

INSTRUCTIONS

EM-STH10

SPECIMEN TILTING HOLDER

No. IEM-STH10
(EM566001)

1. GENERAL

The use of the EM-STH specimen tilting holder in a JEM electron microscope equipped with a side entry goniometer enables to be tilted about two orthogonal axes.

2. SPECIFICATIONS

- Specimen tilt angle: $\pm 25^\circ$.
- Specimen grid: 3 mm dia. grid.
- Effective field of view: 2 mm dia. (at tilt angle 0°).

3. COMPOSITION (Fig. 3.1)

1. Specimen holder box
2. Specimen holder (incl. protection cylinder)
3. Specimen holder stand
4. Specimen exchange mount A
5. Specimen clamp
6. Specimen exchange mount B
7. Specimen exchange tool

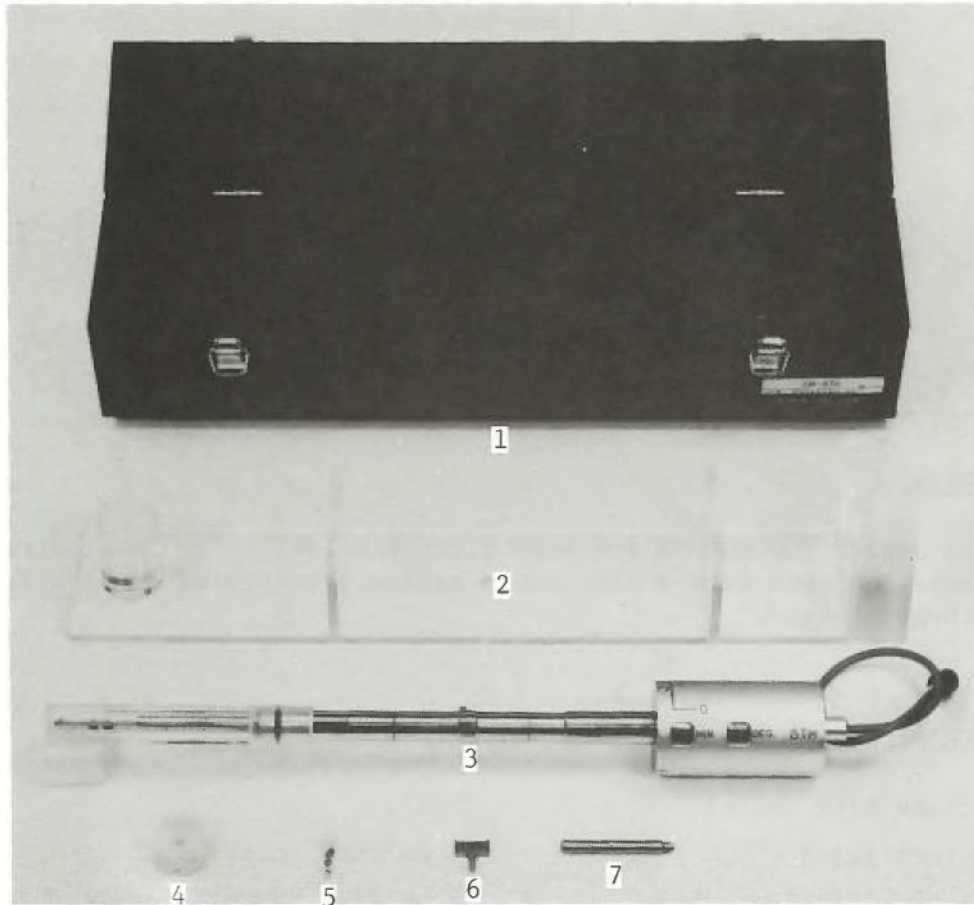


Fig. 3.1 Composition

4. OPERATION

4.1 Removing the specimen holder from the column

1. Set the FILAMENT (EMISSION) knob to OFF.
2. Select a specimen tilt speed with the Y-tilt/rotation speed control knob and use the Y pedal switches so as to obtain DEG and MIN indicator readings of 0° (see Fig. 4.1).
3. Disconnect the specimen holder cable.
4. Withdraw the specimen holder as far as it will go, turn it fully counterclockwise, and remove it.
5. Cover the specimen holder with the protection cylinder and store it in the specimen holder box.

AMENDMENTS TO INSTRUCTION MANUAL

EM - S T H 1 0

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Please amend Setp 3 in Subsect. 4.4 as follows.

3. Read the Y-tilt angle from the DEG and MIN indicators on the specimen holder.

Two turns of the MIN indicator correspond to one graduation of the DEG indicator. One turn of the MIN indicator therefore corresponds to half a graduation of the DEG indicator, 3° in other wards, one graduation of DEG indicator being 6° . One turn of the MIN indicator is graduated into $360'$ (6° in other wards); however, the actual specimen tilt angle when the MIN indicator is turned one rotation is 3° ($180'$ in other wards). Consequently, the actual specimen tilt angle of one graduation of the MIN indicator is $5'$ although the graduation reads $10'$.

The specimen is tilted in the + (plus) direction (the red digits on the indicator should be used) if the specimen retainer (specimen) is turned counterclockwise when viewing from the column front, and in the - (minus) direction (the black digits should be used) if the retainer is turned clockwise.

Examples: Fig. 4.8a shows the tilt angle of 17° in the - direction, i.e.,

DEG: $12^\circ + 3^\circ = 15^\circ$

Since the cursor lies on the 18° side between the two graduations 12° and 18° , 3° (one turn of the MIN indicator) should be added to 12° .

MIN: $240' = 2^\circ$

Although $240'$ is 4° , the actual tilt angle is 2° .

Fig. 4.8b shows the tilt angle of 7° in the + direction, i.e.,

DEG: 6°

No addition should be made to 6° since the cursor lies on the 6° side between the two graduations 6° and 12° .

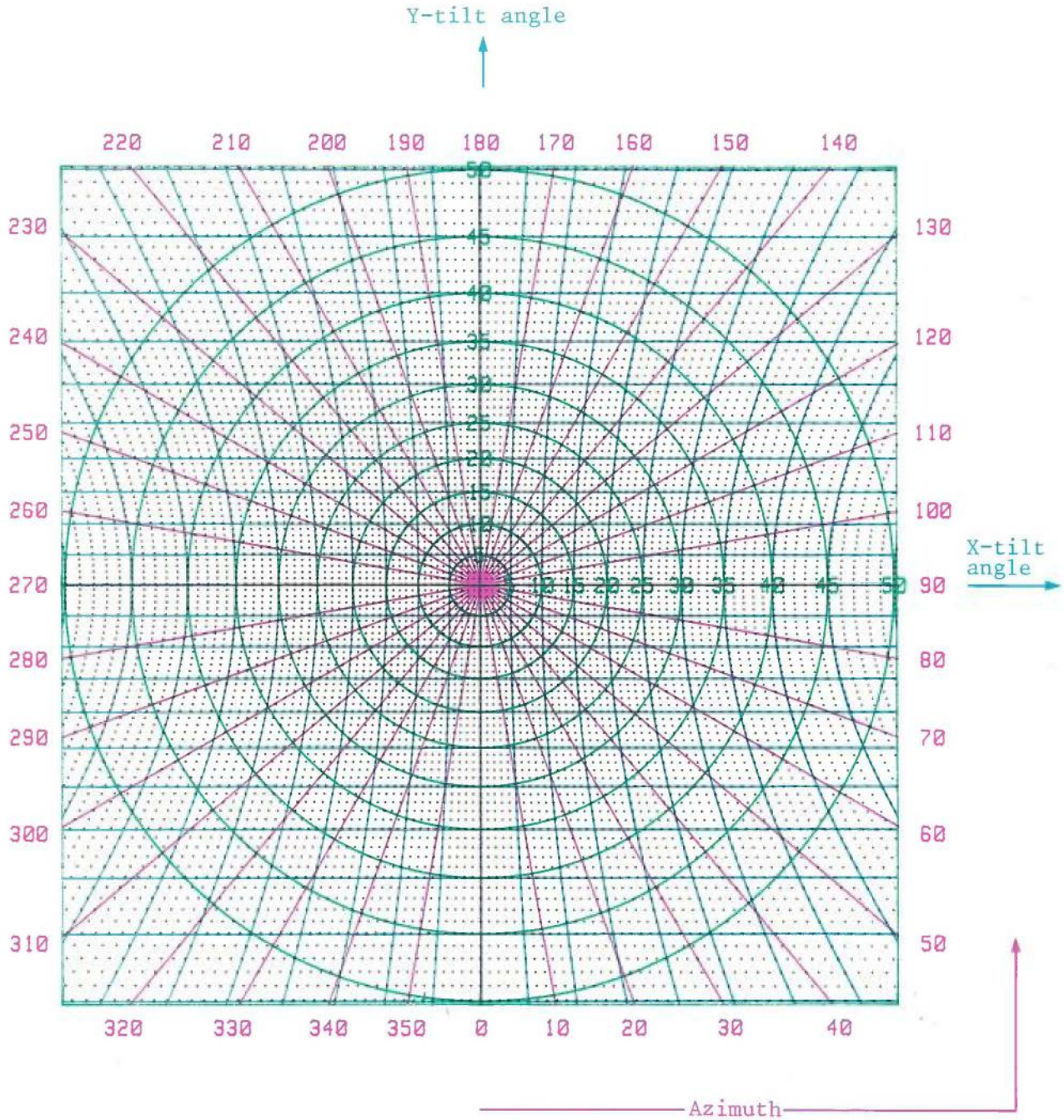
MIN: $120' = 1^\circ$

Although $120'$ is 2° , the actual tilt angle is 1° .

Use the "RESULTANT TILT ANGLE AND AZIMUTH CHART DIAGRAMS" in the EM-BST instruction manual instead of Fig. 4.9 in this manual.

合成角および方位角度表

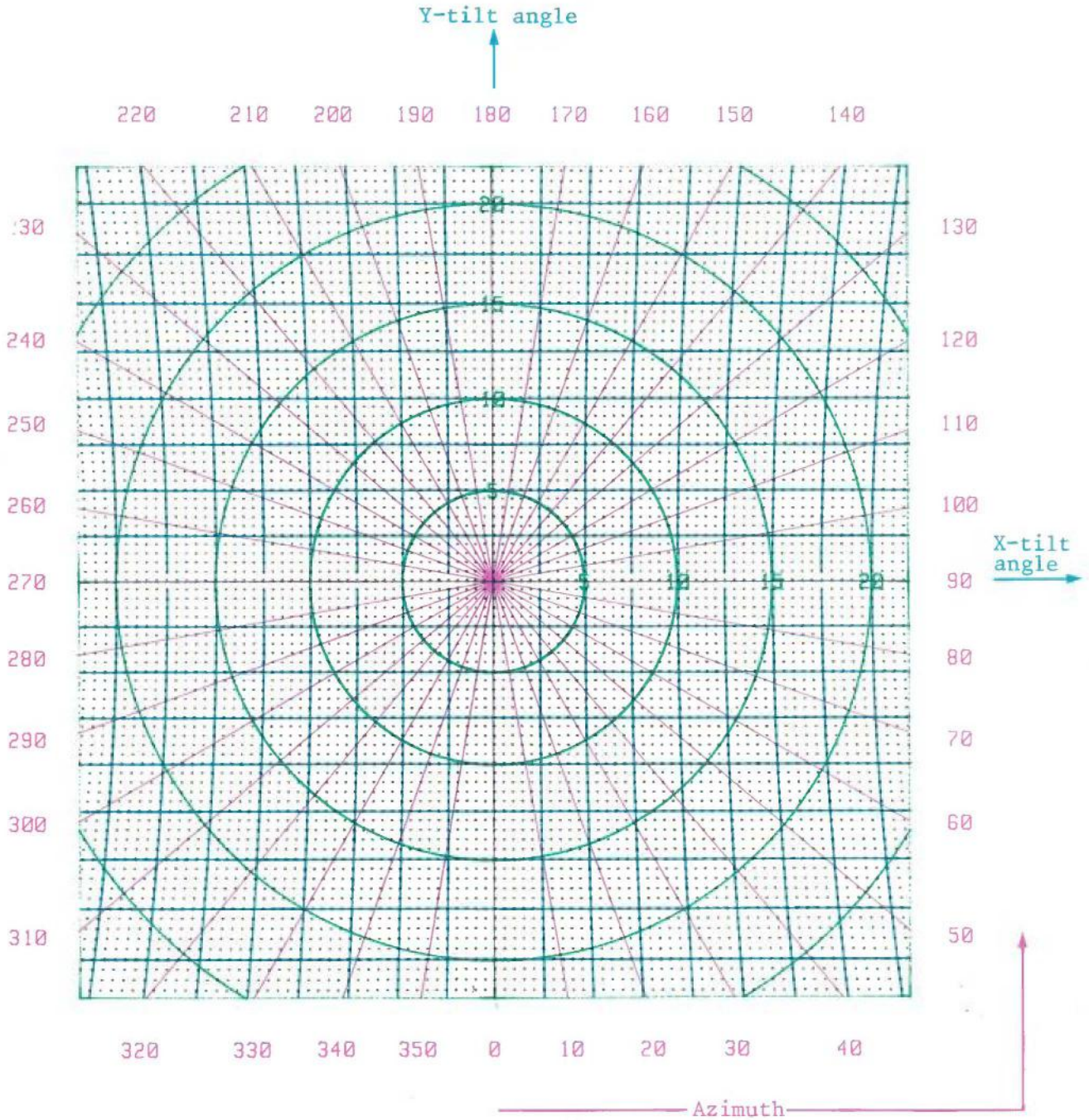
X傾斜角とY傾斜角を下表にあてはめれば、合成角と方位角がわかります。たとえば、X傾斜角が $+35^\circ$ でY傾斜角が -30° の場合は、合成角は 45° 、方位角は 54.5° になります。



40° tilt

RESULTANT TILT ANGLE AND AZIMUTH CHART DIAGRAMS

After obtaining X- and Y-tilt angles, the resultant tilt angle and azimuth can be read off from the diagram below. Assuming that the X- and Y-tilt angles are $+17\frac{1}{2}^\circ$ and -10° , respectively, the resultant angle is 20° and the azimuth is 61° .



15° tilt

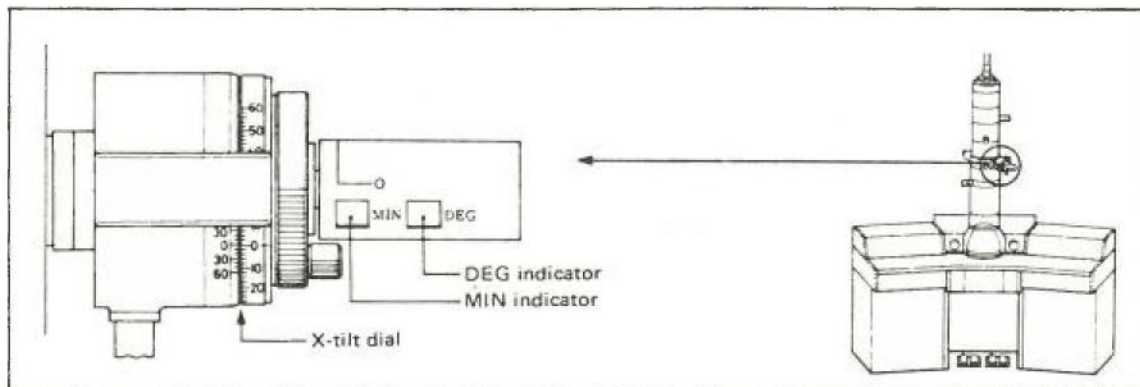


Fig. 4.1 X-tilt dial and Y-tilt indicators

4.2 Specimen exchange

1. Remove the specimen holder stand from the specimen holder box and mount specimen exchange mount B on specimen exchange mount A (see Fig. 4.2).

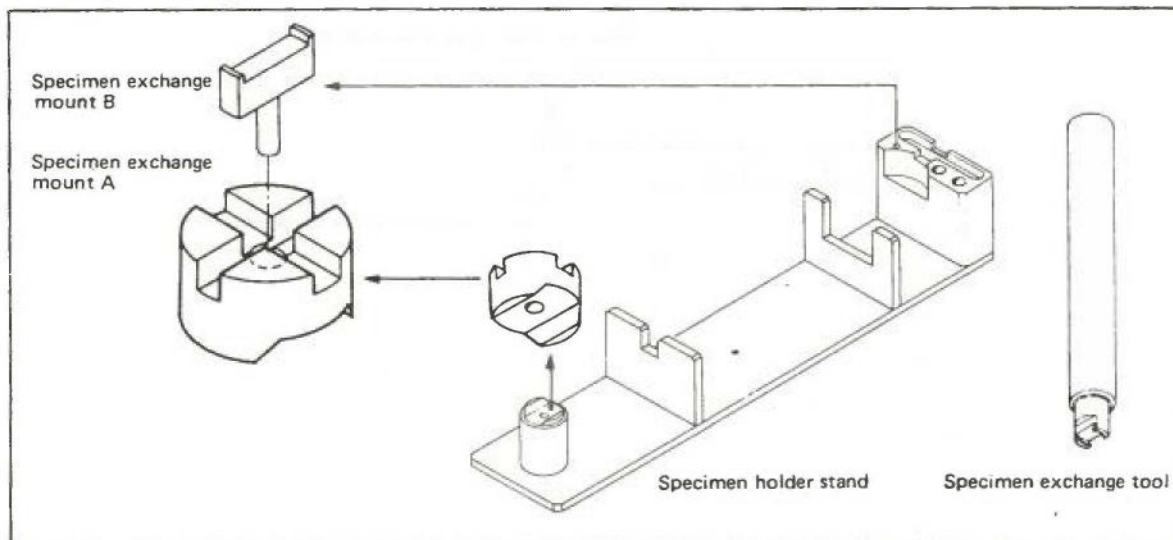


Fig. 4.2 Specimen exchange mounts

2. Place specimen exchange mount A in the specimen holder stand so that mount B is oriented as shown in Fig. 4.3.

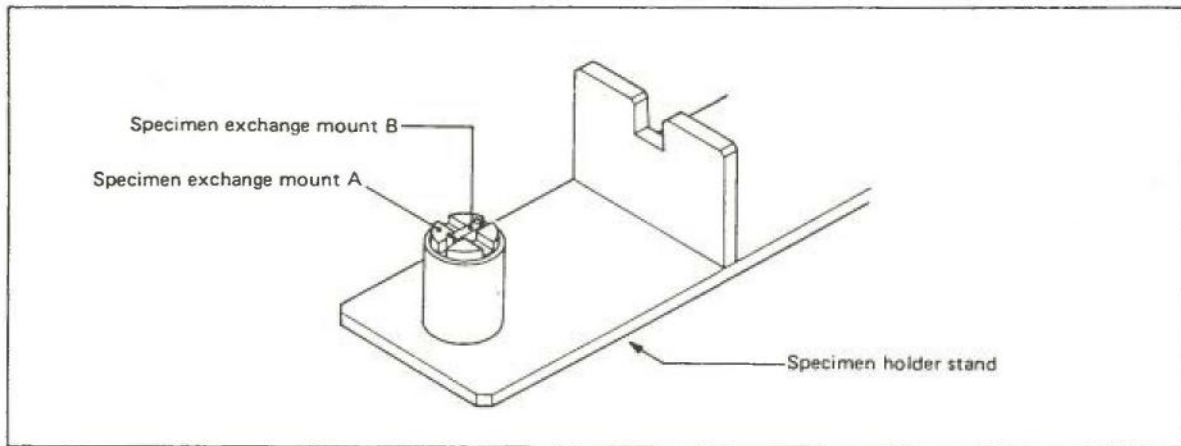


Fig. 4.3 Mounting the specimen exchange mounts

3. Place the specimen holder on the specimen holder stand with the holder shaft pin facing downward as shown in Fig. 4.4.

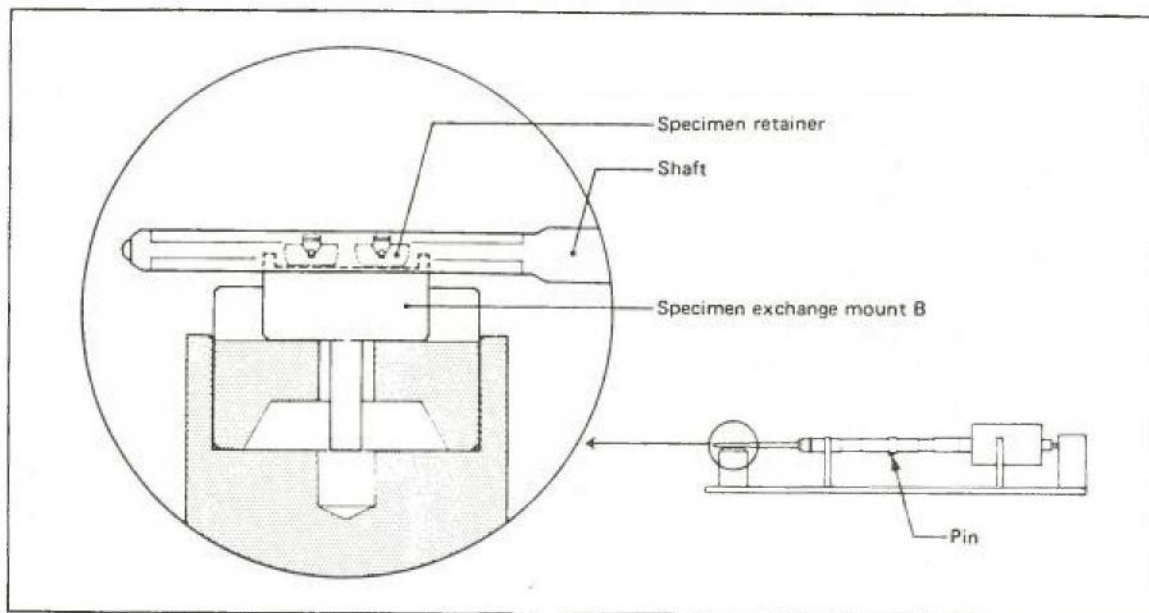


Fig. 4.4 Mounting the specimen holder on the holder stand

4. Remove the used specimen from the specimen holder as follows (Fig. 4.5):
 - a. Orientate the clawed tip of the specimen exchange tool in the specimen retainer so that the two claws do not align with the arms of the specimen clamp (Fig. 4.5a), then, while lightly applying downward pressure on the tool, turn the tool so that it engages

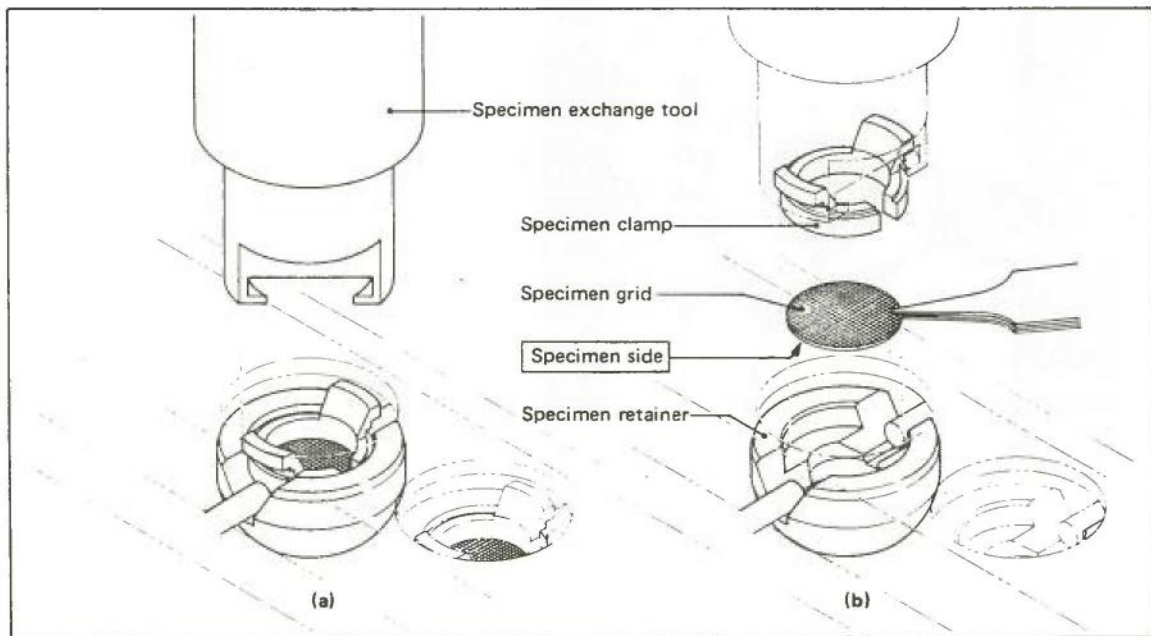


Fig. 4.5 Specimen exchange

- with the tipped rim of the clamp and remove the clamp by lifting the tool straight up (Fig. 4.5b).
- b. Remove the specimen holder from the holder stand, and the specimen from the holder by turning the holder upside down.
 - c. Return the specimen holder to the stand (Fig. 4.4).
5. Load a new specimen in the specimen holder as follows:
- a. Place the specimen grid in the specimen retainer with the specimen facing downward (Fig. 4.5b).
 - b. Attach the specimen clamp to the specimen exchange tool and insert the tool into the specimen retainer.
 - c. Detach the tool from the clamp by turning the tool sufficiently to disengage it from tipped rim of the clamp. The specimen is now secured in the specimen retainer.
 - d. Make a note of the specimens in the 1 and 2 specimen retainers.

4.3 Inserting the specimen holder into the column

1. Limit the X-tilt angle as follows:
 - a. Turn the X-tilt speed control knob fully clockwise and set the X-tilt dial to 0° by operating the X-pedal switches.
 - b. Set the two X-tilt angle limiting screws (Fig. 4.6) to 25° .
2. Confirm the following:
 - a. That the V7 of the JEM-1200EX is closed, or the HIGH and AIRLOCK OPEN lamps of the JEM-100/200CX are lit.

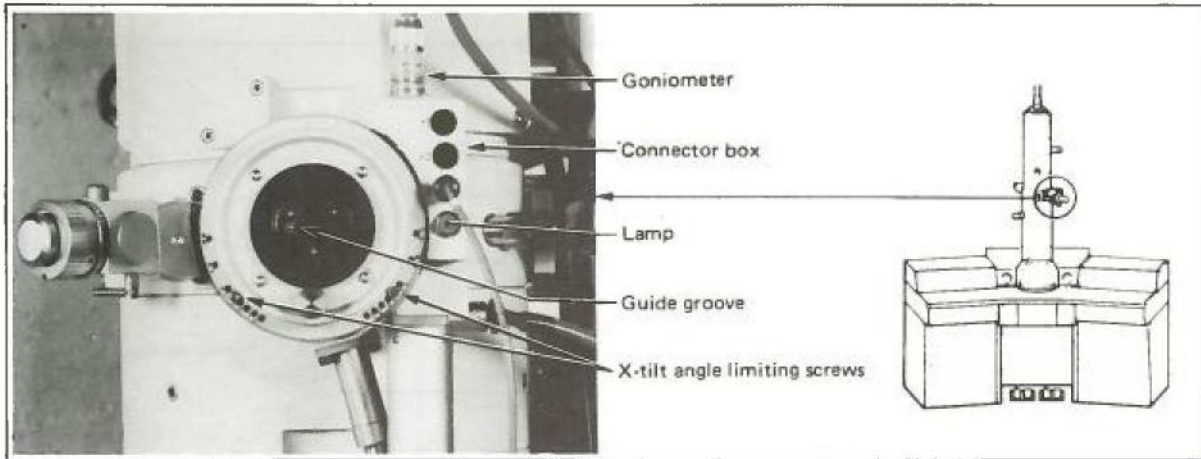


Fig. 4.6 Goniometer

- b. That the FILAMENT (EMISSION) knob is set at OFF.
3. After checking that there is no dirt or dust on the specimen holder O-ring, align the specimen holder guide pin with the goniometer guide groove (Fig. 4.6), push the holder into the goniometer as far as it will go and hold it there until the connector box lamp (which lights up indicating the commencement of goniometer evacuation) goes out.
4. When the connector box lamp goes out indicating that goniometer evacuation is complete, turn the specimen holder fully clockwise and push it in fully.
5. Connect the holder cable to socket H1 on the connector box.
6. Set the specimen number indicator (Fig. 4.7) to the desired number with the specimen selector.

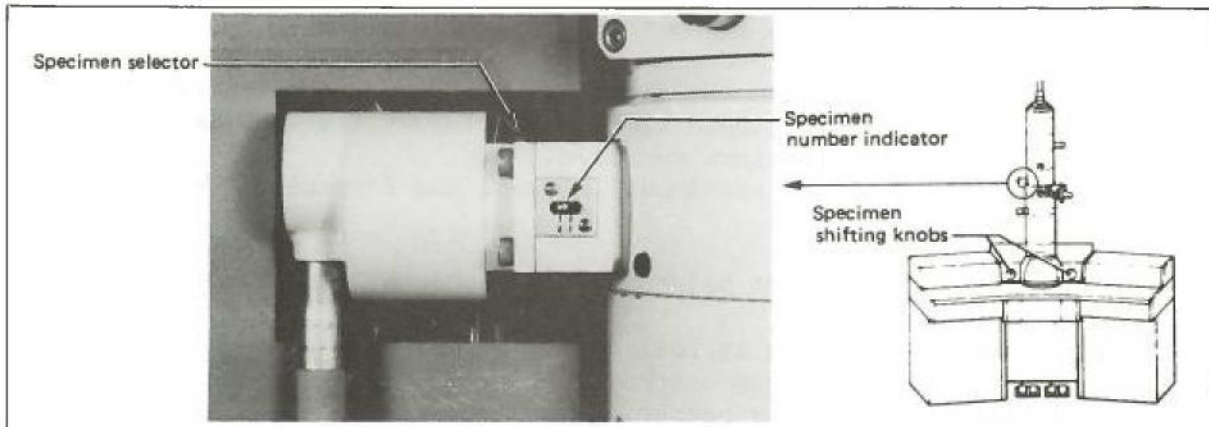


Fig. 4.7 Specimen selecting device

4.4 Tilting the specimen

This describes how to carry out Y-tilting. See the microscope's instruction manual (in case of 100CX, see SEG instru. manual) concerning X-tilting.

1. Select the specimen tilting speed with the Y-tilt speed control knob.
2. Tilt the specimen by operating the pedal switches while observing the image. To select the desired field of view, use the specimen shifting knobs.
3. Read off the Y-tilt angle from the DEG and MIN indicators on the specimen holder.

Reading off the Y-tilt angle

One graduation of the DEG indicator corresponds to 6 degrees and one graduation of the MIN indicator corresponds to 10 minutes. The direction of tilt is assumed to be + or - when the specimen retainer is turned counterclockwise or clockwise viewed from the front of the specimen chamber. The red digits are used for + rotation and the black digits for - rotation. For example if the DEG and MIN indicators read as shown in Fig. 4.8a, that is

DEG: 12°
MIN: 240' = 4°

the Y-tilt angle is 16° in the - direction.

If the DEG and MIN indicators read as shown in Fig. 4.8b, that is

DEG: 6°
MIN: 120' = 2°

the Y-tilt angle is 8° in the + direction.

4. Read off the resultant specimen tilt angle and azimuth from the chart diagram (Fig. 4.9). For example, if the X-tilt angle is -25° and the Y-tilt angle is -15°, the resultant tilt angle and azimuth are about 27.5° and 299°, respectively.

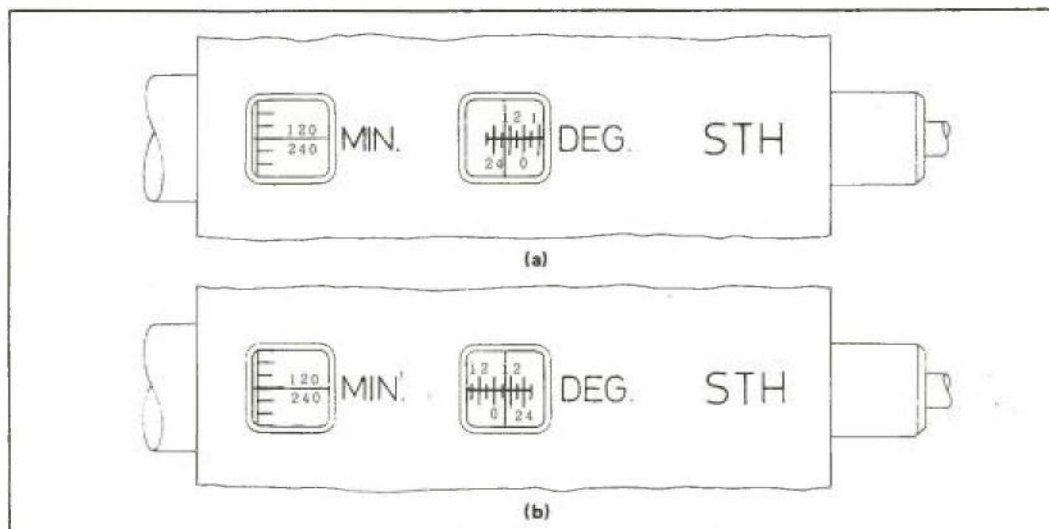
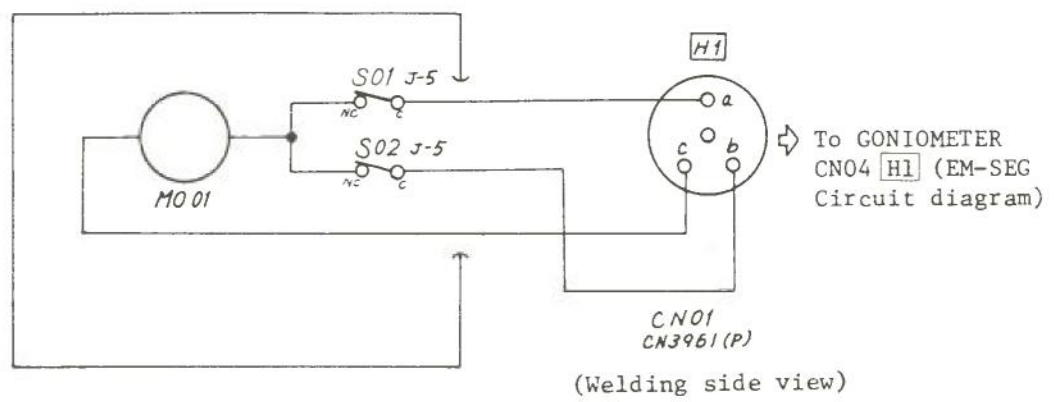


Fig. 4.8 Y-tilt indicators



SPECIMEN TILT AND ROTATION HOLDER

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