



Service Manual

Chassis & Mast

DP100	3DP-10011-up
DP115	4DP-10011-up
DP135	5DP-10011-up
DP150	6DP-10011-up

FOREWORD

This service manual is a guide to servicing of Cat® Lift Truck's 10 ton to 15 ton pneumatic models. The instructions are grouped by systems to serve the convenience of your ready reference.

Long productive life of your lift trucks depends to a great extent on correct servicing – the servicing consistent with what you will learn from this service manual. We hope you read the respective sections of this manual carefully and know all the components you will work on before attempting to start a test, repair or rebuild job.

The descriptions, illustrations and specifications contained in this manual were of the trucks of serial numbers in effect at the time it was approved for printing. Cat lift truck reserves the right to change specifications or design without notice and without incurring obligation.

These lift trucks are powered by Mitsubishi 6D16TL diesel engine. For the items of the engine, refer to the following service manual:

6D16 Diesel Engine Service Manual (Pub. No. 99709-68130)

Safety Related Signs

The following safety related signs are used in this service manual to emphasize important and critical instructions:



Indicates a specific potential hazard resulting in serious bodily injury or death.



Indicates a specific potential hazard resulting in bodily injury, or damage to, or destruction of, the machine.



Indicates a condition that can cause damage to, or shorten service life of, the machine.

SAFETY

 WARNING

The proper and safe lubrication and maintenance for this lift truck, recommended by Cat lift truck, are outlined in the OPERATION & MAINTENANCE MANUAL for these trucks.

Improper performance of lubrication or maintenance procedures is dangerous and could result in injury or death. Read and understand the OPERATION & MAINTENANCE MANUAL before performing any lubrication or maintenance.

The serviceman or mechanic may be unfamiliar with many of the systems on this truck. This makes it important to use caution when performing service work. A knowledge of the system and/or components is important before the removal or disassembly of any component.

Because of the size of some of the truck components, the serviceman or mechanic should check the weights noted in this Manual. Use proper lifting procedures when removing any components.

Following is a list of basic precautions that should always be observed.

1. Read and understand all warning plates and decals on the truck before operating, lubricating or repairing the product.
2. Always wear protective glasses and protective shoes when working around trucks. In particular, wear protective glasses when pounding on any part of the truck or its attachments with a hammer or sledge. Use welders gloves, hood/goggles, apron and other protective clothing appropriate to the welding job being performed. Do not wear loose-fitting or torn clothing. Remove all rings from fingers when working on machinery.
3. Do not work on any truck that is supported only by lift jacks or a hoist. Always use blocks or jack stands to support the truck before performing any disassembly.

4. Lower the forks or other implements to the ground before performing any work on the truck. If this cannot be done, make sure the forks or other implements are blocked correctly to prevent them from dropping unexpectedly.

 WARNING

Do not operate this truck unless you have read and understand the instructions in the OPERATION & MAINTENANCE MANUAL. Improper truck operation is dangerous and could result in injury or death.

5. Use steps and grab handles (if applicable) when mounting or dismounting a truck. Clean any mud or debris from steps, walkways or work platforms before using. Always face truck when using steps, ladders and walkways. When it is not possible to use the designed access system, provide ladders, scaffolds, or work platforms to perform safe repair operations.
6. To avoid back injury, use a hoist when lifting components which weigh 23 kg (50 lb.) or more. Make sure all chains, hooks, slings, etc., are in good condition and are of the correct capacity. Be sure hooks are positioned correctly. Lifting eyes are not to be side loaded during a lifting operation.
7. To avoid burns, be alert for hot parts on trucks which have just been stopped and hot fluids in lines, tubes and compartments.
8. Be careful when removing cover plates. Gradually back off the last two bolts or nuts located at opposite ends of the cover or device and pry cover loose to relieve any spring or other pressure, before removing the last two bolts or nuts completely.
9. Be careful when removing filler caps, breathers and plugs on the truck. Hold a rag over the cap or plug to prevent being sprayed or splashed by liquids under pressure. The danger is even greater if the truck has just been stopped because fluids can be hot.

10. Always use tools that are in good condition and be sure you understand how to use them before performing any service work.
11. Reinstall all fasteners with same part number. Do not use a lesser quality fastener if replacements are necessary. Do not mix metric fasteners with standard nuts and bolts.
12. If possible, make all repairs with the truck parked on a level, hard surface. Block truck so it does not roll while working on or under truck.
13. Disconnect battery and discharge any capacitors (electric trucks) before starting to work on truck. Hang "Do not Operate" tag in the Operator's Compartment.
14. Repairs, which require welding, should be performed only with the benefit of the appropriate reference information and by personnel adequately trained and knowledgeable in welding procedures. Determine type of metal being welded and select correct welding procedure and electrodes, rods or wire to provide a weld metal strength equivalent at least to that of parent metal.
15. Do not damage wiring during removal operations. Reinstall the wiring so it is not damaged nor will it be damaged in operation by contacting sharp corners, or by rubbing against some object or hot surface. Do not connect wiring to a line containing fluid.
16. Be sure all protective devices including guards and shields are properly installed and functioning correctly before starting a repair. If a guard or shield must be removed to perform the repair work, use extra caution.
17. Always support the mast and carriage to keep carriage or attachments raised when maintenance or repair work is performed, which requires the mast in the raised position.
18. Loose or damaged fuel, lubricant and hydraulic lines, tubes and hoses can cause fires. Do not bend or strike high pressure lines or install ones which have been bent or damaged. Inspect lines, tubes and hoses carefully. Do not check for leaks with your hands. Pin hole (very small) leaks can result in a high velocity oil stream that will be invisible close to the hose. This oil can penetrate the skin and cause personal injury. Use cardboard or paper to locate pin hole leaks.
19. Tighten connections to the correct torque. Make sure that all heat shields, clamps and guards are installed correctly to avoid excessive heat, vibration or rubbing against other parts during operation. Shields that protect against oil spray onto hot exhaust components in event of a line, tube or seal failure, must be installed correctly.
20. Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.
21. Do not operate a truck if any rotating part is damaged or contacts any other part during operation. Any high speed rotating component that has been damaged or altered should be checked for balance before reusing.

HOW TO READ THIS MANUAL

1. Service data in the text

Example:

A: Standard value B: Repair or service limit

Unit: mm (in.)

Clearance between cylinder and piston	A	0.020 to 0.105 (0.00079 to 0.00413)
	B	0.15 (0.0059)

2. Symbols or abbreviations

OP Option

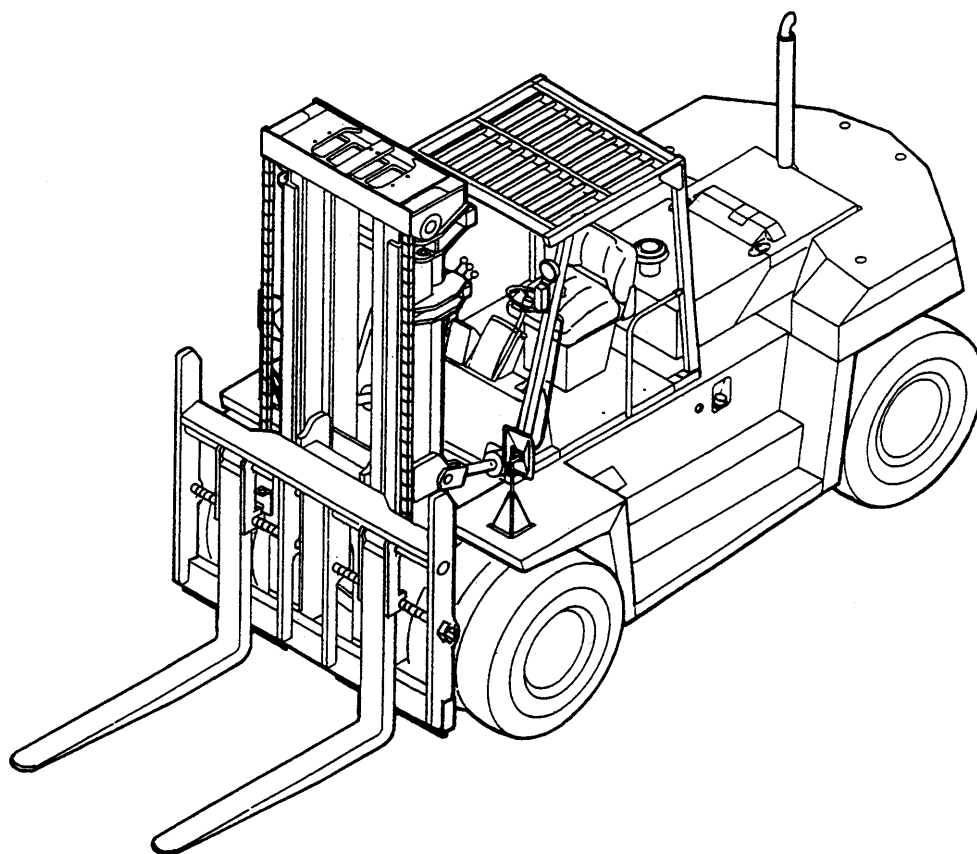
R1/4 Taper pipe thread (external) 1/4 inch (formerly PT1/4)

Rc1/8 Taper pipe thread (internal) 1/8 inch (formerly PT1/8)

G1/4A Straight pipe thread (external) 1/4 inch (formerly PF1/4-A)

Rp1/8 Straight pipe thread (internal) 1/8 inch (formerly PS1/8)

Model View



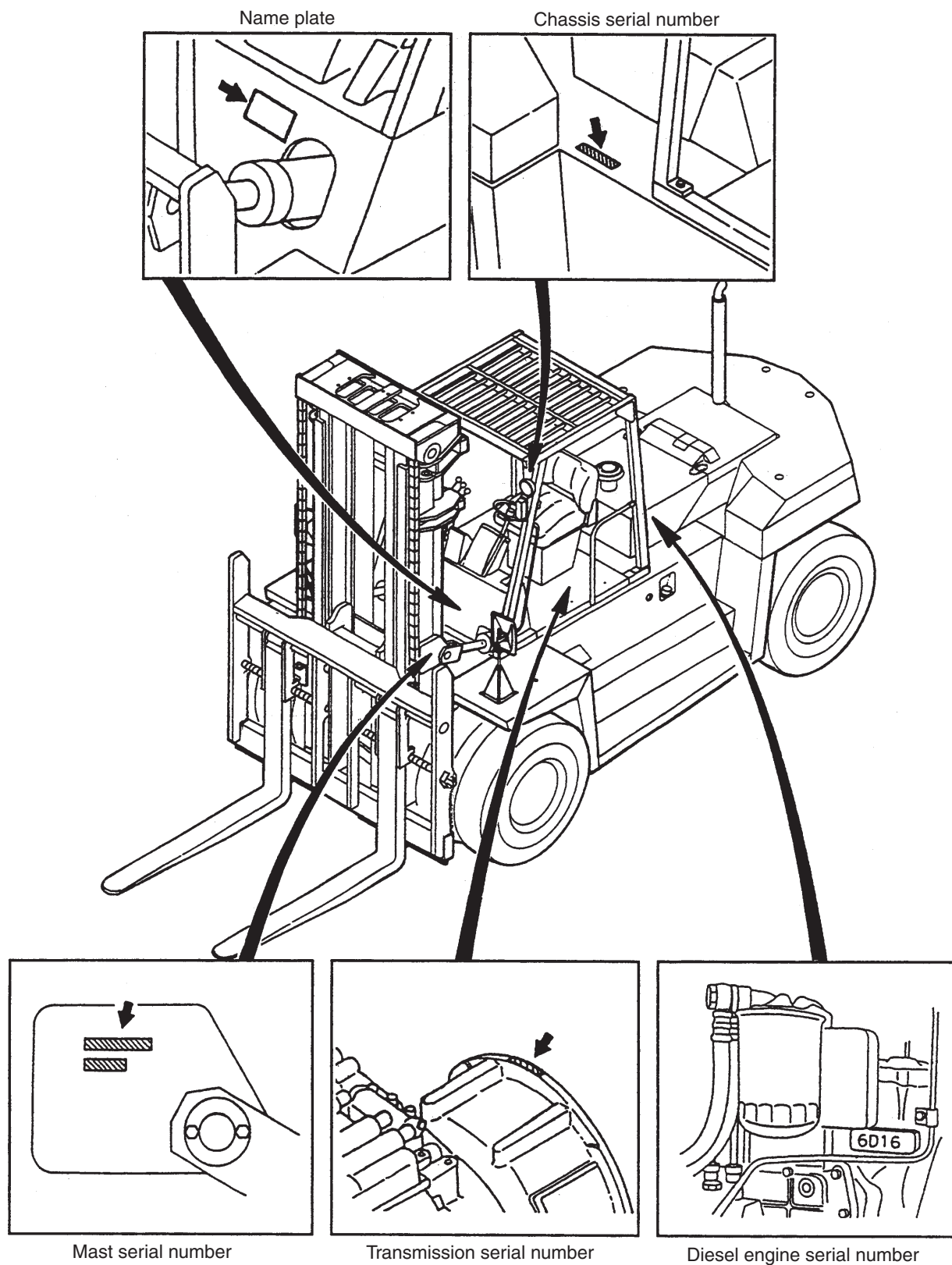
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Truck Models Covered

This Service Manual furnishes servicing and maintenance information for the following trucks:

Truck model	Transmission	Designation – Serial number	Engine mounted
DP100	Powershift	3DP – 10011- up	Mitsubishi 6D16TL diesel engine
DP115	Powershift	4DP – 10011- up	Mitsubishi 6D16TL diesel engine
DP135	Powershift	5DP – 10011- up	Mitsubishi 6D16TL diesel engine
DP150	Powershift	6DP – 10011- up	Mitsubishi 6D16TL diesel engine

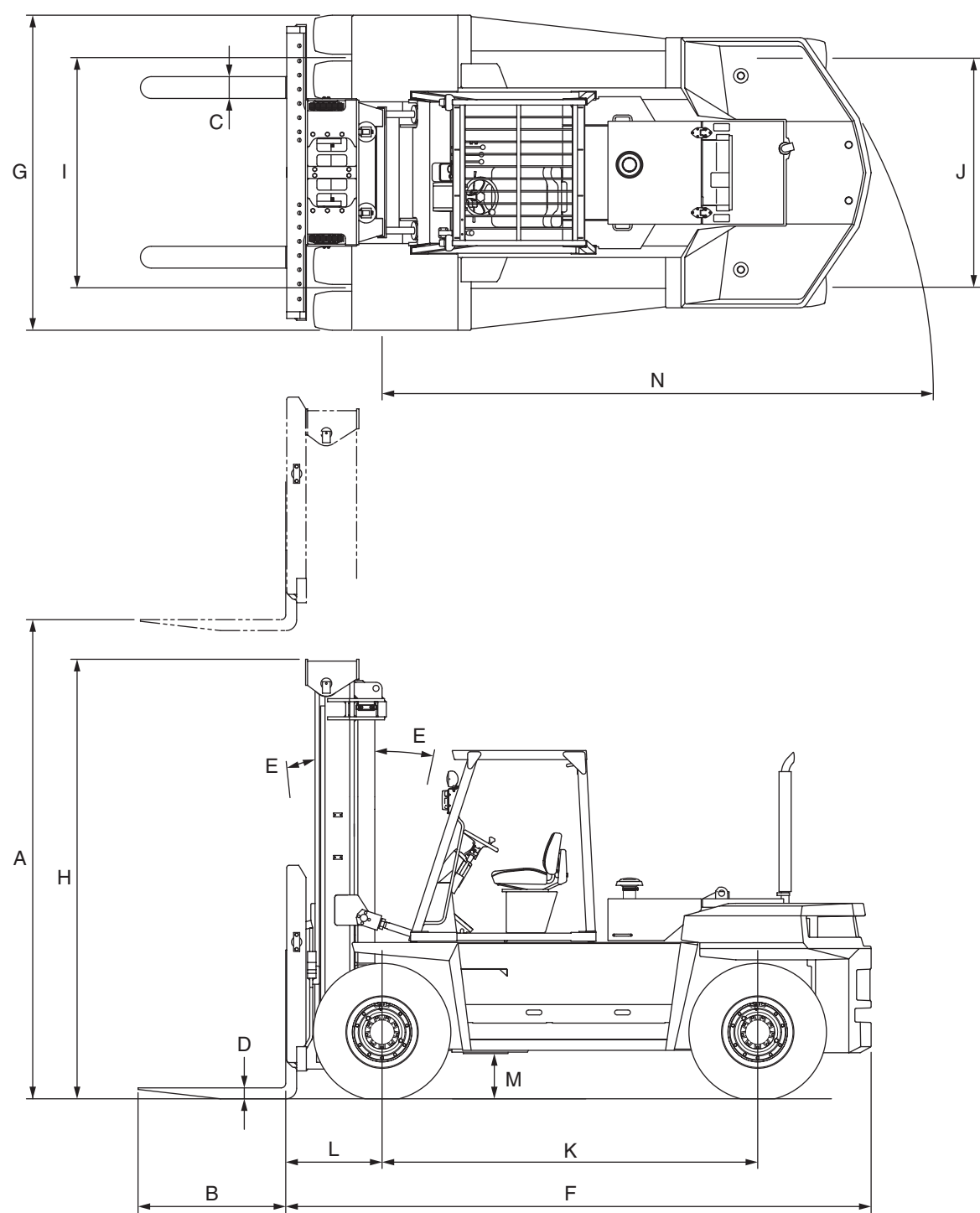
Serial Number Locations



Technical Data

Truck Model			DP100	DP115	DP135	DP150
Item			DP100	DP115	DP135	DP150
Designation			3DP	4DP	5DP	6DP
Type			Standard (with 3-speed powershift transmission)			
General	Capacity/load center kgf/mm (lbf/in.)		10000/600 (22000/24)	11500/600 (25000/24)	13500/600 (30000/24)	15000/600 (33000/24)
	Lift mm (in.)		3000 (120)		3300 (130)	
	Lift speed (unloaded/loaded) mm/sec (fpm)		360/300 (71/65)	360/340 (71/67)	310/290 (61/57)	310/280 (61/55)
	Lowering speed (unloaded/loaded) mm/sec (fpm)		500/450 (98/89)		420/380 (83/75)	
	Tilt angle (forward – backward)		15° – 12°			
	Free lift mm (in.)		0			
Performance	Travel speeds (unloaded/ loaded) km/h (mph)	Forward	31.5/24.5 (20/15)		33.0/22.0 (20/14)	
		Reverse				
	Minimum turning radius mm (in.)		4000 (157)	4060 (160)	4160 (164)	4550 (179)
	Turning angle	Inside	78°27'			
		Outside	51°14'			
	Minimum intersecting aisle mm (in.)		3550 (140)	3590 (141)	3680 (145)	3830 (151)
Tires	Gradeability (rated load)	At 1.6 km/h (1 mph)	32%	29%	23%	
		At 2 km/h (1.2 mph)	21%	19%	15%	14%
	Size of tires (front and rear)		10.00-20- 14PR (I)	10.00-20- 16PR (I)	12.00-20-18PR (I)	
	Inflation pressure of tires (front and rear) kPa (kgf/cm²) [psi]		700 (7.0) [101]	800 (8.0) [116]	800 (8.0) [116]	
Weight and axle loading (unloaded)	Weight kg (lb)		14450 (31860)	15330 (33800)	17320 (38190)	17760 (39160)
	Front axle loading kg (lb)		7090 (15630)	6950 (15320)	7460 (16450)	7940 (17510)
	Rear axle loading kg (lb)		7360 (16230)	8380 (18480)	9860 (21740)	9820 (21650)

Dimensions (Approximate)



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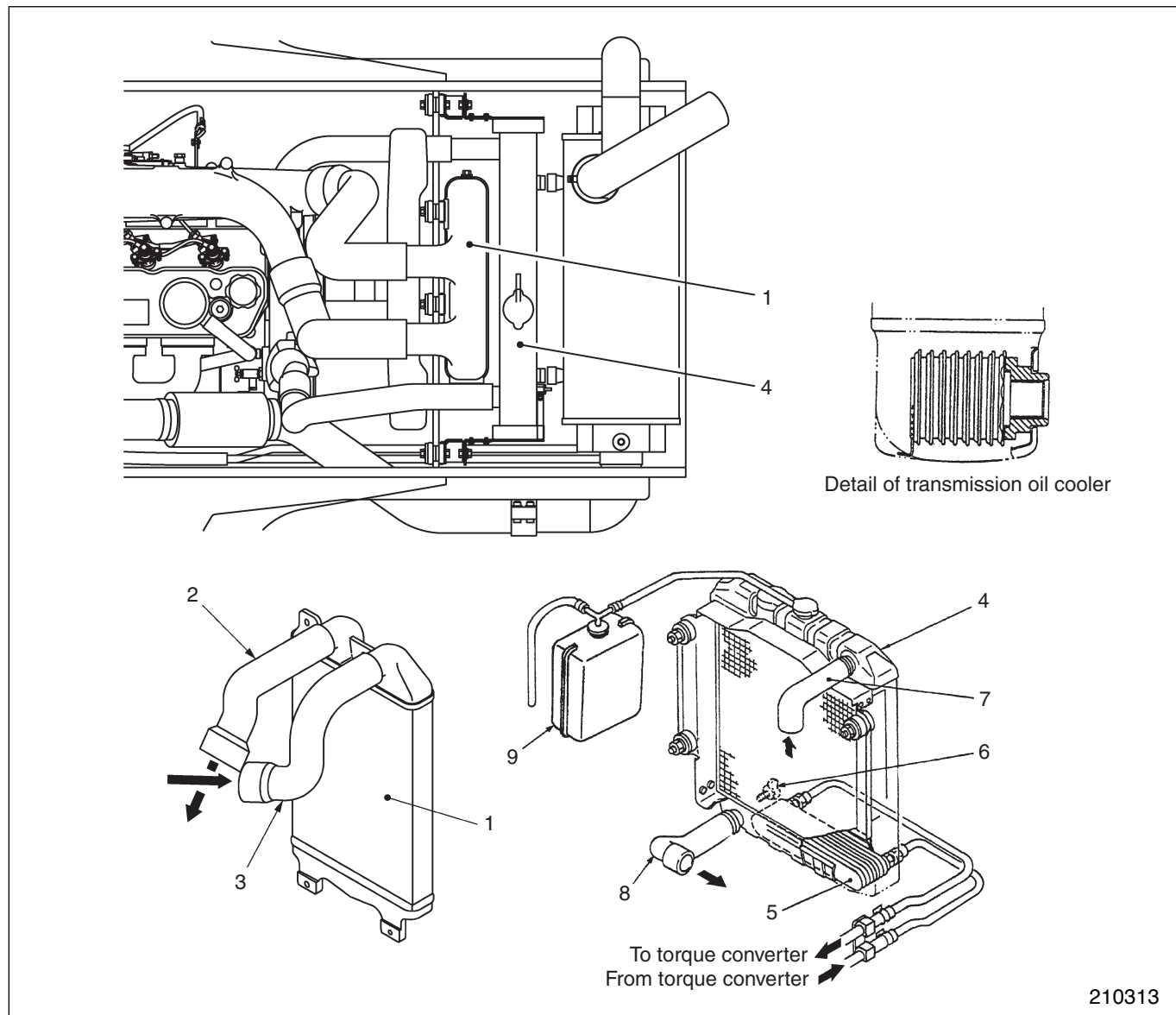
Unit: mm (in.)

Ref. No.	Truck Model Item	DP100	DP115	DP135	DP150
A	Lift	3300 (130)			
B	Fork length	1220 (48)			
C	Fork width	180 (7.1)			
D	Fork thickness	70 (2.8)		90 (3.5)	
E	Tilt angle (forward – backward)	15° – 12°			
F	Overall length	4293 (169)	4371 (172)	4528 (178)	4830 (190)
G	Overall width (outside of tires)	2514 (99)		2599 (102)	
H	Overall height (to top of mast lowered)	3137 (124)		3483 (137)	
I	Tread (front)	1900 (75)		1906 (75)	
J	Tread (rear)	1930 (76)		1890 (74)	
K	Wheelbase	2800 (110)			3100 (122)
L	Front overhang	754 (29.7)	759 (29.9)	792 (31.2)	794 (31.3)
M	Ground clearance (at frame)	340 (13.4)		380 (15.0)	
N	Minimum turning radius	4000 (157)	4060 (160)	4160 (164)	4550 (179)

Specifications

Item	Truck Model	DP100	DP115	DP135	DP150
Type		Forced circulation			
Radiator type		Corrugated fin with pressure cap (with built-in transmission oil cooler)			
Oil cooler type		Plate fin type			
Capacity (complete system)	liter (U.S. gal.)	23 (6.1)			

Description



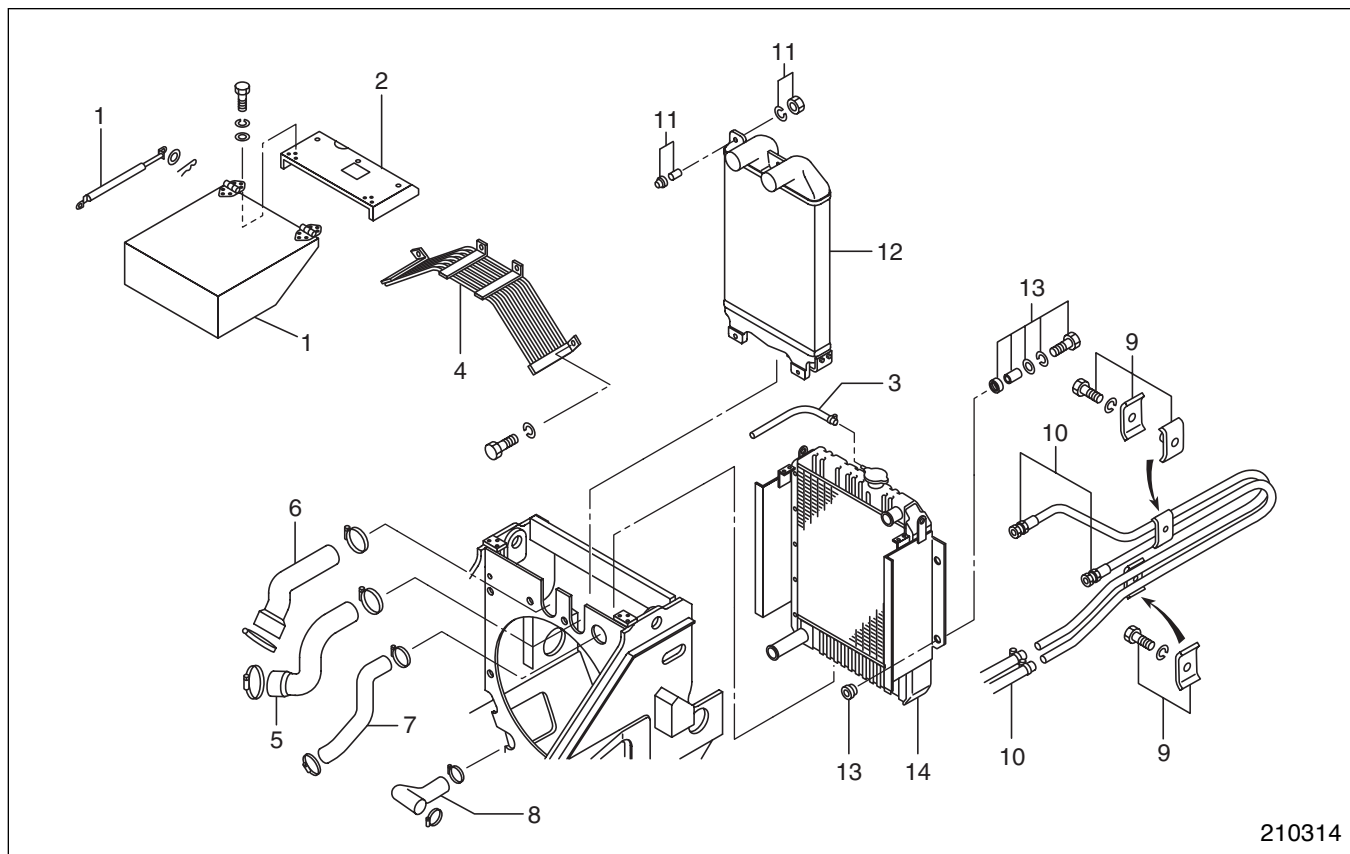
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| 1. Intercooler | 6. Drain cock |
| 2. Intake hose (intercooler) | 7. Upper hose (radiator) |
| 3. Outlet hose (intercooler) | 8. Lower hose (radiator) |
| 4. Radiator | 9. Reserve tank |
| 5. Transmission oil cooler | |

The radiator with a tube-and-fin type core comes standard. The fins are corrugated. The cooling fan is of pusher type and has eight blades to provide high cooling efficiency. The lower tank has a built-in transmission oil cooler which, in operation, is constantly removing heat from the transmission oil returning from the torque converter.

Removal and Installation

Radiator and Intercooler

Removal



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Sequence

- | | |
|-----------------------------|---|
| 1. Engine cover, Gas spring | 8. Radiator hose (lower) |
| 2. Radiator cover | 9. Clamp |
| 3. Reserve tank hose | 10. Oil cooler pipe |
| 4. Fan guard | 11. Intercooler mount, Grommet, Collar, Washers |
| 5. Intercooler intake hose | 12. Intercooler |
| 6. Intercooler outlet hose | 13. Radiator mount, Grommet, Collar, Washers |
| 7. Radiator hoses (upper) | 14. Radiator |

Start by:

Loosen the radiator drain cock to drain coolant from the radiator.



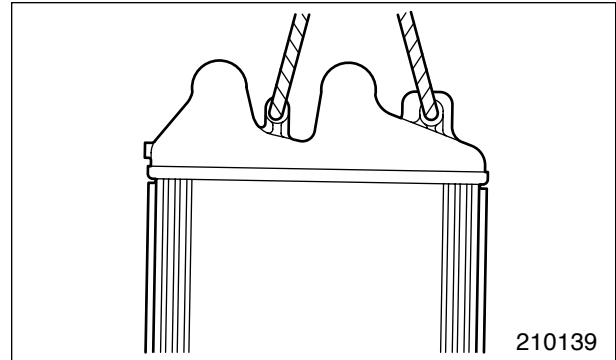
Make sure the coolant temperature is cool before opening the drain cock.

Suggestions for Removal

1. Intercooler

- (1) Install eyebolts in the bracket mounting bolt holes.
- (2) Hitch a sling into the eyebolts and lift the intercooler with a crane to remove.

Weight of intercooler	9 kg (20 lb)
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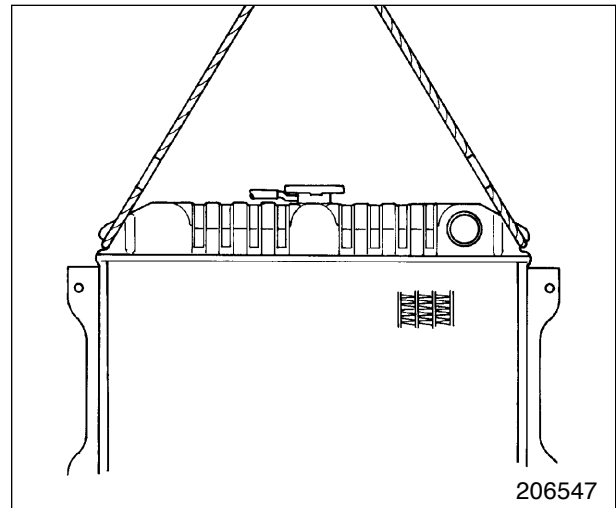


2. Radiator

- (1) Hitch a sling to the radiator and support the radiator.

Weight of radiator	30 kg (66 lb)
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- (2) Remove the radiator mounts (at 4 places) and lift off the radiator.



Inspection

1. Intercooler

- (1) Replace the mounting rubber if it lacks elasticity or if it is hardened.
- (2) If foreign substances such as insects or dust adhere to the core fins, blow compressed air from the opposite direction to remove them, taking care not to damage the fins.
- (3) Replace the intercooler if corrosion and rusting are remarkable or if the fins are unrepairable.
- (4) Check the intercooler hoses (upper and lower) for expansion and damage to the hose clamp. Replace them if any abnormality is found.

2. Radiator

- (1) Blow dirt and bugs, if any, from the radiator fins with compressed air. Be careful not to bend the fins because this will decrease cooling efficiency.

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