



# Michigan L90B



- **Engine output gross:**  
SAE J1349 115 kW (156 hp)
- **Operating weight:**  
12,6 t (27,600 lb)
- **Buckets:**  
2,1-6,5 m<sup>3</sup> (2,7-8,5 yd<sup>3</sup>)
  
- *Direct-injected, turbocharged Volvo diesel*
- *Volvo BM Automatic Power Shift*
- *Precision steering and small turning radius*
- *Care Cab – the cab with great comfort and safety*
- *Contronic monitoring system*
- *Loader unit with parallel lift-arm action, high lift height and long reach*
- *Pilot operated hydraulic system*
- *Ample breakout and lifting forces*
- *The largest family of attachments on the market*

**MICHIGAN**



## ENGINE

The engine is a 6-cylinder, direct-injection, 4-stroke, turbocharged diesel with wet, replaceable cylinder liners.

### Air cleaning:

1. Cyclone cleaner with automatic exhaust ejector.
2. Paper filter with indicator in the cab.
3. Safety filter.

Make	Volvo		
Model	TD 61 GB		
Output at	rps	rpm	36,7 2200
SAE J1349 Gross	kW	hp	115 156
Flywheel output at	rps	rpm	36,7 2200
SAE J1349 Net	kW	hp	109 148
DIN 70020 / 6271 Net	kW	hp	109 148
Max. torque at	rps	rpm	23,3 1400
SAE J1349 Gross	N•m	lbf ft	640 472
SAE J1349 Net	N•m	lbf ft	630 465
DIN 70020 / 6271 Net	N•m	lbf ft	630 465
No. of cylinders	6		
Displacement, total	l	in <sup>3</sup>	5,48 334
Bore	mm	in	98,43 3.87
Stroke	mm	in	120 4.72
Compression ratio	16:1		



## ELECTRICAL SYSTEM

*Conronic* monitoring system with extended function surveillance. Solid-state electrical distribution box. The electrical system is well-protected by fuses. Prewired for optional equipment.

### Central warning:

*Central warning lamp for following functions: engine oil pressure, brake pressure, parking brake (buzzer as well), engine temperature (buzzer as well) transmission temperature, transmission oil pressure, secondary steering (optional equipment).*

Voltage	V	24	
Batteries	V	2x12	
Battery capacity	Ah	2x105	
Cranking capacity, ea.	A	800	
Reserve capacity, ea.	min	270	
Alternator rating	W / A	1680 / 60	
Starter motor output	kW	hp	5,4 7.3



## SERVICE REFILL CAPACITIES

Crankcase	l	US gal	17	4.5
Fuel tank	l	US gal	210	55
Cooling system	l	US gal	53	14
Transmission, total	l	US gal	33	8.7
Front axle, total	l	US gal	32,5	8.6
Rear axle, total	l	US gal	29,5	7.8
Hydraulic system	l	US gal	130	34.0
Hydraulic tank	l	US gal	95	26



## DRIVETRAIN

**Torque converter:** single-stage, single-phase.

**Transmission:** Volvo BM power shift transmission of countershaft type with directional clutch modulation. Single lever control.

**Axles:** fully floating half-shafts. One-piece cast steel axle housing. Rigid front axle and oscillating rear axle.

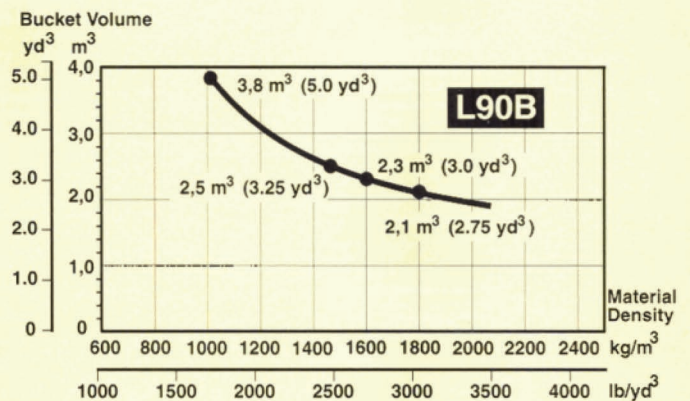
**Differential:** 100% differential lock on front axle. Engagement and disengagement by means of switch on cab floor.

**Hub reduction:** Volvo BM manufacture with planetary type hub reduction gears. Low-friction roller bearings on each planetary wheel. The hub reduction gears can be removed without having to remove wheels and brakes.

**Tires:** alternative tires are available for different working operations.

Torque multiplication	2,66 : 1			
Transmission, make	Volvo BM			
Model	HT 131			
Running speeds				
1, forward/reverse	km/h	mph	7,2	4.5
2, forward/reverse	km/h	mph	13,6	8.5
3, forward/reverse	km/h	mph	28,5	17.7
4, forward	km/h	mph	39,7	24.9
Measurement with tires	20.5 R 25*			
Front axle, make	Volvo BM			
Model	AH 55 E			
Rear axle, make	Volvo BM			
Model	AH 45 K			
Oscillation	± °	in	15	
	mm		525	20.7

## BUCKET SELECTION DIAGRAM



## ALTERATION OF DIMENSIONAL DATA

Tires:	20.5-25(12PR)L-2	20.5-25(12PR)L-3	Counterweight 1	*Counterweight 2
Extra counterweight	kg lb		300* 660	500** 1100
Width over wheels	mm in			
Ground clearance	mm in			
Tipping load at full turn	kg lb	-100 -220	+530 1170	+800 1760
Operating weight	kg lb	-220 -485	+300 660	+500 1100

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.

\*Counterweight only recommended for stabilizing purposes in timber and pallet handling on hard and level ground. May be combined with counterweight 1 only in timber and pallet handling on hard and flat surface.



## BRAKE SYSTEM

The brake system meets requirements according to SAE J1473, EG 71/320 and ISO 3450.

**Service brakes:** fully hydraulically operated power disc brakes. Transmission disengagement when braking preselected with a switch on the instrument panel.

**Secondary:** two independent circuits, axle divided system.

**Parking brake:** disc brake on front axle pinion drive flange. A warning lamp indicates when the parking brake is applied and gear lever is in forward or reverse.

Brake friction area				
front/wheel ea.	cm <sup>2</sup>	in <sup>2</sup>	405	<b>62.8</b>
rear/wheel ea.	cm <sup>2</sup>	in <sup>2</sup>	405	<b>62.8</b>
Accumulators				
volume, total	l	in <sup>3</sup>	2	<b>61</b>
Parking brake				
area, total	cm <sup>2</sup>	in <sup>2</sup>	100	<b>15.5</b>



## STEERING SYSTEM

Load-sensing hydrostatic articulated steering.

**Pump:** variable flow axial piston pump fitted to a power take-off on transmission.

**System supply:** steering system supplied from separate steering pump.

**Cylinders:** two double-acting cylinders.

Steering cylinders				
Bore	mm	in	80	<b>3.2</b>
Piston rod diameter	mm	in	50	<b>2.0</b>
Stroke	mm	in	410	<b>16.1</b>
Relief pressure				
Flow	MPa	psi	16,5	<b>2393</b>
	l/min		91	
	<b>US gpm</b>		<b>24</b>	
at				
and engine speed	MPa	psi	10	<b>1450</b>
	rps	rpm	36,7	<b>2200</b>



## CAB

**Safety and comfort:** Tested and approved according to standards: ROPS (ISO/CD 3471-1990, SAE J1040 APR88), FOPS (ISO 3449-1984, SAE J231), and meets standard according to "Overhead guards for rider lift trucks" (ISO 6055-1981) and "Operator Restraint System" (SAE J386).

The *Care Cab* has convenient boarding steps and a wide door opening. It is lined on the inside with sound-absorbent material and mounted on 4 rubber pads to damp sound and inhibit vibration.

Large glazed areas, good all-round visibility. The windshield is curved and made of laminated green-tinted glass.

All important operator information is presented clearly visible in front of the operator. Information panel for *Contronic* monitoring system.

**Heater and defroster:** Heating element with filtered fresh air and 4-speed fan with defroster outlets for all windows.

**Operator's seat:** Spring-suspended, adjustable operator's seat with lap belt. The seat is hung on a bracket on the rear wall. The force from the lap belt is absorbed by the seat rails.

Emergency exits			3	
Ventilation	m <sup>3</sup> /min	cfm	10	<b>353</b>
Heating capacity	kW	Btu/h	11	<b>37500</b>
Operator's seat			ISRI	6000/575



## HYDRAULIC SYSTEM

Open center system pilot operated, and filtered breather on reservoir.

**Pump:** vane pump fitted to a power take-off on the transmission.

**System supply:** system supplied from a separate pump. The pilot system is supplied from a combined pilot/brake pump.

**Valve:** double-acting 3 spool valve. The control valve is governed by a 3 spool pilot valve.

**Lifting function:** the valve has four positions: lifting, neutral, lowering and floating. Disengageable electromagnetic boom kick-out.

Adjustable for all positions between maximum reach and full lifting height.

**Tilting function:** the valve has three positions: rollback, neutral and forward tilting. Disengageable electromagnetic tilt positioner adjustable for all desired loading angles.

**Cylinders:** double-acting.

**Filter:** full-flow filtering through 10 micron filter cartridge in combination with magnetic core.

**Load unit:** hydraulic cylinders fitted in line with lifting arms.

Main pump				
Relief pressure	MPa	psi	20,5	<b>2975</b>
Flow	l/min		202	
	<b>US gpm</b>		<b>53.4</b>	
at				
and engine speed	MPa	psi	10	<b>1450</b>
	rps	rpm	36,7	<b>2200</b>
Pilot pump				
Relief pressure	MPa	psi	3,0	<b>435</b>
Flow	l/min		25	
	<b>US gpm</b>		<b>6.6</b>	
at				
and engine speed	MPa	psi	10	<b>1450</b>
	rps	rpm	36,7	<b>2200</b>
Lifting cylinder				
Bore	mm	in	120	<b>4.7</b>
Piston rod diameter	mm	in	60	<b>2.4</b>
Stroke	mm	in	980	<b>38.6</b>
Tilting cylinder				
Bore	mm	in	110	<b>4.3</b>
Piston rod diameter	mm	in	60	<b>2.4</b>
Stroke	mm	in	830	<b>32.7</b>
Lifting time *	s		6,5	
Tipping time *	s		1,5	
Lowering time (empty)	s		3,0	
Total cycle time	s		11,0	

\* with load, SAE

## ATTACHMENTS

(for further information please contact your local dealer)

### Buckets

- Straight bucket without teeth
- Straight bucket with teeth
- Spade nose bucket without teeth
- Spade nose bucket with teeth
- Light materials bucket
- High-dump light materials bucket
- Multipurpose bucket

### Timber grapples

- Unloading grapple
- Sorting grapple
- Tree length grapple
- Tropical timber grapple

- Hi-lift swivel wood clamp (SWC)
- Heel kickout
- Log pusher

### Examples of other attachments

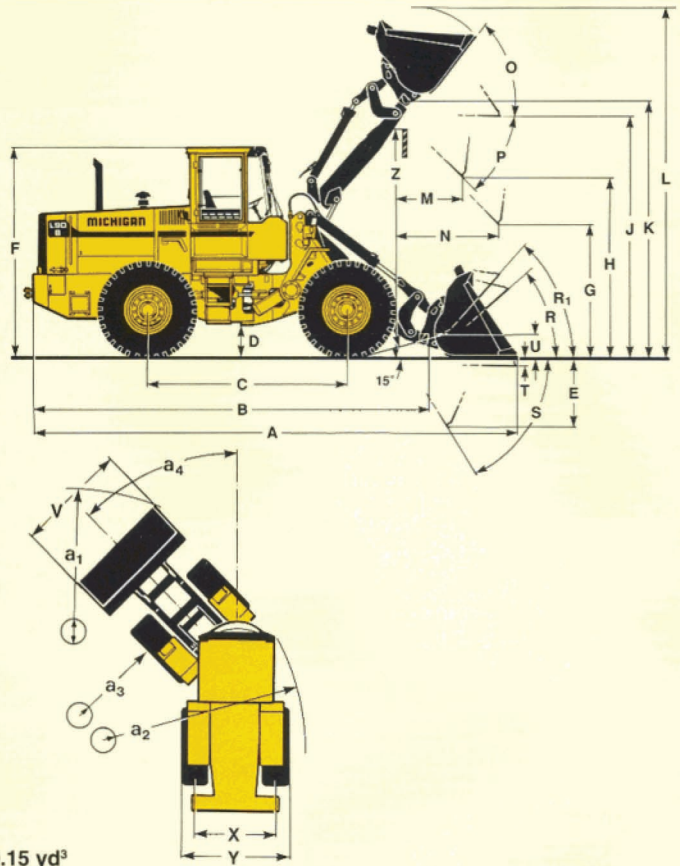
- Pallet forks
- Breakout forks
- Fork tine extension
- Pallet fork with fork positioner
- Combination forks
- Material handling arms
- Hydraulic clamping grapple
- Asphalt cutter
- Diagonal snow blade
- Brooms

# DIMENSIONAL DATA MICHIGAN L90B

Tires: 20.5 R 25\*

Where applicable, specifications and dimensions are in accordance with ISO 7131, SAE J732 FEB80, ISO 7546, SAE J742 FEB85, ISO 5998, SAE J818 MAY87.

B	mm	ft in	5990	19'8"
C	mm	ft in	3000	9'10"
D	mm	ft in	410	1'4"
F	mm	ft in	3200	10'6"
G	mm	ft in	2135	7'
J	mm	ft in	3590	11'9"
K	mm	ft in	3810	12'6"
O	°		53	
P	°		45	
R	°		43	
R <sub>1</sub> *	°		48	
**	°		54	
S	°		58	
T	mm	ft in	95	3,7"
U	mm	ft in	375	1'3"
**	mm	ft in	600	2'
X	mm	ft in	1960	6'5"
Y	mm	ft in	2490	8'2"
Z	mm	ft in	3580	11'9"
a <sub>2</sub>	mm	ft in	5360	17'7"
a <sub>3</sub>	mm	ft in	2880	9'6"
a <sub>4</sub>	± °		40	



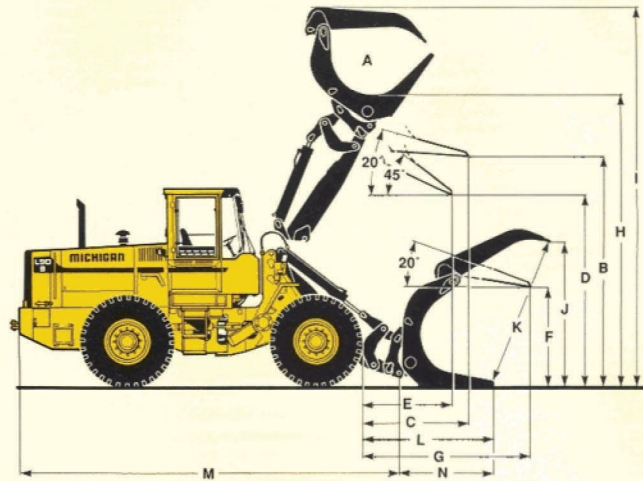
\* Carrying position SAE  
\*\* In practical carry position

† Bolt-on Cutting Edge Increases Bucket Capacity By 0.11 m<sup>3</sup> / 0.15 yd<sup>3</sup>

		Pin-On		Hook-On		Pin-On		Hook-On		Pin-On		Hook-On					
Volume, heaped	m <sup>3</sup> yd <sup>3</sup>	2,5	3.25	2,5	3.25	2,3	3.0	2,3	3.0	2,1	2.75	2,1	2.75	3,8	5.00	3,8	5.00
Struck	m <sup>3</sup> yd <sup>3</sup>	2,0	2.7	2,0	2.7	1,8	2.4	1,8	2.4	1,7	2.3	1,7	2.3	3,15	4.1	3,15	4.1
Static tipping load, straight	kg	9100		8700		9400		9000		9500		9000		9130		8310	
	lb	20,100		19,200		20,700		19,800		20,900		19,800		20,120		18,300	
at 35° turn	kg	8000		7700		8300		7900		8300		7900		8130		7400	
	lb	17,600		17,000		18,300		17,400		18,300		17,400		17,910		16,290	
at full turn	kg	7700		7300		7900		7600		8000		7600		7860		7150	
	lb	17,000		16,100		17,400		16,800		17,600		16,800		17,300		15,740	
Breakout force	kN	108,3		99,4		120,7		110,2		120,7		110,3		82,9		74,9	
	lbf	24,350		22,350		27,130		24,770		27,130		24,800		18,650		16,840	
A	mm	7300		7380		7185		7270		7200		7270		7680		7760	
	ft in	23'11"		24'3"		23'7"		23'10"		23'8"		23'10"		25'2"		25'6"	
L	mm	5100		5150		5100		5150		5000		5050		5300		5340	
	ft in	16'9"		16'11"		16'9"		16'11"		16'5"		16'7"		17'5"		17'6"	
V	mm	2650		2650		2650		2650		2650		2650		2650		2650	
	ft in	8'8"		8'8"		8'8"		8'8"		8'8"		8'8"		8'8"		8'8"	
a <sub>1</sub> clearance circle	mm	11880		11930		11820		11870		11820		11870		11960		12010	
	ft in	39'		39'2"		38'9"		38'11"		38'9"		38'11"		39'3"		39'5"	
E	mm	1110		1180		1010		1080		1010		1080		1440		1510	
	ft in	3'8"		3'10"		3'4"		3'7"		3'4"		3'7"		4'9"		4'11"	
H	mm	2730		2670		2810		2750		2810		2750		2450		2390	
	ft in	8'11"		8'9"		9'3"		9'0"		9'3"		9'0"		8'0"		7'10"	
M	mm	1130		1190		1050		1110		1050		1110		1410		1460	
	ft in	3'9"		3'11"		3'5"		3'8"		3'5"		3'8"		4'8"		4'9"	
N	mm	1660		1690		1610		1650		1610		1650		1780		1800	
	ft in	5'5"		5'7"		5'3"		5'5"		5'3"		5'5"		5'10"		5'11"	
Weight distribution, front	kg	5490		5670		5270		5440		5250		5400		5440		5580	
	lb	12,100		12,500		11,620		11,990		11,580		11,900		11,970		12,280	
Weight distribution, rear	kg	7030		6950		7100		7030		7100		7040		7050		6980	
	lb	15,500		15,320		15,650		15,500		15,650		15,520		15,520		15,360	
Operating weight	kg	12520		12620		12370		12470		12350		12440		12480		12550	
	lb	27,600		27,820		27,270		27,490		27,230		27,420		27,490		27,640	

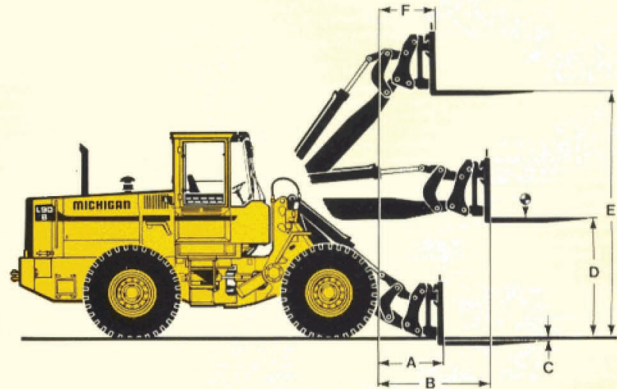
## GENERAL PURPOSE GRAPPLE (Hook-On)

Operating weight	kg	lb	12970	28600
Operating load	kg	lb	4450	9800
A	m <sup>2</sup>	ft <sup>2</sup>	1,3	14,0
B	mm	ft in	3275	10'9"
C	mm	ft in	2030	6'7"
D	mm	ft in	2615	8'7"
E	mm	ft in	1645	5'5"
F	mm	ft in	1425	4'8"
G	mm	ft in	2815	9'2"
H	mm	ft in	4385	14'5"
I	mm	ft in	5890	19'4"
J	mm	ft in	2290	7'6"
K	mm	ft in	2350	7'8"
L	mm	ft in	2215	7'3"
M	mm	ft in	6015	19'9"
N	mm	ft in	1920	6'4"



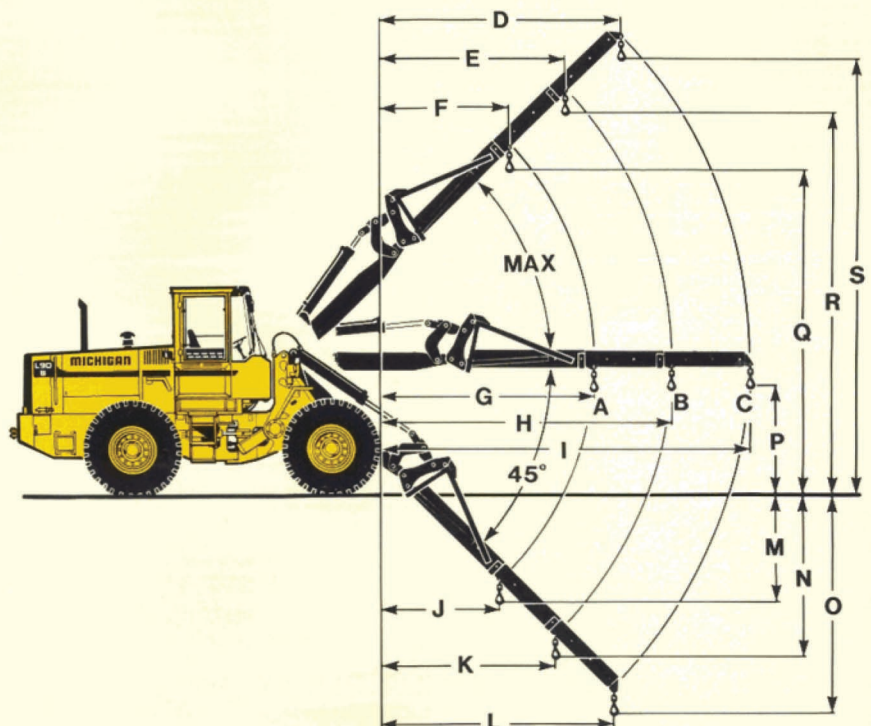
## PALLET FORK (Hook-On)

Fork tine, length	mm	ft in	1225	4'0"
Fork frame, width	mm	ft in	1500	4'11"
Distance to centre of gravity, level fork tines	mm	ft in	600	2'0"
Operating weight	kg	lb	12125	26700
Safe working load according to SS 3462	kg	lb	5100	11200
A	mm	ft in	830	2'10"
B	mm	ft in	1610	5'3"
C	mm	ft in	55	2,2"
D	mm	ft in	1790	5'10"
E	mm	ft in	3630	11'11"
F	mm	ft in	825	2'8"



## MATERIAL HANDLING ARM (Hook-On)

Operating weight	kg	lb	12095	26600
Operating load at position				
A	kg	lb	2220	4890
B	kg	lb	1750	3860
C	kg	lb	1450	3200
D	mm	ft in	2760	9'1"
E	mm	ft in	2145	7'2"
F	mm	ft in	1585	5'2"
G	mm	ft in	3290	10'10"
H	mm	ft in	4325	14'2"
I	mm	ft in	5455	17'10"
J	mm	ft in	1830	6'0"
K	mm	ft in	2570	8'5"
L	mm	ft in	3360	11'0"
M	mm	ft in	1805	5'11"
N	mm	ft in	2535	8'4"
O	mm	ft in	3335	10'11"
P	mm	ft in	1535	5'0"
Q	mm	ft in	5220	17'1"
R	mm	ft in	6085	20'0"
S	mm	ft in	7040	23'1"



## STANDARD EQUIPMENT

<p>Air cleaner, dry type dual element, exhaust aspirated precleaner Alternator, 24V, 60 AMP Battery disconnect, lockable Boom kickout, automatic Brakes, 4-wheel, dry disc, dual circuit brake system, secondary Bucket leveler, automatic with position indicator Cab access steps &amp; 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 11kW 37,500 Btu/h with four-speed blower fan, filtered air floor mat interior light interior rearview mirror</p>	<p>safety glass, tinted seat belt (SAE J386) seat, suspension, 6-way adjustable heated steering wheel, adjustable tilt, telescopic storage compartment sun visor windshield washer, front &amp; rear windshield wiper, front, intermittent windshield wiper, rear Cold starting aids: engine intake manifold pre-heater engine fuel mixture enrichment Differentials: front, hydraulic differential lock rear, conventional Drawbar with pin Engine coolant filter Exhaust rain cap (elbow type) Fenders, front &amp; rear Fuel water separator Hydraulic control lever safety latch Hydraulic oil cooler Hydraulic pressure test ports, quick connect Instrument/gauges, illuminated: brake system pressure gauge engine coolant temperature gauge</p>	<p>fuel gauge hourmeter transmission/ converter fluid temperature gauge sight gauges: brake fluid level coolant level hydraulic fluid level Transmission/ converter fluid gauge Isolation mounts: cab, engine, transmission 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 (2-front, 2-rear) Mirrors, rearview (2), exterior Muffler, spark arresting Neutral start feature Side panels, engine hood Steering frame lock Tires: 20.5-25(12PR)L-2 (General) Transmission: modulated, with single lever control, automatic power shift, and operator controlled declutch</p>	<p>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: central warning audible engine coolant parking brake horn, electric reverse alarm (SAE J994) Warning &amp; 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 transmission oil pressure differential lock engine intake manifold preheater high beam driving lights parking brake applied</p>
--	---	---	--

## OPTIONAL EQUIPMENT

<p>Air conditioner, 7 kW 24,000 Btu/h Air precleaner, heavy duty cyclone, turbo II type oil bath type Attachment rib kit Beacon, amber rotating Boom suspension system Bucket teeth, bolt-on, (8) (not for use on light material buckets) Cold starting aid, engine preheater-coolant and oil (110V - 1500W) Comfort drive control (CDC) Counterweight</p>	<p>Cutting edge, 3 pc. reversible bolt-on (not for use on high tip buckets) Dual service brake pedal Engine fan, suction Engine, high altitude version, factory installed Engine, low emission version, factory installed Engine shutdown to idle kit Guards: belly plates headlights, front muffler guard taillights, rear windshield worklights, rear</p>	<p>Hand throttle control Hydraulic attachment bracket with separate locking system Hydraulic control for 3rd function Hydraulic control for 3rd &amp; 4th functions Instrument/gauges: speedometer/tachometer Light, attachment flood (halogen) Lockable tool box Mud guards Radio mounting kit (includes 2 speakers, antenna &amp; voltage reducers) Retractable seat belt Secondary steering Sliding window, door</p>	<p>Slow moving vehicle emblem Spillguard, bolt-on (not for use on light material buckets) Strainer for fueling Switch, forward/reverse shifting Tire options: 20.5R25 20.5-25(12PR)L-3 25/65R25 Working lights, front, extra 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.

### VME Sales North America

One West Pack Square  
BB&T Building  
Asheville, North Carolina 28801

Ref. No. 22 1 669 1959 AMERICAN

Kurir-tryck, Katrineholm