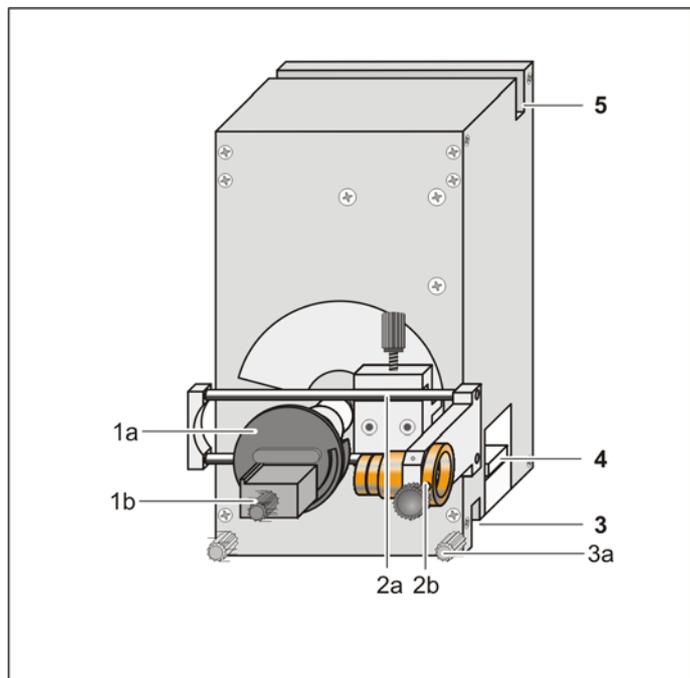


06/05-W97-Sel



Instruction sheet 554 831

Goniometer (554 831)

- 1 Target arm**
with target holder (1a), target stage (1b)
- 2 Sensor arm**
with sensor holder (2a), sensor seat (2b)
- 3 Bottom guide groove**
with knurled screws (3a)
- 4 Terminal pin connector**
- 5 Top guide groove**

1 Description

The goniometer is a self-contained unit for mounting in the X-ray apparatus and is included in the scope of supply of the X-ray apparatus (554 811). It is equipped with two independently controllable stepping motors which move the sensor and target arms. The motion is defined using the keys in the control panel of the X-ray apparatus and initiated manually with the ADJUST knob or automatically with the SCAN key (see instruction sheet of the X-ray apparatus).

The target stage can accommodate e.g. the LiF crystal for Bragg reflection (554 77), the NaCl crystal for Bragg reflection (554 78), the aluminum scattering body from the Compton accessory X-ray (554 836) or other samples.

The entire goniometer unit can be shifted within the experiment chamber. The length of the sensor arm is variable, so that the angular resolution can be altered for the slit of the sensor.

Note

The goniometer is positioned solely by means of electric stepper motors:

- Do not block the target arm and sensor arm of the goniometer and do not use force to move them.

2 Technical data

Working principle:	stepping motors for target and sensor arms, which can be electronically coupled
Angular resolution:	0.1°
Angular range of target:	unlimited
Angular range of sensor:	approx. -10° to 170°

Sensor arm:

Length of sensor arm:	approx. 40-110 mm
Width of sensor slit:	1 mm

Target stage:

Sample clamping width:	3-9 mm
Area of platform:	25 mm x 28 mm

General data:

Dimensions:	13.5 cm × 22.5 cm × 12.5 cm
Weight:	3 kg

3 Zero position of the measuring system

Warning: Each time the zero position of the measuring system is changed the old values of the zero position are overwritten in the microprocessor memory by the new values

The zero position of the goniometer measuring system is determined by arm movement toward two light barriers with subsequent step correction. The correction values with reference to the position of the light barriers are stored in the X-ray apparatus.

You can adjust the zero position of the measuring system most precisely using the experiment "Bragg reflection"; the adjustment is then with reference to the lattice planes of the monocrystal.

Additionally required:

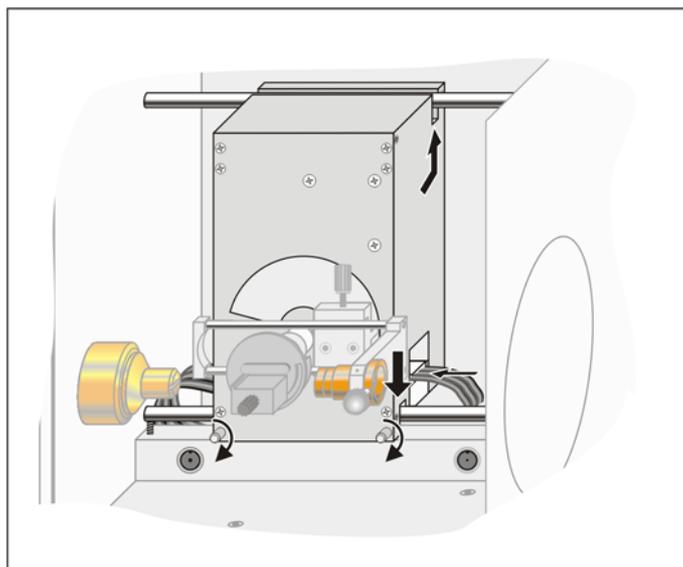
1 End-window counter for a, b, γ radiation and x-rays	559 01
1 NaCl crystal for Bragg reflection (in scope of supply of 554 811)	554 78

- Press the ZERO key to return the target and sensor arms to the current zero position.
- Mount the NaCl crystal and the end-window counter (see below).
- In coupled scanning mode, set the target to about 7.2° using the ADJUST knob.
- Set the tube high voltage $U = 35.0$ kV and emission current $I = 1.00$ mA and switch on the tube high voltage with HV ON/OFF.
- Switch between sensor and target scanning modes and locate the maximum counting rate for the first reflection maximum of the NaCl monocrystal under manual control .
- In coupled scanning mode, move the target back by 7.2° (even if this takes you into the negative range!).
- Save the positions of the target and the sensor as the "zero position of the measuring system" by pressing TARGET, COUPLED and β LIMITS simultaneously.
- To verify your adjustments, assume the angle 7.2° in coupled scanning mode and check the maximum counting rate.

Note:

It is easier to adjust the zero position of the measuring system with the help of the software "X-ray Apparatus". Please select "Settings", "Crystal Calibration" in the software and follow the instructions on the screen.

4 Mounting and demounting



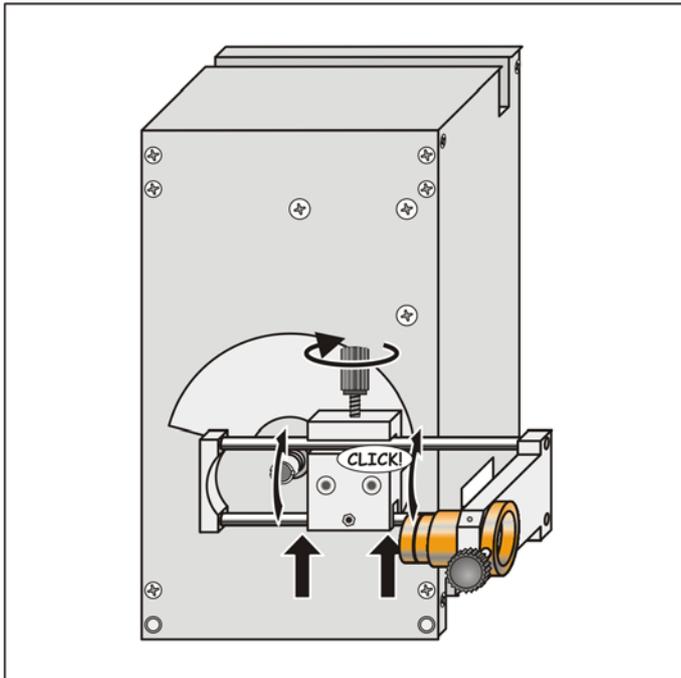
Mounting:

- Mount the target and sensor holders, if this has not already been done.
- Lay the ribbon cable of the X-ray apparatus out flat and to the right behind the bottom guide rod in the experiment chamber.
- Screw off the knurled screws of the bottom guide groove.
- Set the top guide groove over the top guide rod.
- Pivot the bottom section of the goniometer onto the bottom guide rail of the X-ray apparatus, raise the goniometer and place it in the assembly so that the bottom guide rod slides into the bottom guide groove of the goniometer.
- Slide the goniometer in the experiment chamber to the left and plug the ribbon cable into the connector of the goniometer (check to make sure that the polarity-reversal protectors line up).
- Slide the goniometer to the desired distance from the collimator, insert the knurled screws of the bottom guide slot and tighten them.
- Mount the sensor.

Demounting:

- Remove the sensor from its seat.
- Screw off the knurled screws of the bottom guide groove of the goniometer.
- Slide the goniometer in the experiment chamber to the left and unplug the ribbon cable from the connector on the goniometer.
- Manually steer the sensor arm of the goniometer to the 0° position.
- Lift the goniometer until it touches the top guide rod, lift the bottom section of the goniometer forward and lower it until the upper section of the goniometer can also be lifted forward.

5 Mounting/ demounting the sensor holder



Mounting:

- Remove the target holder.
- Loosen the knurled screw on the sensor arm.
- First insert the bottom guide rail of the sensor holder in the bottom groove of the sensor arm and then insert the top guide rail into the top groove until it snaps in.
- Set the desired distance between the target and the sensor and then fix the sensor holder in position with the corresponding knurled screw.

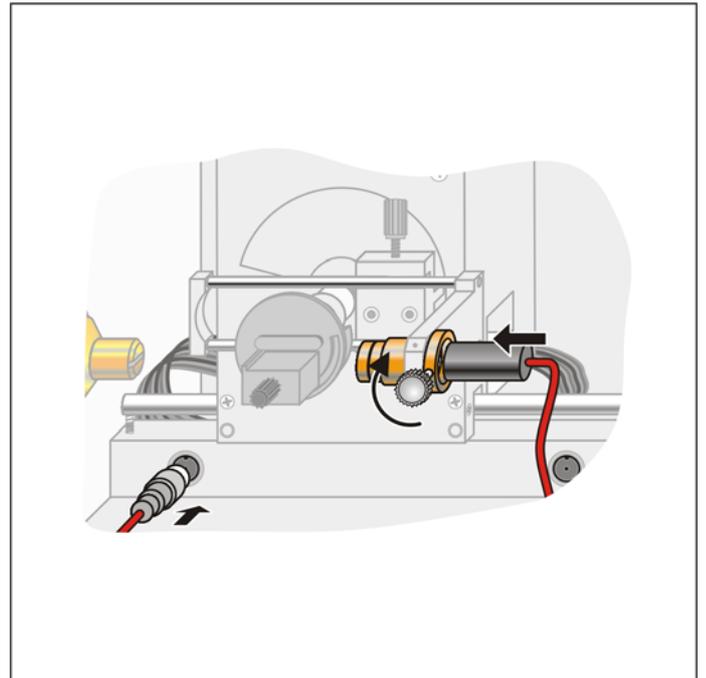
Demounting:

- Remove the sensor.
- Remove the target holder.
- Loosen the knurled screw on the sensor arm.
- Lift the top guide rail of the sensor holder out of the top groove of the sensor arm and lower the sensor holder.

Adjusting the sensor arm:

- Loosen the knurled screw on the sensor arm.
- Set the desired distance between the target and the sensor and then fix the sensor holder in position with the corresponding knurled screw.

6 Inserting a sensor



- Slide the goniometer to the left in the experiment chamber as necessary.
- Loosen the knurled screw at the sensor seat.
- Remove the cover cap from the end-window counter, carefully insert the counter in the sensor seat from the rear as far as it will go and then tighten the knurled screw.
- Press the SENSOR key and use the ADJUST knob to check that the sensor holder can move freely in the angular range you wish to investigate.

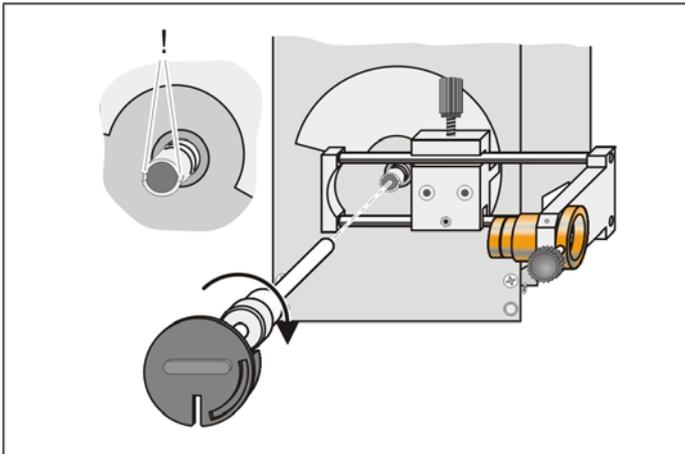
When using the internal rate meter:

- Connect the lead of the counter tube to the socket marked GM TUBE in the experiment chamber.

When using an external counter:

- Connect the counter tube lead to the socket marked HV OUT in the experiment chamber and connect the socket HV IN on the connector panel of the X-ray apparatus to the external counter.

7 Mounting/ demounting the target holder



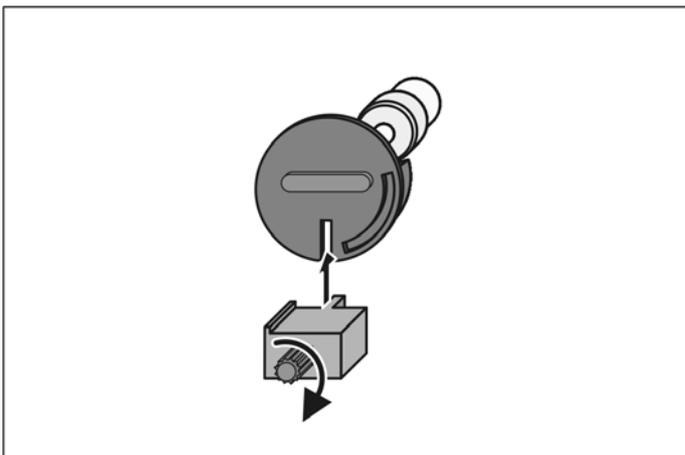
Mounting:

- Mount the goniometer and position the target arm of the goniometer horizontally with the ZERO key (the V-shaped groove in the bushing of the target arm must be vertical).
- Insert the axle of the target holder into the bushing of the target arm so that the cotter pin of the axle slides into the V-shaped groove of the bushing.
- Tighten the union nut of the target holder finger-tight.

Demounting:

- First remove the target, e.g. monocrystal, if one has been set up (see below).
- Loosen the union nut of the target holder.
- Pull the axle of the target holder forward out of the bushing of the target arm.

8 Mounting/ demounting the target stage



Mounting:

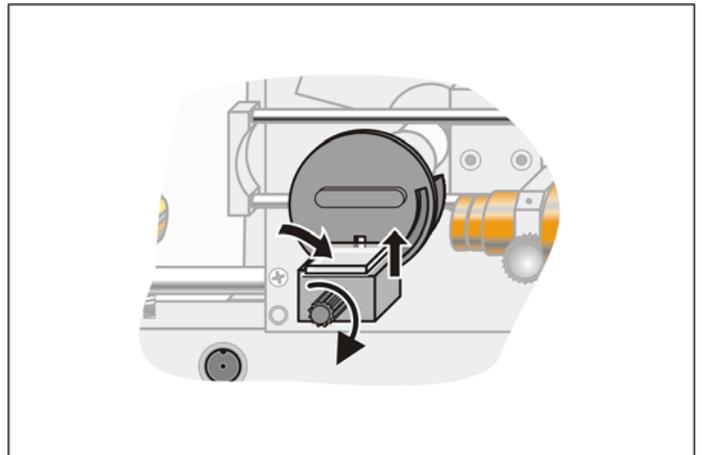
- Loosen the knurled screw on the target stage.
- Insert the plastic guide in the groove of the target holder from below and raise the target stage as far as it will go.
- Tighten the knurled screw finger-tight.

Demounting:

- First remove the target (see section below).

- Loosen the knurled screw on the target stage and pull the target stage downward out of the groove of the target holder.

9 Setting up a target



- Position the target and sensor arms of the goniometer horizontally using the ZERO key.
- Loosen the knurled screw of the target stage and lower the platform slightly.
- Lay the target (e.g. NaCl crystal or aluminum scattering body) flat on the target stage and push it backwards against the back stop.
- Raise the target stage with the target up against the stop edge and tighten the knurled screw finger-tight.
- Carefully check that the target is held firmly.