

Strain Indicator and Recorder



FEATURES

- Four input channels
- Direct reading LCD display
- On-board data storage
- 0 to 2.5Vdc analog output
- Quarter, half and full bridge circuits
- Built-in bridge completion
- 120-, 350- and 1000-ohm dummy gages
- Automatic zero-balancing and calibration
- Intuitive, menu-driven operations
- USB data link
- Operation from keypad or PC
- Portable, lightweight and rugged
- Battery, USB or line-voltage power
- Optional 10-pin transducer connectors

DESCRIPTION

The Model P3 Strain Indicator and Recorder is a portable, battery-operated instrument capable of simultaneously accepting four inputs from quarter-, half-, and full-bridge strain-gage circuits, including strain-gage-based transducers. Water-resistant grommets in the hinged cover allow the lid to be closed with leadwires attached. Designed for use in a wide variety of physical test and measurement applications, the P3 functions as bridge amplifier, static strain indicator, and digital data logger.

The Model P3 Strain Indicator and Recorder, utilizing a large LCD display for readout of setup information and acquired data, incorporates many unique operating features that make it the most advanced instrument of its kind. An extensive, easy-to-use menu-driven user interface operates through a front-panel keypad to readily configure the P3 to meet your particular measurement requirements. Selections include active input and output channels, bridge configuration, measurement units, bridge balance, calibration method, and recording options, among others.

Standard sensor input connection is via eccentric-lever-release terminal blocks. Optional transducer connection is available via side-mounted bayonet locking circular connectors.

Data, recorded at a user-selectable rate of up to 1 reading per channel per second, is stored on a removable flash card

and is transferred by USB to a host computer for subsequent storage, reduction and presentation with the supplied software.

The P3 can also be configured and operated directly from your PC with a separate software application included with each instrument. Additionally, a full set of ActiveX components is provided for creating custom applications in any language supporting ActiveX.

A highly stable measurement circuit, regulated bridge excitation supply, and precisely settable gage factor enable measurements of $\pm 0.1\%$ accuracy and 1 microstrain resolution. Bridge completion resistors of 120, 350 and 1000 ohms are built in for quarter-bridge operation. Also, input connections and switches are provided for remote shunt calibration of transducers and full-bridge circuits.

The P3 operates from two readily available D cells. Battery life depends upon mode of operation but ranges up to 600 hours of continuous use for a single channel. It can also be powered by connection to an external battery or power supply, a USB port on a PC or with an optional external line-voltage adapter, the Model P3-A105.

Strain Indicator and Recorder

HARDWARE SPECIFICATIONS

All specifications nominal or typical at +23°C unless noted.

Inputs:

Eccentric-lever-release terminal blocks accept up to four independent bridge inputs. Accommodates 16-28 AWG (1.3 to 0.35mm diameter) wire.

The Transducer Option includes four 10-pin bayonet locking circular connectors mounted on the side of the case and wired in parallel to the lever-release terminal blocks. The supplied mating connector has a 0.046inch (1.17mm) diameter solder well.

Bridge Configurations:

Quarter-, half-, and full-bridge circuits. Internal bridge completion provided for 120Ω, 350Ω and 1000Ω quarter bridges, 60 to 2000Ω half or full bridge.

Display:

Full dot-matrix structure with 128 dots x 64 dots FSTN positive, gray transfective LCD with backlight. Display update is twice a second.

Data Conversion:

High-resolution sigma-delta converter. 60Hz or 50Hz noise rejection. User selectable.

Basic Range:

±31,000 microstrain (±1 microstrain resolution) at Gage Factor = 2.000.

Accuracy:

±0.1% of reading ±3 counts. (Normal mode operation at Gage Factor = 2.000)

Gage Factor Settings:

Range 0.500 to 9.900.

Balance:

Single key operation to initiate automatic software balance.

Bridge Excitation:

1.5Vdc nominal. Readings are fully ratiometric, and not degraded by variation in excitation voltage.

Communication Interface:

Universal Serial Bus with type B connector. Used for transferring stored data and firmware.

Data Storage:

Media: Removable Secure Digital or Multimedia Card (2GB max). Data Recording Rate: 1 reading per second maximum.

Calibration:

Shunt calibration across each dummy resistor to simulate 5000 microstrain (± 0.1%). Remote calibration supported via accessible switch contacts at input terminal block.

Analog Output:

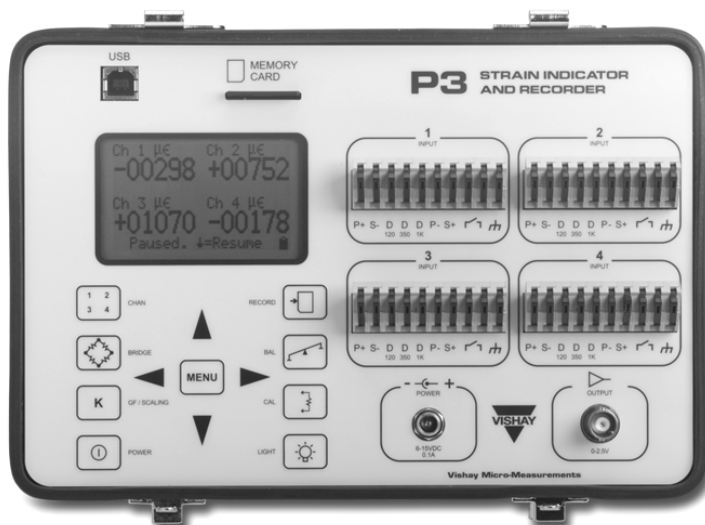
BNC connector. 0 to 2.5V maximum output. Device impedance of 2000Ω or greater. 480 samples/second DAC output update rate.

Power:

Internal battery pack using two “D” cells. Battery life up to 600 hours (single channel, normal mode.) Can also be powered from USB or by external battery or other power source of 6 to 15Vdc. AC adapter optional (Model P3-A105).

Operational Environment:

Temperature 0 to + 50°C. Humidity up to 90% RH, noncondensing.



Strain Indicator and Recorder

FIRMWARE FEATURES

Display Update Rate:

- 2 readings per second.

Recording Rates:

- Up to 64 data files.
- Automatic recording:
 - 1 reading every 1 to 3600 seconds.
 - individually selectable per channel.
- Manual Recording.
- Automatic date/time stamping.

Scaling:

- Automatic scaling for microstrain, based upon gage factor, with nonlinearity correction based upon bridge type.
- Automatic calculation of mV/V.
- Linear scaling for other engineering units.

Units:

- | | | | |
|-----------------|-------|--------|-----------|
| • $\mu\epsilon$ | • g | • rpm | • hp |
| • mV/V | • lbf | • m | • deg |
| • psi | • lb | • s | • rad |
| • ksi | • kg | • A | • oz |
| • GPa | • in | • N | • mV |
| • MPa | • mm | • V | • m/s^2 |
| • Pa | • mil | • Ohms | • ton |

Bridge Types:

- Quarter bridge.
- Half bridge, adjacent arms, equal and opposite strains.
- Half bridge opposite arms equal strains.
- Shear bridge, 2 active arms.
- Poisson half bridge.
- Full bridge 4 fully active arms.
- Shear bridge, 4 active arms.
- Full bridge, Poisson gages in opposite arms.
- Full bridge, Poisson gages in adjacent arms.
- Undefined full bridge.
- Undefined half bridge/quarter bridge.

Bridge Balance:

- Automatic
- Manual offset adjust
- Disabled (Raw offset)

Backlight Control:

- Programmable on time while in run mode:
 - 5, 15 or 60 seconds.
 - Manual off/on.
- If illuminated, backlight will remain illuminated while operating menus.

Software Adjustable Contrast**Operating Modes:**

- Normal mode.
- Analog output (any one of four channels.)

Data Link:

- USB interface
- Windows-based P3 software provided for control and data storage.
- No device driver required (treated as an HID device).

Real-time Clock**System Calibration/Verification:**

- Requires Model 1550A Strain Indicator calibrator or other compatible calibrator.
- Calibration date stored in flash memory.

Firmware Upgradeable**View Showing Optional Transducer Input connectors:**

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