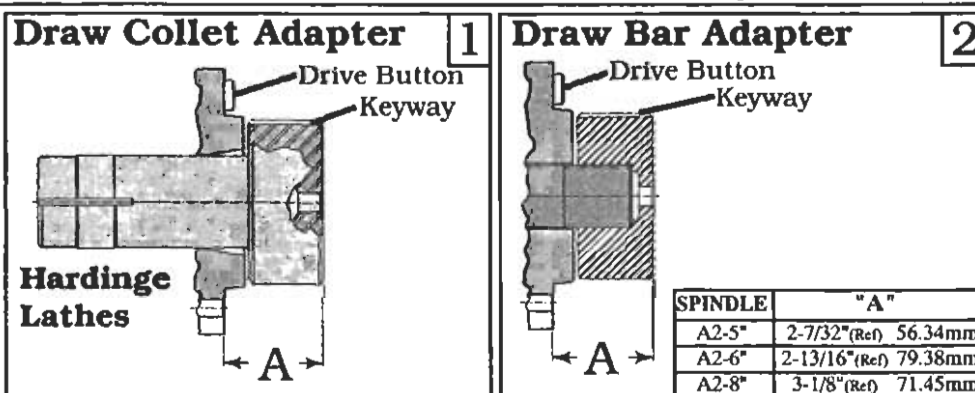


**B74D****Instructions: Hardinge® Sure-Grip® Expanding Collet System****Spindle Mount Style: 16C, 20C, 25C, A2-5, A2-6, A2-8****QUICK START**

Quick Start instructions quickly guide you through the procedures. First read the main instructions to thoroughly understand how to use the expanding collet system.

**Draw Bar Adapter and Draw Collet Adapter: Figures 1 - 2**

- Remove any spindle-mounted devices (jaw chuck, fixtures, etc.) that may be on the machine.
- Actuate the machine's draw bar to its OPEN position: draw bar full forward.
- Thoroughly clean all contamination from the spindle mount locating surfaces and inside the spindle.
- Coat all sliding surfaces with anti-seize grease.

- **Hardinge Lathes:** Insert the draw collet adapter and turn the machine's draw bar until the face of the adapter is set to the proper "A" dimension (see figure 1). The keyway will be automatically lined up with the drive button.

**OTHER CNC Lathes:** Turn the draw bar adapter onto the draw bar until the face of the adapter is set to the proper dimension "A" from the locating shoulder face of the spindle. Fine tune by rotating until the closest of the three keyways on the draw bar adapter is aligned with the drive button on the machine spindle.

- Lightly coat O.D. of the draw bar adapter or draw collet adapter with anti-seize grease.
- Slide the spindle arbor onto the draw bar adapter (figure 3) or draw collet adapter (figure 4) aligning the arbor's key with the spindle drive button on the lathe spindle.
- Use the four (4) mounting screws (see figure 3 or 4) to tighten the mount to the spindle.

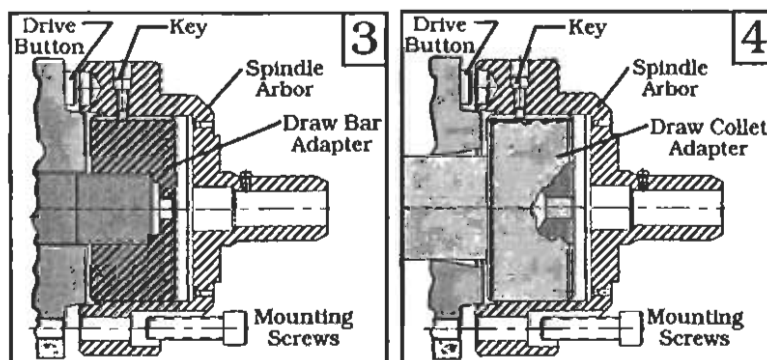
**QUICK START**

- Clean parts, spindle and mount
- Activate draw bar – forward position
- Lubricate
- Set the draw bar adapter or draw collet adapter to the "A" dimension.
- Align keyway of draw bar adapter with spindle drive button
- Slide spindle arbor onto draw bar adapter / draw collet adapter, aligning drive button & arbor key
- Bolt in place

**NOTE: For Optimum Concentricity do the following:**

- Thread in each bolt until it just stops.
- Tighten the bolts in a diagonal (criss-cross) pattern to the torque shown below.

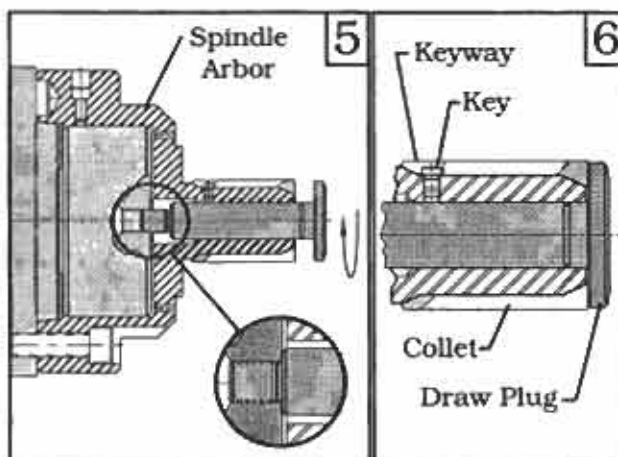
| Spindle    | Torque                |
|------------|-----------------------|
| 16C, A2-5" | 40 Ft. Lbs. (54 N•M)  |
| 20C, A2-6" | 60 Ft. Lbs. (81 N•M)  |
| 25C, A2-8" | 90 Ft. Lbs. (122 N•M) |



- Check to make certain face of the draw bar adapter is not bottomed against the inside face of the spindle Arbor (see figure 3 & 4).

## Installing Expanding Collet and Draw Plug - Figures 5 - 6

- Actuate the draw bar to its full forward position.
- Coat the angles of the spindle arbor with anti-seize grease.
- Slide the expanding collet on the arbor making certain the keyway is aligned to the key.
- Insert the draw plug into the spindle arbor and tighten until it bottoms out on the face of the draw collet/draw bar adapter (figure 5 inset).
- Adjust the machine's draw bar until the back face of the draw plug is against the face of the collet (figure 6). The collet should just begin to expand.
- If the collet is going to be used towards the high side of its range, adjust the draw bar until there is about .005" (.127mm) clearance between I.D. of the workpiece and the O.D. of the expanding collet.
- Lock the machine's draw bar.



### QUICK START

- Draw bar full fwd..
- Lubricate
- Align collet keyway with arbor key
- Insert draw bar and bottom out on face of adapter
- Adjust machine's draw bar. Touch face of collet or expand to I.D. of workpiece. (.005 clearance)
- Lock draw bar

- Mount workpiece on expanding collet.
- Turn draw bar pressure way down.
- Actuate machine's draw bar to close collet.
- Adjust pressure according to chart shown below.

## Maximum Recommended Draw Bar Pull

To obtain maximum efficiency and adequate gripping of your workpiece, using the expanding collet system requires the proper amount of drawbar pressure. If inadequate pressure is used, the part will slip on the collet. Excessive pressure could break the threaded draw plug and possibly damage the spindle arbor.

Use the above chart only as a general guideline. The end user should determine the actual drawbar pressure. Contact Hardinge® if you have application questions.

16C, 20C, 25C, A2-5", A2-6", A2-8"

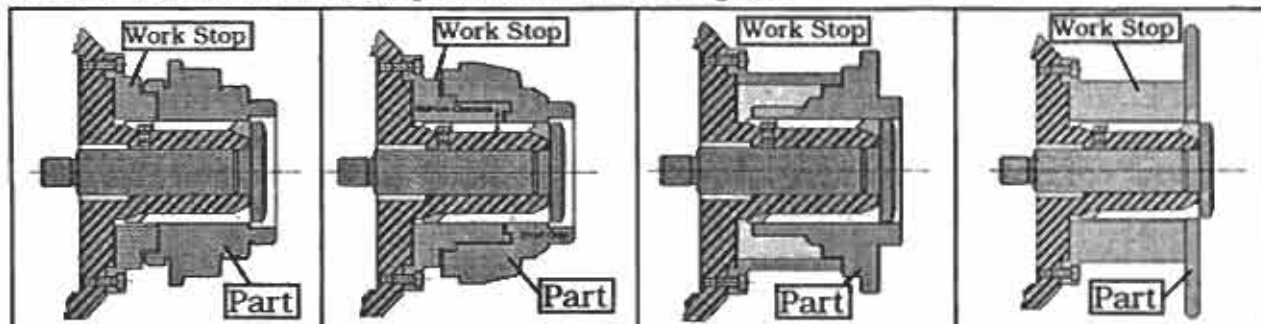
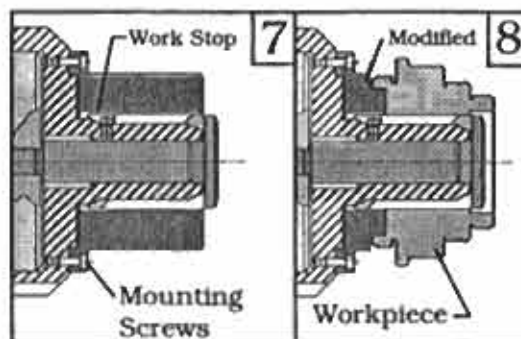
| Style | Maximum: Lbs. | Newtons |
|-------|---------------|---------|
| #100  | 2,000         | 8894    |
| #200  | 2,000         | 8894    |
| #250  | 2,000         | 8894    |
| #300  | 4,000         | 17788   |
| #400  | 7,000         | 31129   |
| #500  | 9,000         | 40023   |
| #600  | 9,000         | 40023   |

## Installing The Work Stop - Figures 7 - 8

- The I.D. must be machined before mounting to the assembly -

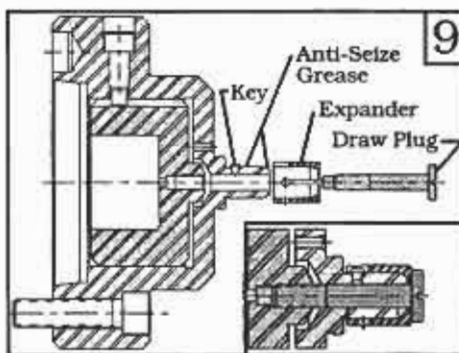
- Machining the work stop
  - When the full length of the collet grips the bore of the part, the I.D. of the work stop is bored to 1/64" (.3968mm) above the maximum part I.D. When short gripping, the work stop should be bored to .002" to .003" (.0508mm to .0762mm) larger than the maximum bore of the workpiece. This reduces gripping problems when holding on a bore that is less than the length of the collet.
  - The work stop must be machined to conform to the locating surface required by the workpiece engineering drawing (see figures below).
- Clean all locating surfaces
- Assemble work stop onto the spindle arbor using mounting screws.

**NOTE:** If the perpendicularity tolerances are extremely close, the locating face of the work stop need a very light cut taken with a facing tool.



## Installing Style #100 Expander & Draw Plug - Figure 9

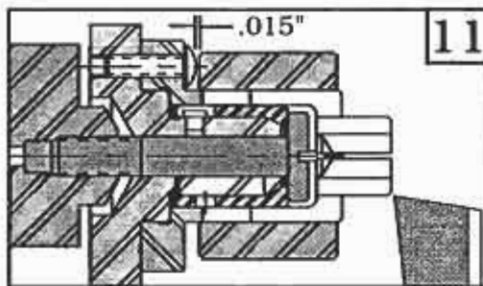
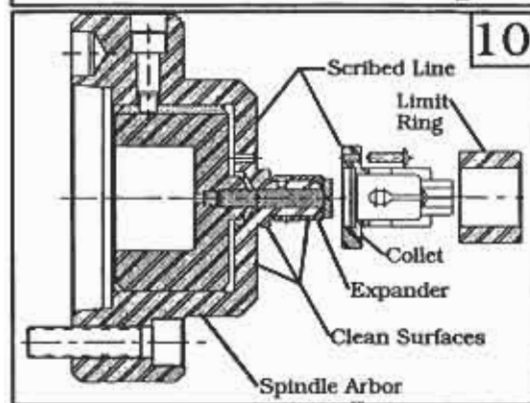
- Install the #100 draw collet or draw bar adapter and spindle arbor using instructions on page one and two.
- Actuate the draw bar to its full forward position.
- Coat the angle/sliding surfaces of the spindle arbor with anti-seize grease (see figure 9).
- Slide the expander fully on to the spindle arbor, aligning the keyway with the key.
- Insert the draw plug into the spindle arbor and tighten until it bottoms out in the draw collet/draw bar adapter.
- Adjust the machine's draw bar until the back face of the draw plug is against the face of the expander. The expander should not be expanded (see Figure 9 - insert).
- Lock the draw tube/bar.
- Do not close the collet until the expanding collet #100S or #100L is mounted.



### QUICK START

- Install # 100 arbor see page 1 & 2
- Draw bar full fwd.
- Coat with anti-seize
- Slide expander on arbor - align key
- Tighten draw plug - bottom out
- Adjust machine's draw bar - Back face of the draw plug just touches expander
- Lock draw bar
- DO NOT ACTUATE DRAW BAR

## Mounting and Machining the Style 100S and 100L Expanding Collets - Figures 10 - 11



### QUICK START

- Clean
- Align scribed line on collet with arbor line
- Tighten screws
- Slide limit ring on collet - Leave space
- Set machine closer pressure (page 3)
- Turn & face to size
- Remove limit ring

- Clean the faces of the spindle arbor, the bearing diameters and the expander.
- There are lines scribed on the large diameter of the expanding collet and on the face of the spindle arbor. Slide the expanding collet onto the expander sleeve and align the two scribe marks (see figure 10).
- Insert the three (3) button head screws and tighten.
- Slip the Limit Ring on the expanding collet until it touches the screws - pull away about .015" (.381mm). This ensures that the expander is not miss-aligned by the screws. (See figure 11)
- Turn the draw bar pressure way down
- Actuate the machine's closer to expand the collet
- Adjust the machine's closer pressure to make certain it is adequate and not too high (see "maximum recommended draw bar pull" chart on opposite page).
- **NOTE:** The maximum length of the gripping portion of the collet should not exceed the diameter dimension of the workpiece's bore. Example: a part with .125"(3.17mm) bore should have a maximum turned length of .125"(3.17mm). A part with a .375"(9.53mm) bore should have a maximum turned length of .375"(.953mm). If the length recommendations are exceeded, the collet will collapse in the front resulting in a line contact at the back of the collet. Concentricity requirements will be very difficult to hold. In this condition the part may slip, causing damage to the part, collet, and/or cutting tools.
- Machine the collet to the desired dimension. The last cut on the O.D and the face should be very light. The finished diameter should be the same size as the bore of the workpiece (-.001" [.024mm] or less).
- **Remove the Limit Ring.**
- Deburr the collet.
- Begin your production run.

# Frequently Asked Questions

## Can I machine a workpiece without using a work stop?

**Yes & No.** The collet draws back as it grips the bore of the workpiece. Any variation in the gripping diameter will cause the part to pull back farther or less than the setup piece.

If you are only machining the OD of the part then a work stop is not necessary. Unfortunately 99% of the time this is not the case. Usually you will be machining a face or shoulder which has a length dimension that has to be held to a locating surface. This requires a work stop.

## Do I have to buy a different collet for each different bore size?

**No.** The collets will handle a variation in size of  $-.001"$  to  $+.015"$  (.025 mm to .381 mm). If you have a 1-3/4" (6.35 mm) Collet, it can grip workpieces that have bores from 1.749" to 1.765" (6.1 mm to 6.969 mm) in diameter.

## Will I destroy the expansion collet if I close the collet without a part on it?

**No.** The Hardinge® Sure-Grip® System is designed to eliminate this problem. The draw bar will contact the face of the arbor before the collet can be overexpanded.

## Can I buy Emergency Expanding Collets?

**No.** Because the collets come in 1/64" (.3968 mm) sizes and each collet can handle a variation of  $-.001"$  to  $+.015"$  (.025 mm to .381 mm) there is no need for emergency collets.

## Can I grip on a Hex hole?

**Yes.** Hex and Square collets are available. The delivery is 21 working days.

## Can I damage my Hardinge Sure-Grip System if I use to much draw bar force?

**Yes:** The maximum draw bar forces are listed on page 1. If you exceed these forces you may damage the arbor assembly.

## I plan on taking 1/8" off a part while holding on a small bore. Can I use the Model #100?

**No:** The #100 collet is for light machining operations such as taking a few thousands off the face or OD of a workpiece. We recommend that you use the Model "S" Precision style expanding collet for heavier stock removal on parts with small bores (less than 1/2" [12.7 mm]).

## How do I machine the Work Stop.

**This is usually done by gripping the work stop in a step chuck or 3 Jaw Chuck:** When the full length of the collet grips the bore of the part, the I.D. of the work stop should be bored to 1/64" (.3968mm) above the maximum part I.D. When short gripping, the bore of the work stop should be .002" to .003" (.0508 mm to .0762 mm) larger than the **maximum bore** of workpiece. This practice will ensure the best gripping of

workpieces whose bore is less than the length of the collet (this is called short-gripping). The remainder of the machining on the work stop relates to the workpiece and its locating surface.

After mounting the work stop onto the arbor, take a very light facing cut on the locating surface to make it perpendicular to the centerline of the spindle.

The 5C work stop mounts to a spindle adapter and the 16C work stop bolts directly to the spindle. When machining the work stop do not mount the collet arbor, mount the spindle adapter and work stop to the 5C spindle adapter or bolt the 16C work stop to the A2-5 spindle and machine the bore and work stop according to the workpiece specifications. After machining remove the work stop, clean the spindle, mount the spindle arbor, replace the work stop and adjust the collet closer. You must take a very light facing cut on the locating surface of the work stop to make it run perpendicular to the centerline of the spindle.

## After mounting my Expanding Collet Assembly the TIR is a couple thousandths. How can I correct this condition?

**Did you take a very light facing cut on the locating surface of the work stop.** Many people forget to do this operation and it must be done each time the assembly is mounted on/into the spindle. Not doing this operation can cause your collet to run out many thousandths.

## If you have taken a facing cut on the locating surface:

Remove the Hardinge Sure-Grip Assembly, clean the spindle and the assembly. Look for small nicks and stone them down with a hard Arkansas stone (white stone). Use a lint free cloth when cleaning the part.

Before remounting the Hardinge Sure-Grip assembly check the spindle TIR of your machine tool with an electronic indicator. For the collet style assembly check the collet seat. For the spindle mounted style check the spindle nose and the locating face. If these areas run out the only solution is to have your machines spindle rebuilt.

Remount the assembly, without the collet and check the TIR of the arbor angles. If these run within the arbor specifications mount the collet, take a very light facing cut on the work stop locating surface and then check the TIR with a gauge piece. A gauge piece is made by boring a hole in a blank to the exact size of the part bore, facing the end and turning the OD all in one chucking. This piece is then mounted on the Hardinge Sure-Grip expanding collet with the machined face located against the work stop. Don't forget, the work stop must be lightly faced to make certain that it is perpendicular to the centerline of the spindle.

## Performance Has Established Leadership for Hardinge.



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