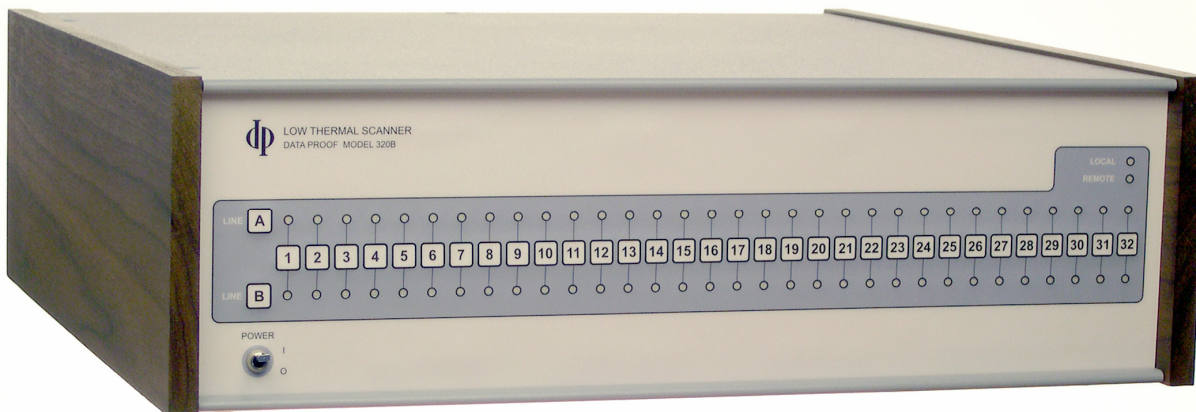




LOW THERMAL SCANNER

Models: 160B
and 320B



FEATURES

- * Thermals typically < 15 or 20 nanovolts
- * Front Panel or bus operation
- * Dual output configuration with 16 or 32 inputs
- * Four terminal measurements
- * Standard cell protection
- * Simple operation

USES

Data Proof Low Thermal Scanners with extremely low thermal offsets are ideal for automating precision DC measurements to sub-ppm accuracy. Data Proof Scanners can be used to compare voltage reference standards, as well as four-terminal measurements on resistance devices. This versatile dual Scanner has two pairs of output lines that make it suitable for a wide variety of low level DC measurements.

LOW THERMAL DESIGN

Special care has been taken to design a Scanner that minimizes thermal offsets for making precision Direct Current measurements in standards laboratories. This Scanner contains customized sealed relays that offer switching with very low thermal offsets. A very short pulse actuates the relay minimizing any self-heating.

Input leads are attached directly to the relay boards reducing the number of connections. Relays make connection by shorting together adjacent pads with pairs of contacts. Thus any thermal emf caused by a contact is canceled out by the nearly equal thermal emf generated by the other half of the pair. Relays are mounted in a heavy machined aluminum box to maintain thermal equilibrium in the switching area.

TWO MODELS AVAILABLE

A choice of two Scanners is available. The Model 160B has 16 input channels and the Model 320B has 32 channels. Four different input connections are also available. The Option 1,4 and 5 have 6 foot cables to connect directly to the devices under test, and the Option 2 has low thermal binding posts. Rack mount versions are available.

CONVENIENT OPERATION

The relay circuits are activated either by front panel push buttons or by means of an IEEE-488 bus. A bus interface is built into the Scanner as standard equipment and is easy to operate. A simple three character bus command sets the interface to remote, opens any previously closed relay, and then closes the specified relay.

DUAL SCANNER DESIGN

Each input pair is connected to separate relays and each relay switches the input lines to two different output circuits. Both high and low input lines are switched. This dual arrangement allows difference measurements to be made between voltage devices. True four-terminal measurements can also be made on resistance devices by using two input channels. With the Option 5 Scanners true four-terminal measurement can be made with each channel.

VOLTAGE APPLICATION

The diagram below shows the connections for comparing voltage standards. Any two units can be compared by closing one A-Line relay and one B-Line relay. The small difference voltage is measured by a meter across the high A and B Lines. The negative terminals are connected together by a short-circuit on the low lines. All other devices connected to the Scanner are left floating.

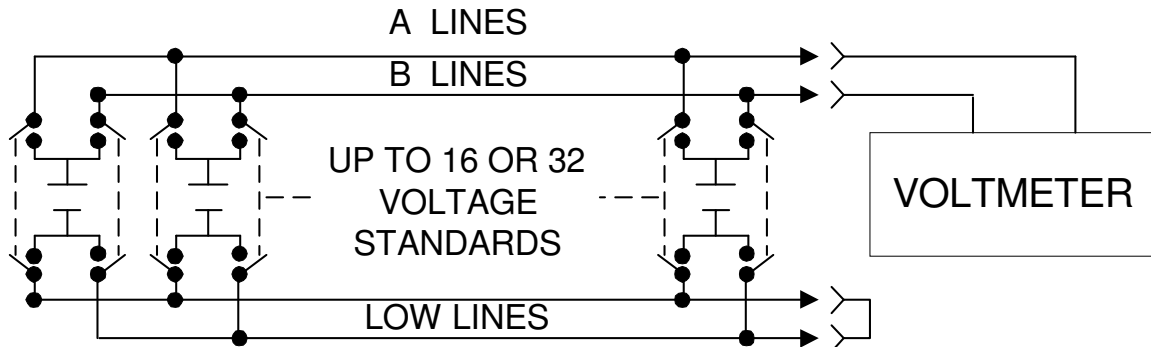


Diagram for Opt. 1, 2, 4 Low Thermal Scanners

STANDARD CELL PROTECTION

These Scanners were carefully designed to protect standard cells from being damaged due to Scanner failure or operator error. An extra contact on each relay is used to connect the relays in series, forming a protection circuit. All relays on a line must be open before power can be applied to close any relay. This protection circuit is available at the rear panel so that multiple Scanners can be cascaded and all cells in a large system will have this protection feature. Also relays are driven from a decoder so only one circuit can be activated at a time.

MANY APPLICATIONS AVAILABLE

Data Proof Scanners are very versatile and can be used anywhere low thermal switching is needed. Please contact us for application notes with designs to automate measurements of voltage, resistance, temperature, etc. Software is also available.

SPECIFICATIONS

Number of Input Channels:

16 for Models 160B and 160BR*
32 for Models 320B and 320BR*
* Rack mount versions

Thermoelectric Potentials:

Less than 20 nanovolts typical,
50 nanovolts maximum (Options 1, 2, 5)
Less than 15 nanovolts typical,
30 nanovolts max (Option 4)

Error Contribution:

Standard deviation <20 nanovolts when NIST
4x4 design is run with inputs shorted

Scanner Control:

Local - using front panel push buttons
Remote - via IEEE-488 bus (included)

Relay Contact Ratings:

10,000,000 cycles minimum at low levels
0.05 ohm maximum resistance (initial)
2.0 amp maximum at 24 V. DC.

Size in inches (millimeters):

5.2 (133) high, 17.7 (451) wide, 16.5 (420) deep

Power: 100 – 250V ~, 50-60 Hz, (external power supply)

Data Subject to change

REAR PANEL CONNECTIONS

Inputs - Choice of:

- Opt 1: Six foot cables. Untinned solid copper wire in groups of 4 pairs.
- Opt 2: Low thermal binding posts. Tellurium copper gold flashed per Mil-G-45204.
- Opt 4 Six foot cables. Shielded Teflon wire
- Opt 5 Six foot shielded/guarded wire, PE Insulation (See Opt.5 Guarded Scanner data sheet.)

Outputs: Four low thermal binding posts (Options 1, 2, 4)
A and B high lines
A and B low lines

Bus Input: 24 pin IEEE-488 connector CINCH No. 57-20240

Cell Protection: Terminals go low (0 volts) when any relay is closed, and go high (5 volts through 10 kohm) when all relays are open. These lines can be connected in parallel with other scanners to protect all standard cells in a large system. Two circuits are provided, one for A line and one for B line.

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