

**686G, 686GXR and 688G SERIES 2
TELESCOPIC HANDLERS
Service Manual
7-16041**

Table of Contents

Description	Section No.	Form No.
General		
	Tab 1	
Section Index - General		7-16070
Standard Torque Specification	1001	8-71601
Fluids and Lubricants	1002	7-16080
Safety and General Information	1003	7-16090
Loctite Product Chart		8-98902
Engine		
	Tab 2	
Section Index- Engine		7-90140
Diesel Engine Specifications	2000	7-16100
Engine and Transmission Removal and Installation	2001	7-89691
Engine Troubleshooting	2002	7-89701
Fuel System		
	Tab 3	
Section Index- Fuel System		7-16110
Electrical		
	Tab 4	
Section Index - Electrical		7-16700
Electrical System General	4000	7-16710
Electrical Schematics and Troubleshooting	4001	7-16720
Electrical Gauges and Senders	4005	7-89741
Alternator	4007	7-49250
Steering		
	Tab 5	
Section Index - Steering		7-90170
How It Works	5000	7-89751
Steering Specifications	5001	7-89760
Steering Troubleshooting	5002	7-89771
Steering Pump and Steering Column	5003	7-89781
Steering Selector Valve	5004	7-89791
Steering Priority Valve	5005	7-89800

Reprinted

**686G, 686GXR and 688G SERIES 2
TELESCOPIC HANDLERS
Service Manual
7-16041**

Table of Contents

Description	Section No.	Form No.
Power Train		Tab 6
Section Index - Power Train		7-90180
How It Works	6000	7-89820
Removal and Installation of Power Train Components	6001	7-16730
Transmission Specifications and Troubleshooting	6002	7-89841
Drive Axle	6004	7-16740
Brakes		Tab 7
Section Index - Brakes		7-90190
How It Works	7000	7-16750
Brake System Specifications	7001	7-89870
Brake System Troubleshooting	7002	7-89880
Brake System Removal and Installation of Components	7003	7-89891
Hydraulics		Tab 8
Section Index - Hydraulics		7-90201
How It Works	8000	7-16760
Hydraulic Specifications, Schematics and Troubleshooting	8001	7-17210
Hydraulic Specifications, Schematics and Troubleshooting 686GXR P.I.N. JFE0001848 and after, 688G P.I.N. JFE0003613 and after	8001	6-49340
Removal and Installation of Hydraulic Components	8002	7-90281
Hydraulic Cylinders	8006	7-16770
Hydraulic and Fuel Tanks	8007	7-89930
Mounted Equipment and Chassis		Tab 9
Section Index- Mounted Equipment and Chassis		7-90210
How It Works	9000	7-16780
Specifications, and Troubleshooting	9001	7-16790
Removal and Installation of Boom Components	9005	7-16800
Electrical Schematic and Hydraulic Schematic Foldout - 686G,686GXR, and 688G		7-17200
Electrical Schematic and Hydraulic Schematic Foldout - 686GXR Series 2 Machines P.I.N. JFE0001848 and After and 688G Series 2 Machines P.I.N. JFE0003613 and After		6-49430

Section 1001

STANDARD TORQUE SPECIFICATIONS

CASE CORPORATION
700 State Street
Racine, WI 53404 U.S.A.

CASE CANADA CORPORATION
3350 South Service Road
Burlington, ON L7N 3M6 CANADA

Rac 8-71601

© 1994 Case Corporation
Printed in U.S.A.
Issued November, 1991

<https://www.ebooklibonline.com>

Hello dear friend!

Thank you very much for reading.

Enter the link into your browser.

The full manual is available for immediate download.

<https://www.ebooklibonline.com>

TABLE OF CONTENTS

TORQUE SPECIFICATIONS - DECIMAL HARDWARE 2


TORQUE SPECIFICATIONS - METRIC HARDWARE 3


TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS 4

TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS 5

TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers dry, or when lubricated with engine oil. Not applicable if special graphities, Molydisulfide greases, or other extreme pressure lubricants are used.

Grade 5 Bolts, Nuts, and Studs		
		
Size	Pound-Inches	Newton metres
1/4 inch	108 to 132	12 to 15
5/16 inch	204 to 252	23 to 28
3/8 inch	420 to 504	48 to 57
Size	Pound-Feet	Newton metres
7/16 inch	54 to 64	73 to 87
1/2 inch	80 to 96	109 to 130
9/16 inch	110 to 132	149 to 179
5/8 inch	150 to 180	203 to 244
3/4 inch	270 to 324	366 to 439
7/8 inch	400 to 480	542 to 651
1.0 inch	580 to 696	787 to 944
1-1/8 inch	800 to 880	1085 to 1193
1-1/4 inch	1120 to 1240	1519 to 1681
1-3/8 inch	1460 to 1680	1980 to 2278
1-1/2 inch	1940 to 2200	2631 to 2983


Grade 8 Bolts, Nuts, and Studs		
		
Size	Pound-Inches	Newton metres
1/4 inch	144 to 180	16 to 20
5/16 inch	288 to 348	33 to 39
3/8 inch	540 to 648	61 to 73
Size	Pound-Feet	Newton metres
7/16 inch	70 to 84	95 to 114
1/2 inch	110 to 132	149 to 179
9/16 inch	160 to 192	217 to 260
5/8 inch	220 to 264	298 to 358
3/4 inch	380 to 456	515 to 618
7/8 inch	600 to 720	814 to 976
1.0 inch	900 to 1080	1220 to 1465
1-1/8 inch	1280 to 1440	1736 to 1953
1-1/4 inch	1820 to 2000	2468 to 2712
1-3/8 inch	2380 to 2720	3227 to 3688
1-1/2 inch	3160 to 3560	4285 to 4827


NOTE: Use thick nuts with Grade 8 bolts.

TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when specifications are not given.

These values apply to fasteners with coarse threads as received from supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or Molydisulfide grease or oil is used.

Grade 8.8 Bolts, Nuts, and Studs		
		
Size	Pound-Inches	Newton metres
M4	24 to 36	3 to 4
M5	60 to 72	7 to 8
M6	96 to 108	11 to 12
M8	228 to 276	26 to 31
M10	456 to 540	52 to 61
Size	Pound-Feet	Newton metres
M12	66 to 79	90 to 107
M14	106 to 127	144 to 172
M16	160 to 200	217 to 271
M20	320 to 380	434 to 515
M24	500 to 600	675 to 815
M30	920 to 1100	1250 to 1500
M36	1600 to 1950	2175 to 2600

Grade 10.9 Bolts, Nuts, and Studs		
		
Size	Pound-Inches	Newton metres
M4	36 to 48	4 to 5
M5	84 to 96	9 to 11
M6	132 to 156	15 to 18
M8	324 to 384	37 to 43
Size	Pound-Feet	Newton metres
M10	54 to 64	73 to 87
M12	93 to 112	125 to 150
M14	149 to 179	200 to 245
M16	230 to 280	310 to 380
M20	450 to 540	610 to 730
M24	780 to 940	1050 to 1275
M30	1470 to 1770	2000 to 2400
M36	2580 to 3090	3500 to 4200

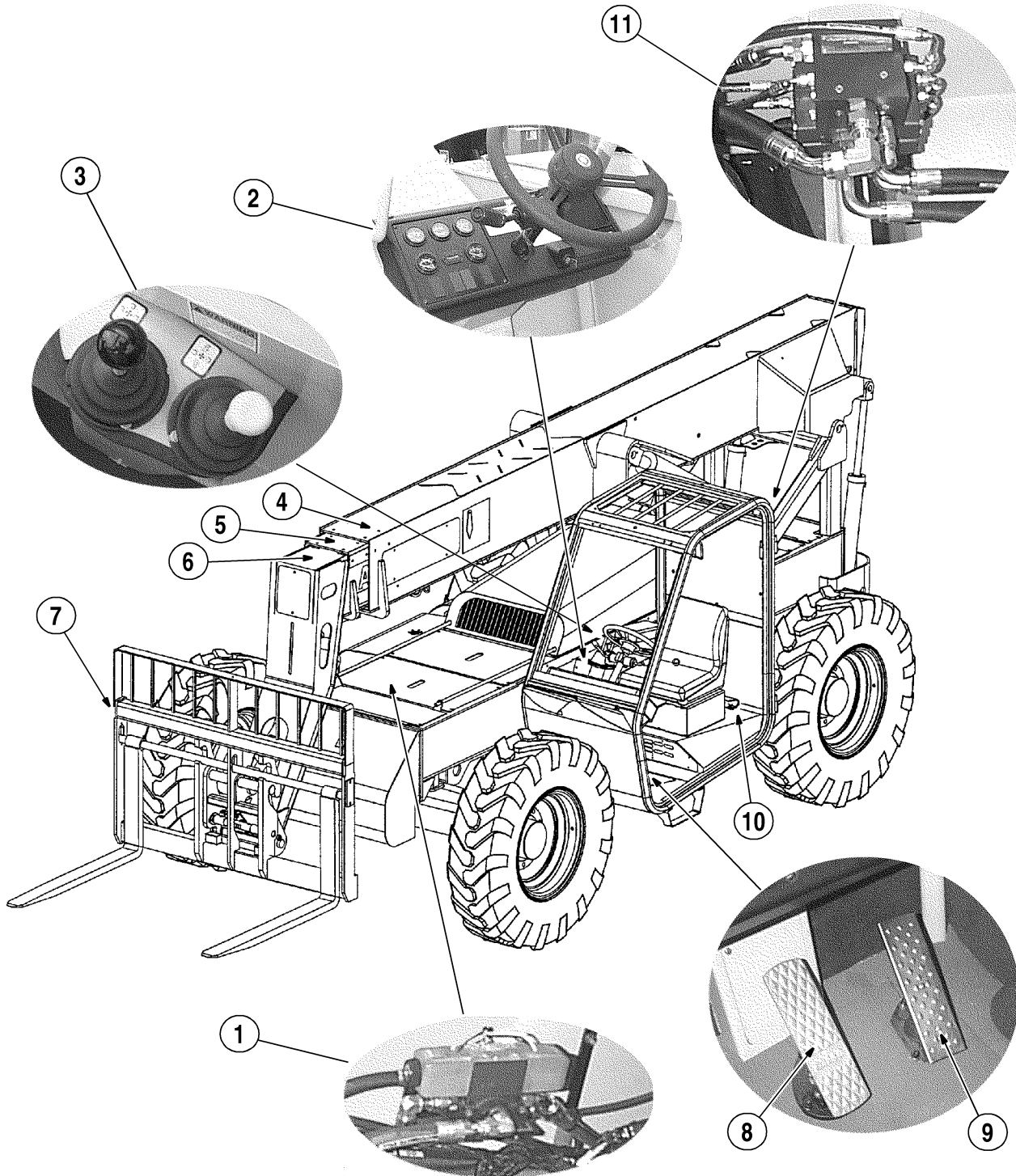
Grade 12.9 Bolts, Nuts, and Studs



Usually the torque values specified for grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.

INTRODUCTION

Location of Major Components

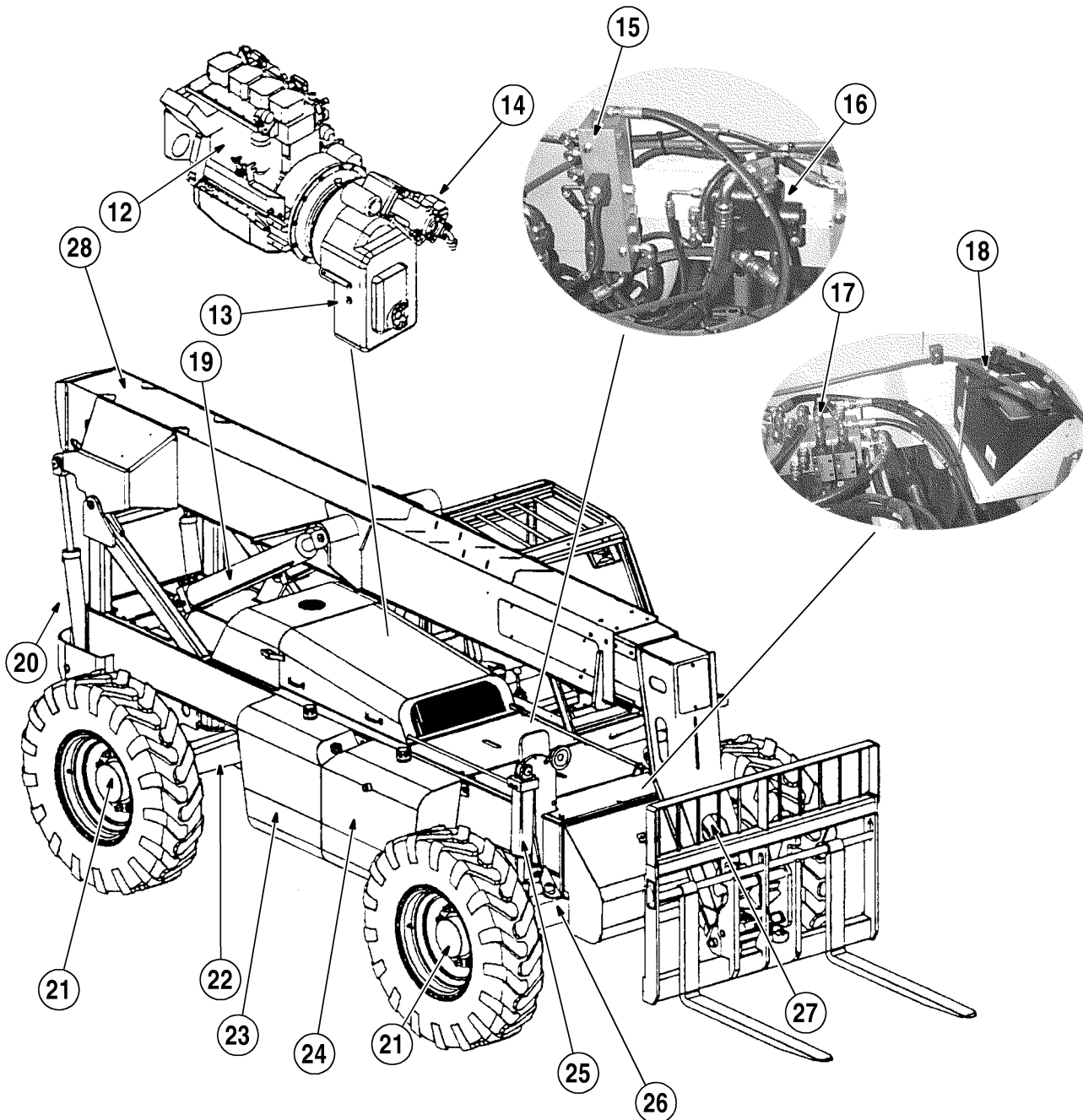


- 1. STEERING MODE SELECTOR
- 2. CONTROL PANEL AND STEERING WHEEL
- 3. JOYSTICK CONTROLS
- 4. OUTER BOOM
- 5. INTERMEDIATE BOOM
- 6. INNER BOOM

- 7. CARRIAGE
- 8. BRAKE PEDAL
- 9. ACCELERATOR PEDAL
- 10. BOOM STOP
- 11. BOOM CONTROL VALVE

BS98N065

Major Components (Illustration 1 of 2)



- | | |
|-------------------------------------|---|
| 12. ENGINE | 21. PLANETARY WHEEL END (BOTH SIDES) |
| 13. TRANSMISSION | 22. REAR AXLE |
| 14. HYDRAULIC PUMP | 23. FUEL TANK |
| 15. HYDRAULIC DRAIN MANIFOLD | 24. HYDRAULIC TANK |
| 16. PRIORITY VALVE | 25. FRAME LEVEL CYLINDER |
| 17. FRAME LEVEL/FORK TILT MANIFOLD | 26. FRONT AXLE |
| 18. BATTERY | 27. CARRIAGE TILT CYLINDER |
| 19. BOOM LIFT CYLINDER (BOTH SIDES) | 28. CROWD CYLINDER - LOCATED INSIDE BOOM ASSEMBLY |
| 20. TILT COMPENSATION CYLINDER | |

BS99A105

Major Components (Illustration 2 of 2)

Section 2001

ENGINE AND TRANSMISSION REMOVAL AND INSTALLATION

CASE CANADA CORPORATION
450 Sherman Avenue
Hamilton, ON L8N 4C4 CANADA

CASE CORPORATION
700 State Street
Racine, WI 53404 U.S.A.

Bur 7-89691

© 1999 Case Corporation
Printed in U.S.A.
November, 1999

TABLE OF CONTENTS


ENGINE AND TRANSMISSION REMOVAL	3
Preparation	3
Boom Stop Stowed	3
Boom Stop Installed	3
Hood and Deck Plates	4
Removal Procedure	4
Engine and Transmission Repairs	5
Engine and Transmission Installation	5

NOTE: Case Corporation reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

ENGINE AND TRANSMISSION REMOVAL

The engine can be removed separately from the transmission. However, due to space limitations, it is easier to remove the engine and transmission as an assembly; and that is the method described in this manual. Refer to Section 6, TRANSMISSION, for the procedure to remove the transmission separately.

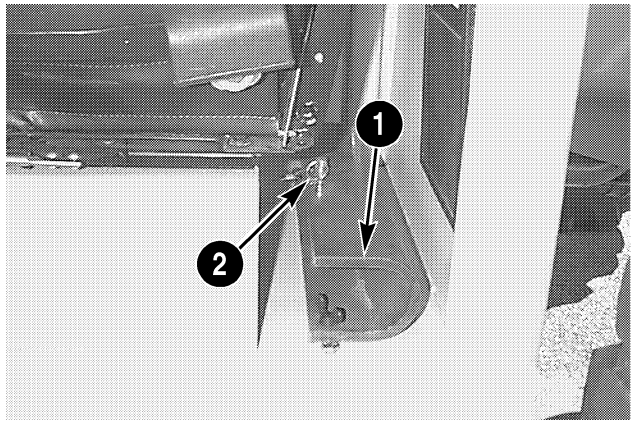
Preparation



WARNING: *The boom can crush. Never perform maintenance or service operations under the boom while it is in the raised position without blocking the boom to prevent it from falling.*

M690

Boom Stop Stowed



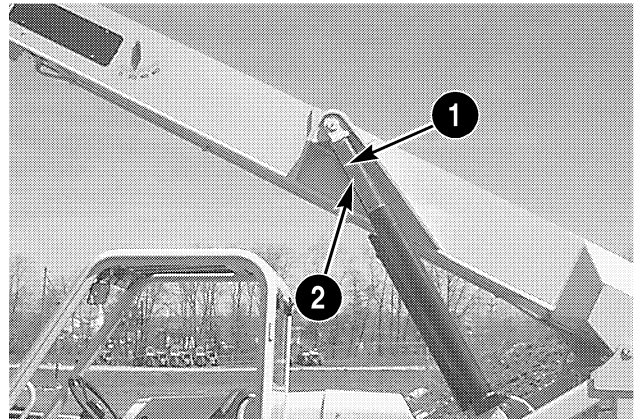
1. BOOM STOP

2. PIN

BP98N002

1. Remove the boom stop from its stowed position on the cab floor behind the operator's seat.

Boom Stop Installed



1. BOOM STOP

2. PIN

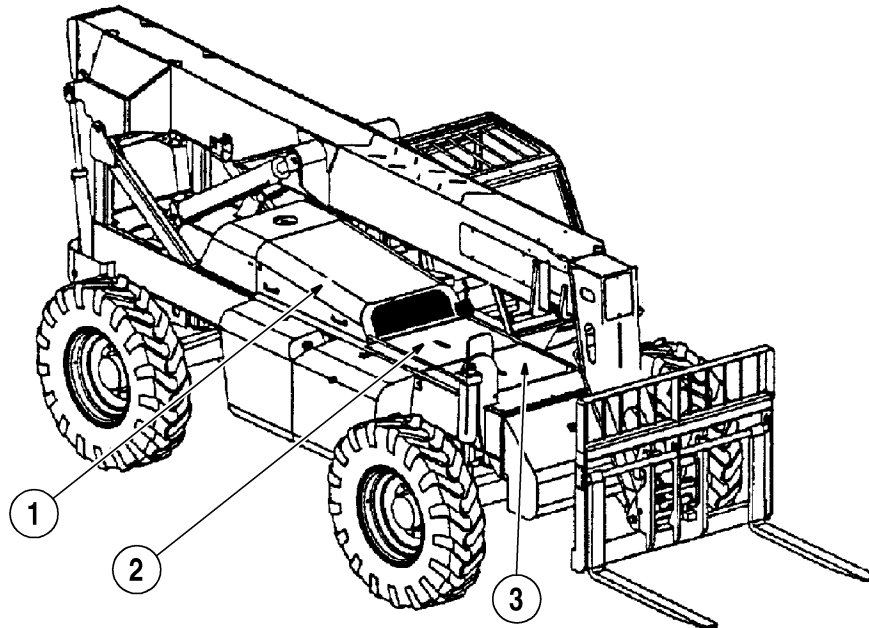
BP98N003

NOTE: *Use care not to damage the highly polished surface on the hydraulic cylinder rod when installing the boom stop. Scratches and gouges on the rod surface may damage the cylinder seals.*

1. Raise the boom high enough to place the boom stop (1) on the cylinder rod. Place the boom stop (1) onto the cylinder rod and install pin (2) to secure the boom stop (1) on the cylinder rod.
2. Slowly lower the boom until it rests against the boom stop (1).

Hood and Deck Plates

1. Remove hood (1) and deck plates (2) and (3).



1. HOOD

2. DECK PLATES

3. DECK PLATES

BS98N067

Removal Procedure

1. Thoroughly clean the entire engine and transmission assembly to reduce the possibility of dirt entering any part of the system.
2. Tag all hoses and electrical connections for reassembly.

WARNING: Injury can occur when removing the radiator cap.

Steam or fluid escaping from the radiator can burn. Rust inhibitor contains alkali, avoid contact with skin and eyes.



Always shut down the engine and allow to cool before removing the radiator cap. Remove cap slowly to relieve pressure. Avoid contact with steam or escaping fluid.

M646

NOTE: Capture all drained fluids in suitable containers. Dispose of fluids in accordance with local procedures.

3. Drain the engine coolant from the radiator and the engine. Disconnect the coolant hoses from the engine.

NOTE: It is not necessary to drain the engine oil or transmission fluid prior to removing the engine and transmission from the machine. However, if it is desired to drain these fluids, refer to the Operators Manual for the fluid capacities and procedures.

WARNING: Fuel is highly flammable.



Do not smoke or allow open flame while disconnecting fuel lines.

Always wipe up spilled fuel.

M691

4. Disconnect fuel line from the fuel pump and drain fuel into a suitable container. Dispose of fuel in accordance with local Environmental/Legal guidelines.
5. Disconnect all hoses and electrical wiring connectors. Cap off hoses to prevent contamination.
6. Disconnect the exhaust pipe.
7. Disconnect the throttle linkage and remove the fan shroud.

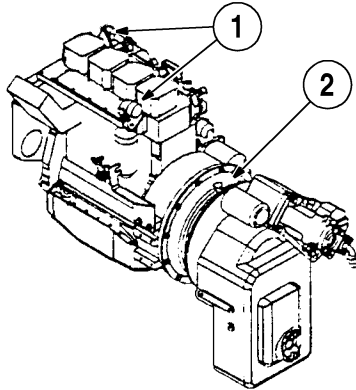
8. Disconnect the drive shafts from each side of the transmission.



WARNING: Use acceptable lift/support equipment to lift engine and transmission assembly. Equipment must be capable of lifting the combined weight of the engine and transmission.

M692

9. Attach lifting hooks or sling to engage lift points. Place a lifting strap around bell housing (2).



BS99A042

1. ENGINE LIFT POINTS 2. BELL HOUSING

10. Carefully take up the slack in the lifting slings until the weight of the engine and transmission is supported.
11. Remove the engine and transmission mounting hardware.
12. Carefully lift the engine and transmission assembly from the frame and move it to the area where the work will be completed.
13. If further disassembly of the mounting hardware is required, remove the engine mounting plate and transmission mounting brackets (4). See page 2001-6 for illustration.
14. Remove the upper halves of transmission mounting bushings and engine shock mount (12) from the frame. See page 2001-6 for illustration.
15. Inspect all mounting hardware for excessive wear and damage. Check engine shock mount and transmission mounting bushings for cracks. Replace as necessary.

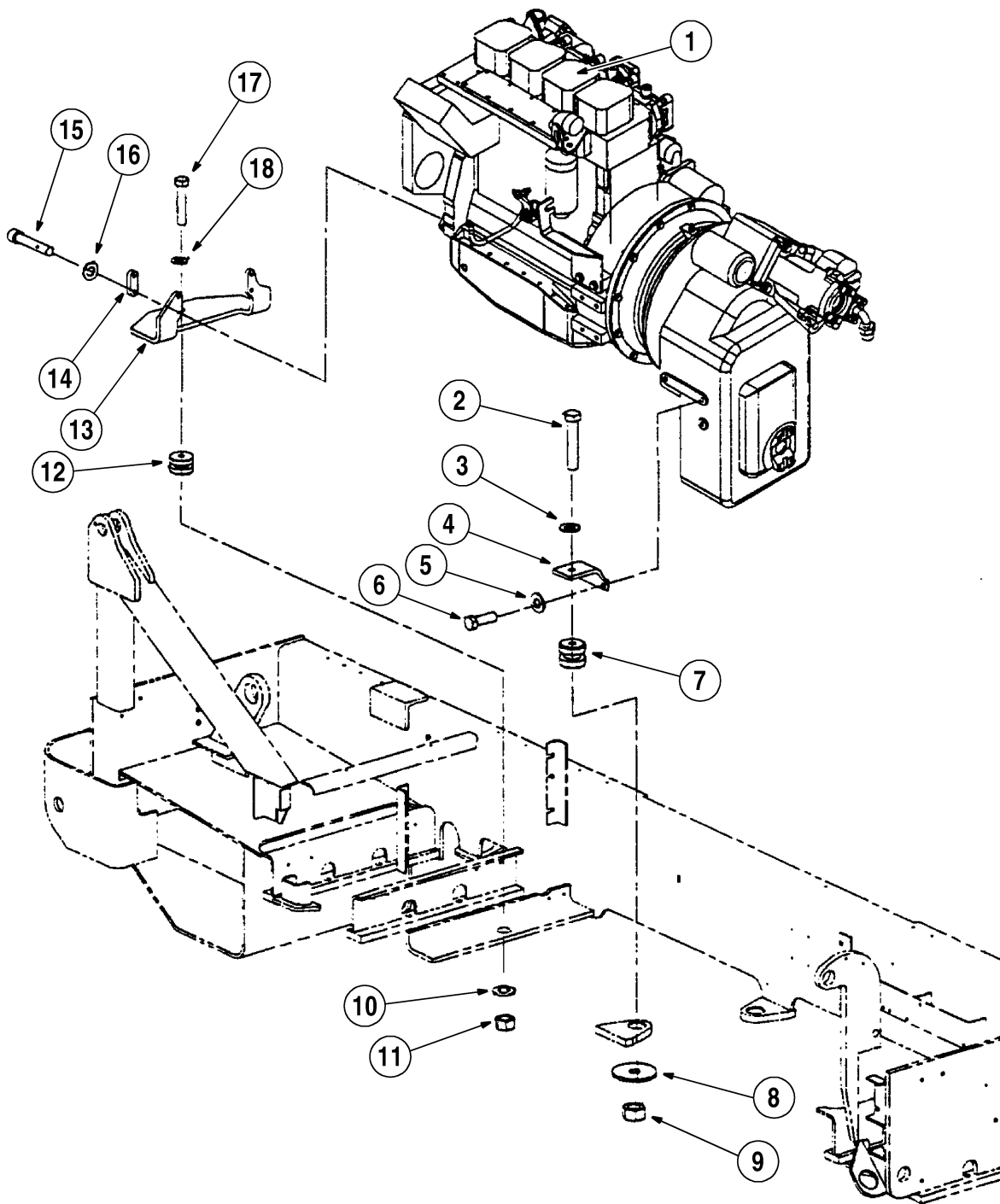
Engine and Transmission Repairs

Engine repairs should be referred to Engine Manual. See Section 6 - Transmission for information on the Power Shift Transmission.

Engine and Transmission Installation

See page 2001-6 for illustration.

- If removed, apply Loctite 271 to cap screws (15) and attach engine mounting plates (13) to engine (1) with washer (16) and spacer (14). Tighten cap screws (15) to 150 Nm (111 lb-ft).
- If removed, apply Loctite 271 to cap screws (6) and with washers (5) in place attach transmission brackets (4) to each side of the transmission. Tighten cap screws (6) to 150 Nm (111 lb-ft).



BS99A043

- | | |
|----------------------------------|---------------------------|
| 1. ENGINE | 10. FLAT WASHER |
| 2. BOLT | 11. HEX NUT |
| 3. FLAT WASHER | 12. SHOCK MOUNT |
| 4. TRANSMISSION MOUNTING BRACKET | 13. ENGINE MOUNTING PLATE |
| 5. FLAT WASHER | 14. ENGINE SPACER |
| 6. BOLT | 15. BOLT |
| 7. TRANSMISSION MOUNTING BUSHING | 16. FLAT WASHER |
| 8. TRANSMISSION SNUBBING WASHER | 17. BOLT |
| 9. HEX NUT | 18. FLAT WASHER |

Engine and Transmission Installation

3. Place the upper half of the engine mount (12) and transmission mounting bushings (7) in the frame.
4. Place washers (3) on cap screws (2), apply Loctite 271, and place a cap screw in each transmission mounting bracket (4).
5. Place washer (18) on cap screw (17), apply Loctite 271 and install the cap screw in engine mounting plate (13).
6. Be sure lifting hooks and sling are secure and carefully raise the engine transmission assembly into position over the frame. Lower the assembly into the frame while aligning cap screws (2) and (17) with the transmission mount bushing (7) and the engine shock mount (12) in the frame.
7. Place the lower half of engine shock mount (12) onto cap screw (17) install washer (10) and nut (11). Tighten nut (11) to 570 Nm (420 lb-ft).
8. Place lower halves of transmission mounting bushings (7) onto cap screws (2), install washers (8) and nuts (9). Tighten nuts (9) to 814 Nm (600 lb-ft).

9. Disconnect lifting hooks and straps from the assembly.
10. Connect drive shafts (front and rear) to the transmission.
11. Connect exhaust pipe.
12. Connect throttle linkage and install fan shroud.

NOTE: *Add a small amount of hydraulic oil through the inlet port of the hydraulic pump before connecting the hydraulic hoses.*

13. Connect all wiring connectors and connect the hydraulic hoses to the hydraulic pump.
14. Connect the fuel line to the fuel pump.
15. Refer to the Operators Manual for capacities, procedures and recommended fluids and fill engine coolant, hydraulic fluid reservoir, and engine oil as required.
16. Start the engine and raise the boom enough to remove boom stop.
17. Remove the boom stop and stow the boom stop on the cab floor behind the operator's seat.

Section 2002

2002

ENGINE TROUBLESHOOTING

CASE CORPORATION
700 State Street
Racine, WI 53404 U.S.A.

CASE CANADA CORPORATION
450 Sherman Avenue
Hamilton, ON L8N 4C4 CANADA

Bur 7-89701

© 1999 Case Corporation
Printed in U.S.A.
November, 1999

TABLE OF CONTENTS

TROUBLESHOOTING, ENGINE 3

NOTE: Case Corporation reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

TROUBLESHOOTING, ENGINE

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>
Engine will not start and the starter does not rotate	<ul style="list-style-type: none"> Fuse is defective Batteries discharged Battery cable connections loose or disconnected In-line line fuse to starter fused Faulty starter relay Ignition switch defective Starter solenoid or starter defective
Engine will not start and the starter does rotate	<ul style="list-style-type: none"> Empty fuel tank Air in fuel system Clogged fuel filter Fuel solenoid at fuel pump defective Intake air system restricted Contaminated fuel
Engine difficult to start and has poor and irregular performance	<ul style="list-style-type: none"> Low battery power Batteries discharged Battery cable connections are loose or corroded causing the starter to turn too slowly Oil viscosity too high for cold (winter) conditions Fuel line blockage due to wax separation in winter Incorrect valve clearance Defective fuel injectors Defective turbocharger Air cleaner element restricted Loose or badly adjusted throttle cable
Engine making excessive fumes	<ul style="list-style-type: none"> Lugging engine Air in fuel system Engine oil level too high Air cleaner/filter plugged Low compression due to poor condition of the valves or incorrect valve clearance Injection pump timing incorrect Air leak between turbocharger and intake/exhaust manifold Multiple seal washers under injector nozzle Injector nozzle malfunction Faulty turbocharger Engine running too cold Injection pump overfueled

Continued on next page



Suggest:

If the above button click is invalid.

Please download this document

first, and then click the above link

to download the complete manual.

Thank you so much for reading

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>
Engine overheats-stop engine immediately	Excessive dirt on cooling system Engine belt broken Defective injector nozzles Incorrect fuel pump calibration Blocked cooling air flow
Low engine oil pressure	Low engine oil level Defective oil pressure switch Leaks from lubrication system
Engine makes excessive noise	Drive belt squeal Intake air/exhaust leaks Excessive valve clearance Faulty turbocharger

<https://www.ebooklibonline.com>

Hello dear friend!

Thank you very much for reading.

Enter the link into your browser.

The full manual is available for immediate download.

<https://www.ebooklibonline.com>