PRESSURE/ELECTRICAL CALIBRATOR

NEW **MODEL 1091 PLUS**

Data Sheet 910000-178 Rev A
Date September 1997
File Tester

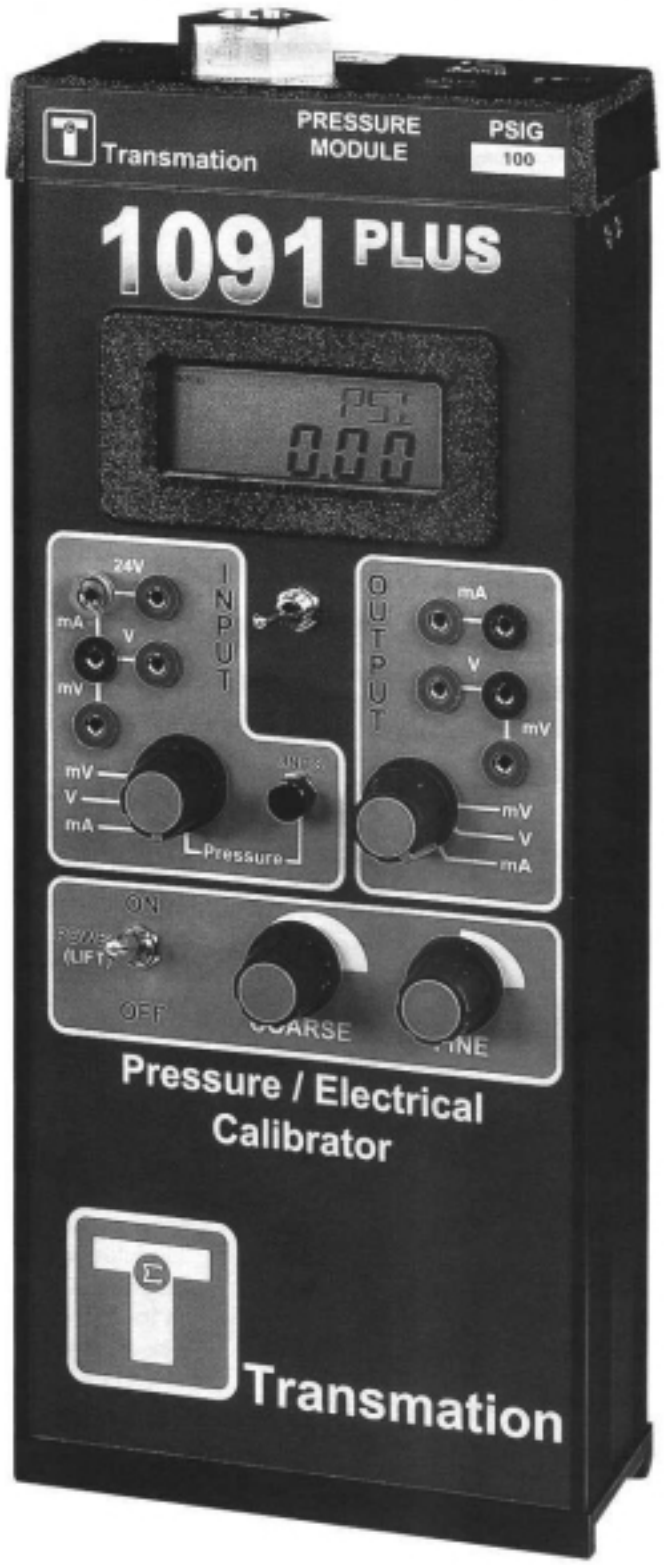
INDUSTRIAL PERFORMANCE PRECISION MEASUREMENT

- Measure pressure from 0.001 to 5000 psig
- Accurate to 0.05%.

Now display in the units you choose...

PSI
"H2O
mmH2O
"HG
mmHG
pa
kPa
mBAR
BAR
kgf/cm2

- Measure and/or simulate mA, mV, V with 0.01% accuracy
- Power 24V transmitters directly
- Simultaneous input and output signals with 200 VAC Isolation
- No gravity correction required for pressure
- Standard with premium rechargeable NiCad 2.2 amp batteries (long battery life)
- Industrial duty aluminum case
- Stability to 0.01%
- Use your existing 1091 or 1090 Transducer Modules



Transmation
Instrument Division

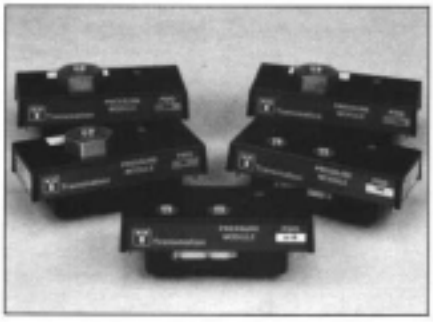
Select Your Pressure Range and Unit of Measure

You can eliminate the complication and risk of error in calculating different values for psig.

The Model 1091PLUS will display pressure in the engineering units you choose.

Simply push the Units button on the Input section until your unit of measurement scrolls up. Selectable engineering units satisfy virtually every process requirement.

Model 1091PLUS saves you the expense and bulk of carrying multiple calibrators.



Each 1091PLUS Transducer Module is quick to connect and simple to change. Simply turn two quarter-turn captive screws on the top end cap to loosen and remove the module. A ribbon cable connector links the Transducer Module to the Readout Module. When you calibrate, a pushbutton on top zeroes the module to atmospheric pressure.

You have a choice of multiple pressure ranges, from a narrow 0 to 0.500 psig up to a wide 0 to 5000 psig. Both isolated and non-isolated modules are available.

Diaphragm-Isolated Pressure Modules accept any fluid or gas compatible to the 316 stainless steel, in spans from 16 to 5000 psig. Non-Isolated Pressure Modules accept non-conductive, non-corrosive, instrument-grade clean air or inert gas inputs in spans from 0.500 to 100.0 psig. Resolution to 0.001 inches of water is possible with the 0.500 module.

Each Non-Isolated Pressure Module contains a unique, positive overpressure protection system called POPS. This preserves sensor calibration and prevents damaging and dangerous ruptures. Over-pressures up to 1000 psi are vented to the atmosphere through orifice restriction and relief valves at the back of the module and away from the user. This happens when input pressure exceeds the module's full scale rating by 117% to 160%. The relief valve automatically seals when pressure drops back below full scale value.

Improved Accuracy

MODEL 1090PLUS when used with the new transducer modules can achieve accuracies of 0.05% for pressure and 0.01% for electrical signals. These higher accuracies are achieved via an automatic computer controlled test fixture.

Economical

Use your existing 1090 or 1091 transducer modules on the 1091PLUS readout module, (1091 and 1090 modules will not display in selected engineering units, you can send these in for a conversion – contact factory). Likewise, you can use the 1091PLUS transducer modules with your existing 1090 or 1091 readout modules.

Total Loop Maintenance

Model 1091PLUS is also a full function DC signal calibrator that can be used to test and calibrate any DC current or voltage I/O process instrument.

Model 1091PLUS measures and generates milliamp signals to test field wiring, loop receivers, and indicators. It also measures and generates voltage signals associated with computers and controllers in the process loop. Model 1091PLUS measures and generates millivolt signals from T/C and pH instruments, analyzers, and strain gauge or load cells. Isolation between Input and Output to 200 VAC is standard.

Model 1091PLUS can also supply 24 volts to power a two-wire transmitter.

Values are displayed on a large, 5 digit LCD. Each signal type has a separate set of terminals for input and output. The 1091PLUS Readout Module is isolated, so you can perform both measurements (input) and simulations (output) simultaneously. Two front panel rotary switches permit independent range selection for Input and Output. Coarse and Fine adjustment controls deliver excellent output resolution.

Lab Accurate-Field Tough

Model 1091PLUS is traceable to the National Institute of Standards and Technology.

Calibration of each 1091PLUS Pressure Module is checked within 0.001% on a computer test system to ensure accuracy of ± 0.05% FS±1LSD of base and module. A calibration certificate is shipped with each module.

For each Model 1091PLUS Readout Module, current and voltage ranges are calibrated to ±0.01% of reading for superior accuracy every time.

Portable Calibrator

The 1091PLUS Calibrator is about the size of a two-way radio and weighs just 4 pounds. It comes in a padded vinyl carrying case with a strap to hang conveniently at the job site. A large back pocket holds all accessories. The pocket will even hold a pressure pump.

You can choose the Model 1098P Precision Pressure Pump to generate up to 100 psig with 0.001 psig resolution. For higher applications, Model 1099 Pneumatic Hand Pump generates up to 600 psig or choose a Hydraulic Hand Pump to generate pressures up to 3000 psig.

Combining any of these capabilities with those of the 1091PLUS provides a complete, portable pressure calibration system.

Unlimited Operation

Model 1091PLUS is a member of the Transmation Snap-Pack® family of portable calibrators. The reliable Snap-Pack Battery Cartridge uses nickel-cadmium batteries for long life. Batteries are rated for up to 1000 charge/discharge cycles. Each battery is individually tested by Transmation to insure its long life. When it's time to change, the depleted cartridge can be easily snapped out of the bottom of the readout module and a recharged battery snapped in to continue operation. Display will indicate "Low Bat" when it is time to change Snap-Pack.

Ordering Information and Specifications

Please Specify:

MODEL NO.	DESCRIPTION
1091PLUS 10	Pressure FlexiTESTER®, DC Snap-Pack: 120 & 240 VAC, 50/60 Hz recharge
1091PLUS 21	Pressure FlexiTESTER®, AC Snap-Pack: 90-130 VAC, 50/60 Hz recharge
1091PLUS 22	Pressure FlexiTESTER®, AC Snap-Pack: 208-240 VAC, 50/60 Hz recharge

Each 1091PLUS Read-out Includes:

- 1091PLUS Users Guide (P/N 100858-900)
- Two sets of test leads (P/N 500143-003)
- A/C Snap-Pack Battery Cartridge Installed
- Snap-Pack Instruction Manual (P/N 100724-902)
- Vinyl Carrying Case (P/N 759995-016)
- AC Charger Transformer (AC Snap-Packs only): 90-130 VAC recharge (P/N 502226-069) or 208-240 VAC recharge (P/N 502226-079)
- Spare 125 mA Fuse Assembly
- NPT to BSP Adapter Fitting

Accessories

Optional Accessories:

- Precision Pressure Pump, 0 to 100 psig — Model 1098P
- High Pressure Pneumatic Callibrator Hand Pump — Model 1099 PNC
- Hand Actuated Pneumatic Pump, 150, 300, or 600 psig — Model 1099
- Hand-Actuated Hydraulic Pump, 0 to 3000 psig — P/N 100830-075
- Low Pressure Kit, rated to 250 psig — P/N 100798-004
- High Pressure Quick-Connect Kit, rated to 3000 psig — P/N 100836-300 (3' Hose) or — 301 (6' Hose)
- Balston Filter Kit

Table 1-1: Available Transducer Modules

Non-Isolated			Isolated		
Model No.	Range	Accuracy[1] (% of range)	Model No.	Range	Accuracy[1] (% of range)
PPDN00.5	0.5 psig	0.15%	PPGI0016	16 psig	0.075%
PPDN0005	5 psig	0.075%	PPGI0033	33 psig	0.05%
PPDN0010	10 psig	0.05%	PPGI0050	50 psig	0.05%
PPDN0016	16 psig	0.05%	PPGI0100	100 psig	0.05%
PPDN0033	33 psig	0.05%	PPGI0150	150 psig	0.05%
PPDN0050	50 psig	0.05%	PPGI0300	300 psig	0.05%
PPDNo100	100 psig	0.05%	PPGI0500	500 psig	0.05%
			PPGI1000	1000 psig	0.05%
			PPGI3000	3000 psig	0.05%
			PPGI5000	5000 psig	0.075%

Footnote:

1) Represents accuracy of the transducer module only; for a combined accuracy, add readout module input calibrated accuracy from specifications.

Specifications

Unless otherwise indicated, all specifications are referred to an ambient temperature of 25°C±1°C (77°F±2°F).

READOUT MODULE

Input Ranges:
Current: -50.00 to + 50.00 mA
Voltage: -50.00 to + 50.00 V
Millivolt: -99.99 to + 100.00 mV

Input Calibrated Accuracy:
Current: ±0.01% of reading + 0.01% of span ± 1 L.S.D.
Voltage: ±0.01% of reading ± 1 L.S.D.
Millivolt: ±0.01% of reading ± 1 L.S.D.
Pressure: ±0.01% of reading + 0.01% of span ± 1 L.S.D.

Input Impedance:
Current: 10 ohms nominal
Voltage: 1 megohm nominal
Millivolt: 1 megohm nominal

Temperature Coefficient: 0.002% of span per °F

Common Mode Effect: 0.01% of span maximum at maximum common mode voltage (input-to-case and input-to-output)

Maximum Common Mode Voltage: 250 VDC or 120 VRMS @ 50/60 Hz

Normal Mode Rejection: 60 dB minimum @ 50/60 Hz

Input Protection: mA input protected via 1/8 amp fuse

Output Ranges:
Current: 0 to 22.00 mA
Voltage: 0 to 11.00 V
Millivolt: 0 to 110.00 mV

Output Calibrated Accuracy:
Current: ±0.01% of reading ± 1 L.S.D.
Voltage: ±0.01% of reading ± 1 L.S.D.
Millivolt: ±0.01% of reading ± 1 L.S.D.

Output Load Drive (Current): 500 ohms maximum @ 20 mA

Output Impedance (Voltage): 10 ohms

Output Impedance (Millivolt): 1 ohm

Output Protection: Protected against output short circuit

Output Noise: 0.01% of span

Power Supply: 24 VDC typical @ 20mA for powering two-wire transmitters

Electrical Isolation: 250 VDC or 200 VAC RMS (input-to-case and input-to-output)

Stability: Short Term (24 hours): 0.01% of span
Long Term (30 days): 0.02% of span

Storage Temperature: -30°C to 60°C (-22°F to 140°F)

Operating Temperature: 0°C to 49°C (32°F to 122°F)

Power: Rechargeable nickel-cadmium batteries in a Transmation AC Snap-Pack Battery Cartridge

Auto-Zero: Pushbutton operated; sets Readout Module display to 0 ± 1 count; disabled when not in pressure mode

Agency Approvals: Pending

Charge Life: Typically provides 25 hours use in measurement mode, 9 hours use for current output @ 20 mA or 24V loop power @ 20 mA

Low Battery Indication: Display indicates low battery condition when battery voltage approaches the end of its charge life (4.7V typical)

Display: 5 digit liquid crystal display with status annunciators for pressure units, milliamps, volts, millivolts, input, output, polarity, overrange, and low battery

Input/Output Connections: Miniature banana jacks

Housing: Interlocking anodized aluminum extrusions

Dimensions (HWD): 273 mm x 114 mm x 55 mm (10.75"x 4.5"x2.175") with Transducer Module installed

Weight: 1.86 kg (4.1 lb.) including Transducer Module and Snap-Pack Battery Cartridge

NON-ISOLATED AND DIAPHRAGM ISOLATED TRANSDUCER MODULES

Media Compatibility: Non-Isolated; Non-conductive, non-corrosive, instrument grade clean, dry air or clean inert gas Isolated; Fluid or gas non-corrosive to 316 Stainless steel wetted material

Overpressure Rating: Isolated; 2 times full scale rating for zero shift of less than ±0.05% of span

Positive Pressure Calibrated Accuracy: See Table 1-1

Negative Pressure Calibrated Accuracy: ±5% of full scale

Overpressure Protection: Self-sealing pressure relief system integral to Transducer Module; set for release @ 117% to 160% of full scale pressure input

Pressure Connections: Threaded internal 1/8"-27 NPT fittings

Filtration: Port filter provided in each pressure port

Sensor Volume: <0.1 cubic inch on both positive and negative ports

Combined Repeatability and Sensitivity: 1 L.S.D. on Readout Module display

Dimensions (HWD): 38 mm x 114 mm x 55 mm (1.5" x 4.5" x 2.175")

Weight: 0.31 kg (11 oz.)

Pressure Units: PSI; "H_2O at 68°F, 60°F, 23°C, 4°C; mmH_2O at 4°C, 23°C; "HG; mmHG; PA; kPA; BAR; KGF