

Replacement of a picture tube

Attention

WARNING: CRT HANDLING

The picture tube encloses a high vacuum and care must be taken not to bump or to scratch the picture tube as this may cause the tube to implode resulting in personal injury and property damage. Shatterproof goggles must always be worn by individuals while handling the CRT or installing it in the projector. Do not handle the CRT by the neck.

How to access the picture tubes for removal

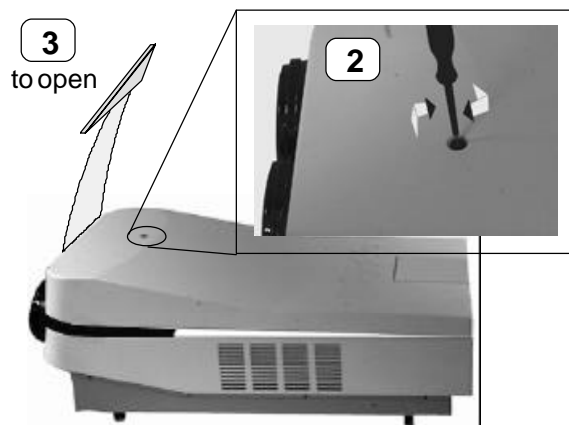
The following parts of the projector have to be removed to gain access to the picture tubes:
 - top cover (total removal)
 - top cover plate, covering the picture tube assembly.

How to open top cover

To open the top cover, proceed to the following step:

Step	Action
1	Power down the projector and pull out the power cord from the wall outlet.
2	Turn the lock screw with a screwdriver or a coin a half turn counter clockwise
3	Lift up the top cover and carefully pivot it vertically (attention: no cover support provided).

Illustration how to open top cover



No cover support

The top cover is not secured with an incorporated support. If a complete turn over is required, we advise to remove the top cover totally.

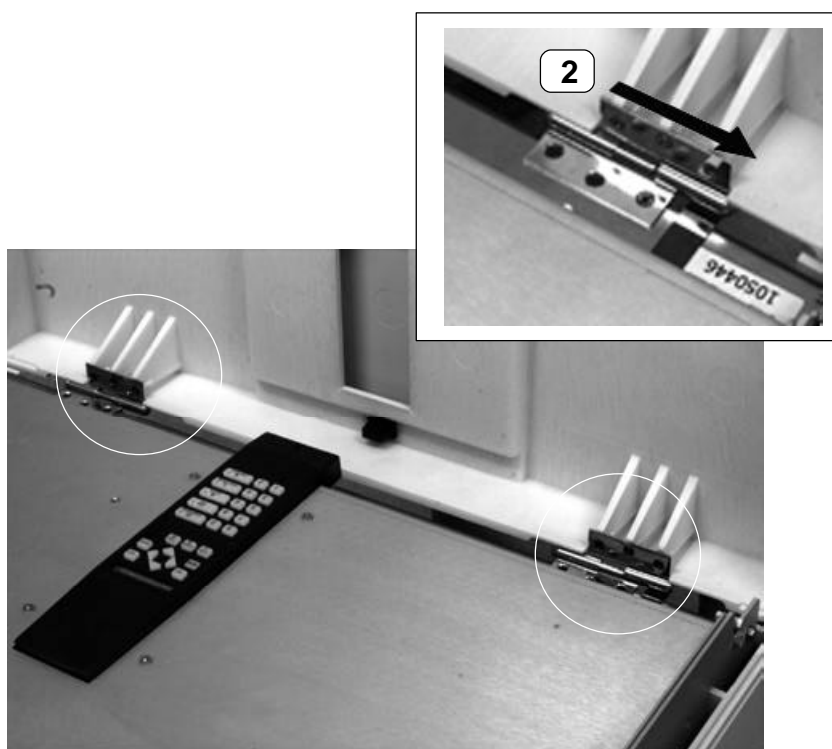
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How to remove top cover

To remove the top cover, proceed to the following step:

Step	Action
1	Stand behind the projector
2	Grip the top cover by the front and turn it until it stands vertical.
3	Hit the bottom of the cover on the right side to dislocate the hinge joint.
4	Remove the top cover.

Illustration top cover removal



Removing the Picture tube cover

Picture tube cover assembly

The picture tube cover assembly exist of:

- a bridge metallic plate, securing the position of the three CRT blocks in the main frame.
- a metallic cover, covering the three CRT units in the main frame

Necessary tool

for the fixation metallic plate: pot nut runner of 8mm & 7mm

for the metallic cover: pot nut runner of 7mm

How to remove the metallic cover

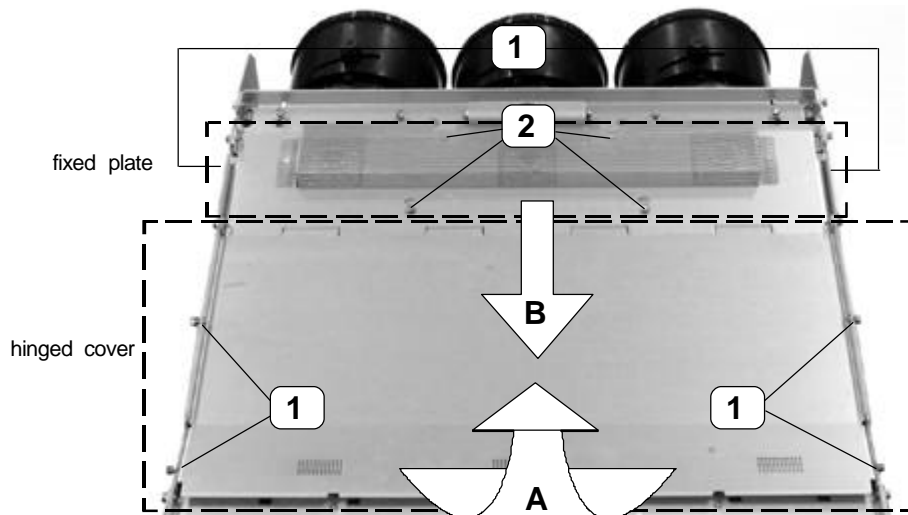
The metallic cover consists of two parts:

- a fixed plate, secured in position by 6 screws and
- a hinged cover, pivoting on the fixed part, and locked on the main frame by 4 screws.

To remove the cover assembly, continue with the following steps:

Step	Action
1	Loosen the 4 screws locking the hinged cover to the frame.
2	Loosen the 4 screws securing the fixed plate on the top of the main frame.
3	Remove the 2 screws securing the fixed plate on the side of the main frame.
4	First lift up (A) the cover and then slide (B) the complete assembly backwards to remove.

Illustration metallic cover removal



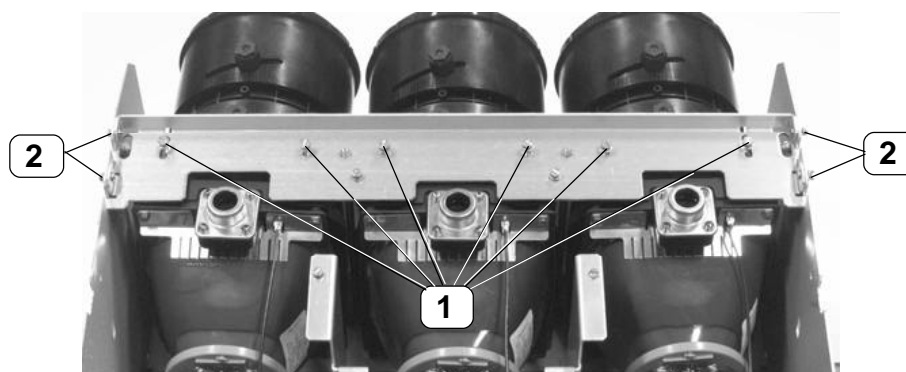
Removing the Picture tube cover

How to remove the bridge metallic plate

To remove the cover assembly, continue with the following steps:

Step	Action
1	Remove the 6 screws (nut driver 7mm) securing the CRT blocks on the plate.
2	Remove on both sides of the frame the 2 screws (nut driver 8mm) securing the fixed plate on the top of the main frame.
3	Remove the plate.

Illustration metallic cover removal



Removing the Lens of the defective picture tube

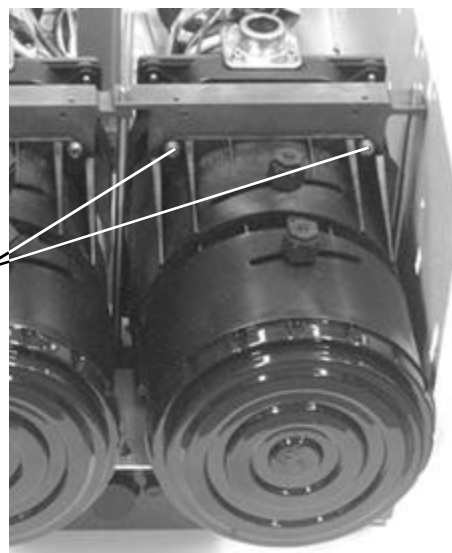
Necessary tool

Pot nut runner of 8 mm

Lens

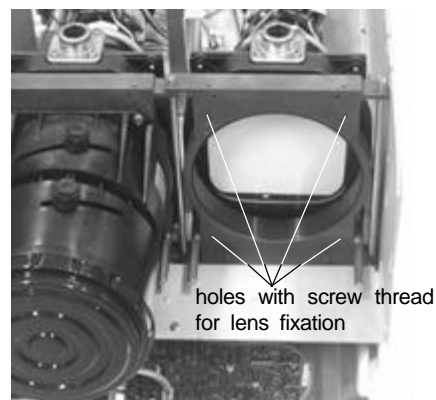
The lens is fixed to the main frame by 4 screws, 2 on top and 2 on bottom of the lens.

lens fixation
screws



How to remove the lens

Support the lens body by hand and remove the 4 screws, holding lens to frame.



Removing the picture tube from its frame

How to remove the picture tube out of its frame

The picture tube unit is fixed to the main frame in two ways:

- Mechanical: two long bolts secure the position of the picture tube support in the frame.
- Electrical: the Units on the picture tube are electrical connected to the main frame.

To remove the unit, first disconnect the picture tube units electrical from the main frame and then remove the bolts holding the picture tube support to the main frame.

Necessary tool

Screwdriver 5mm

How to disconnect the picture tube units electrical from the main frame

The following units have to be disconnected from the main frame:

- deflection unit connection
- focus unit connection
- ground connection
- video driver unit
- EHT lead

How to disconnect the video driver unit

Disconnect the units as described below:

Step	Action
1	Pull out the connector on top of the unit.
2	Pull out on main frame the wire connector.
3	Disconnect the two ground connectors
4	Loosen the 2 screws holding driver module to support brace.
5	Carefully pull off the Video Driver Unit from the picture tube socket.
6	Lay down the unit, still connected to the frame with the focus wire, out of the area of the picture tube to be removed.

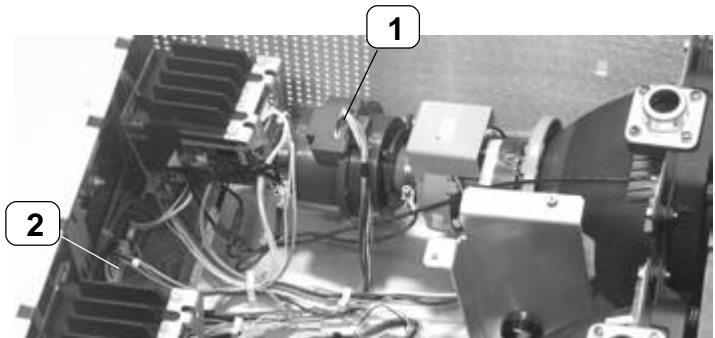
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Removing the picture tube from its frame

How to disconnect the Units on the neck of the picture tube

Disconnect the units as described below:

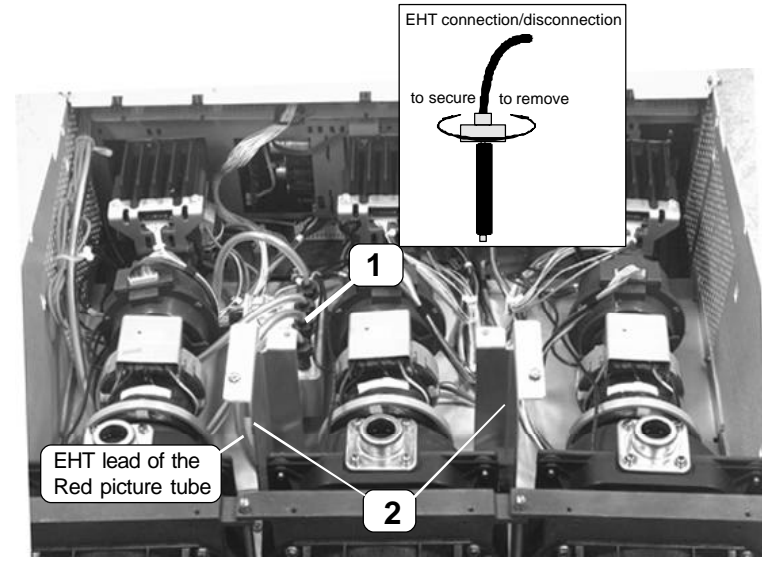
Step	Action
1	Pull out focus connector on top of unit.
2	Pull out on main frame the deflection connector.



How to disconnect the EHT lead of the CRT

Disconnect the EHT lead as described below:

Step	Action
1	Pull out on the EHT splitter the respective EHT lead, e.g. Red CRT.
2	Push the EHT lead through the provided hole in the two cover supports to make the EHT lead free for removal with the tube.

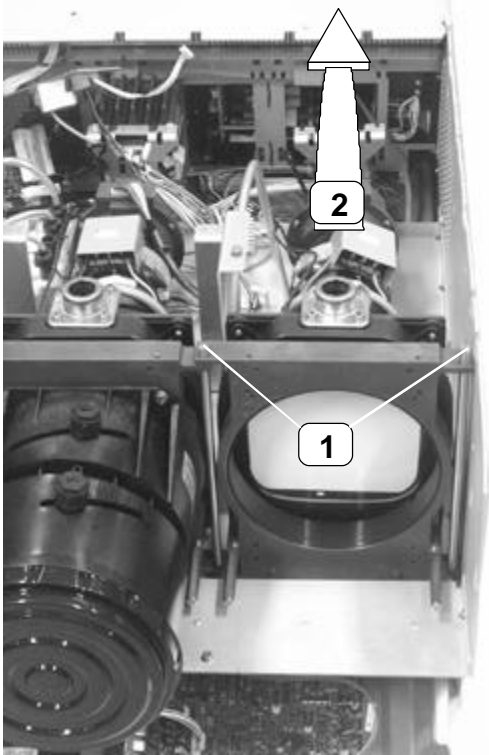


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Removing the picture tube from its frame

How to remove the picture tube unit mechanical out of the main frame

To remove the picture tube unit out of main frame, proceed as follows:

Step	Action
1	Remove the two rods with screwed thread at the end.
2	Take the picture tube unit out of the main frame 

Removing the Picture Tube Unit from its support

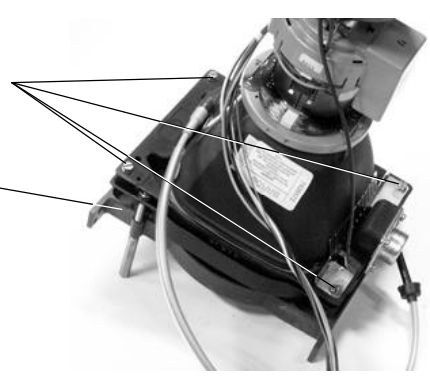
Necessary tool

Pot nut runner of 8 mm

How to remove the picture tube from its support

The CRT Unit is mounted on its support by means of four bolts. To separate the CRT unit from its support, proceed as follows (see photo):

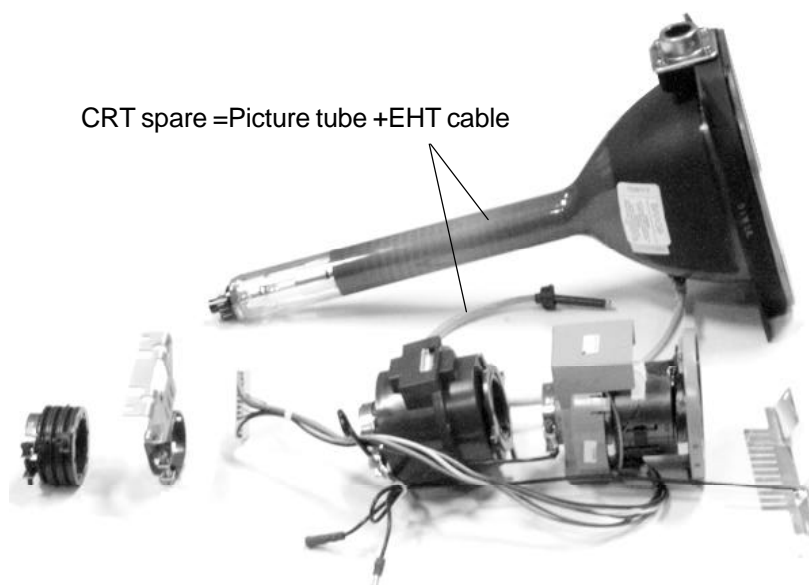
Step	Action
1	Put the CRT Unit on its face.
2	Remove the four screws holding picture tube to support.
3	Remove the Picture tube from its support.



Disassembling the Picture Tube unit

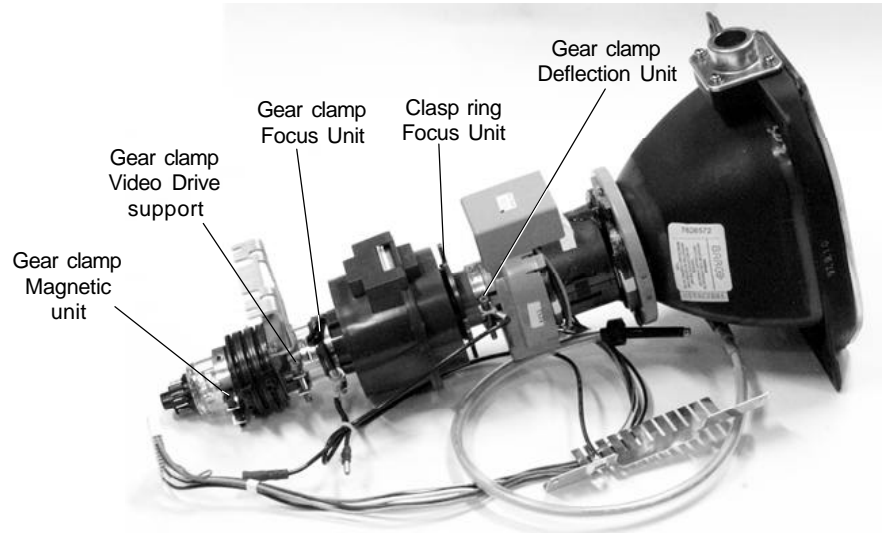
Purpose

The mounted units on the picture tube have to be removed because the CRT spare consist of a naked picture tube with the EHT cable installed.



**Removing the
Picture tube units
from the neck**

The Units on the picture tube are clamped on the neck of the picture tube by means of a gear clamp. Follow the next steps to remove:



Step	Action
1	Loosen the gear clamp of the Magnetic unit
2	Slide the unit off of the end of the CRT
3	Loosen the gear clamp of the Video Drive support
4	Slide the unit off of the end of the CRT
5	Loosen the gear clamp of the Focus and Deflection unit and the clasp ring of the Focus unit .
6	Slide the two units (joined by the ground wire) together off of the end of the CRT



Mounting the Picture Tube on its support

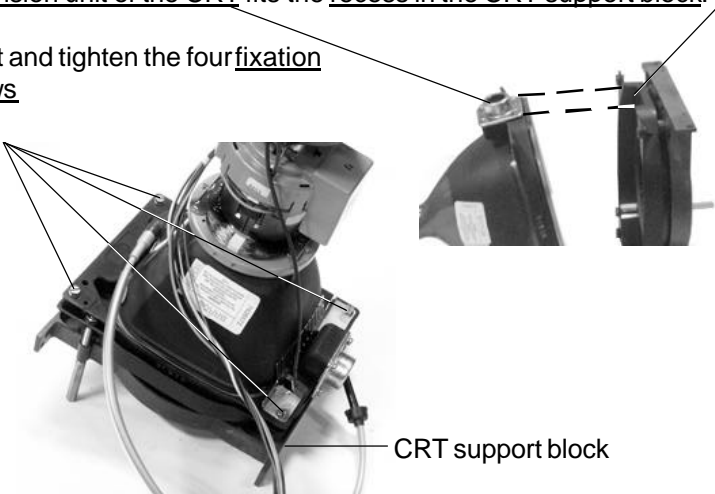
Necessary tool

Pot nut runner of 8 mm

How to mount the picture tube on its support

The CRT Unit is mounted on its support by means of four bolts. To mount the CRT unit on its support, proceed as follows (see photo):

Step	Action
1	Put the CRT support block on its face.
2.	Place the picture tube face in the support in such a way that the <u>expansion unit of the CRT</u> fits the <u>recess in the CRT support block</u> .
3	Insert and tighten the four <u>fixation screws</u>

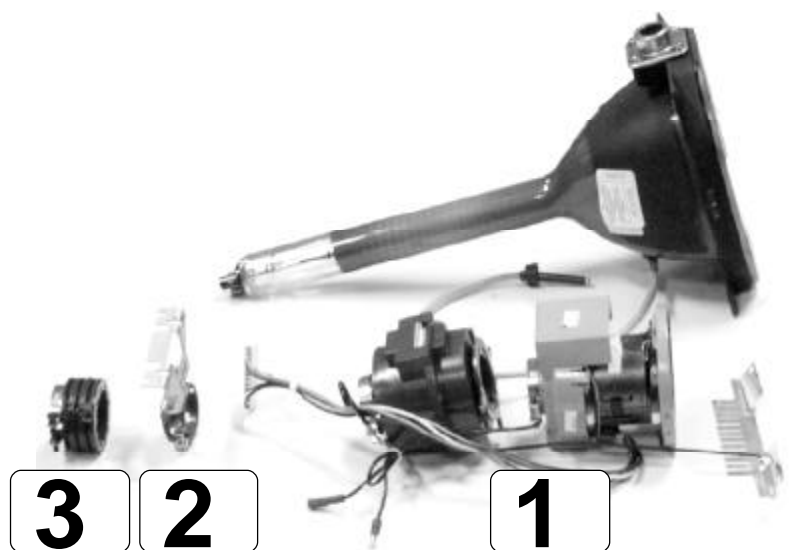


Reassembling the Picture Tube unit

Necessary tool

Philips screwdriver to pull tight the gear clamps

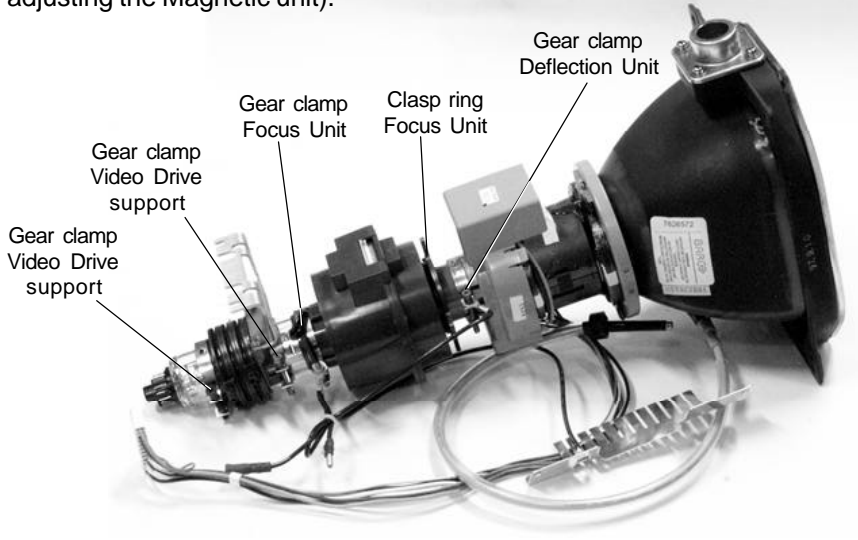
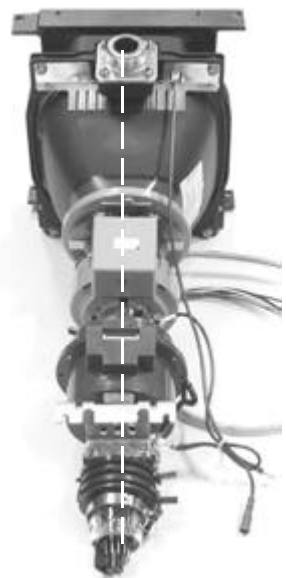
Order of installation



Mounting the units on the neck of the picture tube

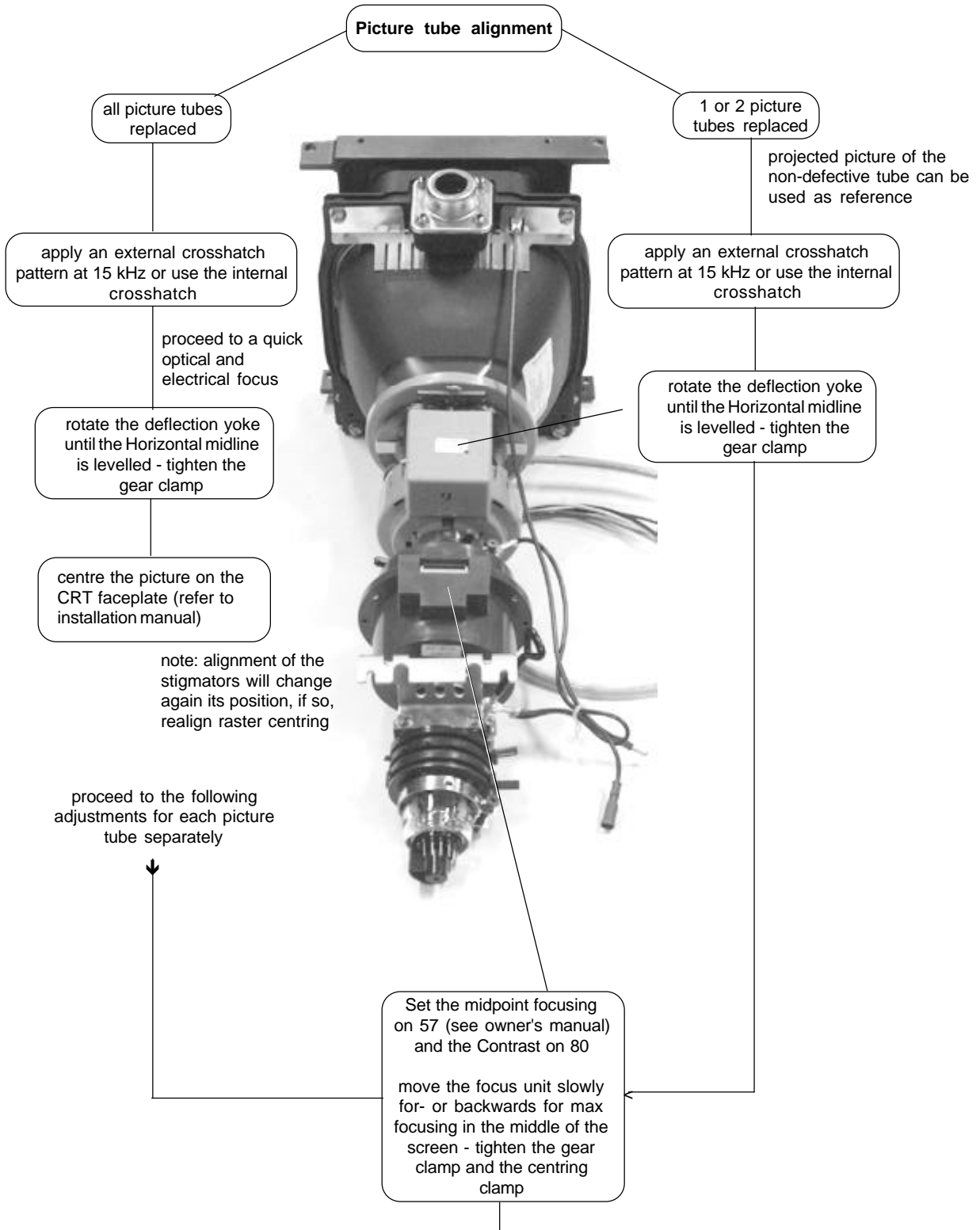
The Units on the picture tube are clamped on the neck by means of a gear clamp. Follow the next steps to install:

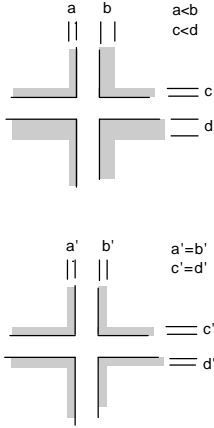
Step	Action
1	Slide the two units Focus and Deflection unit , (joined by the ground wire) together on the neck of the CRT , the Deflection block fully against the CRT bulb and the Focus unit ± 8 mm from Deflection unit (see photo).
2	Tighten slightly the gear clamp of the Focus and Deflection unit and the clasp ring of the Focus unit (rotation must be possible for correct adjustment of the units).
3	Slide the Video Drive support on the end of the CRT.
4	Tighten not too fast the gear clamp of the Video Drive support (position determined when the Video Driver module is plugged on the CRT).
5	Slide the Magnetic unit on the end of the CRT (min 2 cm from the end of the CRT neck).
6	Tighten not too fast the gear clamp of the Magnetic unit (position can change when adjusting the Magnetic unit).



Picture tube alignment

Before starting the alignment of the new picture tube, the projector must warm up for at least 15 minutes at a medium brightness and contrast.





lower the Brightness and put the Contrast on its max with the RCU Set the midpoint focusing on 0

adjust the 2-pole magnets rings by rotating one or both up to a point where 'shading' of both sides of the vertical and horizontal lines is equal.

realign the electrical and optical focus

select a source that generate a field of small dots and crosshairs

Set the midpoint focusing on 100

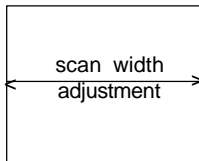
adjust the 4-pole rings until the defocused dots are circular.

realign the electrical and optical focus

reposition the raster as described earlier

due to mutual influence between the stigmators, focus and centring, it is advised to repeat above a couple of times

decrease the Contrast and Increase the Brightness to reveal the background raster



see service sheet 'Deflection switching/Hor Amplitude' in this manual for the alignment of the image width coils

Note: when only one tube has been replaced, the image width of one of the other tubes as a reference, and obviously limit the adjustment to the core of the corresponding replaced tube

