

Klein Convergence Gauge

Since 1983, Klein Instruments has manufactured the industry standard Klein Convergence Gauge. This gauge is so familiar, it is often known simply as the Klein gauge.

PURPOSE

This small, handheld, opto-mechanical device is used to measure the convergence error between the lines of a CRT display. This sturdy, accurate tool is sufficient to obtain measurements that are invaluable to engineers, manufacturers, and quality inspectors.

The CM7Ax is made for monitors, the CM14Ax for medium-sized screens, and the CM28Ax for large-screen and rear-projection big-screen TVs.

DESCRIPTION

- Base dimensions 1.5" x 2.4" (38mm x 60mm)
- Weight 6 oz. (170g)
- Handheld
- Laminated prism filters
- 4X magnifier lens
- Adjustable focus
- Adjustable pointer for true zero correction
- Engraved scale
- Non-abrasive plastic feet
- Rugged aluminum alloy construction

MODELS AVAILABLE

The following versions of this gauge are available:

Model	Scale Range	Scale mm/div	Center Prism
CM7AG	± 0.7mm	0.05mm	Green
CM7AR	± 0.7mm	0.05mm	Red
CM14AG	± 1.4mm	0.1mm	Green
CM14AR	± 1.4mm	0.1mm	Red
CM28AG	± 2.8mm	0.2mm	Green
CM28AR	± 2.8mm	0.2mm	Red



OPERATION

1. Generate a white grid pattern and place the gauge on the area where convergence is to be measured.
2. If the horizontal lines of the grid pattern are misconverged, they will appear as separate red, green, and blue lines. Rotate the knobs on each side of the gauge until the brightness centers of the images line up.
3. The image convergence error has now been measured. The error between red/green and blue/green can be measured directly from the scales. The red/blue error can be obtained by subtraction.

WARRANTY

Klein Instruments Corporation warrants that the product will be free from defects in workmanship and materials for a period of one year from the date of purchase. The warranty is limited to the repair, adjustment, and/or replacement of defective parts.



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Using the Klein Gauge to Measure Convergence Error in Quality Control

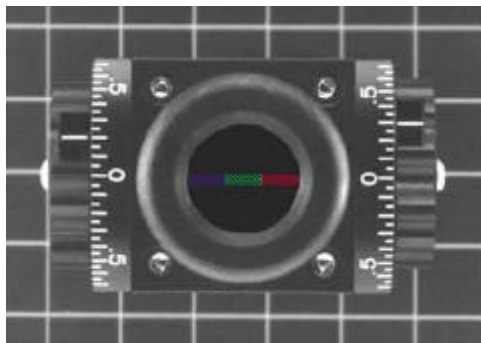
Method

Use the Klein Gauge to determine the greatest convergence error in the Y-axis direction, then rotate the device 90 degrees and determine the greatest convergence error in the X-axis direction.



The Klein Gauge as pictured below is a CM7AG shown placed on the CRT screen, with the Y-axis mark up. The knob pointers are indicating results.

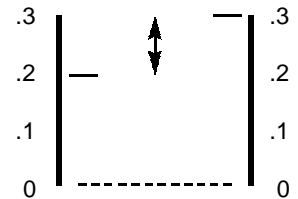
Example 1



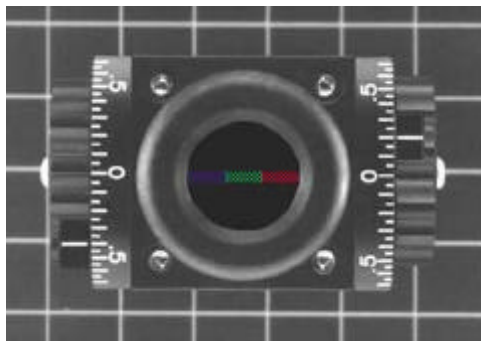
Convergence Error (Y- direction)
*greatest magnitude error
(graph is visual representation of R/B)

Ex. 1

B/G 0.2
* R/G 0.3
R/B 0.1

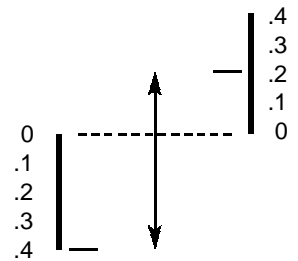


Example 2

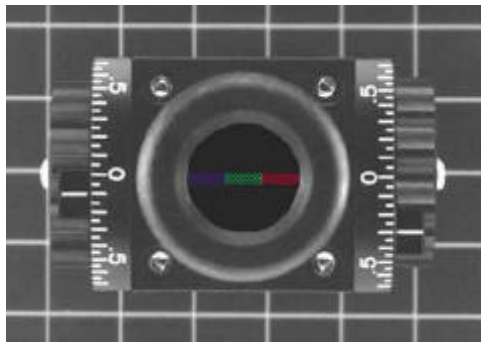


Ex. 2

B/G 0.4
R/G 0.2
* R/B 0.6

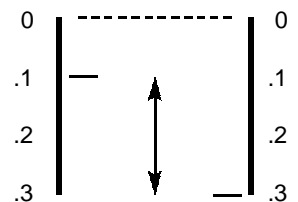


Example 3



Ex. 3

B/G 0.1
* R/G 0.3
R/B 0.2



These convergence error examples are of the Y-axis. Remember to take convergence error measurements for the X-axis. For any questions on accuracy, see the Convergence Gauge F.A.Q. (02-0035-2).