Strain Indicator and Recorder

FEATURES

- Four input channels
- Direct reading LCD display
- On-board data storage
- 0 to 2.5 VDC 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 ±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 0.35 mm 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 0.046 inch (1.17 mm) 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 transflective LCD with backlight. Display update is twice a second.

Data Conversion

High-resolution sigma-delta converter. 60 Hz or 50 Hz 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

1.5 VDC 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

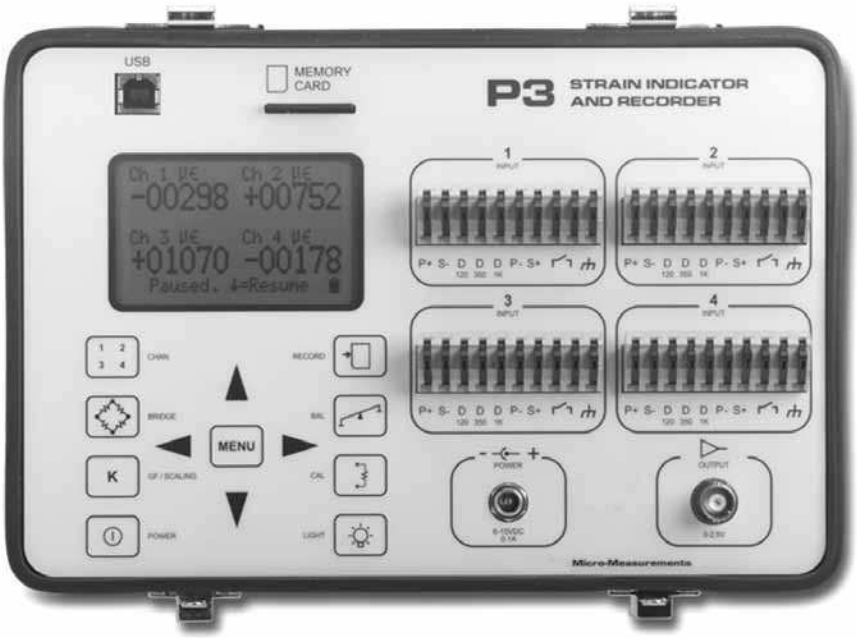
BNC connector. 0 to 2.5V maximum output. Device impedance of 2000Ω or greater. 480 samples/second DAC output update rate.

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 15 VDC. 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

με	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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