

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
- Remote shunt calibration of transducers
- Intuitive, menu-driven operations
- USB data link
- Portable, lightweight and rugged
- Battery, USB or line-voltage power

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.

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

multimedia card and is transferred by USB to a host computer for subsequent storage, reduction and presentation with third-party software.

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 an internal battery pack of 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.

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 dia.)

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 Multimedia Card (16Mb supplied)
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 assessable switch contacts at input terminal block.

Analog Output:

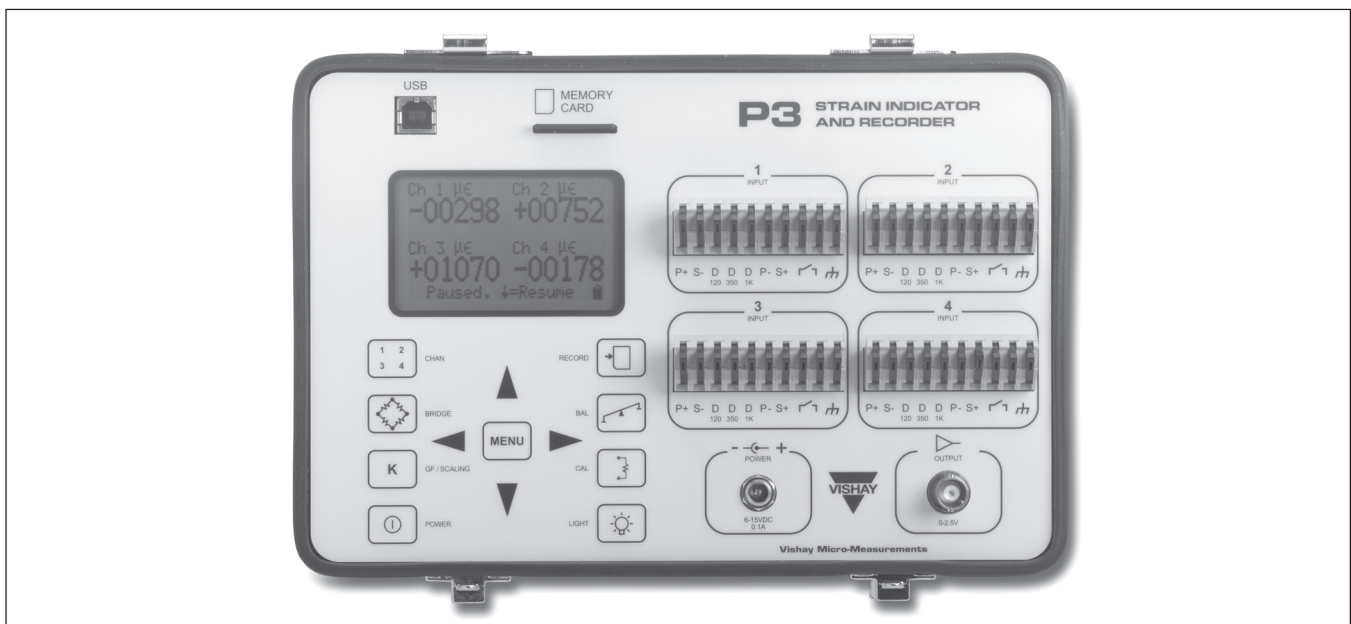
BNC connector. 0 to 2.5V maximum output. Device impedance of 2000Ω or greater. 480Hz output update rate.

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.

Operational Environment:

Temperature 0 to + 50°C. Humidity up to 90% RH, non-condensing.





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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:

- $\mu\epsilon$
- mV/V
- psi
- ksi
- GPa
- MPa
- Pa
- g
- lbf
- lb
- Kg
- in
- mm
- mil
- rpm
- m
- s
- A
- N
- V
- Ohms
- hp
- deg
- rad
- oz
- mV
- m/s²
- 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 strains 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 utility software provided for creating Excel and ASCII files from data stored on MMC.
- No device driver required (treated as a HID device).

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

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

Firmware Upgradeable