

AWMS Inc.

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DRO PROS
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DRO PROS,

You were most helpful when I was looking to purchase a DRO for my lathe - so thought I would drop you a line and let you know how things turned out as well as offer some other information.

I suggest you consider adding a spot on your web site that shows customer installs of your products on various machines. The way others solve the problems of installation would be helpful for ALL users. Particularly, if the installation is on a similar machine. Should you choose to do so, here is my contribution.

About me:

I am NOT a professional machinist! I own / operate a refrigeration business, a second 29 year career after being a broadcast engineer (General Radio Telephone & Extra Class HAM licenses), then data acquisition & control technician for 15 years. My hobbies include fixed wing aircraft and jet helicopter maintenance (I am A&P rated) and a side line of gun smithing – building machineguns and silencers as well as repair.

My friend with the press brake is interested in installing a DRO on both an older Hardinge and 1500 Clausing. He liked mine well enough to want to equip his last two non-DRO lathes with your low cost packages. (He currently has a Sony on his mill and Sargon on his big lathe.)

Now, on to the description of my install and some pictures of it!

Sincerely,

Mike Gray

My DRO PROS Easson installation

The Lathe:

My lathe is not a shiny new table top mini lathe! It is a 40 ++ year old Clausing 15 X 48 model 6913 that has seen considerable use. When I bought it, the crud was ¼” thick all over it – I’m still removing it! New paint to follow – someday. Don’t know what kind of coolant those folks used but it was NASTY and very hard to remove to boot.

Cross Slide 1st.

I began with the cross slide scale installation. Placing the reader head / trolley down is preferred but on this machine, impossible. Just won’t fit unless the scale is raised above the cross slide. Ok, so I must lay the scale on its side. If it is installed on the tailstock side of the cross slide, well over 2” is lost in movement toward the tailstock. Not good, as there are times I want the tailstock closer than that! Seems if the scale is mounted on its side on the headstock side of the cross slide, I lose less than ½” of carriage travel toward the headstock! Having long ago ditched the lantern type tool post and gone to a quick change type, I really lose NO functionality from the missing ½” travel. My custom scale protector will limit carriage travel to prevent crashing the trolley into the headstock.

Modified the scale mounting bar by cutting each end off flush with the scale, trimming it up in the mill for a nice finish. It is mounted 1/8” below the top of the cross slide so the scale protector will be flush when installed. Rather than using the set screws for alignment of the mounting bar, I must use shims. (Beer can works great and is easy to work – just cut with scissors!) In the end, no shims were required. Two ¼ - 20 socket head screws mount it via holes milled in the bar. Be SURE the screw heads are recessed deep enough to prevent contact with the scale!! Adequate vertical adjustment is assured by slotting the recessed holes for the screws. Top of the bar is drilled and tapped for three flat head 10-24 counter sunk screws to attach my custom scale guard.





The mounting bar must be adjusted for perfect alignment in two planes BEFORE the scale is installed. Mine required only slight vertical adjustment of the scale when it was installed. Note the reader head is disconnected and the BPP is installed during scale alignment.



My kit did not include a trolley bar for the cross slide so I fabricated one from 3/8" aluminum. Easy enough; slice off a hunk, trim up in the mill, drill four holes, tap two. The two holes for screwing down to the carriage were slotted to adjust for "gapping" between "Blue Plastic Piece" and scale as part of final alignment. A piece of 1/4" aluminum was cut, drilled and slotted in the mill to go between my trolley bar and the reader head. One of the screws holding the 3/8" trolley bar down to the carriage is near the reader head cable and a bit difficult to access. Goes to prove even the most thought out installation can have a "gotcha"!



While the scale protector included with the kit is a neat piece, it just doesn't fit this application. Due to the vulnerable location of the scale, the provided scale cover is not strong enough for my desired level of protection. Therefore, a custom scale protector was fabricated from 1/8" steel and end caps welded on. It has a notch to clear the trolley bar as cross slide moves to rear. Protector is about one inch longer than scale so it does not touch in front and provides room for the cable to exit in the rear. Very difficult to get exact leg in press brake so it is milled to precise size, clearing carriage about .075". Should something heavy be dropped on the protector (like a chuck?? Nah, never happen!) the protector will be partially supported by the carriage. The protector is fastened to the scale mounting bar with three 10-24 flat head screws as mentioned before. Should the unthinkable happen and a chuck be dropped on the scale, this robust protector should prevent scale or reader head destruction.





Next the long scale for carriage

Installation of the long scale (1200 mm) for the carriage presented its own set of challenges! The Clausing has large holes cast in the bed as seen here.



These can best be described as swarf and coolant funnels!! Mounting the scale in front of these is a guarantee of scale damage or contamination. Mounting the scale ABOVE the “swarf funnels” leaves the trolley hanging down below the top of the holes so custom brackets were fabricated to reduce exposure. The horizontal piece that attaches to the reader head / trolley was fabricated from 1/4” aluminum with slotted holes to allow adjustment of the reader head which is attached with M4 button head screws to capture less swarf. It is attached to the 3/8” vertical piece with recessed 10-24 screws. That piece of 3/8” aluminum is used for the vertical part attached to the carriage. Two slots for the 1/4 - 20 screws that hold it to the carriage and two drilled and tapped holes in the bottom just like the original cast bracket. The upper right corner was sawed off to provide good cable route from the cross slide reader head. Of course, were this machine equipped with a taper attachment, different brackets would be required.

Mounting the scale required thinner adjustable spacers to prevent interference with bolts on the carriage bottom. Made those from some 1/4” steel. I felt steel would serve better due to thin material tapped for set screws. Not visible in pictures.



Carriage travel of this lathe is more than the 1200 mm scale can handle so a stop was fabricated. It is merely a piece of steel tubing of the correct diameter and length slipped over the clutch operating bar. Still allows full distance between centers and is not really necessary as long as the tailstock is on the ways. SOME form of hard, non removable stop is required to prevent destroying the scale from over travel! (No picture)

Display

I bent a piece of 1/4" hot roll at the correct angle to make a mounting bracket for the display. Solid, and right where I want it! Now to smooth the edges and paint it.....



The cables from the scales are clamped securely but are still prone to getting tangled up with swarf in the chip pan as the carriage is moved. A screen door spring will be attached to keep the cables where I want them rather than piled up in the chip pan.



ALL installations are different. This one required several custom parts to suit my ideas. I am fortunate to have a mill but most of the work could be accomplished with only a drill , file and sweat. As for the scale protector, I am again fortunate, having a friend with a fantastic shop and skill to match. No doubt simpler ways could be found to accomplish the same end. I am FAR from a professional at this so no doubt any other hobbyist could do at least as well - and a professional could do a lot better!

To date, I am very pleased with the results!

Mike Gray