

# PM-932M Mills with & without power downfeed option

Supplement to Section 2 of the PM-932M manual

## QUILL DOWNFEED

### *Mills without power downfeed*

The quill is controlled in two different ways, **coarse** and **fine**.

In the drilling mode, coarse feed, the mill functions like a standard drill press – lower the quill using any of the three downfeed levers to rotate the lever hub counter-clockwise. For milling operations the lever hub is disengaged, and the quill is controlled by the fine downfeed handwheel. The quill is locked by a lever on the face of the headstock, Figure 2 (On power downfeed versions of the PM-932 the quill locking lever is on the left of the headstock, Figure 2 inset.)

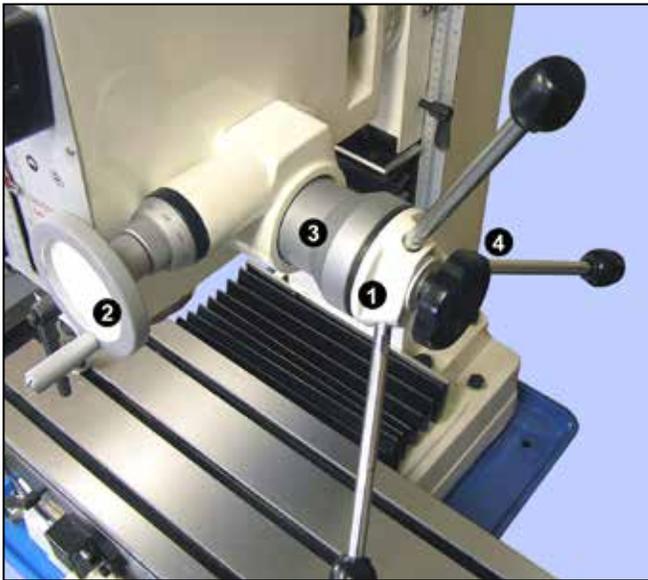


Figure 1 **Quill downfeed controls**

The lever hub (1) is full-time connected to the quill pinion. The fine control handwheel (2) is connected by a worm gear to the sleeve (3), and is free to rotate — doing nothing to the quill — unless it is coupled to the lever hub (1). Couple sleeve (3) to hub (1) by tightening knob (4).

### **Coarse feed** (Figure 1)

For drilling operations, loosen knob (4), allowing the lever hub to rotate independently of sleeve (3). If desired, set the depth stop.

### **Fine feed** (Figure 1)

For milling operations calling for precise, repeatable control of tool depth, tighten knob (4) to engage the tapered face of hub (1) with the internal taper on sleeve (3). Tighten the Z-axis locks.

Rotate the fine control handwheel (2) to raise or lower the quill. Before switching to fine control, it is usually a good idea to run the depth stop up to the top. Lower the quill by rotating the fine control knob clockwise, positioning it precisely either by count-

ing divisions on the graduated dial, or by reference to the front panel DRO (digital readout). Use the locking lever to hold the quill firmly in position.

If you are counting divisions be aware of backlash in the worm drive. This means that the handwheel must always be **turning in the same direction** throughout the entire process, from setting a reference level to subsequent cutting passes at specific depths – see the backlash discussion in Section 2 of the manual. Using the DRO – which has no backlash issues – is less laborious, but remember that the quill is **spring-loaded**. This calls for care when releasing the quill locking lever prior to repositioning the quill downward. If the fine control knob has been allowed to disengage (backed off counter clockwise), the quill will jump up by 0.01" or more. To avoid this, make sure the fine control is firmly clockwise, lightly loading the quill rack, before releasing the locking lever.

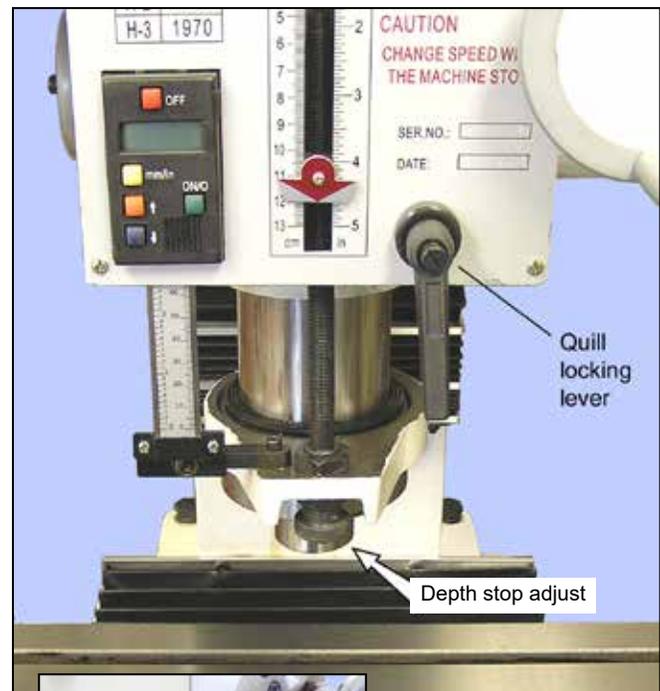


Figure 2 **DRO, depth stop & quill locking lever**

Above, mills without power downfeed. On PM-932 mills with power downfeed the quill locking lever is on the left side of the headstock, inset.

## QUILL DOWNFEED

### *Mills with power downfeed*

This is a factory-installed option. Mills shipped without this option cannot be retrofitted.



Figure 3 PM-932M mill with power downfeed option

Power downfeed can be used to reduce workload in many routine operations including drilling, reaming, honing, and hole boring with single point tools.

Three feed rates are available:

**0.1 mm** (~ 0.004") per spindle revolution  
**0.18 mm** (~ 0.007")  
**0.26 mm** (~ 0.010")

The quill is controlled by hand in two different ways, **coarse** and **fine**. The power downfeed system is described later in this document.

In the drilling more (coarse feed) the mill functions like a standard drill press – pull the rearmost downfeed lever up and over toward you to rotate the downfeed lever hub clockwise to lower the quill. For milling operations the downfeed levers

right-shifted to engage the downfeed lever hub with the fine control handwheel, which may then be rotated clockwise to lower the quill under precise control.

#### **Coarse feed (manual feed)**

For drilling operations swing the downfeed levers inward — toward the mill — to disengage the lever hub from the fine control handwheel. Tighten the downfeed lever stop screw to lock the levers in position, thus preventing unintended engagement of the power downfeed.

The graduated depth collar can be used to set a depth stop for drilling as follows:

1. Tighten the Z-axis locks.
2. Lower the quill to bring the point of the drill down to the desired end point, then tighten the quill locking lever.
3. Loosen the depth collar clamp lever to free the depth collar

from the lever hub.

4. Rotate the depth collar clockwise as far as it will go (it should indicate approximately 5 inches). When the depth collar clamp lever is re-tightened, this will define the quill's end stop.
5. Re-tighten the depth collar clamp lever.
6. Unlock the quill. While observing the DRO reading, raise and lower the quill a few times to be sure the quill stops at the desired end point.

### Fine feed

For surfacing and other milling operations calling for precise tool depth increments, use the fine control handwheel.

**!** *With the spindle stationary, set the Power Feed Engage and Feed Rate Selectors to OFF.*

1. Tighten the Z-axis locks.
2. Loosen the downfeed lever stop screw to free the downfeed levers.
3. Pivot the levers outward, testing for gear engagement as you go (jiggle the levers as necessary to fully engage — no gap between lever and its slot in the lever hub).
4. Lower the quill to the desired depth by rotating the fine control handwheel clockwise (only).
5. Tighten the quill locking lever.

**Note:** Use the graduated dial on the fine control handwheel for guidance only. It has 120 divisions of approximately 0.002". Use the DRO for precise downfeed control.

### USING THE POWER DOWNFEED SYSTEM

**!** **Stop the spindle before touching the Power Feed Engage or Feed Rate Selector knobs**

Key points to remember, referring to Figure 3:

- The Feed Rate selector knob can be turned either clockwise or counter-clockwise to the OFF setting, but not beyond — go back the other way instead.
- The graduated depth collar is free to rotate on the downfeed lever hub only when the depth collar clamp lever is loose.
- When the depth collar clamp lever is tightened, the collar is driven by the lever hub.
- The downfeed lever hub is full-time connected to the quill pinion.
- Pivot the quill downfeed levers **inward** to control the quill by hand, drill-press style.
- Pivot the levers **outward** to move the lever hub under power. **Prevent premature disengagement by light outward finger pressure on one of the levers.**
- The lever hub automatically disengages from the power feed — levers pivot inward — when the zero line (0) on the depth collar nears the scale datum. **At this point the quill will reverse ABRUPTLY by spring action unless restrained by light finger pressure as noted above.**

### Power downfeed example

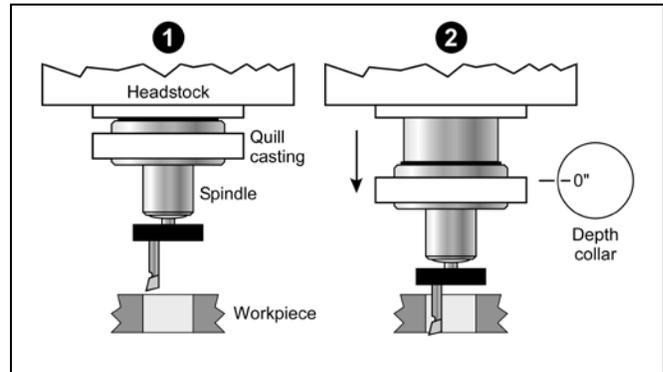


Figure 4 Hole boring with power downfeed

In Figure 4 a previously drilled hole is to be enlarged using a single point boring tool. What follows is one of several possible procedures.

1. With the quill fully retracted (1), lower the headstock to bring the cutting tool just clear of the upper surface of the workpiece.
2. Lock the Z-axis.
3. With the cutting tool inboard of the drilled hole, lower the quill by hand to the desired end point for the tool (2).
4. Lock the quill, then set the depth collar to zero.
5. Tighten the depth collar clamp lever.
6. Release the quill locking lever, allowing the quill to retract fully, position (1).
7. Is the **SPINDLE STOPPED?** Select a **Feed Rate**, then set the **Power Feed Engage knob** to ON. Jiggle the spindle and Fine Control by hand to ensure the power feed is properly engaged.
8. **Stay clear of the Fine Control knob — this will rotate when the spindle runs.**
9. Turn the spindle motor on, **forward** direction (F) only for power feed.
10. Pivot the quill downfeed levers outward, feeling for gear engagement as you go (jiggle the levers as necessary to fully engage — no gap between lever and its slot in the lever hub).
11. The quill will now descend under power until "0" on the depth collar approaches the scale datum, at which point the quill will retract rapidly to position (1) unless — recommended — it is restrained by light pressure on the downfeed levers.