



Michigan L160



ENGINE OUTPUT:
252 hp (185kW) VOLVO
DIRECT-INJECTED,
TURBO CHARGED DIESEL

OPERATING WEIGHT:
49,195 lb(22,3t)

BUCKETS: 4.5 - 8.0 yd³
(3,45 - 6,1 m³)

**AUTOMATIC POWER SHIFT
TRANSMISSION**

**INDUSTRY'S FIRST QUICK
COUPLING ATTACHMENT
BRACKET SYSTEM**

**COMFORT/EFFICIENCY
DESIGNED CAB**

**HIGH LIFT ARM MOUNTING
OFFERS LONG REACH AND
HIGH LIFT HEIGHT**

**PARALLEL LIFT ARMS,
LEVEL FORKS THROUGH
ENTIRE LIFT ARC**

**PILOT OPERATED
"FINGERTIP" HYDRAULICS**

MICHIGAN



ENGINE

Direct-injected, turbocharged 6-cylinder in-line 4-cycle diesel.

Make		Volvo	
Model		TD102GB	
Max. rating* at	2200 rpm	(36,7 rps)	
SAE J1349 (ISO 1585)	264 hp	(194 kW)	
Flywheel rating** at	2200 rpm	(36,7 rps)	
SAE J1349 (ISO 1585)	252 hp	(185 kW)	
DIN 70020/6271	252 hp	(185 kW)	
Max. torque at	1400 rpm	(23,3 rps)	
SAE J1349 (ISO 1585)	710 lbf ft	(962 Nm)	
DIN 70020/6271	710 lbf ft	(962 Nm)	
Number of cylinders	6		
Displacement, total	586 in ³	(9,6 dm ³ ,l)	
Bore	4.75 in	(120,65 mm)	
Stroke	5.5 in	(140 mm)	

Air cleaners

1. Cyclone pre-cleaner with automatic dust ejector.
2. Paper filter with restriction warning light on instrument panel.
3. Replaceable safety filter.

***Max. rating** - Rating of engine equipped only with components essential for engine function, such as injection pump, oil pump, and water pump.

****Flywheel rating** - Net rating measured with fan, intake and exhaust system, cooling system, and alternator mounted.



DRIVETRAIN

Torque Converter: Single stage, single phase.

Transmission: Volvo BM automatic powershift transmission, countershaft-type with bi-directional clutch modulation. Single lever control. Four speeds forward, three reverse.

Axes: Full-floating axle half-shafts with planetary final gear reduction. Single piece cast axle housings. Fixed front axle and oscillating rear axle.

Differentials: Hypoid gear differentials on front and rear axles. 100% differential lock on front axle controlled by floor switch.

Hub Reduction: Planetary-type final drive reduction with low-friction roller bearings mounted in each wheel hub.

Tires: Tubeless with nylon cord body. Other tires available for different applications.

Torque multiplication	2.6 :1
Transmission make, model	* Volvo BM, HT 200
Speeds, forward/reverse	
1	4.5 mph (7,3 km/h)
2	8.4 mph (13,5 km/h)
3	16.6 mph (26,7 km/h)
4	24.8 mph (39,9 km/h)
Measured with tires	26.5-25
Front axle make	Volvo BM
Rear axle make	Volvo BM
Rear axle oscillation, total	30 deg
	12 in (300 mm)



ELECTRICAL

The electrical system is well-protected by fuses. Pre-wired for optional equipment.

Voltage	24 V	
Batteries (12 volt) no.	2	
Battery capacity, ea.	140 Ah	
Cranking capacity, ea.	800 A	
Reserve capacity, ea.	270 min	
Alternator rating	1540/60 W/A	
Starter motor output	9 hp	(6,6 kW)



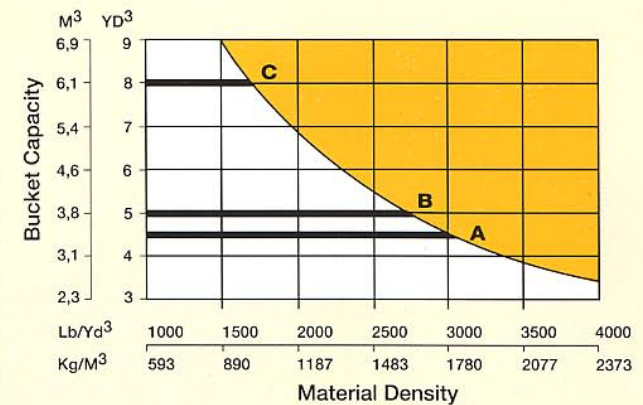
SERVICE REFILL CAPACITIES

Crankcase, with filter	7.1 US gal	(27 dm ³ ,l)
Fuel tank	89.8 US gal	(340 dm ³ ,l)
Cooling system	18.5 US gal	(70 dm ³ ,l)
Transmission, total	12.4 US gal	(47 dm ³ ,l)
Front axle, total	11.9 US gal	(45 dm ³ ,l)
Rear axle, total	14.8 US gal	(56 dm ³ ,l)
Hydraulic system, total	84.5 US gal	(320 dm ³ ,l)
Hydraulic tank	60.8 US gal	(230 dm ³ ,l)



BUCKETS

A - Straight Edge General Purpose	4.5 yd ³	3.45 m ³
B - Straight Edge Material Handling	5.0 yd ³	3.8 m ³
C - Straight Edge Light Material	8.0 yd ³	6.1 m ³



Note:

Correct Bucket Selection is determined by consideration of the work application, material density and type of material. Refer to Operational Data for bucket choices. The above graph is to be used as a guideline.

Contact your VME distributor for assistance.



BRAKES

The brake system meets requirements according to SAE J1152, EG 71/320 and ISO 3450.

Service brakes: Air-hydraulically operated dry disc brakes.

Application of brake pedal applies brakes and also neutralizes transmission when transmission disengaging switch is activated.

Secondary: Dual circuit axle-by-axle system. Actuated by service brake pedal. Visual low pressure alarm. Dead engine braking pressure provided by air reservoir in each circuit.

Parking brake: Wet multi-disc type in transmission case on output shaft. Spring applied, hydraulically released; actuated by a control to operator's left. Warning lamp for brake applied. Flashing central warning light if gear lever is in forward or reverse.

Brake friction area		
Front wheel (ea.)	126 in ²	(810 cm ²)
Rear wheel (ea.)	126 in ²	(810 cm ²)
Reservoirs, no.	3	
Volume, total	1830 in ³	(30 dm ³ ,l)
Parking brake area, total	240 in ²	(1547 cm ²)



STEERING

Articulated frame. Hydrostatic steering system with amplified hydraulics flow.

Pump: Vane type, mounted to a power take-off on the transmission.

Cylinders: Two double-acting cylinders with chrome plated piston rods.

Steering cylinders, no.	2	
Bore	4.3 in	(110 mm)
Stroke	16.7 in	(423 mm)
Relief pressure	2175 psi	(15 MPa)
Steer pump output	50 US gal/min	(190 dm ³ ,l/min)
at pressure	1450 psi	(10 MPa)
and engine speed	2200 rpm	(36,7 rps)



CAB

Integral ROPS/FOPS Cab meets requirements according to SAE J1040C, SAE J231, ISO 3471-1986, ISO 3449-1980, and SS/ISO 6055. Sound-insulating lining. Floor mats. Lockable door. Side and rear window exits. Tinted safety glass.

Heater, Defroster and Ventilator: A three speed fan provides filtered fresh air and defroster for the front and side windows. Air conditioning optional.

Operator's Seat: Fully adjustable suspension seat with seat belt (SAE #J386) and heater.

Heating capacity	39,600 BTU/h	(11,6 kW)
Air conditioning (optional)	19,400 BTU/h	(5,7 kW)



HYDRAULICS

Open center system pilot operated, and filtered breather on reservoir. **Pumps:** Triple vane type, mounted to a power take-off on the transmission.

System Supply: Pumps 1 and 2 supply the main hydraulic functions until the system pressure exceeds 2465 psi (MMPa), when Pump 2 is diverted to tank. Pump 3 supplies the pilot valve circuit.

Valve: Three-spool valve with built-in pressure relief valve. Actuated by a pilot valve, it is mounted on front frame for easy access.

Lift function: The valve has four positions: Raise, hold, lower and float. An automatic kickout detent is adjustable for any position between maximum reach and full lift height.

Tilt function: The valve has three positions: Rollback, hold and dump. Automatic bucket positioner adjustable to any desired loading angle.

Cylinders: Double-acting.

Filters: Two full-flow 10 micron return filters with magnetic core, located in hydraulic oil tank.

Load Unit: Hydraulic cylinders mounted in line with lifting arms.

Pump No. 1

Relief pressure	2900 psi	(20 MPa)
Pump output	66 US gal/min	(250 dm ³ ,l/min)
at pressure	1450 psi	(10 MPa)
and engine speed	2200 rpm	(36,7 rps)

Pump No. 2

Relief pressure	2465 psi	(17 MPa)
Pump output	37 US gal/min	(140 dm ³ ,l/min)
at pressure	1450 psi	(10 MPa)
and engine speed	2200 rpm	(36,7 rps)

Output, pump total	103 US gal/min	(390 dm ³ ,l/min)
Lift cylinders, no.	2	

Bore	6.3 in	(160 mm)
Stroke	43.6 in	(1107 mm)

Tilt cylinders, no.	2	
Bore	5.5 in	(140 mm)
Stroke	38.7 in	(983 mm)

Raising time (loaded) 7.0 s

Dumping time 1.9 s

(loaded)

Lowering time (empty) 2.8 s

Total cycle time 11.7 s

ATTACHMENTS

(for further information please contact your local dealer)

Buckets

- High-Dump Light Materials
- Light Materials
- Multi-Purpose
- Side Dump
- Spade Nose with Teeth
- Spill Plate
- Straight Edge
- Straight Edge with Teeth

Fork Equipment

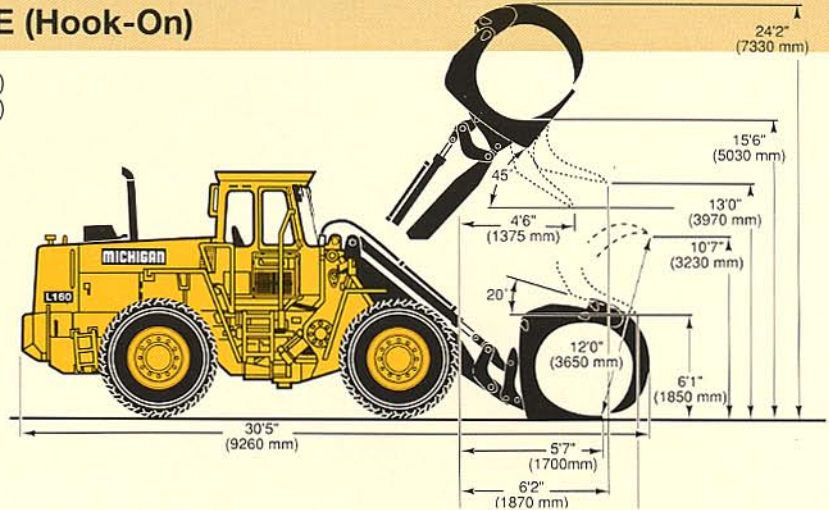
- Fork Frame
- Fork Tines
- Forklift Carrier with One-Piece Top Clamp
- Forklift Carrier with Two Independent Top Clamps

Timber Grapples

- Sorting
- Tree Length
- Unloading
- Heel Kickout
- for Use Only on the Sorting and Unloading Grapples- Requires Hydraulic Control for 4th Function
- Log Pusher

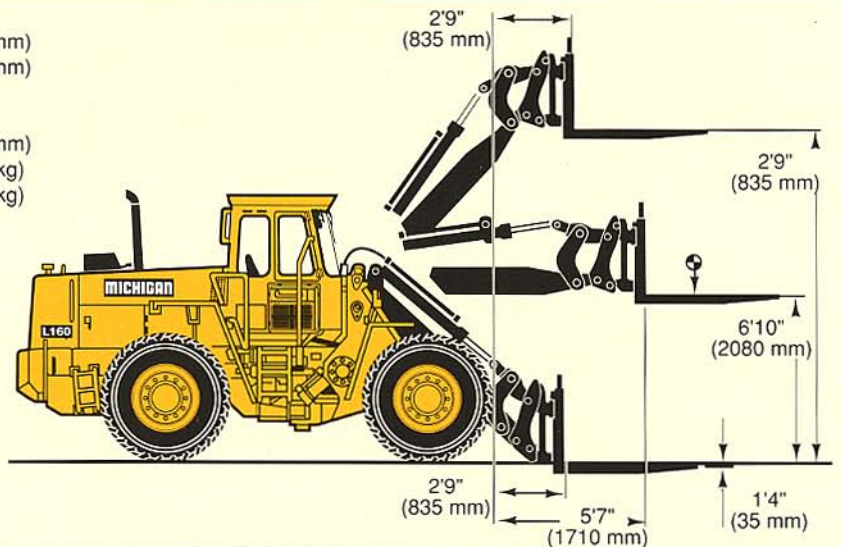
GENERAL PURPOSE GRAPPLE (Hook-On)

Operating Weight 50,077 lb (22 715 kg)
 Operating Load 17,220 lb (7810 kg)



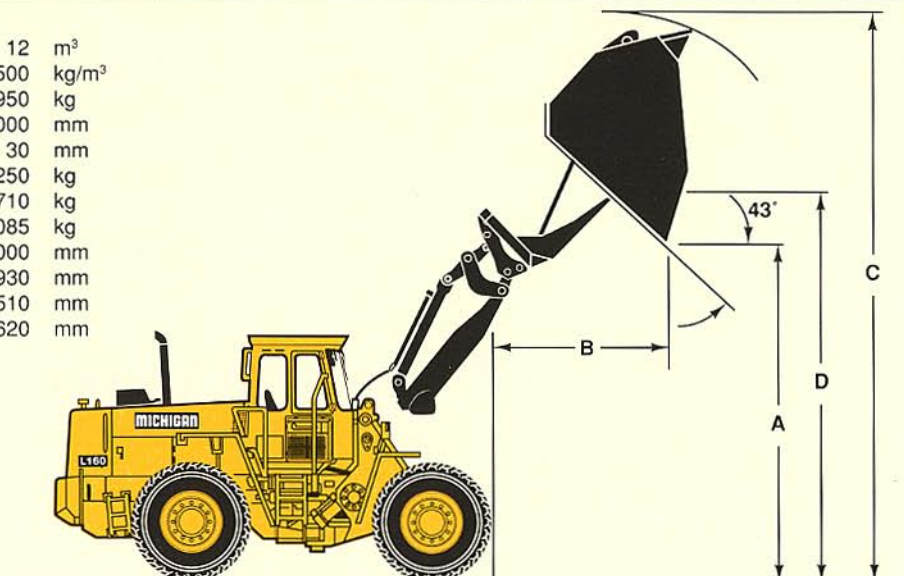
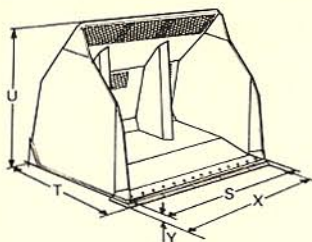
PALLET FORK (Hook-On)

Fork tine length 59" (1500 mm)
 Fork frame width 7'5" (2260 mm)
 Distance to center of gravity, fork tines level 24" (600 mm)
 Operating weight 47,895 lb (21 725 kg)
 Safe working load 22,485 lb (10 200 kg) according to SS 3462



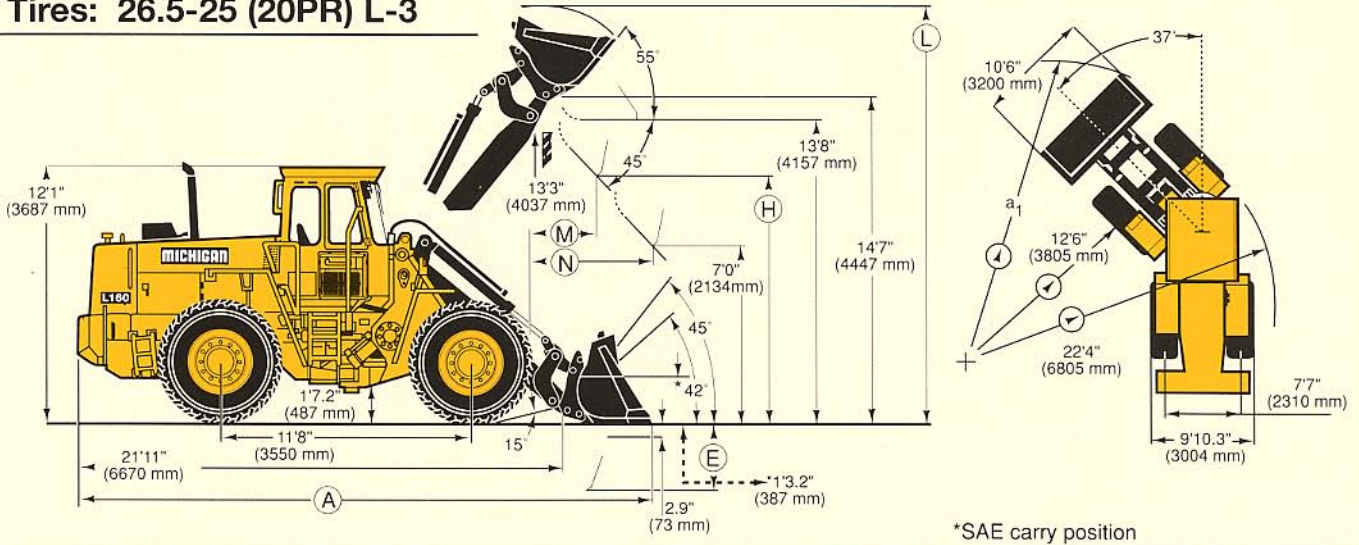
HIGH DUMP BUCKET (90110 Hook on)

Capacity, heaped 15.7 yd³ 12 m³
 Material weight 850 lb/yd³ 500 kg/m³
 Bucketlet weight 6505 lb 2950 kg
 X cutting edge 13' 1.5" 4000 mm
 Y cutting edge 1.2" 30 mm
 A 27' 1" lb 8250 kg
 B 18' 9" lb 5710 kg
 C 16' 8" lb 5085 kg
 D 6' 7" 2000 mm
 S 12' 11" 3930 mm
 T 8' 3" 2510 mm
 U 8' 7" 2620 mm



OPERATIONAL DATA MICHIGAN L160

Tires: 26.5-25 (20PR) L-3



*SAE carry position

†Mounting/Bucket type		Pin-On	Hook-On	Pin-On	Hook-On	Pin-On	Hook-On
Volume, Heaped	yd ³	5.0	5.0	4.5	4.5	8.0	8.0
	m ³	3,8	3,8	3,45	3,45	6,1	6,1
Struck	yd ³	4.2	4.2	3.4	3.4	6.4	6.4
	m ³	3,2	3,2	2,6	2,6	4,9	4,9
Static tipping load, straight	lb	37,390	35,580	37,900	35,935	35,760	34,105
	kg	16,960	16,140	17,190	16,300	16,220	15,470
at 35° turn	lb	32,930	31,255	33,375	31,565	31,365	29,845
	kg	14,940	14,180	15,140	14,320	14,230	13,540
at full turn	lb	32,390	30,740	32,840	31,050	30,850	29,340
	kg	14,695	13,945	14,895	14,085	13,995	13,305
Breakout force	lbf	40,182	36,510	42,550	38,470	31,060	28,720
	kN	178,8	162,5	189,3	171,2	138,2	127,8
Hydraulic lifting force at ground level	lbf	55,970	54,890	56,280	55,150	54,840	53,810
	kN	249,1	244,3	250,4	245,4	244,0	239,4
at max. height	lbf	24,550	23,910	24,737	24,080	23,980	23,350
	kN	109,3	106,4	110,1	107,2	106,7	103,9
(A)	ft in	26'8"	27'2"	26'6"	26'11"	27'11"	28'4"
	mm	8140	8270	8070	8200	8510	8640
(E)	ft in	4'2"	4'7"	4'0"	4'4"	5'4"	5'8"
	mm	1280	1400	1220	1330	1620	1730
(H)	ft in	10'5"	10'2"	10'7"	10'4"	9'7"	9'3"
	mm	3180	3090	3230	3140	2929	2830
(L)	ft in	18'11"	18'11"	18'9"	18'9"	19'5"	19'5"
	mm	5770	5770	5710	5710	5920	5920
(M)	ft in	3'9"	4'1"	3'7"	3'11"	4'8"	4'11"
	mm	1150	1240	1100	1190	1410	1504
(N)	ft in	6'2"	6'4"	6'0"	6'3"	6'8"	6'10"
	mm	1880	1930	1840	1900	2040	2080
a ₁ Turning circle over bucket	ft in	48'5"	48'8"	48'4"	48'6"	49'1"	49'3"
	mm	14,760	14,820	14,730	14,790	14,960	15,020
Weight distribution, front	lb	21,230	22,200	20,925	21,915	22,200	23,170
	kg	9630	10,070	9490	9940	10,070	10,510
Weight distribution, rear	lb	27,965	27,590	28,075	27,700	27,590	27,215
	kg	12,685	12,515	12,735	12,565	12,515	12,345
Operating weight	lb	49,195	49,790	49,000	49,615	49,790	50,385
	kg	22,315	22,585	22,225	22,505	22,585	22,855

†Bolt-on Cutting Edge Increases Bucket Capacity By .25 yd³ (.19 m³)

ALTERATION OF OPERATIONAL DATA

Tires:	26.5-25(20PR)L-3	26.5R25	26.5-25(20PR)L-4	*Counterweight	Wherever applicable, specifications are in accordance with SAE Standards J732 and J742. Changes from the standard configuration may change machine dimensions and operating data. Operating weight is approximate and includes the bucket given in the table and all standard equipment.
Liquid ballast in rear tires	*75% CaCl ₂			N/A	*Liquid ballast in rear tires/counterweight only recommended for stabilizing purposes in timber and pallet handling on hard and level ground.
Width over wheels		-0.16 in (-4 mm)	+0.31in (+8mm)		
Ground Clearance		-0.67 in (-17 mm)	+1.46in (+37mm)		
Tipping Load at full turn	+4190lb (+1900kg)	+340lb(+155kg)	+780lb(+470kg)	+1962lb (+890 kg)	
Operating weight	+3370 lb (+1530 kg)	+562 lb (+255 kg)	+1720 lb(+750kg)	+1168lb (+530 kg)	

STANDARD EQUIPMENT

AIR CLEANER, DRY TYPE, DUAL ELEMENT, EXHAUST ASPIRATED PRECLEANER ALTERNATOR, 24V, 55 AMP BATTERY DISCONNECT, LOCKABLE
 BOOM KICKOUT, AUTOMATIC
 BRAKES, 4-WHEEL AIR OVER HYDRAULIC, DRY DISK, DUAL CIRCUIT BRAKE SYSTEM, SECONDARY
 BUCKET LEVELER, AUTOMATIC WITH POSITION INDICATOR
 CAB ACCESS STEPS & HANDRAILS (SAE J185)
 CAB: ROPS (SAE J1040C) (ISO 3471)
 FOPS (SAE J231) (ISO 3449)
 Acoustical Lining
 Ash Tray, Cigar Lighter
 Door, Lockable (Left Side Access)
 Electrical System: 24V. Pre-wired for Optional Accessories
 Environmental Control: Heater/Defroster/Pressurizer 39,600 Btu/h (11,6 kW) with Three-Speed Blower Fan, Filtered Air
 Floor Mat
 Hand Throttle

Interior Light
 Interior Rearview Mirror
 Safety Glass, Tinted
 Seat Belt (SAE J386)
 Seat, Suspension, 6-Way Adjustable, Heated
 Steering Wheel, Adjustable Tilt
 Storage Compartment
 Sun Visor
 Windshield Washer, Front & Rear
 Windshield Wiper, Front, Intermittent
 Windshield Wiper, Rear
COLD STARTING AIDS:
 Engine Intake Manifold Preheater
 Engine Fuel Mixture Enrichment
DIFFERENTIALS:
 Front, Air Operated Differential Lock
 Rear, Conventional
DRAWBAR WITH PIN EXHAUST RAIN CAP (ELBOW TYPE)
FENDERS, FRONT & REAR HYDRAULIC CONTROL LEVER SAFETY LATCH HYDRAULIC OIL COOLER HYDRAULIC PRESSURE TEST PORTS, QUICK CONNECT INSTRUMENTS/GAUGES, ILLUMINATED:
 Brake System (Dual Indicator) Air Pressure Gauge

Engine Coolant Temperature Gauge
 Fuel Gauge
 Hourmeter
Sight Gauges:
 Coolant Level
 Hydraulic Fluid Level
 Transmission/Converter Fluid Temperature Gauge
ISOLATION MOUNTS:
 Cab, Engine, Transmission, Radiator
LIFTING LUGS
LIGHTS:
 Driving (2-Front), Halogen with High/Low Beam, Parking Lights, Side Marker Lights, Stop/Tail Combination (2-Rear)
 Turn Signals with Hazard Warning Switch
 Work Lights, Halogen (4-Front, 4-Rear)
MIRRORS, REARVIEW (2), EXTERIOR
MUFFLER, SPARK ARRESTING
NEUTRAL START FEATURE
SIDE PANELS, ENGINE HOOD
STEERING FRAME LOCK
TIRES: 26.5-25 (20PR) L-3 (General)
TRANSMISSION: MODULATED, WITH SINGLE LEVER CONTROL, AUTOMATIC POWER SHIFT, AND OPERATOR

CONTROLLED DECLUTCH VALVE, MAIN HYDRAULIC, THREE (3) SPOOL, PILOT OPERATED
VANDALISM LOCK, PROVISION FOR:
 Batteries, Engine Coolant, Engine Oil, Fuel, Hydraulic Fluid, Converter/Transmission Fluid
WARNING ALARMS:
 Horn, Electric
 Reverse Alarm (SAE J994)
WARNING & MONITORING LIGHTS:
 Air Cleaner Restriction
 Alternator Malfunction
 Central Warning Lamp: Brake System Pressure
 Engine Coolant Temperature
 Engine Oil Pressure
 Parking Brake Applied (Transmission in Forward or Reverse)
 Transmission Fluid Temperature
 Differential Lock
 Engine Intake Manifold Pre-heater
 High Beam Driving Lights
 Parking Brake Applied
 Transmission Clutch Pressure

OPTIONAL EQUIPMENT

Air Conditioner, 19,400 Btu/h (5,7 kW)
 Beacon, Amber Rotating
 Bucket Teeth, Bolt-On, (8) (Not for Use on Light Material Buckets)
 Cold Starting Aid, Engine Coolant Pre-heater (110V-1500W)
 Cutting Edge, 3 pc. Reversible, Bolt-On (Not for Use on High Tip Buckets)
 Dual Service Brake Pedals
 Engine Fan, Suction

Engine, High Altitude Version, Factory
 Engine, Shutdown to Idle Kit
 Guards:
 Muffler
 Worklights, Front
 Worklights, Rear
 Hydraulic Attachment Bracket
 Hydraulic Control for 3rd Function
 Hydraulic Control for 4th and 5th Functions

Hydraulic Return Line (Required for any Double Acting 3rd, 4th or 5th Hydraulic Function)
 Light, Attachment Flood (Halogen)
 Radio Mounting Panel (Includes 2 Speakers and Antenna)
 ROPS/FOPS Canopy (Open Type)
 Secondary Steering
 Slow Moving Vehicle Emblem

Spillguard, Bolt-On (Not for Use on Light Material Buckets)
Tire Options:
 26.5-25(20PR)L-2
 26.5-25(20PR)L-4
 26.5-25(20PR)L-5
 26.5R25
 30/65R29

Under our policy of continuous product improvement, we reserve the right to change specifications and design without prior notice. The illustrations do not necessarily show the standard version of the machine.

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