



Cummins ISX15 / QSX15 DOHC

SLEEVE REMOVAL AND INSTALLATION TOOLING INSTRUCTIONS

Parts Listing and Instructions for PN: 450-6156-00

ISX15 / QSX15 DOHC SERIES – SLEEVE REMOVAL & INSTALLATION



450-6156-00 - ISX15 / QSX15 DOHC Kit with Toolbox

Kit includes the following:

Image #	Description	Part #
1	Guide Bushing	416-6156-32
2	Extended Tap	415-6156-60
3	Removal Tool	415-6136-00
4	Sleeve Drive in Tool	416-6156-51
5	Sleeve Nose Roll-in Tool	416-6156-43
6	Sleeve Body Roll-in Tool	416-6156-53
7	Driving Arbor	414-6114-10
8	Sleeve Seat Cutter (Carbide)	416-6156-25
9	Tip Protrusion Gage	414-6156-50
10	Gauge	416-6156-94
11	Gauge Handle	414-6111-30
12	Injector Tube Clamp Assembly	416-6154-40
13	Gauge Finger	433-6991-00
Not shown	Casting Cleaning Brush (Carbon Steel)	450-6951-01
Not shown	"L" Wrench 5/16"	467-1612-00
Not shown	"T" Wrench 5/16"	467-1612-01
Not shown	"EA" Lube (8 oz.)	468-9910-08
	Toolbox	467-1950-50
CONSUMABLES		
Not shown	ISX15 / QSX15 DOHC Stainless Steel Injector Sleeve w/O-Ring	419-6192-31

Tooling made in USA

REMOVAL and INSTALLATION

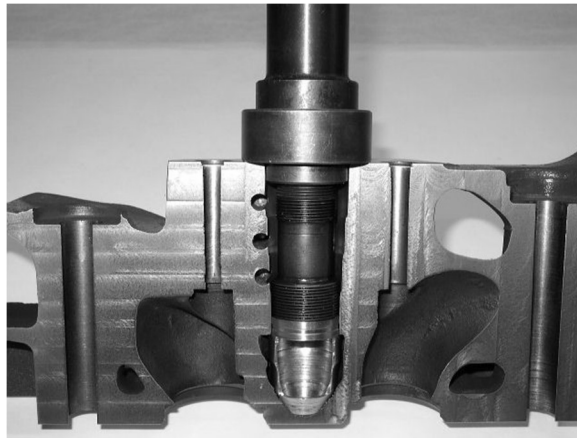
Sleeve Removal

- (1) With valves removed, install the sleeve hold down clamp (416-6154-40) through the inside of the sleeve. Install washer and nut onto stud sticking out from face of head and tighten.
- (2) The clamp will keep the sleeve from turning while tapping the sleeve.
- (3) Using extended tap (416-6156-60) and guide bushing (416-6156-32), using the tap lubricated with "EA" Lube (468-9910-08) tap the injector sleeve about 3/8" to 1/2" deep.
- (4) Unbolt and remove the hold down clamp.



Clamp Assembly. - Extended Tap - Guide Bushing

- (5) Insert the sleeve remover (415-6136-00) threaded puller shaft of the removal tool down into the old sleeve.
- (6) Continue to torque the shaft into the sleeve until the shaft grips the sleeve tightly with the threads.
- (7) With the puller bridge (or cup) in place between the puller nut and the face of the casting, and with the thrust bearing and the two thrust washers between the puller nut and the puller bridge, continue tightening down the puller nut and pull out the old sleeve.



Sleeve Remover

Sleeve Installation

1. Using the carbon steel brush (450-6951-01) clean the inside of the injector sleeve bore.



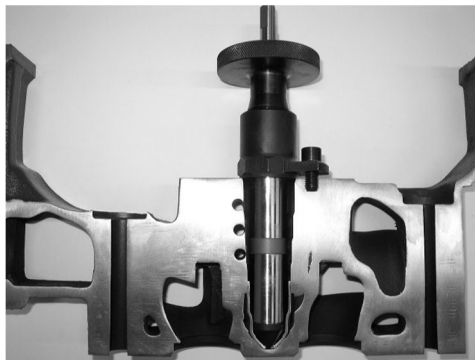
Carbon Steel Brush

2. Using the sleeve drive in tool (416-6156-51) and a hammer, drive the sleeve to the bottom of the casting.



Sleeve Drive In Tool

3. Using sleeve nose roll-in tool (416-6156-43) back off hand knob, keep tool lubricated with “Quality Motor Oil” (NOT “EA” Lube), using the bolt provided, bolt the tool to the head. You can use a drill motor or a seat and guide machine to drive the tool. Turning the tool at a slow RPM, turn the knob clockwise, rolling the nose of the sleeve in.



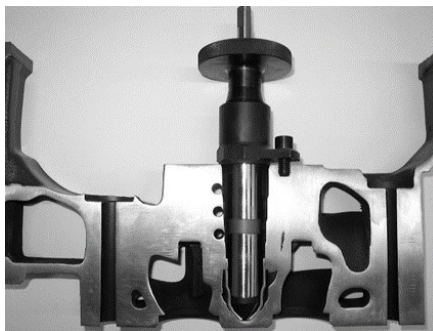
Sleeve Nose Roll-In Tool

4. Using the roll-in tool to roll in the upper end of the injector sleeve (416-6156-53) can be used in a seat and guide machine. Keeping the tool lubricated with a “Quality Motor Oil” (NOT “EA” Lube), roll in the upper end of the sleeve by running the machine clockwise and letting the roll-in tool feed itself. To remove the tool, reverse the direction.



Sleeve 'Body' Roll-In Tool

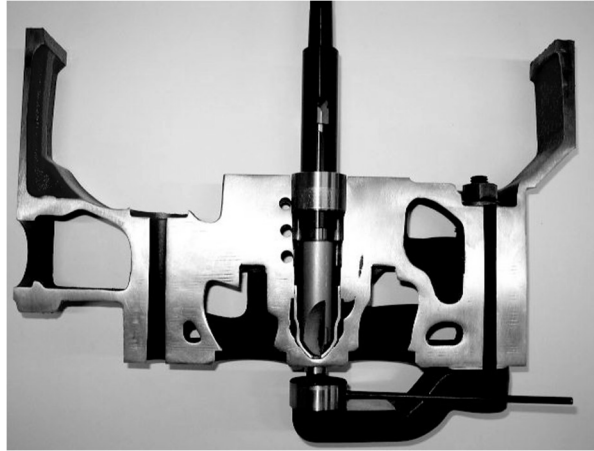
5. Using the sleeve nose roll-in tool (416-6156-43), **repeat step 3:**
Using sleeve nose roll-in tool (416-6156-43) back off hand knob, keep tool lubricated with “Quality Motor Oil” (NOT “EA” Lube), using the bolt provided, bolt the tool to the head. You can use a drill motor or a seat and guide machine to drive the tool. Turning the tool at a slow RPM, turn the knob clockwise, rolling the nose of the sleeve in.



Sleeve Nose Roll-In Tool

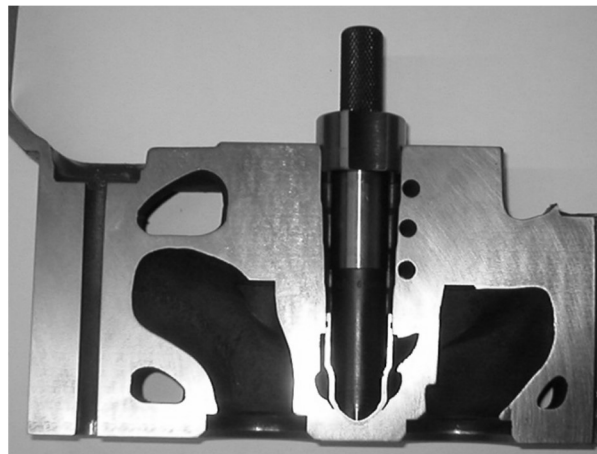
Cutting Injector Tip Protrusion

- (1) Using the guide bushing (416-6156-32), sleeve seat cutter (416-6156-25) and driving arbor (414-6114-10), set up in a seat and guide machine, bolt gauge finger (433-6991-00) to face of head, set gauge (416-6156-94) with gauge handle (414-6111-30) onto gauge finger.
- (2) Using "EA" Lube (468-9910-08) as lubricant, run the machine at a slow (60-85) RPM and may have to be varied to get a good finish. Cut sleeve until pilot end of cutter touches the gauge.
- (3) Tip protrusion can be checked with the tip protrusion gauge (416-6156-50) and Guide Bushing (416-6156-32).
- (4) The flat tip of the protrusion gauge should be flush with the surface of the head.



Checking Injector Seat Area and Tip Protrusion

- (1) Tip protrusion can be checked with the tip protrusion gauge (416-6156-50) and Guide Bushing (416-6156-32).
- (2) The flat tip of the protrusion gauge should be flush with the surface of the head.
- (3) In addition, Prussian Blue compound can be applied at the tip protrusion seat area of the gauge to insure a proper seat pattern.



Note: Pressure testing of the cylinder head should be performed with injectors secured.



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