PCL-200 & PCL-200-KIT

Portable Manometer/Calibrator

OMEGA®

An OMEGA Technologies Company

Operator's Manual

GENERAL DESCRIPTION

The OMEGA® PCL-200 Series Portable Manometer/Calibrators provide quality performance, reliability and simple push-button operation. Ideally suited to on-site applications, the PCL-200 models effectively bring laboratory/test calibration capabilities directly into the field. Depending upon the specific model ordered, the simultaneous dual display indicates pressure (or differential pressure) and electronic transducer/transmitter output on any of eight key selectable engineering units.

The PCL-200 autozero/autoranging feature eliminates the need to compensate for local gravity, temperature, barometric pressure or head difference due to the location of tester verses unit being tested. The push of a button automatically establishes zero for both pressure and electrical inputs, while the autoranging feature selects either full range span or 1/10 of span for optimum display accuracy.

The PCL-200 Series employ a piezoresistive pressure sensor, CMOS digital technology, and advanced computer calibration techniques that provide superior performance characteristics. Use of the PCL-200 units are limited to clean, non-condensing air or non-corrosive gases.

The available models are:

MODEL	TYPE	RANGE
PCL-200A	Gage	0-200" H_2O (0-7.2 psi)
PCL-200B	Gage	0-2000" H_2O (0-72 psi)
PCL-200C	Differential	0-200" H_2O (0-7.2 psi)
PCL-200D	Differential	0-2000" H_2O (0-72 psi)

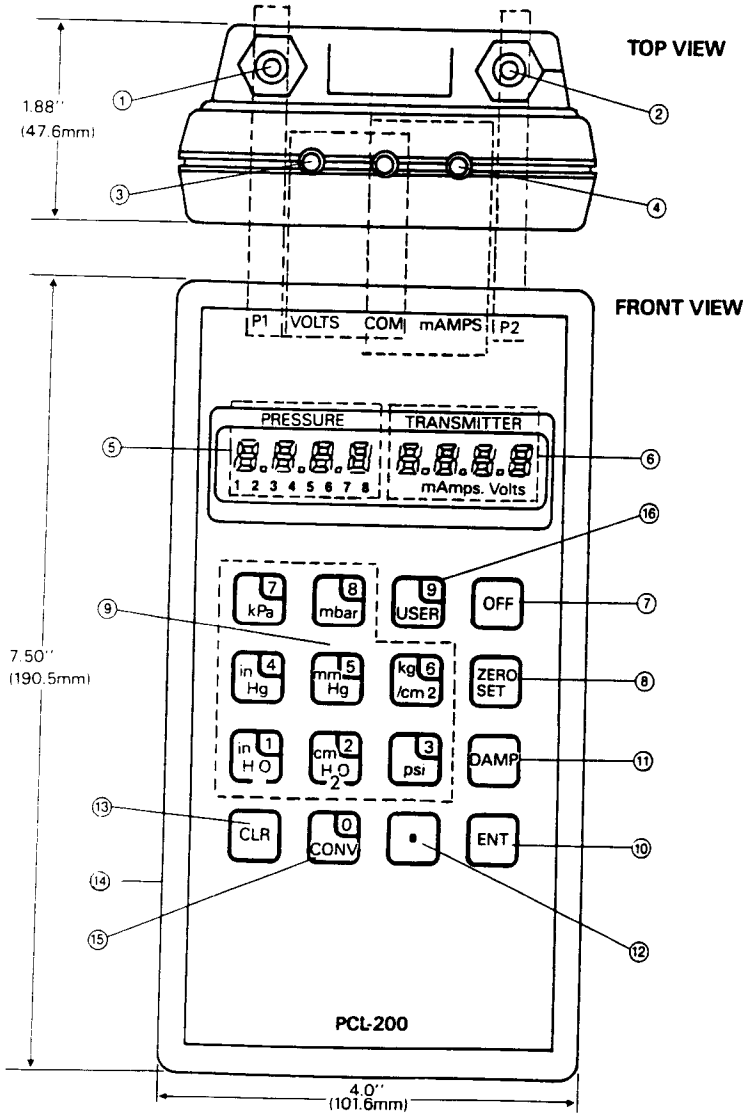


Figure 1. PCL-200 Connections/Controls/Indicators

CONNECTIONS/CONTROLS/INDICATORS

① P1 is connection for pressure measurement (HP side in differential pressure (D/P) models).

② P2 is connection for pressure measurement (LP side; only on D/P models).

③ Connections for voltage measurement (see Figure 5 Typical Voltage Transmitter Calibration Set-Up).

④ Connections for current measurement (see Figure 6, Typical Current Transmitter Calibration Set-Up).

⑤ Four digit LCD pressure display; indicator (numeral below main display) corresponds to units displayed.

⑥ Four digit LCD electronic input display; indicator (mA or volts) will be displayed based on ③ or ④ connections.

⑦ OFF key turns unit off (press any key to turn the unit on). If no keystrokes occur over a 15 minute period, the unit automatically shuts off to conserve batteries. All programmed values/modes are retained and will function when unit is turned on.

⑧ ZERO SET key automatically establishes zero. With all inputs removed, press ZERO SET key and then ENT key ⑩ to zero instrument. Pressing only the ZERO SET key and not the ENT key in sequence will "freeze" the displays at the values displayed when ZERO key was pressed. Remove "freeze" by pressing ZERO SET key again.

⑨ Select pressure units to be displayed (any of 8) after unit has been turned on and zeroed.

⑩ ENT key used for zeroing unit ⑧ above or with USER units ⑯ or CONVersion ⑮ modes.

⑪ DAMP Key. The rate of display update is three per second. Press DAMP key to display running average (flashing pressure and electrical unit indicators show damping mode). Press DAMP key to return to three instantaneous value readings per second.

⑫ DECIMAL key is used with CONVersion ⑮ and USER units ⑯ functions.

⑬ CLR key is used with CONVersion ⑮ and USER units ⑯ functions. Also zero error (uncorrected) may be displayed by pressing ZERO SET and CLR keys. Zero before use.

⑭ Location (on side) of battery charging jack.

⑮ CONVersion key allows user to convert values of any engineering units of those available. Press CONV key, press numbered keys of value to be converted (four significant numbers), press ENT key to enter this numerical value, press key corresponding to units being coverted. Press any other units key and read converted value. Return to pressure by pressing CONV key.

⑯ USER units key allows user to display pressure in units other than those on keyboard. Press USER key. Previously stored units (if any) will be displayed. Press CLR key to clear if change is required. Press numbered keys to enter value of units to be displayed equivalent to range of instrument (in inches of water). Press ENT key to enter this value. Note that no indicator is displayed under pressure value when reading user units.

ADDITIONAL FUNCTIONS/DISPLAYS

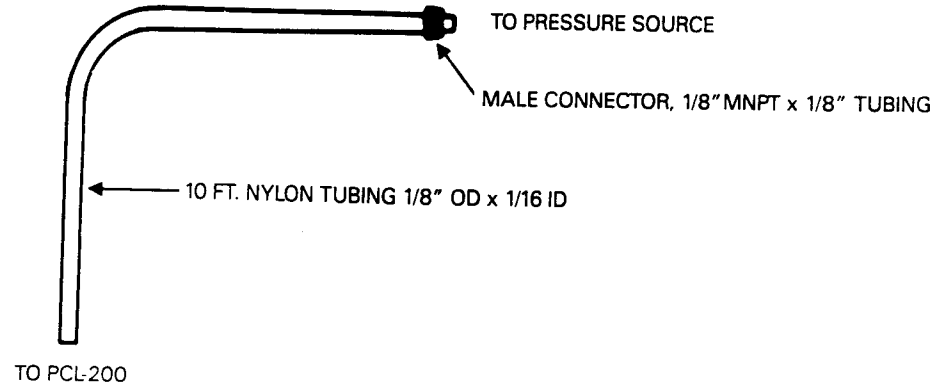
1. "EEEE" is displayed if zero error is beyond range of auto-set capability. Confirm there is no applied pressure, vacuum or electrical input. This display also occurs in conversion mode ⑮ if overranged.
2. "HELP" is displayed if any input is 10% beyond the maximum range of the instrument. (See Specifications.)
3. "Flashing" display (pressure and transmitter values) indicates low battery power. Recharge before use.
4. "-POL" is displayed if pressure or electrical input is more than 5% of span negative. Check for correct connections. Remove all inputs and reset zero ⑧ .
5. Auto-range feature selects full range (see Specifications) or 1/10 of full range span for optimum display accuracy. This applies to both pressure ⑤ and electrical ⑥ input displays.

CAUTION

Before attempting to connect and use the PCL-200, be sure all lines, fittings and hoses are free of liquids, leaks or matter that might plug or otherwise contaminate the instrument.

ACCESSORIES

BASIC TEST KIT



CALIBRATION FITTING KIT (PCL-2CFK)

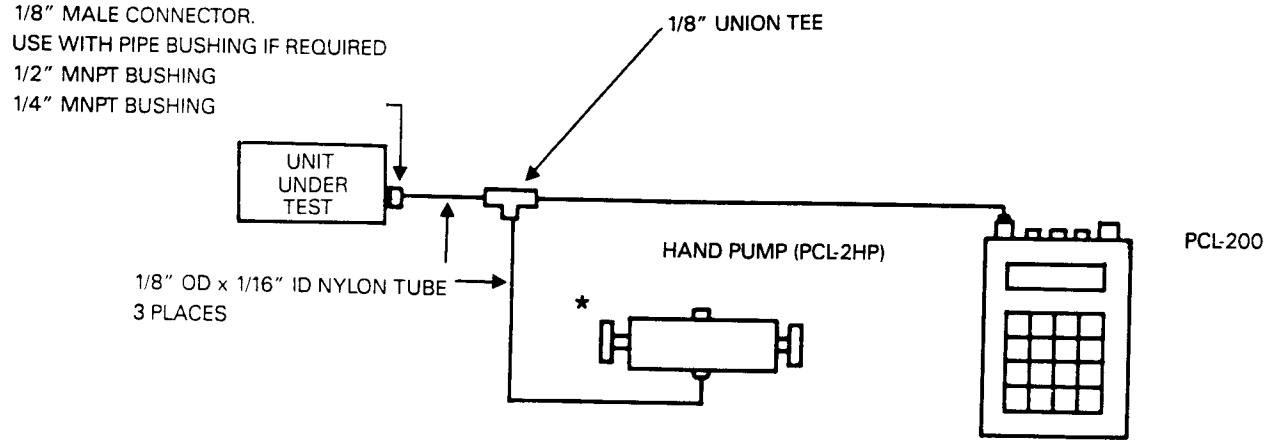


Figure 2. Mechanical Accessories

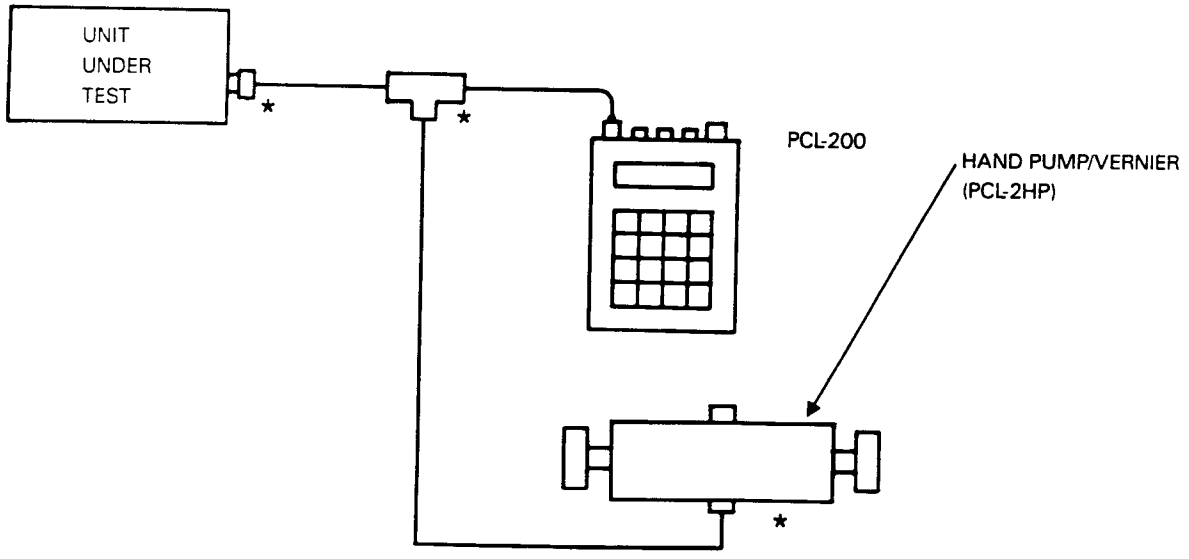


Figure 3. Air Supply Accessories for the PCL-200 Series

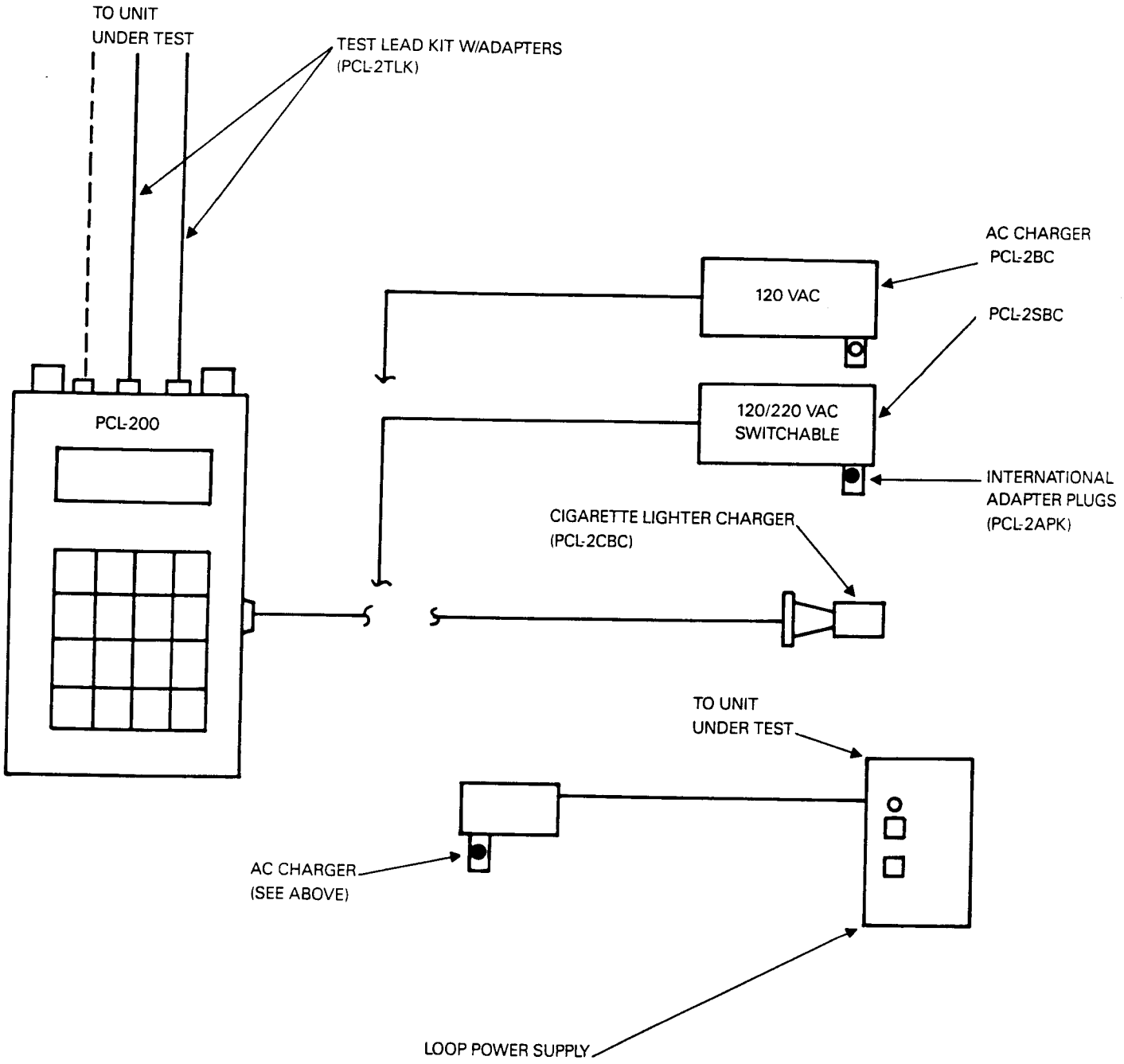
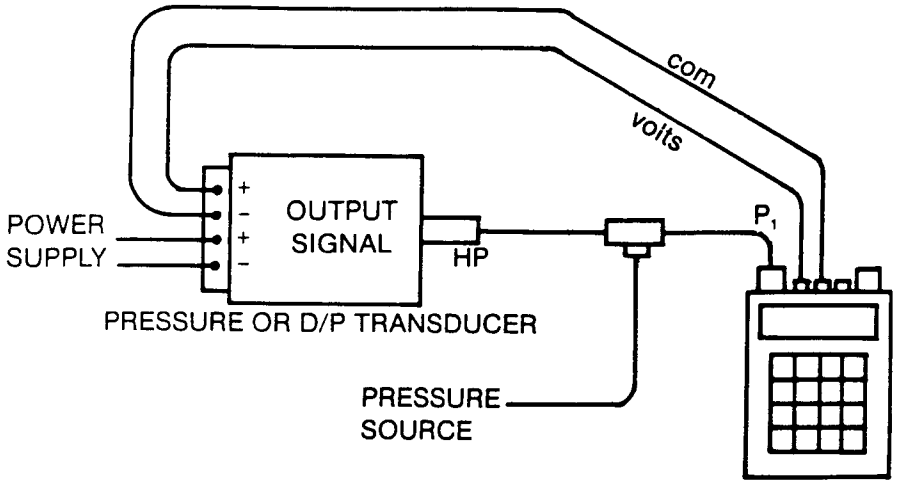


Figure 4. Electrical Accessories for the PCL-200 Series

CAUTION

Do not use the AC Charger with any other product. Do not attempt to charge the PCL-200 with any charger other than those above. Charge or use loop power supplies only in a non-hazardous area.

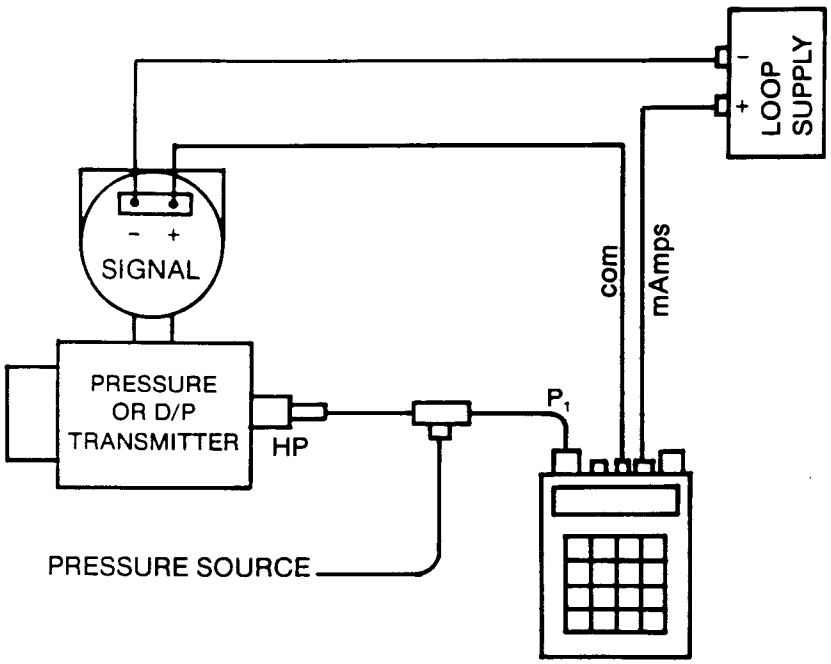


EQUIPMENT REQ'D.	P/N
TEST LEADS (2 SETS)	PCL-2TLK
CALIBRATION FITTING KIT	PCL-2CFK
PRESSURE SOURCE	HAND PUMP, PCL-2HP

PROCEDURE

1. APPLY PRESSURE (with Hand Pump, PCL-2HP), READ PRESSURE AND TRANSMITTER OUTPUT.
2. ADJUST SPAN AND ZERO PER TRANSMITTER'S OPERATING INSTRUCTIONS

Figure 5. Typical Electronic Voltage Transducer Calibration Set-Up



EQUIPMENT REQ'D.	P/N
TEST LEADS (2 SETS)	PCL-2TLK
CALIBRATION FITTING KIT	PCL-2CFK
PRESSURE SOURCE	HAND PUMP, PCL-2HP

PROCEDURE

1. APPLY PRESSURE (with Hand Pump, PCL-2HP), READ PRESSURE AND TRANSMITTER OUTPUT.
2. ADJUST SPAN AND ZERO PER TRANSMITTER'S OPERATING INSTRUCTIONS

Figure 6. Typical Electronic Current Transducer Calibration Set-Up

SPECIFICATIONS

PRESSURE RANGE[1]: See table below for models, ranges and units (other than H_2O).

PRESSURE LIMITS[2]: 15 psig (1 bar) for 200" H_2O range units.
150 psig (10 bar) for 2000" H_2O range units.

ELECTRICAL INPUT RANGE[1]: Voltage, 0/30 Vdc, Resolution .02 for 3 to 30 Vdc/mA, .002 for 0 to 3 Vdc/mA Current, 0/30 mAdc

ELECTRICAL LIMITS[2]: 120 Vac or Vdc

ACCURACY, PRESSURE: ±0.10% reading, ±1 count (includes the combined effects of linearity, hysteresis, repeatability, and temperature over calibrated range)

ACCURACY, ELECTRICAL: ±0.10% reading ±2 counts, both mA and voltage

TEMPERATURE: Operating, −20° to 122°F (−29° to +50°C)
Storage, −40° to 140°F (−40° to +60°C)
Effects, none within the calibrated range of −4° to +104°F (−20° to +40°C)

WETTED PARTS[3]: Do not expose to media which is not compatible with nickel, brass, Buna-N, polyurethane, silicone gel and methacrylate ester.

BATTERIES: Rechargeable Ni-Cad type. When fully charged, operating time (continuous) is min. 40 hrs. at 70°F (21°C) or min. 20 hrs. at −20°F (−29°C).

DISPLAY: LCD Type: 4 digits pressure or differential pressure and simultaneously 4 digits voltage or current input. Digits are 0.3" (7.6mm) high. (Indicator for pressure units and electrical units identifier).

CASE: Black impact resistant injection molded ABS.

KEYBOARD: Sealed membrane type with chemically resistant polyester surface. Keys are positive tactile feedback type.

PRESSURE CONNECTIONS: Quick connect type accepts most 1/8" O.D. nylon, polyethylene and soft copper tubing. Soft wall tubing such as polyurethane or rubber is not recommended.

NOTES:
1 Autoranging (10:1 turndown) is included.
2 Exceeding these limits may cause damage and necessitate repair and/or recalibration and recertification.
3 Not recommended for liquid services.
4 Tubing must be clean and free of O.D. scratches or sharp burrs to insure leak-free measurement and avoid damage to connectors.

CAUTION: Calibration checks may be made with suitably accurate/corrected devices. Aside from auto-zero feature, there are no external adjustments possible. Opening the case assembly voids the warranty.

RANGE AND RESOLUTION

	PCL-200 A/C		PCL-200 B/D	
UNITS	**RANGE**	**RESOLUTION**	**RANGE**	**RESOLUTION**
in H_20	0 - 20.00 20.0 - 200.0	±0.01 ±0.1	0 - 200.0 200 - 2000	±0.1 ±1
cm H_20	0 - 50.80 50.8 - 508.0	±0.03 ±0.3	0 - 508.0 508 - 5080	±0.3 ±3
psi	0 - 0.721 0.721 - 7.212	±0.001 ±0.004	0 - 7.212 7.21 - 72.12	±0.004 ±0.04
in Hg	0 - 1.468 1.47 - 14.68	±0.001 ±0.01	0 - 14.68 14.7 - 146.8	±0.01 ±0.1
mm Hg	0 - 37.30 37.3 - 373.0	±0.02 ±0.2	0 - 373.0 373 - 3730	±0.2 ±2
Kg/Cm^2	0 - 0.507	±0.001	0 - 0.507 0.507 - 5.070	±0.001 ±0.003

RANGE AND RESOLUTION

	PCL-200 A/C		PCL-200 B/D	
UNITS	RANGE	RESOLUTION	RANGE	RESOLUTION
kPa	0 - 4.973 4.97 - 49.73	±0.002 ±0.02	0 - 49.73 49.7 - 497.3	±0.02 ±0.2
mbar	0 - 49.73 49.7 - 497.3	±0.02 ±0.2	0 - 497.3 49.7 - 4973	±0.2 ±2
volts	0 - 3.000 3.00 - 30.00	±0.002 ±0.02	0-3.000 3.00 - 30.00	±0.002 ±0.02
milliamps	0 - 3.000 3.00 - 30.00	±0.002 ±0.02	0-3.000 3.00 - 30.00	±0.002 ±0.02

Water column reference 20°C (68°F)
Mercury column reference 0°C (32°F)

Total accuracy is the sum of the percent of reading plus the resolution for the specific range.

WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of **13 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

OMEGA is glad to offer suggestions on the use of its various products. Nevertheless, OMEGA only warrants that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

Every precaution for accuracy has been taken in the preparation of this manual; however, OMEGA ENGINEERING, INC. neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the products in accordance with the information contained in the manual.

SPECIAL CONDITION: Should this equipment be used in or with any nuclear installation or activity, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the equipment in such a manner.

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RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA ENGINEERING Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:
1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS OR **CALIBRATION**, consult OMEGA for current repair/calibration charges. Have the following information available BEFORE contacting OMEGA:
1. P.O. number to cover the COST of the repair/calibration,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.