

Bed Extension Kit 16 Instructions

The LittleMachineShop.com Bed Extension Kit 16 fits only the LittleMachineShop.com HiTorque 7x12 Mini Lathe (models 4100 and 4200) and other SIEG SC2 lathes. It does not fit earlier C2 mini lathes including those from Harbor Freight and Grizzly.

To install the LittleMachineShop.com Bed Extension Kit 16 you disassemble your lathe and reassemble it with the new parts. You drill and tap nine holes in the new bed way casting as you reassemble the lathe.

The Bed Extension Kit cannot be sold as a bolt-together kit because the mounting holes for the lead screw, the change gear adjuster (or banjo), and the rack vary in position from lathe to lathe. These holes are drilled and threaded at the factory during assembly of the lathe.

The Bed Extension Kit 16 includes the following parts:

- Bed way (16")
- Lead screw (16")
- Rack (16")
- Chip tray (16")
- M3x10 socket head cap screw

You will need the following tools:

- The hex (Allen) wrenches that came with your lathe (3, 4, 5, and 6 mm)
- The end wrenches that came with your lathe (8, 10, 14, and 17 mm)
- A 2.5-mm Allen wrench
- A #2 Phillips screw driver
- A 0.005" feeler gauge
- Two 2½" or larger C-clamps
- An M3x0.5 metric tap and tap drill (2.5 mm or #40)
- An M6x1 metric tap and tap drill (5.0 mm or #9)
- An M8x1.25 metric tap and tap drill (6.8 mm, letter H, or 17/64")
- An electric hand drill

Expect to spend between two and four hours on this project.

If you do not understand what a part is that is referenced in these instructions, see the parts diagram in your user's guide or go to www.LittleMachineShop.com and use the product search to find that part and look at the photograph.

In the following procedures, left, right, front, and back are always related to the operator's position at the lathe. Thus, left means the headstock end and right means the tailstock end.

Teardown

Follow this procedure to disassemble your lathe.

Keep track of the fasteners you remove. You will need them to reassemble your lathe.

Preliminary

1. Unplug the power cord.
2. Remove the tailstock.
3. Remove the rear splashguard. There are four Phillips head machine screws, three in the ways and one in the headstock.
4. Remove the change gear cover. There are two socket head cap screws.

Electrical

1. Detach (but don't disconnect) the control box. There are four Phillips head machine screws, two on top and two on the bottom.
2. Turn the control box so you can work inside it. You need to disconnect the power cord and the motor.
3. Disconnect the two green or green and yellow ground wires from the screws on the front of the headstock. Replace the screws in the holes so you have them when you need them.
4. The black power cord is alone in a hole through the bed way. Disconnect the black and white wires from the On/Off switch by pulling on the terminals. Note that the white wire is connected to the left top terminal and the black wire is connected to the right top terminal.
5. Remove the four Phillips head screws retaining the circuit board. Lift it out of the control box.



6. There are two black wires from the motor in a hole in the bed way. Disconnect the white plug on the end of one wire from the circuit board.
7. Disconnect the motor leads from the U, V, and W screw terminals on the circuit board.

Note: Leave all other connections alone.

8. Set the control box down. It's still connected to the headstock by at least one wire.
9. Remove the black plastic protector from the area that was covered by the control box. There are two Phillips head machine screws.

Motor

1. Remove the motor cover from the back of lathe. There are two Phillips head machine screws.
2. Remove the motor. There are three socket head cap screws through the frame. You access them from the area that was covered by the control box.

Lead Screw

1. Remove the gear, bushing and key from the left end of the lead screw. There is one socket head cap screw.
2. Remove the right lead screw mounting bracket (pillow block). There are two socket head cap screws.
3. Be sure the half nuts are disengaged (handle up) and carefully pull the lead screw out toward the tailstock end of the lathe. If necessary, tap with a soft-faced hammer.
4. Remove the apron. There are two socket head cap screws near the front of the carriage.
5. Slide the carriage off the right end of the ways. You might need to loosen the adjusting screws to get the carriage off the ends of the ways.

Change Gears

1. Remove the M8 nut and washer from the change gear adjuster.
2. Remove the left lead screw mounting bracket and change gear adjustment assembly.
3. Slide the change gear adjustment assembly off the left lead screw mounting bracket.
4. Unscrew the change gear adjusting stud from the bed.

Headstock and Miscellaneous

1. Remove the headstock. There are three socket head cap screws under the ways; two in the front and one in the back.
2. Remove the chip tray and rubber feet, if attached. There are four socket head cap screws.
3. Remove the rack. There are three socket head cap screws.

Preparation

1. Wipe the red grease from the new bed way casting. Don't use a solvent because the residue of the grease will protect the areas of the ways that become inaccessible.
2. Turn the bed way casting over and rest it on folded rags.
3. Use a rigid putty knife or other scraper to remove any paint that may be on the areas where the carriage retainers ride.
4. Use a rigid putty knife or other scraper to remove any paint that may be on the areas where the tailstock clamp rides.
5. If you have a set of metric taps, run a tap through the threaded holes in the bed way casting to remove the paint. This will make reassembly easier.

Reassembly

Follow this procedure to reassemble your lathe.

Rack

1. Position the right end of the new rack $2\frac{3}{4}$ " from the right end of the bed way casting.
2. Use a small C-clamp to hold the rack in position.
3. Using either a transfer punch or the largest drill bit that will fit through the rack mounting screw holes, mark the locations of the four rack mounting screw holes. To mark with the drill, simply start to drill the hole, but stop as soon as a dimple is made.
4. Remove the rack.
5. Use a 2.5 mm or #40 (0.098") drill bit to drill the four holes through.
6. Use an M3x0.5 tap to thread the holes. Take care when tapping these holes. The end of the tap may be in contact with the casting on only one side.
7. Install the rack using four M3x10 socket head cap screws. (One is furnished in the kit in case your lathe didn't have four to start with.)

Carriage

1. Loosen the six adjusting socket head cap screws on the bottom of the carriage.
2. Loosen the four adjusting setscrews and nuts. Back off the setscrews.
3. Slide the carriage onto the ways. Keep it near the right end of the ways.
4. Turn the lathe over and set it down so the right 8" of the ways are hanging off the edge of the workbench. This allows you to move the carriage back and forth with the lathe upside down.
5. Snug up the six adjusting socket head cap screws to remove play, but allow the carriage to move freely.



Note: In a very few cases, the thickness of the new ways is smaller than the range of adjustment on the saddle retainer adjustment. If this occurs you will not be able to get all the play out of this adjustment. The quick fix is to place a plastic cable tie between the ways and the saddle retainer. Once things are adjusted, cinch the cable tie around the saddle retainer lengthwise. The cable tie provides a good bearing surface.

There are a couple of long-term solutions. You can mill a slot in the top of the saddle retainer for a section of cable tie. Don't mill the slot clear to the ends of the saddle retainer or the cable tie will slide out the end. Make the depth of the slot about half the thickness of a cable tie.

Another long-term solution is to mill a step in the saddle retainer. Mill the area that bolts to the carriage so the part that runs on the bottom of the ways extends up past the surface of the carriage. If you don't have the facilities to do this, LittleMachineShop.com will do it for you.

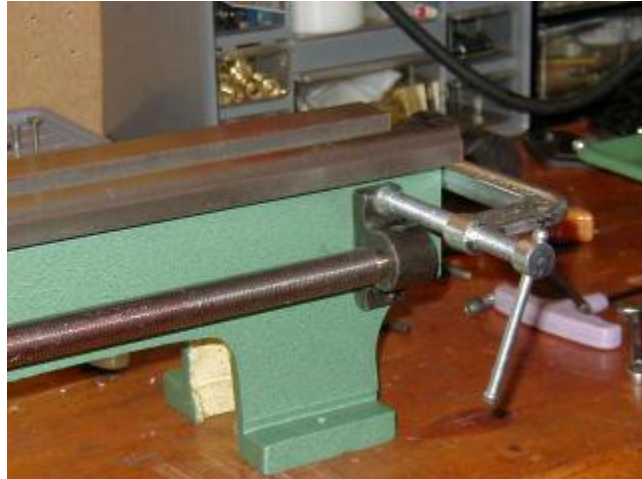
6. Snug up the four setscrews and tighten the four lock nuts.
7. Turn the lathe upright.
8. Install the apron using two M8x20 socket head cap screws. Leave the mounting screws loose.

Position Lead Screw

1. Ensure that the half nuts are disengaged (handle up).
2. Move the carriage to the center of its range of travel.

3. Slip the new lead screw through the half nuts so it is in approximately the correct position. The end with the keyway goes to the left.
4. Slip the left lead screw mounting bracket (the one with the bushing extending from the left side) over the left end of the lead screw.
5. Slip the right lead screw mounting bracket over the right end of the lead screw.

6. Use a 2½" C-clamp to hold the right lead screw mounting bracket so the lead screw is approximately horizontal. The position is not critical at this time.



7. Move the carriage as far to the left as it will go. Engage the half nuts (handle down).

8. Position the left lead screw mounting bracket so that the left edge of its base is flush with the left end of the way casting. Use a small C-clamp on the top ear of the bracket to hold it in position.

9. Snug the apron mounting bolts.

10. Release the half nuts and move the carriage as far to the right as it will go. Loosen the C-clamp holding the right lead screw mounting bracket as you move the carriage toward it.



11. Engage the half nuts (handle down), and re-tighten the C-clamp to lock the right lead screw mounting bracket in the correct position.

12. Move the carriage back and forth, engaging the half nuts at each end and adjusting the position of the lead screw mounting brackets until you are satisfied with the position of the lead screw and the mounting brackets.

Left Lead Screw Bracket

1. Using either a transfer punch or the largest drill bit that will fit through the lead screw mounting bracket screw hole, mark the location for the bottom mounting screw in the left bracket. To mark with the drill, simply start to drill the hole, but stop as soon as a dimple is made.

2. Remove the C-Clamp holding the left lead screw mounting bracket and remove the left lead screw mounting bracket.
3. Use a 5.0 mm or #9 (0.196") drill bit to drill the bottom mounting hole through.
4. Use an M6x1 tap to thread the hole.
5. Install the left lead screw mounting bracket using one M6x20 socket head cap screw.
6. Move the carriage back and forth, engaging the half nuts at each end and adjusting the position of the lead screw mounting brackets until you are satisfied with the position of the lead screw and the mounting brackets.
7. Using the same method as for the bottom mounting screw, mark the location for the top mounting screw in the left bracket.
8. Remove the left lead screw mounting bracket.
9. Use a #9 (0.196") drill bit to drill the top mounting hole through.
10. Use an M6x1 tap to thread the hole.
11. Install the left lead screw mounting bracket using two M6x20 socket head cap screws.

Right Lead Screw Bracket

1. Move the carriage back and forth, engaging the half nuts at each end until you are satisfied with the position of the lead screw. Adjust the right lead screw mounting bracket as required.
2. Use a 0.005" feeler gauge between the right lead screw mounting bracket and the threaded portion of the lead screw to make sure there is some play between the brackets.
3. Using the same method as for the left bracket, mark the location for the bottom mounting screw in the right bracket.
4. Remove the C-clamp holding the right lead screw mounting bracket and remove the right lead screw mounting bracket.
5. Use a #9 (0.196") drill bit to drill the bottom mounting hole through.
6. Use an M6x1 tap to thread the hole.
7. Install the right lead screw mounting bracket using one M6x20 socket head cap screw.
8. Using the same method as for the bottom mounting screw hole, mark the location for the top mounting screw in the right bracket.
9. Remove the right lead screw mounting bracket.
10. Use a #9 (0.196") drill bit to drill the top mounting hole through.

11. Use an M6x1 tap to thread the hole.
12. Install the right lead screw mounting bracket using two M6x20 socket head cap screws.

Adjust Lead Screw

1. Loosen the four socket head cap screws in the two lead screw mounting brackets.
2. Loosen the two socket head cap screws that secure the apron to the carriage.
3. Move the carriage as far left as it will go and engage the half nuts (handle down).
4. Snug, but don't tighten, the two socket head cap screws in the left lead screw mounting bracket.
5. Snug but don't tighten the two socket head cap screws that secure the apron to the carriage.
6. Move the carriage as far right as it will go and engage the half nuts (handle down).
7. Snug, but don't tighten, the two socket head cap screws in the right lead screw mounting bracket.
8. Check that the lead screw turns without binding. Tap the lead screw mounting brackets with a soft-faced hammer or mallet until the lead screw turns without binding.
9. Tighten the four socket head cap screws in the two lead screw mounting brackets.
10. Tighten the two socket head cap screws that secure the apron to the carriage.
11. Check that the lead screw turns without binding. Repeat the adjustments as necessary.

Change Gear Adjusting Stud

1. Scribe a vertical line $5/8$ " back from the front edge on the left end of the bed way casting.

Note: On your original bed way casting, measure the distance from the front edge to the center of the hole for the change gear adjusting stud. If it is over $21/32$ " or less than $19/32$ ", use the dimension you measured instead of $5/8$ " in the step above.

2. Slide the change gear adjuster onto the lead screw mounting bracket.
3. Using either a transfer punch or the largest drill bit that will fit through the curved slot in the change gear adjuster, mark the location of the

intersection of the arc and the line you scribed. To mark with the drill, simply start to drill the hole, but stop as soon as a dimple is made.

4. Remove the change gear adjuster.
5. Use a 6.8 mm, letter H (0.266"), or 17/64" drill bit to drill the stud mounting hole.
6. Use an M8x1.25 tap to thread the hole.
7. Install the change gear adjusting stud. The short end threads into the casting.
8. Slide the change gear adjuster onto the lead screw mounting bracket and over the change gear adjusting stud.
9. Install the M8 washer and M8 nut on the change gear adjusting stud. Leave it loose.

Headstock

1. Install the headstock using two M8x25 socket head cap screws in the front holes and one M8x25 hex head cap screw in the rear hole.

Motor

1. Loosen the adjusting socket head cap screws on the motor bracket.
2. Route the motor wires through the right hole through the bed way casting.
3. Slip the motor pulley through the belt and mount the motor with the three socket head caps screws through the bed way casting.
4. Tighten the belt and tighten the motor adjusting socket head cap screws.
5. Route the power cord through the left hole through the bed way casting.
6. Replace the motor cover and install the two Phillips heads screws.

Electrical

1. Install the black plastic guard over the lead screw using two M5x10 round head Phillips machine screws.
2. Install the rubber chip guard on the lead screw.
3. Connect the white plug from the motor to the circuit board.
4. Connect the three motor leads to the circuit board. The motor leads are marked with white plastic sleeves. Be sure to connect each lead to the corresponding terminal.
5. Replace the circuit board in the control box using four Phillips head screws.
6. Reconnect the power cord to the on-off switch. The white wire goes on the left terminal and the black wire goes on the right terminal.

7. Replace the control box on the front of the lathe using four Phillips head screws.

Change Gears

1. Install the key, bushing, and 80-tooth gear on the left end of the lead screw. Secure with an M6 flat washer and M6x8 socket head cap screw.
2. Adjust the change gears and tighten the M8 adjusting nut.

Covers

1. Install the change gear cover using two M5x45 socket head cap screws.
2. Mount the rubber feet to the holes in the ends of the hat-section chip tray braces using four M5x16 Phillips head machine screws and M5 nuts.
3. Mount the chip tray and braces using four M8x20 socket head cap screws.
4. Install the rear splashguard using three M5x10 Phillips head machine screws. Note that one hole in the splashguard is left empty.