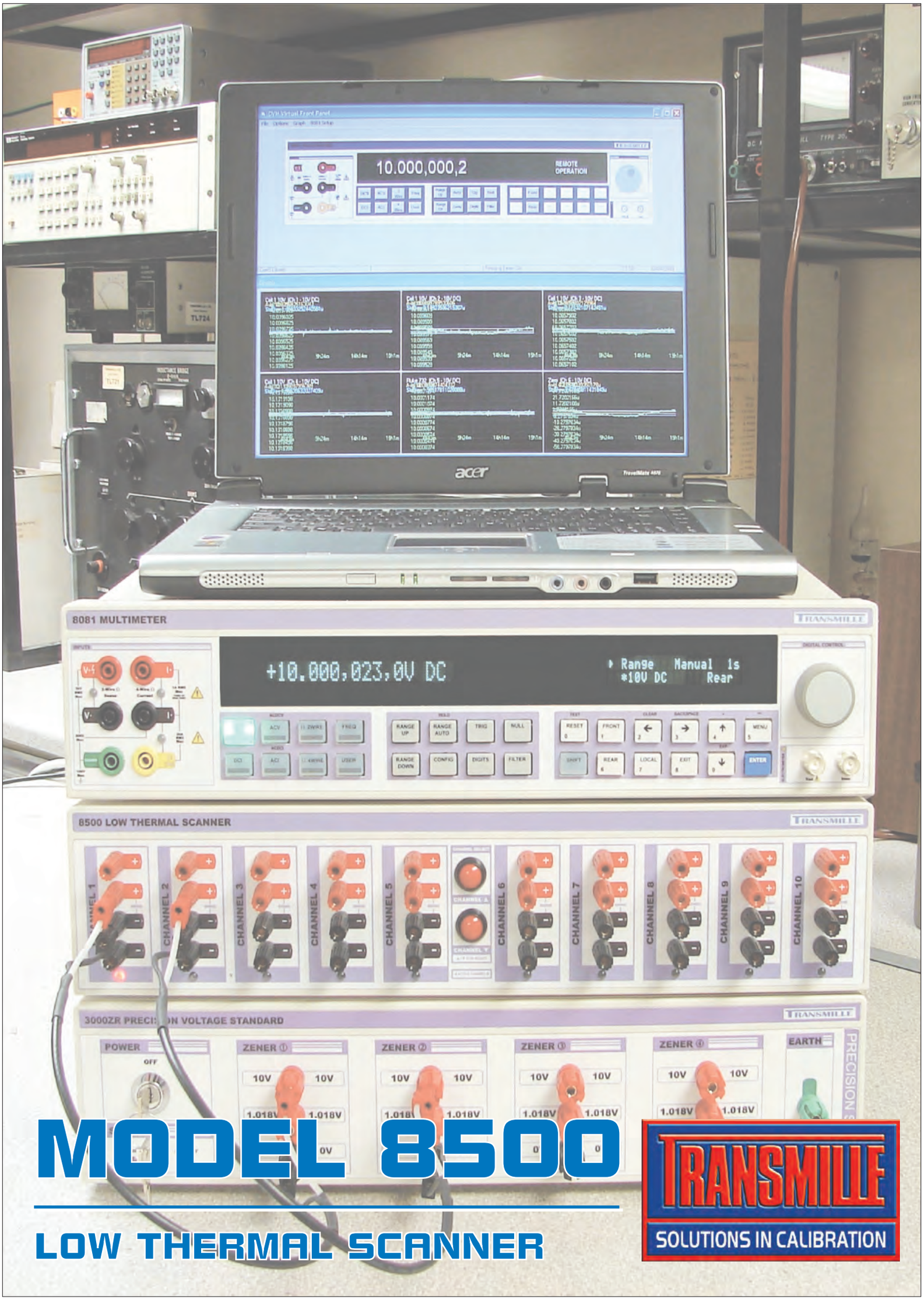

MODEL 8500

LOW THERMAL SCANNER

TRANSMILLE

SOLUTIONS IN CALIBRATION

8500 Series

Low Thermal Scanner

Operation Manual

Version 1.00
Jan 2012

Guarantee and Service

Transmille Ltd. guarantees this instrument to be free from defects under normal use and service for a period of 1 years from purchase. This guarantee applies only to the original purchaser and does not cover fuses, or any instrument which, in Transmille's opinion, has been modified, misused or subjected to abnormal handling or operating conditions.

Transmille's obligation under this guarantee is limited to replacement or repair of an instrument which is returned to Transmille within the warranty period. If Transmille determines that the fault has been caused by the purchaser, Transmille will contact the purchaser before proceeding with any repair.

To obtain repair under this guarantee the purchaser must send the instrument in its original packaging (carriage prepaid) and a description of the fault to Transmille at the address shown below. The instrument will be repaired at the factory and returned to the purchaser, carriage prepaid.

Note :
TRANSMILLE ASSUMES NO RESPONSIBILITY FOR DAMAGE IN TRANSIT

THIS GUARANTEE IS THE PURCHASER'S SOLE AND EXCLUSIVE GUARANTEE AND IS IN LEIU OF ANY OTHER GUARANTEE, EXPRESSED OR IMPLIED. TRANSMILLE SHALL NOT BE LIABLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR LOSS.

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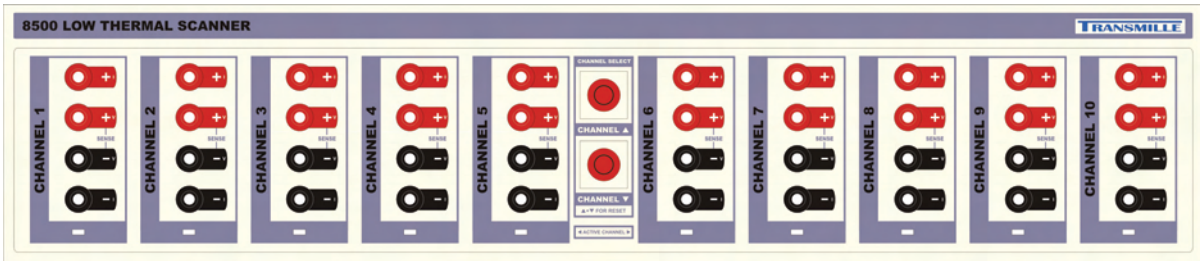


The model 8500 Low Thermal Scanner provides a low thermal 4 terminal switching system making it ideal for 4 wire resistance measurements in resistance thermometry and for resistance comparisons.

The use of ultra low thermal 4mm terminals make connecting the scanner to UUT's easy, allowing the measurement system to be quickly re-configured. With the output from the scanner located on the rear panel connections can be routed efficiently, providing a neat and simple cabling solution.

Applications include scanning of both electronic and standard reference cells, standard resistance comparisons measurements and PRT probe measurements. Special care has taken in the scanner designed to minimize thermal generated EMF voltages. By reducing internal self heating to almost zero by using a very low power circuit, even the power supply is external, using latching relays which only need a single pulse of power to set and using gold platted de-oxgenated copper terminals thermal voltages have been reduced to less than 150nV.

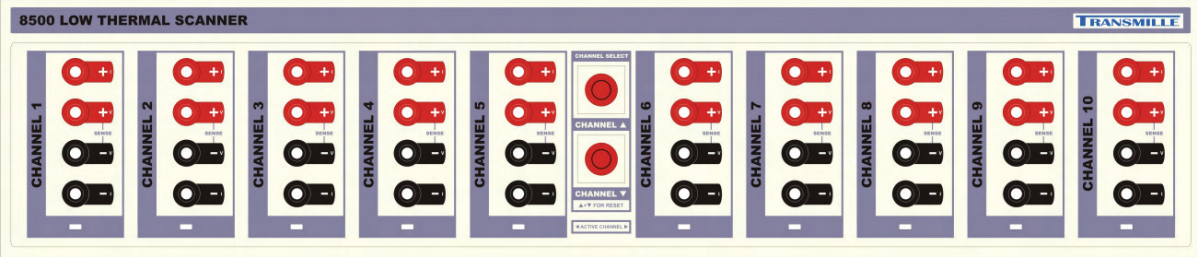
Control is from the Serial RS232 or USB interface (using converter) or via the front panel control buttons. LED indicators show the selected channel. The internal firmware ensures that two channels can never be selected at the same and that the switching is break before make.

Main Features

Number of channels	10
Switching	4 Contact Kelvin switching : 2 Voltage : 2 Current
Maximum Voltage	200V
Maximum Current	1A
Connection	Front panel inputs 4mm terminal low thermal gold on copper
Thermal EMF	Typically less than 150nV
Switch Resistance	Less than 0.2 ohms
Relay Type	Latching
Interface	RS232 / USB (via adapter)
Mains Voltage	200V to 250V AC 50Hz

The 8500 low thermal scanner is built using high quality ultra low thermal gold plated terminals. Internally the 8500 uses the latest in latching relay technology for the ultimate in low thermal performance.

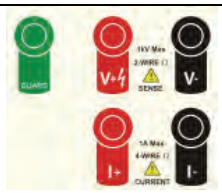
Front Panel



Front Panel Terminals		**• Voltage Positive input** **• Voltage Negative input** **• Current Positive input** **• Current Negative input** **• Guard Terminal (to case)**
Channel Indicator		**LED Active Channel Indicator**
Channel Select Button (Up)		**Channel select – selects next channel (sequential)**
Channel Select Button (Down)		**Channel select – selects previous channel (sequential)**

Note : Press **CHANNEL UP** + **CHANNEL DOWN** buttons together to switch off ALL channels.

Rear Panel

Rear Panel Terminals		**• Low thermal VOLTAGE (Positive) Terminal** **• Low thermal VOLTAGE (Negative) Terminal** **• Low thermal CURRENT (Positive) Terminal** **• Low thermal CURRENT (Negative) Terminal** **• Guard Terminal (to case)**
RS232 Interface		**9 Pin 'D TYPE' connector for connection to an RS232 computer port (or use with an RS232 to USB Converter for USB connection)**
15V DC Supply		**15V External Power Supply input (supplied)**

Operating Notes

This section details operational considerations for the 8500 low thermal scanner. Follow these instructions when operating the scanner.

⚠ CAUTION

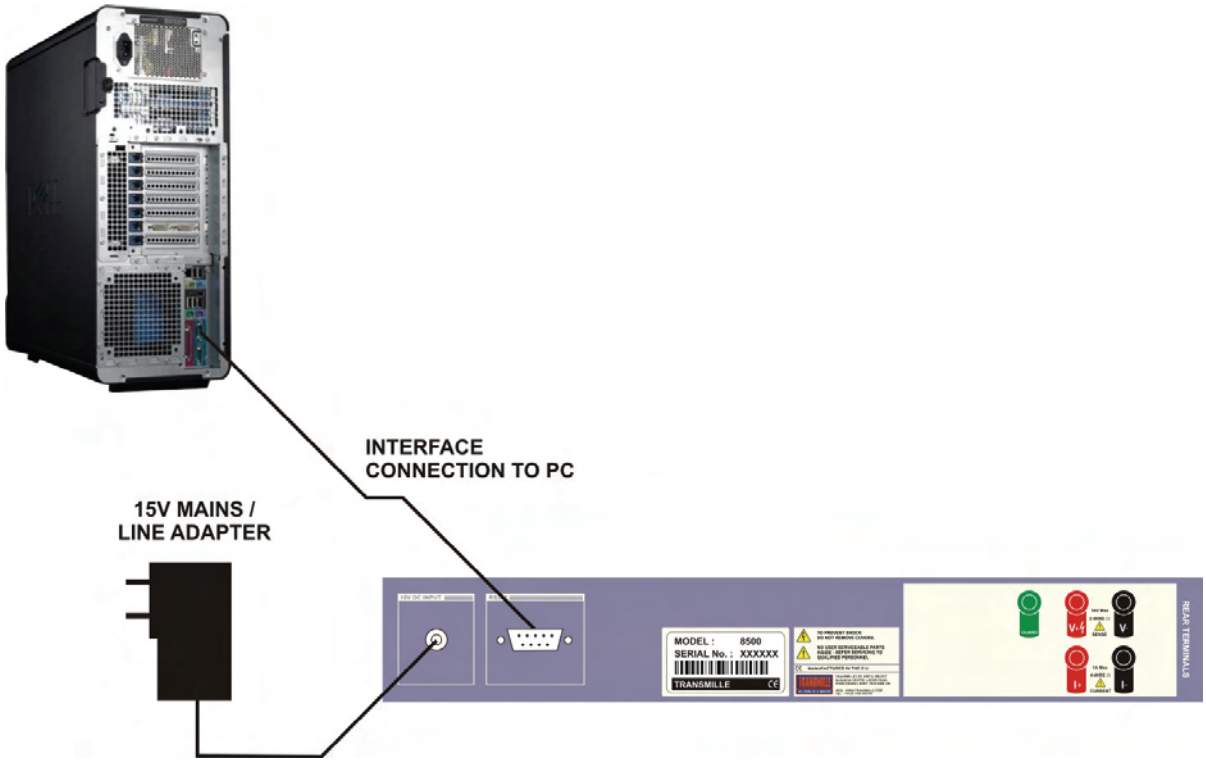
Do not apply voltages above the maximum rating of 200V.

Excessive voltage can cause permanent damage.

The specifications for connections with CURRENT and VOLTAGE (SENSE) require four wire connections as standard. Use of these terminal posts are detailed in the section below.

For the case to act as a shield the EARTH terminal must be connected to earth ground or instrument guard at some point in a calibration configuration. When connecting two or more instruments with guards, the use of a single common earth point avoids earth loops.

Interface / Power Connections

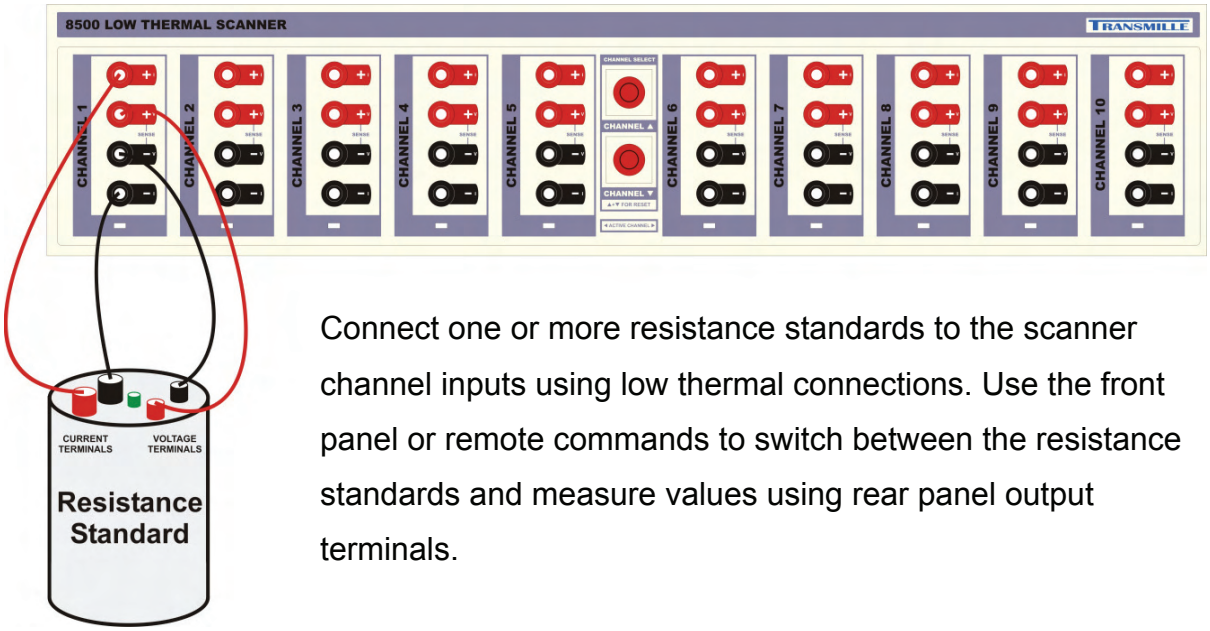


Connect 15V Power Adapter (supplied) to mains / line and RS232 connection to PC (use RS232 to USB converter if USB connection required).

Connection Recommendations

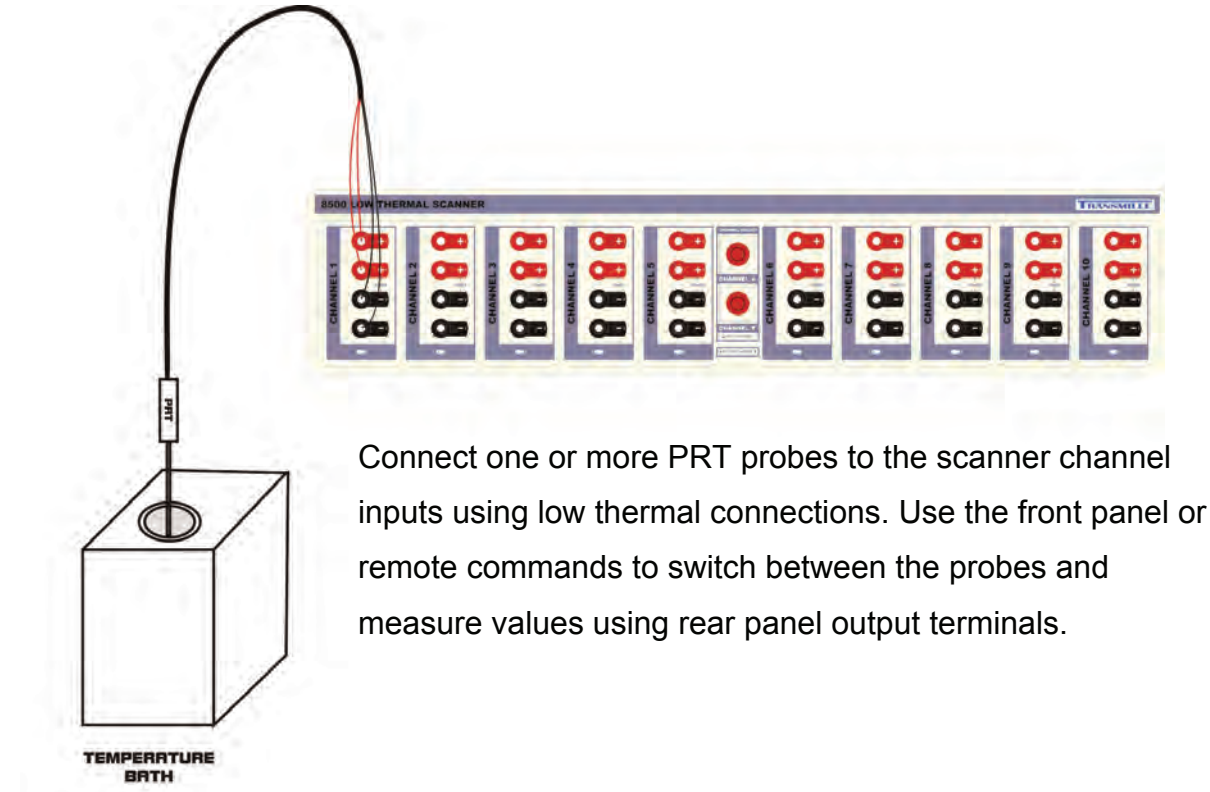
For optimum results use two sets of low thermal test leads which are designed to reduce errors caused by thermal EMFs.

Example Connection : Resistance Standard



Connect one or more resistance standards to the scanner channel inputs using low thermal connections. Use the front panel or remote commands to switch between the resistance standards and measure values using rear panel output terminals.

Example Connection : PRT Probe



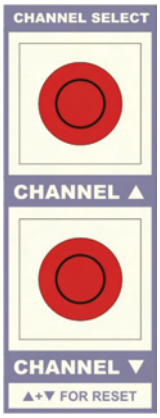
Connect one or more PRT probes to the scanner channel inputs using low thermal connections. Use the front panel or remote commands to switch between the probes and measure values using rear panel output terminals.

Channel Select Modes

Manual Channel Select

To manually select a range, use the front panel **CHANNEL UP** and **CHANNEL DN** buttons. This will select channels from 1 to 10 sequentially.

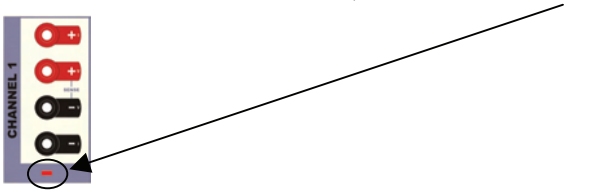
Note : Press **CHANNEL UP** + **CHANNEL DOWN** buttons together to switch off ALL channels.



Unit starts up with no channels selected.

Press CHANNEL UP to select channel 1
The next press of CHANNEL UP will select channel 2, and so on.

As a channel is selected, the channel LED will illuminate



Channel selection is ‘make before’ break so the output will not go open circuit during channel selection.

Remote Channel Select

The 8500 Scanner can be fully controlled via the RS232 interface. The interface uses the standard 9 pin PC connector and a standard serial lead. The scanner can be sent individual commands directly from the Windows HYPER TERMINAL program, any basic or high level program or from the ProCal Calibration System

To allow communication from PC based programs, these programs must be configured to the following settings :

BAUD RATE : 9600
PARITY : NONE
DATA BITS : 8
STOP BITS : 1

Once connected, using the PC the channel number should be sent to the scanner to set the output. The command MUST be terminated with a carriage return (ASCII character 13), for example :

COMMAND	DESCRIPTION
1<CR>	Set Channel 1
2<CR>	Set Channel 2
3<CR>	Set Channel 3
4<CR>	Set Channel 4
5<CR>	Set Channel 5
6<CR>	Set Channel 6
7<CR>	Set Channel 7
8<CR>	Set Channel 8
9<CR>	Set Channel 9
10<CR>	Set Channel 10

Where <CR> is a carriage return (ASCII 13)

Specifications

Inputs	10 Channels (4-terminal)
Outputs	2 Voltage : 2 Current Low Thermal
Switching	4 Contact Kelvin switching : 2 Voltage : 2 Current
Maximum Voltage	200V
Maximum Current	1A
Connection	Front / Rear panel inputs 4mm terminal low thermal gold on copper
Thermal EMF	Typically less than 150nV
Switch Resistance	Less than 0.2 ohms
Relay Type	Latching
Interface	RS232 / USB (via adapter)
Power	15V DC Adapter (200V to 250V AC 50Hz Supply)

Care & Maintenance

The only maintenance instructions for the 8500 precision resistance reference is periodic cleaning. See below for details on the cleaning procedure and precautions for handling.

Cleaning the 8500

To keep the external enclosure of the 8500 in good condition, clean the outer case with a soft cloth. Do not use any liquids in cleaning the enclosure – removal of surface dust is all that is recommended.

⚠ CAUTION

Do not use cleaning fluids or solvents for cleaning as these may damage the enclosure and affect the plastic materials used in the precision resistance standard.

Handling Precautions

The 8500 is designed for mechanical stability, but should not be subjected to excessive shock or be dropped. Transportation is recommended using the original packaging with avoidance of extreme changes of temperature.

Servicing Information

The 8500 is provided certified from the factory, and uses high precision components which are not user repairable. If the instrument is damaged it should be returned to the factory for repair and recalibration.