



Service Manual

Chassis, Mast & Options

DP100N	T36A-10011-up
DP120N	T37A-10011-up
DP135N	T38A-10011-up
DP150N	T39A-10011-up
DP160N	T40A-10011-up

FOREWORD

This service manual is a guide for servicing Cat® lift trucks. For your convenience the instructions are grouped by systems as a ready reference.

The long productive life of your lift truck(s) depends on regular and proper servicing. Servicing consistent with what you will learn by reading this service manual. Read the respective sections of this manual carefully and familiarize yourself with all of the components before attempting to start a test, repair or rebuild job.

The descriptions, illustrations and specifications contained in this manual are for trucks with serial numbers in effect at the time of printing. Cat Lift Trucks reserves the right to change specifications or design without notice and without incurring obligation.

DP100N, DP120N, DP135N, DP150N and DP160N are powered by Mitsubishi 6M60-TL diesel engine. For engine servicing, please refer to the 6M60-TL diesel engine service manual (Publication Number 99709-61100).

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 lift truck.



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

SAFETY



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.

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

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.



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.

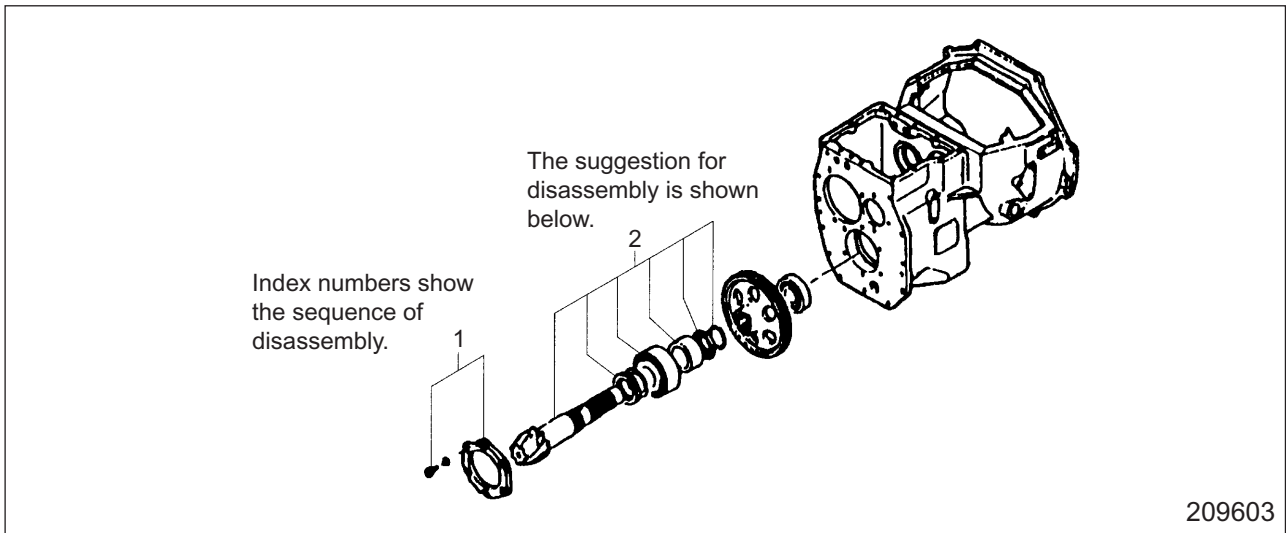
- (4) Lower the forks or other implements to the ground before performing any work on the truck. If this cannot be done, make sure the forks or other implements are blocked correctly to prevent them from dropping unexpectedly.
- (5) Use steps and grab handles (if applicable) when mounting or dismounting 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.

dure 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

Disassembly diagram (example)

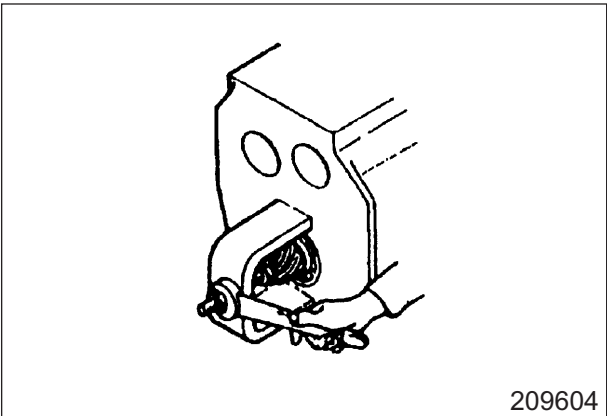


Sequence

- 1 Cover, Bolt, Washer (part name)
- 2 Output shaft (part name)

Suggestion for disassembly

- (1) Output shaft removal



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)

Clearance between cylinder and piston	Standard valve	0.020 to 0.105 mm (0.00079 to 0.00413 in.)
	Repair service unit	0.15 mm (0.059 in.)

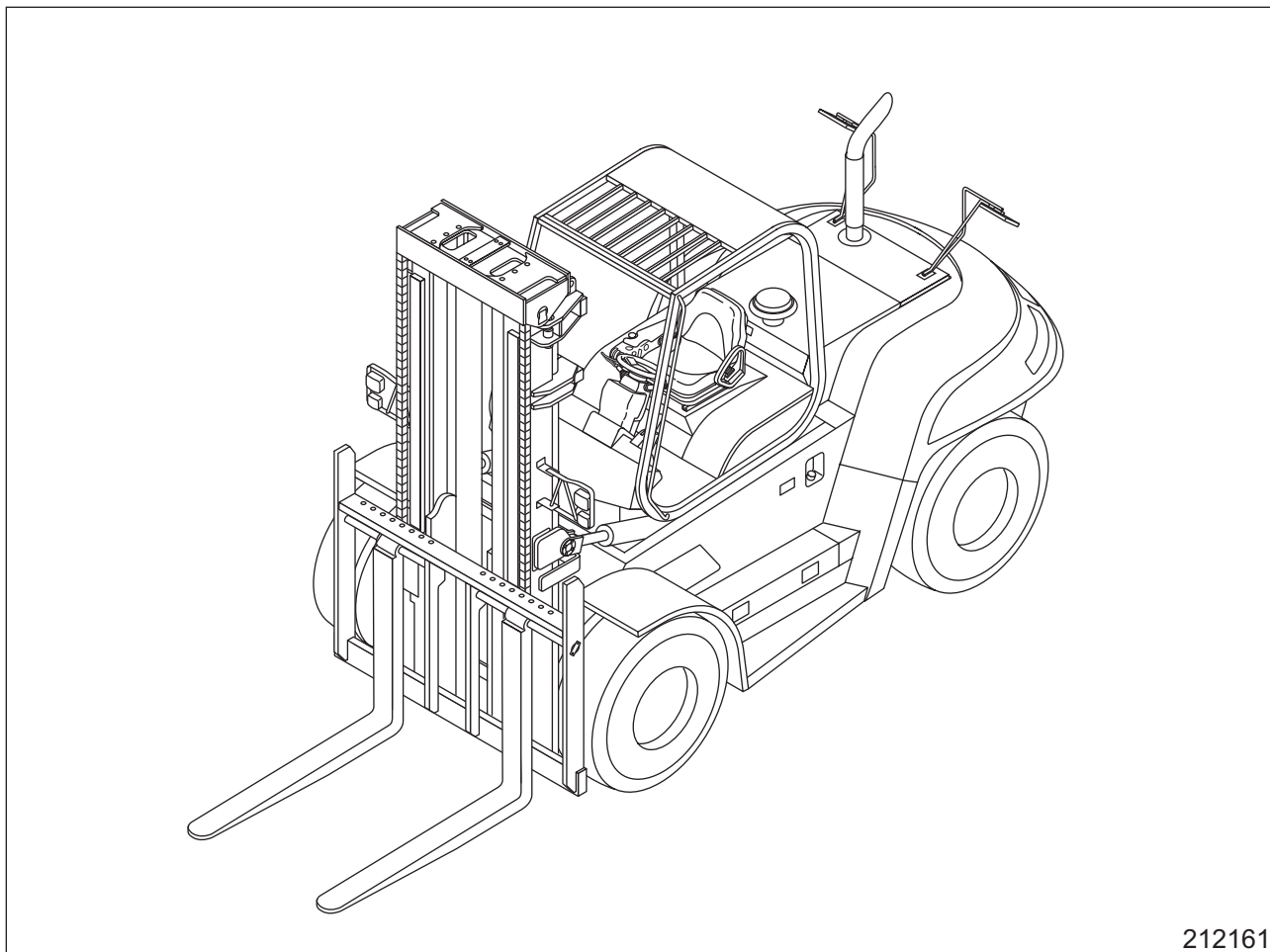
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1. Model View



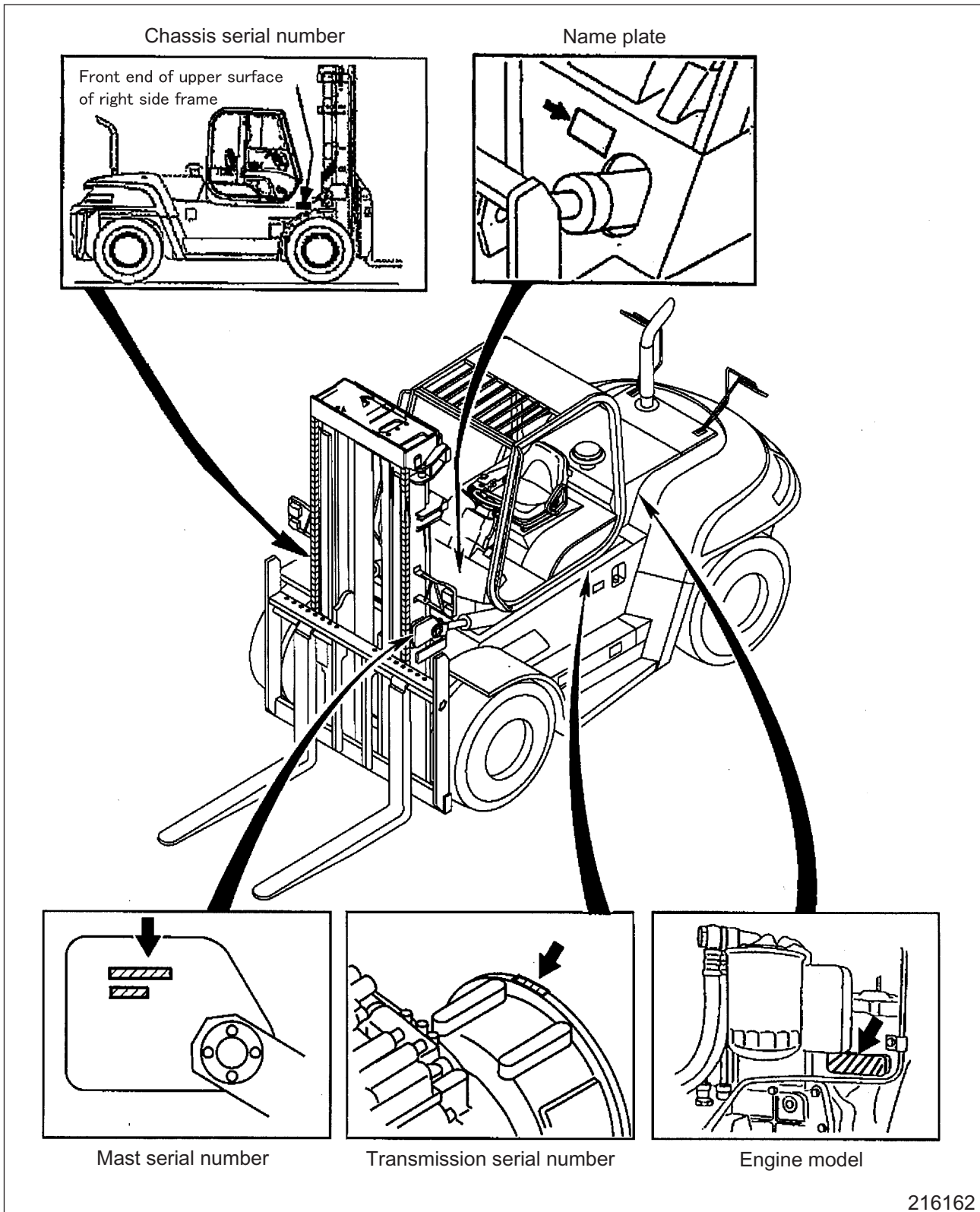
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2. Truck Models Covered

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

Truck model	Transmission	Model code - Serial number	Engine mounted
DP100N	Powershift	T36A-10011-up	Mitsubishi 6M60-TL diesel engine
DP120N	Powershift	T37A-10011-up	Mitsubishi 6M60-TL diesel engine
DP135N	Powershift	T38A-10011-up	Mitsubishi 6M60-TL diesel engine
DP150N	Powershift	T39A-10011-up	Mitsubishi 6M60-TL diesel engine
DP160N	Powershift	T40A-10011-up	Mitsubishi 6M60-TL diesel engine

3. Serial Number Locations

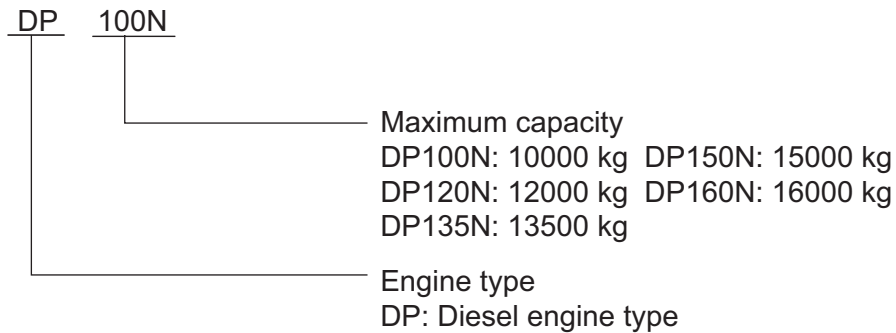


4. Main specifications

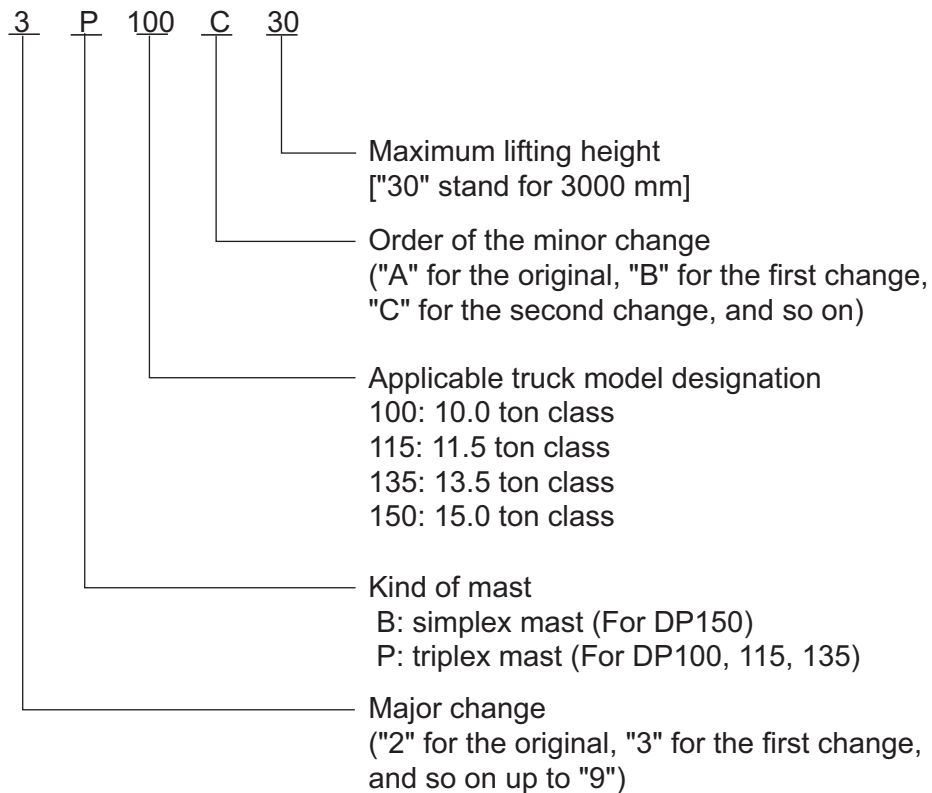
Truck model			DP100N	DP120N	DP135N	DP150N	DP160N
Designation			T36A	T37A	T38A	T39A	T40A
Type			Standard (with 3-speed powershift transmission)				
General	Capacity/load center		10000/600 kgf/mm (17500/24 lbf/in.)	12000/600 kgf/mm (20000/24 lbf/in.)	13500/600 kgf/mm (17500/24 lbf/in.)	15000/600 kgf/mm (20000/24 lbf/in.)	16000/600 kgf/mm (17500/24 lbf/in.)
	Lift		3300 mm (130 in.)				
	Lift speed (unloaded/ loaded)		480/360 mm/sec (104/98 fpm)		400/310 mm/sec (79/61 fpm)		370/310 mm/sec (73/61 fpm)
	Lowering speed (unloaded/ loaded)		500/450 mm/sec (98/89 fpm)		510/380 mm/sec (100/75 fpm)		470/420 mm/sec (93/83 fpm)
	Tilt angle (forward-back- ward)		15°– 12°				
	Free lift		0				
Perform- ance	Travel speeds (unloaded/ loaded)	Forward	29/24.5 km/h (18/15 mph)		30/22.0 km/h (19/14 mph)		
		Reverse					
	Minimum turning radius		4000 mm (157 in.)	4060 mm (160 in.)	4160 mm (164 in.)	4550 mm (179 in.)	4815 mm (190 in.)
	Turning angle	Inside	78°27′				–
		Outside	51°14′				–
	Minimum intersecting aisle		3550 mm (140 in.)	3590 mm (141 in.)	3680 mm (145 in.)	3830 mm (151 in.)	–
Tires	Gradeabil- ity (rated load)	At 1.6 km/h (1 mph)	30%	27%	26%	27%	29%
		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)		12.00-20-20PR (I)
	Inflation pressure of tires (front and rear)		700 kPa (7.0 kgf/cm ²) [101 psi]	800 kPa (8.0 kgf/cm ²) [116 psi]	800 kPa (7.7 kgf/cm ²) [94 psi]		–
Weight and axle loading (unload)	Weight		14800 kg (32630 lb)	16060 kg (28800 lb)	17700 kg (39020 lb)	18050 kg (39790 lb)	18950 kg (41780 lb)
	Front axle loading		7450 kg (16420 lb)	7340 kg (16180 lb)	7850 kg (17310 lb)	8190 kg (18050 lb)	8910 kg (19640 lb)
	Rear axle loading		7350 kg (16200 lb)	8720 kg (19250 lb)	9850 kg (21720 lb)	9860 kg (21730 lb)	10040 kg (22130 lb)

5. Chassis and Mast Model Identification

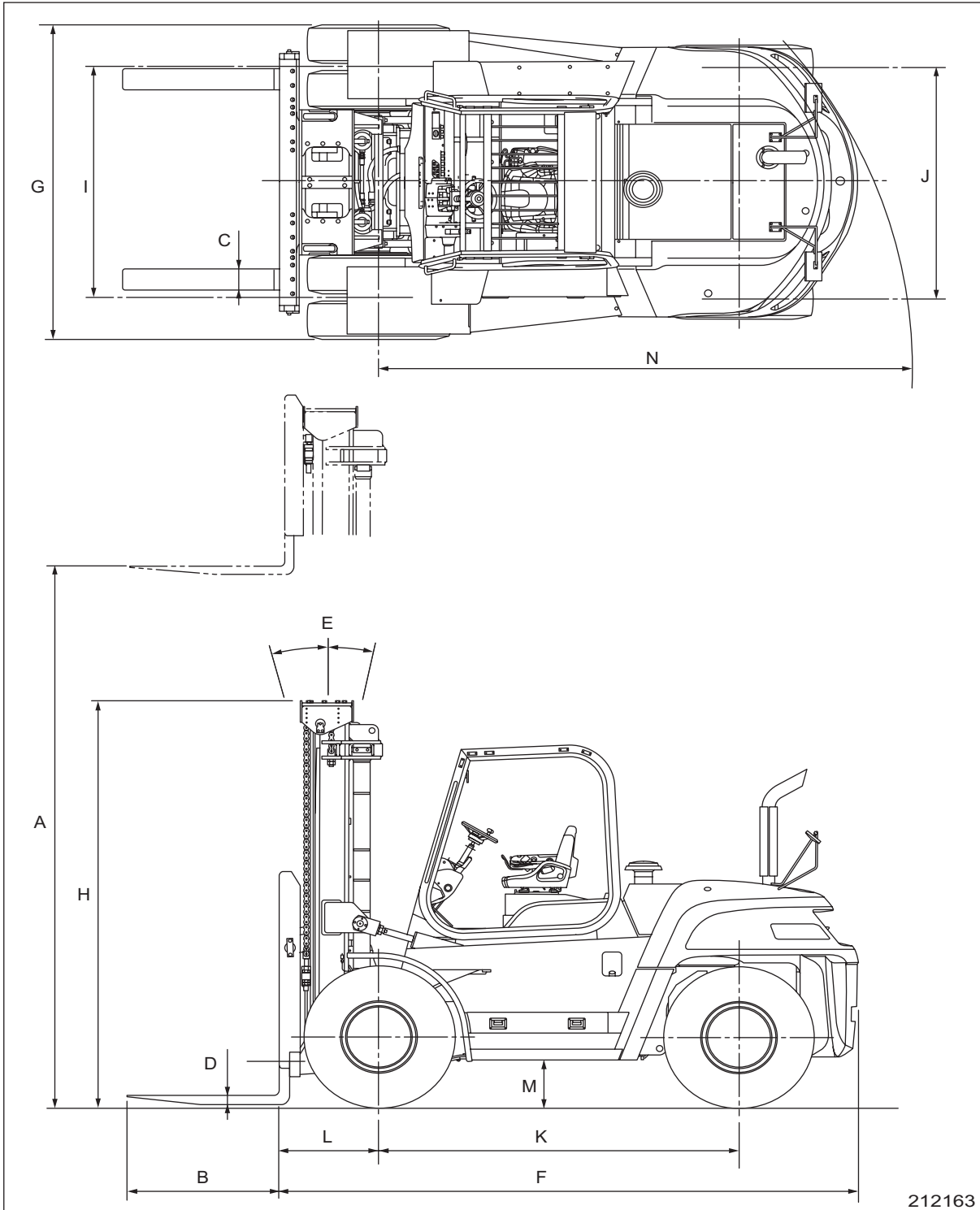
[Chassis]



[Mast]



6. Dimensions (Approximate)



No.	Truck model	DP100N	DP120N	DP135N	DP150N	DP160N
A	Lift	3300 mm (130 in.)				
B	Fork length	1220 mm (48 in.)				
C	Fork width	180 mm (7.1 in.)				
D	Fork thickness	72 mm (2.8 in.)	79 mm (3.1 in.)	88 mm (3.5 in.)	88 mm (3.5 in.)	92 mm (3.6 in.)
E	Tilt angle (forward-backward)	15°–12°				
F	Overall length	4295 mm (169 in.)	4375 mm (172 in.)	4530 mm (178 in.)	4830 mm (190 in.)	5040 mm (198 in.)
G	Overall width (outside of tires)	2515 mm (99 in.)		2600 mm (102 in.)		5040 mm (198 in.)
H	Overall height (to top of mast lowered)	3235 mm (127 in.)		3480 mm (137 in.)		3680 mm (145 in.)
I	Tread (front)	1900 mm (75 in.)		1905 mm (75 in.)		
J	Tread (rear)	1765 mm (77 in.)		1925 mm (76 in.)		1890 mm (74 in.)
K	Wheelbase	2800 mm (110 in.)			3100 mm (122 in.)	3300 mm (130 in.)
L	Front overhang	755 mm (29.7 in.)	765 mm (30 in.)	795 mm (31.3 in.)	795 mm (31.3 in.)	805 mm (31.7 in.)
M	Ground clearance (at frame)	275 mm (10.8 in.)		320 mm (12.6 in.)		
N	Minimum turning radius	4000 mm (157 in.)	4060 mm (160 in.)	4160 mm (164 in.)	4550 mm (179 in.)	4815 mm (190 in.)

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1. Specifications

Truck model		DP100N	DP120N	DP135N	DP150N	DP160N
Cooling system	Cooling method	Forced circulation of coolant				
	Radiator type	Corrugated fins with pressure cap (oil cooler integral type)				
	Oil cooler type	Plate fin type				
	Coolant capacity	23 Liters (4.7 U.S. gal.)				

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