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User's Guide

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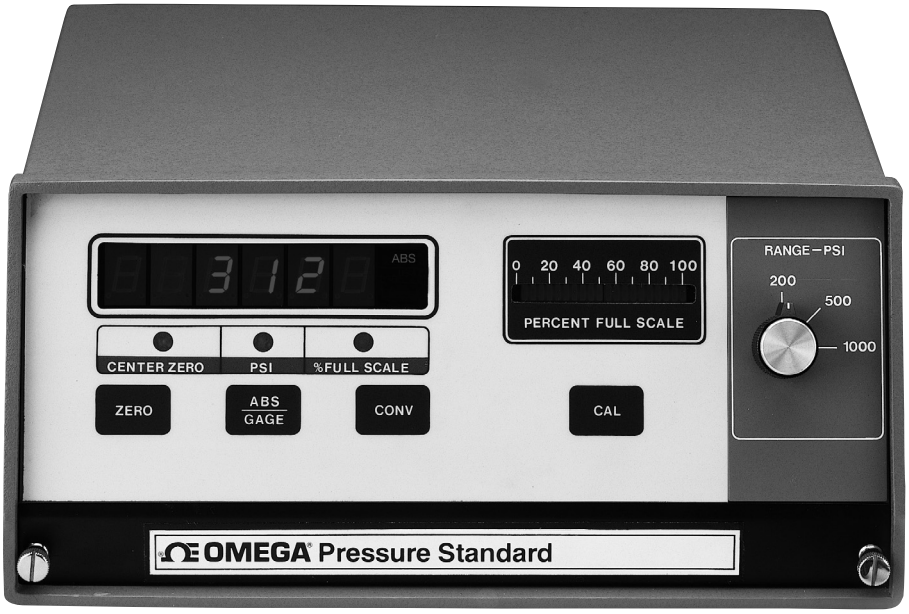

PCL-3000 SERIES
High Accuracy Pressure Standard

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TABLE OF CONTENTS

SECTION 1 INTRODUCTION

1.1 GENERAL DESCRIPTION

The OMEGA® PCL-3000 Series Digital Pressure Standards are specifically designed for use in the manufacture, test or calibration of pressure sensitive devices. Using a patented, bonded foil strain gage sensor and advanced microcircuitry these rugged, compact instruments provide simultaneous digital and analog readouts of the pressures applied.

Standard front panel switches permit desired pressure range selection, automatic zeroing of the display, and actuation of a unique internal self-calibration feature.

Each instrument has two displays - digital and analog. The digital display provides precise pressure information, and the analog display gives quick reference to direction and level of pressure.

1.2 FEATURES

- Three, independent, switch selectable pressure ranges per instrument
- Accuracy of each range equal to or better than +0.5% F. S.
- Both GAGE and ABSOLUTE pressure calibrations available via front panel switch selection (for applicable models)
- Automatic Self-Calibration: Computer controlled internal circuitry provides automatic maintenance of both zero and span calibration data to insure long term stability and accuracy. No potentiometer adjustments used or required. Calibration of all three ranges completed within six seconds.
- Calibration Integrity: Tamper-proof design. Once calibrated, numerous “safe guards” guarantee the integrity of pressure readings obtained. Display “prompting” provides operator with functional status information during both operation and calibration.
- Digital Display: Eliminates parallax, interpolation and operator judgement errors. Large, bright red LED digits provide excellent readability under all lighting conditions.
- Analog Display: An electronic, front panel meter provides instantaneous visual indication of applied pressure.
- Fast response - pressure data refreshed 10 times per second
- Pressure media - any gas or fluid compatible with 17-4PH stainless steel alloy
- Data output is Serial data, 20 mA loop current, ASCII code, supplied as standard interface

1.3 OPTIONS

ANALOG OUTPUT:
Either a 0 to 10 Vdc or a 4 to 20 mA isolated output is available. Both outputs are optically isolated from the input circuitry and the external case. The accuracy is ±0.25% F. S. maximum.

PARALLEL BCD DATA OUTPUT:
This output is isolated, tri-state buffered and DTL/TTL compatible. The data consists of; polarity, five full data digits, measurement units, data valid, hold and enable lines.

RS-232 SIMPLEX OUTPUT:
Available with BAUD Rate Select from 300 to 9600 BAUD, two different formats -computer or printer; and two different request modes - demand or continuous. A program sheet is supplied by the factory when this option is ordered.

PEAK HOLD:
This option retains the maximum pressure value in memory. Depressing the RECALL switch on the front panel will display the peak reading. Depressing the RESET switch clears the peak reading register.

SETPOINT OUTPUT:
Up to two independent set points can be programmed and provided for the purpose of implementing various control functions. These set points may be programmed or changed either via internal switch settings or by the operator.

Solid state, optically isolated relay output contacts rated at 120/240 Vac and 1.5 A are provided for control. Relays may be programmed to be either OPEN or CLOSED below the set point activation level.

BATTERY OPERATION:
This internal self-contained rechargeable battery provides eight hours of continuous service. A low battery light (lower righthand corner of front panel) indicates when it’s time to recharge the batteries.

PANEL MOUNTING KIT: This optional side-mounting kit allows recessed mounting into a custom fit panel.

FREEZE MODE:
When connected via terminal board, TB-2 pins 7 and 8, display data will be momentarily (approximately 5 seconds) frozen when external switch contacts change state

SECTION 2 INSTALLATION

2.1 UNPACKING

Remove the Packing List and check off actual equipment received. If there are any questions about the shipment, please call the OMEGA Customer Service Department at 1-800-622-2378 or (203) 359-1660. We can also be reached on the Internet at:
www.omega.com
e-mail: info@omega.com

Upon receipt of shipment, inspect the container and equipment for any signs of damage. Take particular note of any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE:

The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material in the event reshipment is necessary.

2.2 MOUNTING

The PCL-3000 Series comes standard for table-top usage, with rubberized feet and a tilt stand. With the optional Panel Mounting Kit, the PCL-3000 can be panel-mounted through panels of any thickness up to 1¼ inches. Panel cutout dimensions and overall unit dimensions are shown in Figure 2-1.

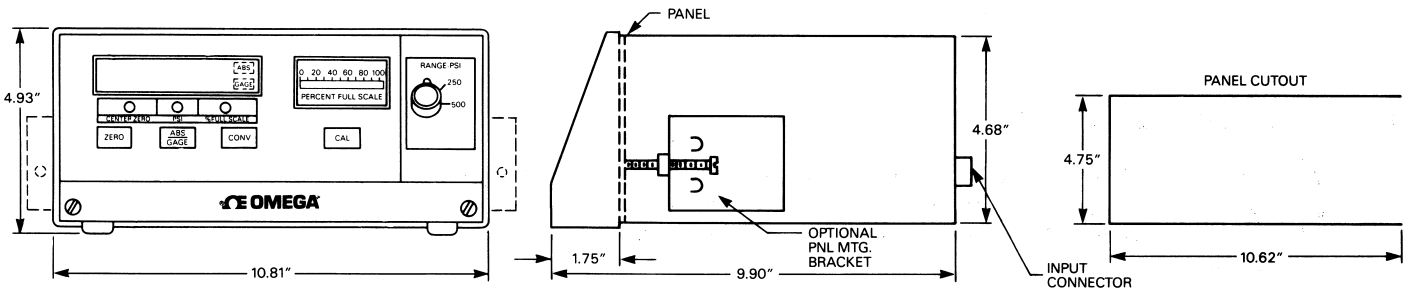


Figure 2-1. Mounting and Outline Dimensions

2.3 117/220 VAC OPERATION

The PCL-3000 is supplied with a multi-tap power transformer primary winding such that input voltages of 117 Vac or 220 Vac, 50/60 Hz may be used for excitation.

The unit will be shipped from the factory with the voltage set according to the customer order, and the 0PCL-3000's rear panel nameplate will reflect this voltage.

To change the operational voltage:

1. Loosen the two thumbscrews located at the bottom outermost corners of the front panel, then slide the electronic assembly forward.

NOTE:

The PCL-3000 may be fully operated with the case removed without any potentially lethal shock hazard to operating personnel, since the highest accessible internal voltage is nominally 25 Vdc.

2. Remove the two screws which hold the line voltage filter to the rear panel. Leave all the wires connected and simply fold them out of the way temporarily.
3. Carefully remove and save the protective insulating cover sheet from the top of the transformer.
4. Refer to Figure 2-2 and make the appropriate transformer connections via jumpers.

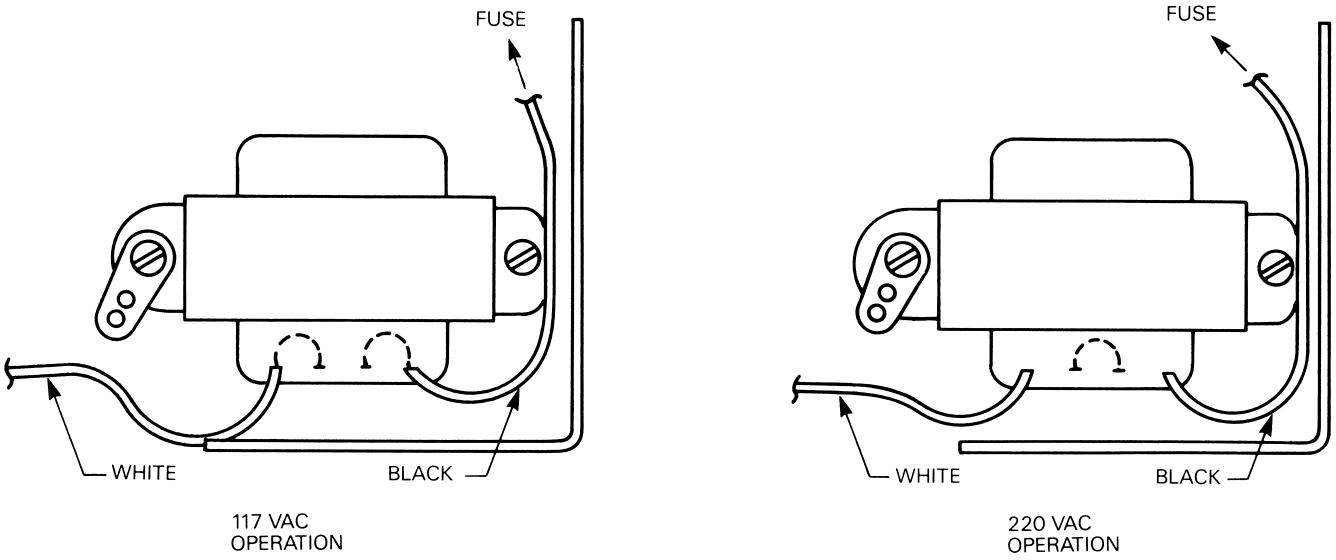


Figure 2-2. 117/220 Vac Jumper Connections

2.4 REAR PANEL CONNECTIONS

The rear panel (refer to Figure 2-3) contains the power line input receptacle, the pressure port fitting, the unit's identification plate, and if required, either one or both option connectors, J1 and J3. The J1 connector is for either of the Analog Output options and the RS-232 option. The J3 connector is for the Parallel BCD Output option. The pressure port is a male, 7/16-20 UNF-2A fitting.

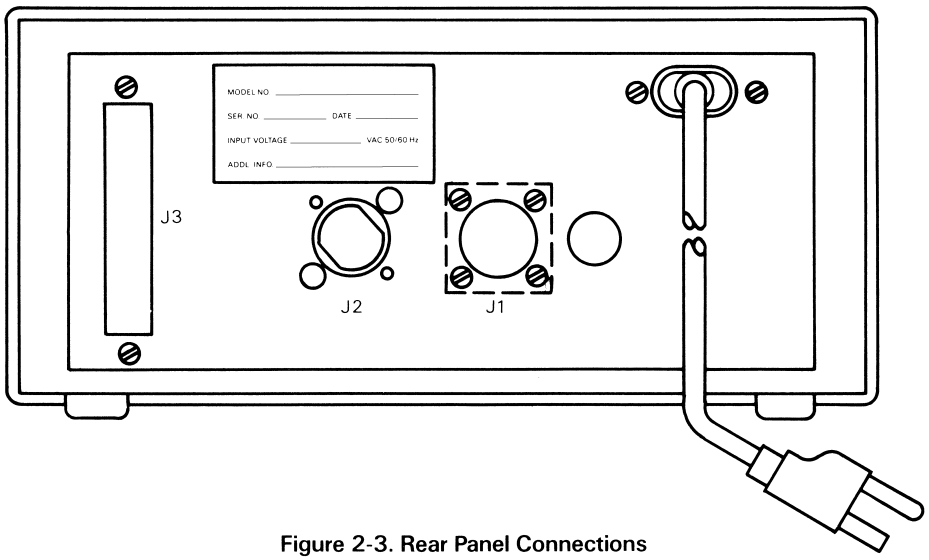


Figure 2-3. Rear Panel Connections

SECTION 3 OPERATION

3.1 CONTROLS AND INDICATORS

TABLE 3-1
CONTROLS AND INDICATORS

ITEM	CONTROL/INDICATOR	FUNCTION
1	Range selection switch	A three position rotary switch that selects the desired pressure range.
2	Analog meter	Used to provide a coarse indication of the pressure applied at any given instant. It has twenty discreet LED segments which individually illuminate, and is calibrated as a ‘‘percent of full scale meter’’, so that each of three pressure ranges may be displayed.
3	Digital display	Provides precise pressure information.
4	ZERO switch	A momentary action push button switch used to ‘‘zero’’ the display with no pressure applied. When actuated, produces a visual feedback through either the digital display or the red LED annunciator located immediately above the ZERO switch.
5	ABS/GAGE switch	A momentary action push button switch used to select between ABSOLUTE and GAGE modes. (Internally disabled if not used or appropriate.)
6	CONV switch	A momentary push button switch used to select the desired display units, psi or % full scale (Models PCL-3000A, B, C, and G) or psi and inches H_2O (Models PCL-3000D and E). (Internally disabled if not used or appropriate.) When actuated, produces a visual feedback through either the digital display or the red LED’s located immediately below the digital display.
7	CAL switch	A momentary push button switch used to activate the internal Self-Calibration sequence.
8	RECALL switch	When depressed, the peak reading will display on the digital display.
9	RESET switch	Clears the peak reading register.
10	Set Point Thumbwheel switches	Used to designate set point 1 and set point 2 values.

NOTE:

Some configurations require that certain switches be inactive. For example, the ABS/GAGA switch is not required if the unit is configured for “gage only” operation. If so, the affected switch will be internally programmed to be inactive and a “blank” overlay will be used to cover the switch nomenclature.

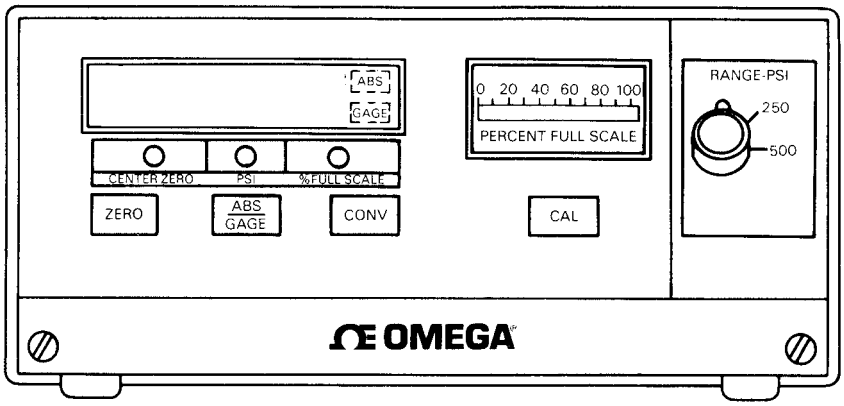


Figure 3-1a. Standard PCL-3000 Series Front Panel Controls and Indicators

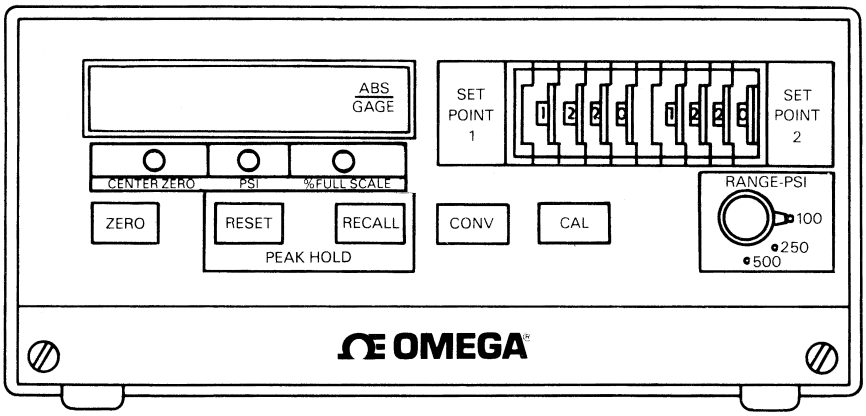


Figure 3-1b. PCL-3000 with Dual Set Point and Peak Hold Options Front Panel Controls and Indicators

3.2 OPERATING PROCEDURE

1. Apply power to the instrument and allow to stabilize for at least 20 minutes. If possible, the unit should have power applied continuously.
2. Connect the pressure source to the instrument via the male, 7/16-20 UNF-2A fitting provided on the rear panel. Valves for venting and applying the pressure should be provided.
3. Select the desired full scale pressure range via the three position RANGE-PSI Switch. Do not change pressure ranges during any given pressure cycle.
4. If applicable or required, select the GAGE mode of operation by momentarily depressing the ABS/GAGE push button switch.
5. To zero the instrument, vent the input pressure port to atmosphere (0 PSIG) and momentarily depress the ZERO push button switch.

   The display will indicate “zero” and the CENTER ZERO annunciator (LED) will illuminate.

6. To perform a self-calibration check simply set the instrument to zero as per step 5 and momentarily depress the CAL switch.

   The display will immediately blank except for two "- -" which indicate the unit is performing the self-calibration. If the calibration is correct, a 100.00 indication will be momentarily displayed and then the display will revert to its normal "zero" indication.

7. To select the desired measurement display units (psi, % full scale, or inches H_20) depress the CONV push button switch.

8. The instrument is now fully calibrated and ready to display applied pressure.

CAUTION:

Application of pressures greater than 1.5 times the highest pressure range value of the indicator may cause calibration errors or even permanent damage to the pressure transducer.

3.3 CONFIGURATION SWITCH SETTINGS

As normally supplied, the PCL-3000 will be fully calibrated and configured to the requirements specified by the customer. However, there are several functions or operational features (covered in paragraphs 3.3.1 through 3.3.5) that may be altered by the operator during usage. These are controlled by the eight position DIP switch, S1 (refer to Figure 3-2). To access S1, loosen the two thumbscrews located at the bottom outermost corners of the front panel, then slide the electronic assembly forward.

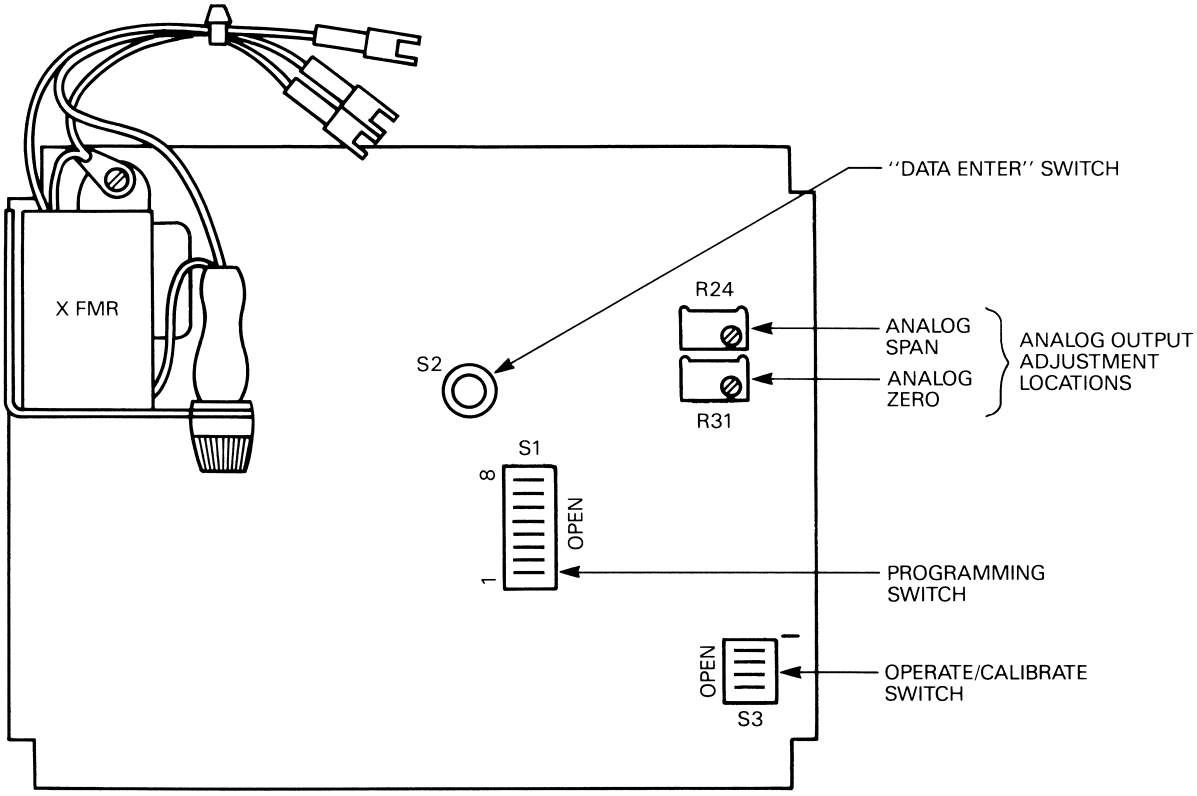


Figure 3-2. Programming Switches and Adjustment Locations

TABLE 3-2
ABS/GAGE/PEAK HOLD SELECT

SWITCH SETTINGS S1		PEAK HOLD MODE	ABS/GAGE MODE*
1	2		
0	0	Disabled	ABS and GAGE
0	1	Disabled	GAGE or ABS only
1	0	Enabled	GAGE or ABS only

0 = Open
1 = Closed
* ABSOLUTE or GAGE modes of operation depend up on the style of transducer supplied and the type of internal memory configuration utilized.

When the ABS/GAGE switching is not utilized, the front panel push button switch will be programmed to inactive and covered with a "blank" overlay.

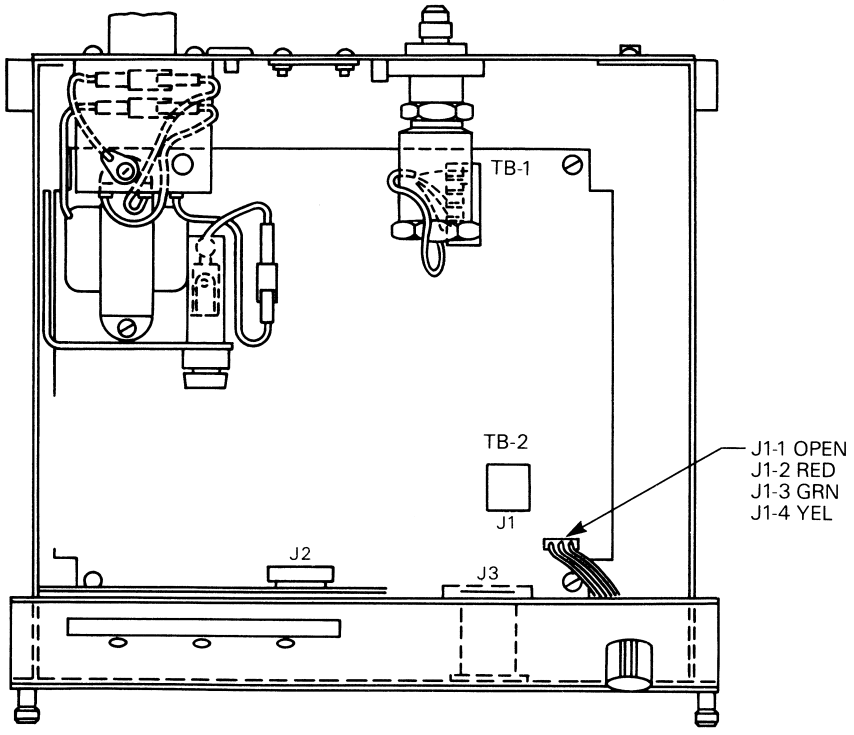
When the PEAK HOLD option is supplied, switching from ABS to GAGE calibration via the front panel is not possible, and when enabled, the FREEZE MODE (if supplied) is not operable.

NOTE:

When the PEAK HOLD option is supplied it is possible to switch from ABS to GAGE via an internal change. Contact the OMEGA Engineering Department for additional information.

3.3.1.1 Freeze Mode

The external contacts for the FREEZE MODE input are available via TB-2, pin 7 (+) and pin 8 (ground return). TB-2 is the orange terminal block located on the right front of the PC Board (refer to Figure 3-3).



WIRING OF TRANSDUCER TO TB-1

SIGNAL NAME	COLOR	TERMINAL BOARD
+ Input	GRN	TB1-3
+ Output	WHT	TB1-4
– Output	RED	TB1-5
– Input	BLK	TB1-6

3.3.2 Convert Enable (Refer to Table 3-3)

TABLE 3-3
CONVERT ENABLE

SWITCH SETTING S1-3	FRONT PANEL CONV KEY MODE
0	Disabled
1	Enabled

The PCL-3000 is supplied with the display indication calibrated in PSI (either A or G or both) and capable of being converted to % of full scale readings (Models PCL-3000A, B, C, and G) or inch H_20 (Models PCL-3000D and E) via the front panel CONV push button switch.

3.3.3 Digital Averaging (Refer to Table 3-4)

TABLE 3-4
DIGITAL AVERAGING

SWITCH SETTINGS S1		AVERAGE SELECT	APPROXIMATE UPDATE RATE
4	5		
0	0	1 (off)	12/sec
1	0	2	6/sec
0	1	4	3/sec
1	1	Auto	3-12/sec

Digital averaging is a technique where numerous update cycles are averaged together before the numerical display data is changed. In essence, this feature acts as a variable rate electronic filter to provide a more stable pressure indication reading.

The AUTO mode of this filter allows the display to update rapidly (12/sec) when the input pressure is being quickly changed, and yet provides extremely stable display operation (3/sec) when the desired pressure input value has been obtained.

3.3.4 Automatic Zero Maintenance (AZM) Enable (Refer to Table 3-5)

TABLE 3-5
AZM ENABLE

SWITCH SETTING S1-6	AZM MODE
0	Disabled AZM
1	Enabled AZM

The Automatic Zero Maintenance (AZM) feature is used to “hold” the indicator reading to a zero value as long as the actual pressure input is maintained at zero. If the input pressure changes by more than one half a least significant display digit between two consecutive display update cycles, the “hold” feature is automatically disabled and the exact magnitude of the pressure being exerted will be displayed.

In some applications it may be better to operate the instrument without the AZM circuit enabled. If so, pressing the ZERO push button switch, with zero pressure applied to the instrument, will guarantee that each new pressure cycle begins at zero.

3.3.5 Automatic Span Maintenance (ASM) Enable (refer to Table 3-6)

TABLE 3-3
CONVERT ENABLE

SWITCH SETTING S1-3	FRONT PANEL CONV KEY MODE
0	Disabled
1	Enabled

The Automatic Span Maintenance (ASM) circuit operates in conjunction with the front panel CAL button to provide a calibration feature that insures long term accuracy by utilizing the computer to generate and control an internal "shunt calibration mode" of operation, where the latest indicator reading obtained is compared against, and if necessary, corrected to the digitally stored value for the same shunt calibration reading obtained at the time of initial pressure calibration.

SECTION 4 THEORY OF OPERATION

The heart of the PCL-3000 Series Pressure Indicators is a highly stable and repeatable pressure transducer.

These sensors, which utilize a patented bending beam mechanism operating in conjunction with a bonded metal foil strain gage bridge, produce an electrical output signal which is linearly proportional to applied pressure.

By combining these sensors with sophisticated microprocessor-based circuitry an even higher degree of operational accuracy and precision has been accomplished. For example, the unique "push-to-zero" and "zero tracking" feature permits each new pressure cycle to begin from a known and digitally stored zero reference value and, eliminates the necessity of the customary "zero" adjustment.

In like manner, the span potentiometer is eliminated since the numerical value corresponding to full scale pressure is also digitally stored during initial instrument calibration and all subsequent pressurizations are simply "ratioed" to this value and displayed in the appropriate engineering units. Computer generated and stored correction curves for both the nonlinearity and the hysteresis of the sensor improve these characteristics by an order of magnitude or more. Finally, a "self-calibration" feature insures long term accuracy by utilizing the computer to generate and control an internal "shunt calibration mode" of operation where the indicator's reading is compared against, and if necessary, corrected to the digitally stored value for full scale obtained at the time of initial pressure calibration.

For all its sophistication, however, the instrument is simple to operate and easy to calibrate. Operation of the unit is completely controlled and performed via the front panel switches and consists basically of the following four-step sequence:

a. Select the desired pressure range.
b. Vent the transducer system to atmospheric pressure.
c. Press the zero switch*.
d. Close the vent valve and begin pressure measurements.

* If a "self-calibration" cycle is desired - press the CAL switch after completing step c.

With respect to calibration, the units are shipped from the factory fully configured and calibrated to the requirements of the customer purchase order and should be ready for immediate use after installation.

However, if and when re-calibration is required, the PCL-3000 Series has been designed and programmed to be very "user friendly" in that it provides the calibrator with various prompting symbols and legends during each phase of the calibration cycle.

To prevent unauthorized tampering or misalignment, numerous safe guards have been incorporated which greatly minimizes this potential danger.

SECTION 5 CALIBRATION

5.1 GENERAL

The following calibration sequence will permit a qualified technician to calibrate the PCL-3000. It must be emphasized that when performing the calibration procedures, that the computer within the PCL-3000 is actually being reprogrammed.

Therefore, it is imperative that the test equipment being used is in satisfactory operating condition, and that the technician fully understands its operational characteristics and methods of usage. In addition, the PCL-3000 must be properly warmed up and electrically stabilized prior to performing a calibration cycle.

5.2 CALIBRATION SET-UP

Figure 5-1 illustrates a typical calibration set-up using a floating piston type air dead weight tester. (Any type of precision source is acceptable as long as its basic accuracy is ±0.025% of point or better.)

To permit proper calibration, at least an on/off and a vent valve, connected as shown in Figure 5-1, must be provided.

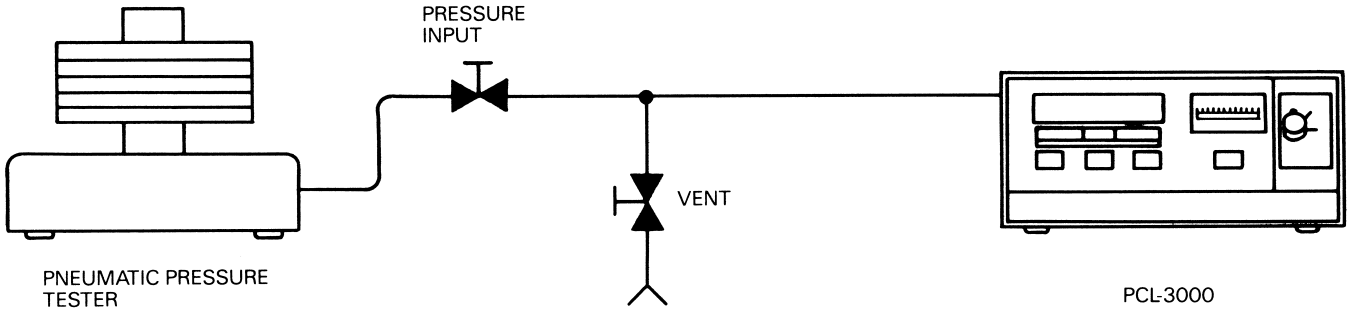


Figure 5-1. Calibration Set-Up

5.3 INSTRUMENT SET-UP

To place the PCL-3000 into its calibrate mode, temporarily remove the instrument from its case by loosening the two thumbscrews at the bottom outermost corners of the front panel and sliding the electronic assembly forward. Locate the four-position DIP switch, S3 (refer to Figure 3-2) and set the switches according to Table 5-1.

TABLE 5-1
S3 SWITCH SETTING
FOR CALIBRATION SET-UP

SWITCH SETTINGS S3				PROGRAM SWITCH MODE
1	2	3	4	
0	0	0	0	OPERATE
1	0	1	0	CALIBRATE

0 = OPEN
1 = CLOSED

In the calibrate mode the indicators numerical display is used to provide operator prompting symbols as well as displaying the various data formats employed. In addition, the front panel ABS/GAGE push button switch becomes a sequential " stepper" used to select the various programming functions (zero/span; linearity/hysteresis; shunt calibration) and the CAL push button switch is used as an "enter" key.

All calibration functions will be performed as "gage" (atmospheric reference) measurements unless the instrument being calibrated has been configured as an "absolute only" unit. If so, the following procedures are still valid except that an absolute ("0" PSIA) reference must be used.

Figure 5-2 illustrates the location of the "stepper" and "enter" key as well as showing the display format obtained as soon as the unit has been placed in the calibrate mode.

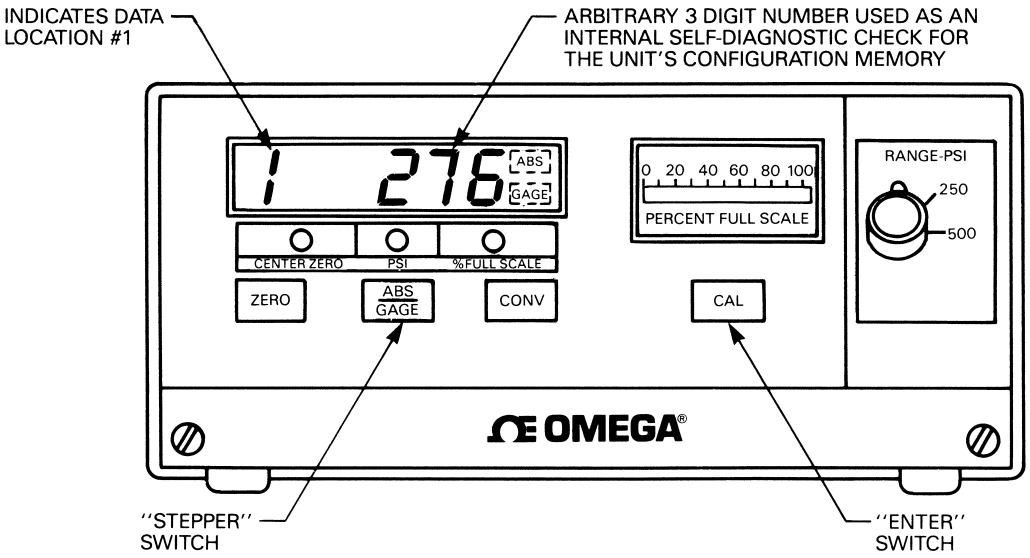


Figure 5-2. Front Panel Format When in Calibrate Mode

5.4 ZERO/SPAN CALIBRATION (EACH RANGE)

Pressing the "stepper" push button once places the PCL-3000 into its ZERO/SPAN calibration mode. The display will be as shown in Figure 5-3.

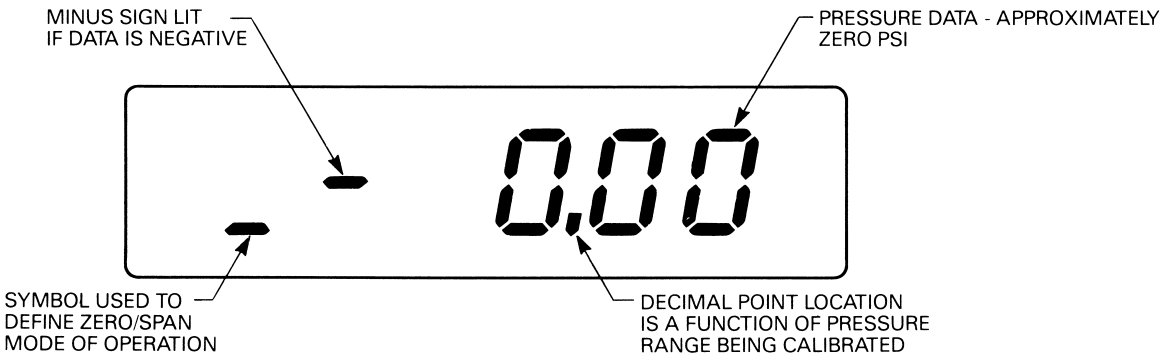


Figure 5-3. Display Indication for ZERO/SPAN Calibration Mode

Starting with the PCI-3000's lowest pressure range, sequentially perform steps 1 and 2 shown in Table 5-2 for each pressure range. Perform the following for each step in Table 5-2:

1. Adjust the input pressure to the appropriate (either 0 or 100%) value.

2. Perform the action indicated by Table 5-2 when pressure input readings are stable.

TABLE 5-2
ZERO AND SPAN CALIBRATION SEQUENCE

STEP NO.	PRESSURE INPUT VALUE	OPERATOR ACTION REQUIRED	RESULTING DISPLAY INDICATION	REMARK
1	0%	Press ''enter'' button	0%	Note 1
2	100%	Press ''enter'' button	100%	Note 2

NOTES:

1. If readings are not stable or are not within ±20% of zero, the zero correction cannot be entered.
2. If readings are not stable or are not within ± 5% of 100%, the span correction cannot be entered.

5.5 LINEARITY AND HYSTERESIS CALIBRATION (EACH RANGE)

NOTE:

For normal re-calibration cycles this section of the procedure can usually be omitted and the calibrating technician may move directly to paragraph 5.6.
Normally the linearization and hysteresis corrections are not required because for any given sensor, once the correction factors have been programmed (initially, during factory calibration) they almost never change unless the sensor itself has been replaced or severely overpressurized during usage.
If it is necessary or desirable to perform the Linearity and Hysteresis Calibration sequence proceed as follows.

Actuating the "stepper" push button once again places the indicator into its LINEARIZATION/HYSTERESIS calibration mode. The display will be as shown in Figure 5-4.

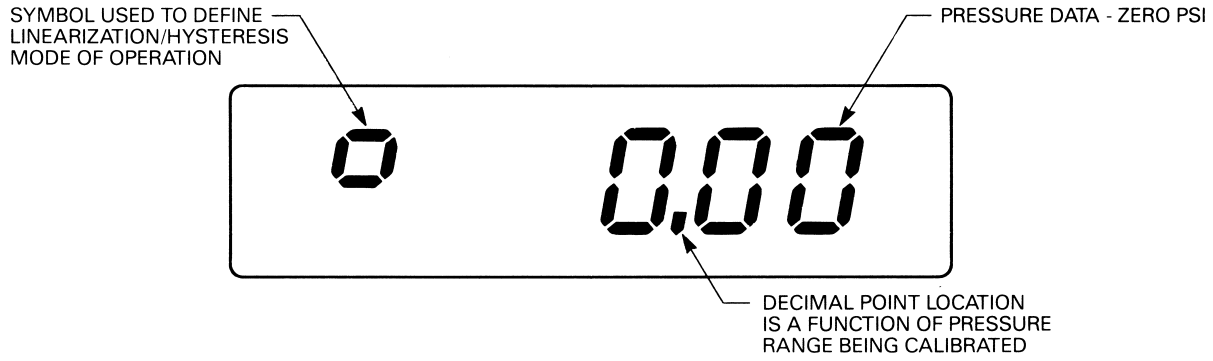


Figure 5-4. Display Indication for LINEARIZATION/HYSTERESIS Calibration Mode

Starting with the PCL-3000's lowest pressure range, sequentially perform the twelve steps described in Table 5-3 for each pressure range being calibrated. Perform the following for each step:

1. Adjust the input pressure to the appropriate value without overshooting the setting. Overshoots of up to one percent are acceptable.
2. Perform the action as indicated in Table 5-3 when the readings are stable.

TABLE 5-3
LINEARIZATION AND HYSTERESIS CALIBRATION SEQUENCE

STEP NO.	INPUT PRESSURE % OF RANGE	OPERATOR ACTION REQUIRED	STATUS SYMBOL IN LEFT MOST DIGIT	REMARKS
1	0%	Press Zero Switch	Upper Circle	Zero on Display
2	10%	Press "enter" Button		Notes 1 & 2
3	20%			
4	30%			
5	40%			
6	50%			
7	60%			
8	70%			
9	80%			
10	90%			
11	100%	No Action Required	Lower Circle	Notes 1 & 2
12	50%	Press Enter Button	Lower Circle	Note 3

NOTES:

1. If the reading in motion or the correction required is not within ±0.8% of full scale, no entry will be made.
2. If the entry is valid, the display will momentarily indicate the correction value (in %) and the memory location at which it is stored.
3. If 100% ±0.05% is not obtained, repeat the ZERO/SPAN calibration sequence.

5.6 SHUNT RESISTOR CALIBRATION

Pressing the "stepper" push button again will select the SHUNT RESISTOR CALIBRATION mode. The display will be as shown in Figure 5-5.

Figure 5-5. Display Indication for SHUNT RESISTOR Calibration Mode

With the PCL-3000's highest pressure range selected, perform the four step sequence as follows:

1. Be sure that the input pressure to the PCL-3000 is at zero psi.
2. Press and hold the zero switch until a stable zero indication is obtained.
3. Release the ZERO switch and allow the display to stabilize at its shunt resistor calibration number (100 ± 5.00%).
4. Press the "enter" button. If accepted, the bottom half of all display digits will momentarily illuminate.

5.7 PERMANENT DATA STORAGE

After completing the previous calibration procedures, the new data that has been "entered" into the computer must be permanently stored. The sequence is as follows:

1. Pressing the "stepper" switch again will bring the indicator back to its initial display condition as shown in Figure 5-2.
2. Slide the PCL-3000 electronics out from the external case (loosen the two thumbscrews located at the bottom outermost corners of the front panel) and depress the DATA ENTER switch, S2, located approximately in the middle of the circuit board (refer to Figure 3-2).
3. If the data is accepted, the three digit number on the right side of the display will indicate 377 as long as the push button switch, S2, is depressed.
4. The calibration is now complete and the CALIBRATE/OPERATE switch, S3, must be returned to its normal operating positions as shown in Table 5-1.

SECTION 6 SPECIFICATIONS

TABLE 6-1
RANGES/RESOLUTION/ACCURACIES

MODEL PCL-3000A PRESSURE RANGES (PSI)	RESOLUTION (PSI)	ACCURACY (PSI)
0-5000	1.0	±3
0-2500.0	0.5	±1.5
0-1000.0	0.2	±0.6
MODEL PCL-3000B PRESSURE RANGES (PSI)	**RESOLUTION (PSI)**	**ACCURACY (PSI)**
0-1000.0	0.2	±0.6
0-500.0	0.1	±0.3
0-200.00	0.05	±0.15
MODEL PCL-3000C PRESSURE RANGES (PSI)	**RESOLUTION (PSI)**	**ACCURACY (PSI)**
0-500.0	0.1	±0.3
0-250.0	0.05	±0.15
0-100.0	0.02	±0.06
MODEL PCL-3000D PRESSURE RANGES (PSI)	**RESOLUTION (PSI)**	**ACCURACY (PSI)**
0-100.00	0.02	±0.06
0-50.00	0.01	±0.03
0-20.000	0.005	±0.015
MODEL PCL-3000E PRESSURE RANGES (PSI)	**RESOLUTION (PSI)**	**ACCURACY (PSI)**
0-50.00	0.01	±0.03
0-25.000	0.005	±0.015
0-10.000	0.002	±0.006
MODEL PCL-3000G PRESSURE RANGES (PSI)	**RESOLUTION (PSI)**	**ACCURACY (PSI)**
0-10,000	2	±6.0
0-5,000.0	1	±3.0
0-2,000.0	.5	±1.5

SPECIFICATIONS (cont'd.)

AVAILABLE PRESSURE CALIBRATIONS: Models PCL-3000A, B, C, and G: Gage and Absolute, switch selectable; Models PCL-3000D and E: Gage with conversion to inches of H_20

OVERALL ACCURACY: ±0.05% F. S. maximum, includes all effects of linearity, hysteresis and repeatability

OPERATING TEMPERATURE: 50° to 110°F

STORAGE TEMPERATURE: 0° to 185°F

RELATIVE HUMIDITY: 95%, non-condensing

PRESSURE MEDIA: Any liquid or gas compatible with 17-4PH stainless steel alloy

PRESSURE SENSOR TYPE: Bonded, metal foil strain gage bridge

PRESSURE CONNECTION: Pressure fitting, 7/16-20 UNF-2A thread

OVERPRESSURE CAPABILITY: 750% F. S. on low range; 300% F. S. on mid-range; 150% on high-range

DIGITAL DISPLAY: High intensity, red LED, 0.43" high digits; active digits, 5 full decards; polarity indication "-" sign

ANALOG DISPLAY: Electronic, high intensity, red LED pointer; 0-100% full scale, each range; resolution, 20 incremental pointer steps per range

PRESSURE TO DIGITAL CONVERSION

CONVERSION RATE: Data updated at the rate of twelve times per second, nominal

DISPLAY RESOLUTION: Nominally 0.02% of full scale for each pressure range displayed

MINIMUM DISPLAY INCREMENTS: To maintain virtually constant resolution, pressure increments of 1, 0.5, 0.2, 0.1, 0.05, 0.02 and 0.01 psi utilized as required

ACCURACY VS. RESOLUTION RATIO: A ratio of approximately a 3:1 is maintained for all pressure ranges displayed.

For example: $\frac{\text{Accuracy}}{\text{Resolution}} = \frac{0.06\%\ \text{F. S.}}{0.02\%\ \text{F. S.}} = 3$

POWER REQUIREMENTS

INPUT VOLTAGE: 117 or 220 Vac ± 10%, 50/60 Hz standard. Desired voltage level selected via tapped transformer primary connections.

POWER CONSUMPTION: 8 watts, typical

LINE FILTER: Line-to-line and line-to-neutral filtering, standard

LINE FUSE: ¼ A, 125 V, slo blo

BATTERY OPERATED OPTION: Internal self-contained rechargeable battery provides 8-hour continuous service; low battery indication indicates time to recharge.

DIMENSIONS: H: 4⅞" x D: 8⅞" x W: 10¾"

WEIGHT: Approximately 12 lbs.

MOUNTING: Either free standing table top with rubber feet or panel mounted with optional Panel Mounting Kit

CONSTRUCTION: Single piece outer case with slide out drawer

CASE MATERIAL: 16 gage, mild steel with textured finish, baked epoxy enamel paint

FRONT PANEL CONTROLS: One three position rotary switch used to select the desired pressure range; four momentary action push button switches (on standard units) ZERO, GAGE/ABSOLUTE, CONV, and CAL (refer to Table 3-1 for functions)

OPTIONAL PEAK HOLD: Retains the maximum pressure value in memory. Depressing RECALL switch on front panel will display the peak reading; depressing the RESET switch clears the peak reading register.

DATA OUTPUT: Standard, serial output, 20 mA loop, ASCII code format with start, stop and parity bits. 1200 baud rate standard.

SPECIFICATIONS (cont'd.)

OPTIONAL OUTPUTS

ANALOG OUTPUTS: Either 0-10 Vdc or 4-20 mA isolated outputs are available. Both outputs are optically isolated from input circuitry and the external case. Accuracy is ±0.25% F. S. maximum.

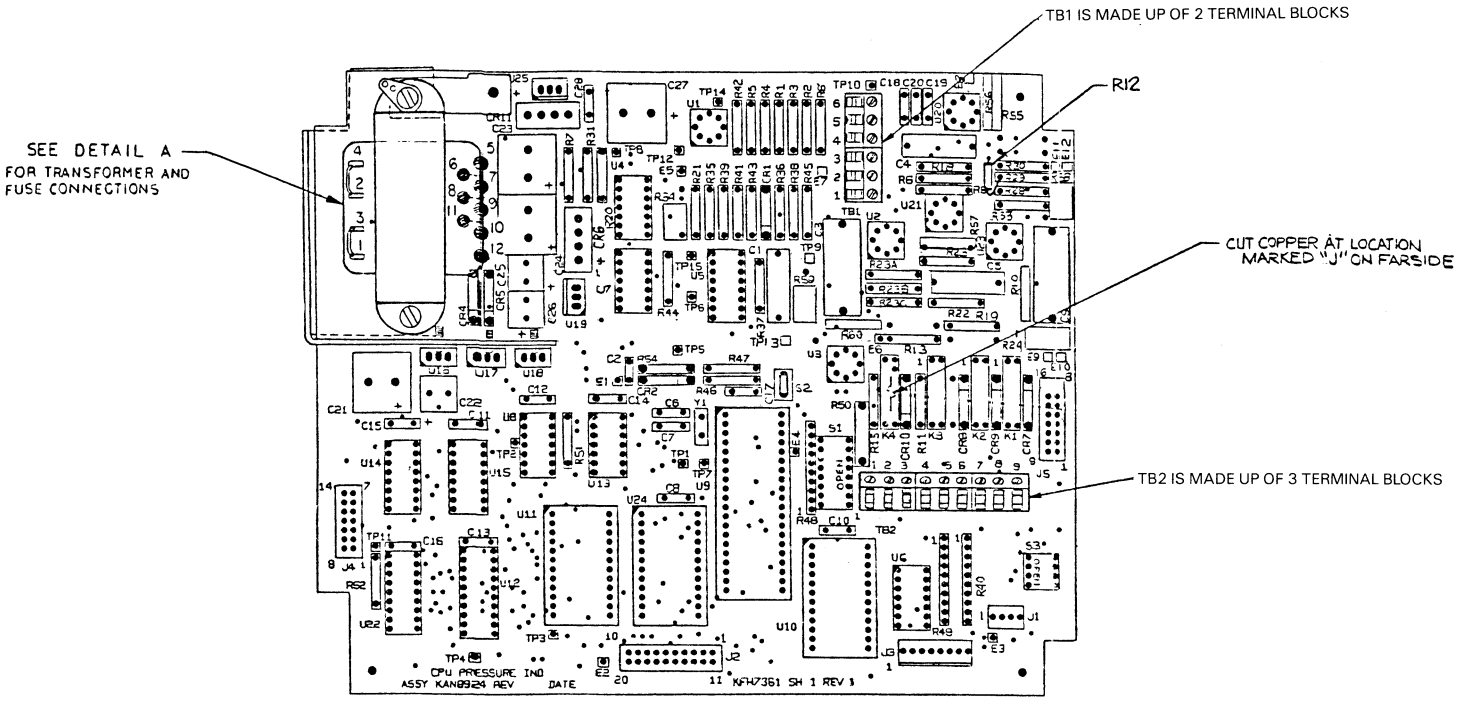
PARALLEL BCD:

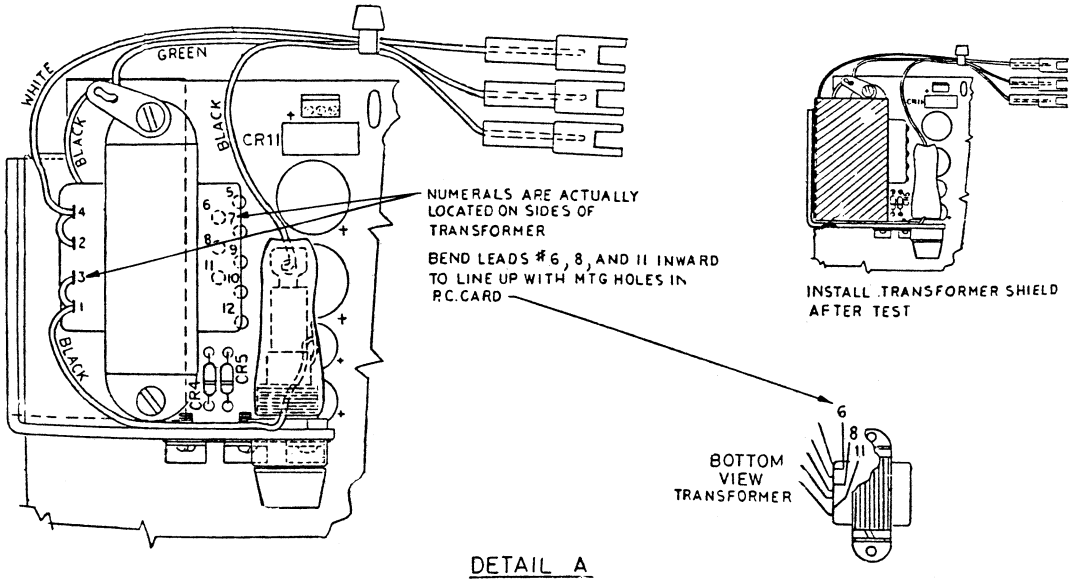
DATA OUTPUT: Isolated, tri-state buffered and DTL/TTL compatible. Data consists of polarity, 5 full data digits, measurement units, data valid, hold and enable lines.

DUAL SET POINT OUTPUTS: Two independent set points can be programmed and provided for the purpose of implementing various control functions. These set points may be programmed or changed either via internal switch settings or by the operator.

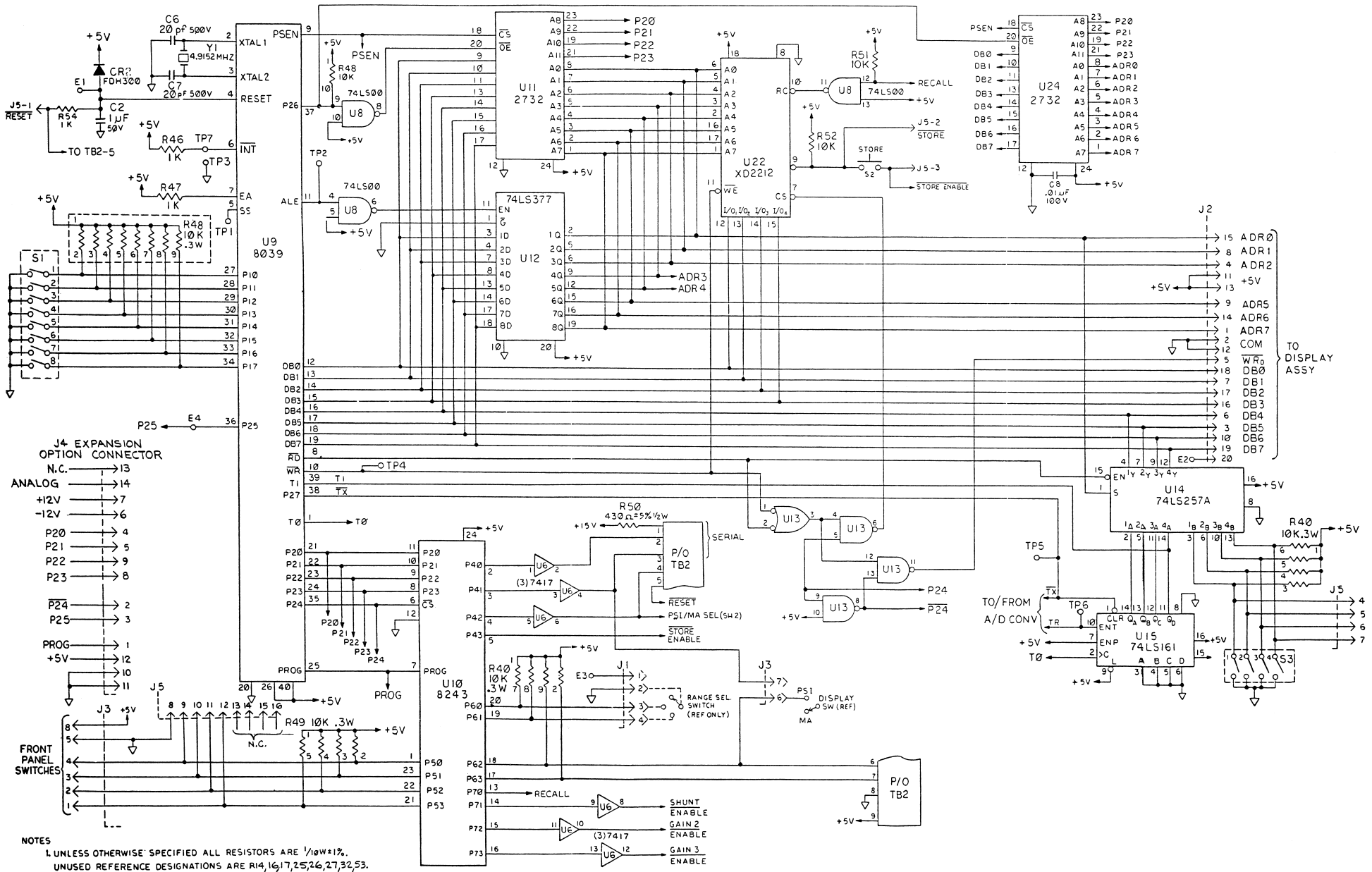
Solid state, optically isolated relay output contacts rated at 120/240 Vac and 1.5 A are provided for control. Relays may be programmed to be either open or closed below the set point activation level.

RS-232 SIMPLEX OUTPUT: Available with BAUD Rate Select from 300 to 9600 BAUD, two different formats-computer or printer; two different request modes-demand or continuous.





PCL-3000 CPU & POWER SUPPLY COMPONENT LAYOUT

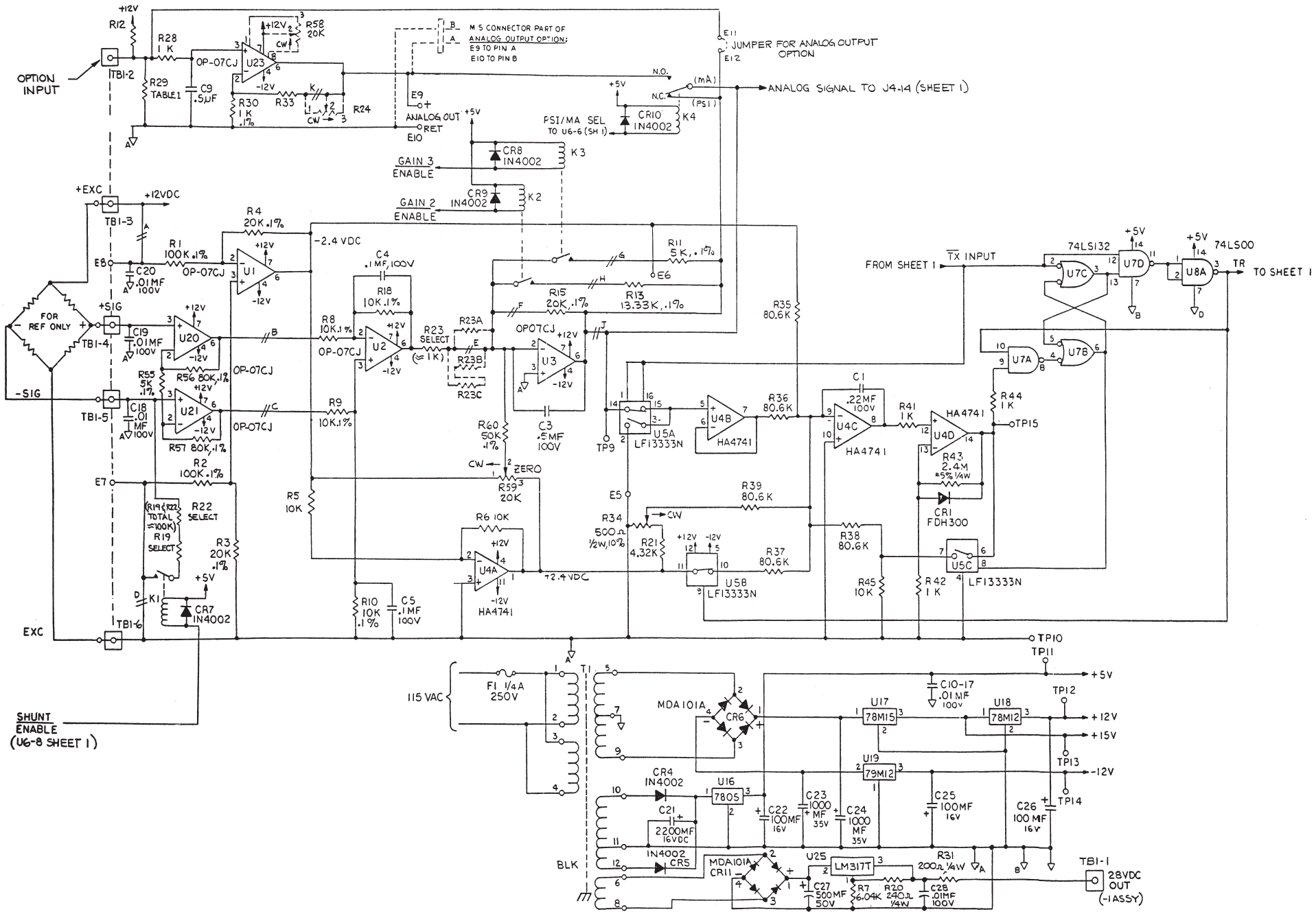


NOTES

1. UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE 1/10W±1%.
   UNUSED REFERENCE DESIGNATIONS ARE R14,16,17,25,26,27,32,53.
2. INPUT OFFSET VOLTAGE DRIFT CHARACTERISTICS OF U20 & U21 ARE MATCHED TO WITHIN 10mV.

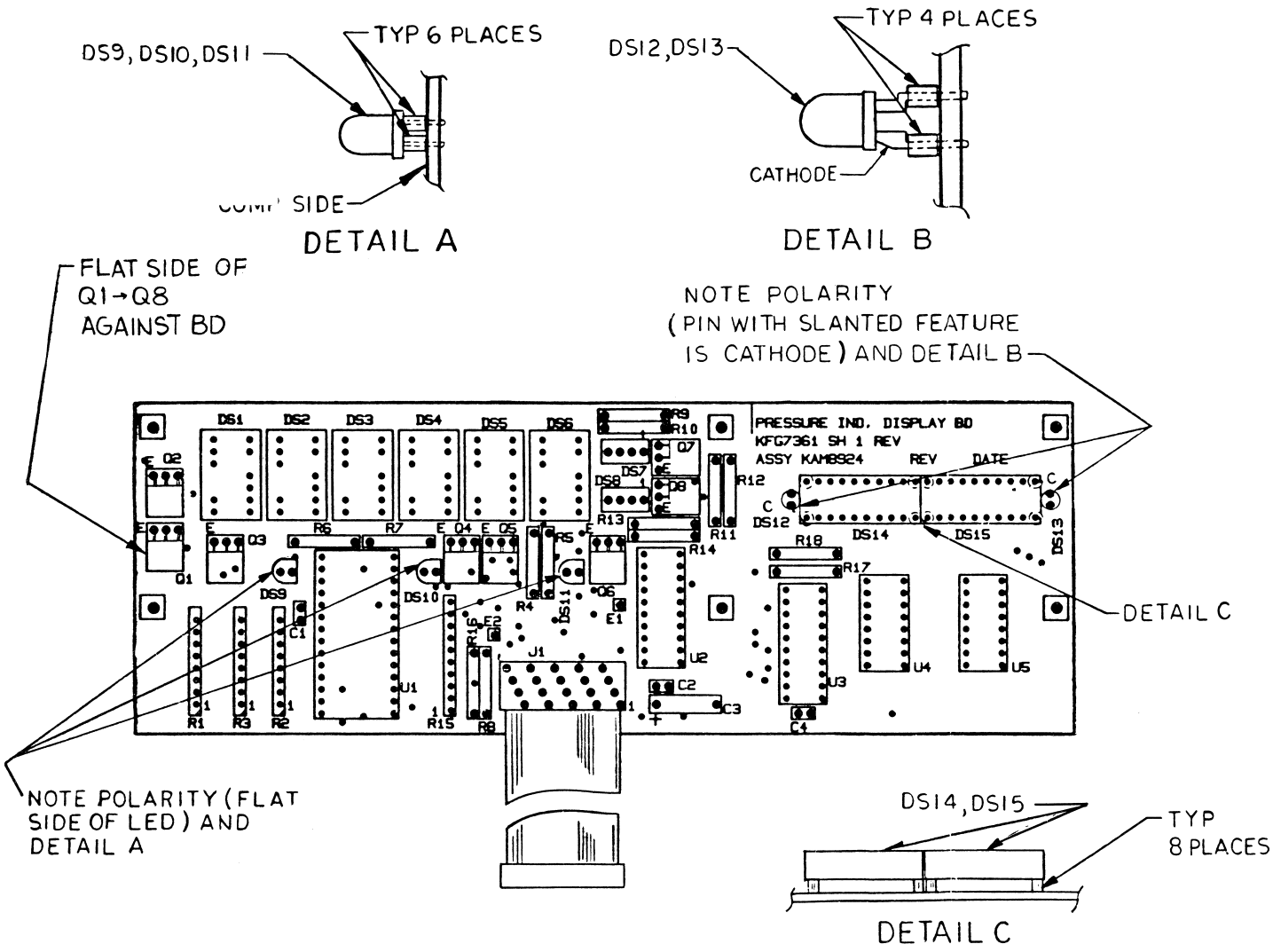
PCL-3000 CPU & POWER SUPPLY SCHEMATIC (Sheet 1 of 2)

NOTES:



PCL-3000 CPU & POWER SUPPLY SCHEMATIC (Sheet 2 of 2)

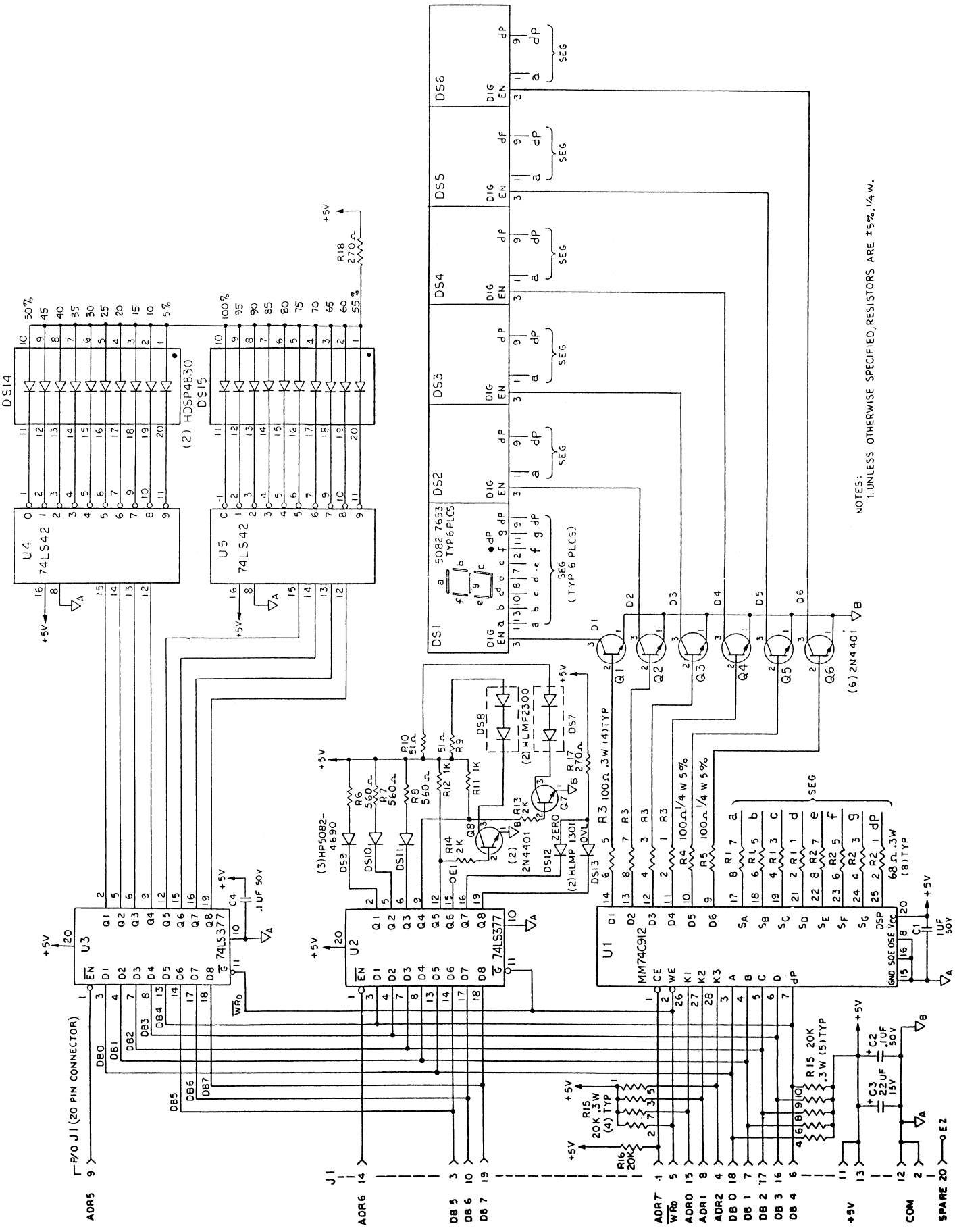
NOTES:



NOTES

1. FOR SCHEMATIC SEE PG. 23
2. OBSERVE POLARITY OF CAPACITORS, LEDs, DISPLAYS, AND SIP RESISTORS.
3.
4. NO COMPONENT SHALL EXCEED .25 HEIGHT, EXCEPT DS1 →DS15 NOT EXCEED .31 HEIGHT.
5. DS1 →DS8 AND J1 MUST BE SEATED FLAT ON PRINTED CIRCUIT BOARD
6. USE ONLY FREON FOR CLEANING.
7. STAMP APPLICABLE DASH NO, REV, AND DATE. MARKING TO BE 1/8" HIGH. USE EPOXY INK.

DISPLAY BOARD COMPONENT LAYOUT



DISPLAY BOARD SCHEMATIC

MADE IN USA

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's 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 malfunctions, 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. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been 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 are not warranted, including but not limited to contact points, fuses, and triacs.

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RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA 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.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order 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, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
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