



Digital Readout System

MODEL H6087-98, H7848-51

INSTALLATION MANUAL



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 WARNING!

This manual provides critical safety instructions on the proper setup, operation, maintenance, and service of this machine/tool. Save this document, refer to it often, and use it to instruct other operators.

Failure to read, understand and follow the instructions in this manual may result in fire or serious personal injury—including amputation, electrocution, or death.

The owner of this machine/tool is solely responsible for its safe use. This responsibility includes but is not limited to proper installation in a safe environment, personnel training and usage authorization, proper inspection and maintenance, manual availability and comprehension, application of safety devices, cutting/sanding/grinding tool integrity, and the usage of personal protective equipment.

The manufacturer will not be held liable for injury or property damage from negligence, improper training, machine modifications or misuse.

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Manual Accuracy

We are proud to offer this document with your new machine! We've made every effort to be exact with the instructions, specifications, drawings, and photographs of the machine we used when writing this manual. However, sometimes we still make an occasional mistake.

Also, owing to our policy of continuous improvement, **your machine may not exactly match the manual**. If you find this to be the case, and the difference between the manual and machine leaves you in doubt, immediately call our technical support for updates or clarification.

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INSTALLATION

Precaution

1. The travel length of the glass scale must be longer than the maximum travel of the machine. There should be at least 10mm of clearance between the ends of the glass scale and the maximum travel of the machine, as shown in **Figure 1**.

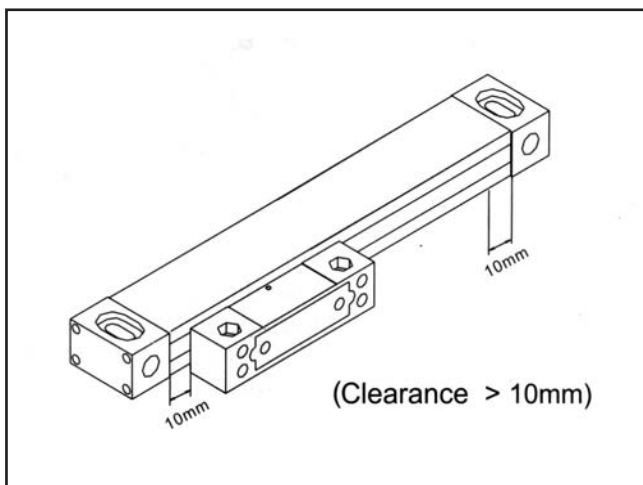


Figure 1. Glass scale clearance.

2. To ensure the reliability of the graduated glass scale, and to avoid any possibility of scale misalignment, the scale should be installed on machined flat surfaces wherever possible. In the case where there are no machined flat surfaces available on the machine, machined flat blocks or the aluminum fillers should be used. Wherever possible, the scale ends and the machine reader head should be installed on a flat surface.

3. Indicators must be set up properly to ensure accurate measurement. Make sure indicator axis is perpendicular to the work. If a vertical dial indicator is used, as in **Figures 2 & 3**, it is important to ensure that the dial indicator is perpendicular to the measured surface to also avoid the cosine measurement error.

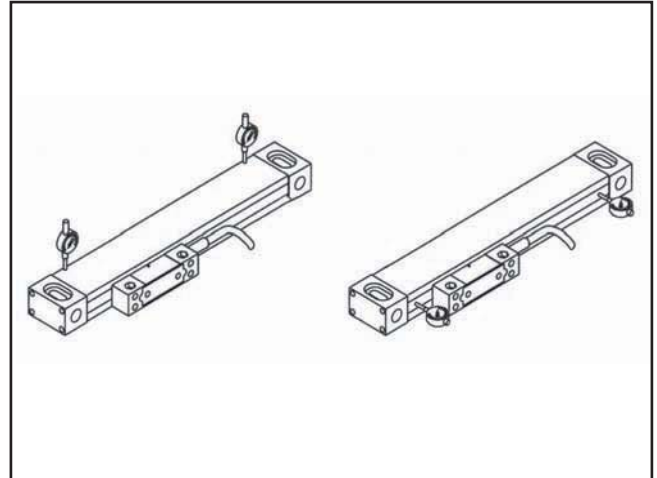


Figure 2. Horizontal scale alignment.

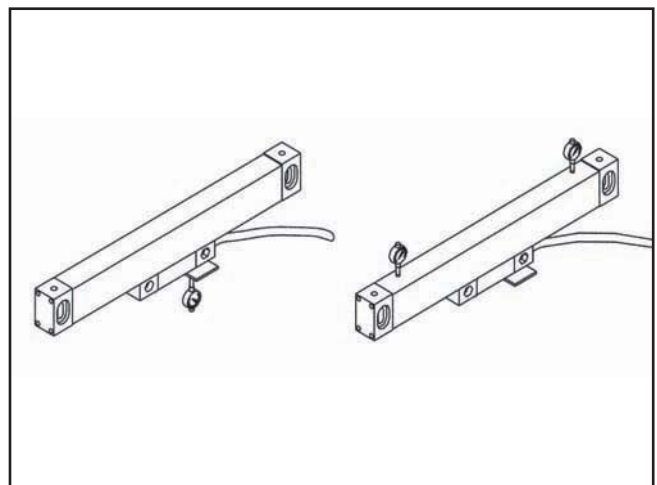


Figure 3. Vertical scale alignment.



Location Selection

To select proper installation locations:

1. Scales should be installed on flat machined surfaces.
2. The opening of the scale must not be installed in direct exposure to metal shavings, oil, water, dust or other foreign objects as illustrated in **Figure 4**. The provided covers should be installed.

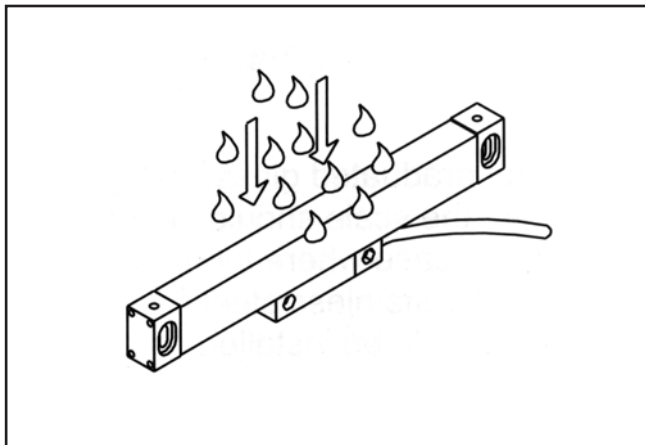


Figure 4. Scale exposure.

3. In cases where machined flat surfaces are not available, an mounting strip or strip should be used to provide a flat surface for the installation. The mounting strip, shown in **Figure 5**, must be as short as possible to provide a rigid surface.

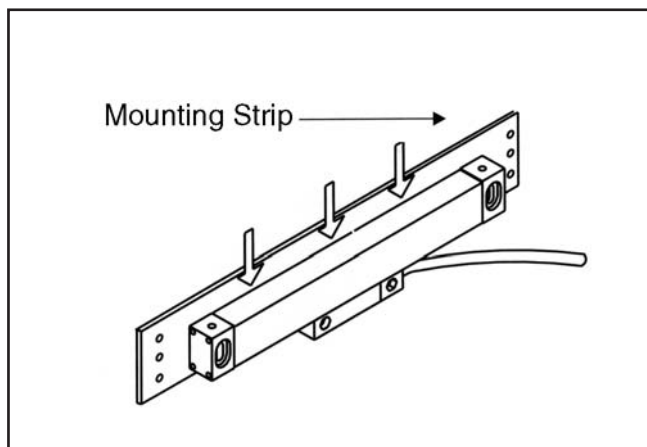


Figure 5. Mounting strip.

4. A clearance of at least $\frac{1}{8}$ " between the scale and scale cover is necessary (**Figure 6**).

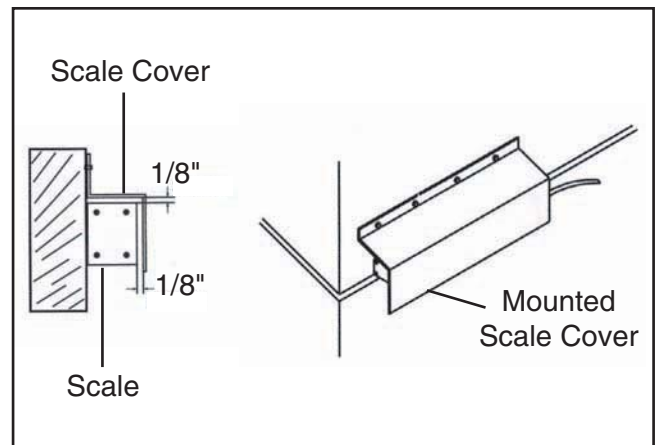


Figure 6. Scale cover clearance.

5. All tapped screw holes must have at least six threads to allow the screw to be firmly secured. For the screw that is needed to secure a heavy load, the tapped holes must have at least eight threads. After tapping, the holes must be deburred and cleaned.
6. All cables must be fixed, but also allow for the maximum machine travel movements. **Figure 7** shows the recommended minimum radius that should be used for bending the scale cable.

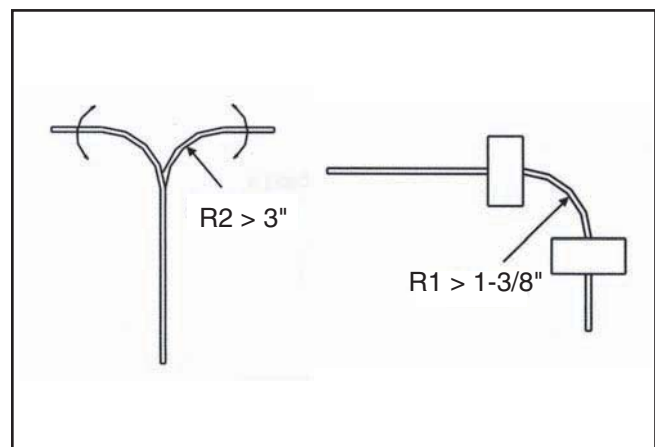


Figure 7. Bending radii.

7. Grounding is very important! Be sure receptacle you plug into is grounded.
8. The horizontal and vertical alignment measurement are taken at 20 mm away from the scale ends, as shown in **Figure 8**.

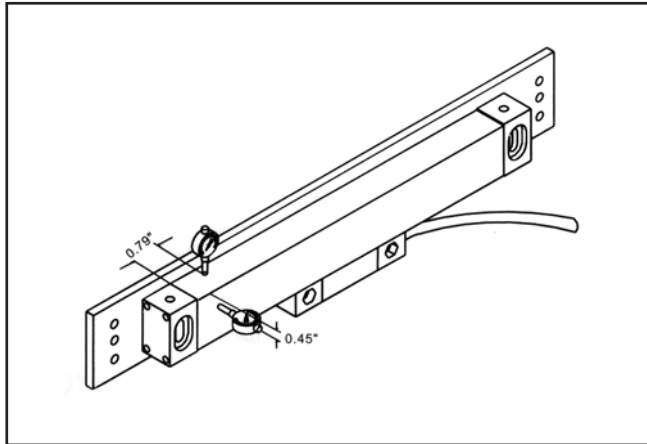


Figure 8. Scale alignment measurements.



Installation Requirements

1. Requirements for the mounting surface:
 - Parallel mounting **Figure 9 & 10**: The parallelism of the two mounting surfaces must be less than 0.1 mm of each other..
 - Perpendicular mounting **Figure 11**: The two mounting surfaces must be less than 0.1 mm out of square.

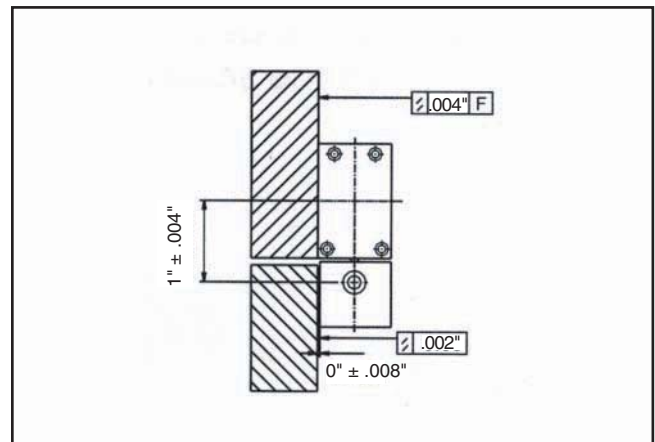


Figure 9. Parallel mounting.

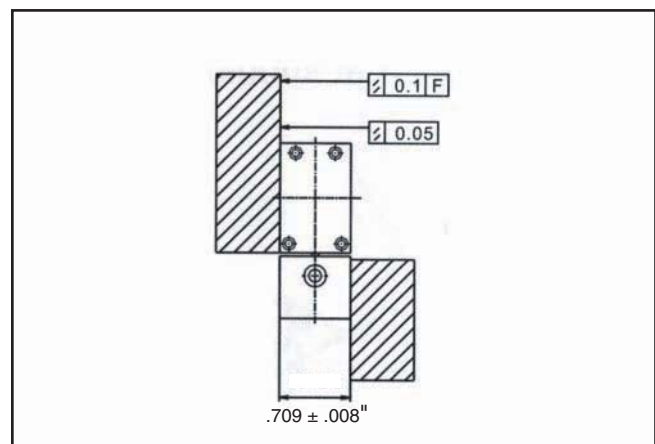


Figure 10. More parallel mounting.

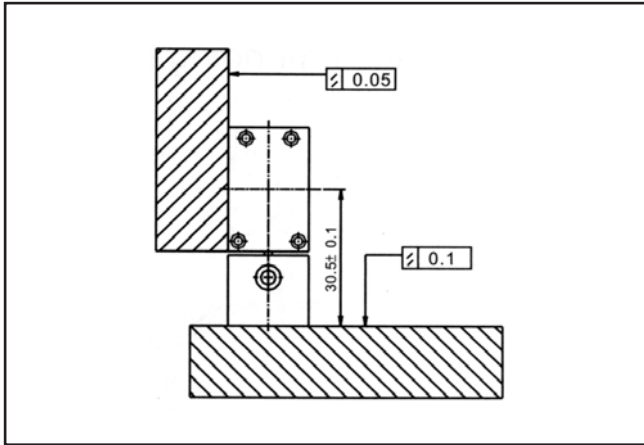


Figure 11. Perpendicular mounting.

2. Scale Alignment:

- For scale travel less than 37.4", the maximum parallel error between the scale and the machine slide must be less than .04", as shown in **Figure 12**.
- For scale travel longer than 37.4" mm (**Figure 13**), the maximum alignment parallelism error must be less than 0.06".

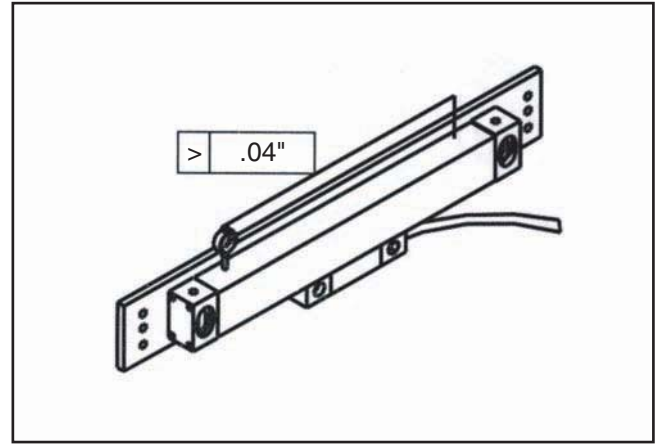


Figure 12. Alignment, less than 37.4" travel.

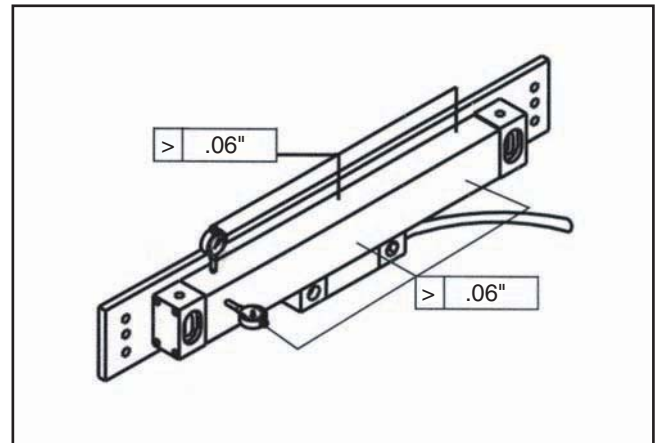


Figure 13. Alignment, more than 37.4" travel.

3. Clearances between the reader head and scale body (**Figure 14**):
- The clearance between the reader head and scale body must be kept between 0.03" - .06".
 - The reader head must be less than .001" parallel with the scale and can be set with feeler gauges to allow the reader head to move unrestricted along the scale.

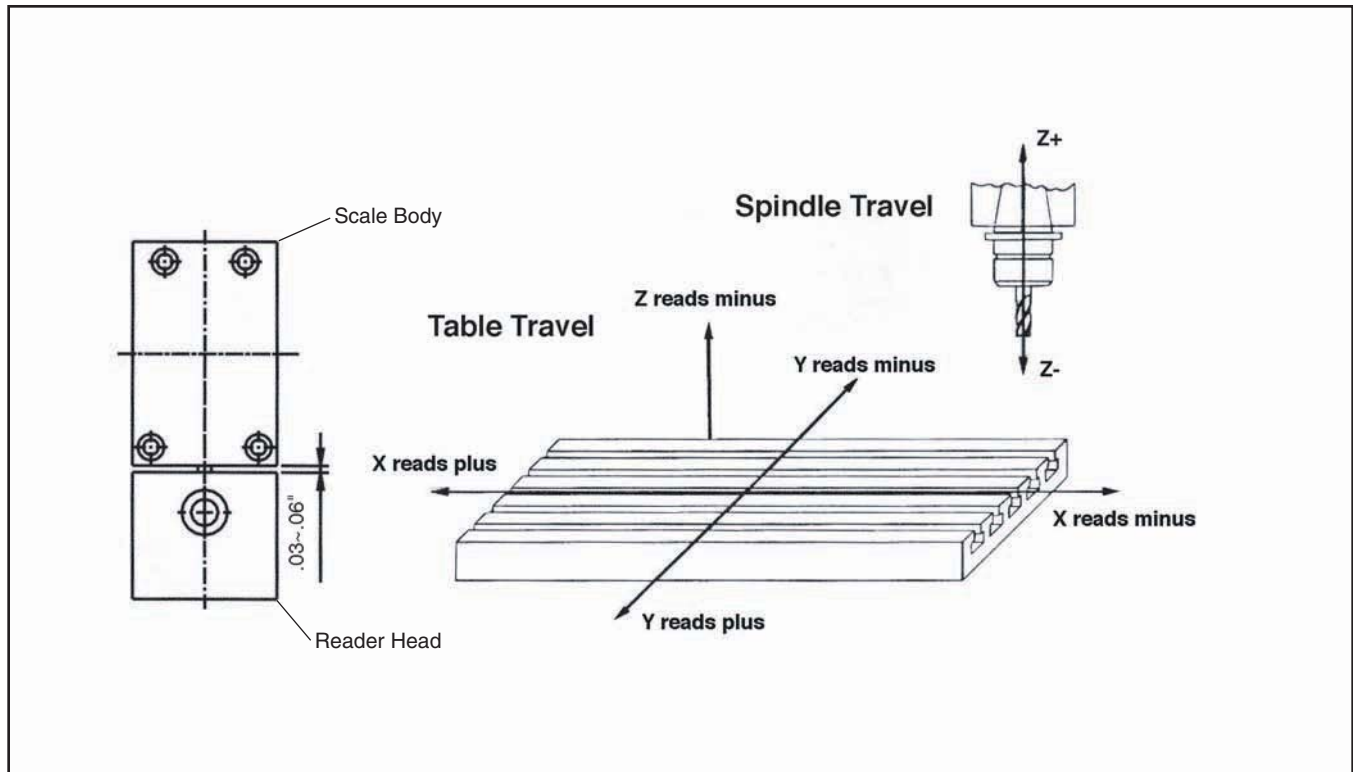


Figure 14. Milling machine table direction and reader head clearance.

Direction on Lathe Installation:

When travelling towards the headstock, the reading should be reduce when the cross slide tavel towards the center, the reading should also reduce.

Note:

To give the best protection at all times, the scale should be mounted with the rubber seals facing down.

Where extreme exposure to metal shavings, coolant, dirt and compressed air are present, install the supplied sheet metal cover guards for maximum protection.

Between the scale and the reader head is a blue strip which helps to maintain the correct distance between the reader head and the scale. Remove this after installation.

Scale Reading Direction:

Before fitting the scale, ensure that the reading direction is correct. To change the direction of the scale, turn the scale over.

Generally the scale reads in the correct direction with the label of the scale exposed.

Lathe Scale Installation:

Before fitting the scale, connect the "X" axis to the cross slide to allow the diameter function to work.



Scale Setup

One of the easiest ways to set up an "X" scale on a milling machine is to clamp two parallels to the flat table surface that the table travels on and set the scale on the parallels.

To set up the "X" axis scale:

1. Carefully drill and tap the holes (**Figure 15**) to match the provided screws.

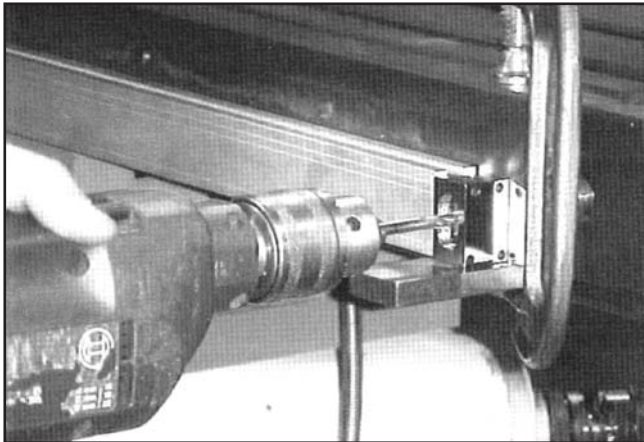


Figure 15. Drilling the screw holes.

2. Mount the cover over the scale and drill and tap holes to secure it to the table, making sure that there is 3mm of clearance between the cover and the scale.
3. Mount the scale on the backing plate using the pre-drilled holes (**Figure 16**), checking that the scale is parallel with the machine slide with a dial indicator.

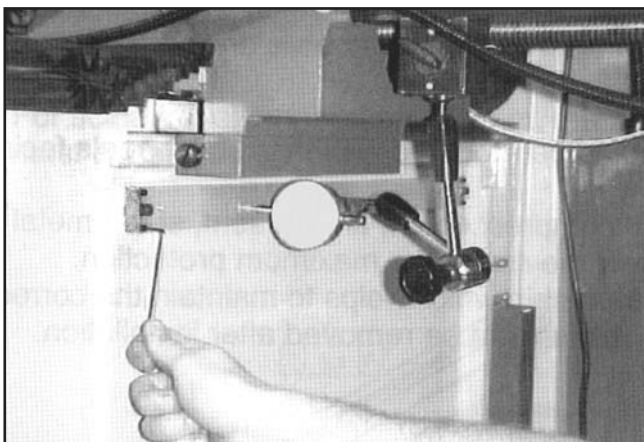


Figure 16. Mounting scale on backing plate.

4. When the scale is mounted, fix the reader head to the saddle. If necessary, shim the head to ensure that it is parallel and in-line with the scales (**Figure 17**). *NOTE: The blue packing between the reader head and scale allows for the correct clearance and holds the reader head parallel to the scale.*

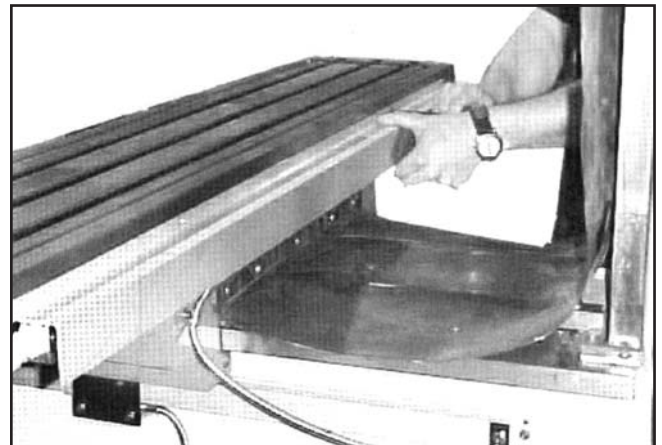


Figure 17. Completing "X" axis scale mounting.

To set up the "Y" axis scale:

1. If the surface is not machined, mount the backing plate and use the set screws to adjust the backing plate. Check with a dial indicator (**Figure 18**), and adjust the backing plate until the scale is square and perpendicular to the machine slides.

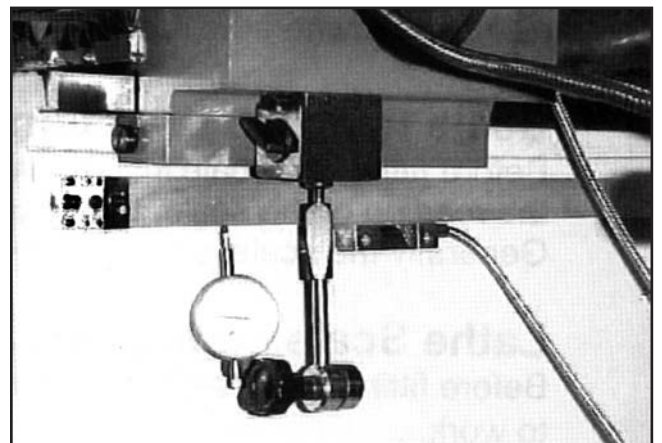


Figure 18. Aligning the backing plate with a dial indicator.

2. Mount the bracket on the saddle (**Figure 19**), to accept the reader head, making sure that the reader head is in-line and parallel to the scale. Secure the cable and leave enough free cable to allow for the travel of the slide.

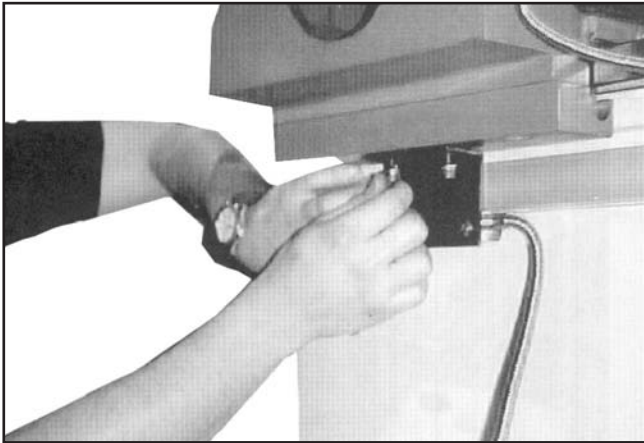


Figure 19. Mounting the bracket to the saddle.

3. After the scale is aligned to the axis, drill and tap the saddle to suit the provided bracket and mount the bracket as shown in **Figure 20**. Ensure the reader head is sitting correctly so when it is attached it will be square and parallel to the scale.

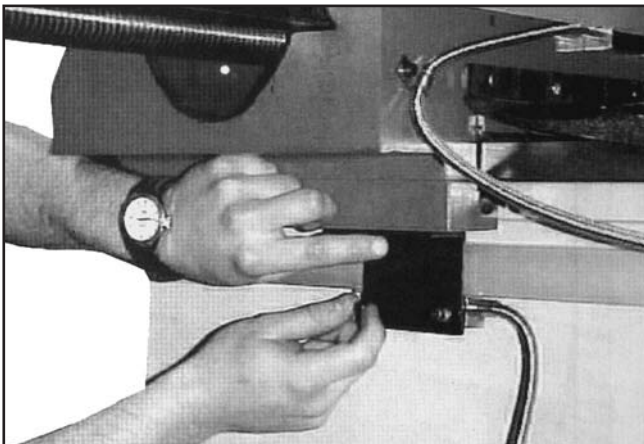


Figure 20. Mounting the provided bracket.

Fitting the "Z" axis scale:

Before mounting the "Z" axis scale, ensure that it will read "+" as you wind the table down, increasing the distance from the table to the cutter.

1. The "Z" axis scale should be installed on the side of the column, ensuring that the open side of the scale is away from the direct metal shavings and coolant and that the travel is in the right direction, "-" towards the spindle and "+" away from the spindle. The bracket should be mounted on the knee (**Figure 21**), and around the scale to allow for the cover to protect the scale (**Figure 22**), where excessive coolant and metal shavings are present.

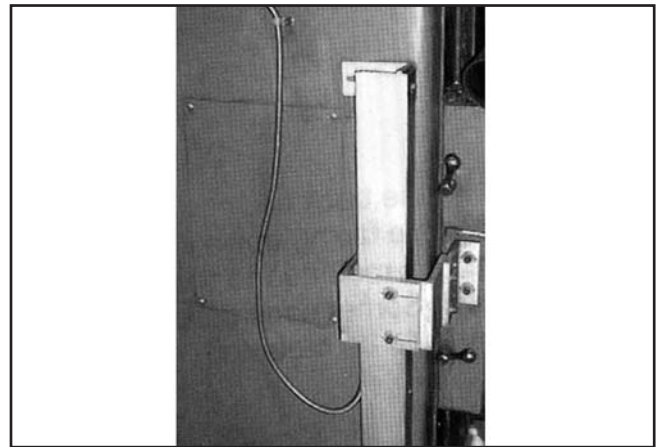


Figure 21. Bracket mounting location.

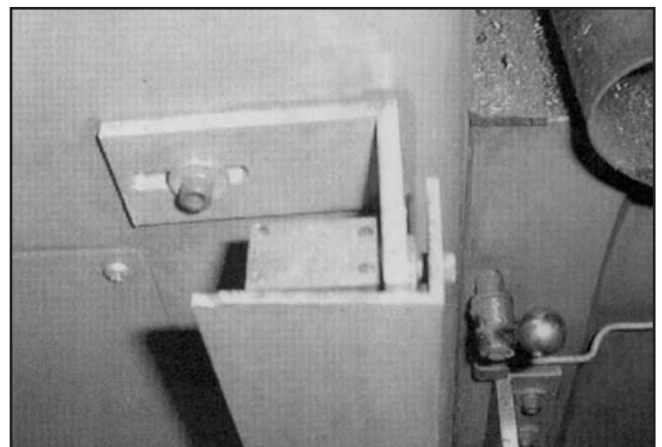


Figure 22. Mounted scale cover.



Lathe Installation

To install readout on a lathe:

1. Mount the scale parallel and square to the slide, shown in **Figure 23**. Testing for parallel can be done with a dial indicator or a precision level.

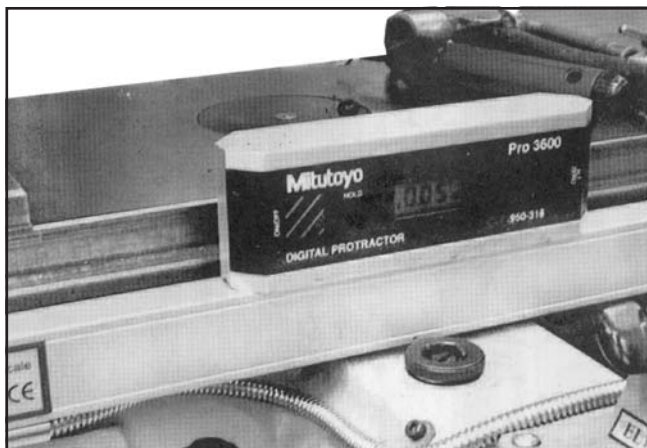


Figure 23. Scale mounting location.

2. Select a flat surface that is suitable and clear of the travelling parts of the lathe and mount the cross slide scale, shown in **Figure 24**.



Figure 24. Flat surface for scale mounting.

3. The longitudinal scale should be mounted on the back of the lathe, (**Figure 25**) with the open side of the scale facing down, and must be parallel to the bed.

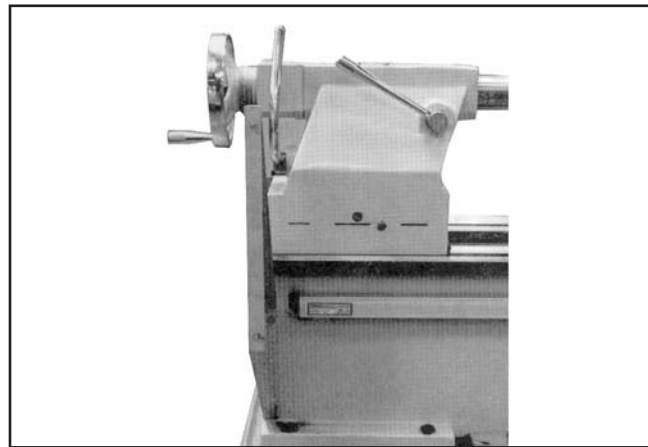


Figure 25. Longitudinal scale mounting on lathe.

4. Mount the reader head to the saddle with the provided brackets (**Figure 26**). Modification may be required for some lathes. Mount covers over the slides as shown in **Figure 27**.

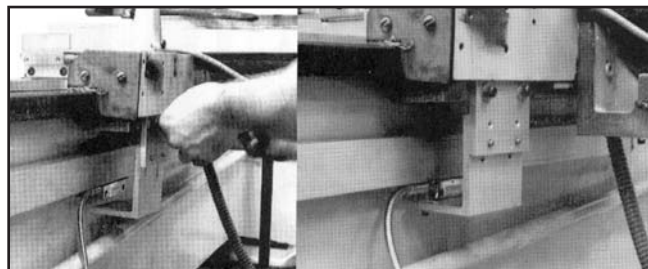


Figure 26. Proper reader head mounting with provided brackets.



Figure 27. Slide cover mounting.



Technical drawing of a 125mm x 125mm x 125mm stainless steel bracket. The drawing includes three views: a front view (top), a side view (middle), and a top view (bottom). The front view shows a bracket with a 125mm x 125mm base plate, a 125mm x 125mm mounting plate, and a 125mm x 125mm mounting plate. The side view shows the bracket's profile with a 125mm x 125mm base plate, a 125mm x 125mm mounting plate, and a 125mm x 125mm mounting plate. The top view shows the bracket's top surface with a 125mm x 125mm base plate, a 125mm x 125mm mounting plate, and a 125mm x 125mm mounting plate. Dimensions are provided in millimeters (mm). Key dimensions include: overall length 144mm, overall width 124mm, overall height 108mm, base plate dimensions 16.75mm x 22.50mm, mounting plate dimensions 19.50mm x 6.00mm, and various hole positions and sizes (e.g., 2 x M5.0, 4 x M4.0). A note specifies 'Standard Installation Gap : 125mm +/- 0.25mm'.



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