DIGITAL SCALE FOR MILL – Z AXIS

Project: Attach a digital scale to the RF-45 to serve as a 'poor persons' DRO.

Materials:
Vertical DRO (6")
Three pieces of scrap from the shop
Misc. machine and hex head cap screws

This photo shows the finished DRO. Holes were drilled and tapped into the mill for the top and bottom brackets, and into the mill quill ring to hold the vertical bar.

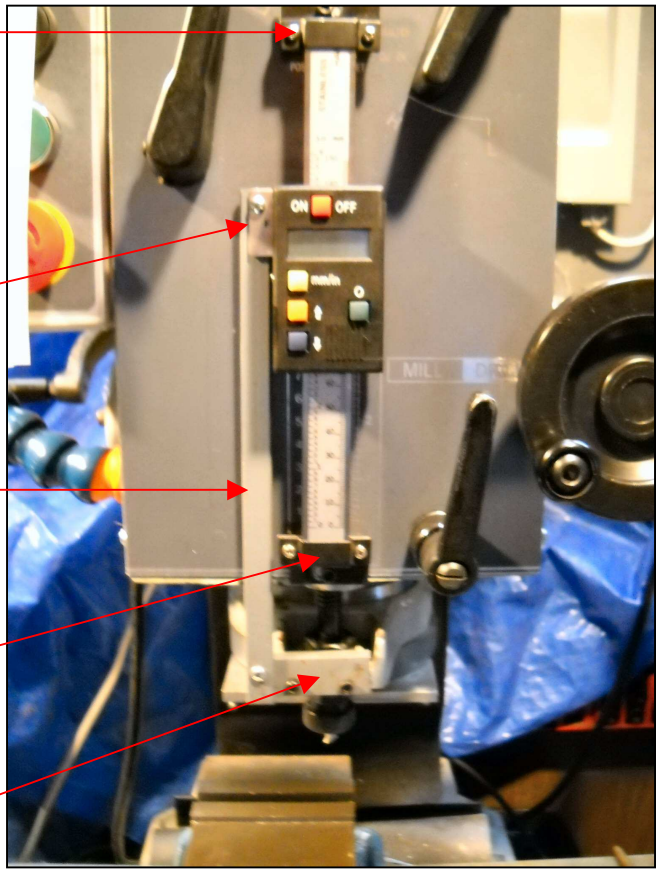
Top bracket of DRO screwed into the RF-45. Two holes are drilled and tapped. Washers are used as shims to set the DRO in front of the mill by about ¼ inch.

Scrap one: attaches sliding head to the vertical bar. It is attached to the sliding head with two screws at the back and to the vertical bar with a machine screw.

Scrap two: a piece of bar stock. Connects the sliding head to the bottom of the quill.

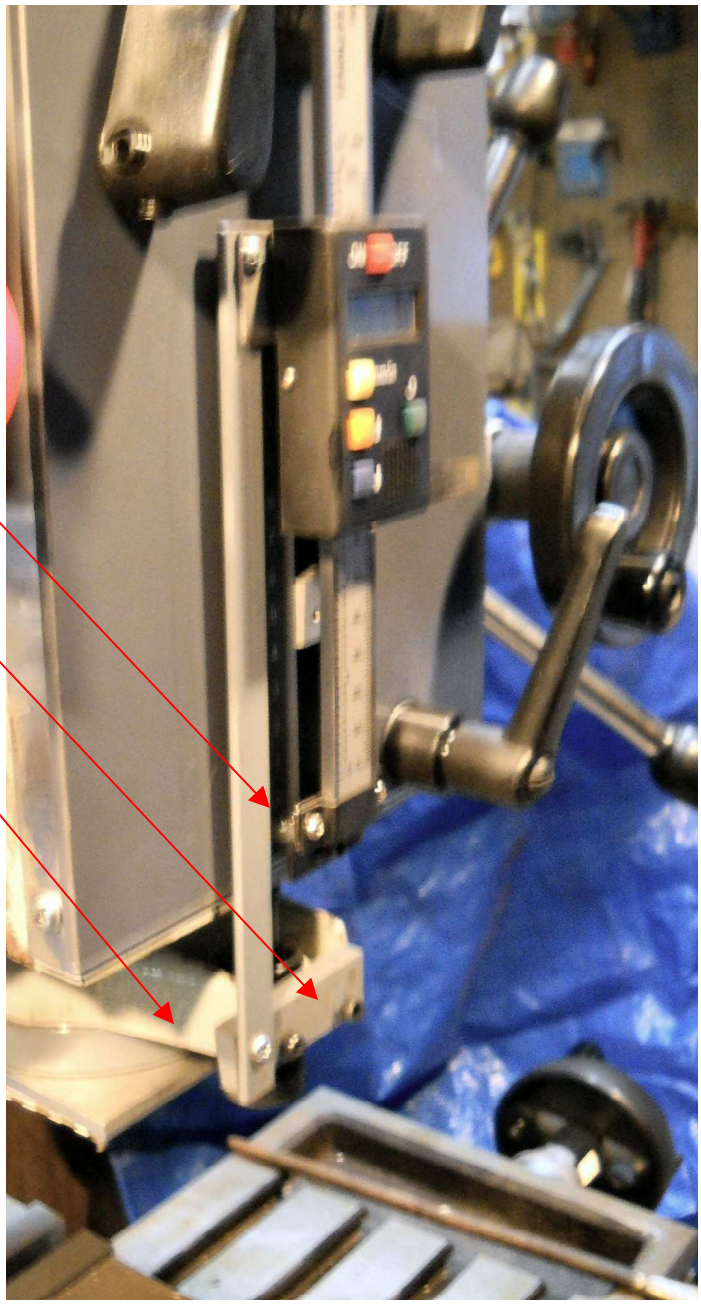
Bottom bracket: attached the same way to the RF-45

Scrap three: a piece of steel fastened to the mill stop quill ring, and to the vertical bar.



Design considerations. There are several ways the scale can be attached. My design parameters were to keep everything out of the way of the mill controls, be as accurate as the scale; i.e. to a thousandth of an inch, and to retain the quill stop. This design fastens both the top and bottom of the scale to the mill using a nut and washers as spacers and shims, while the sliding head is attached to the bottom of the quill by a vertical steel bar.

A small rectangle of sheet metal is screwed into the back of the DRO which comes with holes, screws, and a sheet metal plate that does not work with this design. This piece sticks out on the left side where it is screwed to the vertical bar. (see next photo).



Because there are screw heads in back of the DRO, it has to be held out from the surface of the mill. This is accomplished by using washers as spacers in the screws that hold the top and bottom brackets. The washers behind the bottom bracket are just barely visible.

A piece of steel is used to extend the quill ring out to the front, and to the left side so it can support the vertical bar.

Two hex head machine screws are used to hold this piece of metal. The quill ring is cast iron and was 7 degrees off dead vertical. The steel piece was milled at 7 degrees to the surface would be flush with the vertical bar,

Accuracy: While the quill extends 5” I do not have a way of accurately measuring the DRO. It is exactly accurate according to my vertical calipers, which is not saying very much since calipers are not very accurate.

Measuring the last inch was more gratifying in that the DRO results were confirmed by micrometer to be accurate to the DRO design, a thousandth of an inch. Tests were done using a small 1-2-3 block as a known width and by making cuts of depths of .002”, .005”, and .010” and then verifying with a micrometer.