♦ PRECISION INSTRUMENTS FOR TEST AND MEASUREMENT ♦

SRX-NI-4082

Resistance Standard Set
User and Service Manual

Visit www.ietlabs.com for manual revision updates

SRX-NI-4082 im/December 2022

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WARRANTY

We warrant that this product is free from defects in material and workmanship and, when properly used, will perform in accordance with applicable IET specifications. If within one year after original shipment, it is found not to meet this standard, it will be repaired or, at the option of IET, replaced at no charge when returned to IET. Changes in this product not approved by IET or application of voltages or currents greater than those allowed by the specifications shall void this warranty. IET shall not be liable for any indirect, special, or consequential damages, even if notice has been given to the possibility of such damages.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

Safety Symbols

General definitions of safety symbols used on the instrument or in manuals are listed below.

Caution symbol: the product is marked with this symbol when it is necessary for the user to refer to the instruction manual.

Hazardous voltage symbol: the product is marked with this symbol when high voltage maybe present on the product and an electrical shock hazard can exist.

Indicates the grounding protect terminal, which is used to prevent electric shock from the leakage on chassis. The ground terminal must connect to earth before using the product

Direct current.

Alternating current.

Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.

On supply.

Off supply.

Hot surface. Avoid contact. Surfaces are hot and may cause personal injury if touched.

Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC
This product complies with the WEEE Directive (2002/96/EC) marking requirements.
The affixed label indicates that you must not discard this electrical/ electronic product in domestic household waste.
Product Category: With reference to the equipment types in the WEEE directive Annex 1, this product is classified as a “Monitoring and Control instrumentation” product.

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.

Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.

When replacing old appliances with new one, the retailer is legally obligated to take back your old appliances for disposal.

Proposition 65 Warning for California Residents

WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

This product may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm

⚠ SAFETY PRECAUTIONS ⚠

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS elsewhere in this manual may impair the protection provided by the equipment. Such noncompliance would also violate safety standards of design, manufacture, and intended use of the instrument.

IET Labs assumes no liability for the customer's failure to comply with these precautions.

This is an indoor use product.

DANGEROUS PROCEDURE WARNINGS

Comply with all WARNINGS - Procedures throughout in this manual and instructions on the instrument prevent you from potential hazard. These instructions contained in the warnings must be followed.

BEFORE APPLYING POWER

Verify that all safety precautions are taken. Make all connections to the instrument before applying power. Note the instrument's external markings described under "Safety Symbols".

- DO NOT Operate in an Explosive Atmosphere
- Do not operate the instrument in the presence of inflammable gasses or fumes
- Operation of any electrical instrument in such an environment clearly constitutes a safety hazard
- Use Caution around live circuits and whenever hazardous voltages > 45 V are present
- Operators must not remove instrument covers
- Component replacement and internal adjustments must be made by qualified maintenance personnel only
- DO NOT substitute parts or modify the instrument
- When working with high voltages; post warning signs, train personnel and keep unauthorized personnel away.

To avoid the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the instrument.

Return the instrument to an IET Labs for service and repair to ensure that safety features are maintained in operational condition.

WARNING

OBSERVE ALL SAFETY RULES
WHEN WORKING WITH HIGH VOLTAGES OR LINE VOLTAGES.

Dangerous voltages may be present inside this instrument. Do not open the case
Refer servicing to qualified personnel

HIGH VOLTAGES MAY BE PRESENT AT THE TERMINALS OF THIS INSTRUMENT

WHENEVER HAZARDOUS VOLTAGES (> 45 V) ARE USED, TAKE ALL MEASURES TO AVOID ACCIDENTAL CONTACT WITH ANY LIVE COMPONENTS.

USE MAXIMUM INSULATION AND MINIMIZE THE USE OF BARE CONDUCTORS WHEN USING THIS INSTRUMENT.

Use extreme caution when working with bare conductors or bus bars.

WHEN WORKING WITH HIGH VOLTAGES, POST WARNING SIGNS AND KEEP UNREQUIRED PERSONNEL SAFELY AWAY.

CAUTION

DO NOT APPLY ANY VOLTAGES OR CURRENTS TO THE TERMINALS OF THIS INSTRUMENT IN EXCESS OF THE MAXIMUM LIMITS INDICATED ON THE FRONT PANEL OR THE OPERATING GUIDE LABEL.

Contents

Chapter 1
INTRODUCTION

1.1 Introduction

The SRX-NI-4082 (Figure 1.1)is a set of 4 resistors designed specifically for calibration of the NI PXIe-408x DMMs.

Please follow the NI PXIe-408x calibration procedure

NI PXIe-408x calibration procedure can be found at:
https://www.ni.com/docs/en-US/bundle/pxie-4080-4082-cal-pro/page/calibration.html

Figure 1-1: SRX-NI-4082 Series Resistance Standard Set

Chapter 2
SPECIFICATIONS

For convenience to the user, the pertinent specifications are given in an **OPERATION GUIDE**,

Calibration conditions:
At 23°C, low power, accredited calibration traceable to SI

Terminals:
Two gold plated, low thermal-emf banana plugs positioned on standard 3/4 inch spacing for direct connection to the DMM

Maximum applied power: 0.6 W

Dimensions: 2.54 cm W x 5.1 cm L x 3.8 cm H
(1" x 2" x 1.5")

Weight: 0.15 kg (0.1 lbs)

Operating temperature range: - 55 to 70°C < 80% RH

Altitude: <2000 m

Enclosure: ABS thermoplastic
Flammability - UL 94-V0

NI PXIe-408x calibration procedure can be found at:
https://www.ni.com/docs/en-US/bundle/pxie-4080-4082-cal-pro/page/calibration.html

Nominal (Ω)	Initial Adjustment to Nominal (%)	Calibration Uncertainty typical (ppm) *	Stability 1 year typical (ppm)	TC (ppm/C)	Resistor type	Voltage Coef. (ppm/V)	Terminals
25	<0.1	20	50	2	Metal Foil	0.1	2 banana plugs
125							
5 k							
100 k							

* Low voltage using Fluke 8508A or Fluke 8588A

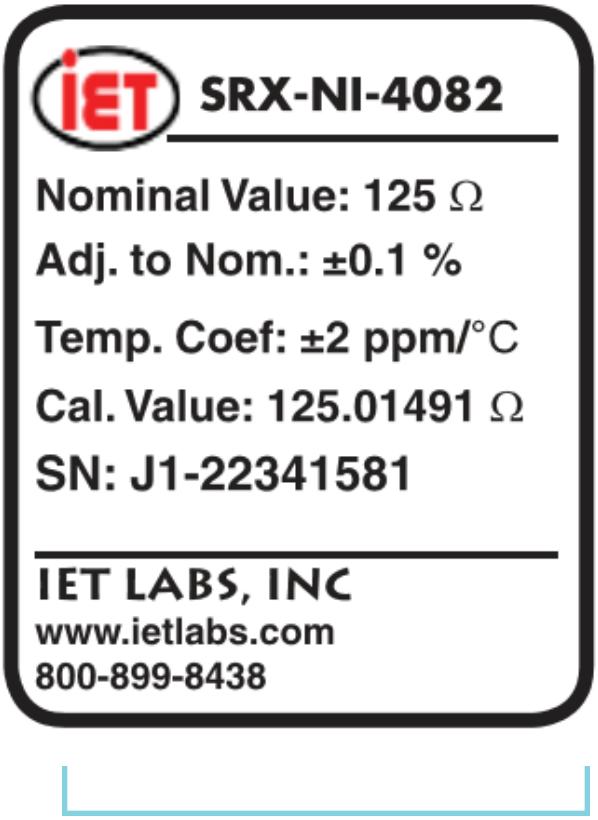

Figure 1-1: Typical Operating Guide affixed to each resistor

Chapter 3
OPERATION

3.1 Initial Inspection and Setup

This instrument was carefully inspected before shipment. It should be in proper electrical and mechanical order upon receipt.

3.2 Connections

The SRX-NI-4082 series is designed to directly plug into the NI PXIe-408x DMM. No cables should be used between the DMM and the SRX-NI-4082 resistor set.

3.3 Environmental Conditions

3.3.1 Operating Temperature

For optimal accuracy, SRX-NI-4082 Models should be used in an environment of 23°C. They should be allowed to stabilize at those temperatures after any significant temperature variation.

3.3.2 Storage Temperature

The SRX-NI-4082 Series should be maintained within the storage temperature range of 0°C to 40°C to retain its accuracy within the specified limits.

3.4 Shipping and Handling

The SRX-NI-4082 Series should not be exposed to any excessive shock or temperature extremes. The option SRC-100, a lightweight transit case capable of storing two SRX-NI-4082 units, is recommended for shipping or transporting the models.

Chapter 4
MAINTENANCE

4.1 Maintainability and Reliability

It is possible to maintain SRX-NI-4082 units indefinitely. They are reliable due to their closed, rugged design and sealed resistors.

4.2 Preventive Maintenance

Keep the SRX-NI-4082 units in a clean environment. This will help prevent possible contamination.

The front panel may be cleaned to eliminate any leakage paths from near or around the binding posts. To clean the front panel:

Wipe the front panel clean using alcohol and a lint-free cloth.

4.3 Calibration

The SRX-NI-4082 units may be employed as standalone instruments or as an integral components of a system. If used as part of a system, they should be calibrated as part of the overall system to provide an optimum system calibration.

If an SRX-NI-4082 model is employed as a standalone device, the following should be observed:

- Calibration Interval
- General Considerations
- Required Equipment
- Calibration Procedure

4.3.1 Calibration Interval

The recommended SRX-NI-4082 Series calibration interval is twelve (12) months.

If the instrument is used to transfer resistance values only, recalibration is not required, assuming that there has been no drastic change of value.

4.3.2 General Considerations

Before starting the calibration procedure, you need to consider the following:

- Calibration environment should be 23°C and less than 50% relative humidity.
- Test instruments should be sufficiently more accurate than the SRX-NI-4082 unit, and/or the uncertainty of the measurement instrumentation has to be considered in the calibration Test Uncertainty Ratio (TUR).
- The testing equipment and the SRX-NI-4082 unit should stabilize at laboratory conditions for at least 24 hours.
- Kelvin type 4-wire test leads should be used to obtain accurate low resistance measurements or two terminal resistance measurement directly to the front terminals of the DMM ,if using 2 terminal resistance mode, and after performing a zero.
- Steps should be taken to minimize thermal emf effects, such as using a meter with “True Ohm” capacity.
- Accepted metrology practices should be followed.

4.3.3 Required Equipment

Many combinations of standards, transfer standards, meters, and bridges may be used to calibrate this instrument. The following are some possible choices:

A high-precision, high-stability digital multimeter (e.g. Fluke 8508A, Fluke 8588A or Keysight 3458A) or other DMM with an accuracy of 20 ppm or better for direct measurements.

4.3.4 Calibration Procedure

To calibrate an SRX-NI-4082 unit, proceed as follows:

1. Set up the calibration equipment in the resistance measurement mode.
2. Confirm the resistance of the unit.
3. Confirm that the resistance is consistent with historical measurements to verify stability.