

## Tool Instruction Cylinder Assembly Puller Kit

4328817R1

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Tool Number: 12-192-01



0000472121

Figure 1. 12-192-01 Cylinder Assembly Puller Kit

### Purpose

Tool used to remove the entire power cylinder assembly.

### Application(s)

International<sup>®</sup> A26

International<sup>®</sup> N13

MaxxForce<sup>®</sup> 13

Other vehicle applications may apply

## Application(s) (cont.)



**GOVERNMENT REGULATION:** Engine fluids (oil, fuel, and coolant) may be a hazard to human health and the environment. Handle all fluids and other contaminated materials (such as filters or rags) in accordance with applicable regulations. Recycle or dispose of engine fluids, filters, and other contaminated materials according to applicable regulations.



**WARNING:** To prevent personal injury and / or death, or damage to property, read all safety instructions in the “Safety Information” section of the *Engine Service Manual* or *Engine Diagnostic Manual*.



**WARNING:** To prevent personal injury and / or death, or damage to property, park vehicle on hard flat surface, turn the engine off, set the parking brake, and install wheel chocks to prevent the vehicle from moving in either direction.



**WARNING:** To prevent personal injury and / or death, always wear safe eye protection when performing vehicle maintenance.





**WARNING:** To prevent personal injury and / or death, or damage to property, keep flames or sparks away from vehicle and do not smoke while servicing the vehicle’s batteries. Batteries expel explosive gases.



**WARNING:** To prevent personal injury and / or death, or damage to property, inspect tool for wear / damage prior to use. Replace any worn or damaged components as necessary.

## Tool Contents

Table 1

Image	Tool Number	Qty	Description
 <p>0000472221</p>	12-192-01	1	Cylinder Assembly Puller Kit
 <p>0000160075</p>	4328817R1	1	Tool Instruction

## Instructions

**IMPORTANT:** Please reference International® Service Portal<sup>SM</sup> regarding any possible revisions to this document.

**NOTE:** Please read through this document and any related service information prior to starting this procedure.

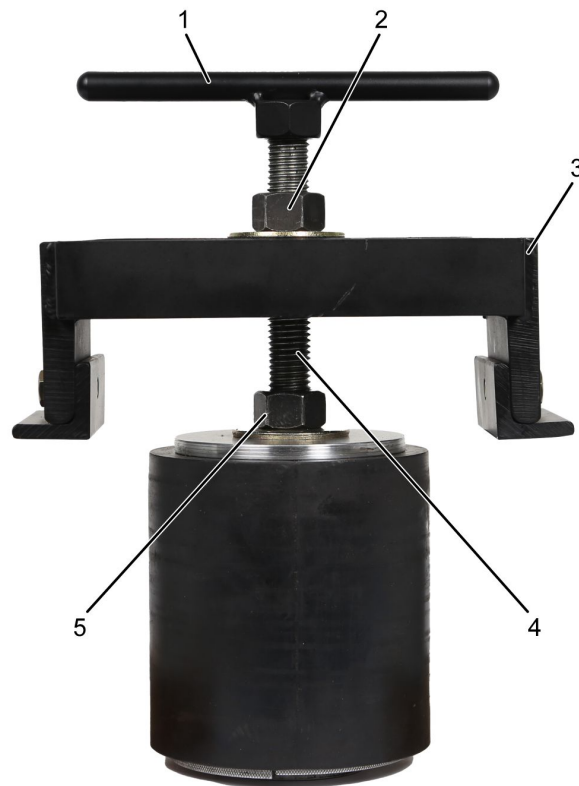
1. Park vehicle on a level surface.
2. Shift transmission into Park or Neutral and set parking brake.
3. Turn ignition to Key OFF position.
4. Install wheel chocks.
5. Unlatch and open hood.
6. Remove cylinder head and oil pan. Refer to International® A26 Engine Service Manual for detailed instructions.
7. Visually inspect overall condition of the power cylinder components, cylinder sleeve, and rod and piston for pitting, erosion, scoring, glazing, cracks, or other physical damage.



**CAUTION:** To prevent damage to property and / or vehicle components, **DO NOT bend or damage the cooling jet. A bent or damaged cooling jet will cause premature engine failure.**

8. Remove six piston cooling jets and set aside on a clean workbench. Refer to International® A26 Engine Service Manual for detailed instructions.
9. Visually inspect the overall condition of piston cooling jets for any blockage, cracks, bends, or other physical damage.
10. Rotate crankshaft so a pair of connecting rods is at Bottom Dead Center (BDC). BDC cylinder pairs include 1 and 6, 2 and 5, and 3 and 4.
11. Remove connecting rod caps from two connecting rods at BDC. Refer to International® A26 Engine Service Manual for detailed instructions.

## Instructions (cont.)



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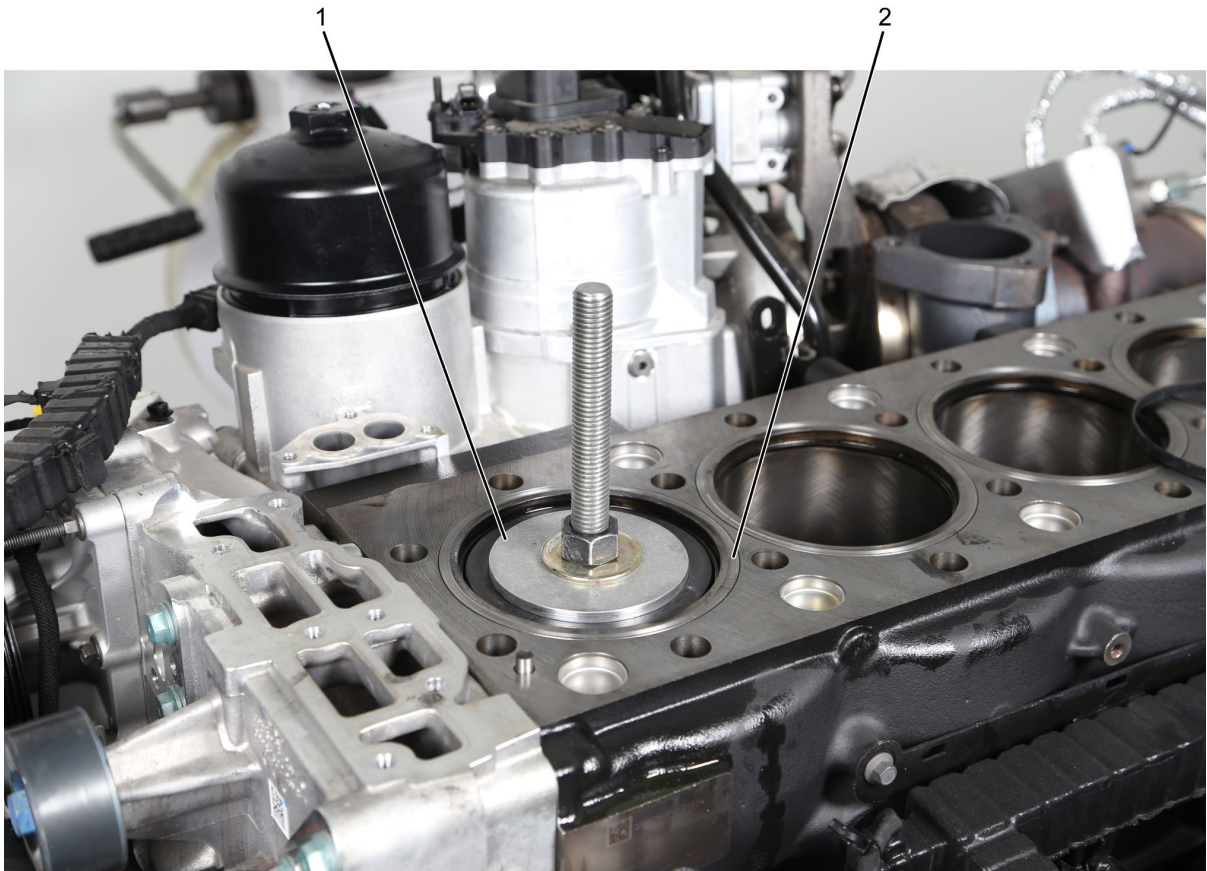
**Figure 2. Cylinder Kit Puller Assembly 12-192-01**

1. T-handle
2. Puller bridge nut
3. Puller bridge assembly
4. Threaded shaft
5. Puller nut

**NOTE: DO NOT discard Anti-Polish Ring (APR). It will be reused.**

12. Remove Anti-Polish Ring (APR) and set aside on a clean workbench prior to installation of Cylinder Kit Puller Assembly (Figure 2).
13. Spray cylinder sleeve with brake cleaner or equivalent to remove engine oil and / or contaminants.

## Instructions (cont.)



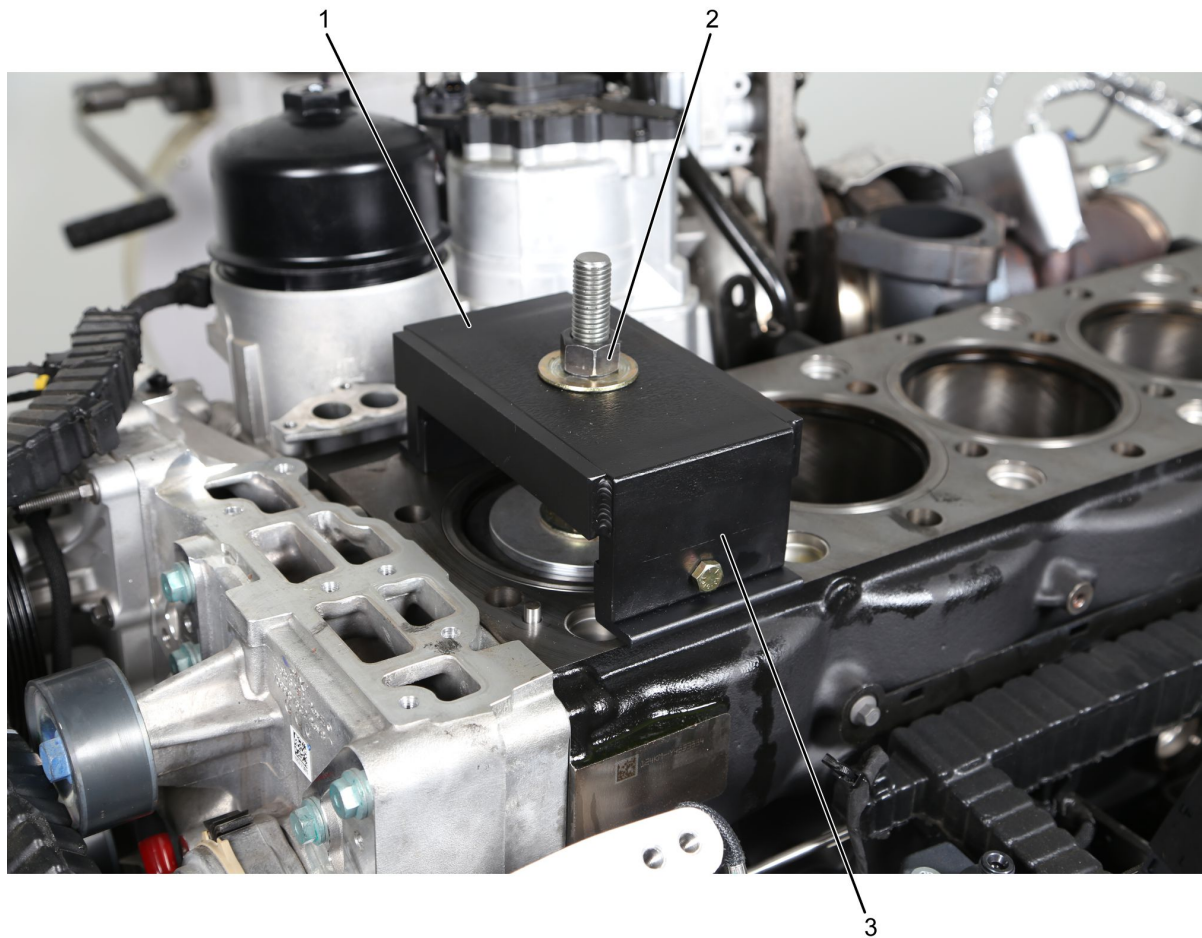
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**Figure 3. Cylinder Kit Puller**

1. Puller
2. Cylinder sleeve

14. Install puller (Figure 3, Item 1) into cylinder sleeve (Figure 3, Item 2) with the piston at BDC.
15. Install puller nut (Figure 2, Item 5) onto threaded shaft (Figure 2, Item 4). Using a torque wrench, tighten to 90 lb-ft (122 N·m).

## Instructions (cont.)



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**Figure 4. Puller Bridge Assembly**

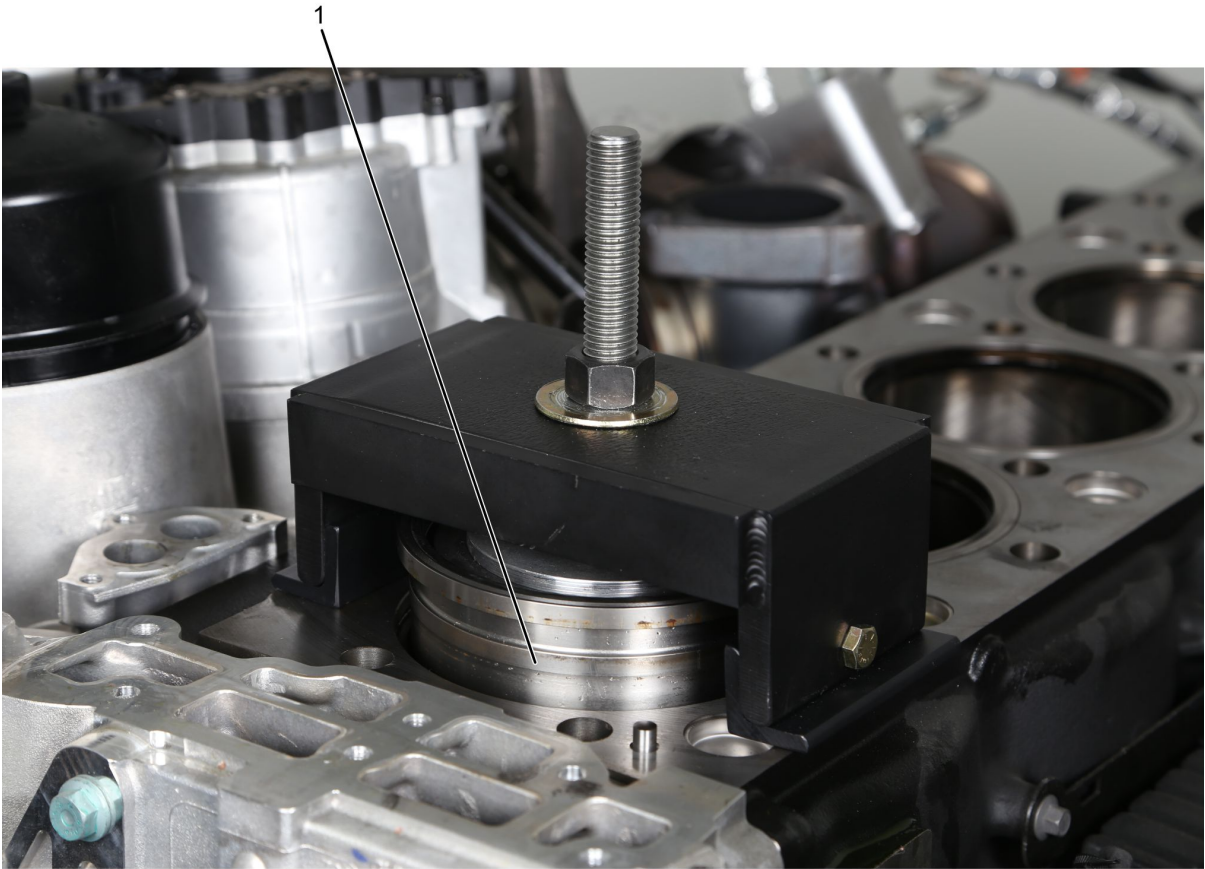
1. Puller bridge assembly
2. Puller bridge nut
3. Puller bridge legs

**NOTE: Make certain puller bridge legs (Figure 4, Item 3) are flat and only in contact with the engine block deck surface.**

16. Install puller bridge assembly (Figure 4, Item 1) over threaded shaft and install puller bridge nut (Figure 4, Item 2).



## Instructions (cont.)



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**Figure 5. Cylinder Sleeve**

1. Cylinder sleeve

**NOTE: Once the sleeve is lifted above the sleeve O-rings, engine coolant will drain from the engine block. Ensure that a suitable drain pan is located under the engine.**

17. Tighten puller bridge nut (Figure 4, Item 2) until cylinder sleeve (Figure 5, Item 1) is pulled above the cylinder sleeve O-rings.
18. Loosen and remove puller bridge nut and puller bridge assembly (Figure 4, Item 1) to reduce overall weight.

## Instructions (cont.)



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**Figure 6. T-Handle**

1. T-handle

19. Install and tighten T-handle (Figure 6, Item 1) onto threaded shaft (Figure 2, Item 4).

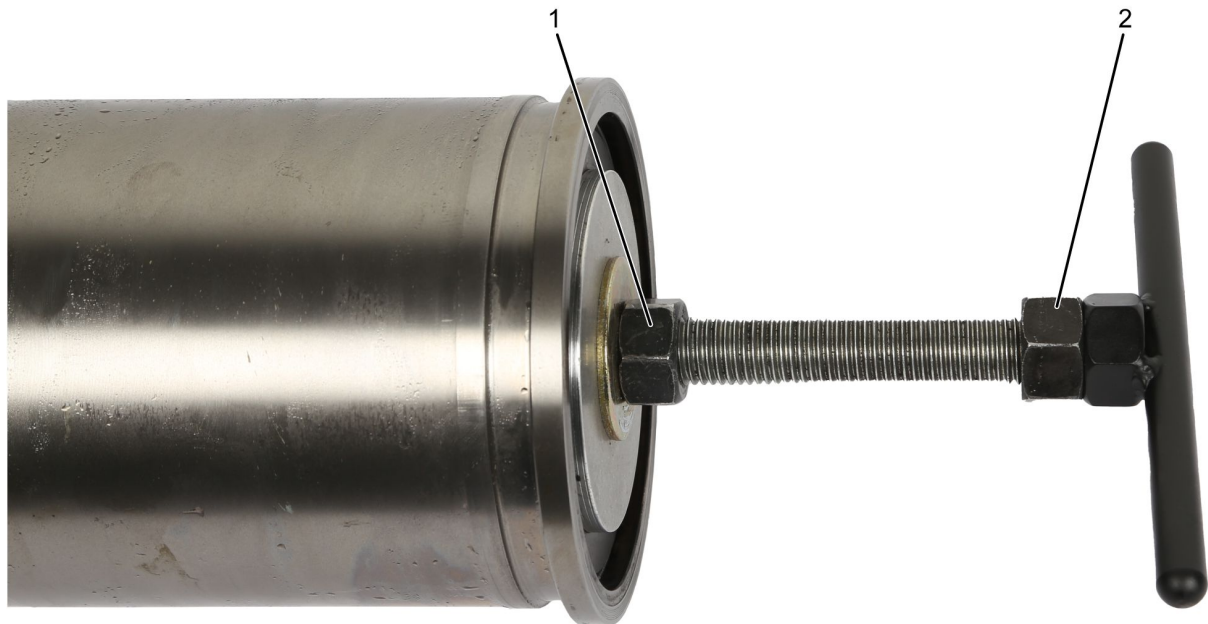
**⚠ CAUTION: To prevent damage to property and / or vehicle components, handle power cylinder kit with care. Do not lean or stand assembly on vehicle components. Total weight of the power cylinder kit including cylinder kit puller is 37 lb (17 kg).**

**NOTE: When puller is installed correctly and cylinder wear is normal, the piston assembly will not fall out during removal or installation.**

20. Pull power cylinder straight out of the block and transfer to a clean workbench.



## Instructions (cont.)

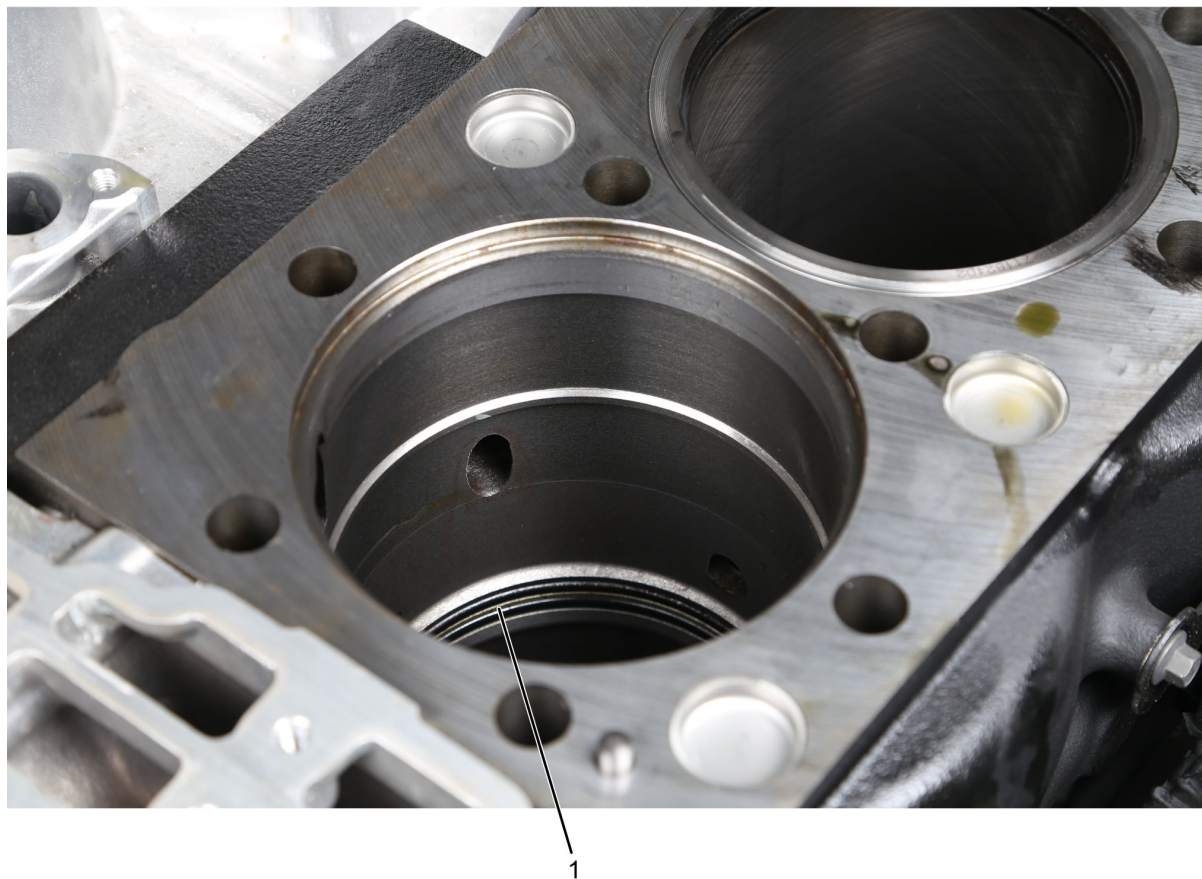


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**Figure 7. Puller Release**

1. Puller bridge nut
  2. Puller nut
- 
21. Remove T-handle from threaded shaft and install puller nut (Figure 7, Item 2) to threaded shaft.
  22. Reinstall T-handle to threaded shaft.
  23. Use the puller bridge nut (Figure 7, Item 1) and puller nut (Figure 7, Item 2) to hold the power cylinder steady.
  24. Loosen the puller bridge nut (Figure 7, Item 1) to release tension.
  25. Remove cylinder kit puller from power cylinder to reduce overall weight.

## Instructions (cont.)



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**Figure 8. Cylinder Sleeve O-Ring Locations**

1. Cylinder sleeve O-ring (2)
  
26. Remove and discard cylinder sleeve O-rings (2) (Figure 8, Item 1) located in engine block bores.
27. Perform Steps 10 through 26 until all desired power cylinders are removed.

## Instructions (cont.)

**NOTE:** Only perform Steps 28 through 37 when utilizing reduced power cylinder kit part number 2522946C92.



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**Figure 9. Piston Pin**

1. Piston pin
2. Connecting rod
3. Piston pin retainer (2)

**CAUTION:** To prevent damage to property and / or vehicle components, **DO NOT** clamp the sleeve in a vise as sleeve damage can occur.

**CAUTION:** To prevent damage to property and / or vehicle components, **DO NOT** pull piston completely out exposing the rings. If the rings are exposed, they must be replaced.

28. Secure sleeve in place while gently sliding the piston out of the bottom of the cylinder without exposing the rings. Slide piston only far enough to allow clearance for piston pin (Figure 9, Item 1) to slide out.
29. Remove piston pin retainers (Figure 9, Item 3).
30. Slide piston pin (Figure 9, Item 1) only far enough to remove connecting rod (Figure 9, Item 2).
31. Remove connecting rod (Figure 9, Item 2) and set aside on a clean workbench.
32. Using a paint marker, mark beam of connecting rod with engine serial number and cylinder it was removed from.

## Instructions (cont.)



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**Figure 10. Piston Body**

1. Connecting rod
2. Piston body
3. Wide boss side (location on piston)
4. Tab side (location on connecting rod)

**⚠ CAUTION:** To prevent damage to property and / or vehicle components, pistons in this engine are directional and therefore **MUST** be assembled to the connecting rod correctly to avoid piston to valve contact.

**NOTE:** The wide boss side (Figure 10, Item 3) must always face forward.

33. Mark wide boss side (Figure 10, Item 3) located on piston, for position and orientation. Wide boss side must always face forward.

34. Lubricate piston pin and piston pin bore with a light film of engine assembly grease or clean engine oil.

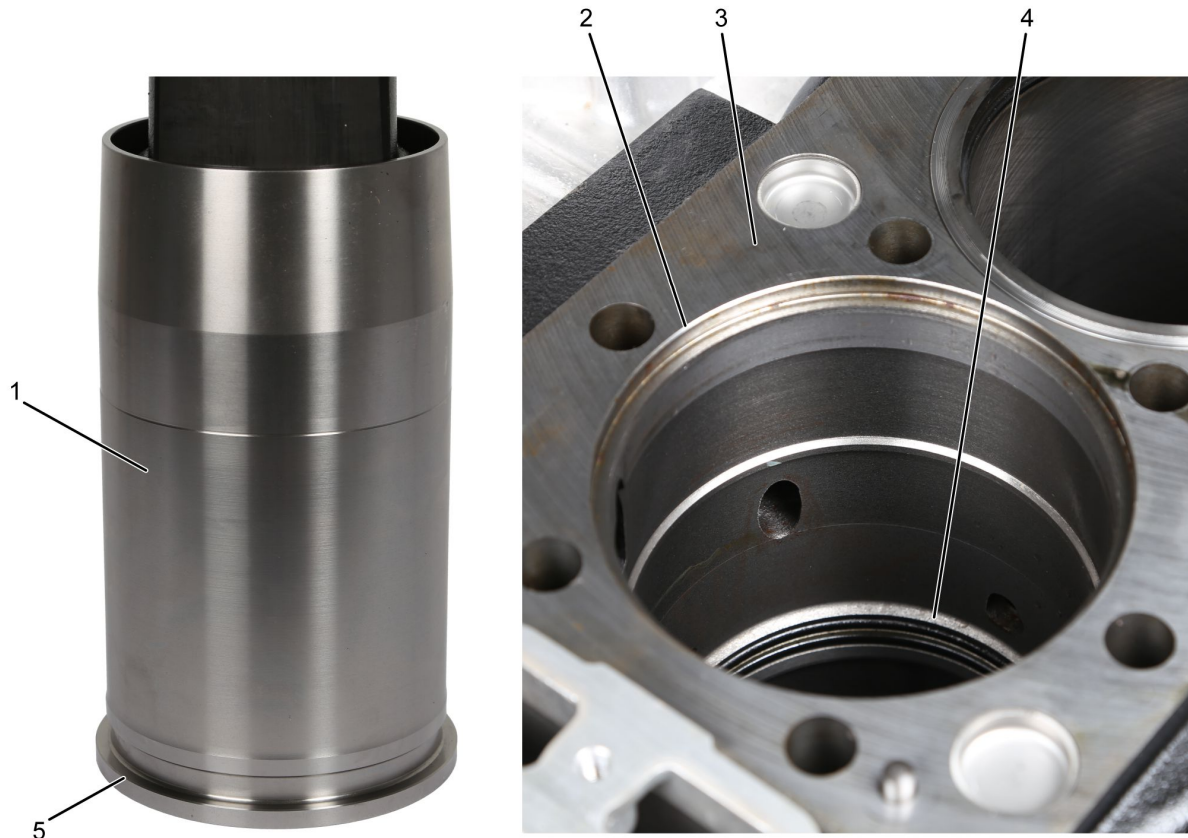
**NOTE:** Proper orientation is critical. Note the relationship of the tab side of the connecting rod to the wide boss of the piston body. Make certain connecting rod to piston body orientation is correct prior to installation.

35. Position new connecting rod into piston body (Figure 10, Item 2).

36. Slide original piston pin through new connecting rod.

## Instructions (cont.)

37. Install new piston pin retainers with opening facing upward in the 12 o'clock position. See (Figure 9, Item 3). Refer to International® A26 Engine Service Manual for detailed instructions.
38. Perform Steps 28 through 37 until all desired connecting rods have been replaced.



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**Figure 11. Items to Clean Before Assembly**

1. Sleeve
2. Counterbore
3. Engine block
4. O-ring groove (2)
5. Sleeve flange

**NOTE: Make sure that the sleeve, counterbores, and crankshaft are clean and free of any debris prior to installation of new O-rings and power cylinder assembly.**

39. Clean engine block (Figure 11, Item 3), sleeve (Figure 11, Item 1), sleeve flanges (Figure 11, Item 5), counterbore (Figure 11, Item 2), O-ring grooves (Figure 11, Item 4), and crankshaft by hand.
40. Visually inspect the overall condition of sleeve (Figure 11, Item 1) for any pitting, cavitation, cracks, or other physical damage. Replace as necessary.
41. Install the new O-rings in block. Refer to International® A26 Engine Service Manual for detailed instructions.
42. Lubricate O-rings and sleeve using engine assembly grease or clean engine oil.



## Instructions (cont.)

43. Install new upper connecting rod bearing. Refer to International® A26 Engine Service Manual for detailed instructions.
44. Lubricate new upper connecting rod bearing using engine assembly grease or clean engine oil.



**WARNING: To prevent personal injury and / or death, or damage to property, DO NOT install a power cylinder kit without the puller installed. Failure to install the puller could cause the piston to slide out of the sleeve bottom due to its weight.**

45. Install puller (Figure 3, Item 1) into cylinder sleeve (Figure 3, Item 2) with piston at BDC.
46. Install puller nut (Figure 2, Item 5) onto threaded shaft. Using a torque wrench, tighten to 90 lb-ft (122 N·m).
47. Install and tighten T-handle onto threaded shaft.

**NOTE: It is recommended to position another technician under the engine to help guide the connecting rod to seat it properly against the crankshaft.**

**NOTE: Make certain connecting rod orientation is correct prior to installation.**

**NOTE: Ensure that the tab side of the connecting rod is on the same side as the camshaft or driver side. Carefully lower the assembly in place making sure the connecting rod seats properly against the crankshaft.**

**NOTE: Connecting rod installs into the engine with the bearing tab side facing the camshaft side or driver side.**

48. Place power cylinder kit into block by using T-handle to keep properly position connecting rod into cylinder block bore. If equipped, rotate engine assembly for installation of desired cylinder.
49. Loosen puller nut and remove tool from cylinder after power cylinder kit is resting in place in the block.
50. Seat sleeve into place. Refer to International® A26 Engine Service Manual for detailed instructions.
51. Slowly push piston down to seat connecting rod against crankshaft.
52. Install new lower connecting rod bearing. Refer to International® A26 Engine Service Manual for detailed instructions.
53. Lubricate new lower connecting rod bearing using engine assembly grease or clean engine oil.
54. Install rod cap. Refer to International® A26 Engine Service Manual for detailed instructions and torque specifications.
55. Install piston cooling jet. Refer to International® A26 Engine Service Manual for detailed instructions.

## Instructions (cont.)



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**Figure 12. Anti-Polish Ring (APR)**

1. APR groove
2. APR

56. Clean carbon and all debris from the APR (Figure 12, Item 2) and APR groove (Figure 12, Item 1).
57. Install APR making sure it seats fully against sleeve and can move freely.
58. Perform Steps 39 through 57 until all desired power cylinder kits and connecting rod caps are installed.
59. Install cylinder head and oil pan. Refer to International® A26 Engine Service Manual for detailed instructions.
60. Perform engine oil priming procedure. Refer to International® A26 Engine Service Manual for detailed instructions.
61. Close and latch hood.
62. Remove wheel chocks.

## Care and Maintenance

- Keep tools clean and free of contaminants
- Replace any damaged components

## Contact Information

If you would like to order additional tools or need replacement parts, please refer to the Navistar Service Tool Catalog. If you have questions, concerns, or feedback, please contact Navistar Service Tool Support Center:

- Submit a Service Tool iKNow Case File.
- Phone: 800-365-0088 (toll free).