

Service Procedures

SVC 207 Crankshaft Service 2020

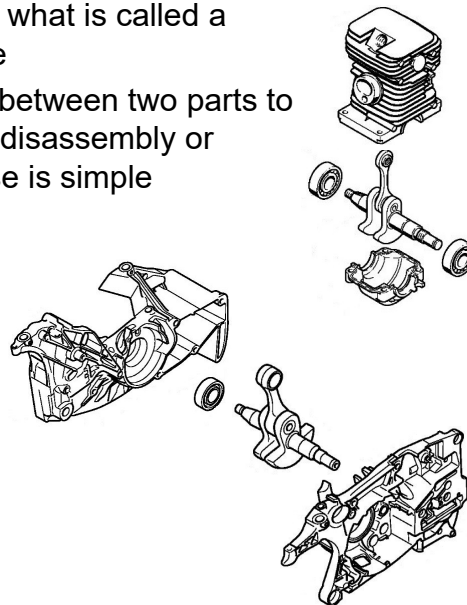


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STIHL Crankcase Design

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- Many STIHL products have what is called a “modular” design crankcase
- The crankshaft is captured between two parts to build the engine assembly; disassembly or reassembly of the crankcase is simple
- Other STIHL products have a split design crankcase
- The crankshaft is captured between two crankcase halves to build the engine assembly and special tools are required for disassembly or reassembly



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Service Tool AS 5910 007 2222 (current)

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- The tool is bolted to the bar studs on the chain saw case and the LH threaded spindle pushes directly on the end of the crankshaft to split the crankcase

In the past, it was also used to pull the crankshaft through the bearing using the LH threaded adapters, once the bearing was installed in the case half

This did put pressure on the outer bearing race and crankcase

Installing Tool AS 5910 850 5220 is now used for reassembly



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Installing Tool AS 5910 850 5220 (new 2020)

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- AS is an abbreviation of Antriebsseite which is PTO or drive side, where the power is taken from the engine, so in most cases this tool is for the clutch side

The main spindle has RH threads for pulling

The adapters all have LH threads to fit the various sizes of crankshaft threads on the clutch side

This tool pulls the crankshaft through the bearing for installation with no heat or hammering



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Installing Tool LS 5910 850 5221 (new 2020)

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- LS is an abbreviation of Lüfterradseite which refers to the fanwheel side, which in most cases will be the ignition side

The main spindle has LH threads

The adapters have RH threads for the various sizes of crankshaft threads on the flywheel side

This tool pulls the crankshaft through the bearing for installation with no heat or hammering



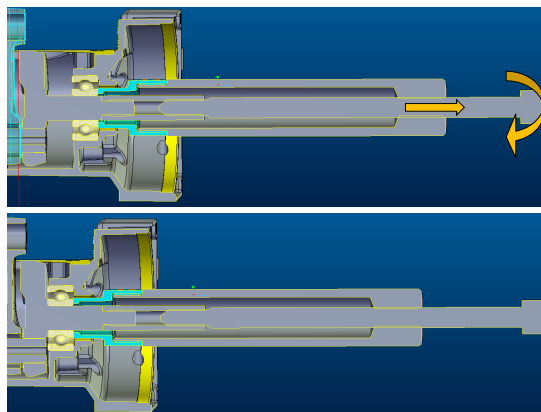
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AS and LS Tool Function

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- All of the pressure is on the inner race of the bearing, not the outer race or crankcase, as in the past



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Puller 5910 890 4505 (new 2018)

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- Bolts: 3 with M5 threads, 1 with M4 threads
- Adapters: small and large ID for protecting the end of the crankshaft

This tool is used only to push the crankshaft out of the case on the ignition side

It is also used on both sides on units like a TS or FS where there are no bar studs

It is a universal fit for any model with 3 fastening holes around the crankshaft in any pattern



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Crankshaft Removal

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- Service Tool ZS 5910 007 2201 is replaced by Puller 5910 890 4505

This tool had dedicated holes drilled in the plates for specific bolt patterns, and as new models came out the workshop manual would give instructions for drilling new holes, or a new drilled plate would be made available



Service Tool ZS
5910 007 2201

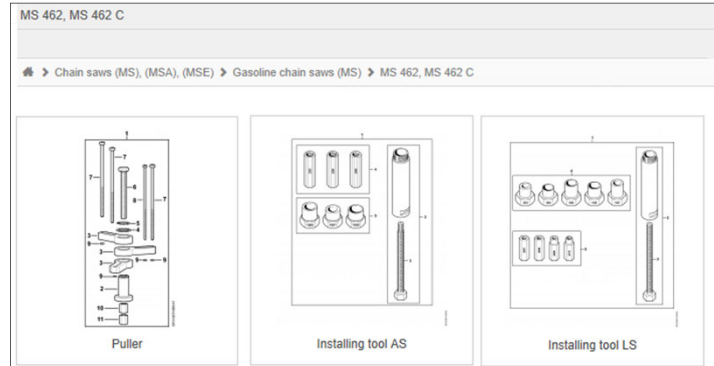
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Item Part Numbers for Each Set

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- All 3 of these new tool sets show up in SSC at the end of most models
- When opened, the part number of the set as well as each item in the set is shown so if a piece gets damaged it can be replaced individually



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New Tool Use

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- Always check the workshop manual first to see what is recommended



- These new tools will not be referenced in older manuals, but will be for future models
- These tools can be used on just about any split case model without heat or hammering or using a press
- The following is a guide showing an example of these tools in use

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Time Allowed for Repair

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- The Repair Timetables Manual allows 120 minutes to replace crankshaft bearings on an 1128 series MS 460 chain saw
- As with most technical procedures, the first time may take longer but with practice and experience using the correct tools, a technician can do a complete crankcase split and reassemble the unit in 2 hours or less



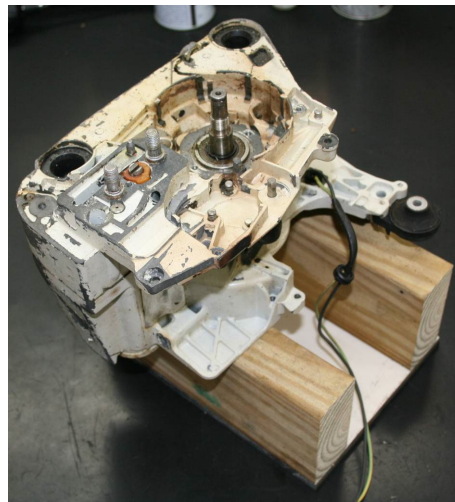
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Tips & Tricks: Case Split

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- For support of the crankcase, make a simple open box from some scrap 2X4 material and a piece of plywood or rigid material
- This lets the case lay flat and stable without the end of the crankshaft hitting the work surface for installation of seals and other steps



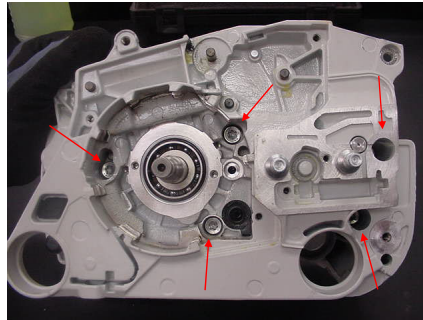
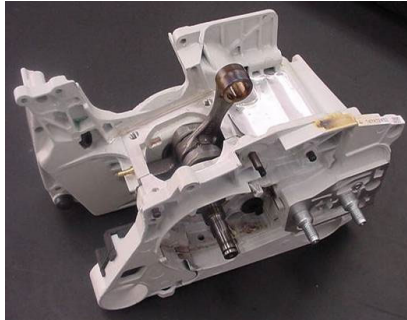
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Crankshaft Removal: Clutch Side

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- Preparation for use of crankcase service tools
- Strip the crankcase down to this level
- Follow the directions in the service manual for the model being repaired: this is a MS 460
- Remove 5, T 27 machine screws
- Be sure to drain the oil tank completely



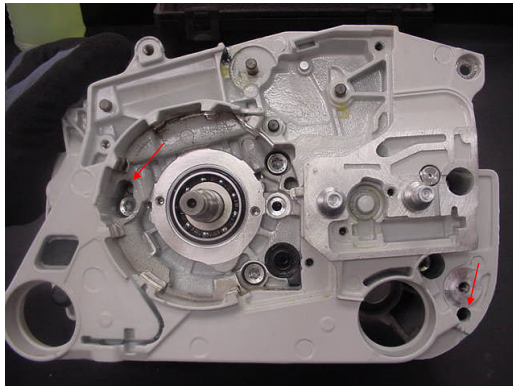
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Crankshaft Removal: Clutch Side

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- Service Tool AS
- Drive out 2 dowel pins part way
- Newer models may not have dowel pins, refer to the workshop manual for details



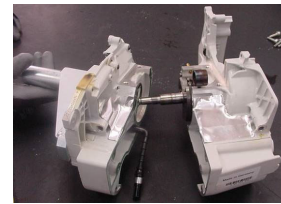
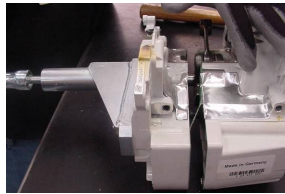
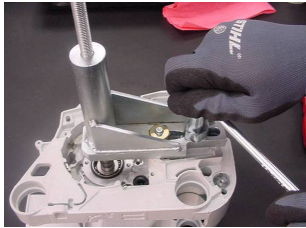
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Crankshaft Removal: Clutch Side

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- Service Tool AS 5910 007 2222
- Attach to the bar studs
- Tighten the spindle screw against the end of the crankshaft
- There will be some “popping” sounds as the crankshaft slides out of the bearing



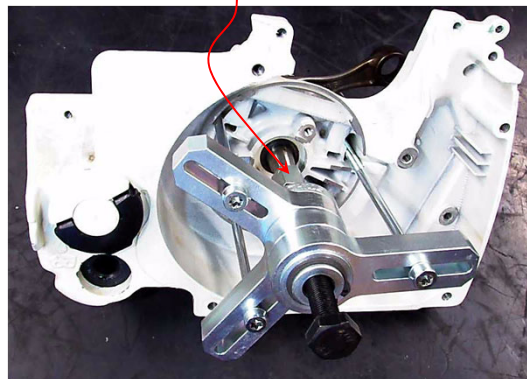
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Crankshaft Removal: Flywheel Side

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- Puller 5910 890 4505
- Thread the correct size crankshaft end protector on the spindle
- Place a long M5 bolt through any arm and thread it into any of the 3 holes around the crankshaft and repeat for each arm

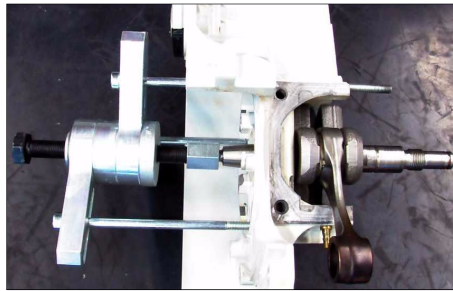
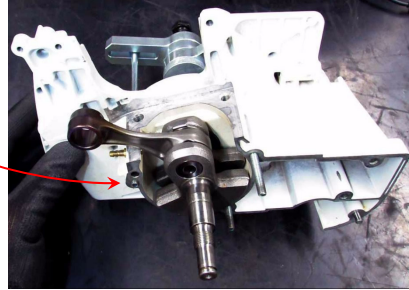


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Crankshaft Removal: Flywheel Side

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- Puller 5910 890 4505
- Work with the bolts so that one is just through the threads in the case
- Important: Adjust the other 2 bolts to square up the tool with the case
- They will be coming through the case quite a bit

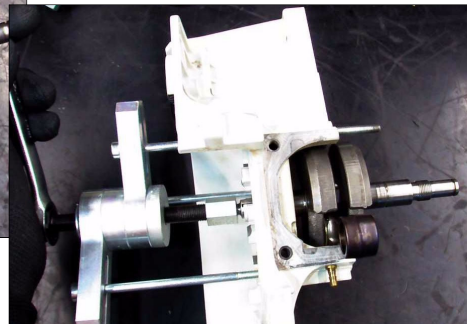


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Crankshaft Removal: Flywheel Side

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- Puller 5910 890 4505
- Use a 17mm wrench to turn the spindle and the crank will slide out of the bearing
- It may make some popping sounds



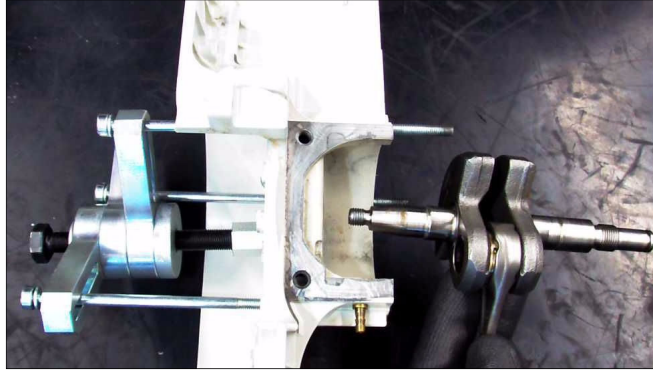
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Crankshaft Removal: Flywheel Side

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- Puller 5910 890 4505
- The bearing should stay in the case; if not, inspect the case carefully to be sure there is no damage to the case or that the bearing has not spun the outer race in the case



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Bearing Removal

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- Refer to the workshop manual for specific details for installing bearings
- Use the recommended press arbor to remove a bearing
- Most of these tools are meant to have both sides used so never use a ball peen hammer on them
- Use a dead blow or soft faced hammer, or a press to push the bearing through

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Bearing Installation

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- For most split case designs, the workshop manual recommends heating the case to about 150 °C, or 300 °F
- Heat the case, then check the temp back and forth until the recommended temperature is reached



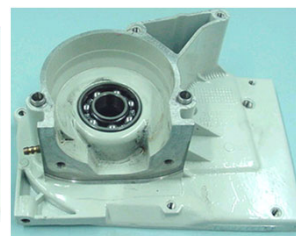
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Bearing Installation

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- Once the recommended temperature is reached, place the bearing in the case and it should just fall into place easily
- Use the press arbor to verify it is seated completely
- This method works well with no hammering or pressure applied and the case shrinks quickly once the relatively colder bearing is in place
- On most chain saws the oil pump must be in place as a stop for the bearing



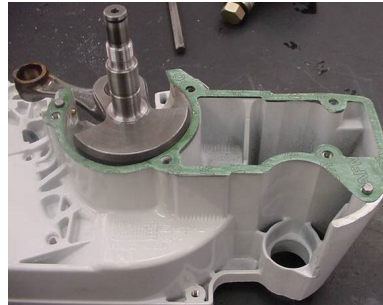
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Crankshaft Installation

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- Lubricate the crankshaft where it will slide into the bearing with some two-stroke mix oil
- If present, drive the dowels back out about 3/16", and position the gasket, being sure that the gasket surfaces are clean



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Installing Tool LS 5910 850 5221

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- Crankshaft seal must be removed
- Find the screw sleeve that fits through the case and will seat against the bearing race



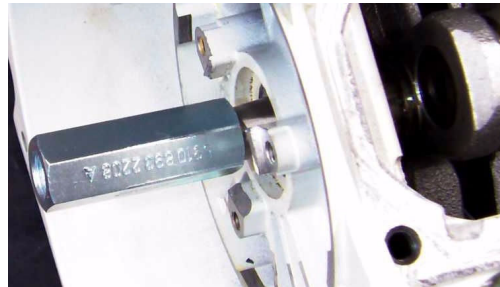
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Installing Tool LS 5910 850 5221

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- Find the adapter that threads onto the crankshaft
- Position the crankshaft through the bearing and thread the adapter all the way on hand tight



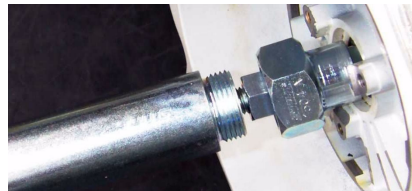
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Installing Tool LS 5910 850 5221

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- Slide the screw sleeve over the adapter
- Position the LS spindle and start the threads of the spindle bolt into the adapter
- Now start the threads of the screw sleeve onto the LS spindle and work back and forth until they are all seated



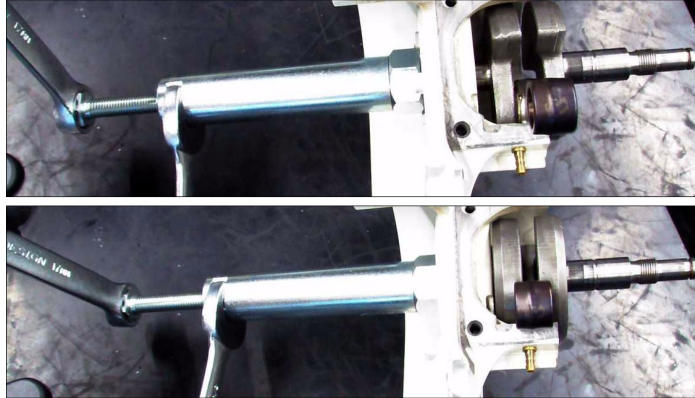
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Installing Tool LS 5910 850 5221

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- Hold the spindle sleeve with a 19mm or ¾" open end (note: the slot is very thin on the spindle sleeve so find a narrow wrench or make modifications to the spindle sleeve or wrench if needed)
- Turn the spindle bolt with a 17mm wrench and the crankshaft will spin as it slides through the bearing; continue until it is seated



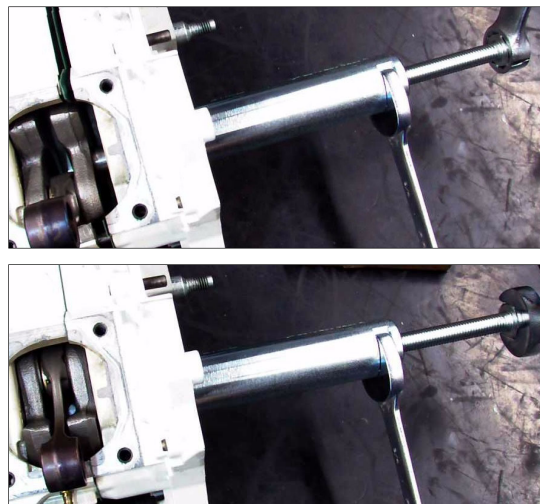
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Installing Tool AS 5910 850 5220

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- For the clutch side, use the same process to select the screw sleeve and adapter to fit the engine
- Oil pump and seal are not in place
- Tighten the spindle screw until the case halves are against each other and the crankshaft is seated against the bearing



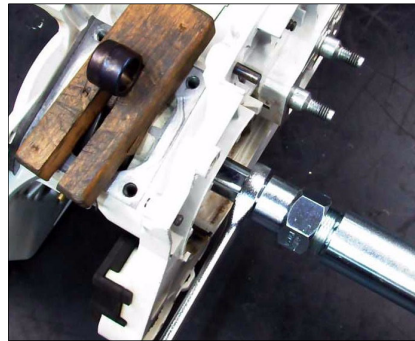
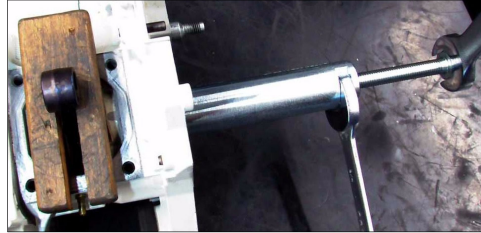
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Installing Tools LS and AS

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- For removal of both tools, place a piston support under the rod end and remove the tool



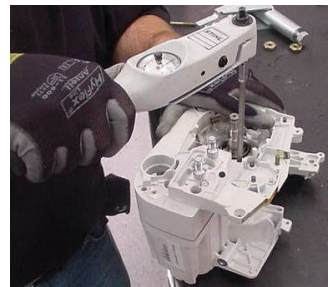
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Crankshaft Installation

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- Once the halves are seated, remove the tool and drive the dowel pins back in about 1/4"
- New models have alignment sleeves that stay in place
- Torque the crankcase fasteners to specification



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Crankshaft Installation

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- Center the crankshaft
 - In some cases the crankshaft will not seem to spin freely after the case halves have been torqued
 - Use a plastic mallet or soft faced dead blow hammer and hit the crankshaft on each side to release it
 - Verify that it now spins freely



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Modular Engine Bearing Service

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- A bearing separator and two-bolt puller are used to remove the bearing from the crankshaft on any modular engine design

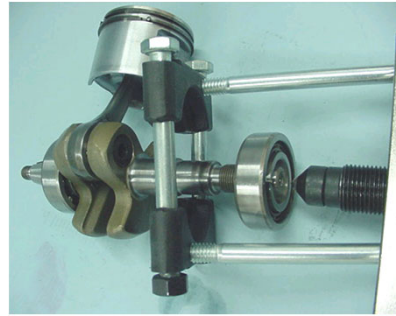
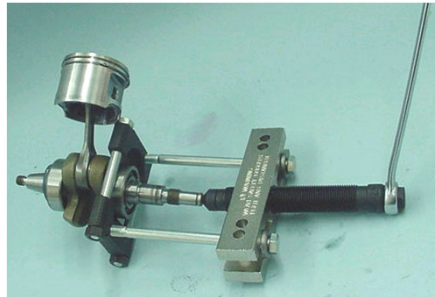


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Bearing Removal

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Bearing Install

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- The heat gun and laser thermometer are used to heat the bearing and in most cases it can be seated with a mallet and a socket or driver
- Refer to the workshop manual to verify the temperature used and recommended procedure



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Summary

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- While this is not as common of a repair at today's labor rates as it was in years past, it is something a qualified Service Technician needs to be able to do, in the time allowed
- With the proper investment in tools, this can be done properly and in a timely manner

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