User manual:

SPD Component Tester

ProSCT

Raycap reserves the right to introduce changes in performance, dimensions and materials in the course of technical progress. No part of this work, nor of the information laid down herein and or derivable here from and/or developed in connection here with, may be reproduced or used in any form or by any means. Legal action will be taken against infringements. This publication replaces previous editions and is subject to change at any time.

© 2025 Raycap All rights reserved.

Table of Contents

1. SPD Component Tester

Introduction

The ProSCT has been developed to test components commonly used in surge protective devices, such as Gas Discharge Tubes (GDT), Metal Oxide Varistors (MOV) and Transient Voltage Suppressors (TVS) diodes.

It is a portable, battery operated, instrument with integrated battery charger and housed in a robust ergonomic enclosure. The instrument features a 320x240 pixel TFT Color Display with Touch Screen user interface.

2. Symbols

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!

3. Safety

⚠ Warnings - please read before using

The manual shall be read for every symbol ⚠ placed on the instrument in order to find out the sort of hazard!

During measurement, the ProSCT generates high voltages at the output terminals. To prevent possible electrical shock, personal injury, or the possibility of fire, it is important that the following points are carefully observed:

- Use the product only as specified.
- Do not operate the product in the vicinity of explosive gas, vapor or in wet environments.
- Do not use test leads if they are damaged. Examine the test leads for damaged insulation, exposed metal or wear.
- Use only test leads supplied with the product.
- Firstly connect the test leads to the component which is going to be tested and then to the unit.
- When servicing the unit there is risk of electric shock due to generator of 1,5 kVdc. After repair it is necessary to check correct functioning of instrument according to the specification.
- The unit should not be operated with the case open. Exposure to hazardous voltages is possible.
- Keep fingers well removed from test leads or components to which the test leads are attached during measurements.
- Recharge the batteries when the low battery indicator shows to prevent incorrect measurements.
- The unit is charged by external power supply with voltage 12 Vdc ± 1,2 Vdc. Input current is less than 2 A. When batteries are being charged the instrument can not test SPD components.
- Do not operate the product if it is damaged.
- Test leads and test probes with alligator is specified. If used other types of test accessory protection by the equipment may be impaired.
- Do not use non rechargeable batteries. Use only rechargeable battery NiMH, 1.2 V, AA.
- Have only an approved Raycap technician repair the product.
- Use only specified replacement parts.
- Replace batteries with NiMH cells of similar mAh rating for best results.
- Use only the approved DC power unit supplied with the product.
- If the unit is used in a manner not specified by the manufacturer protection provided by unit can be impaired.

The unit provides double insulation between hazardous voltage and accessible parts. The clips of accessories shall not be touched during high voltage test. There is high voltage on the alligator clips when the red diode is illuminating.

Safety instructions

The device must only be put into operation and maintained by qualified electricians who are famil-iar 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. Device is intended only for indoor use.
- 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 en-closures).
- 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 130575000) 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).

4. Unpacking the Instrument

The standard product is supplied with the items listed in Table 1. If the product is damaged or an item is missing, please contact the place of purchase immediately.

Table 1. Standard Accessories:

Description	Part Number
ProSCT in Suitcase	130 576
5 x AA Batteries, NiMH, 1.2V, 2450 mAh	660 000 006
12 VDC power adapter, 100 VAC - 240 VAC, 2000mA	685 000 009
Test lead set with alligator clips	-
LCD touch screen stylus	-
ProSCT Adapter *(optional - page 29)*	130 575

ProSCT in Suitcase

ProSCT Adapter
(optional - page 29)

⚠ 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 informa- tion of the status of the ProSCT battery (Ref: Battery Monitoring Section).

5. Indicators, Connections and Controls

Figure 2: Front view of instrument controls.

Legend:

❶ Run Heartbeat LED (Green)
pulses to indicate instrument is alive

❷ Battery Status LED (Blue)
illuminates when battery is completely flat (<1.12 V/cell) and requires recharging

❸ High Voltage LED (Red)
illuminates when HV is present at the output terminals during a measurement

❹ TFT LCD display with resistive touch panel

❺ ON/OFF button
short press instrument ON > short press instrument OFF. Continuous press forces instrument OFF if in a locked-up state

❻ MEASURE button
to take a measurement

❼ Output terminal connections

⚠ *Warning: High Voltage are present at these terminals (Ref. Safety section)*

Figure 3: Rear view of instrument controls.

Legend:

❶ USB *for factory use and used during firmware update*

❷ DC Power supply input
12 VDC, 2000 mA

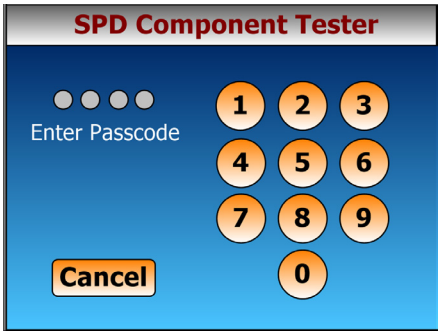
⚠ *Warning: The unit is charged by external power supply (Ref. Safety section)*

❸ Battery compartment - *5 x AA Batteries, NiMH, 1,2 V, 2450 mAh*

⚠ *Warning: Do not use non rechargeable batteries (Ref. Safety section)*

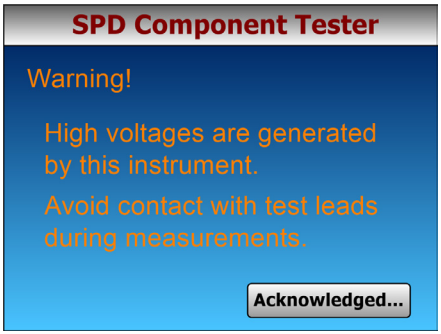
6. User Displays, Menu Structure and Navigation

Passcode Screen



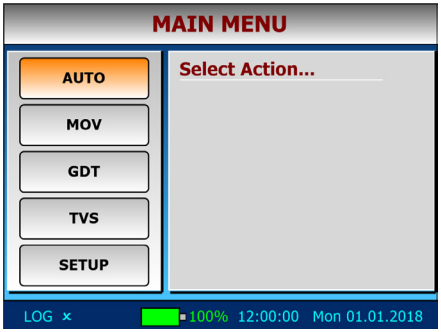
The passcode is used to unlock the instrument to prevent unauthorized use. On first use of the instrument before any User Options have been configured, the *Passcode Screen* is displayed to the user. The default passcode is 1_2_3_4. This code can be changed in the *SETUP/ Device-Setup/Set-Passcode* menu. If the passcode is forgotten, the unit can be restored to its User *Commissioning* state where the passcode will be reset to the default (*Ref. Restoring Factory Defaults section*).

Splash Screen



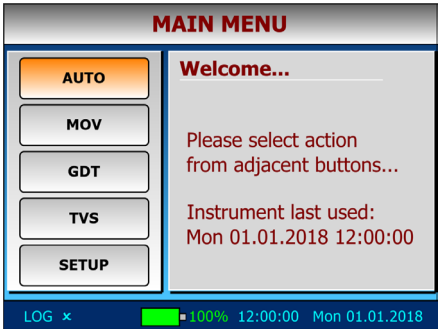
The *Splash Screen* is used to greet the user and provide important safety information. The user is required to read the information and by clicking the *Acknowledged...* button is signifying that the potential hazard is understood and that precautions indicated will be followed (Ref. *Safety* section).

Main Screen



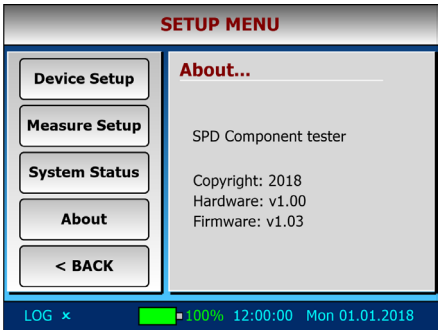
The *Main Screen* comprises four display panels. On the left is the Buttons panel where the user selects various actions by clicking the required button. On the right is the *Output panel*, where results of measurements are displayed. At the top is the *Title panel*, where menu navigation information 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).

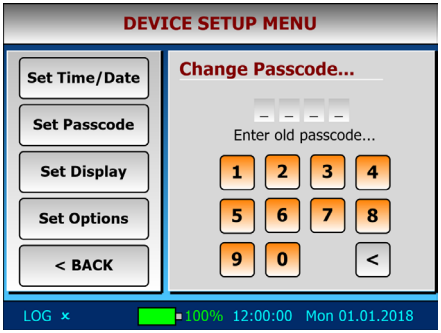
About Screen



The *About Screen* provides information about the ProSCT manufacturing build.

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

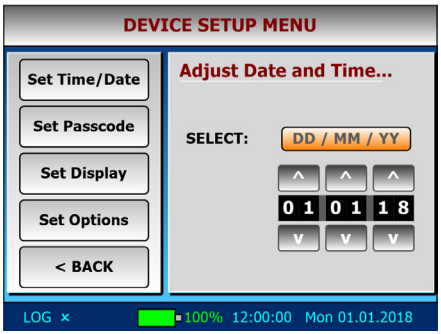
Change Passcode Screen



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

Note: The requirement that a passcode be entered in order to allow access to the instrument can be turned ON or OFF in the SETUP/Device-Setup/ Options menu.

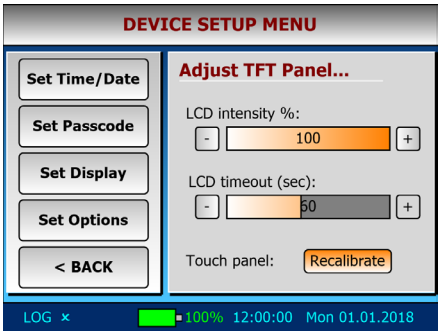
Time/Date Screen



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 ProSCT is powered OFF.

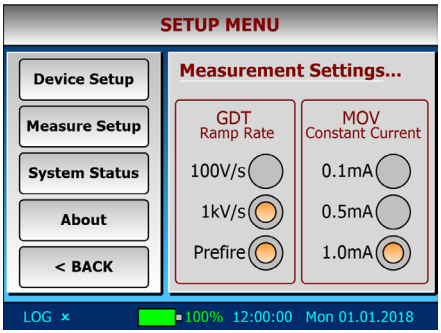
Note: The real time clock uses an internal battery to maintain the time and date settings. The condition of this battery is checked each time the instrument is started, and the user informed if replacement is required (Ref. Replacing RTC battery section).

Display Screen



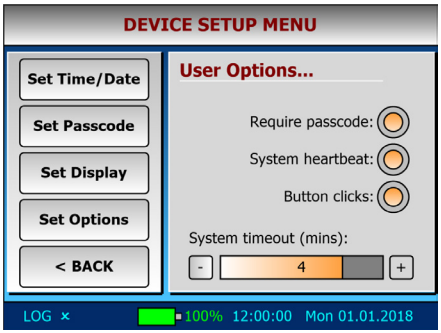
Adjustment of the TFT LCD panel settings is possible in the *Display Screen*. The intensity of the LCD backlight can be set between 0 - 100%. Setting the LCD determines the time after user inactivity when the display turns OFF to conserve battery power. This can be set from 10 - 120 s. Moving the slider 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 preionize 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

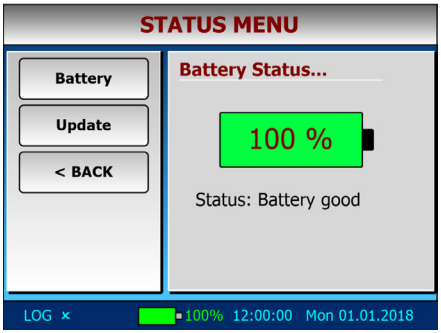


The *Options Screen* is where various user preferences can be configured. These include whether:

- 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 (Ref. Power OFF section).

Battery Screen

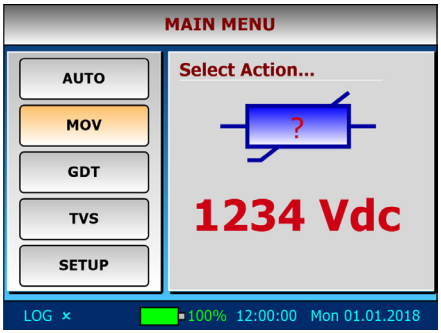


The *Battery Screen* provides information of the status of the ProSCT battery (Ref: Battery Monitoring Section). The battery icon shows either the % remaining, or the of AC ~ symbol if the DC charger is connected.

The battery icon is color-coded to depict the battery condition:

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

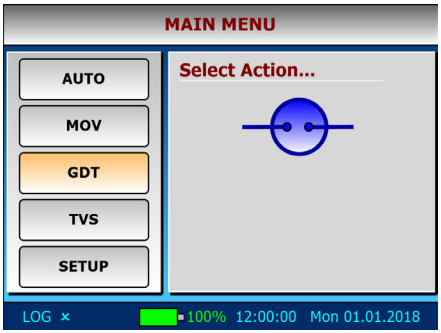
MOV Screen



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 Measure Button on the front of the instrument. The constant current setting used is configured in the Measurement Screen.

Note: If the LOG mode is turned ON, the measurement output is directed to the Log Screen rather.

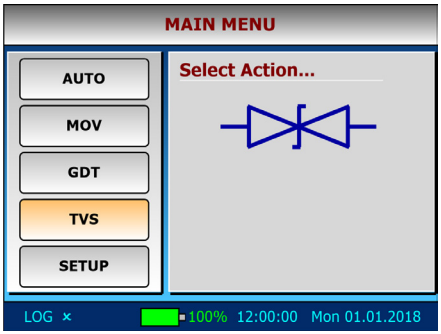
GDT Screen



The *GDT Screen* is where the firing voltage of the GDT under test is displayed. The measurement is performed by pressing the Measure 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.

Note: If the LOG mode is turned ON, the measurement output is directed to the Log Screen rather.

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 *Measure 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 200V in the TVS mode, while in the MOV mode a maximum of 1500 VDC is possible to drive the required constant current.

Note: If the LOG mode is turned ON, the measurement output is directed to the Log Screen rather.

7. Using ProSCT

Power ON

With ProSCT 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 SETUP/Device- Setup/Set-Options menu) and click the Acknowledge... button in the *Splash Screen* signifying that the Warning message has been read (Ref. 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 (Ref. Replacing Clock Battery section).

Power OFF

With ProSCT 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...”.

Note: 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 ProSCT 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 Measure 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:

LCD defaults:
- Backlight intensity - 100%
- Backlight - ON
- Backlight timeout - 60 secs

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

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

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

8. 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 HV ϟ 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 Measurement Setup menus.

Device Setup

From the main menu 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 Menu

Measure Setup

From the main menu navigate to: *SETUP/Measure-Setup*. The Measure Setup 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 Menu (Ref. Measurement Screen).

System Status

From the main menu 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 Menu.

About ProSCT

From the main menu navigate to: *SETUP/About-ProSCT.* Displays information about the ProSCT units including Title, Model, Manufacturer, Copyright, Hardware and Firmware versions, the instruments serial number. Click the < *BACK* button to return to the Main Menu.

Battery Monitoring

The battery voltage is continuously monitored by the tester 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).*
- Red - completely flat (< 1.12 V/cell). The Blue battery LED on the front of the instrument will illuminate.

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

Warning: To avoid false readings, recharge the batteries as soon as the battery icon appears as orange.

9. 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 (*Ref. Measurement Screen section*).

⚠ *Warning: 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.*

⚠ *Warning: During measurement of the protective device, USB port must not be used.*

⚠ *Warning: When testing, do not touch the adapter contacts, the crocodile clips and any live parts that are electrically connected to the crocodile clips. Dangerous voltages are present during testing.*

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 (*Ref. 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 (*Ref. Measurement Screen section*). The current used can be selected from one of 0.1 mA, 0.5 mA, 1.0 mA.

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

Step 3: If desired, enable the Log Measurement mode LOG Mode (*Ref. Log Screen section*). A check √ in the Footer panel indicates this mode has been activated.

Step 4: Press the Measure button on the front panel of the instrument. The RED HV LED ϟ will briefly illuminate to indicate that high voltage is being produced at the output terminal sockets. Please ref to Safety section.

Step 5: The reading will be displayed on the Output panel (*Ref. MOV Screen section*).

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

Step 6: Check the result on the display with the respective table at the end of the manual.
Product is OK → minimum value < measured value < maximum value
Product is not OK → measured value < minimum value or measured value > maximum value.

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 (*Ref. TVS Screen section*).

Note: For more information on measurement of TVS components, the user is referred to: IEC 61643- 321 Components for low-volt- age 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 MOV Button respectively.

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

Note: It is normal to define the DC spark-over voltage of a GDT as Udc @ 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.

Note: 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 (Ref. Log Screen section). A check √ in the Footer panel indicates this mode has been activated.

Step 5: Press the Measure button on the front panel of the instrument. The RED HV LED ϟ will briefly illuminate to indicate that high voltage is being produced at the output terminal sockets. Please ref to Safety section.

Step 6: The reading will be displayed on the Output panel (Ref. GDT Screen section).

Note: 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).

Step 7: Check the result on the display with the respective table at the end of the manual.
Product is OK → minimum value < measured value < maximum value
Product is not OK → measured value < minimum value or measured value > maximum value.

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.

> *Note: 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 ows 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. Note: Set the required constant current for the measurement (Ref. Measurement Screen section) to 1.0 mA.*

Step 3: If desired, enable the Log Measurement mode LOG Mode (Ref. Log Screen section). A check √ in the Footer panel indicates this mode has been activated.

Step 4: Press the Measure button on the front panel of the instrument. The RED HV LED ϟ will briefly illuminate to indicate that high voltage is being produced at the output terminal sockets. Please ref to Safety section.

Step 5: The reading will be displayed on the Output panel (Ref. MOV Screen section).

> *Note: 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.*

Step 6: Check the result on the display with the respective table at the end of the manual.
Product is OK → minimum value < measured value < maximum value
Product is not OK → measured value < minimum value or measured value > maximum value.

Updating the Firmware

The firmware developed for the ProSCT 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 ProSCT 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 (updatexxx.hex) to the instrument. This is a third party software developed by MikroElektronika(1) for this purpose (Ref. Figure 5).

Key: *BL-Mode* > Bootloader mode
PR-Mode > Program mode

To upgrade the firmware please follows these steps:

1. Turn the instrument ON.
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 exitback 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 > ProSCT is in BL-Mode
    - GREEN LED blinking > ProSCT is waiting for PC application to connect
6. Connect ProSCT 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 ProSCT
    - Bootloader firmware in ProSCT 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 „ProSCTxxx.hex"
9. Click the Begin Upload button
    - The progress bar shows the new firmware being loading to ProSCT
10. Once the upload is complete, ProSCT will reboot into its User Configuration Mode
    - BLUE LED > ProSCT is in PR-Mode
11. Disconnect the USB cable.
12. Update is complete and the About Screen should show the new version of firmware installed.

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

Figure 5: Bootloader PC application software used to upload ProSCT firmware updates.

⚠ *Warning: 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 ProSCT 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.*

9. 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 and alligator clips with white spirits alcohol.

Replacing Main Battery

It is recommended that AA NiMH cells with at least 2300 mAh (Ref. General Specifications section of this manual) be used in this instrument. Typically, such batteries can withstand 500 recharge cycles.

⚠ *Warning: Do not use non-rechargeable batteries. Use only rechargeable battery NiMH, 1,2V, AA.*

⚠ *Warning: 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 (refer to Figure 6):

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 CR2032 3V Lithium coin cell battery. In order to replace this battery, the back cover of the ProSCT unit must be removed.

⚠ *Warning: 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 (Ref. Figure 6):

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 ProSCT 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 Measure button on the front panel at the same time the ON/OFF button is pressed (Ref. Restoring Factory Defaults section).
13. Adjust the time and date (*Ref. Time/Date Screen section*).

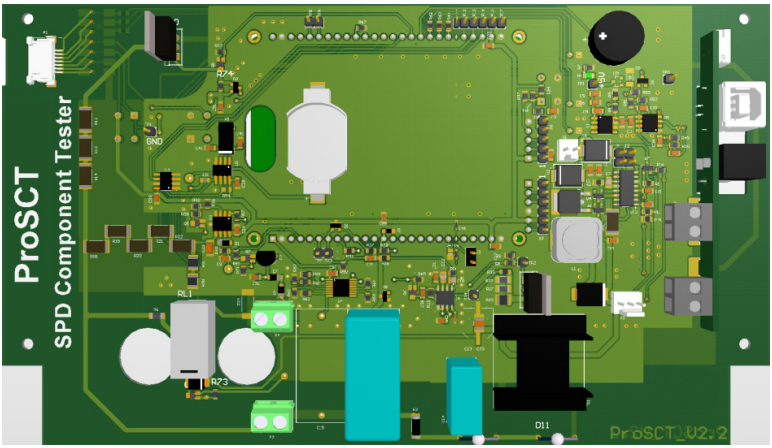


Figure 6: Location of CR2032 real time clock battery

11. 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 VDC
- Display of successive measurements using LOG Mode
- Internal intelligent battery charger
- Remote firmware update capability

Included Accessories

- Test lead set with alligator clips
- 5 x AA Batteries, NiMH, 1.2 V, 2450 mAh
- 12 VDC multi-system power adapter, 100 VAC - 240 VAC, 2000 mA
- LCD touch screen stylus
- ProSCT Adapter *(optional)*

General Specifications

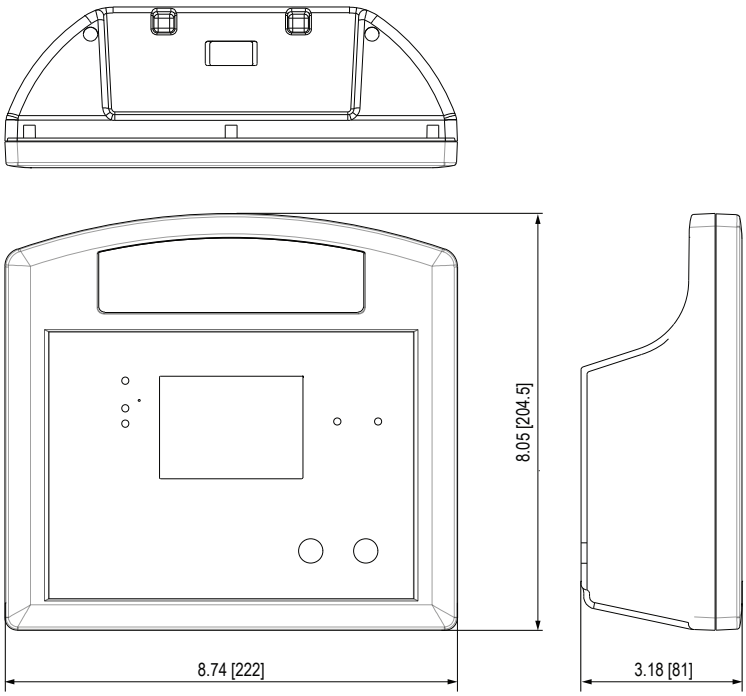
Specification	Characteristics
Battery size, quantity	Type AA, 5 ea.
Battery type	NiMH (supplied)
Battery life (typical)	200 hours idling
Operating Temperature	-10 °C to 50 °C
Storage Temperature	-10 °C to 60 °C indefinitely (to -40 °C for 100 hrs)
Relative Humidity	80 % 10 to 35 °C; 70 % 35 to 40 °C
Operating Altitude	0 to 2000 meters
Vibration	Class 3 per Mil-Prf-28800F
Enclosure Sealing	IP 20
Enclosure Material	ABS (UL 94 HB)
Pollution Degree	2
Size	220 mm (W) x 205 mm (H) x 82 mm (D)
Weight (with batteries)	0.94 kg
Standards	EN 61626-1, IEC 61010-1
Certification	RoHS, CE

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 VDC
MOV Measurement Accuracy*	1.5 % +/- 2 digit counts
GDT Measurement Accuracy*	1kV/s: 3.5 % +/- 2 digit counts 100V/s: 1.6 % +/- 2 digit counts

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

12. Physical Dimensions



13. ProSCT Adapter (optional)

130 575

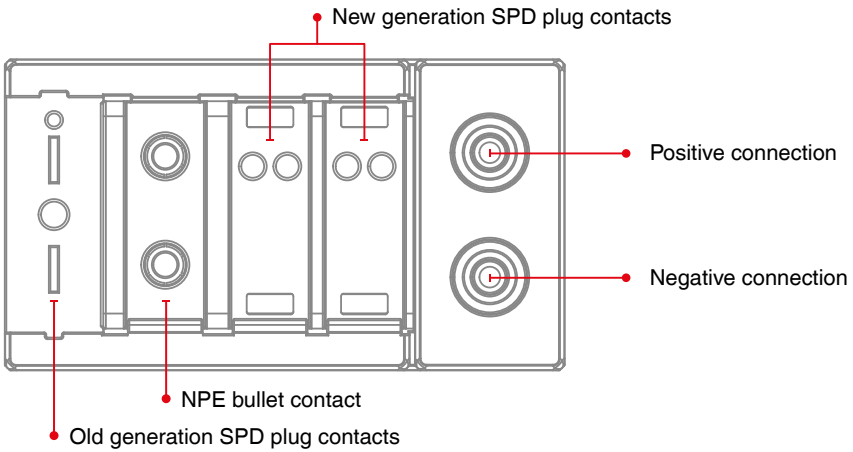
Introduction

The ProSCT SPD adapter is intended as an accessory for the ProSCT (SPD Component Tester) instrument developed by Raycap. It is used to interface a DIN rail base assembly to the ProSCT instrument. The base assembly is designed to accommodate various generations of Raycap SPD modules.

It is connected to the ProSCT instrument via means of cable with banana jack plugs. *(modules not included)*

SPD adapter	130 575
Connections towards SPD tester	Banana jack
Connections towards SPD modules	Old SPD flat contacts, NPE bullet contact, 2 New SPD spring contacts (for 1TE and 2TE modules)
Operating temperatures	-10 °C to +50 °C
Enclosure Dimension (L×W×D)	2.3"×.4.3"×2" [60×108×52 mm]
Weight	.38 lbs [175 g]
Standards	IEC 61010-1
Certification	RoHS, CE

Connecting



The ProSCT SPD adapter has 4 connection sockets for different types of SPD modules. Typical width of SPD modules is 1TE or 2TE (2TE width available only for New SPD spring contacts on the SPD adapter).

Ensure correct polarity on all SPD adapter contacts. Red banana jack plug should be connected to positive pole of the SPD tester and black banana jack should be connected to negative pole of the SPD tester.

Only press the “TEST” button if all 3 slots (NPE bullet contact, 2 x New generation SPD plug contacts) of the test adapter are occupied (1 test object and 2 empty enclosures). Old generation SPD plug contacts could remain empty if not used.

Using SPD adapter

Before an SPD module is insterted into the base adapter, ensure which connection type is on the selected SPD. Select an appropriate connection on the SPD adapter and plug the selected SPD to the appropriate plug on the SPD adapter. First insert all modules or dummy modules to the adapter and then connect the adapter with the provided cables to the testing device before commencing the test.

Only one SPD module should be tested at a time since all plugs are connected in parallel. The test adapter is designed so that the corresponding surge protective module can only be inserted in one direction into the plug connection of the test adapter.

Inserting the test module to the adapter

- Use both hands when inserting the test modules.
- Guide the test module carefully into the intended plug terminals.
- Push the test module into the plug terminals as far as it will go.

Removing the test module from the test adapter

- Wait until the test procedure has been completed before removing the test module.
- Grap the test module and the test adapter simultaneously and remove the test module.

15. AC Type 1+2 SPD

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0007	ProTec T1-75-1+0	1 TE	135	165		
59.0008	ProTec T1-75-1+0-R	1 TE	135	165		
59.0009	ProTec T1-150-1+0	1 TE	297	363		
59.0010	ProTec T1-150-1+0-R	1 TE	297	363		
59.0011	ProTec T1-300-1+0	1 TE	423	517		
59.0012	ProTec T1-300-1+0-R	1 TE	423	517		
59.0013	ProTec T1-350-1+0	1 TE	558	682		
59.0014	ProTec T1-350-1+0-R	1 TE	558	682		
59.0531	ProTec T1-440-1+0	1 TE	637	715		
59.0532	ProTec T1-440-1+0-R	1 TE	637	715		
59.0015	ProTec T1-480-1+0	1 TE	702	858		
59.0016	ProTec T1-480-1+0-R	1 TE	702	858		
59.0017	ProTec T1-750-1+0	1 TE	1215	1485		
59.0018	ProTec T1-750-1+0-R	1 TE	1215	1485		
59.0349	ProTec T1-75-2+0	2 TE	135	165		
59.0350	ProTec T1-75-2+0-R	2 TE	135	165		
59.0019	ProTec T1-150-2+0	2 TE	297	363		
59.0020	ProTec T1-150-2+0-R	2 TE	297	363		
59.0021	ProTec T1-300-2+0	2 TE	423	517		
59.0022	ProTec T1-300-2+0-R	2 TE	423	517		
59.0023	ProTec T1-350-2+0	2 TE	558	682		
59.0024	ProTec T1-350-2+0-R	2 TE	558	682		
59.0533	ProTec T1-440-2+0	2 TE	637	715		
59.0534	ProTec T1-440-2+0-R	2 TE	637	715		
59.0025	ProTec T1-480-2+0	2 TE	702	858		
59.0026	ProTec T1-480-2+0-R	2 TE	702	858		
59.0027	ProTec T1-750-2+0	2 TE	1215	1485		
59.0028	ProTec T1-750-2+0-R	2 TE	1215	1485		
59.0029	ProTec T1-150-3+0	3 TE	297	363		
59.0030	ProTec T1-150-3+0-R	3 TE	297	363		
59.0031	ProTec T1-300-3+0	3 TE	423	517		
59.0032	ProTec T1-300-3+0-R	3 TE	423	517		

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0033	ProTec T1-350-3+0	3 TE	558	682		
59.0034	ProTec T1-350-3+0-R	3 TE	558	682		
59.0535	ProTec T1-440-3+0	3 TE	637	715		
59.0536	ProTec T1-440-3+0-R	3 TE	637	715		
59.0035	ProTec T1-480-3+0	3 TE	702	858		
59.0036	ProTec T1-480-3+0-R	3 TE	702	858		
59.0037	ProTec T1-750-3+0	3 TE	1215	1485		
59.0038	ProTec T1-750-3+0-R	3 TE	1215	1485		
59.0039	ProTec T1-150-4+0	4 TE	297	363		
59.0040	ProTec T1-150-4+0-R	4 TE	297	363		
59.0041	ProTec T1-300-4+0	4 TE	423	517		
59.0042	ProTec T1-300-4+0-R	4 TE	423	517		
59.0351	ProTec T1-350-4+0	4 TE	558	682		
59.0352	ProTec T1-350-4+0-R	4 TE	558	682		
59.0537	ProTec T1-440-3+0	4 TE	637	715		
59.0538	ProTec T1-440-3+0-R	4 TE	637	715		
59.0043	ProTec T1-480-4+0	4 TE	702	858		
59.0044	ProTec T1-480-4+0-R	4 TE	702	858		
59.0047	ProTec T1-75-1+1	2 TE	135	165	500	950
59.0048	ProTec T1-75-1+1-R	2 TE	135	165	500	950
59.0049	ProTec T1-150-1+1	2 TE	297	363	500	950
59.0050	ProTec T1-150-1+1-R	2 TE	297	363	500	950
59.0051	ProTec T1-300-1+1	2 TE	423	517	500	950
59.0052	ProTec T1-300-1+1-R	2 TE	423	517	500	950
59.0053	ProTec T1-350-1+1	2 TE	558	682	500	950
59.0054	ProTec T1-350-1+1-R	2 TE	558	682	500	950
59.0059	ProTec T1-300-3+1	4 TE	423	517	500	950
59.0060	ProTec T1-300-3+1-R	4 TE	423	517	500	950
59.0061	ProTec T1-350-3+1	4 TE	558	682	500	950
59.0062	ProTec T1-350-3+1-R	4 TE	558	682	500	950
59.0001	ProTec T1-75-P	1 TE plug	135	165		
59.0002	ProTec T1-150-P	1 TE plug	297	363		

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0003	ProTec T1-300-P	1 TE plug	423	517		
59.0004	ProTec T1-350-P	1 TE plug	558	682		
59.0539	ProTec T1-440-P	1 TE plug	637	715		
59.0005	ProTec T1-480-P	1 TE plug	702	858		
59.0006	ProTec T1-750-P	1 TE plug	1215	1485		
59.0269	ProTube T1-50-P	1 TE plug			500	950
59.0271	ProTube T1-100-P	1 TE plug			500	950
59.0276	ProTube T1-50-0+1	1 TE			500	950
59.0278	ProTube T1-100-0+1	1TE			500	950
59.A594	ProTec T1HS-300-1+0	2 TE			605	1000
59.A595	ProTec T1HS-300-1+0-R	2 TE			605	1000
59.0304	ProTec T1HS-300-3+0	6 TE			605	1000
59.0305	ProTec T1HS-300-3+0-R	6 TE			605	1000
59.0306	ProTec T1HS-300-3+1	8 TE			605 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.0307	ProTec T1HS-300-3+1-R	8 TE			605 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.0260	ProTec T1HS-300-4+0	8 TE			605	1000
59.0261	ProTec T1HS-300-4+0-R	8 TE			605	1000
59.A596	ProTube T1HS-100-0+1	2 TE			500	950
59.A597	ProTube T1HS-100-0+1-R	2 TE			500	950
59.0302	ProTec T1HS-300-P	1 TE plug			605	1000
59.0303	ProTube T1HS-100-P	1 TE plug			500	950
59.0310	ProTec T1H-300-1+0	1 TE			605	1000
59.0311	ProTec T1H-300-1+0-R	1 TE			605	1000
59.0312	ProTec T1H-300-2+0	2 TE			605	1000
59.0313	ProTec T1H-300-2+0-R	2 TE			605	1000
59.0314	ProTec T1H-300-3+0	3 TE			605	1000
59.0315	ProTec T1H-300-3+0-R	3 TE			605	1000
59.0316	ProTec T1H-300-4+0	4 TE			605	1000
59.0317	ProTec T1H-300-4+0-R	4 TE			605	1000
59.0318	ProTec T1H-300-1+1	2 TE			605 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0319	ProTec T1H-300-1+1-R	2 TE			605 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.0320	ProTec T1H-300-3+1	4 TE			605 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.0321	ProTec T1H-300-3+1-R	4 TE			605 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.0340	ProTube T1H-50-0+1	1 TE			500	950
59.0308	ProTec T1H-300-P	1 TE plug			605	1000
59.0309	ProTube T1H-50-P	1 TE plug			500	950
59.0738	ProTec T1S-275-1+0	1 TE			600	1000
59.0739	ProTec T1S-275-1+0-R	1 TE			600	1000
59.0740	ProTec T1S-275-2+0	2 TE			600	1000
59.0741	ProTec T1S-275-2+0-R	2 TE			600	1000
59.0742	ProTec T1S-275-3+0	3 TE			600	1000
59.0743	ProTec T1S-275-3+0-R	3 TE			600	1000
59.0744	ProTec T1S-275-4+0	4 TE			600	1000
59.0745	ProTec T1S-275-4+0-R	4 TE			600	1000
59.0746	ProTec T1S-275-1+1	2 TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.0747	ProTec T1S-275-1+1-R	2 TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.0748	ProTec T1S-275-3+1	4 TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.0749	ProTec T1S-275-3+1-R	4 TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.0382	ProTec T1S-275-3+1-N	4 TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.0383	ProTec T1S-275-3+1-N-R	4 TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.0384	ProTec T1S-275-P	1 TE plug			600	1000
59.0385	ProTec T1S-275-N-P	1 TE plug			600	1000
59.0386	ProTube T1S-100-P	1 TE plug			500	950
59.A371	ProTec T1-300-1+0-LH	1 TE	423	517		
59.A372	ProTec T1-300-1+0-LH-R	1 TE	423	517		

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.A373	ProTec T1-300-2+0-LH	2 TE	423	517		
59.A374	ProTec T1-300-2+0-LH-R	2 TE	423	517		
59.A375	ProTec T1-300-3+0-LH	3 TE	423	517		
59.A376	ProTec T1-300-3+0-LH-R	3 TE	423	517		
59.A377	ProTec T1-300-4+0-LH	4 TE	423	517		
59.A378	ProTec T1-300-4+0-LH-R	4 TE	423	517		
59.A379	ProTec T1-300-1+1- LH	2 TE	423	517	500	950
59.A380	ProTec T1-300-1+1-LH-R	2 TE	423	517	500	950
59.A381	ProTec T1-300-3+1-LH	4 TE	423	517	500	950
59.A382	ProTec T1-300-3+1-LH-R	4 TE	423	517	500	950
59.A384	ProTube T1-50-0+1-LH	1 TE			500	950
59.A383	ProTec T1-300-LH-P	1 TE plug	423	517		
59.A385	ProTube T1-50-LH-P	1 TE plug			500	950
59.A530	ProTec T1S-35-275-1+0	2 TE			600	1000
59.A531	ProTec T1S-35-275-1+0-R	2 TE			600	1000
59.A532	ProTec T1S-35-275-P	2 TE plug			600	1000
59.A533	ProTec T1S-50-275-1+0	2 TE			600	1000
59.A534	ProTec T1S-50-275-1+0-R	2 TE			600	1000
59.A535	ProTec T1S-50-275-P	2 TE plug			600	1000
59.A500	ProTec T1SF-275-1+0	2 TE			600	1000
59.A501	ProTec T1SF-275-1+0-R	2 TE			600	1000
59.C245	ProTec T1SF-275-2+0	4 TE			600 (L-PE) / 500 (N-PE)	1000 (L-PE) / 950 (N-PE)
59.C246	ProTec T1SF-275-2+0-R	4 TE			600 (L-PE) / 500 (N-PE)	1000 (L-PE) / 950 (N-PE)
59.C170	ProTec T1SF-275-3+0	6TE			600	1000
59.C171	ProTec T1SF-275-3+0-R	6TE			600	1000
59.C172	ProTec T1SF-275-3+1	8TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.C173	ProTec T1SF-275-3+1-R	8TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 950 (N-PE)
59.C247	ProTec T1SF-275-4+0	8TE			600 (L-PE) / 500 (N-PE)	1000 (L-PE) / 950 (N-PE)

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.C248	ProTec T1SF-275-4+0-R	8TE			600 (L-PE) / 500 (N-PE)	1000 (L-PE) / 950 (N-PE)
59.C234	ProTube T1SF-100-0+1	2 TE			500	950
59.C235	ProTube T1SF-100-0+1-R	2 TE			500	950
59.A502	ProTec T1SF-275-P	2 TE plug			600	1000
59.C174	ProTec T1SF-275-P	2 TE plug			600	1000
59.C674	ProTube T1SF-25-P	2 TE plug			500	950
59.C175	ProTube T1SF-100-P	2 TE plug			500	950
515 961	ProTec 60 T1H-300-3+0	2 TE			605	1000
515 962	ProTec 60 T1H-300-3+0-R	2 TE			605	1000
515 963	ProTec 60 T1H-300-3+1	2 TE			605	1000
515 964	ProTec 60 T1H-300-3+1-R	2 TE			605	1000
515 943	ProTec 60 T1-300-3+0	2 TE	423	517		
515 944	ProTec 60 T1-300-3+0-R	2 TE	423	517		
515 949	ProTec 60 T1-300-3+1	2 TE	423	517		
515 950	ProTec 60 T1-300-3+1-R	2 TE	423	517		
59.C384	ProTec T1H-300-P	1 TE plug			605	1000
59.C345	ProTec T1-300-P	1 TE plug	423	517		
59.A546	ProTec T1-S-950-4Y	4TE	637 (L-C*) / 819 (C*-PE)	715 (L-C*) / 1001 (C*-PE)		
59.A547	ProTec T1-S-950-4Y-R	4TE	637 (L-C*) / 819 (C*-PE)	715 (L-C*) / 1001 (C*-PE)		
59.A548	ProTec T1-S-440-P	1 TE plug	637	715		
59.A573	ProTec T1-S-550-P	1 TE plug	819	1001		
59.0668	ProTec T1-300-1+0-E	1 TE	423	517		
59.0669	ProTec T1-300-1+0-E-R	1 TE	423	517		
59.0670	ProTec T1-300-2+0-E	2 TE	423	517		
59.0671	ProTec T1-300-2+0-E-R	2 TE	423	517		
59.0672	ProTec T1-300-3+0-E	3 TE	423	517		
59.0673	ProTec T1-300-3+0-E-R	3 TE	423	517		
59.0674	ProTec T1-300-4+0-E	4TE	423	517		
59.0675	ProTec T1-300-4+0-E-R	4TE	423	517		
59.A589	ProTec T1-300-1+1-E	2 TE	423	517	500	950

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.A590	ProTec T1-300-1+1-E-R	2 TE	423	517	500	950
59.A591	ProTec T1-300-3+1-E	4TE	423	517	500	950
59.A592	ProTec T1-300-3+1-E-R	4TE	423	517	500	950
59.0676	ProTec T1-300-E-P	1 TE plug	423	517		
59.A593	ProTube T1-30-E-P	1 TE plug			500	950

** Common terminal*

16. AC Type 2 SPD

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0069	ProTec T2-75-1+0	1 TE	135	165		
59.0070	ProTec T2-75-1+0-R	1 TE	135	165		
59.0071	ProTec T2-150-1+0	1 TE	297	363		
59.0072	ProTec T2-150-1+0-R	1 TE	297	363		
59.0073	ProTec T2-300-1+0	1 TE	423	517		
59.0074	ProTec T2-300-1+0-R	1 TE	423	517		
59.0075	ProTec T2-350-1+0	1 TE	558	682		
59.0076	ProTec T2-350-1+0-R	1 TE	558	682		
59.0545	ProTec T2-440-1+0	1 TE	637	715		
59.0546	ProTec T2-440-1+0-R	1 TE	637	715		
59.0077	ProTec T2-480-1+0	1 TE	702	858		
59.0078	ProTec T2-480-1+0-R	1 TE	702	858		
59.0677	ProTec T2-550-1+0	1 TE	819	1001		
59.0678	ProTec T2-550-1+0-R	1 TE	819	1001		
59.0079	ProTec T2-750-1+0	1 TE	1215	1485		
59.0080	ProTec T2-750-1+0-R	1 TE	1215	1485		
59.0343	ProTec T2-75-2+0	2 TE	135	165		
59.0344	ProTec T2-75-2+0-R	2 TE	135	165		
59.0081	ProTec T2-150-2+0	2 TE	297	363		
59.0082	ProTec T2-150-2+0-R	2 TE	397	363		
59.0083	ProTec T2-300-2+0	2 TE	423	517		
59.0084	ProTec T2-300-2+0-R	2 TE	423	517		
59.0085	ProTec T2-350-2+0	2 TE	558	682		
59.0086	ProTec T2-350-2+0-R	2 TE	558	682		
59.0548	ProTec T2-440-2+0	2 TE	637	715		
59.0549	ProTec T2-440-2+0-R	2 TE	637	715		
59.0087	ProTec T2-480-2+0	2 TE	702	858		
59.0088	ProTec T2-480-2+0-R	2 TE	702	858		
59.0679	ProTec T2-550-2+0	2 TE	819	1001		
59.0680	ProTec T2-550-2+0-R	2 TE	819	1001		
59.0089	ProTec T2-750-2+0	2 TE	1215	1485		
59.0090	ProTec T2-750-2+0-R	2 TE	1215	1485		

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0091	ProTec T2-150-3+0	3 TE	297	363		
59.0092	ProTec T2-150-3+0-R	3 TE	297	363		
59.0093	ProTec T2-300-3+0	3 TE	423	517		
59.0094	ProTec T2-300-3+0-R	3 TE	423	517		
59.0095	ProTec T2-350-3+0	3 TE	558	682		
59.0096	ProTec T2-350-3+0-R	3 TE	558	682		
59.0550	ProTec T2-440-3+0	3 TE	637	715		
59.0551	ProTec T2-440-3+0-R	3 TE	637	715		
59.0097	ProTec T2-480-3+0	3 TE	702	858		
59.0098	ProTec T2-480-3+0-R	3 TE	702	858		
59.0681	ProTec T2-550-3+0	3 TE	819	1001		
59.0682	ProTec T2-550-3+0-R	3 TE	819	1001		
59.0099	ProTec T2-750-3+0	3 TE	1215	1485		
59.0100	ProTec T2-750-3+0-R	3 TE	1215	1485		
59.0101	ProTec T2-150-4+0	4 TE	297	363		
59.0102	ProTec T2-150-4+0-R	4 TE	297	363		
59.0103	ProTec T2-300-4+0	4 TE	423	517		
59.0104	ProTec T2-300-4+0-R	4 TE	423	517		
59.0550	ProTec T2-440-4+0	4 TE	637	715		
59.0551	ProTec T2-440-4+0-R	4 TE	637	715		
59.0105	ProTec T2-480-4+0	4 TE	702	858		
59.0106	ProTec T2-480-4+0-R	4 TE	702	858		
59.0683	ProTec T2-550-4+0	4 TE	819	1001		
59.0684	ProTec T2-550-4+0-R	4 TE	819	1001		
59.0109	ProTec T2-75-1+1	2 TE	135	165	500	900
59.0110	ProTec T2-75-1+1-R	2 TE	135	165	500	900
59.0111	ProTec T2-150-1+1	2 TE	297	363	500	900
59.0112	ProTec T2-150-1+1-R	2 TE	297	363	500	900
59.0113	ProTec T2-300-1+1	2 TE	423	517	500	900
59.0114	ProTec T2-300-1+1-R	2 TE	423	517	500	900
59.0115	ProTec T2-350-1+1	2 TE	558	682	500	900
59.0116	ProTec T2-350-1+1-R	2 TE	558	682	500	900

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0121	ProTec T2-300-3+1	4 TE	423	517	500	900
59.0122	ProTec T2-300-3+1-R	4 TE	423	517	500	900
59.0123	ProTec T2-350-3+1	4 TE	558	682	500	900
59.0124	ProTec T2-350-3+1-R	4 TE	558	682	500	900
59.0280	ProTube T2-40-0+1	1 TE			500	900
59.0336	ProTube T2-40-0+1-R	1 TE			500	900
59.0063	ProTec T2-75-P	1 TE plug	135	165		
59.0064	ProTec T2-150-P	1 TE plug	297	363		
59.0065	ProTec T2-300-P	1 TE plug	423	517		
59.0066	ProTec T2-350-P	1 TE plug	558	682		
59.0547	ProTec T2-440-P	1 TE plug	637	715		
59.0067	ProTec T2-480-P	1 TE plug	702	858		
59.0685	ProTec T2-550-P	1 TE plug	819	1001		
59.0068	ProTec T2-750-P	1 TE plug	1215	1485		
59.0273	ProTube T2-40-P	1 TE plug			500	900
59.0132	SafeTec T2-75-1+0	1 TE	135	165		
59.0133	SafeTec T2-75-1+0-R	1 TE	135	165		
59.0134	SafeTec T2-150-1+0	1 TE	297	363		
59.0135	SafeTec T2-150-1+0-R	1 TE	297	363		
59.0136	SafeTec T2-300-1+0	1 TE	423	517		
59.0137	SafeTec T2-300-1+0-R	1 TE	423	517		
59.0138	SafeTec T2-350-1+0	1 TE	558	682		
59.0139	SafeTec T2-350-1+0-R	1 TE	558	682		
59.0140	SafeTec T2-480-1+0	1 TE	702	858		
59.0141	SafeTec T2-480-1+0-R	1 TE	702	858		
59.0142	SafeTec T2-550-1+0	1 TE	819	1001		
59.0143	SafeTec T2-550-1+0-R	1 TE	819	1001		
59.0144	SafeTec T2-750-1+0	1 TE	1215	1485		
59.0145	SafeTec T2-750-1+0-R	1 TE	1215	1485		
59.0345	SafeTec T2-75-2+0	2 TE	135	165		
59.0346	SafeTec T2-75-2+0-R	2 TE	135	165		
59.0148	SafeTec T2-150-2+0	2 TE	297	363		

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0149	SafeTec T2-150-2+0-R	2 TE	297	363		
59.0150	SafeTec T2-300-2+0	2 TE	423	517		
59.0151	SafeTec T2-300-2+0-R	2 TE	423	517		
59.0152	SafeTec T2-350-2+0	2 TE	558	682		
59.0153	SafeTec T2-350-2+0-R	2 TE	558	682		
59.0154	SafeTec T2-480-2+0	2 TE	702	858		
59.0155	SafeTec T2-480-2+0-R	2 TE	702	858		
59.0156	SafeTec T2-550-2+0	2 TE	819	1001		
59.0157	SafeTec T2-550-2+0-R	2 TE	819	1001		
59.0158	SafeTec T2-750-2+0	2 TE	1215	1485		
59.0159	SafeTec T2-750-2+0-R	2 TE	1215	1485		
59.0162	SafeTec T2-150-3+0	3 TE	297	363		
59.0163	SafeTec T2-150-3+0-R	3 TE	297	363		
59.0164	SafeTec T2-300-3+0	3 TE	423	517		
59.0165	SafeTec T2-300-3+0-R	3 TE	423	517		
59.0166	SafeTec T2-350-3+0	3 TE	558	682		
59.0167	SafeTec T2-350-3+0-R	3 TE	558	682		
59.0168	SafeTec T2-480-3+0	3 TE	702	858		
59.0169	SafeTec T2-480-3+0-R	3 TE	702	858		
59.0170	SafeTec T2-550-3+0	3 TE	819	1001		
59.0171	SafeTec T2-550-3+0-R	3 TE	819	1001		
59.0172	SafeTec T2-750-3+0	3 TE	1215	1485		
59.0173	SafeTec T2-750-3+0-R	3 TE	1215	1485		
59.0176	SafeTec T2-150-4+0	4 TE	297	363		
59.0177	SafeTec T2-150-4+0-R	4 TE	297	363		
59.0178	SafeTec T2-300-4+0	4 TE	423	517		
59.0179	SafeTec T2-300-4+0-R	4 TE	423	517		
59.0180	SafeTec T2-350-4+0	4 TE	558	682		
59.0181	SafeTec T2-350-4+0-R	4 TE	558	682		
59.0182	SafeTec T2-480-4+0	4 TE	702	858		
59.0183	SafeTec T2-480-4+0-R	4 TE	702	858		
59.0184	SafeTec T2-550-4+0	4 TE	819	1001		

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0185	SafeTec T2-550-4+0-R	4 TE	819	1001		
59.0186	SafeTec T2-75-1+1	2 TE	135	165	500	900
59.0187	SafeTec T2-75-1+1-R	2 TE	135	165	500	900
59.0188	SafeTec T2-150-1+1	2 TE	297	363	500	900
59.0189	SafeTec T2-150-1+1-R	2 TE	297	363	500	900
59.0190	SafeTec T2-300-1+1	2 TE	423	517	500	900
59.0191	SafeTec T2-300-1+1-R	2 TE	423	517	500	900
59.0192	SafeTec T2-350-1+1	2 TE	558	682	500	900
59.0193	SafeTec T2-350-1+1-R	2 TE	558	682	500	900
59.0198	SafeTec T2-300-3+1	4 TE	423	517	500	900
59.0199	SafeTec T2-300-3+1-R	4 TE	423	517	500	900
59.0200	SafeTec T2-350-3+1	4 TE	558	682	500	900
59.0201	SafeTec T2-350-3+1-R	4 TE	558	682	500	900
59.0281	SafeTube T2-40-0+1				500	900
59.0337	SafeTube T2-40-0+1-R				500	900
59.0125	SafeTec T2-75-P	1 TE plug	135	165		
59.0126	SafeTec T2-150-P	1 TE plug	297	363		
59.0127	SafeTec T2-300-P	1 TE plug	423	517		
59.0128	SafeTec T2-350-P	1 TE plug	558	682		
59.0129	SafeTec T2-480-P	1 TE plug	702	858		
59.0130	SafeTec T2-750-P	1 TE plug	1215	1485		
59.0274	SafeTube T2-40-P				500	900
59.0208	ProTec T2-ADV-75-1+0	1 TE	135	165		
59.0209	ProTec T2-ADV-75-1+0-R	1 TE	135	165		
59.0210	ProTec T2-ADV-150-1+0	1 TE	297	363		
59.0211	ProTec T2-ADV-150-1+0-R	1 TE	297	363		
59.0212	ProTec T2-ADV-300-1+0	1 TE	423	517		
59.0213	ProTec T2-ADV-300-1+0-R	1 TE	423	517		
59.0214	ProTec T2-ADV-350-1+0	1 TE	558	682		
59.0215	ProTec T2-ADV-350-1+0-R	1 TE	558	682		
59.0216	ProTec T2-ADV-480-1+0	1 TE	702	858		
59.0217	ProTec T2-ADV-480-1+0-R	1 TE	702	858		

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0347	ProTec T2-ADV-75-2+0	2 TE	135	165		
59.0348	ProTec T2-ADV-75-2+0-R	2 TE	135	165		
59.0220	ProTec T2-ADV-150-2+0	2 TE	297	363		
59.0221	ProTec T2-ADV-150-2+0-R	2 TE	297	363		
59.0222	ProTec T2-ADV-300-2+0	2 TE	423	517		
59.0223	ProTec T2-ADV-300-2+0-R	2 TE	423	517		
59.0224	ProTec T2-ADV-350-2+0	2 TE	558	682		
59.0225	ProTec T2-ADV-350-2+0-R	2 TE	558	682		
59.0226	ProTec T2-ADV-480-2+0	2 TE	702	858		
59.0227	ProTec T2-ADV-480-2+0-R	2 TE	702	858		
59.0228	ProTec T2-ADV-150-3+0	3 TE	297	363		
59.0229	ProTec T2-ADV-150-3+0-R	3 TE	297	363		
59.0230	ProTec T2-ADV-300-3+0	3 TE	423	517		
59.0231	ProTec T2-ADV-300-3+0-R	3 TE	423	517		
59.0232	ProTec T2-ADV-350-3+0	3 TE	558	682		
59.0233	ProTec T2-ADV-350-3+0-R	3 TE	558	682		
59.0234	ProTec T2-ADV-480-3+0	3 TE	702	858		
59.0235	ProTec T2-ADV-480-3+0-R	3 TE	702	858		
59.0236	ProTec T2-ADV-150-4+0	4 TE	297	363		
59.0237	ProTec T2-ADV-150-4+0-R	4 TE	297	363		
59.0238	ProTec T2-ADV-300-4+0	4 TE	423	517		
59.0239	ProTec T2-ADV-300-4+0-R	4 TE	423	517		
59.0240	ProTec T2-ADV-350-4+0	4 TE	558	682		
59.0241	ProTec T2-ADV-350-4+0-R	4 TE	558	682		
59.0242	ProTec T2-ADV-480-4+0	4 TE	702	858		
59.0243	ProTec T2-ADV-480-4+0-R	4 TE	702	858		
59.0244	ProTec T2-ADV-75-1+1	2 TE	135	165	500	900
59.0245	ProTec T2-ADV-75-1+1-R	2 TE	135	165	500	900
59.0246	ProTec T2-ADV-150-1+1	2 TE	297	363	500	900
59.0247	ProTec T2-ADV-150-1+1-R	2 TE	297	363	500	900
59.0248	ProTec T2-ADV-300-1+1	2 TE	423	517	500	900
59.0249	ProTec T2-ADV-300-1+1-R	2 TE	423	517	500	900

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0250	ProTec T2-ADV-480-1+1	2 TE	702	858	500	900
59.0251	ProTec T2-ADV-480-1+1-R	2 TE	702	858	500	900
59.0256	ProTec T2-ADV-300-3+1	4 TE	423	517	500	900
59.0257	ProTec T2-ADV-300-3+1-R	4 TE	423	517	500	900
59.0258	ProTec T2-ADV-350-3+1	4 TE	558	682	500	900
59.0259	ProTec T2-ADV-350-3+1-R	4 TE	558	682	500	900
59.0202	ProTec T2-ADV-75-P	1 TE plug	135	165		
59.0203	ProTec T2-ADV-150-P	1 TE plug	297	363		
59.0204	ProTec T2-ADV-300-P	1 TE plug	423	517		
59.0205	ProTec T2-ADV-350-P	1 TE plug	558	682		
59.0206	ProTec T2-ADV-480-P	1 TE plug	702	858		
59.0275	ProTube T2-ADV-40-P	1 TE plug			500	900
59.0324	ProTec T2H-300-1+0	1 TE			600	1000
59.0325	ProTec T2H-300-1+0-R	1 TE			600	1000
59.0326	ProTec T2H-300-2+0	2 TE			600	1000
59.0327	ProTec T2H-300-2+0-R	2 TE			600	1000
59.0328	ProTec T2H-300-3+0	3 TE			600	1000
59.0329	ProTec T2H-300-3+0-R	3 TE			600	1000
59.0330	ProTec T2H-300-4+0	4 TE			600	1000
59.0331	ProTec T2H-300-4+0-R	4 TE			600	1000
59.0332	ProTec T2H-300-1+1	2 TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 900 (N-PE)
59.0333	ProTec T2H-300-1+1-R	2 TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 900 (N-PE)
59.0334	ProTec T2H-300-3+1	4 TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 900 (N-PE)
59.0335	ProTec T2H-300-3+1-R	4 TE			600 (L-N) / 500 (N-PE)	1000 (L-N) / 900 (N-PE)
59.0341	ProTube T2H-40-0+1	1 TE			500	900
59.0342	ProTube T2H-40-0+1-R	1 TE			500	900
59.0322	ProTec T2H-300-P	1 TE plug			600	1000
59.0323	ProTube T2H-40-P	1 TE plug			500	900
59.A250	ProTec T2F-300-1+0	1 TE	423	490		

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.A251	ProTec T2F-300-1+0-R	1 TE	423	490		
59.A252	ProTec T2F-300-2+0	2 TE	423	490		
59.A253	ProTec T2F-300-2+0-R	2 TE	423	490		
59.A254	ProTec T2F-300-3+0	3 TE	423	490		
59.A255	ProTec T2F-300-3+0-R	3 TE	423	490		
59.A256	ProTec T2F-300-4+0	4 TE	423	490		
59.A257	ProTec T2F-300-4+0-R	4 TE	423	490		
59.A259	ProTec T2F-300-1+1	2 TE	423	490	500	900
59.A260	ProTec T2F-300-1+1-R	2 TE	423	490	500	900
59.A261	ProTec T2F-300-3+1	4 TE	423	490	500	900
59.A262	ProTec T2F-300-3+1-R	4 TE	423	490	500	900
59.A942	ProTec T2F-440-1+0	1 TE	660	750		
59.A943	ProTec T2F-440-1+0-R	1 TE	660	750		
59.A944	ProTec T2F-440-2+0	2 TE	660	750		
59.A945	ProTec T2F-440-2+0-R	2 TE	660	750		
59.A946	ProTec T2F-440-3+0	3 TE	660	750		
59.A947	ProTec T2F-440-3+0-R	3 TE	660	750		
59.A948	ProTec T2F-440-4+0	4 TE	660	750		
59.A949	ProTec T2F-440-4+0-R	4 TE	660	750		
59.A950	ProTec T2F-440-P	1 TE plug	660	750		
59.A258	ProTec T2F-300-P	1 TE plug	423	490		
59.A271	ProTube T2F-40-P	1 TE plug			500	900
515 945	ProTec 60 T2F-300-3+0	2 TE	423	490		
515 946	ProTec 60 T2F-300-3+0-R	2 TE	423	490		
515 951	ProTec 60 T2F-300-3+1	2 TE	423	490		
515 952	ProTec 60 T2F-300-3+1-R	2 TE	423	490		
515 933	ProTec 60 T2-300-3+0	2 TE	423	517		
515 942	ProTec 60 T2-300-3+0-R	2 TE	423	517		
515 947	ProTec 60 T2-300-3+1	2 TE	423	517		
515 948	ProTec 60 T2-300-3+1-R	2 TE	423	517		
59.C347	ProTec T2F-300-P	1 TE plug	423	490		
59.C346	ProTec T2-300-P	1 TE plug	423	517		

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.A582	ProTec T2-S-950-4Y	4 TE	819 (L-C*) / 643 (C*-PE)	1001 (L-C*) / 787 (C*-PE)		
59.A583	ProTec T2-S-950-4Y-R	4 TE	819 (L-C*) / 643 (C*-PE)	1001 (L-C*) / 787 (C*-PE)		
59.A584	ProTec T2-S-550-P	1 TE plug	819	1001		
59.A585	ProTec T2-S-400-P	1 TE plug	643	787		

** Common terminal*

16. PV Type 1+2 & 2 SPDs

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.0285	ProTec T1-1100PV-3+0	3 TE	675	825		
59.0286	ProTec T1-1100PV-3+0-R	3 TE	675	825		
59.0283	ProTec T1-550PV-P	1 TE plug	675	825		
59.0284	ProTec T1-550PV-M-P	1 TE plug	675	825		
59.0289	ProTec T1-1500PV-3+0	3 TE	825	1100		
59.0290	ProTec T1-1500PV-3+0-R	3 TE	825	1100		
59.0287	ProTec T1-750PV-P	1 TE plug	825	1100		
59.0288	ProTec T1-750PV-M-P	1 TE plug	825	1100		
59.0916	ProTec T1-1500PV-3+0-S-R	3 TE	819	1001		
59.0917	ProTec T1-1500PV-3+0-S	3 TE	819	1001		
59.0918	ProTec T1-750PV-S-M-P (side plug)	1 TE plug	819	1001		
59.0919	ProTec T1-750PV-S-P (middle plug)	1 TE plug	819	1001		
59.A574	ProTec T1-600PV-3+0	3 TE	423	517		
59.A575	ProTec T1-600PV-3+0-R	3 TE	423	517		
59.B253	ProTec T1-600PV-3+0-US	3 TE	423	517		
59.B254	ProTec T1-600PV-3+0-US-R	3 TE	423	517		
59.A576	ProTec T1-300PV-P	1 TE plug	423	517		
59.A577	ProTec T1-300PV-M-P	1 TE plug	423	517		
59.A444	ProTec T1-1100PV-5Y-00	5 TE	643	787		
59.A445	ProTec T1-1100PV-5Y-00-R	5 TE	643	787		
59.A446	ProTec T1-550PV-00-P (ground plug)	1 TE plug	643	787		
59.A447	ProTec T1-550PV-M-00-P (side plugs)	1 TE plug	643	787		
59.A466	ProTec T1-1100PV-5Y-01	5 TE	643	787		
59.A467	ProTec T1-1100PV-5Y-01-R	5 TE	643	787		
59.A468	ProTec T1-550PV-01-P (ground plug)	1 TE plug	643	787		
59.A469	ProTec T1-550PV-01-M-P (side plugs)	1 TE plug	643	787		
59.A001	ProTec T1-1200PVG-3+0	3 TE	675	825	1050	1500

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.A002	ProTec T1-1200PVG-3+0-R	3 TE	675	825	1050	1500
59.A003	ProTec T1-600PVG-P	1 TE plug	675	825		
59.A004	ProTube T1-600PVG-P	1 TE plug			1050	1500
59.0979	ProTec T2-250PV-3+0-R	3 TE	135	165		
59.0985	ProTec T2-250PV-3+0	3 TE	135	165		
59.0980	ProTec T2-600PV-3+0-R	3 TE	324	396		
59.0986	ProTec T2-600PV-3+0	3 TE	324	396		
59.A087	ProTec T2-600PV-2+0-R	2 TE	643	787		
59.A086	ProTec T2-600PV-2+0	2 TE	643	787		
59.A321	ProTec T2-250PV-2+0-R	2 TE	297	363		
59.A320	ProTec T2-250PV-2+0	2 TE	297	363		
59.A302	ProTec T2-125PV-2+0-R	2 TE	135	165		
59.A301	ProTec T2-125PV-2+0	2 TE	135	165		
59.0983	ProTec T2-600PV-1+0-R	1 TE	643	787		
59.0989	ProTec T2-600PV-1+0	1 TE	643	787		
59.0982	ProTec T2-250PV-1+0-R	1 TE	297	363		
59.0988	ProTec T2-250PV-1+0	1 TE	297	363		
59.0995	ProTec T2-600PV-P	1 TE plug	643	787		
59.0992	ProTec T2-300PV-P	1 TE plug	324	396		
59.0994	ProTec T2-250PV-P	1 TE plug	297	363		
59.0292	ProTec T2-1100PV-3+0	3 TE	643	787		
59.0293	ProTec T2-1100PV-3+0-R	3 TE	643	787		
59.0291	ProTec T2-550PV-P	1 TE plug	643	787		
59.0295	ProTec T2-1500PV-3+0	3 TE	900	1100		
59.0296	ProTec T2-1500PV-3+0-R	3 TE	900	1100		
59.0294	ProTec T2-750PV-P	1 TE plug	900	1100		
59.A298	ProTec T2-125PV-1+0	1 TE	135	165		
59.A299	ProTec T2-125PV-1+0-R	1 TE	135	165		
59.A300	ProTec T2-125PV-P	1 TE plug	135	165		
59.B257	ProTec T2-1100PV-3+0-US	3 TE	643	787		
59.B258	ProTec T2-1100PV-3+0-US-R	3 TE	643	787		

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.B259	ProTec T2-1500PV-3+0-US	3 TE	900	1100		
59.B260	ProTec T2-1500PV-3+0-US-R	3 TE	900	1100		
59.A452	ProTec T2-1100PV-5Y-00	5 TE	643	787		
59.A453	ProTec T2-1100PV-5Y-00-R	5 TE	643	787		
59.A454	ProTec T2-550PV-00-P	1 TE plug	643	787		
59.A474	ProTec T2-1100PV-5Y-01	5 TE	643	787		
59.A475	ProTec T2-1100PV-5Y-01-R	5 TE	643	787		
59.A476	ProTec T2-550PV-01-P	1 TE plug	643	787		
59.A086	ProTec T2-600PV-2+0	2 TE	643	787		
59.A087	ProTec T2-600PV-2+0-R	2 TE	643	787		
59.A088	ProTec T2-600PV-P	1 TE plug	643	787		

17. DC Type 1+2, 2 SPD

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.A955	ProTec T2-250DCB-3Y	3 TE	387	473		
59.A956	ProTec T2-250DCB-3Y-R	3 TE	387	473		
59.A957	ProTec T2-500DCB-3Y	3 TE	504	616		
59.A958	ProTec T2-500DCB-3Y-R	3 TE	504	616		
59.A959	ProTec T2-750DCB-3Y	3 TE	738	902		
59.A960	ProTec T2-750DCB-3Y-R	3 TE	738	902		
59.A961	ProTec T2-250DCB-M-P (side plug)	1 TE plug	387	473		
59.A962	ProTec T2-250DCB-P (middle plug)	1 TE plug	387	473		
59.A963	ProTec T2-500DCB-M-P (side plug)	1 TE plug	504	616		
59.A964	ProTec T2-500DCB-P (middle plug)	1 TE plug	504	616		
59.A965	ProTec T2-750DCB-M-P (side plug)	1 TE plug	738	902		
59.A966	ProTec T2-750DCB-P (middle plug)	1 TE plug	738	902		
59.A983	ProTec T2-500DCU-3Y	3 TE	387	473		
59.A984	ProTec T2-500DCU-3Y-R	3 TE	387	473		
59.A985	ProTec T2-1000DCU-3Y	3 TE	504	616		
59.A986	ProTec T2-1000DCU-3Y-R	3 TE	504	616		
59.A987	ProTec T2-1500DCU-3Y	3 TE	738	902		
59.A988	ProTec T2-1500DCU-3Y-R	3 TE	738	902		
59.A989	ProTec T2-500DCU-M-P (side plug)	1 TE plug	387	473		
59.A990	ProTec T2-500DCU-P (middle plug)	1 TE plug	387	473		
59.A991	ProTec T2-1000DCU-M-P (side plug)	1 TE plug	504	616		
59.A992	ProTec T2-10000DCU-P (middle plug)	1 TE plug	504	616		
59.A993	ProTec T2-1500DCU-M-P (side plug)	1 TE plug	738	902		

			MOV @ 1 mA, (L-N, L-PE, L-PEN, N-PE)		GDT @ 100 V/s (L-N, L-PE, L-PEN, N-PE)	
Order Code	Product Name	Dimensions DIN 43880	Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
59.A994	ProTec T2-1500DCU-P (middle plug)	1 TE plug	738	902		
59.C380	ProTec T2-1000DCGU-3Y	3 TE	738	902	833	1250
59.C381	ProTec T2-1000DCGU-3Y-R	3 TE	738	902	833	1250
59.C383	ProTec T2-500DCGU-M-P	1 TE plug	738	902		
59.C382	ProTube T2-500DCGU-P	1 TE plug			833	1250

©Raycap • All rights reserved
130 574 300 | 250626
www.raycap.com

Raycap d.o.o.,
Poslovna cona Žeje pri Komendi,
Pod hrasti 7, SI-1218 Komenda

Raycap