

Avoiding Mill Head Repositioning, version 1.1

By R. G. Sparber with a firm push from Corey Renner

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One subject that comes up every few months on the Yahoo group site "mill_drill" is the issue of raising or lowering the mill head. What else can you do when the new cutter won't fit or reach?

But disturbing the head means you have lost alignment. Specifically, the center of rotation of the spindle is no longer at the same point on the table.

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Many shop tested and theoretical solutions have been proposed. But, as Corey Renner clearly stated, the best solution is to plan ahead. In the majority of cases, the head doesn't have to be disturbed at all.



Here you see a typical dilemma. I have a 3/8" drill mounted in my keyless chuck and my 3/8" end mill. With their R-8 tapers lined up, you can see that there is more than a six inch distance between ends. If the head was set to be one inch from the bottom of the end mill, it would be impossible to even mount the drill chuck.

However, if the mill head was adjusted to give me one inch from the drill mounted in this chuck, the end mill could not reach.

Depending on the needed depth of cuts, you might be able to set the mill head so the drill almost touches the work surface. Then, the end mill might just touch the surface. That could be all you need. If not, it is time to be a little creative.



I have swapped out my beloved keyless chuck for my old key chuck. The key chuck is shorter so now the difference between ends is around four inches. Maybe that is good enough. If not, all is not lost.



Maybe I can get the job done with a longer end mill. This end mill will deflect more than the original so I might have to take lighter cuts. The diameter is also larger which might not work. I've got one more trick up my sleeve.



Since this happens to be a 3/8" diameter drill, I can hold it in one of the few R-8 collets in my collection. The end mill is now slightly *longer* than the drill. I might even be able to go back to my original end mill.

The key is to plan out the work before making chips. Even the best method of reestablishing head alignment is not as good as not messing with it in the first place.

Suggestions from Readers

J.R. Williams, Jim (in Western Wisconsin), and Craig E. Johnson , suggested buying a set of screw machine length drills.

Arthur Marks had a long list:

- * Use the smallest capacity drill chuck for the job. A Jacobs 11N, 3/8" capacity super chuck is surprisingly short.
- * Have a drill size you don't have an R8 collet for? Use tooling sleeves: Hardinge HDB2, HDB5 type or similar fitted in a larger R8 collet. Also easily shop made.
- * Use end mill extensions. They are essentially rods with a hole + setscrew on the end. I've made some shop made specials, even, when required. For example, one time I had a need to work very close to a tall shoulder. Even a normal end mill extension interfered because the holder is larger than the end mill diameter. Bringing the spindle down, the quill interfered. I made a very thin, cylindrical end mill extension and kept the cuts light. Worked like a charm.
- * Same as above, but ER style end mill extensions. They don't even need to be long. The 2" length shank type are helpful when all you really need is an extra inch of reach. Obviously harder to make in the shop, though.
- * Want to use a bigger end mill, but the length doesn't accommodate other tooling without moving the head down? Try an R8 shank shell mill arbor. Shell end mills can be had as small as 1-1/4" diameter.

Martik777 sent me this:

I have yet to use a drill chuck on my mill, ER collets handle pretty much everything except a 3/4" EM I made a reducer for. I made 3/8" split sleeves for the commonly used drill bits as I normally have a 3/8" collet in the chuck.

Craig E. Johnson wrote:

You don't want to be milling with long mills and the quill extended- it is a sure path to flex and chatter. If you need to both drill and mill, how about drilling first, then putting in a mill of the same size and lowering the head, lining the mill up into the previously drilled hole. Surely this method is good to a few thousandths if you are careful.

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I welcome your comments and questions.

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