PROVING UNITS



Instruction Manual

PD230SRD
PD440S
PD440SRD
PD440SRDX
PD690S
PD690SRD

MARTINDALE ELECTRIC

Keeping You Safe

⚠

ALWAYS READ THESE INSTRUCTIONS BEFORE PROCEEDING

Thank you using one of our products. For safety and full understanding of its benefits please read this manual before use. Technical support is available from +44 (0)1923 441717 and support@martindale-electric.co.uk

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1. SAFETY INFORMATION: Always read before proceeding.

⚠ REMEMBER: SAFETY IS NO ACCIDENT

Before using this equipment **read all instructions and cautionary markings** in this manual and and on the equipment.

These instructions contain both information and warnings that are necessary for the safe operation and maintenance of this product. Failure to understand and to comply with the warnings and instructions can result in serious injury, damage or even death.

Particular attention should be paid to the Warnings, Precautions and Technical Specifications.

Read and save these instructions for future reference.
Updated instructions and product information are available at:
www.martindale-electric.co.uk

1.1 Precautions

⚠ Warnings
These warnings apply to the proving units.

To reduce the risk of electric shock, fire or injury:
It is important that proper safety measures are taken when working with voltages exceeding the extra low voltage (ELV) threshold of 50V AC RMS or 120V DC.

Before use check the unit for cracks or any other damage. Make sure the unit is free from dust, grease and moisture. Also check any associated accessories for damage. **Do not use** if damaged.

Do not use if the battery cover is not fitted.

⚠ Cautions

Avoid severe mechanical shock or vibration and extreme temperature.

To avoid corrosion from leaking batteries, remove the batteries when the unit is not in use for an extended period.

Do not short the output terminals.

The equipment **must only** be used by a suitably trained and qualified person.

Do not use in wet conditions or with wet hands.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

1.2 Meaning of Symbols and Markings

⚠	**Caution - risk of danger & refer to instructions**
⚠	**Caution - risk of electric shock**
⧈	**Equipment protected by double or reinforced insulation (Class II)**
CE	**Equipment complies with relevant EU Directives**
UK CA	**Equipment complies with relevant UK Conformity Assessed marking**
	End of life disposal of this equipment should be in accordance with relevant EU Directives

2. INTRODUCTION

2.1 Inspection

Examine the shipping carton for any sign of damage. Inspect the unit and any accessories for damage. If there is any damage then consult your distributor immediately.

2.2 Description



1. Voltage Indicating LEDs
2. Calibration card (PD440SRDX only)
3. Output voltage terminals
4. AC/DC selection and output indication switch
5. DC output indicate LED
6. AC output indicate LED
7. Battery low LED

The PD230SRD / PD440S / PD440SRD / PD440SRDX / PD690S / PD690SRD are portable battery powered proving units for testing of contact type voltage detectors or other units with voltage detection capability, e.g. multimeters or multifunction testers. The table below shows the differences in the output voltage for each model.

After the voltage detector probes are pushed down onto the Proving Device (PD) unit output voltage terminals, the PD unit outputs voltage level(s) for period(s) indicated in the table before the voltage drops to 0V and the terminal's output goes into low impedance mode.

PD440S / PD690S

The PD440S and PD690S output a fixed AC voltage for 5s before the output voltage is reduced to 0V and the terminal output goes into low impedance mode.

The PD440S fixed output voltage is 440V AC 50Hz nominal.

The PD690S fixed output voltage is 690V AC 50Hz nominal.

PD230SRD / PD440SRD / PD440SRDX / PD690SRD

The output voltage can be set to be to AC or DC mode using the AC/DC output selection push button. The output voltage reduces in steps over a period of 10s.

For example, the PD230SRD outputs voltage in the following steps: 230V for 4s, 120V for 2s, and 50V for 4s before the output voltage is reduced to 0V and the terminal output goes into low impedance mode.

Product	Output voltage step down	NO LOAD output voltage step (50Hz nominal AC V / DC V)				
PD690SRD	✓	690	440	230	120	50
PD440SRD / PD440SRDX	✓	440	230	120	50	
PD230SRD	✓	230	120	50		
PD690S		690				
PD440S		440				

2.3 Accessories

All units come with the following accessories:

- 6 x 1.5V AA alkaline batteries
- Instructions
- MG3 magnetic hanger *

* excluding kits where a PD carry case is included

2.4 Battery Installation

Refer to Section 4.1 (Battery Replacement) for the battery installation instructions for all units.

3. OPERATION

⚠ Caution

Always make sure the precautions and limitations of the unit being tested are observed. If necessary refer to the specification of the unit being tested.

Also refer to the graph of typical output voltage under various load conditions at the rear of these instructions.

3.1 AC / DC output voltage mode selection and mode indication

AC / DC output voltage mode selection and mode indication can be carried out using the AC / DC output selection push button.
The push button functions are described below.

Function	Operation step/s	Description
Output mode indication	1. Momentarily press the push button while the proving device is not being used	Output mode indications are as follow, AC output mode - "AC" LED ON, "DC" LED OFF DC output mode - "DC" LED ON, "AC" LED OFF The LED will time out after approximately 10s. It is not necessary to wait for the LED to time out before proving a voltage indicator. If the LED is left to time out, then a minimum of 3s is required before pressing the button again or proving a voltage indicator.
Change output mode	1. Carry out "Output mode indication" function. 2. Momentarily press push button again	1. Each time the push button is momentarily pressed the Output Mode changes to the opposite mode 2. The default startup output mode does not change
Change default startup output mode	1. Carry out "Output mode indication" function. 2. Press push button (and keep it pressed). The LEDs will change to indicate the new output mode 3. Release push button when the LED stops flashing (after about 3 seconds)	If the LED fails to flash then this indicates that default output mode is already set to the mode indicated by the "AC" or "DC" LED

3.2 Proving Unit LED indications

	LED indicators								
		Output mode		Output terminals voltages indicators					
Product	**Battery low**	**AC (50Hz)**	**DC**	**690V**	**400V**	**230V**	**120V**	**50V**	**High voltage**
PD690SRD	✓	✓	✓	✓	✓	✓	✓	✓	
PD440SRD	✓	✓	✓		✓	✓	✓	✓	
PD440SRDX	✓	✓	✓		✓	✓	✓	✓	
PD230SRD	✓	✓	✓			✓	✓	✓	
PD690S	✓								✓
PD440S	✓								✓

The previous table shows the LED indicators for each PD product type.

For example, the PD690SRD includes the following LED indicators- 690V, 440V, 230V, 120V, 50V.

Battery low indication
All PD products support the battery low LED, which is illuminated when the battery voltage is low.

PD440S / PD690S
On these PD products the “High voltage” LED is ON when the live voltage is present at the voltage output terminals. If the loading impedance of the voltage indicator (at the output terminals) is less than 1kΩ then the “High voltage” LED will start flashing.

PD230SRD / PD440SRD / PD440SRDX / PD690SRD
On these PD products there are multiple LED to indicate the voltage at the PD output terminals when a voltage indicator is under test at the terminals. Refer to the graph of typical output voltage under various voltage indicator load conditions on the specification page. Also refer to the “PD Output voltages table” under section 2.2. The LED indication will depend on the loading impedance of the voltage indicator under test as well as the PD output voltage steps in the “PD Output voltage table”. If the loading impedance of the voltage indicator (at the output terminals) is less than 1kΩ then the “50V” LED will start flashing.

Voltage Output Mode (AC / DC)
AC LED and DC LED indicate the PD output voltage mode.

3.3 Proving a Test Lamp, Voltage Tester / Indicator, DMM etc.

Place one probe of the unit under test into the right hand socket of the proving unit until it makes contact with the terminal. Place the other probe into the left hand terminal of the proving unit and gently press down. It is important to follow this procedure in order to ensure PD output voltage is applied to the equipment under test from the start of the PD output voltage test cycle.

The PD output voltage test cycle starts from when the voltage indicator is applied to the left hand terminal of the PD.

On the PD440S and PD690S, the output voltage test cycle is 5s long.

On the PD230SRD / PD440SRD / PD440SRDX / PD690SRD, the output voltage test cycle is up to 10s long.

At the end of these PD units' test cycles, the output voltage drops to 0V and the output goes into low impedance. For SRD and SRDX versions, a minimum of 3s is required between tests.

Observe that the required indicators on the unit under test illuminate, then withdraw the probe from the right hand terminal first, and then the left.

If none of the proving unit LED's illuminate when performing the above tests, check the condition of the proving unit batteries and replace them if required (see section 4.1).

3.4 Test Lamp, Voltage Tester / Indicator Cables

During the above tests, emphasis should also be placed upon the flexing of the UUT cable along its length, and particularly at the

entry points to the hand held elements, to confirm that the cable has not fractured.

It may be necessary to perform this test a number of times as the proving unit times out after 5s on the PD440S /PD690S and after 10s on the PD230SRD / PD440SRD / PD440SRDX / PD690SRD.

3.5 CALCHECK (PD440SRDX only)

The CALCHECK feature may be used to check that a multifunction tester, insulation tester or continuity tester is maintaining ongoing accuracy between calibrations. There are two insulation test resistance values, 0.5MΩ and 1MΩ. There are also two continuity test resistance values, 0.5Ω and 1Ω.

One probe of the tester being checked should be placed on the desired resistance value and the other probe should be placed on the COM terminal, following the instruction manual for the tester being used.

The CALCHECK feature is not designed to be used to check loop testers, where the high test current will damage the proving device. The CALCHECK (X models only) feature can be used as a regular check that instruments are not drifting between calibrations. Records can be kept using the CALCHECK Verification Measurement sheet at the back of this manual. An initial measurement can be taken soon after calibration and the results recorded. Further checks can be made periodically, e.g. every month, and the results also recorded on the sheet.

Further copies of the sheet can be downloaded from www.martindale-electric.co.uk/manuals/.

4. MAINTENANCE

4.1 Battery Replacement

Remove the rear battery cover by turning the quarter turn screw 90° anti-clockwise and then lifting the cover. Observing correct polarity fit 6 new 1.5V, AA alkaline batteries (IEC LR6, NEDA 15A). Replace the battery cover by positioning the top onto the rear casing slots, lowering the cover and then locking by turning the quarter turn screw 90° clockwise. **Note:** Do not mix old and new batteries.

4.2 Cleaning

If contamination is found, clean with a damp soft cloth and, if necessary, a mild detergent or alcohol. Do not use abrasives, abrasive solvents, or detergents which can cause damage to the unit. If a mild detergent is used, the unit should subsequently be thoroughly cleaned with a water dampened soft cloth. After cleaning, dry and allow to remain in a dry environment for 2 hours before use.

4.3 Repair and Service

There are no user serviceable parts in this unit other than those that may be described in section 4. Return to Martindale Electric if faulty. Our service department will quote promptly to repair any fault that occurs outside the guarantee period.
Before the unit is returned, please ensure that you have checked the unit and batteries.

4.4 Storage Conditions

The instrument should be kept in cool, dry conditions and not subjected to shock, scratching or other damage, prolonged direct harsh sunlight, extremes of temperature and in such a manner as to preserve the working life of the unit. It is strongly advised that the unit is not kept in a tool box where other tools may damage it.

5. WARRANTY AND LIMITATION OF LIABILITY

This Martindale product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is 2 years and begins on the date of receipt by the end user. This warranty extends only to the original buyer or end-user customer, and does not apply to fuses, disposable batteries, test leads or to any product which, in Martindale's opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation, handling or storage.

Martindale authorised resellers shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of Martindale.

Martindale's warranty obligation is limited, at Martindale's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to Martindale within the warranty period.

This warranty is the buyer's sole and exclusive remedy and is in lieu of all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. Martindale shall not be liable for any special, indirect, incidental or consequential damages or losses, including loss of data, arising from any cause or theory.

Since some jurisdictions do not allow limitation of the term of an implied warranty, or exclusion or limitation of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any part of any provision of this warranty is held invalid or unenforceable by a court or other decision-maker of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision or other part of that provision.

Nothing in this statement reduces your statutory rights.

6. CALCHECK verification measurements (PD440SRDX only)

PD model	
PD serial no.	
Test instrument model	
Test instrument serial no.	
Test instrument date of calibration	

Initial measurement

Date	Insulation		Continuity		Initials
	0.5MΩ	1MΩ	0.5Ω	1Ω	

Periodic verification measurements

Date	Insulation		Continuity		Initials
	0.5MΩ	1MΩ	0.5Ω	1Ω	

Periodic verification measurements (PD440SRDX only)

Date	Insulation		Continuity		Initials
	0.5MΩ	1MΩ	0.5Ω	1Ω	

MARTINDALE ELECTRIC

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Specification
PDS / PDSRD / PDSRDX
Proving Units



Electrical

Product	Output voltage step down	NO LOAD output voltage step (50Hz nominal AC V / DC V)				
PD690SRD	✓	690	440	230	120	50
PD440SRD / PD440SRDX	✓	440	230	120	50	
PD230SRD	✓	230	120	50		
PD690S		690				
PD440S		440				

MARTINDALE ELECTRIC

Keeping You Safe

Specification
PDS / PDSRD / PDSRDX
Proving Units

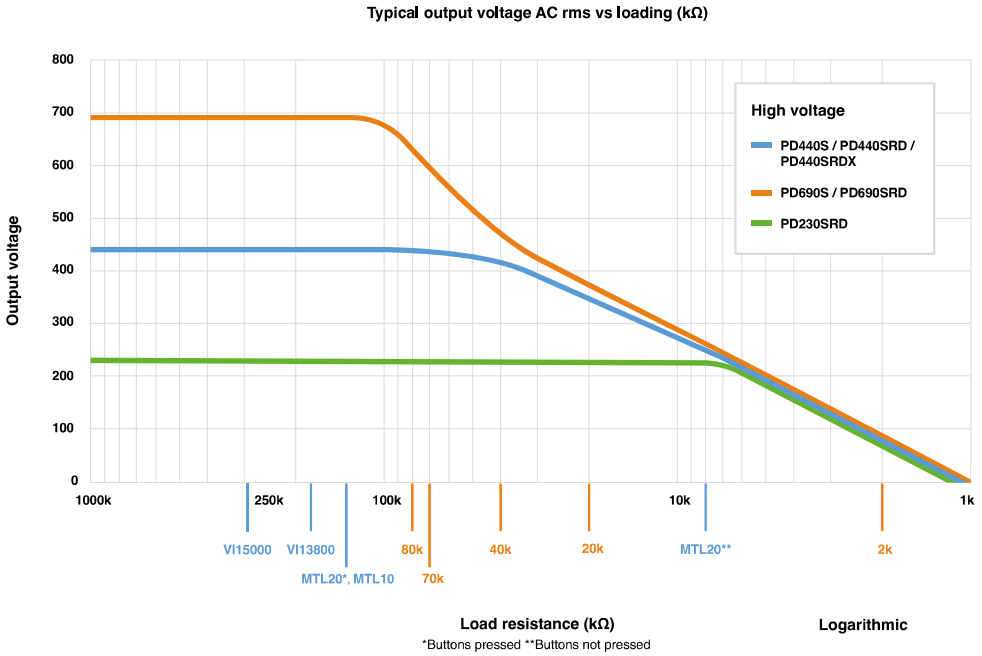
All Units
Output loading: See typical output voltage vs. loading graph

CALCHECK - PD440SRDX only
Insulation test resistance nominal values:
0.5MΩ (max test voltage 1kV)
1.0MΩ (max test voltage 1kV)

Continuity test resistance nominal values:
0.5Ω (max test current 200mA)
1.0Ω (max test current 200mA)

General
Power: Internal batteries
Internal batteries: 6 x 1.5V, AA alkaline batteries (IEC LR6, NEDA 15A)
Dimensions: 150 x 80 x 35mm.
Weight packed: 435g approx. (with batteries)
Includes: 6 x 1.5V AA alkaline batteries, instructions

Environmental
Location: Suitable for indoor use, and outdor use in dry weather conditions only.
Operating temperature: -10°C to 40°C at max. 70% R.H.
Altitude: up to 2000m
Pollution degree: 2


Typical output voltage AC rms vs loading (kΩ)
Output voltage
800
700
600
500
400
300
200
100
0
1000k
250k
100k
10k
1k
High voltage
PD440S / PD440SRD / PD440SRDX
PD690S / PD690SRD
PD230SRD
VI15000
VI13800
MTL20*, MTL10
80k
70k
40k
20k
MTL20**
2k
Load resistance (kΩ)
Logarithmic
*Buttons pressed **Buttons not pressed

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