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International BC-144, BD-144, & BD-154 Series Engines

Service Manual

SM12A

Reprinted

CASE IH

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THIS SAFETY ALERT SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS AND BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY OR DEATH.

M171B

If Safety Decals on this machine use the words **Danger, Warning or Caution,** which are defined as follows:

- **DANGER:** Indicates an immediate hazardous situation which if not avoided, will result in death or serious injury. The color associated with Danger is RED.
- **WARNING:** Indicates an potentially hazardous situation which if not avoided, will result in serious injury. The color associated with Warning is ORANGE.
- **CAUTION:** Indicates an potentially hazardous situation which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. The color associated with Caution is YELLOW.

If Safety Decals on this machine are ISO two panel Pictorial, decals are defined as follows:

- The first panel indicates the nature of the hazard.
- The second panel indicates the appropriate avoidance of the hazard.
- Background color is YELLOW.
- Prohibition symbols such as  and  if used, are RED.

WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE INJURY OR DEATH. BEFORE USING THIS MACHINE, MAKE CERTAIN THAT EVERY OPERATOR:

- Is instructed in safe and proper use of the machine.
- Reads and understands the Manual(s) pertaining to the machine.
- Reads and understands ALL Safety Decals on the machine.
- Clears the area of other persons.
- Learns and practices safe use of machine controls in a safe, clear area before operating this machine on a job site.

It is your responsibility to observe pertinent laws and regulations and follow Case Corporation instructions on machine operation and maintenance.

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SM-12A
SERVICE MANUAL

INTERNATIONAL

BC-144 BD-144 & BD-154
SERIES ENGINES

The black tabs shown on the right hand side of this page line up with the corresponding tabs on the title pages of the respective groups.

NOTE

Refer to the SUPPLEMENT AND CHANGE INDEX

for the latest instructions, before carrying out work on these engines.

INTERNATIONAL HARVESTER COMPANY
OF GREAT BRITAIN LIMITED
259 CITY ROAD, LONDON, E.C.1.

GENERAL 1
MANIFOLDS, CYLINDER HEAD AND VALVES 2
CONNECTING RODS, PISTONS AND CYLINDER SLEEVES 3
LUBRICATION SYSTEM 4
COOLING SYSTEM 5
TIMING GEAR TRAIN, FRONT COVER AND CAMSHAFT 6
CRANKSHAFT, MAIN BEARINGS AND FLYWHEEL 7
GOVERNOR BC-144 ENGINE 8
CARBURETTOR BC-144 ENGINE 9
LPG ATTACHMENT BC-144 ENGINE 10

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4. SPECIFICATIONS

The following specifications are listed in GROUP order. During the overhaul of worn components personal initiative must be exercised to determine whether or not a component is suitable for re-use. It is obviously uneconomical to return worn parts to service with an expec ion of life which may involve labour costs at an early date.

	BC-144 Series	BD-144 Series	BD-154 Series
1. GENERAL			
Number of cylinders	4	4	4
Bore (in)	3-3/8	3-3/8	3-1/2
Stroke (in)	4	4	4
Displacement (in^3)	144	144	154
Compression ratio	6.3 : 1	21.1 : 1	23 :1
Compression pressure lb/in^2			
at 200 rev/min	80/105	330/355	445/470
at 300 rev/min	90/115	350/375	510/535
Firing order	1-3-4-2	1-3-4-2	1-3-4-2
ENGINE SPEED (rev/min)			
Full load, governed	BC-144 2000 BC-144A 1875 BC-144H 2200 BC-144H Propane (LPG) 2200	BD-144 Mechanical Governor 1750 ± 10 BD-144 Pneumatic Governor 1800 BD-144A Pneumatic Governor 1900 BD-144 Pneumatic Governor (for B-55 Baler) 1525 ± 10 BD-144 Mechanical Governor (for Canadian Engine) 2000 ± 10 BD-144 DPA Injection Pump 1775 BD-144A DPA Injection Pump 1900 BD-144B DPA Injection Pump 1525 BD-144C & BD-144F 2000 BD-144 (DPA) 6000 ft Derated 1775 BD-144A (DPA) 6000 ft Derated 1900 BD-144C & BD-144F(DPA) 6000 ft Derated 2000	BD-154 DPA Injection Pump 2000 BD-154D DPA Injection Pump 2000 BD-154H DPA Injection Pump 2200 BD-154 (DPA) 6000 ft Derated 2000 BD-154H (DPA) 6000 ft Derated 2200

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2. BOLT IDENTIFICATION CHART

IH TYPE	BSS	MANUFACTURERS MARKINGS						
2	R	R45-55	BEES 45 R 55	NEWALL HITENSILE "R"	SPNR	NEWTON R	SPARTS R	TWLR
	T	T55-65	BEES 55 T-65	NEWALLOY T or NEWALL HITENSILE T	SPNT	NEWTON T	SPARTS T	TWLT
4	V	V65-75	BEES 65 V 75	NEWALLOY "V"	SPNV	NEWTON V	SPARTS V	TWLV

T70-128

3. STANDARD TORQUE DATA FOR NUTS AND BOLTS

Where no special torque data is specified, the following torque should be used on all nuts and bolts providing that the threads are lubricated with engine oil or chassis grease.

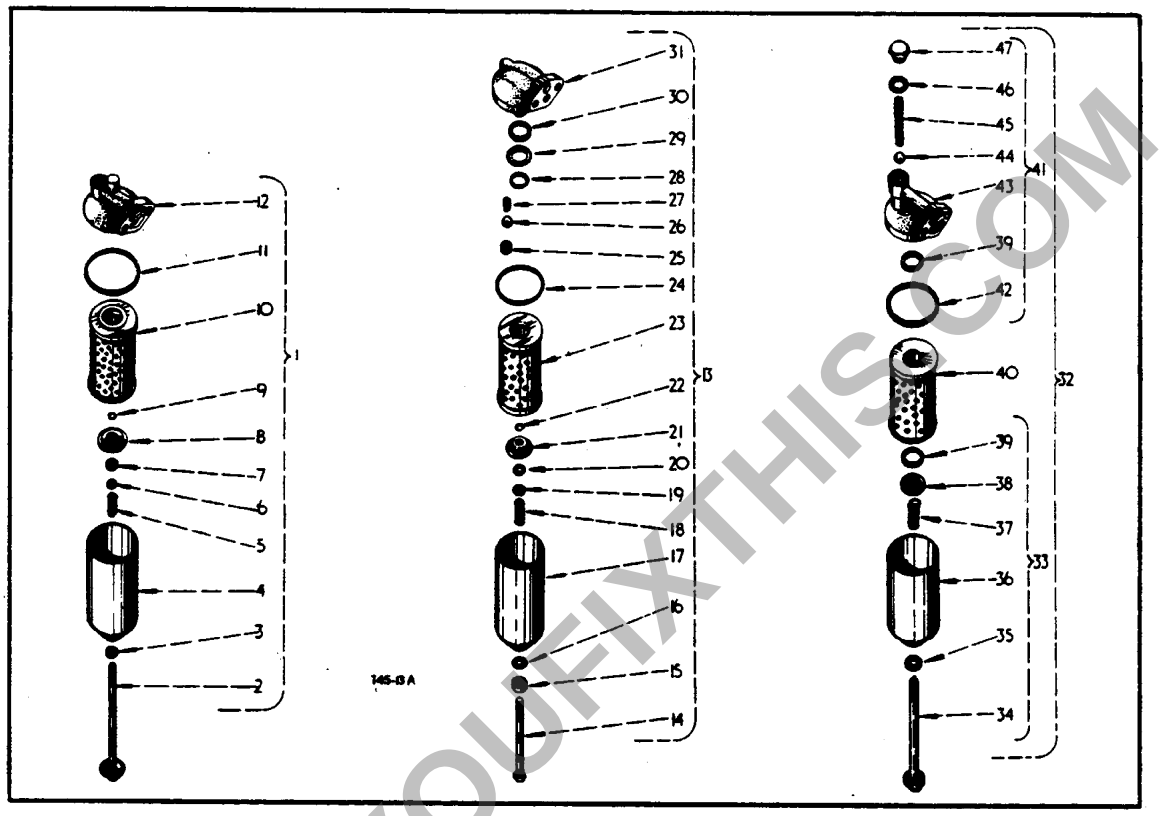
Bolt Size	TYPE 2		TYPE 4	
	Min.	Max.	Min.	Max.
1/4	9	10	12	14
5/16	19	21	27	30
3/8	33	37	45	50
7/16	53	60	75	85
1/2	80	90	115	130
9/16	115	130	165	185
5/8	160	180	220	250
3/4	290	320	400	450
7/8	420	470	650	730
1	630	710	970	1090
1-1/8	850	950	1380	1550
1-1/4	1200	1350	1940	2180

T70-127

NOTE: When re-using nuts and bolts in service; use the minimum torque figure.

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1. "TECALEMIT" Filter
2. Centre bolt
3. Sealing washer
4. Bowl
5. Pressure plate spring
6. Washer
7. Felt washer
8. Pressure plate
9. Centre bolt circlip
10. Element
11. Head seal
12. Head

13. "PUROLATOR" Filter
14. Centre bolt
15. Centre bolt collar
16. Sealing washer
17. Bowl
18. Spring
19. Plain washer
20. Centre spindle seal
21. Element guide - bottom
22. Circlip
23. Element
24. Head seal
25. Relief valve seat
26. Relief valve ball
27. Relief valve spring
28. Circlip
29. Element guide - top
30. Gasket
31. Head

32. "A.C. DELCO" Filter
33. Bowl assembly
34. Centre bolt
35. Sealing washer
36. Bowl
37. Element retainer spring
38. Lower seal retainer
39. Element seals
40. Element
41. Head assembly
42. Head seal
43. Head
44. Relief valve ball
45. Relief valve spring
46. Valve plug gasket
47. Valve plug

Fig. 8 EXPLODED VIEW OF OIL FILTERS

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1. DESCRIPTION

1a. MANIFOLDS

Separate manifolds are fitted to the BD-144 and BD-154 series engines. The inlet manifold on the left hand side and the exhaust manifold on the right hand side of the cylinder head.

A one piece casting housing both the inlet and exhaust manifolds is fitted on the left hand side of the BC-144 series engines cylinder head. The intake manifold also serves as the mounting for the carburettor.

1b. CYLINDER HEAD AND VALVES

The cylinder head houses the valves, valve guides, pre-combustion chambers and glow plugs on the diesel engines, or valves, valve guides and spark plugs on the petrol engine.

The valve lever shaft assembly, thermostat housing, inlet and exhaust manifolds are fitted on the cylinder head.

The valves are closed by single valve springs on BD-144 series engines and by dual valve springs on the BD-154 series engines. Early models of the BC-144 series engines were fitted with dual valve springs but current models have single valve springs. The exhaust valves on BC-144 series engines are fitted with rotators to ensure that all parts of the valve head are subjected to equal combustion temperatures. Exhaust valve seat inserts of specially hardened material are fitted to BC-144 series engines.

2. MANIFOLDS

2a. REMOVAL

1. DIESEL ENGINES-INLET MANIFOLD

(a) Remove the crankcase breather pipe (1-1).

(b) Disconnect the feed pump to filter fuel pipe (2-1) from the filter.

(c) Disconnect the filter to injection pump fuel pipe (3-1) from the filter.

(d) Disconnect the injection pump excess outlet pipe (4-1) from the filter.

(e) Disconnect the injector spill pipe (5-1) from the filter.

(f) Remove the four bolts (6-1) and lift off the manifold.

2. DIESEL ENGINES-EXHAUST MANIFOLD

(a) Remove the four nuts (1-2) and withdraw the manifold.

3. PETROL ENGINES-COMBINED MANIFOLD

(a) Remove the governor to carburettor control rod (1-3).

(b) Disconnect the fuel feed pump line (2-3) from the carburettor.

(c) Remove the six bolts (3-3) and withdraw the manifold.

2b. INSTALLATION

Reverse the removal procedure.

3. VALVE LEVER SHAFT ASSEMBLY

3a. REMOVAL

(a) Remove the two nuts (2-2) then remove the valve housing cover and gasket.

(b) Remove the nuts (1-4) from the valve lever shaft brackets (2-4).

(c) Remove the bolt (3-4) from the centre valve lever shaft bracket (4-4).

(d) Lift off the valve lever shaft pressing inward to prevent the assembly dismantling.

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(2) High oil consumption.

(3) Blow by will be high.

4b. PREPARATION

(a) Check and fill the cooling system.

(b) Check the level of oil in the crankcase.

(c) Bleed the fuel system as detailed in the relevant Operator's Manual.

(d) Start the engine and run at 1/4 throttle opening until operating temperature is reached.

4c. OPERATION

1. DIESEL ENGINE

PERIOD 1 (1 HOUR)

Operate the tractor in high range third gear with no load at 3/4 throttle.

PERIOD 2 (2 HOURS)

Operate the tractor on light work at 3/4 throttle.

PERIOD 3 (1 HOUR)

Operate the tractor on medium work at full throttle.

2. PETROL ENGINE

PERIOD 1 (1/4 HOUR)

Operate the tractor in high range third gear with no load at 3/4 throttle.

PERIOD 2 (3/4 HOUR)

Operate the tractor on light work at 3/4 throttle.

PERIOD 3 (2 HOURS)

Operate the tractor on medium work at full throttle.

3. DIESEL POWER UNIT

PERIOD 1 (1 HOUR)

Operate the engine on 1/4 load at 3/4 rated speed.

PERIOD 2 (2 HOURS)

Operate the engine on 1/2 load at 3/4 rated speed.

PERIOD 3 (1 HOUR)

Operate the engine on 3/4 load at full rated speed.

4. ALL ENGINES

(a) Check for air, oil and water leaks.

(b) Inspect and replace the oil filter element if necessary.

(c) 1. DIESEL ENGINE

After 25 hours of operation the crankcase oil and oil filter element must be changed.

2. PETROL ENGINE

The crankcase oil can be used until the next oil change period.

(d) After the first 25 hours of operation the cylinder head bolts must be re-torqued and the valve clearance adjusted.

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