



INSTRUCTIONS

-J04654

REV. 2010-09-16

AUTOMATIC COMPRESSION RELEASE TOOLS

GENERAL

Kit Number

94648-08

Models

For model fitment information, see the P&A Retail Catalog or the Parts and Accessories section of www.harley-davidson.com (English only).

Additional Parts Required

Separate purchase and installation of additional parts or accessories is required for proper installation of this kit on your model motorcycle.

Required tools include:

- Cylinder head holding fixture, HD-39786
- Cylinder head fasteners: cylinder head screw, 16480-92A (2 required), cylinder head screw, 16478-85A (2 required), exhaust mounting nuts, 7593 (2 required)
- Valve spring compressor, HD-34736-B
- Valve guide seal tools depending on year and type of cylinder head
- Brass hammer
- Other hand tools required include cutting fluid, tapping fluid for aluminum, hand drill with 3/8 inch chuck, 15" heavy-duty drill press or mill, 4 table clamps (to mount tool plate to press) calipers, torque wrench in ft-lbs or Nm, 1/2" 12 point socket, 5/15" socket, set of allen wrenches, tap handle, assembly lube.

WARNING

The rider's safety depends upon the correct installation of this kit. Use the appropriate service manual procedures. If the procedure is not within your capabilities or you do not have the correct tools, have a Harley-Davidson dealer perform the installation. Improper installation of this kit could result in death or serious injury. (00333a)

Kit Contents

See Figure 7 and Table 1.

INSTALLATION

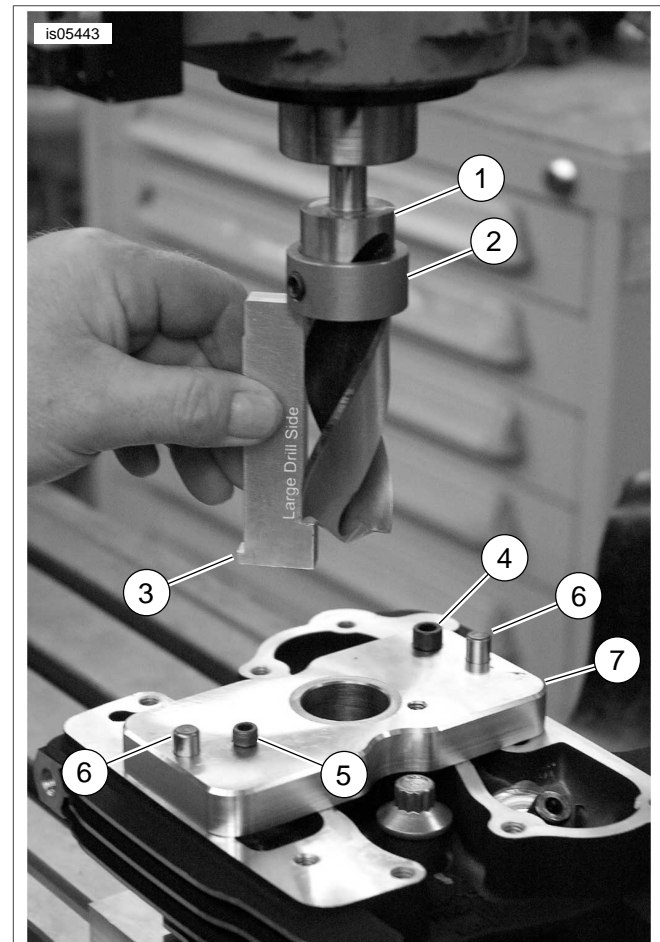
WARNING

Compressed air can pierce the skin and flying debris from compressed air could cause serious eye injury. Wear safety glasses when working with compressed air. Never use your hand to check for air leaks or to determine air flow rates. (00061a)

-J04654

WARNING

Wear safety glasses or goggles while drilling. Flying debris could result in serious eye injury. (00565b)



1. Drill, 1.250 inch
2. Drill stop collar, 1.250 inch
3. Drill stop gauge
4. Socket head screw, 5/16 inch
5. Socket head screw, 1/4 inch
6. Dowel pin
7. Top plate

Figure 1. Top Plate and Drill Bit Stop Collar Installation

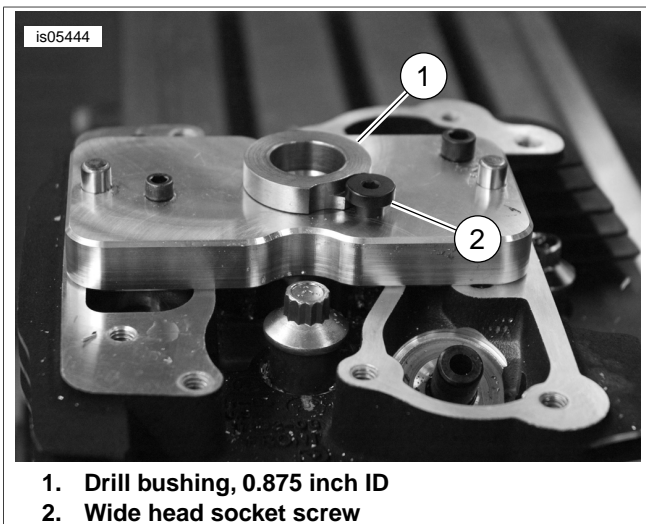
1. Remove valves from cylinder heads.

NOTE

Do not allow the threaded studs to damage the gasket sealing surface of the cylinder head.

2. See Figure 7 and Table 1. Mount a cylinder head to the tooling plate (1).

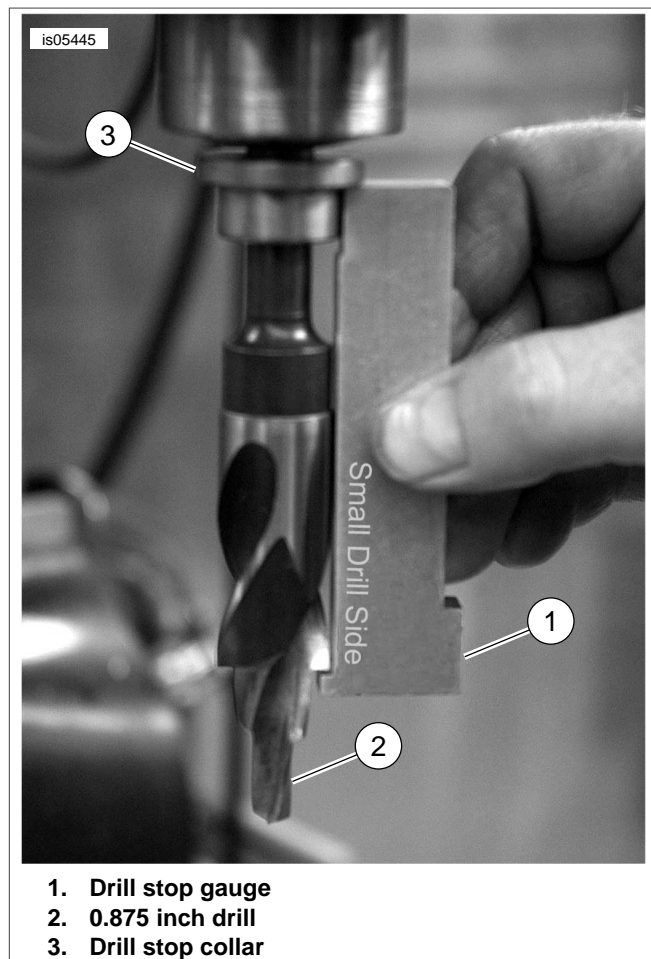
3. Place a head bolt spacer (7) over each stock head bolt and lubricate threads and thrust faces, dowels and studs. Tighten head bolts in a crisscross pattern to 10 ft-lbs (13.5 Nm).
4. See Figure 1. Align the top plate (7) bolt and dowel holes with the head hole pattern, Screamin' Eagle logo towards the spark plug. This plate will only fit one way for the cylinder head it is being installed on. If the plate does not align with the head, turn it over keeping the logo towards the spark plug and install the cylinder head.
5. Lubricate the two dowel pins (6) and insert in the top plate and into the cylinder head.
6. Apply lubricant to the two socket head screws (4 and 5). Insert into their respective holes in the plate to the cylinder head and tighten to 5 ft-lbs (6.8 Nm) .



1. Drill bushing, 0.875 inch ID
2. Wide head socket screw

Figure 2. Install bushing for 0.875 inch drill

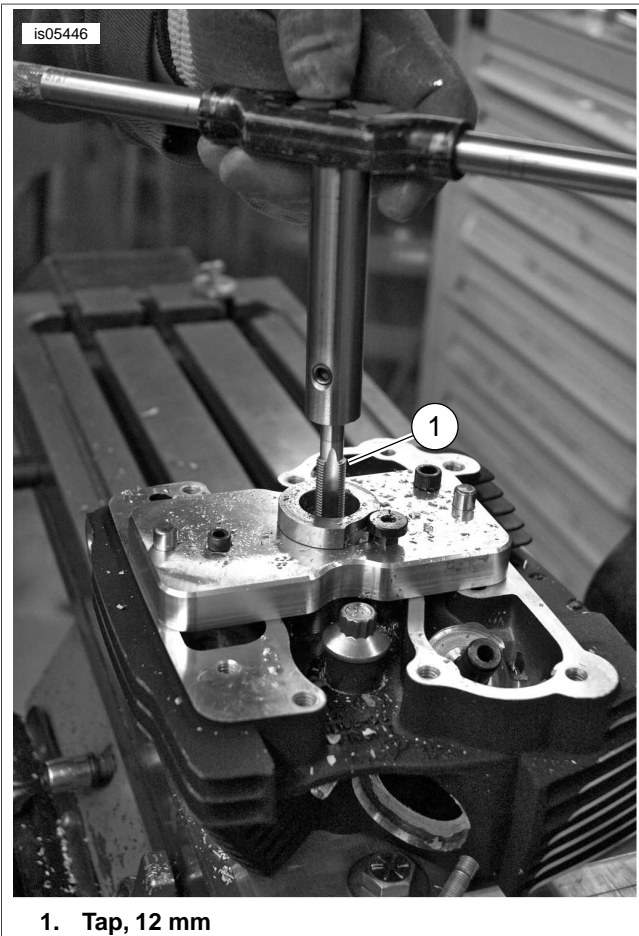
7. Install the 1.25 inch drill stop collar (2) over the 1.25 drill (1). Hold the drill stop gauge (3) with the short side marked "Large Drill Set" over the flat end of the drill and the other end up against the stop collar. Install and tighten set screw in the collar to 5 ft-lbs (6.8 Nm).
8. Install the drill assembly in the press and lower the drill into the drill bushing of the top plate for alignment and clamp the head down to the table to hold it in a centered position.
9. Drill at 350 to 600 rpm, use adequate lubricant and drill slowly.
10. Drill 1/4 inch at a time and remove all chips. Repeat process until the stop collar bottoms out on the plate.
11. See Figure 2. Lubricate the long 0.875 inch ID drill bushing (1) and insert into the plate. Secure bushing with the lubricated wide head socket screw (2) and tighten the screw to 5 ft-lbs (6.8 Nm).
12. See Figure 3. Remove the 1.25 inch drill from the press and install the 0.875 inch drill (2).
13. Install the drill stop collar (3) to the chuck side of drill with the flange at the top.



1. Drill stop gauge
2. 0.875 inch drill
3. Drill stop collar

Figure 3. Install collar for 0.875 inch drill

14. Use the short side of the drill stop gauge (1) marked "Small Drill Set" over the flat end of the drill and the other end up against the stop collar. Install the set screw in the collar and tighten to 5 ft-lbs (6.8 Nm).
15. Drill down 1/4 inch at a time using lubricant then remove chips. Drill down until the stop collar bottoms out on the top of the drill bushing. When finished, carefully remove the drill assembly.



1. Tap, 12 mm

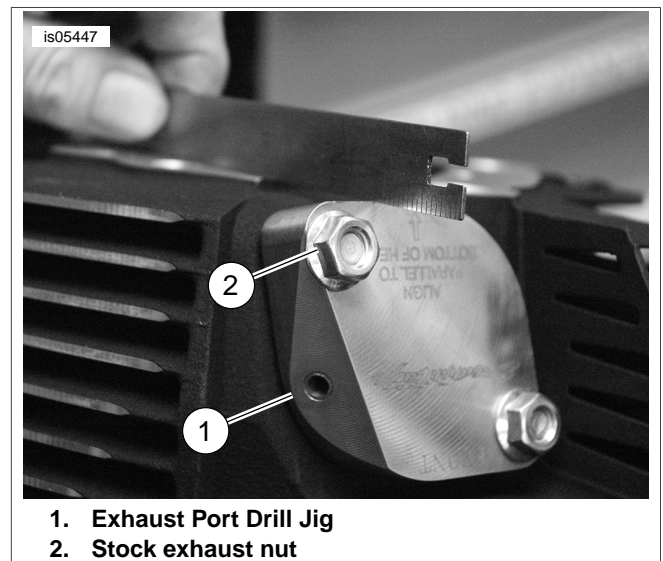
Figure 4. Tapping head for ACR

16. See Figure 4. Install the 12 mm tap (1) into the tap guide extension and handle. Tighten extension set screw to 5 ft-lbs (6.8 Nm).
17. Lubricate tap and drilled hole. Tap hole turning clockwise and reverse tap 1/2 turn after one full turn and continue until the hole is fully tapped. Apply cutting fluid liberally each time you reverse the tap.
18. Remove head from plates. Lube and install cylinder head holding fixture and clamp tool in vise with access to exhaust port.
19. See Figure 5. If you are working with the rear head, install the rear exhaust port drill jig (1). Use two lubricated stock exhaust nuts to fasten the jig to the cylinder head. Hold the jig against the exhaust port and finger tighten the nuts snug. Alternately tighten the nuts to 10 ft-lbs (13.5 Nm).

NOTE

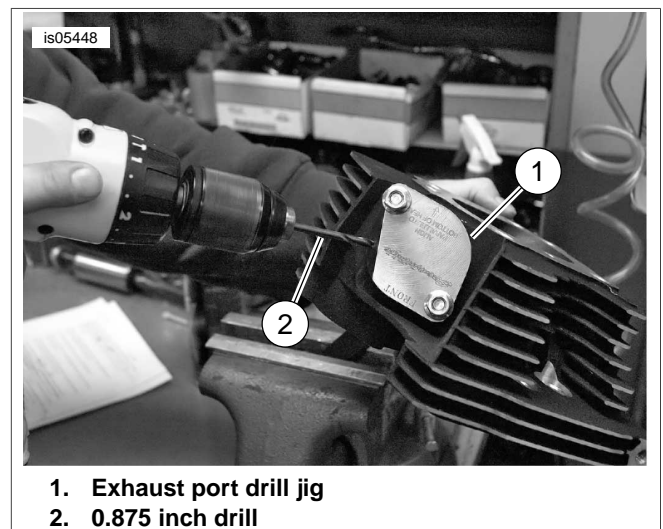
In the following step you will need to tap the transfer punch hard enough and straight enough to leave a punch mark about 0.030 inch deep so the drill will not slide off the wall of the exhaust port. To check this depth you can use calipers to check the amount the transfer punch is out of the drill jig before and after you have tapped it with a hammer.

20. Lubricate and slide transfer punch through the hole in the jig and tap with a hammer.
21. See Figure 6. Set the short #13 drill bit (2) to be 2.5 inches from its tip to the jaws of the drill chuck. Drill a hole slowly using lubricant and remove chips after drilling 1/4 inch at a time. Keep the drill going as straight as possible using lubricant to keep the chips wet. Continue drilling until the drill chuck comes close to making contact with the drill jig then stop and remove the drill bit.
22. Install the long #13 drill bit. Use your calipers to set the drill length to 4.5 inches from the drill chuck jaws to the tip of the drill bit. Drill the hole slowly using lubricant and remove chips after 1/4 inch at a time until the drill enters the ACR cross hole drilled previously.
23. Carefully remove all metal chips and shavings with compressed air or by washing.



1. Exhaust Port Drill Jig
2. Stock exhaust nut

Figure 5. Install Drill Jig



1. Exhaust port drill jig
2. 0.875 inch drill

Figure 6. Drill through to ACR cross hole

SERVICE PARTS

is05462

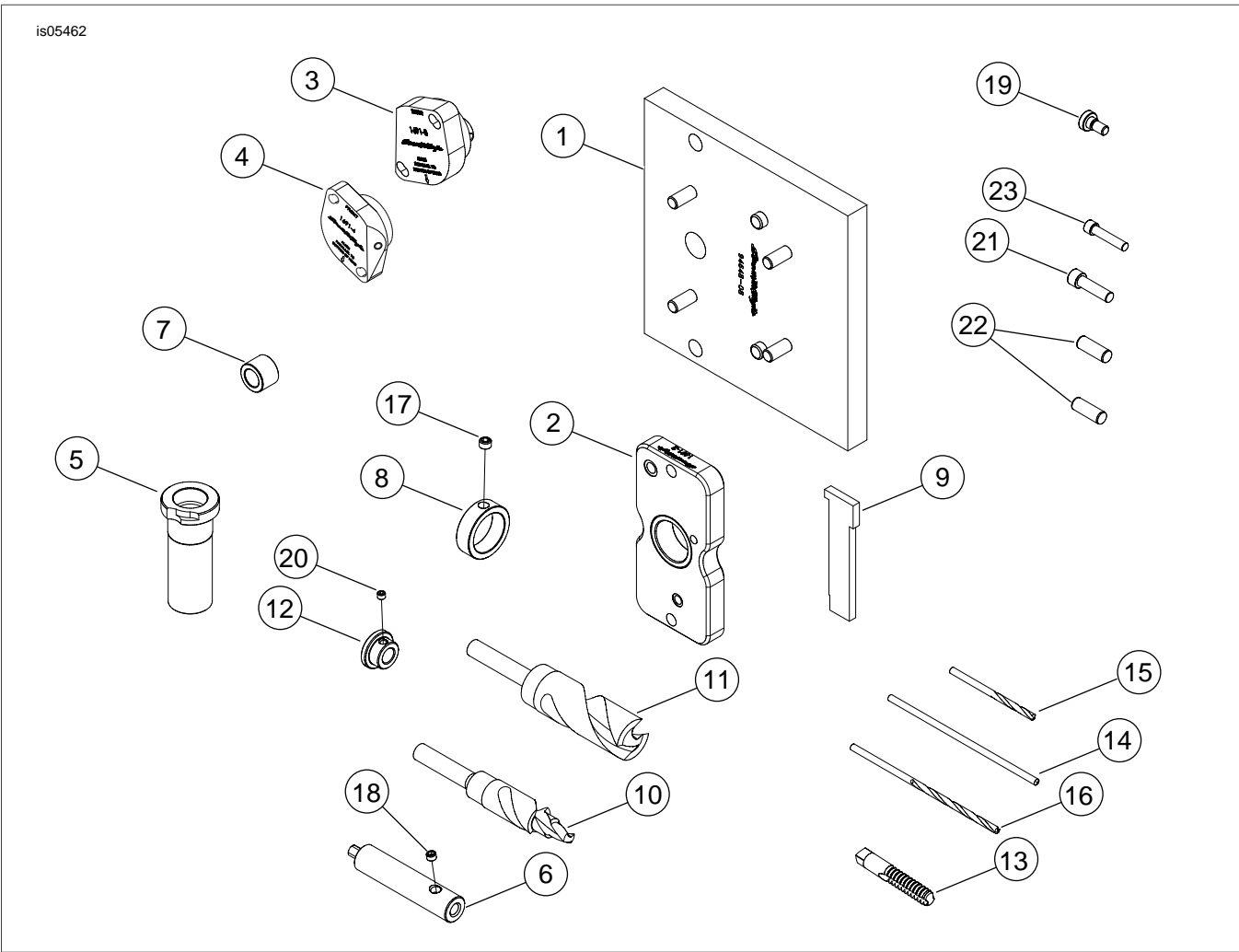


Figure 7. Service Parts Kits: Automatic Compression Release Tools

Table 1. Service Parts Table

Kit	Item	Description (Quantity)
Kit 94648-08 Auto Compression Release Tool Kit	1	Base plate assembly
	2	Drill jig assembly top plate
	3	Rear exhaust assembly drill jig
	4	Front exhaust assembly drill jig
	5	7/8 inch drill bushing
	6	Tap extension
	7	Head bolt spacer
	8	1.25 inch drill stop collar
	9	Drill stop gauge
	10	Form drill, 7/8 inch
	11	Form drill, 1.25 inch
	12	Stop collar, 7/8 inch drill
	13	Tap, 12 mm, 1.25 spiral point
	14	Machined transfer punch, 3/16 inch
	15	#13 jobber drill
	16	#13 Taper length drill
	17	Set screw, 3/8-24 x 1/4 inch
	18	Set screw, 5/16-18 x 1/4 inch
	19	Drill bushing lock screw
	20	Set screw, 1/4-28 x 3/16 inch
	21	Screw, 5/16-18 x 1 inch, SHCS
	22	Dowel, 9.5 mm x 1 inch
	23	Screw, 1/4-20 x 1 inch, SHCS
The following kits break down the above items into categories that can be purchased as separate kits.		
Kit 94049-09 Cutting Tools Kit	This kit contains items 6, 9, 10, 11, 13, 14, 15 and 16	
Kit 94050-09 Bushings, Collars and Spacers Kit	This kit contains items 5, 7, 8, 12, 19 and 22	
Kit 94051-09 Drill Jigs Kit	This kit contains items 3 and 4	