

**16, 18, 20  
and 24HP  
Onan Engines**

**John Deere Horicon Works  
CTM2 (19APR90)**

LITHO IN U.S.A.  
ENGLISH

# Introduction

This component technical manual (CTM) contains necessary instructions to repair the engine.

Use this component technical manual in conjunction with the machine technical manual. An engine application listing in the introduction identifies product-model/engine type-model relationship. See the machine technical manual for:

- Engine removal and installation.
- Theory of operation, diagnostic, and testing procedures.

**N CAUTION: THIS SAFETY-ALERT SYMBOL MEANS ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED.**

When you see this symbol on your machine or in your manual, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

## **INTRODUCTION**

This manual is part of a total service support program.

FOS MANUALS—REFERENCE

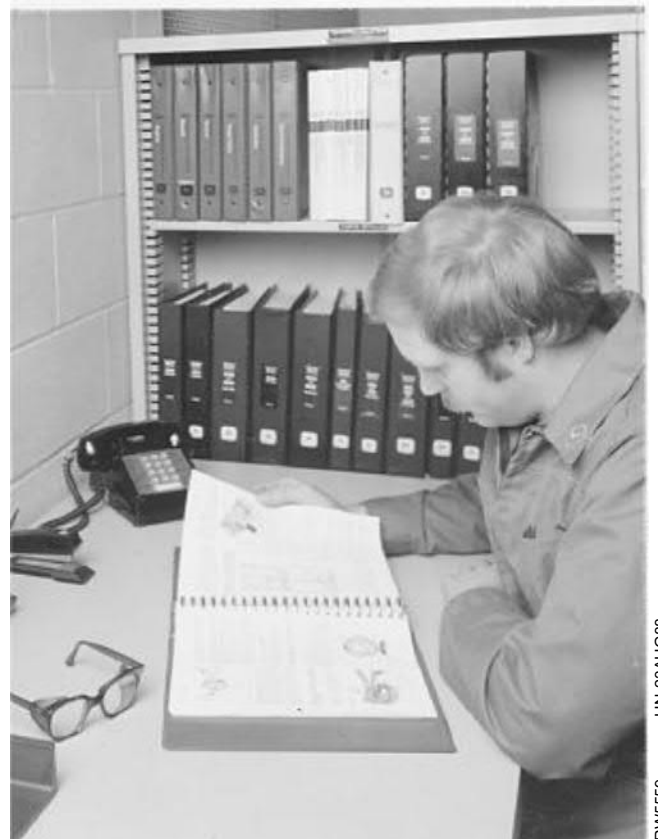
TECHNICAL MANUALS—MACHINE SERVICE

COMPONENT MANUALS—COMPONENT SERVICE

Fundamentals of Service (FOS) Manuals cover basic theory of operation, fundamentals of troubleshooting, general maintenance, and basic types of failures and their causes. FOS Manuals are for training new personnel and for reference by experienced technicians.

Technical Manuals are concise service guides for specific machines. Technical manuals are on-the-job guides containing only the vital information needed by an experienced service technician.

Component Technical Manuals are concise service guides for specific components. Component Technical Manuals are written as stand alone manuals covering multiple machine applications.



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## FEATURES OF THIS TECHNICAL MANUAL

John Deere ILLUSTRATION format emphasizing illustrations and concise instructions in easy-to-use modules.

Emphasis on diagnosis, analysis, and testing so you can understand the problem and correct it.

Diagnostic information presented with the most logical and easiest to isolate problems first to help you identify the majority of routine failures quickly.

Step-by-step instructions for teardown and assembly.

Summary listing at the beginning of each group of all applicable specifications, wear tolerances, torque values, essential tools, and materials needed to do the job.

An emphasis throughout on safety—so you do the job right without getting hurt.

This technical manual was planned and written for you—an experienced service technician. Keep it in a permanent binder in the shop where it is handy. Refer to it when you need to know correct service procedures or specifications.



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O53,INTRO3 -19-07OCT85

## ABOUT THIS MANUAL

This Component Technical Manual (CTM-2) covers the recommended repair procedures for all 16, 18, 20, and 24 HP Onan Engines removed from the machine. These engines can be repaired on a clean work bench or put on an engine stand.

Some components may be serviced without removing the engine from the machine. You may want to determine the repair procedure before you remove the engine. Refer to the machine technical manual for engine removal and installation procedures.

M98,INTR,1 -19-11NOV85



**Thanks very much for your reading,  
Want to get more information,  
Please click here, Then get the complete  
manual**

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**Have any questions please write to me:  
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## ENGINE APPLICATION CHART

Refer to the engine application chart to identify product-model/engine type-model relationship.

### Front Mowers

Machine No.	Engine Model
F910	B48G or P220G
F930	T260

### CONSUMER PRODUCTS

#### Lawn and Garden Tractors

Machine No.	Engine Model
316	B43E or P218G
318	B43G or P218G
420	B48G or P220G

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## ENGLISH TORQUE SPECIFICATIONS

NOTE: Wrench torque tolerance is  $\pm 20\%$ .

Bolt Diameter	Plain Head*		Three Radial Dashes*		Six Radial Dashes*	
	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m
1/4 in.	6	8	9	12	12	16
5/16 in.	10	14	18	24	25	34
3/8 in.	20	27	30	41	45	61
7/16 in.	30	41	50	68	70	95
1/2 in.	45	61	75	101	110	149
9/16 in.	70	95	110	150	155	210
5/8 in.	95	128	155	210	215	290
3/4 in.	165	225	270	365	385	520
7/8 in.	170	230	435	590	620	840
1 in.	255	345	660	895	930	1260

Torque figures indicated above and in the Specification Sections of this manual are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual.

\* Torque value for bolts and cap screws are identified by their head markings.

S11,2000,DD -19-11JUL85

**METRIC TORQUE SPECIFICATIONS**

*NOTE: Wrench torque tolerance is  $\pm 20\%$ .*

Bolt Diameter	Property Class 8.8*		Property Class 10.9*	
	lb-ft	N·m	lb-ft	N·m
M5	5	6	7	9
M6	8	10	11	15
M8	18	25	26	35
M10	37	50	52	70
M12	66	90	92	125
M16	166	225	229	310
M20	321	435	450	610
M24	554	750	775	1050

Torque figure indicated above and in the Specification Sections of this manual are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual.

\* Torque value for bolts and cap screws are identified by their head markings.

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### SPECIFICATIONS

Item	Measurement	Specification
Breather Valve Cover Bolt	Torque	$2 \pm 1 \text{ N}\cdot\text{m}$ ( $18 \pm 9 \text{ lb}\cdot\text{in.}$ )

M98,2005K,1 -19-07OCT85

### REMOVE AIR CLEANER

1. Remove wing nut and cover.



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M98,2005K,2 -19-07OCT85

2. Remove lock nut and air cleaner element.



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M98,2005K,3 -19-07OCT85

3. Remove precleaner. Wash precleaner as necessary.



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M98,2005K,4 -19-07OCT85

## Air Cleaner and Breather/Air Cleaner

4. Wash precleaner in warm, soapy water. Rinse in clean water. Squeeze precleaner to remove most of water. Let precleaner air dry.



M98,2005K,5 -19-07OCT85

M34579 -JUN-07SEP88

5. Hold a lighted bulb inside air cleaner element. If you can see the light through element and the paper appears clean, the element is still usable. If the element is oily, dirty, bent, torn, crushed or obstructed in any way, install a new element.



M98,2005K,6 -19-07OCT85

M34582 -JUN-07SEP88

**IMPORTANT: Close choke and all openings to keep objects from falling into carburetor, flywheel housing, and air intake system.**

6. Remove three cap screws and splash plate (A).

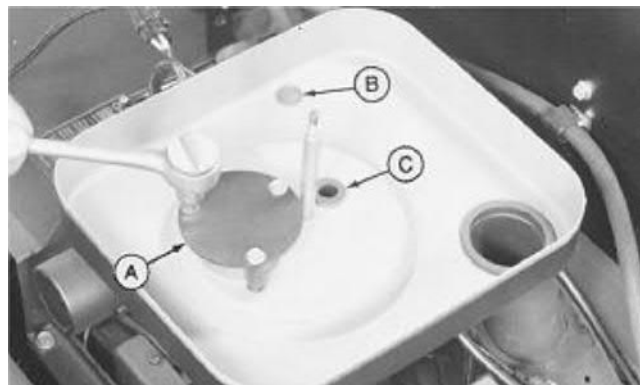
7. Remove two base cap screws (B).

8. Push breather hose (C) from air cleaner base.

9. Lift air cleaner base from carburetor.

10. Clean inside of base and cover.

11. Inspect air intake hose for cracks or deterioration; replace if necessary.

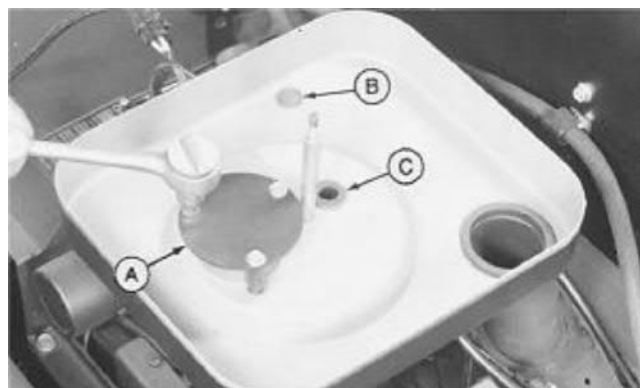


M98,2005K,7 -19-07OCT85

M36997 -JUN-25JAN90

## INSTALL AIR CLEANER

1. Check carburetor intake to make sure the O-ring is in place.
2. Put air cleaner base on carburetor.
3. Install breather hose (C). Be sure breather hose and intake hose are tightly installed to prevent dirt from entering the system.
4. Install and tighten two cap screws (B).
5. Install and fasten splash plate (A) with three screws.



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M36997

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M98,2005K,8 -19-08OCT85

6. Apply 1 oz (30 ml) of clean engine oil to precleaner.
7. Squeeze precleaner to distribute oil evenly and to remove excess oil.



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8. Put precleaner on air cleaner element. Install element and hold down.
9. Install lock nut. Tighten until snug only.



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M36996

M98,2005K,10 -19-11NOV85

## Air Cleaner and Breather/Breather, Repair

10. Install cover. Fasten with wing nut.



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M36995 -JUN-25/JAN90

### REPAIR BREATHER—T260 ENGINE

1. Remove air cleaner. (See Remove Air Cleaner in this section.)

2. Loosen clamp to remove breather tube.



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M36998 -JUN-25/JAN90

3. Remove filter packing.

4. Wash filter packing in a safe solvent and blow dry with air pressure. If packing comes apart or is deteriorated, replace it.



M98,2005K,13 -19-08OCT85

M36999 -JUN-25/JAN90

5. Wash breather valve with solvent.

Inspect ball valves to be sure they move freely.

Inspect O-ring for cuts or cracks. Replace if defective.

6. When installing breather tube, be sure filter packing is in breather and that the O-ring is installed on the valve assembly.

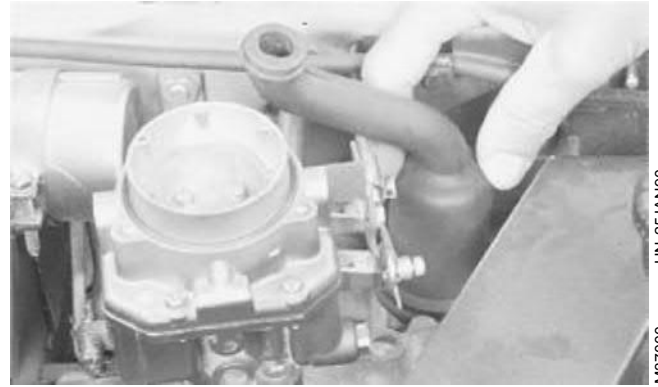


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### REPAIR BREATHER—B43E, B43G, B48G, P218G, AND P220G ENGINES

1. Remove air cleaner. (See Remove Air Cleaner in this group.)
2. Pull breather tube from breather assembly.



M98,2005K,15 -19-29JAN87

M37000  
-JUN-25JAN90  
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3. Remove filter packing.
4. Wash filter packing in a safe solvent and blow dry with air pressure. If packing comes apart or is deteriorated, replace it.



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M37001  
-JUN-25JAN90

5. Remove three cap screws to remove manifold cover.



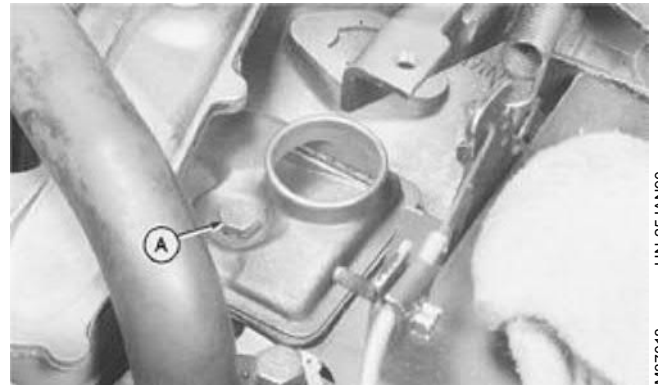
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6. Remove cap screw (A).

**IMPORTANT: Do not drop small parts into engine opening when removing breather assembly.**

7. Remove breather assembly.



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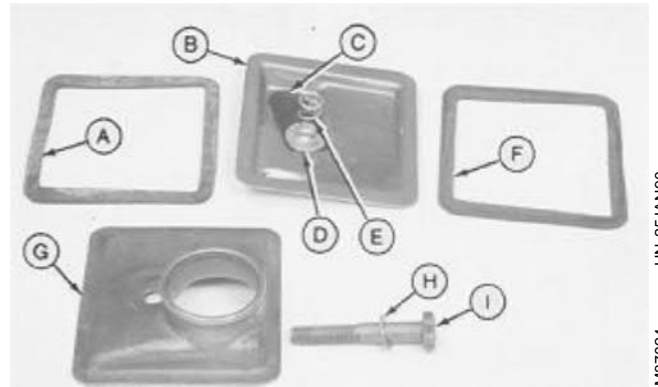
## Air Cleaner and Breather/Breather, Repair

8. Clean parts with solvent. Inspect reed valve (C). Replace it if cracked or bent. Replace gaskets if broken or deteriorated.

**NOTE:** When installing the first gasket, be sure it aligns with the flange on the deflector (B). Apply a small amount of clean grease to the gaskets to hold them in place during installation.

9. Install in order:

- A—Gasket
- B—Deflector
- C—Reed Valve
- D—Washer
- E—Spring
- F—Gasket
- G—Valve Cover
- H—Washer
- I—Cap Screw



M98,2005K,19 -19-08OCT85

M37024 -UN-25JAN90

**IMPORTANT:** Be sure gaskets are in place before tightening cap screw. Breather will not function properly if air leaks are present.

10. Tighten cap screw to  $2 \pm 1$  N·m ( $18 \pm 9$  lb-in.).



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11. Install manifold cover. Fasten with three cap screws.



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*Air Cleaner and Breather/Breather, Repair*

12. Install filter packing in breather tube.

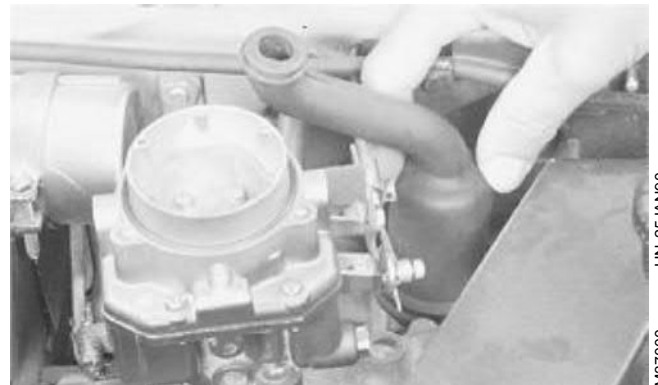


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13. Push breather tube securely onto valve cover.



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M98,2005K,23 -19-11NOV85



*Air Cleaner and Breather/Breather, Repair*

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# Group 10 Intake Manifold and Cylinder Heads

## SERVICE EQUIPMENT AND TOOLS

*NOTE: Order tools from the U.S. SERVICE-GARD™ Catalog or from the European Microfiche Tool Catalog (MTC). Some tools may be available from a local supplier.*

Name	Use
Feeler Gauge	Measure cylinder head flatness

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## SERVICE PARTS KITS

The following kits are available through your parts catalog:

Overhaul Gasket Kit

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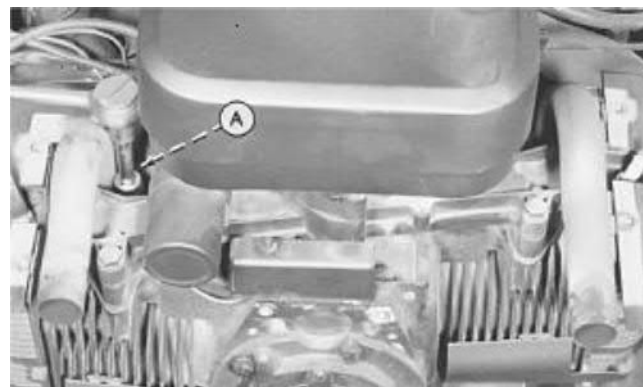
## SPECIFICATIONS

Item	Measurement	Specification
<b>MUFFLER AND EXHAUST PIPES</b>		
Exhaust Pipe Cap Screw		
P218G, P220G, B43E, B43G, B48G Engines	Torque	11 ± 3 N·m 97 ± 27 lb-in.)
T260 Engine	Torque	29 ± 2 N·m (257 ± 18 lb-in.)
Lift Bracket Cap Screw	Torque	11 ± 3 N·m (97 ± 27 lb-in.)
<b>INTAKE MANIFOLD</b>		
Attaching Cap Screw		
B43E, B43G, B48G Engines	Torque	11 ± 3 N·m (97 ± 27 lb-in.)
T260 Engine	Torque	29 ± 2 N·m (257 ± 18 lb-in.)
P218G, P220G Engines	Torque	6 N·m (53 lb-in.)
<b>CYLINDER HEAD</b>		
Cylinder Head	Flatness	0.005—0.10 mm (0.002—0.004 in.)
Attaching Cap Screws or Nuts		
P218G, P220G, B43E, B43G, B48G Engines	Torque-In Sequence	20 ± 1 N·m (180 ± 12 lb-in.)
T260 Engine:		
(Top six nuts with washers)	Torque-In Sequence	16 ± 1 N·m (142 ± 12 lb-in)
(Bottom four nuts)	Torque-In Sequence	20 ± 1 N·m (180 ± 12 lb-in.)
Lift Bracket Cap Screw	Torque	11 ± 3 N·m (97 ± 27 lb-in.)

M98,2010K,3 -19-10FEB87

## REMOVE INTAKE MANIFOLD

1. Remove muffler. (See machine technical manual.)
2. Remove four cap screws to remove exhaust pipes and gasket (A). Inspect exhaust pipes for cracks or damage. Replace as necessary.
3. Remove air cleaner base. (See Group 05 in this manual.)



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M36913

M98,2010K,4 -19-11NOV85

## Intake Manifold and Cylinder Heads/Intake Manifold

4. For T260 engines, remove two cap screws to remove coil bracket.

5. Remove clip (A) to disconnect throttle rod.

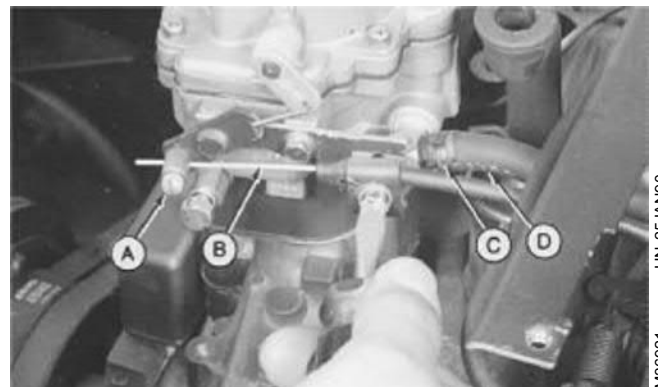


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6. If engine is in machine, loosen clamp and screw (A) to disconnect choke cable (B).

7. If engine is in machine, slide hose clamp (C) back to disconnect fuel inlet line (D).

A—Screw  
B—Choke Cable  
C—Hose Clamp  
D—Fuel Inlet Line



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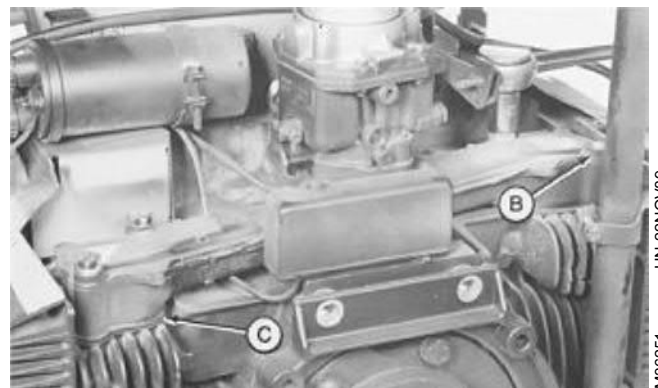
8. For T260 engine, remove four cap screws to remove intake manifold, carburetor, and gaskets (A).

For B43E, B43G, or B48G engine, remove three cap screws to remove spacer (B), intake manifold, carburetor, and gaskets (C).

For P218G and P220G engine, remove four cap screws to remove intake manifold, carburetor, and gaskets.



T260 Engine



B43E, B43G, B48G Engines

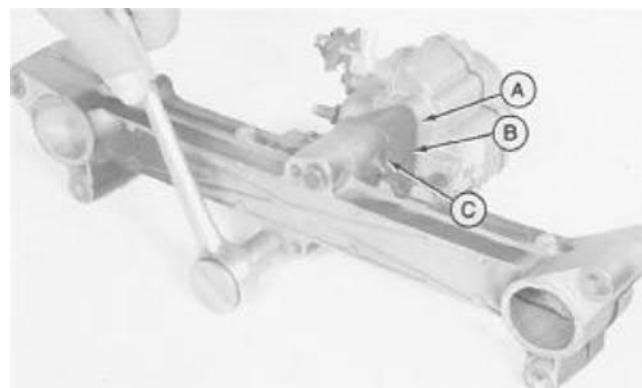
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## Intake Manifold and Cylinder Heads/Intake Manifold

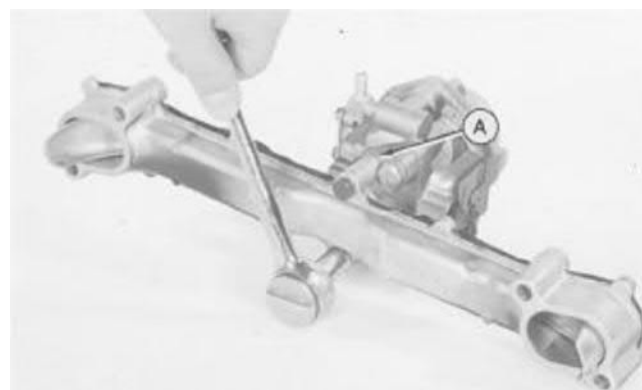
9. For T260, P218G or P220G engine, remove two cap screws to remove carburetor, gasket (A), spacer (B), and gasket (C).

For B43E, B43G, or B48G engine, remove two cap screws to remove carburetor and gasket (A).

10. Inspect intake manifold for cracks or holes. Replace as necessary.



T260, P218G, P220G Engine



B43E, B43G, B48G Engines

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## INSTALL INTAKE MANIFOLD

1. Install a new gasket on intake manifold.

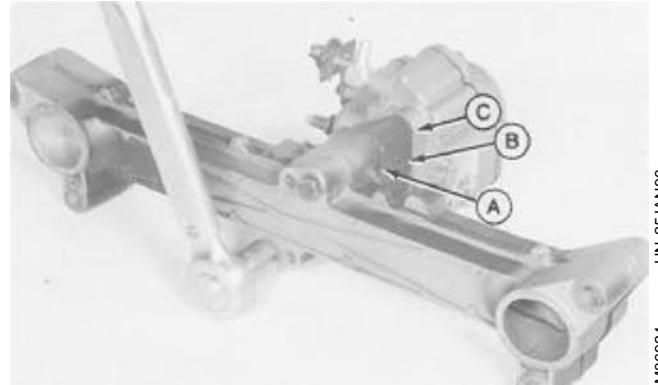


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## Intake Manifold and Cylinder Heads/Intake Manifold

2. For T260, P218G, or P220G engine, install gasket (A) spacer (B), gasket (C), and carburetor on intake manifold. Install and tighten two cap screws.

For B43E, B43G, or B48G engine, install carburetor on intake manifold and fasten with cap screws.



T260, P218G, P220G Engine



B43E, B43G, B48G Engines

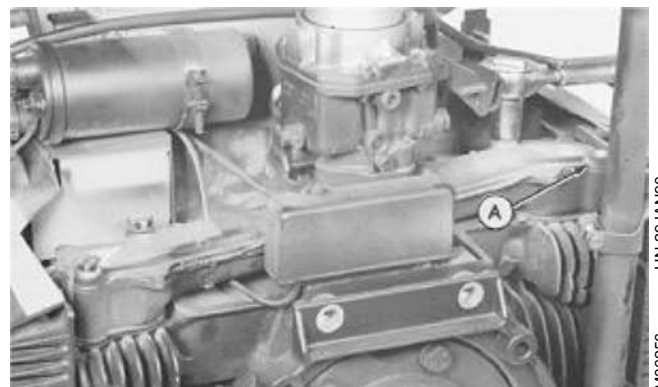
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**NOTE:** For T260 engine, go to step 5.

3. Install new gaskets with notch in gasket aligned with notch on intake port.

4. For B43E, B43G, or B48G engine, install intake manifold and tighten cap screws to  $11 \pm 3$  N·m ( $97 \pm 27$  lb-in.). Install spacer (A).

For P218G or P220G engine, install intake manifold and oil fill tube. Tighten cap screws to 6 N·m (53 lb-in.).



M98,2010K,11 -19-30JAN87

## Intake Manifold and Cylinder Heads/Intake Manifold

5. Install new gaskets on intake ports.
6. Install intake manifold and tighten cap screws to  $29 \pm 2$  N·m ( $257 \pm 18$  lb-in.).



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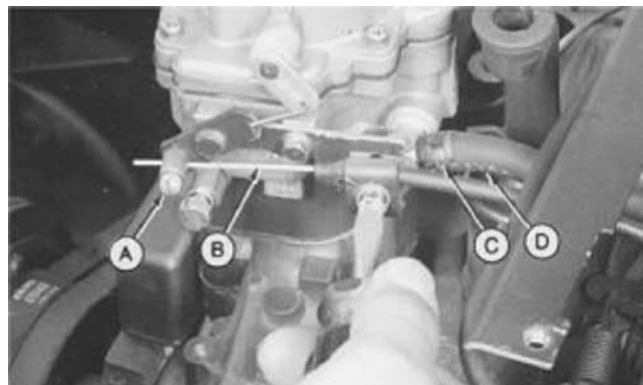
T260 engine

M98,2010K,12 -19-11NOV85

7. If engine is in machine, connect fuel inlet line (D) and fasten with hose clamp (C).

8. If engine is in machine, connect choke cable (B) to choke linkage. Push choke knob down. Hold choke linkage upward (choke plate open). Tighten screw (A) and clamp.

**A—Screw**  
**B—Choke Cable**  
**C—Hose Clamp**  
**D—Fuel Inlet Line**



M36921 -UN-25JAN90

M98,2010K,13 -19-08OCT85

9. Connect throttle rod and fasten with clip (A).
10. For T260 engine, install coil bracket on intake manifold. Install and tighten two cap screws.



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