Power Supply Calibration Adapter EA2O23

- **Measure Output voltage to 33 Volts**
- **Active Current load to 4 Amps**
- **Measure output Resistance**
- **Connects to Feature port on calibrator**
- **Safety overload cut-out & Indicator**
- **Requires ProCal calibration or 2000 Series virtual front panel Software**

Overview

A unique and very useful option for simplifying calibration of power supplies. The PSU adapter can measure the supplies output voltage and also provide a precision current load allowing volts, current and even output resistance to be calibrated by one compact unit.

The PSU adapter connects to the feature connector on the calibrator and to the power supply to be calibrated by a 4 wire connection for Current load/Voltage Sense.

Technical Details

The output from the calibrator is converted by the PSU adapter into a precision current load and the supply output voltage is measured by using the calibrators internal high accuracy A/D converter.

The operation is controlled using a PC running either the Virtual front panel program or ProCal software. The software sends commands to the calibrator to set the output or read back the voltage which is displayed on the computer.

Controlling Calibration of Power Supplies

Basic control using the **2000 Series Virtual Front Panel Software** (Optional) can be achieved with readings displayed on the PC screen. Multiple current loads can be set up using the customisable 'POD' mode.

Automated Calibration of Power Supplies

Advanced control using the **ProCal Calibration Software** (Optional), with readings displayed and automatically recorded in certificates.

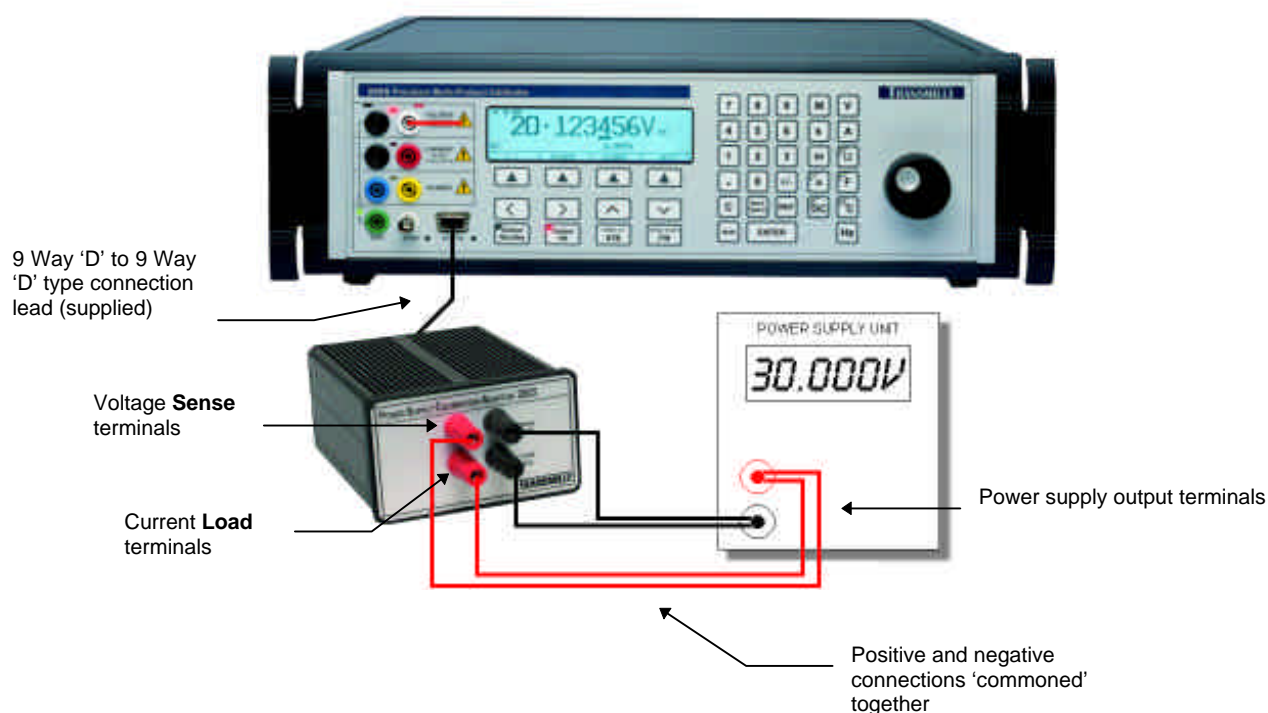### Specification - See extended specifications for full details

DC Voltage Measurement Accuracy				
Range	Resolution	1 Year Rel.		
		%	±	mV
0 to 33 Volts	0.01V	0.02	±	20

DC Current Load Accuracy				
Range	Resolution	1 Year Rel.		
		%	±	mA
0 to 4 Amps	0.01A	0.05	±	1

Power Supply Calibration Adapter Connection

Using the supplied 9 Way 'D' to 9 Way 'D' lead connect the PSU adapter to the 'feature' connector on the front of the 2000 Series calibrator. To connect to the PSU, use two pairs of 4mm to 4mm tests leads (for example, as supplied with the optional Transmille precision lead set) and connect the positive terminals of the PSU adapter (both *V Sense* and *I Load*) to the positive terminal of the power supply. Repeat for the negative terminals - this configuration is the optimal setup for minimising lead changes during power supply calibration.

9 Way 'D' to 9 Way 'D' type connection lead (supplied)

Voltage **Sense** terminals

Current **Load** terminals

Power supply output terminals

Positive and negative connections 'commoned' together

Using the Power Supply Calibration Option

Calibration using the power supply adapter is achieved using one of two methods :

1. *Basic* control using the **2000 Series Virtual Front Panel Software** (Optional) with readings displayed on the PC screen.

2. *Advanced* control using the **ProCal Calibration Software** (Optional), with readings displayed and automatically recorded for use in certificate creation.
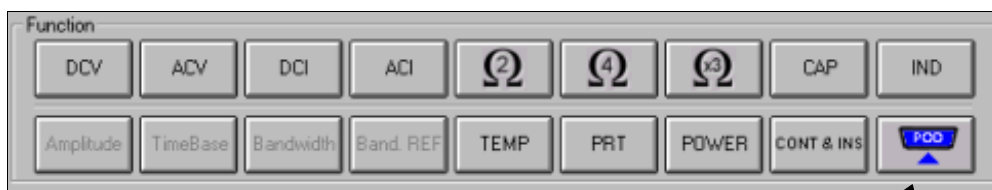
Power Supply Calibration Adapter -
Operation Using the Virtual Front Panel

1. Start the 2000 Series Virtual Front Panel by choosing

    START -> PROGRAMS -> 2000 Series Virtual Front Panel

2. Select POD mode by clicking on the POD button

    Select POD mode by clicking this
    function button

3. From the drop down list, select the one of the default functions from the list :

    *   PSU Adapter : Voltage Measurement
    *   PSU Adapter : 0A Load
    *   PSU Adapter : 0.25A Load
    *   PSU Adapter : 0.5A Load
    *   PSU Adapter : 0.75A Load
    *   PSU Adapter : 1A Load
    *   PSU Adapter : 1.5A Load
    *   PSU Adapter : 2A Load
    *   PSU Adapter : 2.5A Load
   *   PSU Adapter : 3A Load
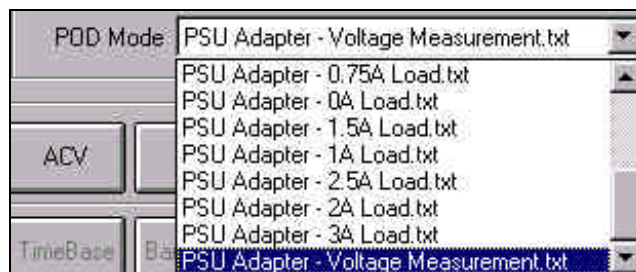
Creating a Custom Datafile For the Virtual Front Panel

If the default functions do not cover the current load required, a custom datafile can be created as follows :

A.   Start *Windows Explorer* and look in the '**C:\Program Files\2000 series virtual front panel**' folder.

This folder should contain a sub-folder called 'POD Data' (If it does not, then create it).


POD Data folder
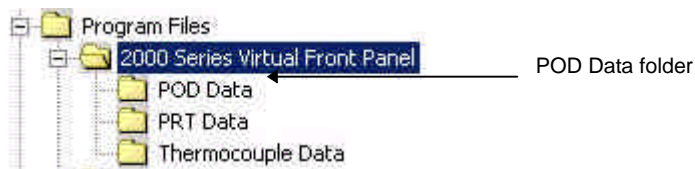
B.   Create a Notepad file which contains a one line control string (5 parameters separated by a comma)

ⓘ **TIP** : To simplify this task copy an existing datafile and rename it using *Windows Explorer*

C.   Using the worked example below as a guide, enter the parameters to create the custom datafile

Worked Example

The example below sets a 0.5A Load.

Data file as displayed by Notepad -
Note the comma's separating the five parameters
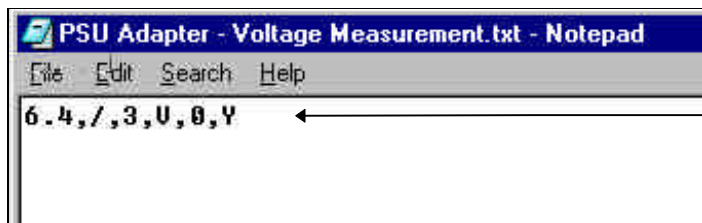
6.4	Gain Factor of the voltage measurement. This factor will be different for each adapter, if incorrect the voltage reading displayed will be wrong.
*	**Multiply** the reading returned from the calibrator by the gain factor
3	Number of decimal places shown by the VFP Program
V	The units character displayed after the reading by the VFP
R2/O0.5/#LOAD 0.5A	Command to set the calibrator to the 2 Volt range and output to 0.5 Volts which will set a 0.5A load on the adapter. The '#' command sets the calibrator display to show 'LOAD 0.5A'.
Y	Readback option : Y = Readback data from feature connector N = No readback

D.   Once the datafile has been saved, restart the virtual front panel program.

Your custom datafile should now be listed in the drop down list and is ready to use.

ⓘ **Note** : As many files as required can be created with different names for different loads.

Operation Using ProCal Calibration Software

These instruction assume basic knowledge of the ProCal calibration software - ProEdit should be used to create a procedure prior to following the instructions below.

> ⓘ **Note** :   The ProEdit *procedure builder wizard* function supports power supply procedure creation - Simply run ProEdit and choose File -> Procedure Builder Wizard to run. This function will automatically create the necessary formulas and simplify the writing of power supply procedures.
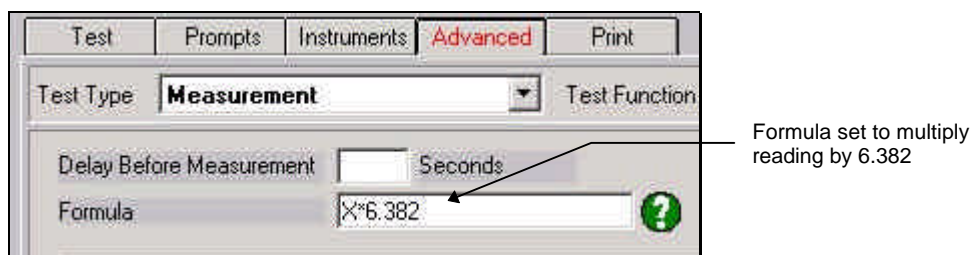
Output Voltage Testing Using ProCal

1.   Select the '**MEASUREMENT**' test type and '**DC VOLTAGE**' test function - then complete the boxes for test title, test value and accuracy etc. as normal.

2.   Under the '**INSTRUMENTS'** instruments tab select the *2000 series calibrator* in the **Custom Cal Instrument** section.

Measurement TEST TYPE selected

2000 Series selected as custom Cal Instrument
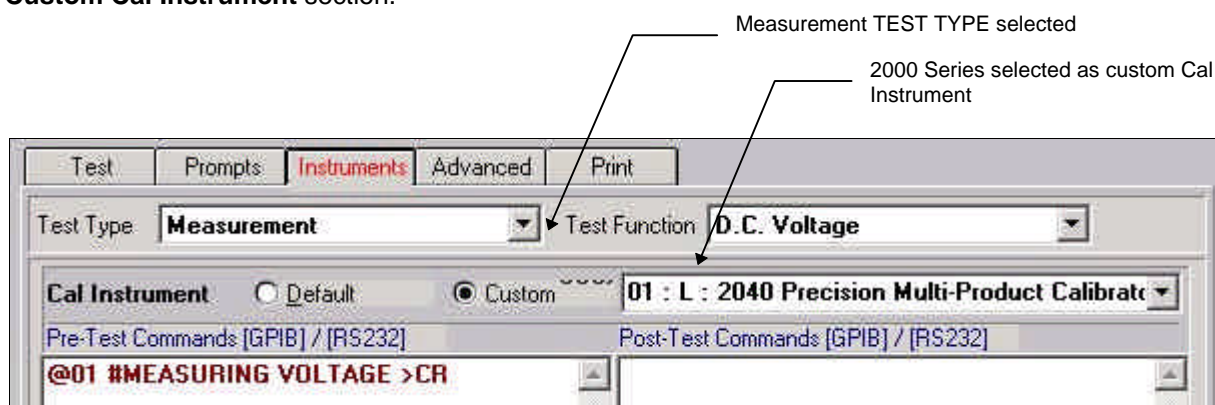
> ⓘ **Note** : You can also display a message in the 2000 series display whilst this test is running by entering a command in the **Pre-Test Commands** box (as shown above in the **Pre-Test Command** box)

3   Under the '**ADVANCED'** tab set the formula to multiply the returned reading (X) by the gain factor for the adapter (default = 6.382)

Formula set to multiply reading by 6.382

1. Select '**GENERAL**' type test - then complete the boxes for test title, test value and accuracy etc. as normal.

2. Select the '**INSTRUMENTS**' tab and enter the commands for setting the required load current.

    In the example below the load current is 1A.

    General TEST TYPE selected
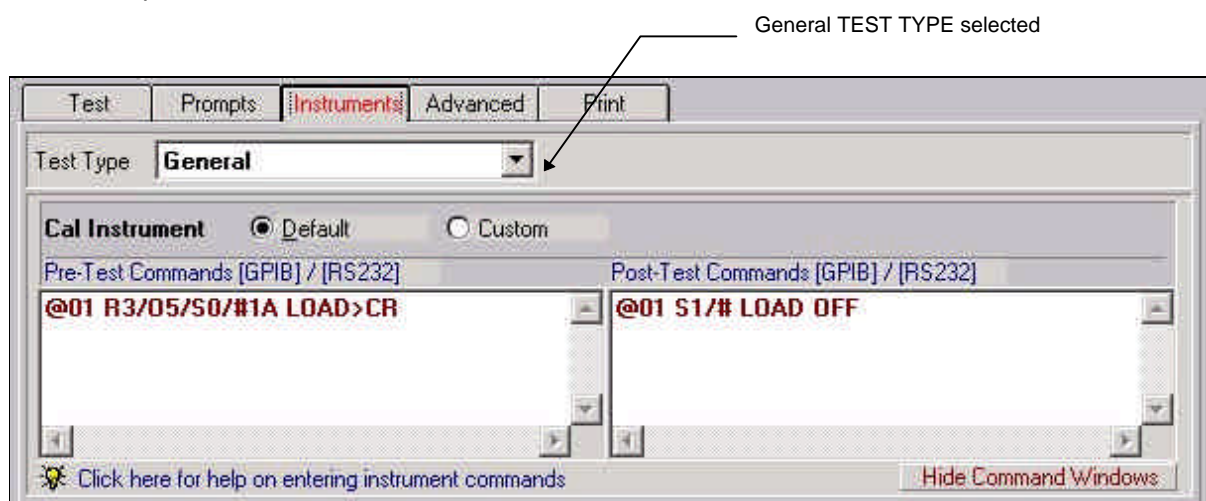
ⓘ **Note** : The PSU voltage should be set to 5 Volts to avoid excessive dissipation in the PSU adapter

You can send a command to turn off the load after the test. (*Post Test Commands*)

1.   This requires two voltage measurement tests -

Set up a test to record the voltage under no load at, for example, 5 Volts -

this test can be set to *non printing* under the *print tab*.

2.   Set up a second test to measures the same voltage (Copy & Paste above test) but under, for example, 1A load.

ⓘ **Note** : This test will be reading back in **OHMS**, so although the Test Type should be set to **DC VOLTAGE**, the test value should be set to zero **OHMS**.

Using the formula box in the '**ADVANCED**' tab, take the first test away from the second test and multiply with gain factor & divide by current (Ohms law) to get resistance.

The '**DUAL UNITS**' check box under the '**ADVANCED**' tab should be ticked as measurement is in volts but result in ohms.

Test	Prompts	Instruments	Advanced	Print

Test Type **Measurement**   Test Function **D.C. Voltage**

Delay Before Measurement [   ] Seconds   Enable Dual Units ☑

Formula   X*6.382-T3*-1 ❓   Number of Coil Turns [   ]

2000 Series Power Supply Calibration Adapter Specifications

General Specifications	
Adaptor connection	Connects to male 'D' type feature connector on 2000 Series front panel
Indicators	Incorporates 1x Power indicator LED : 1 x Overload indicator LED
Adaptor Dimensions	10.5cm x 13.2cm x 5.5cm
Connections	1 x 9 way male 'D' type connector
	2x Voltage input 4mm terminals (Red & Black)
	2x Current load 4mm terminals (Red & Black)
Connection to Calibrator	Via supplied 9 Way male to female serial lead (straight through connection)

DC Voltage Measurement Accuracy					
Range	Resolution	90 Day Rel. % ± mV	180 Day Rel. % ± mV	1 Year Rel. % ± mV	2 Year Rel. % ± mV
0 to 33 Volts	0.01V	0.016 ± 20	0.016 ± 20	0.02 ± 20	0.028 ± 20

DC Current Load Accuracy					
Range	Resolution	90 Day Rel. % ± mA	180 Day Rel. % ± mA	1 Year Rel. % ± mA	2 Year Rel. % ± mA
0 to 4 Amps	0.01A	0.040 ± 1.0	0.045 ± 1.0	0.05 ± 1	0.070 ± 1.0

Specifications apply between 17°C and 27°C.

Outside this range an allowance of 0.18 x 1 Year Spec. per °C should be added.

Due to continuous development specifications may be subject to change.