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Model ICX110, ICX210 and ICX410
Three-field Ionization Chamber
Calibration Procedure for Pre-Amplifier board 61135D

The following adjustments apply to the calibration of a 61135D pre-amplifier board for a stationary 3-field ion chamber, e.g. for chest or table use.

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.

Chamber Gain Adjustment (61135D R22):

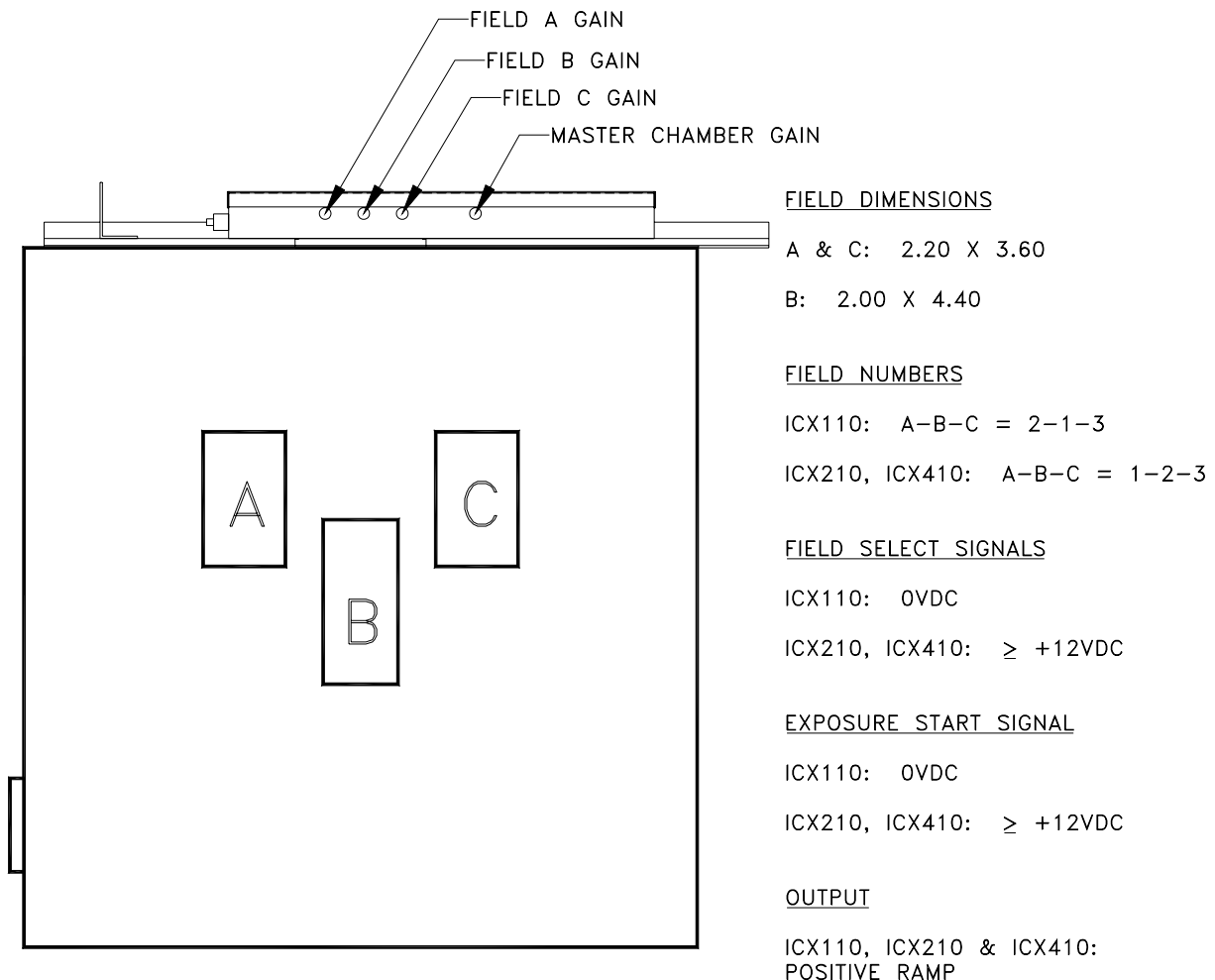
Typically, the chamber gain adjustment is the only adjustment needed when installing an ICX series ion chamber. Use the chamber gain adjustment to match the overall chamber sensitivity to that of the other stationary chambers connected to the system. Note that the chamber gain adjustment is a multi-turn potentiometer. A clockwise adjustment to the chamber 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.

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.

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.

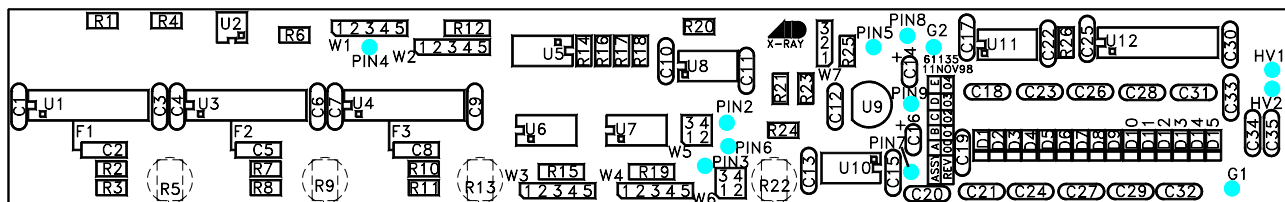


Ion Chamber Pin Outs:

61135D PIN OUTS	WIRE COLOR	FUNCTION	14-PIN AMP M-SERIES CONNECTOR
1	NONE	NO CONNECTION	NONE
2	YELLOW	FIELD 2 SELECT	D
3	VIOLET	FIELD 1 SELECT	H
4	WHITE	OUTPUT	B
5	GRAY	RESET (START INTEGRATING)	J
6	BROWN	FIELD 3 SELECT	A
7	BLUE	-15VDC	F
8	ORANGE	+15VDC	C
9	BLACK	GND	L
G2	BLACK	SHIELD	K

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
61135D W1	1-2 & 3-4	low-active reset
61135D W2, W3 and W4	1-2 & 3-4	low-active field select
61135D W5 and 61135D W6	1-2 & 3-4 and 1-2 & 3-4	A-B-C = 2-1-3
61135D W7	2-3	positive output signal

Trex - Continental, GTR Labs, Keithley, Ratheon, Xonics Compatible jumper configuration:

Jumper	Position	Function
61135D W1	1-2 & 3-4	low-active reset
61135D W2, W3 and W4	1-2 & 3-4	low-active field select
61135D W5 and 61135D W6	1-3 & 2-4 and 1-2 & 3-4	A-B-C = 1-2-3
61135D W7	2-3	positive output signal

Trex - Bennett Compatible jumper configuration:

Jumper	Position	Function
61135D W1	1-2 & 3-4	low-active reset
61135D W2, W3 and W4	1-2 & 3-4	low-active field select
61135D W5 and 61135D W6	1-3 & 2-4 and 1-2 & 3-4	A-B-C = 1-2-3
61135D W7	1-2	negative output signal

GE, Fischer, Varian Compatible jumper configuration:

Jumper	Position	Function
61135D W1	2-3 & 4-5	high-active reset
61135D W2, W3 and W4	2-3 & 4-5	high-active field select
61135D W5 and 61135D W6	1-3 & 2-4 and 1-2 & 3-4	A-B-C = 1-2-3
61135D W7	2-3	positive output signal

Picker Compatible jumper configuration:

Jumper	Position	Function
61135D W1	1-2 & 3-4	low-active reset
61135D W2, W3 and W4	1-2 & 3-4	low-active field select
61135D W5 and 61135D W6	1-2 & 3-4 and 1-2 & 3-4	A-B-C = 2-1-3
61135D W7	1-2	negative output signal