

Three-field Ionization Chamber
Calibration Procedure
for
Pre-Amplifier board 61150A

The following adjustments apply to the calibration of a 61150A pre-amplifier board for a stationary 3-field ion chamber, e.g. for chest or table use.

Please Note: This calibration instruction is also valid for pre-amp assemblies 61150C and 61150D.

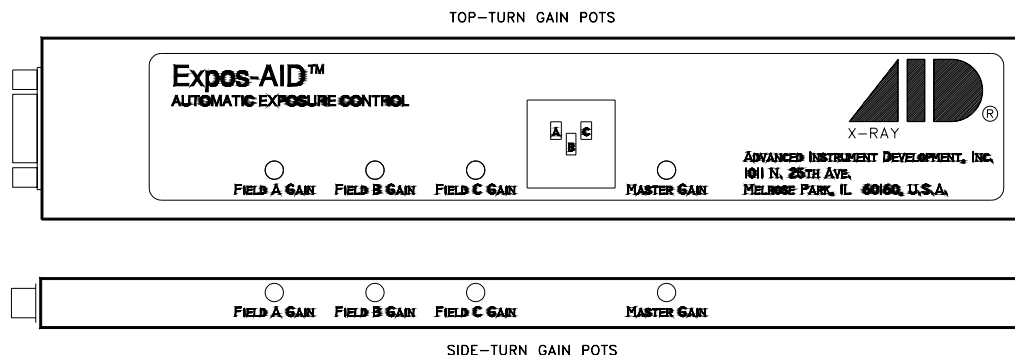
The procedure assumes that the installation of the Automatic Exposure Control (AEC) is complete and that the AEC and x-ray generator are in proper working condition. After making the necessary interconnections between the ion chamber and the AEC, power up the system.

The 61150A pre-amplifier board can be configured to operate with several different AEC systems. If specified at the time of purchase, the ion chamber will be delivered with the pre-amplifier board already configured for a particular application. To reconfigure an ion chamber for a different configuration, see the section on Ion Chamber Inputs and Output and the section on Specific Configurations at the end of this document.

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 (20 to 25 cm) 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:

Typically, the chamber gain adjustment is the only adjustment needed when installing a ICX series ion chamber. Use the chamber gain adjustment to match the overall chamber sensitivity to that of the other stationary chambers connected to the system. Note that the chamber 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 chamber gain for the desired optical density. Make the chamber gain adjustment for each stationary chamber being installed.

Field Balance Check:

Using the 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.

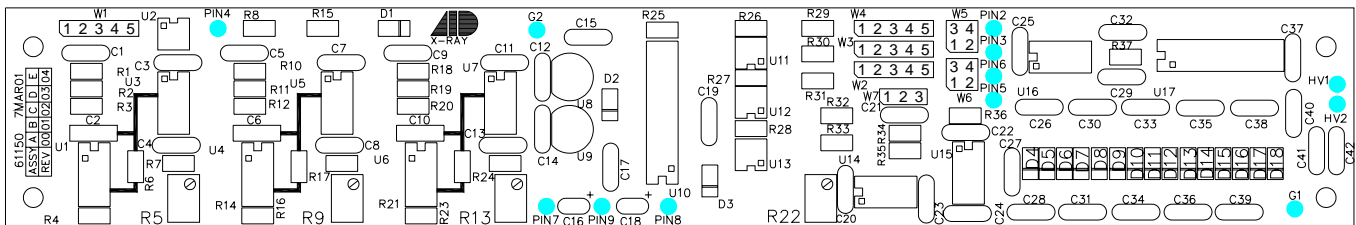
If necessary, adjust the individual gain potentiometers to balance the outputs to give the same mAs reading for each field selected individually. Note that individual gain adjustments are multi-turn potentiometers. A clockwise adjustment to a field gain potentiometer will increase the sensitivity of that field, causing the length of the exposure (mAs) to decrease.

Ionization Chamber Pin-outs:

61150A Pre-amp Board Pin-out	61150A Pre-amp Chassis Wire Color	Function	9-Pin Sub-D Pin-Out
1	N/C	NONE	1
2	RED	FIELD 2 SELECT	2
3	ORANGE	FIELD 1 SELECT	3
4	YELLOW	RESET	4
5	GREEN	OUTPUT	5
6	BLUE	FIELD 3 SELECT	6
7	VIOLET	NEGATIVE SUPPLY	7
8	GRAY	POSITIVE SUPPLY	8
9	WHITE	GROUND	9

Ionization Chamber Inputs and Output:

Signal	Jumper	Comments
Positive Supply Voltage Range	None	+11.4VDC to +15.75VDC less than 85 mA.
Negative Supply Voltage Range	None	-11.4VDC to -15.75VDC less than 15 mA.
Low-Active Reset (Exposure Duration)	W1 = 1-2 & 3-4	Pulling this line to ground ($\leq 8VDC$) beginning at exposure start and lasting for the entire duration of the exposure allows the integrator to operate.
High-Active Reset (Exposure Duration)	W1 = 2-3 & 4-5	Pulling this high ($\geq 4VDC$) beginning at exposure start and lasting for the entire duration of the exposure allows the integrator to operate.
Low-active Field Selects	W2, W3 and W4 = 1-2 & 3-4	Low-active: Pulling the field select lines to ground (0VDC) will select the field.
High-active Field Selects	W2, W3 and W4 = 2-3 & 4-5	High-active: Driving the field select lines high (+12VDC to +24VDC) will select the field.
Field Configuration A-B-C = 1-2-3	W5 = 1-3 & 2-4 and W6 = 1-2 & 3-4	Field selects 1, 2 and 3 select left (A), center (B) and right (C), respectively, as viewed from the x-ray tube-side of the ion chamber.
Field Configuration A-B-C = 2-1-3	W5 = 1-2 & 3-4 and W6 = 1-2 & 3-4	Field selects 2, 1 and 3 select left (A), center (B) and right (C), respectively, as viewed from the x-ray tube-side of the ion chamber.
Field Configuration A-B-C = 3-1-2	W5 = 1-2 & 3-4 and W6 = 1-3 & 2-4	Field selects 3, 1 and 2 select left (A), center (B) and right (C), respectively, as viewed from the x-ray tube-side of the ion chamber.
Field Configuration A-B-C = 3-2-1	W5 = 1-3 & 2-4 and W6 = 1-3 & 2-4	Field selects 3, 2 and 1 select left (A), center (B) and right (C), respectively, as viewed from the x-ray tube-side of the ion chamber.
Negative Output	W7 = 1-2	Time integrated signal ramping from 0VDC to a maximum of at least 80% of the supply voltage (-9.6VDC for -12VDC supply). The slope of this signal is directly proportional to the amount of x-ray flux received.
Positive Output	W7 = 2-3	Time integrated signal ramping from 0VDC to a maximum of at least 80% of the supply voltage (+9.6VDC for +12VDC supply). The slope of this signal is directly proportional to the amount of x-ray flux received.



Specific Configurations:

Unless specified otherwise, ICX ion chambers are delivered with an AID compatible jumper configuration. AID compatible means that the input and output signals will interface with Advanced Instrument Development, Inc's Expos-AID™ Automatic Exposure Control. This same configuration will also interface with Acoma, Control-X, CPI, Electromed, Gendex, Innerscan, OEC, Summit Industries, etc. Various configurations are listed below.

AID Compatible jumper configuration:

Jumper	Position	Function
61150A W1	1-2 & 3-4	low-active reset
61150A W2, W3 and W4	1-2 & 3-4	low-active field select
61150A W5 and 61150A W6	1-2 & 3-4 and 1-2 & 3-4	A-B-C = 2-1-3
61150A W7	2-3	positive output signal

Trex - Continental, Elscint, Keithley, Ratheon, Xonics Compatible jumper configuration:

Jumper	Position	Function
61150A W1	1-2 & 3-4	low-active reset
61150A W2, W3 and W4	1-2 & 3-4	low-active field select
61150A W5 and 61150A W6	1-3 & 2-4 and 1-2 & 3-4	A-B-C = 1-2-3
61150A W7	2-3	positive output signal

Trex - Bennett Compatible jumper configuration:

Jumper	Position	Function
61150A W1	1-2 & 3-4	low-active reset
61150A W2, W3 and W4	1-2 & 3-4	low-active field select
61150A W5 and 61150A W6	1-3 & 2-4 and 1-2 & 3-4	A-B-C = 1-2-3
61150A W7	1-2	negative output signal

Advanced Instrument Development, Inc.

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Downers Grove, IL 60515 U.S.A.

Phone: (630) 271-9729

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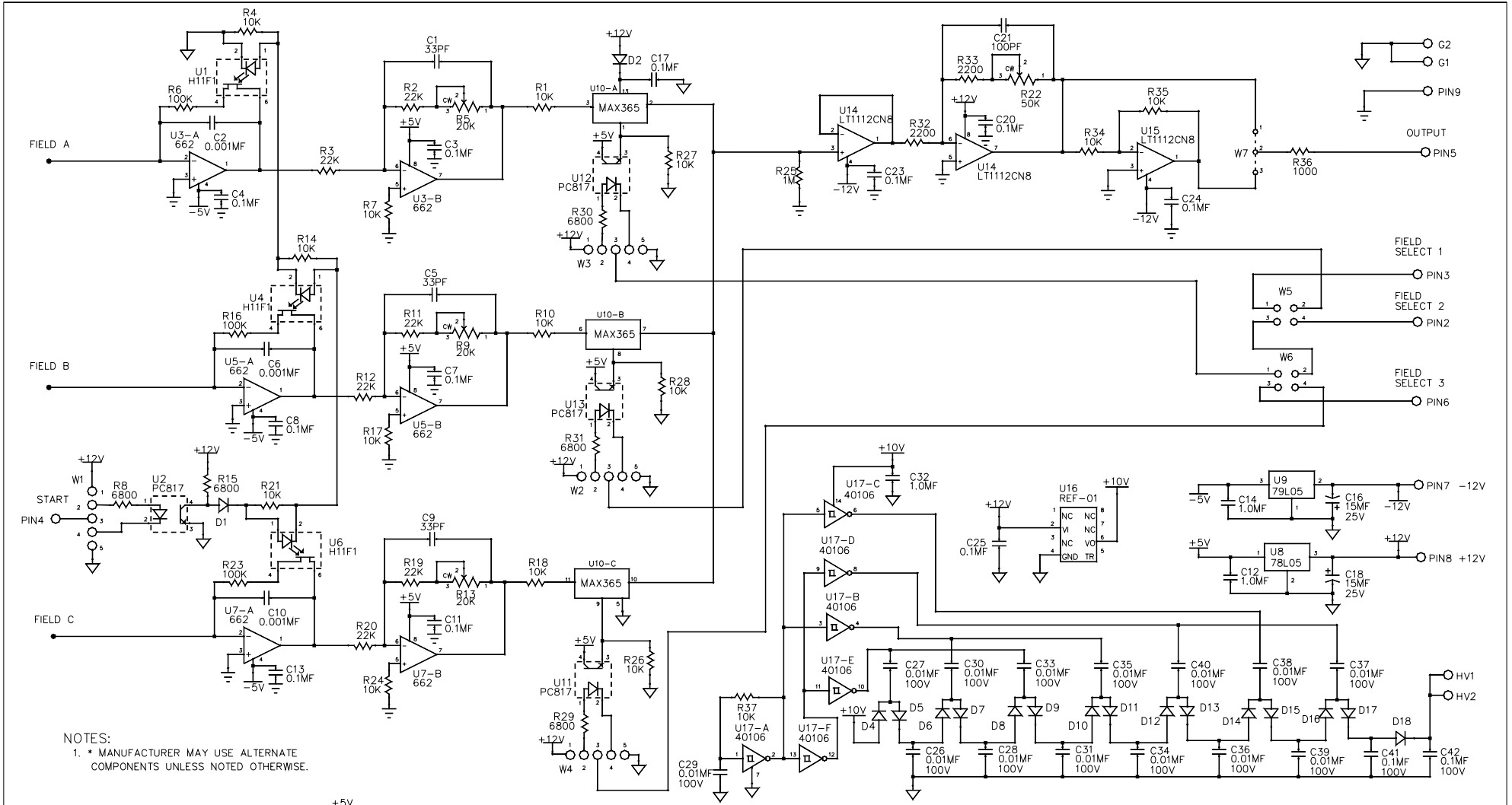
Fax: (630) 271-9995

GE, Fischer, Varian Compatible jumper configuration:

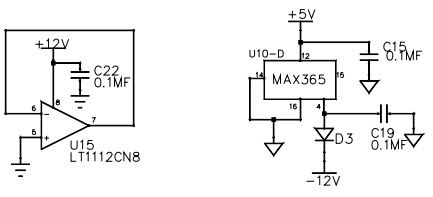
Jumper	Position	Function
61150A W1	2-3 & 4-5	high-active reset
61150A W2, W3 and W4	2-3 & 4-5	high-active field select
61150A W5 and 61150A W6	1-3 & 2-4 and 1-2 & 3-4	A-B-C = 1-2-3
61150A W7	2-3	positive output signal

Picker Compatible jumper configuration:

Jumper	Position	Function
61150A W1	1-2 & 3-4	low-active reset
61150A W2, W3 and W4	1-2 & 3-4	low-active field select
61150A W5 and 61150A W6	1-2 & 3-4 and 1-2 & 3-4	A-B-C = 2-1-3
61150A W7	1-2	negative output signal



NOTES:
 1. * MANUFACTURER MAY USE ALTERNATE COMPONENTS UNLESS NOTED OTHERWISE.



REV.	ECN NO.	DATE	REVISIONS	BY
01	1969	05APR01	U14 & U15 WERE LF442	BRP
00	1957	07MAR01	NEW BOARD	CJL

DO NOT SCALE
 UNLESS SPECIFIED OTHERWISE;
 DIMENSIONS ARE IN INCHES.
 FRACTIONS DECIMALS ANGLES
 ±1/64 ±0.010 ±1°

ADVANCED INSTRUMENT DEVELOPMENT, INC.
 1011 N. 25TH AVE.
 MELROSE PARK, IL. 60160

SCALE: NONE DRAWN BY: CJL DATE: 07MAR01
 MATERIAL: NONE CHECKED BY: DATE:
 FINISH: APPROVED BY: DATE:

**3-FIELD 662-OP-AMP PRE-AMP
 CALCULATED GAIN RANGE 1.0 TO 23.7
 TOP-TURN POTS**

USED ON: ICX SERIES	NEXT ASSY:	DRAWING NO.: 61150A	REV.: 01
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