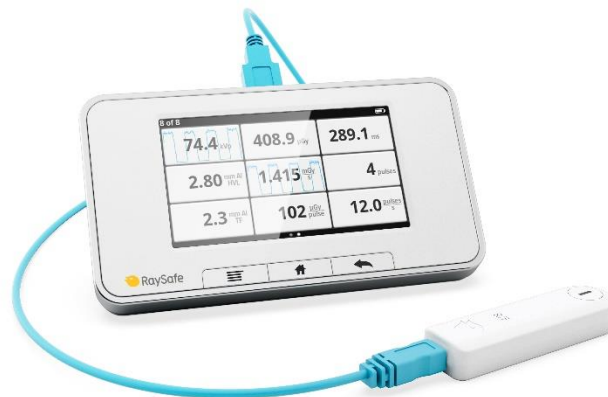# RaySafe X2 R/F – kVp measurements on Siemens CT scanners with STRATON X-ray tubes

BACKGROUND

This application note describes how to measure tube peak voltage (kVp) with the RaySafe X2 R/F sensor (X2 R/F) on Siemens CT scanners with STRATON X-ray tubes, in terms of positioning and use of correction factors[1].

Siemens CT scanners with STRATON tubes contain beam filter materials that are not handled by the active compensation of the sensor. Therefore, correction factors are needed for kVp measurements.

X2 R/F sensors with application version (app version) 2.20 or higher have a setting for correction factors. Lower app versions require manual corrections of measured kVp values. This application notes gives instructions for both scenarios.

Note: If your sensor has app version 2.19 or lower, the setting for correction factors, *Siemens CT Straton*, will be added the next time your X2 R/F sensor is sent for factory calibration and upgrade.

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[1] For details on correction factors and positioning of the RaySafe Xi R/F detector for measurements on Siemens CT scanners with STRATON X-ray tubes, see the application note CT kV measurements on SOMATOM.

SENSOR POSITIONING

For kVp measurements on CT scanners, position the X2 R/F sensor according to Figure 1. The sensor can be positioned in any direction, as long as the sensor area faces the X-ray tube.
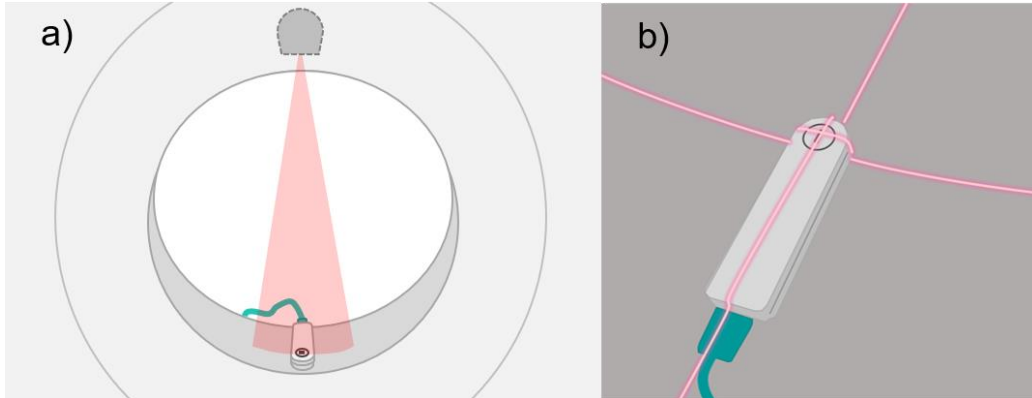

Figure 1: a) Position the sensor in the gantry, or on the couch, opposite to the X-ray tube. **b)** Use the laser lines of the CT scanner to center the active sensor area to the X-ray beam.

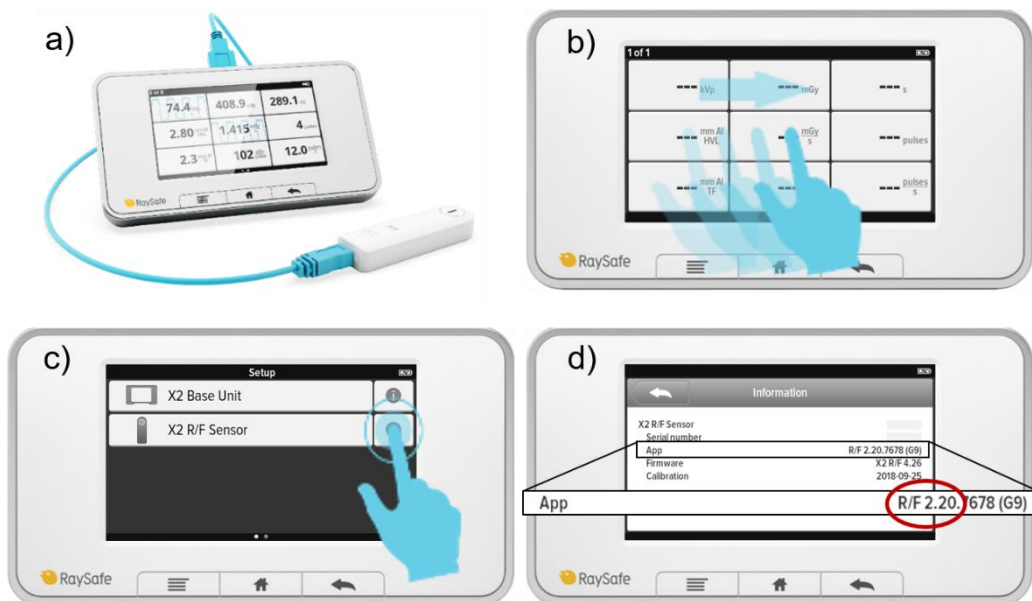## HOW TO FIND THE APP VERSION OF THE SENSOR

Figure 2: a) Connect the sensor to the X2 Base Unit. **b)** Swipe right from the measurement screen. **c)** Tap the information sign for the X2 R/F sensor.
d) Find the app version (marked in red).

RaySafe™

kVp CORRECTION FACTORS:
SENSOR APP VERSION 2.20 OR HIGHER

If the X2 R/F sensor has app version 2.20 or higher, use a setting in the X2 Base Unit to correct the kVp values.

How to get kVp:

1. Position the sensor in the gantry, or on the couch (Figure 1).
2. Select the setting *Siemens CT Straton* in the X2 Base Unit (Figure 3).
3. Expose in **topogram mode** to measure kVp.
4. The kVp value shown on the X2 Base Unit is corrected and ready to use.

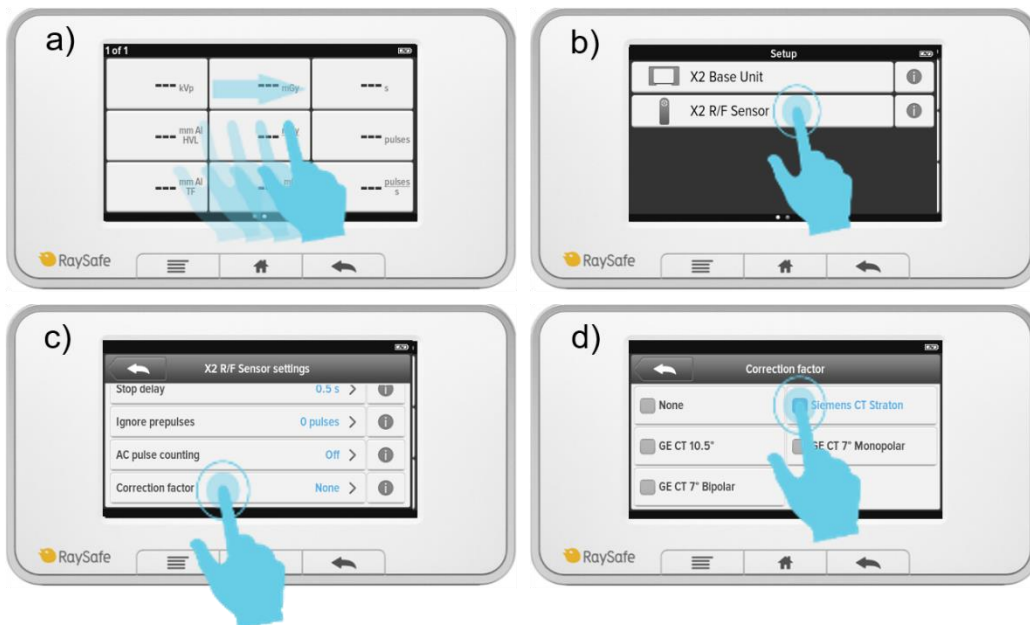**Note:** The correction factors affect the kVp value only.

Figure 3: Correction factor settings in the X2 Base Unit for kVp measurements on Siemens CT scanners with STRATON X-ray tubes. **(a)** Swipe right from the home screen. **(b)** Tap *X2 R/F Sensor*. **(c)** Tap *Correction factor*. **(d)** Select *Siemens CT Straton*.

kVp CORRECTION FACTORS:
SENSOR WITH APP VERSION 2.19 OR LOWER

If the X2 R/F sensor has app version 2.19 or lower, correct the measured kVp value manually. Equation 1 gives the relation between measured and corrected kVp:

$$kVp_{corrected} = 0{,}8483 \cdot kVp_{measured} + 10{,}041 \qquad \textit{(Eq. 1)}$$

How to get kVp:

1. Position the sensor in the gantry, or on the couch (Figure 1).
2. Expose in **topogram mode** to measure kVp.
3. Use Equation 1 to manually correct the measured kVp value.

Calculation example:

$Measured\ kVp = 106\ kVp$

$Corrected\ kVp = 0{,}8483 \cdot 106\ kVp + 10{,}041 = 99{,}9608\ kVp \approx 100\ kVp$

Table 1 shows examples of measured and corrected kVp values, rounded to the nearest whole number.

Table 1:

Measured kVp	Corrected kVp
71	70
82	80
106	100
130	120
153	140

CONTACT

Please visit www.raysafe.com for more information.