



**Model 484B06**

**Line Powered Signal Conditioner for ICP® Sensors**

**Installation and Operating Manual**

**For assistance with the operation of this product,  
contact PCB Piezotronics, Inc.**

**Toll-free: 800-828-8840  
24-hour SensorLine: 716-684-0001  
Fax: 716-684-0987  
E-mail: [info@pcb.com](mailto:info@pcb.com)  
Web: [www.pcb.com](http://www.pcb.com)**



## Repair and Maintenance

PCB guarantees Total Customer Satisfaction through its “Lifetime Warranty Plus” on all Platinum Stock Products sold by PCB and through its limited warranties on all other PCB Stock, Standard and Special products. Due to the sophisticated nature of our sensors and associated instrumentation, **field servicing and repair is not recommended and, if attempted, will void the factory warranty.**

Beyond routine calibration and battery replacements where applicable, our products require no user maintenance. Clean electrical connectors, housings, and mounting surfaces with solutions and techniques that will not harm the material of construction. Observe caution when using liquids near devices that are not hermetically sealed. Such devices should only be wiped with a dampened cloth—never saturated or submerged.

In the event that equipment becomes damaged or ceases to operate, our Application Engineers are here to support your troubleshooting efforts 24 hours a day, 7 days a week. Call or email with model and serial number as well as a brief description of the problem.

## Calibration

Routine calibration of sensors and associated instrumentation is necessary to maintain measurement accuracy. We recommend calibrating on an annual basis, after exposure to any extreme environmental influence, or prior to any critical test.

PCB Piezotronics is an ISO-9001 certified company whose calibration services are accredited by A2LA to ISO/IEC 17025, with full traceability to SI through N.I.S.T. In addition to our standard calibration services, we also offer specialized tests, including: sensitivity at elevated or cryogenic temperatures, phase response, extended high or low frequency response, extended range, leak testing, hydrostatic pressure testing, and others. For more information, contact your local PCB Piezotronics distributor, sales representative, or factory customer service representative.

## Returning Equipment

If factory repair is required, our representatives will provide you with a Return Material Authorization (RMA) number, which we use to reference any information you have already provided and expedite the repair process. This number should be clearly marked on the outside of all returned package(s) and on any packing list(s) accompanying the shipment.

## Contact Information

PCB Piezotronics, Inc.  
3425 Walden Ave.  
Depew, NY14043 USA  
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Repair inquiries: [rma@pcb.com](mailto:rma@pcb.com)

For a complete list of distributors, global offices and sales representatives, visit our website, [www.pcb.com](http://www.pcb.com).

## Safety Considerations

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the precautions required to avoid injury. While our equipment is designed with user safety in mind, the protection provided by the equipment may be impaired if equipment is used in a manner not specified by this manual.

Discontinue use and contact our 24-Hour Sensorline if:

- Assistance is needed to safely operate equipment
- Damage is visible or suspected
- Equipment fails or malfunctions

For complete equipment ratings, refer to the enclosed specification sheet for your product.

## Definition of Terms and Symbols

The following symbols may be used in this manual:



### DANGER

Indicates an immediate hazardous situation, which, if not avoided, may result in death or serious injury.

**CAUTION**

Refers to hazards that could damage the instrument.

**NOTE**

Indicates tips, recommendations and important information. The notes simplify processes and contain additional information on particular operating steps.

**The following symbols may be found on the equipment described in this manual:**



This symbol on the unit indicates that high voltage may be present. Use standard safety precautions to avoid personal contact with this voltage.



This symbol on the unit indicates that the user should refer to the operating instructions located in the manual.



This symbol indicates safety, earth ground.



PCB工业监视和测量设备 - 中国RoHS2公布表

PCB Industrial Monitoring and Measuring Equipment - China RoHS 2 Disclosure Table

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
住房	0	0	0	0	0	0
PCB板	X	0	0	0	0	0
电气连接器	0	0	0	0	0	0
压电晶体	X	0	0	0	0	0
环氧	0	0	0	0	0	0
铁氟龙	0	0	0	0	0	0
电子	0	0	0	0	0	0
厚膜基板	0	0	X	0	0	0
电线	0	0	0	0	0	0
电缆	X	0	0	0	0	0
塑料	0	0	0	0	0	0
焊接	X	0	0	0	0	0
铜合金/黄铜	X	0	0	0	0	0
本表格依据 SJ/T 11364 的规定编制。						
0：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。						
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。						
铅是欧洲RoHS指令2011/65/ EU附件三和附件四目前由于允许的豁免。						

CHINA RoHS COMPLIANCE

Component Name	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Chromium VI Compounds (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
PCB Board	X	O	O	O	O	O
Electrical Connectors	O	O	O	O	O	O
Piezoelectric Crystals	X	O	O	O	O	O
Epoxy	O	O	O	O	O	O
Teflon	O	O	O	O	O	O
Electronics	O	O	O	O	O	O
Thick Film Substrate	O	O	X	O	O	O
Wires	O	O	O	O	O	O
Cables	X	O	O	O	O	O
Plastic	O	O	O	O	O	O
Solder	X	O	O	O	O	O
Copper Alloy/Brass	X	O	O	O	O	O

This table is prepared in accordance with the provisions of SJ/T 11364.

O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

X: Indicates that said hazardous substance contained in at least one of the homogeneous materials for this part is above the limit requirement of GB/T 26572.

Lead is present due to allowed exemption in Annex III or Annex IV of the European RoHS Directive 2011/65/EU.

OPERATING GUIDE  
MODEL 484B DUAL MODE  
ICP® POWER UNIT

## 1.0 INTRODUCTION

The Model 484B Power Unit features an AC signal decoupling mode for standard operation with ICP systems as well as a DC mode for calibration or ultra low frequency operation.

The output amplifier in the 484B is a unity gain buffer amplifier, providing low output impedance (50 ohms) and up to 10mA of output current, independent of transducer drive current.

Model 484B can supply from 2mA to 20mA constant current to ICP transducers or amplifiers.

See Guide G0001 "General Guide to ICP Instrumentation" for a complete coverage of the low impedance concept.

## 2.0 DESCRIPTION

The Model 484B contains a regulated DC power supply (+24V) and a settable constant current source to supply power to a single transducer (or ICP amp).

In the "AC" mode, the signal information is AC (capacitor) coupled from the +9V to +12V DC transducer bias level and fed thru a unity gain buffer amplifier. The coupling time constant in the "AC" mode is 10 seconds and is independent of output load.

In the "DC" mode, the signal is direct coupled from the transducer signal/power lead and fed to a level shifting circuit, then to the unity gain buffer amplifier.

In this mode the transducer discharge time constant is not compromised and full advantage can be taken of long time constant transducers for calibration purposes or for special situations where extra long duration events must be measured. The latter can usually only be accomplished in thermally stable environments.

A zero control knob is provided to adjust the DC zero at the output jack when the unit is in the "DC" mode.

A fault monitor meter is located on the front panel to give a continuous circuit continuity and operation check.

The rear panel contains the coupling mode switch, the "XDCR" jack, the output ("Scope") jack, AC line cord and the bias selector switch.

The bias selector switch allows the use of the Model 484B with the class of low impedance transducers with a nominal +6volt DC bias as well as with the more conventional +11 volt nominal bias transducer.

## 3.0 INSTALLATION

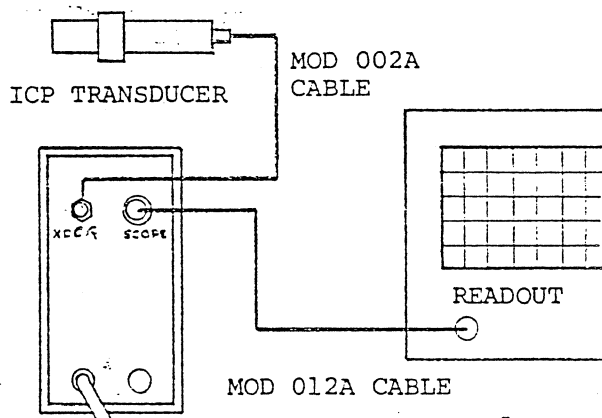


FIGURE 1  
TYPICAL CIRCUIT CONNECTIONS

Connect the transducer (or amplifier) to the "XDCR" jack of the Model 484B using the Model 002A cable as shown in Figure 1.

NOTE: Since the ICP Transducers operate at a low impedance level, it is not necessary to use low noise or other shielded cable. In some cases, it is desirable to use twisted pair and other types of 2-wire cable.

Connect the readout to the "Scope" jack using a Model 012A cable (or equivalent BNC to BNC cable).

Many types of connector adaptors are available at PCB to simplify difficult installation problems. Consult the factory for details.

## 4.0 OPERATION

Plug the 3-wire line cord into a 120V 60Hz receptacle, switch power on and allow unit

to warm up for 10 or 15 minutes with transducer connected to thermally stabilize system components.

Check the specification sheet of your transducer (or amplifier) to determine the bias voltage. Most standard ICP transducers operate with a +9.5V to +13V bias. Keep the bias mode switch in the "11V" position for this type of instrument.

Several types of ICP instruments operate with a bias range of 4.5V to 6.2V. Place the bias mode switch in the "6V" position for this type of transducer.

Observe the fault monitor voltmeter at the front panel. This meter will indicate approximately mid-scale (see Figure 2) for normal transducer operation.

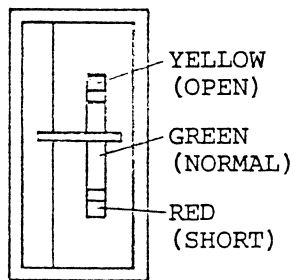


FIGURE 2  
FAULT MONITOR METER

If the transducer cable is open or the ICP amplifier is faulty (open) the meter will indicate in the yellow (full scale) area.

Should the cable or ICP amplifier be shorted, the meter will indicate in the red (zero volts) area.

NOTE: Normal reading of the fault monitor meter is approx. 1/3 F.S. for the 6V nominal bias transducers.

#### 4.1 COUPLING MODE SWITCH

For most normal measurements, the coupling mode switch should be placed in the "AC" position. In this position, the system is AC coupled internally with a 10 sec. coupling time constant.

This gives a low-frequency response as follows:

1% dn @	.11 Hz	(Table 1)
5% dn @	.05 Hz	
30% (-3db) @	.016 Hz	

NOTE: Table 1 applies to a transduction system where the discharge time constant of the transducer is greater than 100 sec. Shorter TC transducers will shorten the overall system TC accordingly.

The AC mode is desirable for standard operation since long term thermal drifting of long TC transducers is nullified by the internal AC coupling.

In the AC mode, the DC offset at the output will be, at the maximum, 50mV positive. The front panel zero control has no effect on output zero with the mode switch in "AC".

The DC mode is provided for system calibration purposes and for situations where it is necessary to measure long duration events with long TC transducers. In this mode, the low frequency response is determined by the transducer only since the 484B direct couples the signal to the output.

#### 4.2 ZERO CONTROL

The front panel zero control knob functions with the coupling mode switch in the "DC" position.

After the system has adequately warmed up, adjust the "zero" control to zero the output voltage. Clockwise rotation shifts the voltage positive and counterclockwise moves it negative.

After longer periods of operation, it may be necessary to re-check and reset the zero slightly. This is normal.

#### 4.3 GAIN AND POLARITY

The Model 484B is a unity gain, non-inverting amplifier. The overall system gain is not affected by use of this amplifier in place of other PCB supplies such as models 480A, 482A, & 483A also power conditioners, model 485B, etc.

#### 4.4 SETTING THE CONSTANT CURRENT

The series 484B Power Units are normally supplied with the constant current output to the transducer set at 4mA nominal.

This is adequate for most laboratory and field applications. Special situations such as driving extra-long cables (beyond 1000 ft.) with high frequency or fast rise

#### 4.4 SETTING THE CONSTANT CURRENT (CON'D)

time pulses, may require increasing the transducer drive current above 4mA.

It has been found that often, when driving fast rise time pulses over long lines, system performance can be optimized by "tuning" the drive current to the line, i.e. by finding the best current setting for the particular set of physical parameters established by the transducer, line length, line termination, pulse rise time, etc.

The optimum current setting is best determined by experimenting with your particular test set-up. A good rule of thumb is to use the lowest current consistent with satisfactory results to minimize transducer self-heating and lower noise.

To set the constant current, remove the protective outer case by removing the 4 rubber feet at the bottom surface. Locate the current adjust potentiometer. (Refer to Figure 3)

Connect a 0-30mA DC meter (or multimeter) to the "XDCR" jack center conductor as shown, returning the negative probe to chassis ground.

The constant current value is read directly on the milliammeter when connected as shown.

Vary the setting of the current adjust pot to set current to a new level.

CAUTION: It may be possible to exceed 20mA slightly. Do not do so as to operate an ICP transducer or amplifier above 20mA may be harmful.

Use care to avoid shorting components with metal screwdriver blades.

#### 4.5 ZERO CLAMP

When making repetitive measurements which produce asymmetrical waveforms, it is sometimes necessary to clamp the output voltage to a zero baseline to avoid the averaging effect typical of all piezoelectric and other AC coupled systems. This behavior is characterized by a slow drift of the signal to the point where the included area under the waveform above ground is equal to the included area below ground.

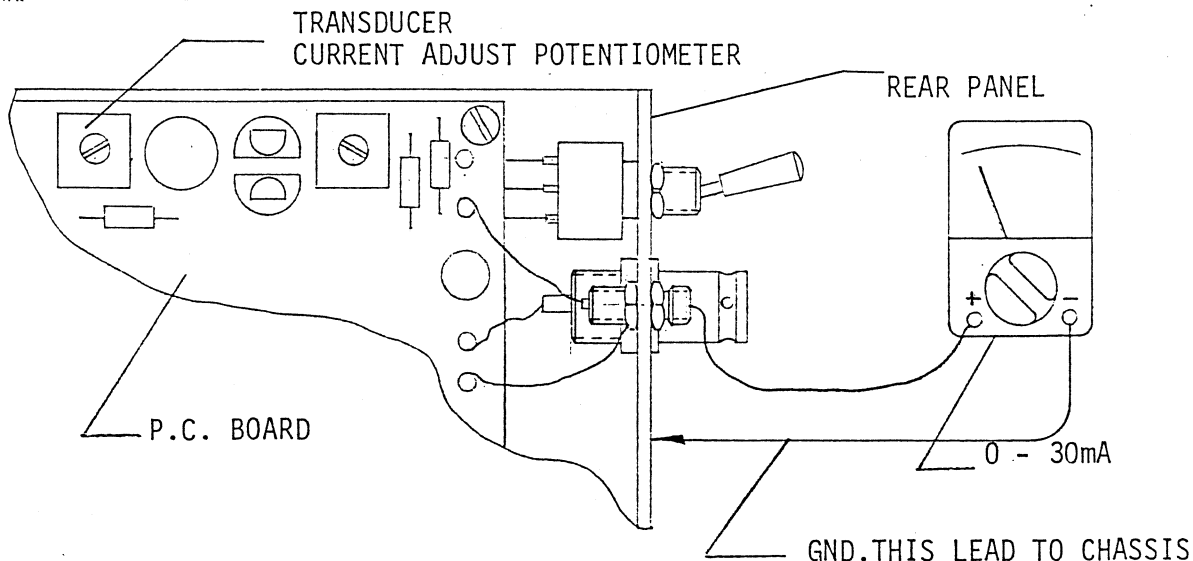


FIGURE 3  
CURRENT ADJUST POT LOCATION



#### 4.5 ZERO CLAMP (Con'd)

It is especially important to zero clamp when the output is used with peak indicating meters, comparitors, level detectors and other readouts which are referenced to a fixed voltage.

Consult the factory about the zero clamp options available for your particular application.

#### 5.0 MAINTENANCE AND REPAIR

Aside from the transducer current adjustment as described in Section 4.4, there are no other adjustments to perform on the Model 484B.

No maintenance is required for these units and it is suggested that should trouble occur, you contact the factory for assistance.

If it is determined that the unit must be returned, please include a brief note describing the problem.

MANUAL NUMBER: 19852  
MANUAL REVISION: NR

Model Number  
**484B06**

**LINE POWERED ICP® SENSOR SIGNAL CONDITIONER**

Revision: E  
ECN #: 23604

**ELECTRICAL**

Supply Voltage Regulated		VDC	+24 ±1.0	
ICP <sup>0</sup> Sensor Excitation Current (Constant Current Source)		mA	2-20	[1]
Time Constant		sec	10 (-0, +50%)	
Transducer Bias Voltage Accommodation Range: 11V nominal 6V nominal		VDC	7.5 to 14.5	
		VDC	3.0 to 8.0	
Low Frequency Response (-5%) AC, DC		Hz	0.05, 0	
High Frequency Response (±5V, -5%)		kHz	50	[4]
DC Offset		mV	<30	[3]
Noise Broadband, RMS (1 Hz-10 kHz)		µV [dB]	85 [-81,0]	
Typical Spectral Noise:	at 1 Hz	µV/√Hz [dB]	7.0 [-103]	
	at 10 Hz	µV/√Hz [dB]	2.5 [-112]	
	at 100 Hz	µV/√Hz [dB]	1.5 [-116]	
	at 1 kHz	µV/√Hz [dB]	1.0 [-120]	
	at 10 kHz	µV/√Hz [dB]	1.0 [-120]	
Gain			1 ±1%	
Maximum Voltage Output		volts (pk)	±10	
Output Impedance		ohms	<50	
Fault Monitor Meter (1 mA movement)		V/F S	24 ±1.0	
Power (50 to 400 Hz)		V/A	115 ±10%/0.12 (maximum)	[2]

**PHYSICAL**

Connectors:	Input (transducer)	type	BNC Jack
	Output (scope)	type	BNC Jack
	AC (power) Input	type	IEC 320
Size (H x W x D):		in	4.25 x 1.62 x 6.25
		[mm]	[108 x 41 x 159]
Weight		lb [gm]	2 [907,2]

**NOTES:**

- [1] Unit supplied with current set at 4 ±0.6 mA.
- [2] Unit set to 230 VAC when ordered as "F484B06."
- [3] In AC mode.
- [4] Serial Number 1261 and greater

**SUPPLIED ACCESSORIES:**

Model 017 AC Line Cord

*In the interest of constant product improvement, we reserve the right to change specifications without notice.*

*ICP® is a registered trademark of PCB Piezotronics, Inc.*

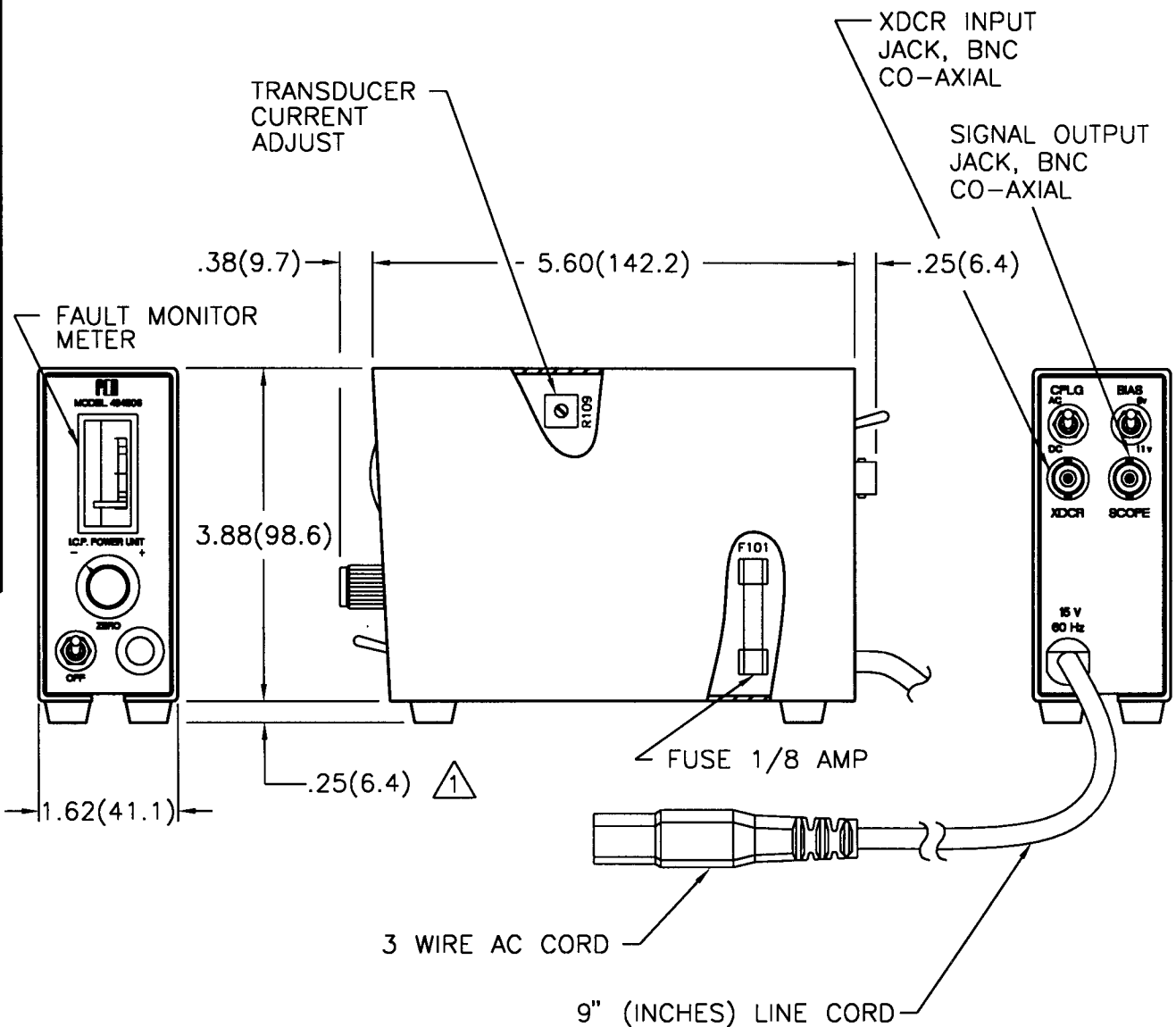


Drawn	<i>JH</i>	<i>2-6-06</i>	Spec No. <b>484-2060-80</b>
Engineer	<i>BH</i>	<i>2-7-06</i>	
Sales	<i>woc</i>	<i>2/7/06</i>	Sheet 1 of 1
Approved	<i>MD</i>	<i>2/13/06</i>	

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APPLICATION			REVISIONS				
NEXT ASS'Y	USED ON	VAR	REV	DESCRIPTION	ECN	DATE	APP'D



⚠️ EXTERNAL COVER MAY BE REMOVED BY REMOVING SCREWS IN RUBBER FEET.

UNLESS SPECIFIED TOLERANCES		DRAWN	DATE	MFG	DATE	PCB PIEZOTRONICS™ 3425 WALDEN AVE. DEPEW, NY 14043 (716) 684-0001 EMAIL: SALES@PCB.COM
DIMENSIONS IN INCHES DECIMALS XX ±.01 XXX ±.005 ANGLES ±2 DEGREES	DIMENSIONS IN MILLIMETERS (IN PARENTHESIS) DECIMALS XX ±0.3 XXX ±0.13 ANGLES ±2 DEGREES	1/2/99	2/4/99	BWS	2/4/99	
FILLETS AND RADII .003 - .005	FILLETS AND RADII (0.07 - 0.13)	APP'D	DATE	ENGR	DATE	DWG. NO. 10387
DD011 REV. B 03/13/98	TITLE OUTLINE DRAWING MODEL 484B06 ICP POWER SUPPLY				SCALE: 1=2	SHEET 1 OF 1