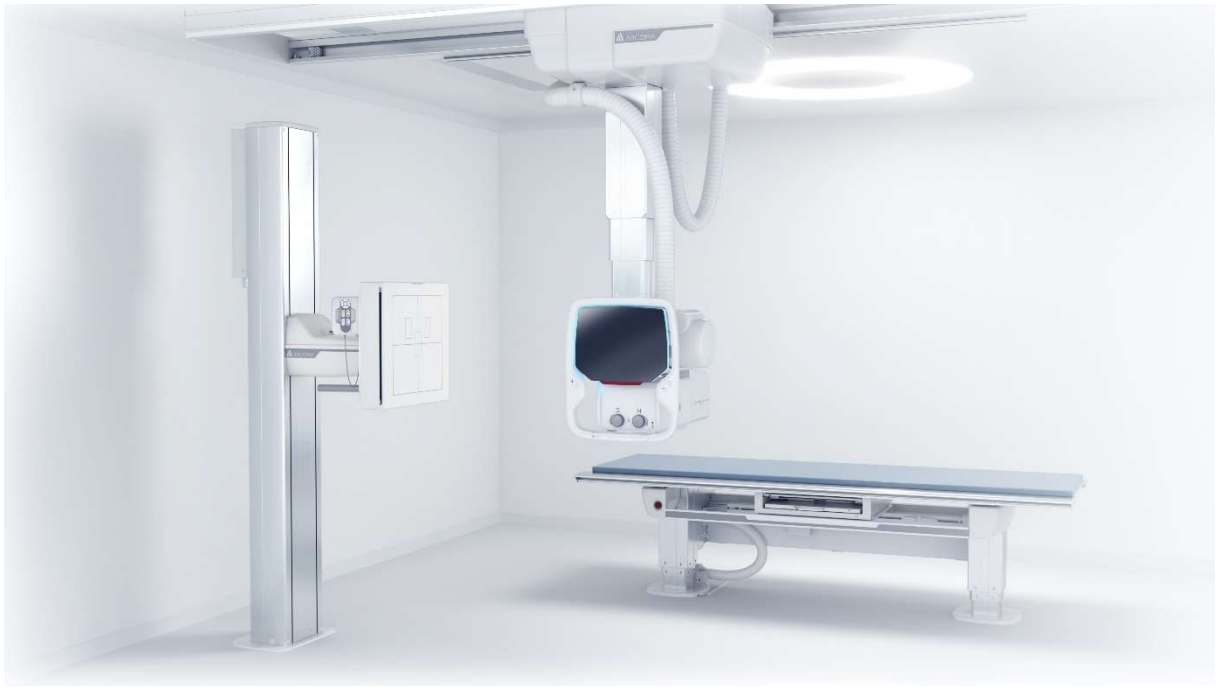
# HOW TO SET AND ADJUST AEC

**APPLICABLE TO:** Omnera 400/500 systems



**INFORMATION:**

The Omnera 400/500 systems are equipped with Automatic Exposure Control (AEC) functionality in the Table and Wall stand detector holders. The systems use ionization type AEC-chambers, and this instruction shows how to calibrate the function.

**REQUIRED TOOLS:**

- Standard service tools.
- CanonNE + AEC protocol

On delivery of the system, the AEC function is pre-calibrated and should only need minor adjustments. For instructions on how to adjust cut-off dose, skip to point 2 followed by point 3 (Table) or point 4 Wall stand.

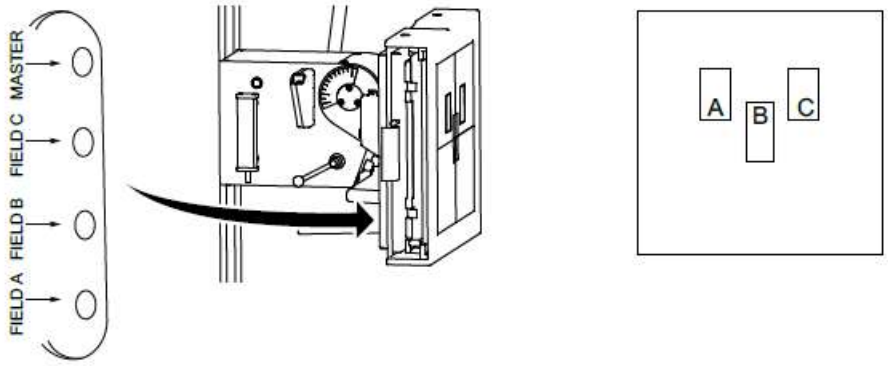
In case a new AEC chamber (spare part) is installed, proceed as follows:

# 1. After installation of new AEC chamber (spare part)

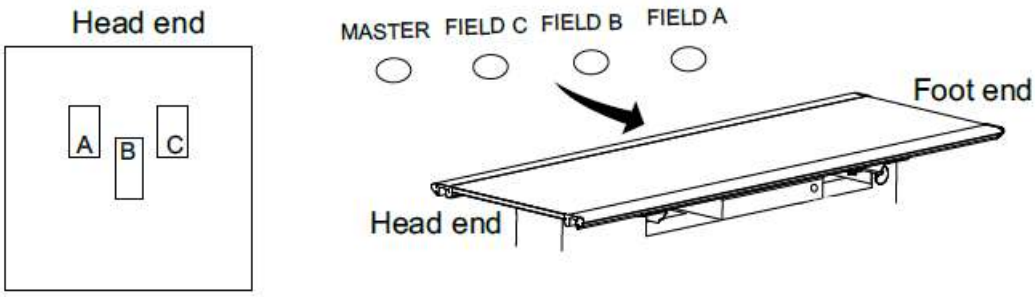
## 1a. Factory default settings – AEC preamplifier potentiometers.

Instruction applicable for both Wall stand and Table chambers.

1. Locate the AEC-chamber potentiometers on the back of the detector holder.
2. Turn the MASTER potentiometer clockwise all the way to its end limit.
3. Then turn it 3,5 rounds back counterclockwise.




*Location of AEC pre-amplifier potentiometers on Wall stand.*




*Location of AEC pre-amplifier potentiometers on Table.*

4. Turn each of the three field balance potentiometers (Field A-C) in one direction until it clicks, then turn 7,5 turns back to set the center of range.

## 2. Preparations

1. Launch GenwareMP and select the AEC menu. Click on the AEC Setup tab.

2. Select the Channel Number you are working on (Wall stand = 1, Table =2).
   Confirm this in the Receptor setup and with the connections in the System Cabinet at the AEC board.

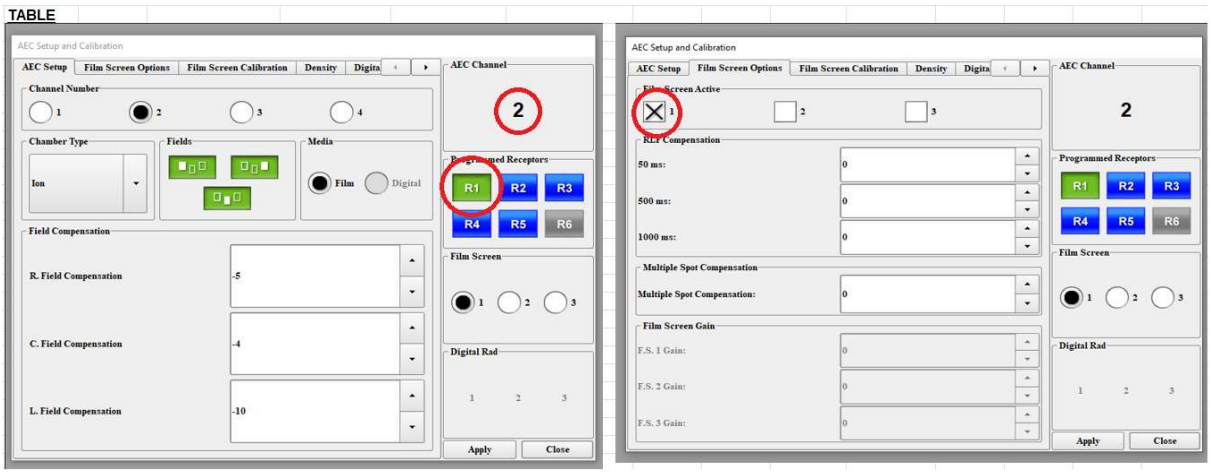
3. Ensure that the correct receptor is selected under Programmed Receptors (R1 = Table, R3 = Wall stand).

4. Ensure that the correct Film Screen is selected under Film Screen (1 = Table, 2 = Wall stand).

5. Click on the Film Screen Options tab.

6. Ensure that the Film Screen Active Box has the correct Film Screen selected for the Table and Wall stand workspaces. If not; Select the AEC Setup tab first, ensure the Receptor and AEC channel number is correct, then click the Film Screen Options tab, and ensure that only one Film Screen is selected under Film Screen Active.

| Workspace | AEC Channel | Receptor | Film Screen |
|---|---|---|---|
| Table | 2 | 1 | 1 |
| Wall Stand | 1 | 3 | 2 |




*Example Table*

7. Click on the Film Screen Calibration tab. Record the value for each kV station and Film screen combination in the *Current Film Screen value* column of the charts below.

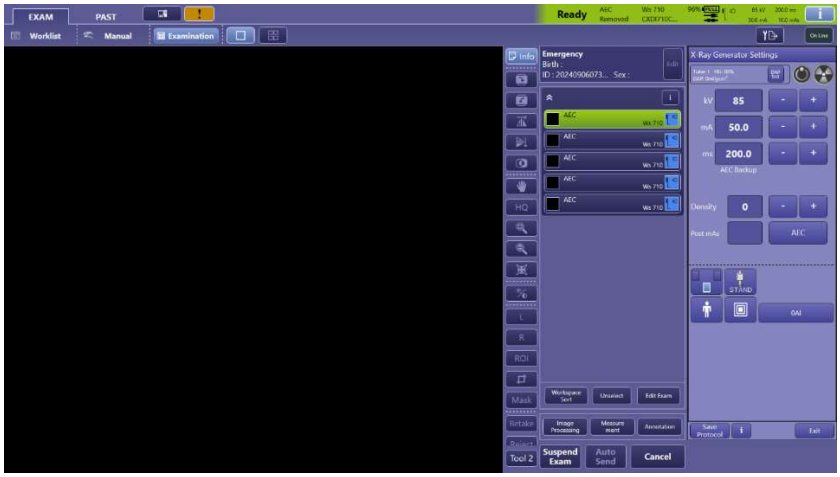
| **Table** | Target EI: 300 (A) | | | **Receptor 1** | **AEC Channel 2** | **Film Screen 1** |
|---|---|---|---|---|---|---|
| Filter (mm Cu) | kV | Post mAs (B) | EI (C) | Calc. mAs (D) | Current Film screen value (E) | Calculated Film screen value (F) |
| 1 | 50 | | | | | |
| 1 | 55 | | | | | |
| 1 | 65 | | | | | |
| 2 | 75 | | | | | |
| 2 | 85 | | | | | |
| 2 | 95 | | | | | |
| 3 | 110 | | | | | |
| 3 | 130 | | | | | |

| **Wall stand** | Target EI: 300 (A) | | | **Receptor 3** | **AEC Channel 1** | **Film screen 2** |
|---|---|---|---|---|---|---|
| Filter (mm Cu) | kV | Post mAs (B) | EI (C) | Calc. mAs (D) | Current Film screen value (E) | Calculated Film screen value (F) |
| 1 | 50 | | | | | |
| 1 | 55 | | | | | |
| 1 | 65 | | | | | |
| 2 | 75 | | | | | |
| 2 | 85 | | | | | |
| 2 | 95 | | | | | |
| 3 | 110 | | | | | |
| 3 | 130 | | | | | |

# 3. Adjusting AEC cut-off dose – Table

## 3a. Field balance and Master gain adjustment

1. Launch CXDI NE and start an examination using the predefined AEC protocol for Table.



2. Select an AEC protocol and confirm the exposure parameters.


**Receptor:** 1 – Table

**Mode:** AEC

**Fields:** Center

**Film screen:** 1

**kV:** 85

**mA:** 100

**Backup time (ms):** 200

**Density:** 0

**Collimator filter:** OFF = 0mm Al/Cu

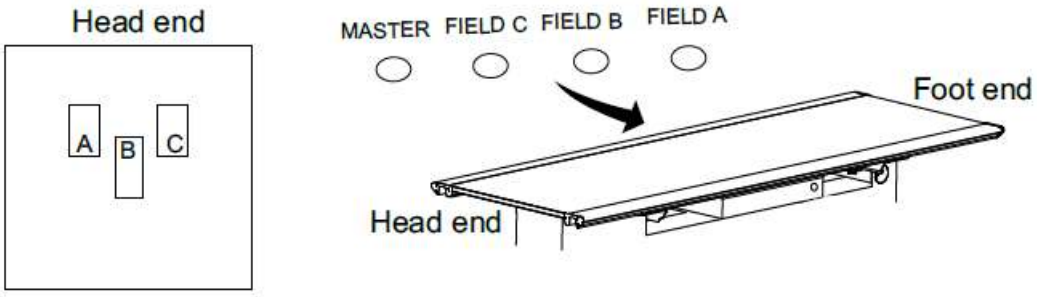
3. Align the x-ray tube with the AEC chamber in the Table. Insert a 2mm copper filter and grid. Use the SID (Source image distance) that matches the grid specification. Normally 40” at the table. If more than one grid is available, use the one with the highest ratio. Adjust the collimator light field to cover all three fields of the AEC chamber.

4. Use CXDI NE to make an exposure with the settings from step 2.

   NOTE! During the calibration, exposure times should be between 20-40ms. Adjust tube current and repeat exposure if necessary.

5. Read the EI value, the target is 300.

6. If adjustment is necessary, locate the Table AEC chamber preamplifier and the potentiometer for the Center field (FIELD B). Adjust and repeat exposure until the required target EI is reached.




7. Select the Left-side AEC Field and repeat step 2-6 until target EI, is achieved. Adjustments are made on the potentiometer for the Left field.

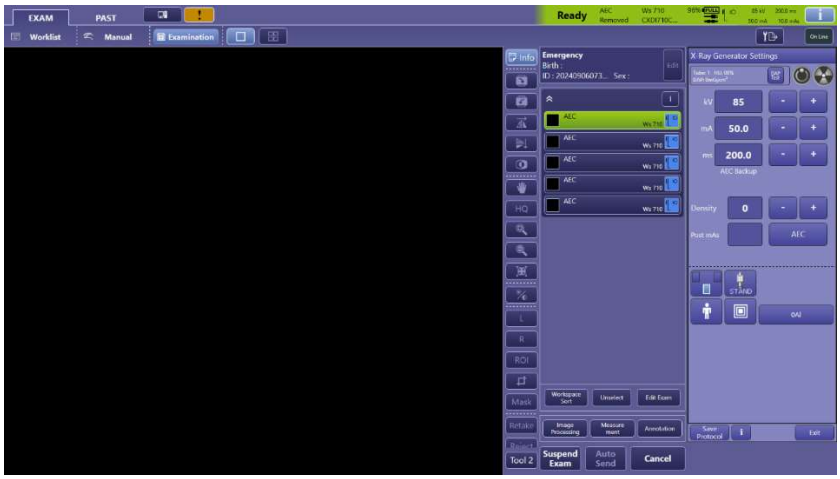
8. Select the Right-side AEC Field and repeat step 2-6 until target EI, is achieved. Adjustments are made on the potentiometer for the Right field.

9. If you cannot reach an EI of 300 with the cell specific potentiometers, perform steps 2-8 with a target EI of 200 for all three fields. Then use the MASTER potentiometer of the preamplifier to bring the EI up to 300 once the cells are balanced.

   After this step the three AEC fields of the Table is adjusted to stop exposure at the target EI when exposed with 85kV.

## 3b. Film screen calibration – Table

1. Launch CXDI NE and start an examination using the predefined AEC protocol for table.




2. Select the following exposure parameters.


**Receptor:** 1 – Table

**Mode:** AEC

**Fields:** Center

**Film screen:** 1

**kV:** 50-130 see chart below

**mA:** 100

**Backup time (ms):** 200

**Density:** 0

**Collimator filter:** OFF = 0mm Al/Cu

3. Align the x-ray tube with the AEC chamber in the Table. Insert a copper filter phantom for each exposure as stated in the chart below. Insert grid. Use the SID (Source image distance) that matches the grid specification. Normally 40" at the table. If more than one grid is available, use the one with the highest ratio. Adjust the collimator light field to cover the Center AEC field.

| **Table** | Target EI: 300 (A) | | | **Receptor 1** | **AEC Channel 2** | **Film Screen 1** |
|---|---|---|---|---|---|---|
| Filter (mm Cu) | kV | Post mAs (B) | EI (C) | Calc. mAs (D) | Current Film screen value (E) | Calculated Film screen value (F) |
| 1 | 50 | | | | | |
| 1 | 55 | | | | | |
| 1 | 65 | | | | | |
| 2 | 75 | | | | | |
| 2 | 85 | | | | | |
| 2 | 95 | | | | | |
| 3 | 110 | | | | | |
| 3 | 130 | | | | | |

4. Use CXDI NE to make exposure with the settings from the chart above.

   NOTE! During the calibration, exposure times should be between 30-100ms. Adjust tube current and repeat exposure if necessary.

5. Record post mAs and EI value in the chart after each exposure and for each kVp/filtration combination. A pre-staged spread sheet can be used to calculate the correction factors (Film screen value) automatically for each kV station.

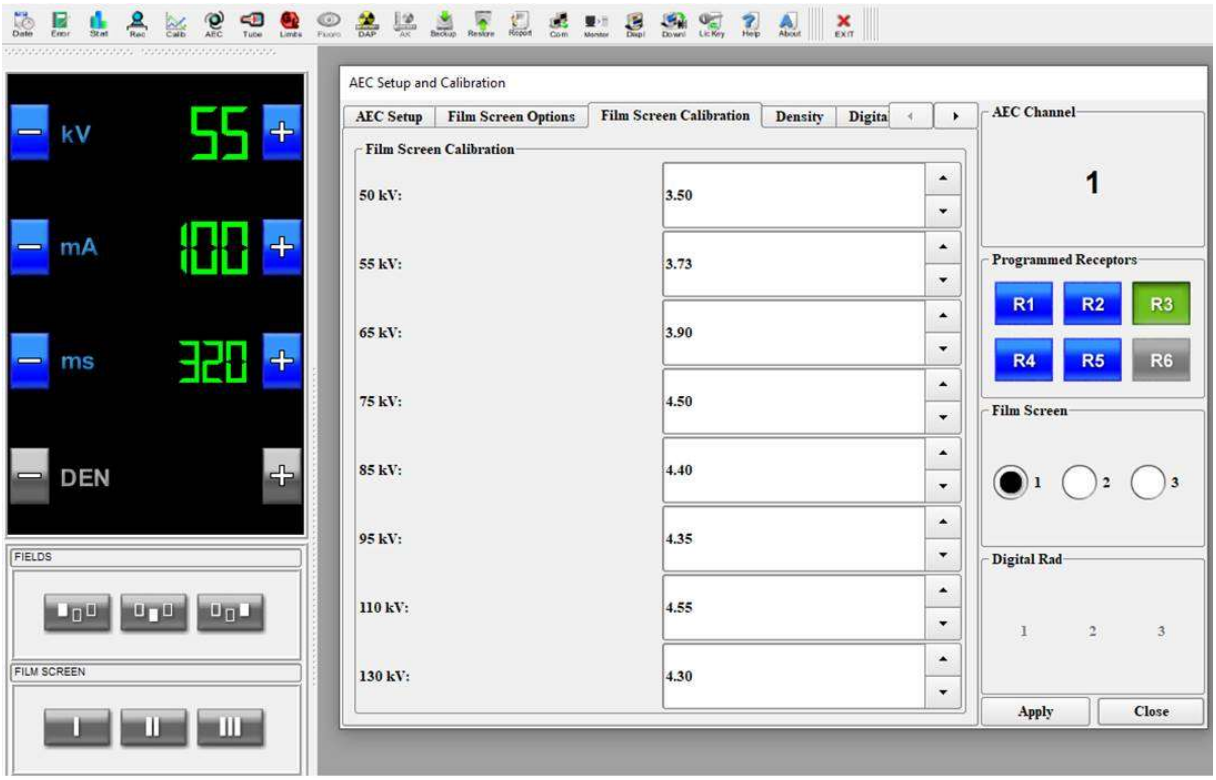
   D = ( A * B ) / C

   F = ( D * E / B)

6. When all exposures have been executed and the chart has been populated with numbers, the Canon NE application can be closed.

7. Launch GenwareMP. Select the AEC Setup tab and select channel 2 for Table. Confirm that Receptor 1 is selected.

8. Select the Film Screen Calibration tab and enter the Calculated Film Screen values from previous step, for each kV station and save the values to the generator.




9. Re-launch CXDI NE and start an examination using the predefined AEC protocol for table.

10. Make exposures for each kVp/filtration setting of the chart again and confirm that each exposure results in the target EI = 300.

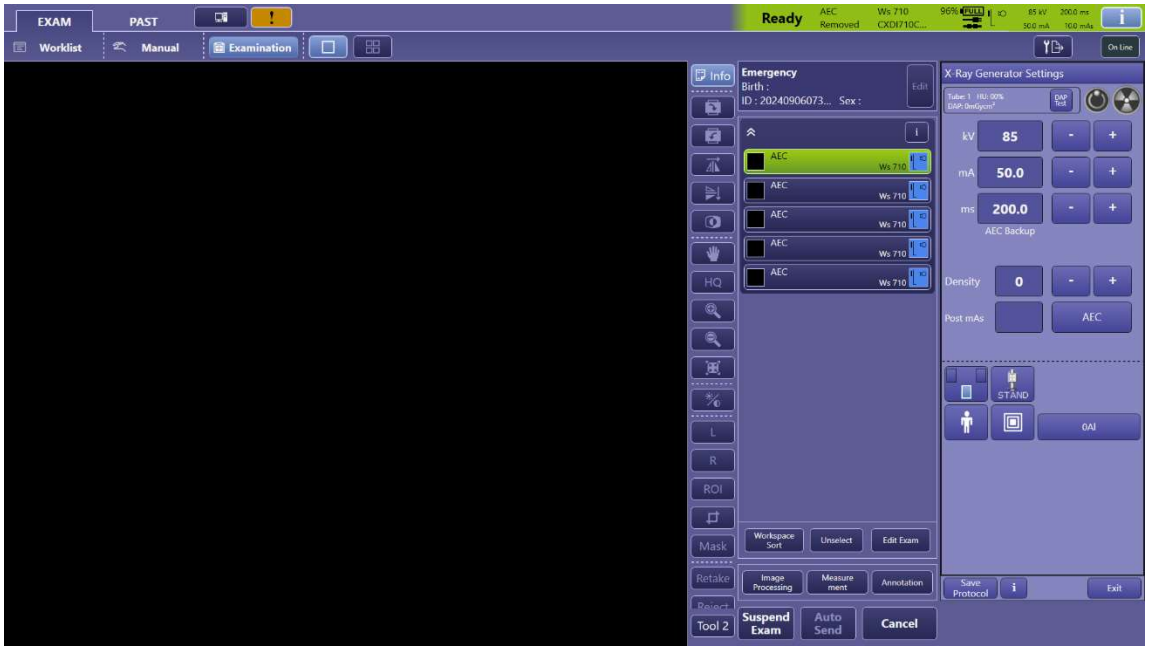
| **Table** | **Target EI: 300** | | | |
|---|---|---|---|---|
| Filter (mm Cu) | kV | Post mAs | EI | Calculated Film screen value |
| 1 | 50 | | | |
| 1 | 55 | | | |
| 1 | 65 | | | |
| 2 | 75 | | | |
| 2 | 85 | | | |
| 2 | 95 | | | |
| 3 | 110 | | | |
| 3 | 130 | | | |

11. You can go back into the GenWare application and tweak the Film Screen values if the EI/mAs is outside of the range of +/- 5 percent.

# 4. Adjusting AEC cut-off dose – Wall stand

## 4a. Field balance and Master gain adjustment

1. Launch CXDI NE and start an examination using the predefined AEC protocol for Wall stand.




2. Select the following exposure parameters.


**Receptor:** 3 – Wall stand

**Mode:** AEC

**Fields:** Center

**Film screen:** 2

**kV:** 85

**mA:** 100

**Backup time (ms):** 200

**Density:** 0

**Collimator filter:** OFF = 0mm Al/Cu

3. Align the x-ray tube with the AEC chamber in the Wall stand. Insert a 2mm copper filter and grid. Use the SID (Source image distance) that matches the grid specification. Normally 60” at

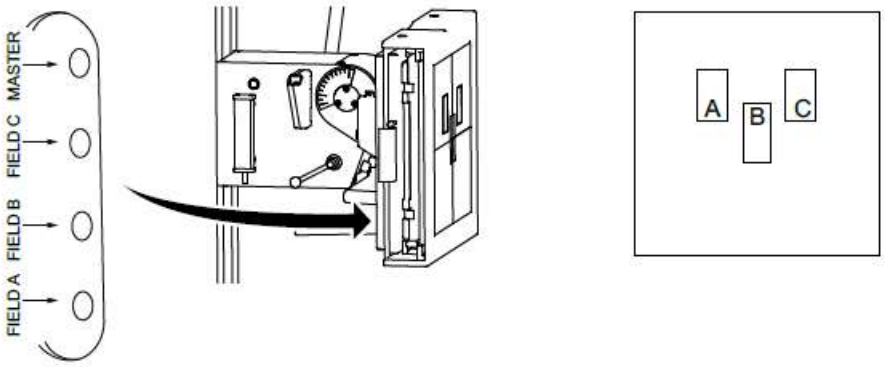
the wall stand. If more than one grid is available, use the one with the highest ratio. Adjust the collimator light field to cover all three fields of the AEC chamber.

4. Use CXDI NE to make an exposure with the settings from step 2.

   NOTE! During the calibration, exposure times should be between 20-40ms. Adjust tube current and repeat exposure if necessary.

5. Read the EI value, the target is 300.

6. If adjustment is necessary, locate the Wall stand AEC chamber preamplifier and the potentiometer for the Center field (FIELD B). Adjust and repeat exposure until the required target EI is reached.




7. Select the Left-side AEC Field and repeat step 2-6 until target EI, is achieved. Adjustments are made on the potentiometer for the Left field.

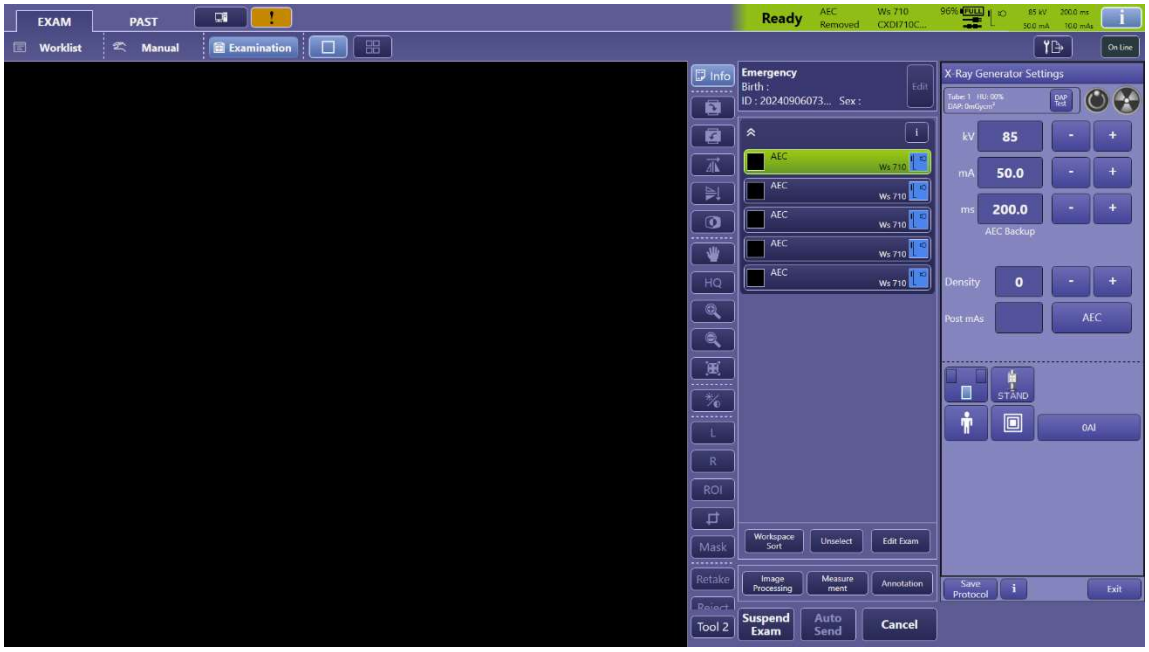
8. Select the Right-side AEC Field and repeat step 2-6 until target EI, is achieved. Adjustments are made on the potentiometer for the Right field.

9. If you cannot reach an EI of 300 with the cell specific potentiometers, perform steps 2-8 with a target EI of 200 for all three fields. Then use the MASTER potentiometer of the preamplifier to bring the EI up to 300 once the cells are balanced.

   After this step the three AEC fields of the Wall stand is adjusted to stop exposure at the target EI when exposed with 85kV.

## 4b. Film screen calibration – Wall stand

1. Launch CXDI NE and start an examination using the predefined AEC protocol for wall stand.




2. Select the following exposure parameters.


**Receptor:** 3 – Wall stand

**Mode:** AEC

**Fields:** Center

**Film screen:** 2

**kV:** 50-130 see chart below

**mA:** 100

**Backup time (ms):** 200

**Density:** 0

**Collimator filter:** OFF = 0mm Al/Cu

3. Align the x-ray tube with the AEC chamber in the Wall stand. Insert a copper filter phantom for each exposure as stated in the chart below. Insert grid. Use the SID (Source image distance) that matches the grid specification. Normally 60” at the wall stand. If more than one grid is available, use the one with the highest ratio. Adjust the collimator light field to cover the Center AEC field.

| **Wall stand** | Target EI: 300 (A) | | | **Receptor 3** | **AEC Channel 1** | **Film screen 2** |
|---|---|---|---|---|---|---|
| Filter (mm Cu) | kV | Post mAs (B) | EI (C) | Calc. mAs (D) | Current Film screen value (E) | Calculated Film screen value (F) |
| 1 | 50 | | | | | |
| 1 | 55 | | | | | |
| 1 | 65 | | | | | |
| 2 | 75 | | | | | |
| 2 | 85 | | | | | |
| 2 | 95 | | | | | |
| 3 | 110 | | | | | |
| 3 | 130 | | | | | |

4. Use CXDI NE to make exposure with the settings from the chart above.

   NOTE! During the calibration, exposure times should be between 30-100ms. Adjust tube current and repeat exposure if necessary.

5. Record post mAs and EI value in the chart after each exposure and for each kVp/filtration combination. A pre-staged spread sheet can be used to calculate the correction factors (Film screen value) automatically for each kV station.

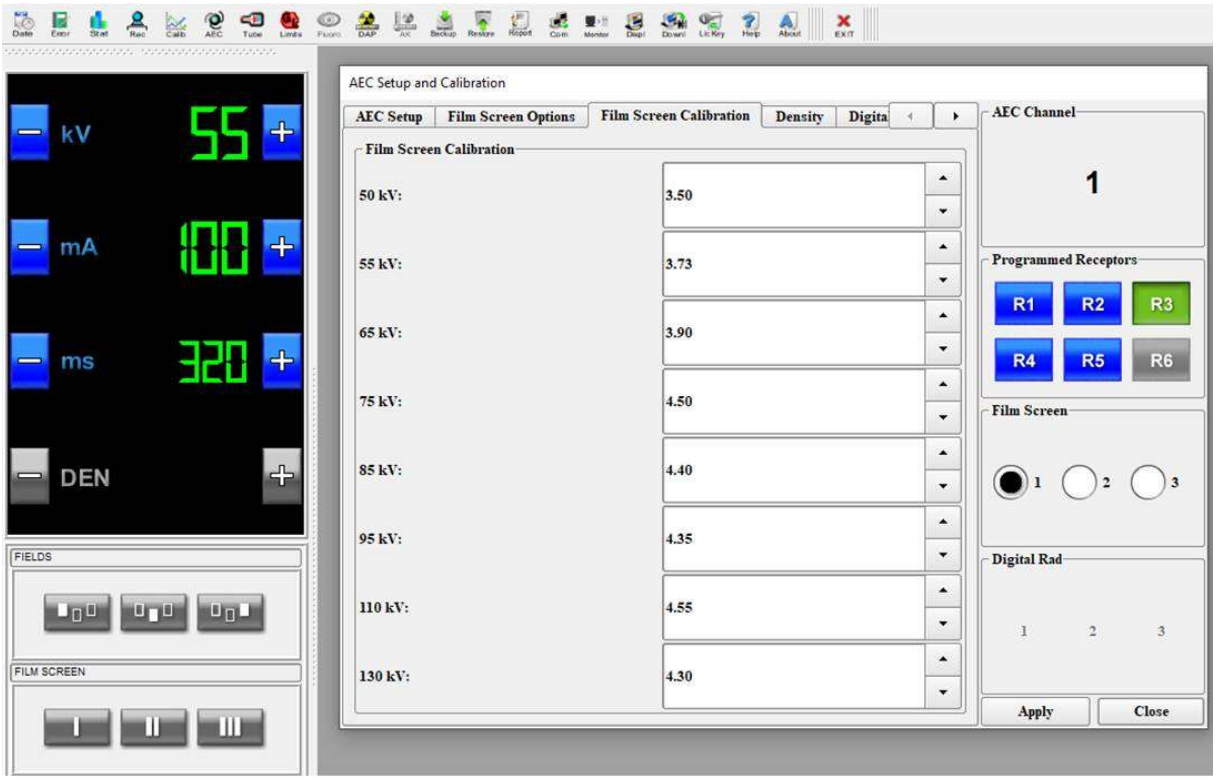
   D = ( A * B ) / C

   F = ( D * E / B)

6. When all exposures have been executed and the chart has been populated with numbers, the Canon NE application can be closed.

7. Launch GenwareMP. Select the AEC Setup tab and select channel 1 for Wall stand. Confirm that Receptor 3 is selected.

8. Select the Film Screen Calibration tab and enter the Calculated Film Screen values from previous step, for each kV station and save the values to the generator.



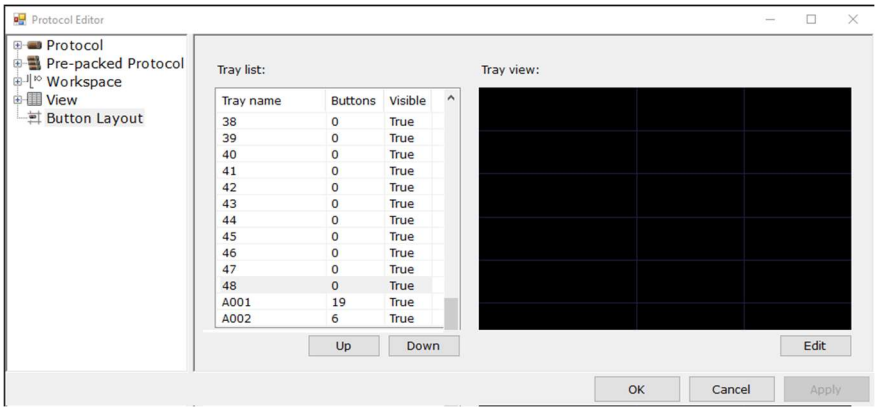

9. Re-launch CXDI NE and start an examination using the predefined AEC protocol for wall stand.
10. Make exposures for each kVp/filtration setting of the chart again and confirm that each exposure results in the target EI = 300.

| **Table** | **Target EI: 300** | | | |
|---|---|---|---|---|
| Filter (mm Cu) | kV | Post mAs | EI | Calculated Film screen value |
| 1 | 50 | | | |
| 1 | 55 | | | |
| 1 | 65 | | | |
| 2 | 75 | | | |
| 2 | 85 | | | |
| 2 | 95 | | | |
| 3 | 110 | | | |
| 3 | 130 | | | |

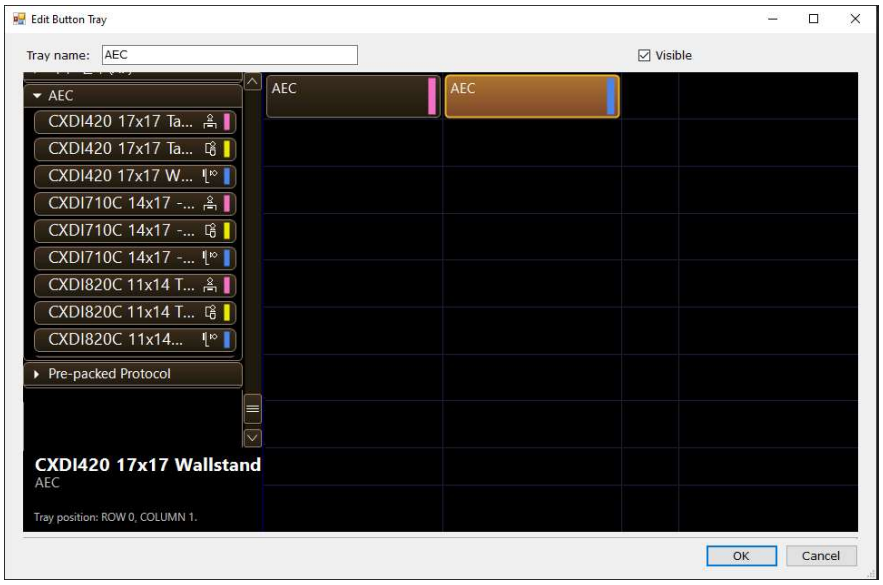
11. You can go back into the GenWare application and tweak the Film Screen values if the EI/mAs is outside of the range of +/- 5 percent.

# Setting up AEC protocols

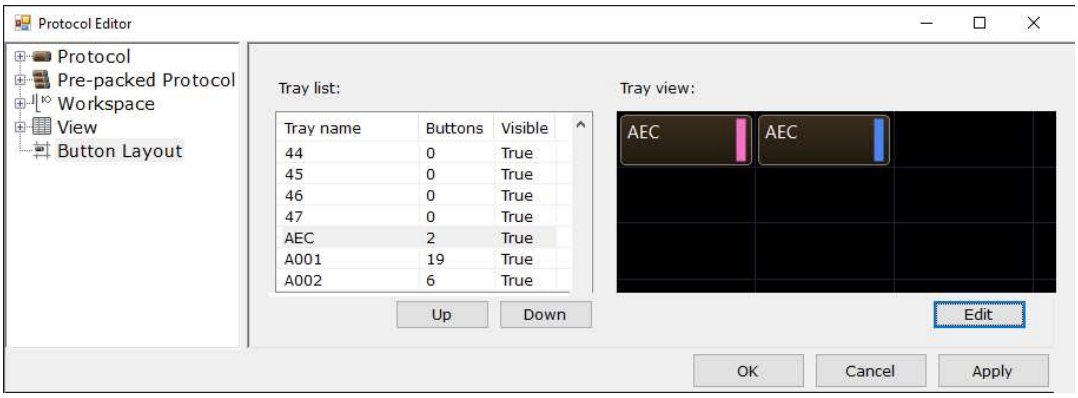
1. Open the Service tool and select Protocol Editor and Button Layout.
   Select an unused Tray and press Edit



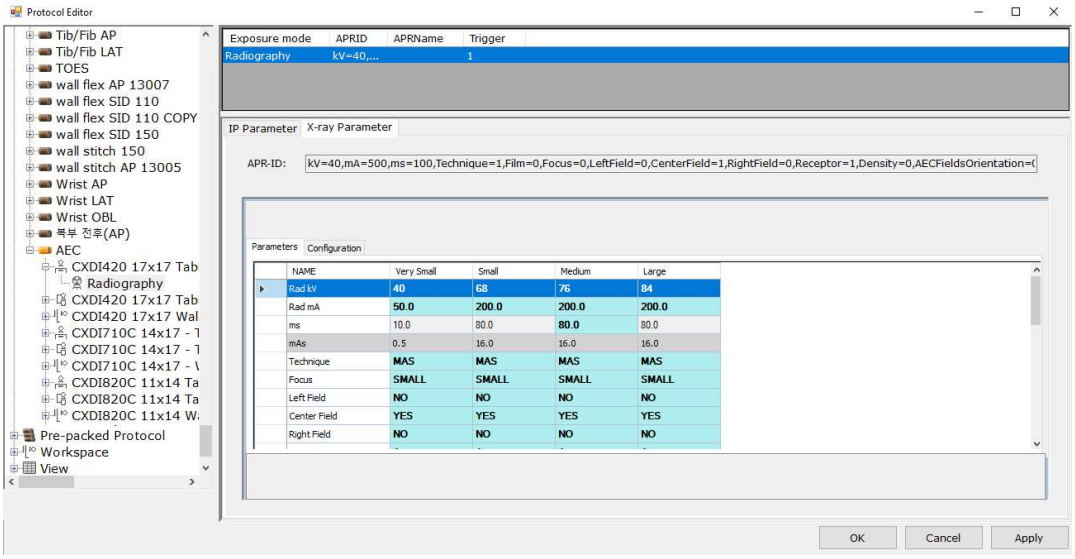

2. Enter a new Tray name.
   Click and drag the AEC protocols from the drop down list to the button tray.




3. Press OK and confirm that the new Tray is available in the Tray list.




4. Enter protocols, Radiography / X-ray parameters, and set the appropriate settings




5. Press Apply to save the settings.

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