

Three-field Ionization Chamber
 Calibration Procedure for Pre-Amplifier board 61175A

The following adjustments apply to the calibration of a 61175A pre-amplifier board for a stationary 3-field ion chamber, e.g. for chest or table use. Note: This procedure is also valid for 61175C, 61175G, 61175J, 61175N and 61175S pre-amp assemblies.

Pre-amp Assembly	Description	Difference from 61175A
61175A	3-Field Philips Compatible Pre-amp, Top-Turn Pots Calculated Gain Range: W2 IN: (0.57 to 26.4) Times 4.5 W2 OUT: (0.1 to 4.6) Times 4.5	None
61175C	3-Field Philips Compatible Pre-amp, Top-Turn Pots Calculated Gain Range: W2 IN: (1.22 to 56.7) Times 4.5 W2 OUT: (0.22 to 10.2) Times 4.5	R14 = 2200 R17 = 10K ohm
61175G	3-Field Philips Compatible Pre-amp, Top-Turn Pots Calculated Gain Range: W2 IN: (1.22 to 56.7) Times 4.5 W2 OUT: (0.22 to 10.2) Times 4.5	R14 = 2200 R17 = 10K ohm R1, R2, R3 = 100k
61175J	3-Field Philips Compatible Pre-amp, Side-Turn Pots Calculated Gain Range: W2 IN: (1.22 to 56.7) Times 4.5 W2 OUT: (0.22 to 10.2) Times 4.5	R14 = 2200 R17 = 10K ohm Side-Turn Pots
61175N	3-Field Philips Compatible Pre-amp, Top-Turn Pots Calculated Gain Range: W2 IN: (1.73 to 80.6) Times 4.5 W2 OUT: (0.27 to 12.5) Times 4.5	R14 = 1500 R17 = 8200
61175S	3-Field Philips Compatible Pre-amp, Top-Turn Pots Calculated Gain Range: W2 IN: (2.16 to 100.2) Times 4.5 W2 OUT: (0.32 to 15.0) Times 4.5	R14 = 1200 R17 = 6800

WARNING:

- Do not attempt to service the equipment unless this service manual has been consulted and is understood.
- Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock and mechanical or other hazards.

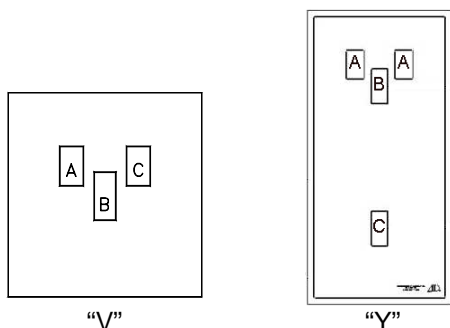
Note: When working with the pre-amplifier assembly it is important that electrostatic discharge (ESD) prevention techniques be observed. Before touching the pre-amp assembly, attach an ESD wrist strap to yourself. Be sure to ground yourself and the ion chamber frame to dissipate static charges.

Note: The pre-amp assembly is a very delicate and sensitive device. It is important to keep it as clean as possible. Wash and dry your hands thoroughly before working with it and, when possible, use unpowdered latex or cotton gloves. Take care to touch the pre-amp board as little as possible. Take

extra care to avoid touching the three air-mounted field inputs. Oils from your fingers on the air-mounts or their components can cause performance degradation.

This document represents proprietary information originated by Advanced Instrument Development, Inc. and which shall not be disclosed or utilized in any manner detrimental to the company's business.

This document describes the calibration of standard "V" or "Y" pattern ion chambers commonly used in medical radiographic equipment, with sensing fields located at the lung and center (spine) positions. The operator selects the field(s) desired, and positions the anatomy of interest in front of the selected field(s). Note that for "Y" pattern ion chambers the two lung fields act together as field "A".

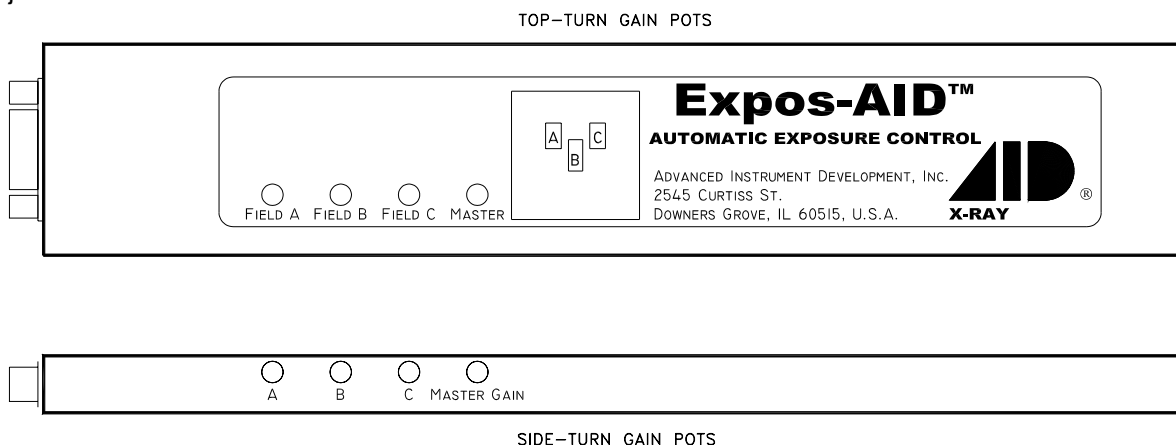


The procedure assumes that the installation of the Automatic Exposure Control (AEC) is complete and that the AEC and x-ray generator are in proper working condition. After making the necessary interconnections between the ion chamber and the AEC, power up the system.

Calibration/Test Set Up:

Select the center field of the ion chamber. Set the generator for 100 kVp and maximum backup time. For 100 kVp use 8 to 10 inches of water or plastic for a phantom. Metals such as copper, aluminum or lead are not suitable for use as phantoms. Make sure the phantom is homogeneous and completely covers all fields equally. Center the x-ray beam on the center field. Collimate the x-ray beam so that it completely covers all three fields but does not extend beyond the limits of the phantom.

Adjustment Potentiometers:



All necessary adjustment potentiometers are accessible through the pre-amp chassis cover. There is no need to open the pre-amp cover during normal calibration procedures.

Master Gain Adjustment (R4):

Typically, the master gain adjustment is the only adjustment needed when installing an ICX series ion chamber. Use the master gain adjustment to match the overall chamber sensitivity to that of the other stationary chambers connected to the system. Note that the master gain adjustment is a multi-turn potentiometer. A clockwise adjustment to the master gain potentiometer will increase the sensitivity of the chamber, causing the length of the exposure (mAs) to decrease.

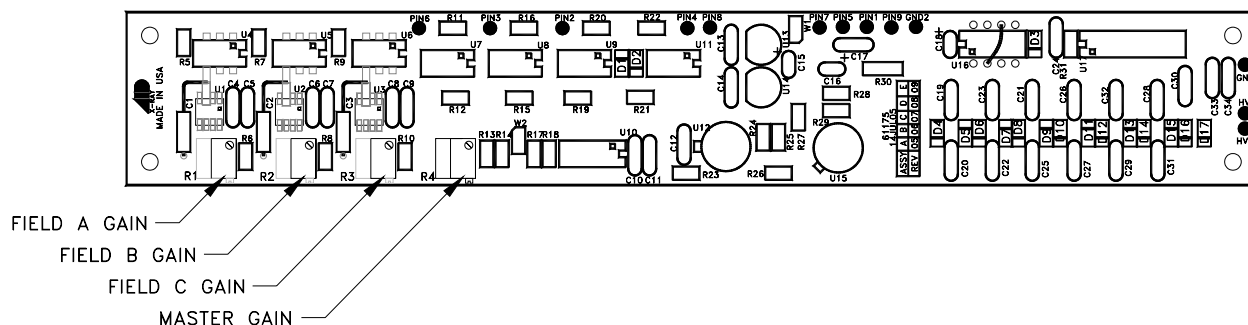
Make exposures and process the films. Adjust the master gain for the desired optical density. Make the master gain adjustment for each stationary chamber being installed.

Some x-ray generators require a significant increase in the sensitivity of the ion chamber. Shunt jumper W2 may be selected to accommodate these systems. Selection of W2 will boost the ion chamber gain by a factor of about 4X.

Balance Check:

Using the Expos-AID AEC post-exposure mAs display or other calibrated mAs meter check the individual fields to see that they are balanced, that is, that they produce the same mAs reading. If mAs readings are not stable from exposure to exposure for an individual field, then it will be necessary to expose films and make these adjustments based upon optical density.

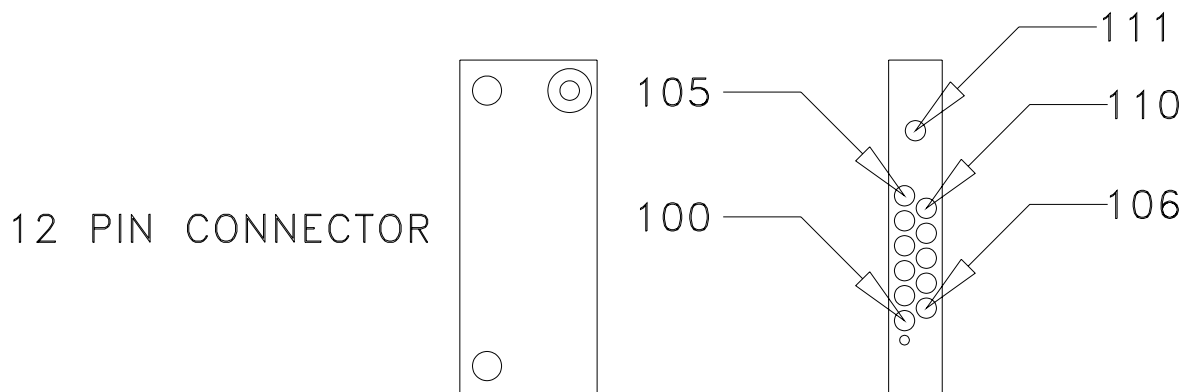
The individual gain potentiometers (R1, R2 and R3) correspond to the Field A, Field B and Field C ion chamber fields, respectively. If necessary, adjust the individual gain potentiometers to balance the outputs to give the same mAs reading for each field. Note that individual gain adjustments are multi-turn potentiometers. A clockwise adjustment to a gain potentiometer will increase the sensitivity of a field, causing the length of the exposure (mAs) to decrease.



Ion Chamber Pin Outs:

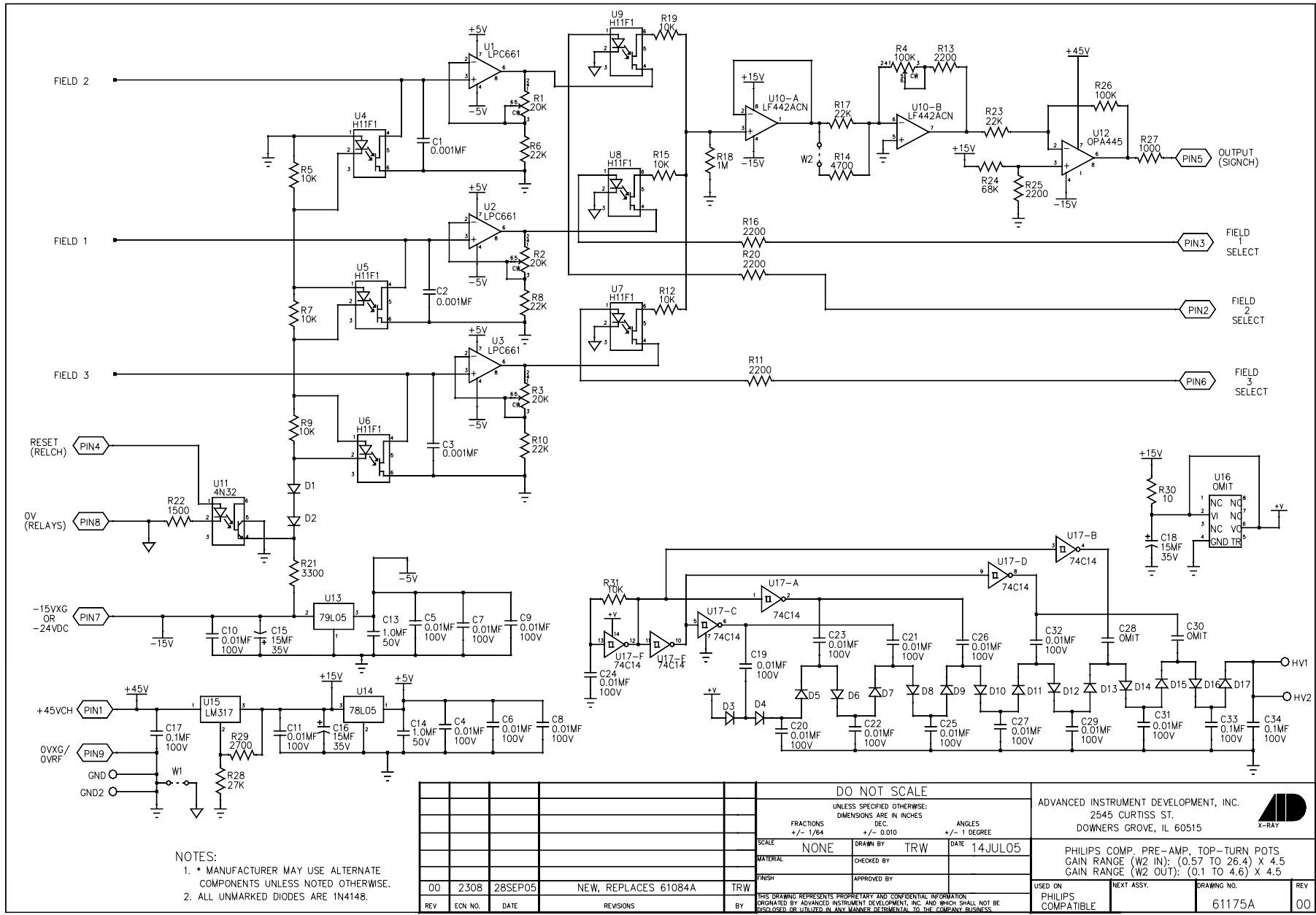
61175A Pin No.	9- or 15-Pin Sub-D Connector	12-Pin Connector	14-Pin Amp Connector	Function
1	1	105	L	+45VDC (+45VCH)
2	2	101	A	Field 2 Select (FDLCH)
3	3	102	D	Field 1 Select (FDCCH)
4	4	104	E	Start Integrating (RELCH)
5	5	107	R	Output (SIGNCH)
6	6	103	H	Field 3 Select (FDRCH)
7	7	106	P	-15 to -24VDC (-15VXG)
8	8	109	N	0VDC (0V RELAYS)
9	9	108	J	GND (0VXG/0VRF)
---	10-15	100, 110 & 111	B,C,F,K,M	No Connection

NOTE: Cable wire colors do not match those inside the pre-amp chassis. Cable pin-out details are available on-line at <http://www.aidxray.com> or by contacting Advanced Instrument Development, Inc.



Acceptable Power Supply Ranges for 61175A Pre-amp:

Supply Voltage	Measurement Point	Acceptable Range
+45VDC Pos. Input Supply Voltage	61175A pin 1	From +43VDC to +49VDC
-24VDC Neg. Input Supply Voltage	61175A pin 7	From -14.3VDC to -29VDC
+5VDC Regulated on board	61175A C14 (positive lead)	From +4.7VDC to +5.3VDC
-5VDC Regulated on board	61175A C13 (negative lead)	From -4.7VDC to -5.3VDC
+75VDC Internal Bias Voltage Regulated on board	61175A C34 at the cathode of D17	From +65VDC to +85VDC



NOTES:
 1. * MANUFACTURER MAY USE ALTERNATE COMPONENTS UNLESS NOTED OTHERWISE.
 2. ALL UNMARKED DIODES ARE 1N4148.

					DO NOT SCALE			ADVANCED INSTRUMENT DEVELOPMENT, INC. 2545 CURTISS ST. DOWNERS GROVE, IL 60515									
					UNLESS SPECIFIED OTHERWISE: FRACTIONS +/- 1/64 DEC. +/- 0.010 ANGLES +/- 1 DEGREE												
					SCALE	NONE	DRAWN BY	TRW	DATE	14JUL05	PHILIPS COMP. PRE-AMP. TOP-TURN POTS GAIN RANGE (W2 IN): (0.57 TO 26.4) X 4.5 GAIN RANGE (W2 OUT): (0.1 TO 4.6) X 4.5						
					MATERIAL			CHECKED BY									
					FINISH			APPROVED BY			USED ON	PHILIPS COMPATIBLE	NEXT ASSY.	DRAWING NO.	61175A	REV	00
					THIS DRAWING REPRESENTS PROPRIETARY AND CONFIDENTIAL INFORMATION ORIGINATED BY ADVANCED INSTRUMENT DEVELOPMENT, INC. AND WHICH SHALL NOT BE DISCLOSED OR UTILIZED IN ANY MANNER DETRIMENTAL TO THE COMPANY BUSINESS.												
REV	EON NO.	DATE	REVISIONS	BY													