



Michigan L70



ENGINE OUTPUT:
110 hp (81 kW) VOLVO
DIRECT-INJECTED, TURBO-
CHARGED DIESEL

OPERATING WEIGHT:
21,600 LB (9,9 t)

BUCKETS 2.0-3.5 yd³
(1,5-2,7 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 4 cylinder, in-line 4-cycle diesel engine with wet, replaceable cylinder liners.

Make Volvo

Model TD 45B

Max. rating* at	2200 rpm	(36,7 rps)
SAE J1349 (ISO 1585)	118 hp	(87 kW)
Flywheel rating** at	2200 rpm	(36,7 rps)
SAE J1349 (ISO 1585)	110 hp	(81 kW)
DIN 70020	110 hp	(81 kW)
Torque at	1400 rpm	(23,3 rps)
SAE J1349 (gross)	325 lbf ft	(440 Nm)
SAE J1349 (ISO 1585) (net)	314 lbf ft	(425 Nm)
DIN 70020	314 lbf ft	(425 Nm)
Number of cylinders	4	
Displacement, total	273 in ³	(4,48 dm ³ ,l)
Bore	4.2 in	(105,6 mm)
Stroke	5 in	(128 mm)
Compression ratio	15.6:1	

Air cleaners

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

*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 installed.



ELECTRICAL

The electrical system circuits are protected by fuses and pre-wired for optional equipment.

Central warning: Flashing warning lamp with buzzer for following functions: engine oil pressure, brake pressure, parking brake, engine temperature, transmission temperature.

Voltage	24 V	
Batteries (12 volt)	2	
Battery capacity, ea.	105 Ah	
Cranking capacity, ea.	650 A	
Reserve capacity, ea.	130 min	
Alternator rating	1680/60 W/A	
Starter motor output	7.3 hp	(5,4 kW)



SERVICE REFILL CAPACITIES

Crankcase	2.8 US gal	(10,5 dm ³ ,l)
Fuel tank (usable)	47.0 US gal	(178 dm ³ ,l)
Fuel tank (total)	48.9 US gal	(185 dm ³ ,l)
Cooling system	7.1 US gal	(27 dm ³ ,l)
Transmission, total	5.8 US gal	(22 dm ³ ,l)
Front axle, total	6.9 US gal	(26 dm ³ ,l)
Rear axle, total	6.0 US gal	(22,5 dm ³ ,l)
Hydraulic system, total	34.3 US gal	(130 dm ³ ,l)
Hydraulic tank	22.5 US gal	(85 dm ³ ,l)



DRIVETRAIN

Torque Converter: Single stage, single phase.

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

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. Engagement and disengagement by means of switch on cab floor.

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

Tires: Tubeless type with nylon cord. Optional tires available for specific applications.

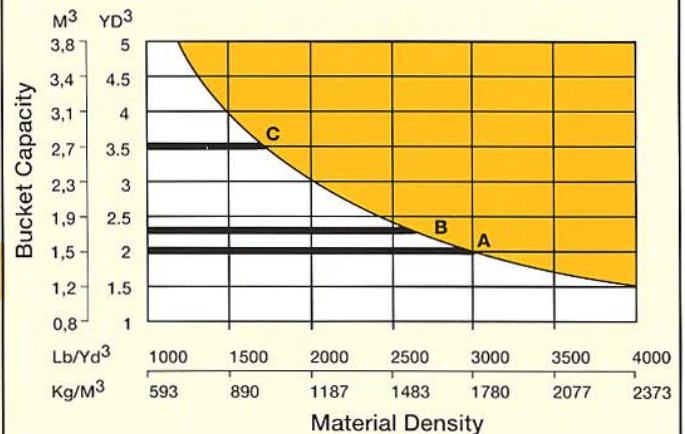
Torque multiplication	2.91:1	
Transmission make, model	Volvo BM, HT 90	
Speeds, forward/reverse		

1	4.1 mph	(6,6 km/h)
2	8.0 mph	(12,8 km/h)
3	14.5 mph	(23,4 km/h)
4 (forward only)	23.9 mph	(38,4 km/h)
Measured with tires	17.5-25	
Front axle make	Volvo BM	
Rear axle make	Volvo BM	
Rear axle oscillation, total	26 deg	
.....	15.75 in	(400 mm)
Standard tires	17.5-25 (12PR) L-2	



BUCKETS

A - Straight Edge General Purpose	2.0 yd ³	1.5 m ³
B - Straight Edge Material Handling	2.25 yd ³	1.7 m ³
C - Straight Edge Light Material	3.5 yd ³	2.7 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, ISO 3450 and EG 71/320.

Service brakes: Full hydraulic power system with outboard mounted 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 three nitrogen-charged accumulators.

Parking brake: Disc brake on front axle input shaft. Manually applied and released. A warning lamp lights if the ignition is on when the parking brake is applied. If the gear lever is then placed in forward or reverse, the central warning lamp flashes and buzzer sounds.

Pump: Fixed displacement gear type, mounted on the torque converter.

Filtration: Full-flow 10 micron filter.

Pressure setting	2180 psi	(15,0 MPa)
Service brake, disc dia.	18.5 in	(470 mm)
thickness	0.63 in	(16 mm)
Brake friction area ea. wheel	62.8 in ²	(405 cm ²)
Parking brake, disc dia.	13 in	(330 mm)
Parking brake area, total	10.9 in ²	(70 mm ²)



STEERING

Articulated frame. Load-sensing hydrostatic steering.

Pump: Variable flow piston type, mounted on torque converter.

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

Steering cylinders, no.	2	
Bore	2.8 in	(70 mm)
Stroke	15.4 in	(390 mm)
Relief pressure	2030 psi	(14 MPa)
Steer pump output	25.6 US gal/min	(97,0 dm ³ /min)
at pressure	1450 psi	(10,0 MPa)
and engine speed	2200 rpm	(36,7 rps)
Articulation	40 deg	



CAB

Integral ROPS/FOPS Cab meets requirements according to SAE J1040C, SAE J231, ISO 3471-1986, ISO 3449-1980, and SS/ISO 6055. Vibration dampened. Sound-insulating lining. Floor mats. Lockable door. Side and rear window emergency exits. All cab windows are 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 seat heater.

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



HYDRAULICS

Pilot-operated, open center system with plate-steel tank construction. Hydraulic tank is vented by filtered breather and the oil is fully filtered and cooled. An access hole is provided in the tank for easy cleaning. An in-tank magnet provides extra protection.

Pumps: One main and one pilot, vane type, mounted on torque converter.

Valve: Split-spool three section valve with built-in pressure relief. Actuated by a manually operated pilot valve, it is mounted on the front frame for easy access.

Lift function: The valve has four positions: Raise, hold, lower and float. An optional automatic kickout 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.

Filter: Full-flow 10 micron return filter with magnet, located in hydraulic oil tank.

Main relief pressure	2975 psi	(20,5 MPa)
Main pump output	45 US gal/min	(170dm ³ /min)
at pressure	1450 psi	(10 MPa)
and engine speed	2200 rpm	(36,7 rps)
Pilot operating	510 psi	(3,5 MPa)
pressure		
Lift cylinders, no.	2	
Bore	3.9 in	(100 mm)
Stroke	37.4 in	(950 mm)
Tilt cylinders, no.	2	
Bore	3.9 in	(100 mm)
Stroke	38.8 in	(985 mm)
Raising time (loaded)	5.1 s	
Dumping time	1.7 s	
(loaded)		
Lowering time (empty)	2.4 s	
Total cycle time	9.2 s	

ATTACHMENTS

(for further information please contact your local dealer)

Buckets

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

Fork Equipment

- Breakout Forks
- Fork Carrier Protection Bars
- Fork Tine Extensions
- Forklift Carrier with Single Piece Hydraulic Top Clamp
- Forklift Carrier with Two Top Clamps
- Pallet Forks
- Pallet Fork with Tine Positioner (Horizontal movement)
- Pallet Fork with Elevating Time

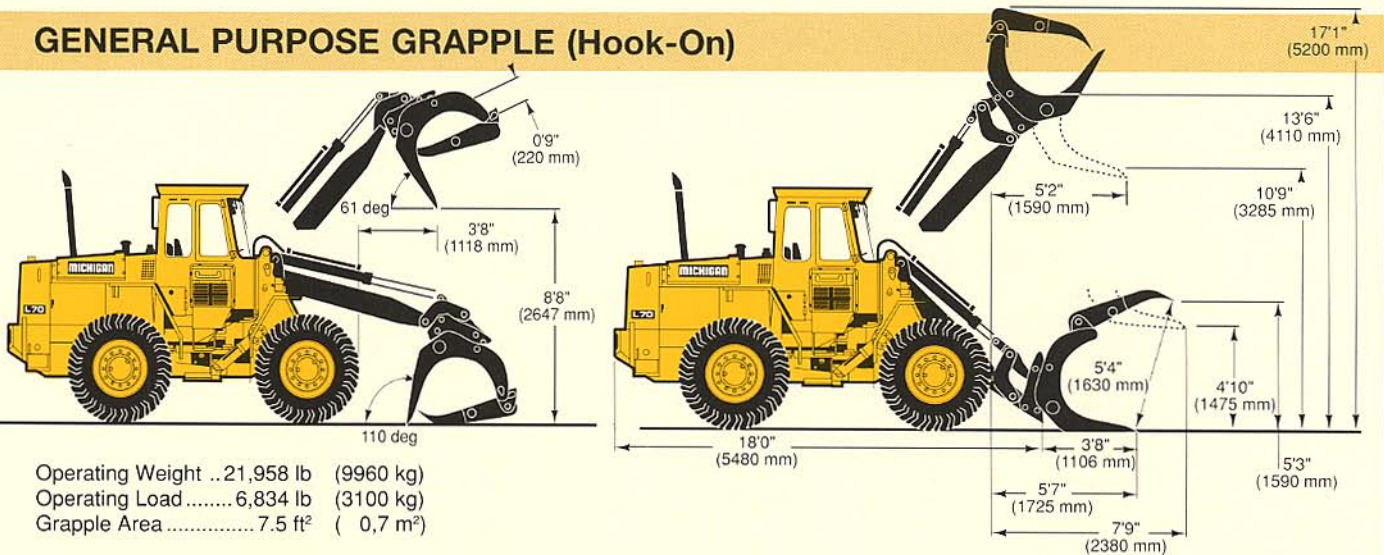
Other Attachments

- Asphalt Cutter
- Attachment Rib Kit (Adapt your existing equipment to the L70)
- Bale Clamp
- Rotary Broom
- Diagonal Snow Blade
- Vee Snow Blade
- Material Handling Arm, Telescopic Manually, Pinned Positions
- Material Handling Arm with Hydraulic Folding, Telescopic Manually, Pinned Positions

Timber Grapples

- (Requires Hydraulic Control for 3rd Function)
- General Purpose Sorting/Unloading
- Heel Kickout for Use Only on the Sorting/Unloading Grapple, Requires Hydraulic Control for 4th Function
- Log Pusher

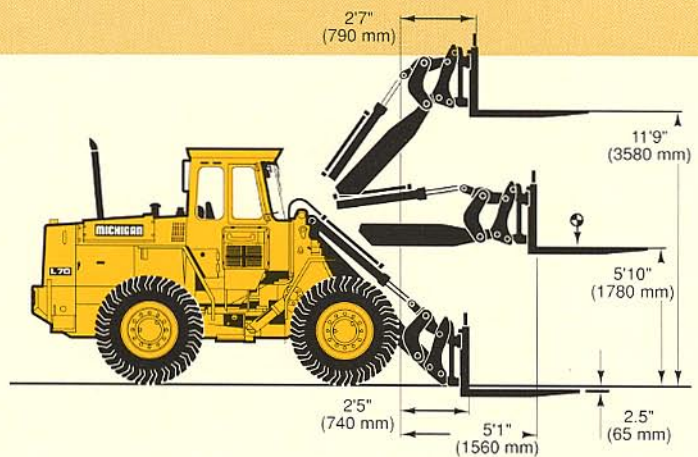
GENERAL PURPOSE GRAPPLE (Hook-On)



Operating Weight ...21,958 lb (9960 kg)
 Operating Load6,834 lb (3100 kg)
 Grapple Area7.5 ft² (0.7 m²)

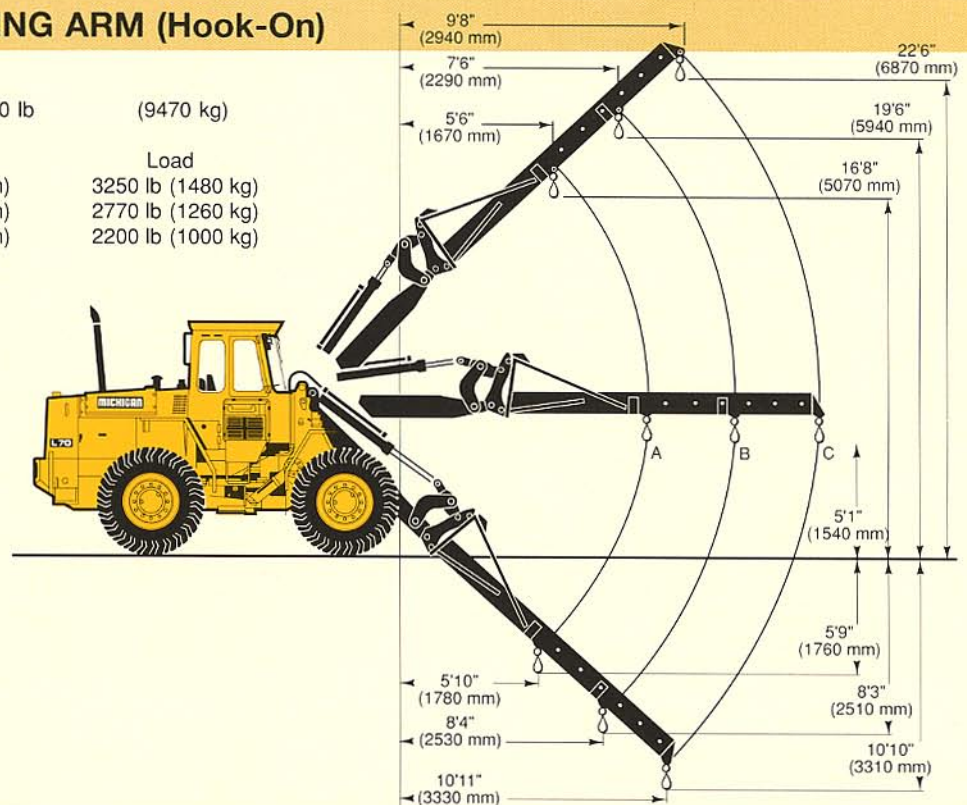
PALLET FORK (Hook-On)

Fork frame with tines
 Tine length 4' 0" (1225 mm)
 Frame width 4' 11" (1500 mm)
 Distance to center of gravity, fork tines level 2' 0" (600 mm)
 Operating weight 20,950 lb (9500 kg)
 Safe working load according to SS 3462 8800 lb (4000 kg)



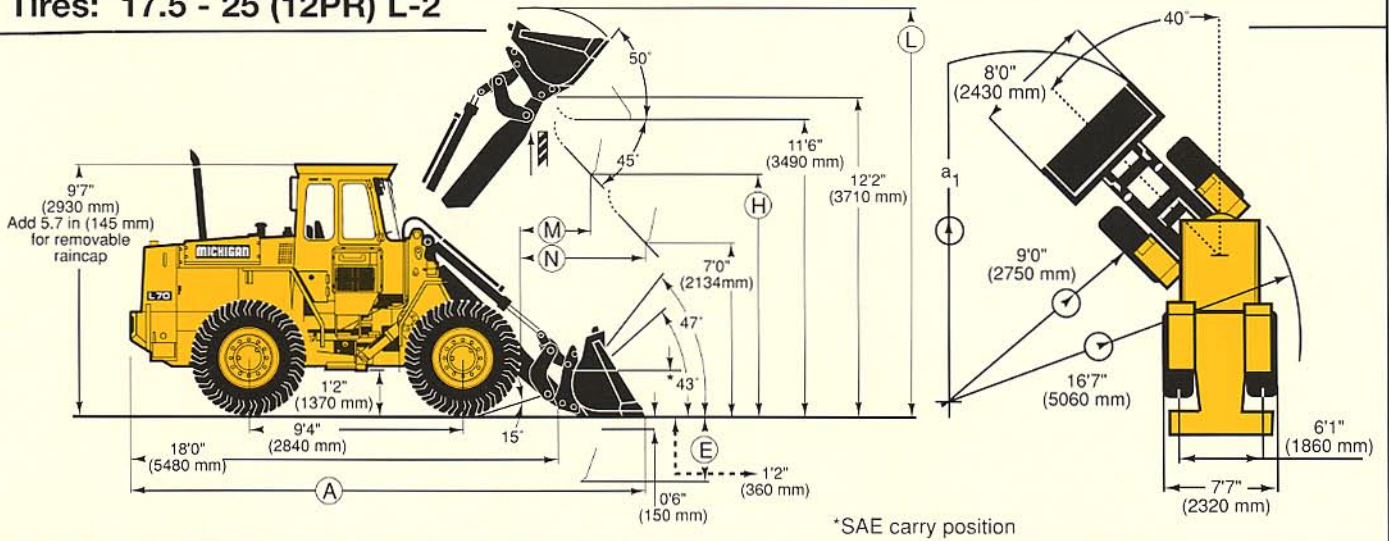
MATERIAL HANDLING ARM (Hook-On)

Operating weight20,880 lb (9470 kg)
 Operating load capacity
 Position Distance Load
 A12'3" (3270 mm) 3250 lb (1480 kg)
 B14'3" (4340 mm) 2770 lb (1260 kg)
 C17'11" (5470 mm) 2200 lb (1000 kg)



OPERATIONAL DATA MICHIGAN L70

Tires: 17.5 - 25 (12PR) L-2



†Mounting/Bucket type	Pin-On	Hook-On	Pin-On	Hook-On	Pin-On	Hook-On
Volume, Heaped	2.25 yd ³ 1.7 m ³	2.25 yd ³ 1.7 m ³	2.0 yd ³ 1.5 m ³	2.0 yd ³ 1.5 m ³	3.5 yd ³ 2.7 m ³	3.5 yd ³ 2.7 m ³
Struck	1.9 yd ³ 1.5 m ³	1.9 yd ³ 1.5 m ³	1.8 yd ³ 1.4 m ³	1.8 yd ³ 1.4 m ³	2.9 yd ³ 2.2 m ³	2.9 yd ³ 2.2 m ³
Static tipping load, straight	15,140 lb 6870 kg	14,390 lb 6520 kg	15,480 lb 7020 kg	14,840 lb 6730 kg	15,230 lb 6910 kg	13,900 lb 6300 kg
at 35° turn	13,500 lb 6120 kg	12,790 lb 5800 kg	13,820 lb 6270 kg	13,210 lb 5990 kg	13,560 lb 6150 kg	12,330 lb 5590 kg
at full turn 40°	13,010 lb 5900 kg	12,320 lb 5590 kg	13,340 lb 6050 kg	12,720 lb 5770 kg	13,070 lb 5930 kg	11,880 lb 5400 kg
Breakout force	23,920 lbf 106.4 kN	21,760 lbf 96.8 kN	25,950 lbf 115.4 kN	23,490 lbf 104.5 kN	17,420 lbf 77.5 kN	16,160 lbf 71.9 kN
Hyd. lifting force, ground level	25,740 lbf 114.5 kN	25,790 lbf 114.7 kN	25,680 lbf 114.2 kN	25,830 lbf 114.9 kN	25,950 lbf 115.4 kN	25,950 lbf 115.4 kN
at max. height	9490 lbf 42.2 kN	9130 lbf 40.6 kN	9510 lbf 42.3 kN	9240 lbf 41.1 kN	9260 lbf 41.2 kN	8840 lbf 39.3 kN
(A)	21'10"	22'1"	21'7"	21'10"	22'11"	23'3"
(E)	6650 mm	6740 mm	6570 mm	6660 mm	7000 mm	7090 mm
(H)	3'3"	3'6"	3'0"	3'3"	4'5"	4'8"
(L)	990 mm	1080 mm	920 mm	1000 mm	1340 mm	1430 mm
(M)	9'2"	9'0"	9'4"	9'2"	8'5"	8'2"
(N)	2800 mm	2740 mm	2850 mm	2790 mm	2560 mm	2500 mm
a ₁	16'0"	16'2"	15'10"	15'11"	16'5"	16'7"
a ₂	4890 mm	4930 mm	4820 mm	4860 mm	5010 mm	5060 mm
(M)	3'5"	3'7"	3'3"	3'5"	4'3"	4'5"
(N)	1050 mm	1100 mm	990 mm	1050 mm	1300 mm	1360 mm
a ₃	5'2"	5'3"	5'1"	5'2"	5'7"	5'8"
a ₄	1580 mm	1610 mm	1550 mm	1580 mm	1700 mm	1720 mm
a ₅ Turning circle over bucket (bucket in carry position)	36'7"	36'9"	36'5"	36'7"	37'3"	37'5"
Weight distribution, front	11 140 mm	11 190 mm	11 100 mm	11 150 mm	11 340 mm	11 400 mm
Weight distribution, rear	9060 lb 4110 kg	9560 lb 4340 kg	9040 lb 4100 kg	9340 lb 4240 kg	9340 lb 4240 kg	9950 lb 4510 kg
Operating weight	12,260 lb 5560 kg	12,040 lb 5460 kg	12,260 lb 5560 kg	12,130 lb 5500 kg	12,130 lb 5500 kg	11,880 lb 5390 kg
	21,320 lb 9670 kg	21,600 lb 9800 kg	21,300 lb 9660 kg	21,470 lb 9740 kg	21,470 lb 9740 kg	21,830 lb 9900 kg

†Bolt-on Cutting Edge Increases Bucket Capacity By .12 yd³ (.09 m³)

ALTERATION OF OPERATIONAL DATA

	17.5-25 Tires	17.5R25 Tires	22/65-25 Tires	*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 in ±0 mm	+4.1 in (+105 mm)		
Ground Clearance		+0.2 in (+5 mm)	-0.55 in (-14 mm)		
Tipping Load at full turn	+1230 lb (+560 kg)	+440 lb (+200 kg)	+250 lb (+113 kg)	+783 lb (+355 kg)	
Operating weight	+1210 lb (+550 kg)	+220 lb (+100 kg)	+432 lb (+196 kg)	+463 lb (+210 kg)	

STANDARD EQUIPMENT			
<p>AIR CLEANER, DRY TYPE, DUAL ELEMENT, EXHAUST ASPIRATED PRECLEANER</p> <p>ALTERNATOR, 24V, 60 AMP</p> <p>BATTERY DISCONNECT, LOCKABLE</p> <p>BOOM LEVER DETENTS</p> <p>ATTACHMENT BRACKET, HYDRAULIC</p> <p>ATTACHMENT BRACKET, SEPARATE LOCKING SYSTEM</p> <p>BRAKES, 4-WHEEL HYDRAULIC, DISC TYPE, DUAL CIRCUIT</p> <p>BRAKE SYSTEM, SECONDARY</p> <p>BUCKET LEVELER, AUTOMATIC WITH POSITION INDICATOR</p> <p>BUCKET LEVER DETENT</p> <p>CAB ACCESS STEPS & HANDRAILS, (SAE J185)</p> <p>CAB: ROPS (SAE J1040C) (ISO 3471) FOPS (SAE J231) (ISO 3449)</p> <p>Acoustical Lining</p> <p>Ash Tray, Cigarette Lighter</p> <p>Door, Lockable (Left Side Access)</p> <p>Electrical System: 24V. Pre-wired for Optional Accessories</p> <p>Environmental Control: Heater/Defroster/Pressurizer 39,600 BTU/h (11,6 kW) with Three-Speed Blower Fan</p>	<p>Filtered Air</p> <p>Floor Mat</p> <p>Hand Throttle</p> <p>Interior Light</p> <p>Interior Rearview Mirror</p> <p>Safety Glass, Tinted</p> <p>Seat Belt (SAE J386)</p> <p>Seat, Suspension, 6-Way Adjustable, Heated</p> <p>Steering Wheel, Adjustable Tilt</p> <p>Storage Compartment</p> <p>Sun Visor</p> <p>Windshield Washer, Front & Rear</p> <p>Windshield Wiper, Front, Intermittent</p> <p>Windshield Wiper, Rear</p> <p>COLD STARTING AIDS: Engine Intake Manifold Pre-heater (ROPS Cab only)</p> <p>Engine Fuel Mixture Enrichment</p> <p>DIFFERENTIALS: Front; Hydraulic Differential Lock</p> <p>Rear; Conventional</p> <p>DRAWBAR WITH PIN</p> <p>ENGINE COOLANT FILTER</p> <p>EXHAUST RAIN CAP (ELBOW TYPE)</p> <p>FENDERS, FRONT & REAR</p> <p>HYDRAULIC CONTROL LEVER SAFETY LATCH</p> <p>HYDRAULIC PRESSURE TEST PORTS, QUICK CONNECT</p> <p>INSTRUMENTS/GAUGES: Illuminated: Brake System Pressure Gauge</p>	<p>Engine Coolant Temperature Gauge</p> <p>Fuel Gauge</p> <p>Hourmeter</p> <p>Transmission/Converter Fluid Temperature Gauge</p> <p>Sight Gauges: Coolant Level Hydraulic Fluid Level</p> <p>ISOLATION MOUNTS: Cab, Engine, Transmission</p> <p>LIFTING LUGS</p> <p>LIGHTS: Driving (2-Front), Halogen with High/Low Beam, Parking Lights, Side Marker Lights, Stop/Tail Combination (2-Rear)</p> <p>Turn Signals with Hazard Warning Switch</p> <p>Work Lights, Halogen (2-Front, 2-Rear)</p> <p>MIRRORS, REARVIEW (2), EXTERIOR</p> <p>MUFFLER, SPARK ARRESTING</p> <p>NEUTRAL START FEATURE</p> <p>SIDE PANELS, ENGINE HOOD</p> <p>STEERING FRAME LOCK</p> <p>TIRES: 17.5-25 (12PR) L-2 (General)</p> <p>TOOL BOX</p> <p>TRANSMISSION: MODULATED WITH SINGLE LEVER CONTROL, AUTOMATIC POWER SHIFT, AND OPERATOR CONTROLLED DECLUTCH VALVE, MAIN HYDRAULIC, THREE (3) SPOOL, PILOT</p>	<p>OPERATED VANDALISM LOCK, PROVISION FOR: Batteries, Engine Coolant, Engine Oil, Fuel, Hydraulic Fluid, Converter/Transmission Fluid, Tool Box</p> <p>WARNING ALARMS: Central Warning Buzzer Horn, Electric</p> <p>WARNING ALARM (SAE J994)</p> <p>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</p> <p>Engine Intake Manifold Pre-heater</p> <p>High Beam Driving Lights</p> <p>Parking Brake Applied</p> <p>TRANSMISSION OIL PRESSURE</p>
OPTIONAL EQUIPMENT			
<p>Air Conditioner, 19,400 BTU/h (5.7 kW)</p> <p>Alternator, Sealed</p> <p>Attachment Rib Kit (For adapting existing attachments on VME attachment bracket)</p> <p>Beacon, Amber Rotating</p> <p>Boom Kickout, Automatic, Adjustable</p> <p>Bucket Spillguard, Bolt-On</p> <p>Bucket Teeth, Bolt-On, (8) (Not for Use on Light Material Buckets)</p> <p>Cab Filters, Asbestos Protection</p>	<p>Cold Starting Aid, Engine Coolant Pre-heater (110V-11500W)</p> <p>Cutting Edge, 3 pc. Reversible, Bolt-On (Not for Use on High Tip Buckets)</p> <p>Dual Service Brake Pedals</p> <p>Engine Air Pre-cleaner, Oil Bath Type</p> <p>Engine Fan, Suction</p> <p>Engine, High Altitude Version, Factory</p> <p>Engine Oil Pressure Gauge</p> <p>Engine, Low Emission Version, Factory</p> <p>Engine, Shutdown to Idle Kit</p>	<p>Extra Air Outlets</p> <p>Guards: Headlights, Front Muffler</p> <p>Taillights, Rear</p> <p>Windshield, Front</p> <p>Worklights, Rear</p> <p>Horn, Electric (Extra Loud)</p> <p>Hydraulic Control for 3rd Function</p> <p>Hydraulic Control for 3rd and 4th Functions</p> <p>Hydraulic Oil Cooler</p> <p>Hydraulic Single Acting Control</p> <p>Radiator, Corrosion Resistant</p> <p>Radio Mounting Panel (Includes 2 Speakers, Antenna and 12 Volt Converter)</p>	<p>ROPS/FOPS Canopy (Open Type)</p> <p>Secondary Steering</p> <p>Slow Moving Vehicle Emblem</p> <p>Speedometer/Tachometer</p> <p>Tire Options: 17.5-25 (12 PR) L-3 17.5R25 22/65-25 (12PR) L-2</p> <p>Transmission Clutch Pressure Gauge</p> <p>Transmission, 8 Speed</p> <p>Voltmeter</p> <p>Working Lights, Front, Extra</p> <p>Working Lights, Rear, Extra</p>

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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