



Michigan L480



ENGINE OUTPUT

620 hp (462 kW)

DIRECT-INJECTED, TURBO-CHARGED, AFTER-COOLED, FUEL EFFICIENT CUMMINS DIESEL

OPERATING WEIGHT

177,860 lb (80,68 t)

BUCKETS 12.5 yd³ (9,6 m³)

DOUBLE-PLATE BOOM

POWERSHIFT, COUNTER-SHAFT TRANSMISSION WITH SINGLE LEVER ELECTRIC SHIFT CONTROL

LIMITED SLIP DIFFERENTIALS, FRONT AND REAR

FULL HYDRAULIC, SINGLE DRY-DISC, OUTBOARD-MOUNTED, SERVICE BRAKES

SEAT-MOUNTED, FINGERTIP HYDRAULIC CONTROLS

CLIMATE-CONTROLLED CAB INDEPENDENT ROPS/FOPS

MICHIGAN



ENGINE

Direct-injected, turbocharged and after-cooled V-12, 4-cycle diesel.

Make	Cummins	
Model	VTA-28C	
Max. rating* at	2100 rpm	(35 rps)
SAE J1349 (ISO 1585)	725 hp	(541 kW)
Flywheel rating** at	2100 rpm	(35 rps)
SAE J1349 (ISO 1585)	620 hp	(462 kW)
Max. torque at	1300 rpm	(21,7 rps)
SAE J1349 (ISO 1585)	2363 lbf ft	(3204 Nm)
Number of cylinders	12	
Displacement, total	1710 in ³	(28,0 l)
Bore	5.50 in	(140 mm)
Stroke	6.00 in	(152 mm)

Air cleaners (2)

1. Cyclone precleaner with automatic dust ejector.
2. Paper filter with restriction indicator.
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.



ELECTRICAL

The electrical system is well protected by circuit breakers and pre-wired for optional equipment.

Voltage	24 V
Alternator	100 A
Batteries (12 volt)	8
Battery capacity, total	2500 CCA
Cranking capacity, each	625 CCA



SERVICE REFILL CAPACITIES

Crankcase	27.0 US gal	(102 l)
Fuel tank (total)	376 US gal	(1422 l)
Fuel tank (usable)	364 US gal	(1378 l)
Cooling system	61.0 US gal	(231 l)
Transmission (total)	33.0 US gal	(125 l)
Wheel hubs, each	10.6 US gal	(40 l)
Differentials, each	29.0 US gal	(110 l)
Midmount bearing	1.25 US gal	(4,7 l)
Hydraulic system (total)	248 US gal	(939 l)
Hydraulic tank	150 US gal	(568 l)



DRIVETRAIN

Torque converter: Clark, high efficiency, single-stage, single-phase.

Transmission: Clark, countershaft-type powershift transmission with directional clutch modulation.

Axes: Clark, full-floating axle shafts with planetary-type hub reductions. Single-piece cast steel axle housing. Fixed front axle and oscillating rear axle.

Differentials: Clark, limited slip differentials in front and rear axles.

Hub reduction: Clark, planetary drive with low-friction roller bearings in each wheel hub.

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

Torque converter make, model	Clark, C16702-21
Torque multiplication	2.96:1
Transmission make, model	Clark, 8422 H-204
Speeds, forward/reverse	
1	3.9 mph (6,3 km/h)
2	6.9 mph (11,1 km/h)
3	11.7 mph (18,8 km/h)
4	19.9 mph (32,0 km/h)
Measured with tires	41.25/70-39 (34PR) L-5
Front axle make, model	Clark, 25D8860
Rear axle make, model	Clark, 25D7060
Rear axle oscillation, total	20 deg
.....	21.0 in (533 mm)



BRAKES

The brake system meets requirements according to SAE J1152 and ISO 3450.

Service brakes: Full hydraulic system with outboard mounted, dry disc brakes with two calipers at each wheel. Left pedal applies brakes and declutches transmission. A separate dash-mounted switch allows the operator to deactivate this declutch feature.

Secondary: Dual circuit axle-by-axle system. Actuated by service brake pedals. Audible and visual low pressure alarm. Dead engine braking capability provided by two nitrogen-charged accumulators.

Parking brake: Dry disc type mounted on front axle input shaft. Spring applied, hydraulically released; actuated by dash-mounted switch. Transmission interlock applies service brakes if shifted into forward or reverse to prevent moving machine when parking brake is applied.

Pump: Piston pump, pressure compensated.

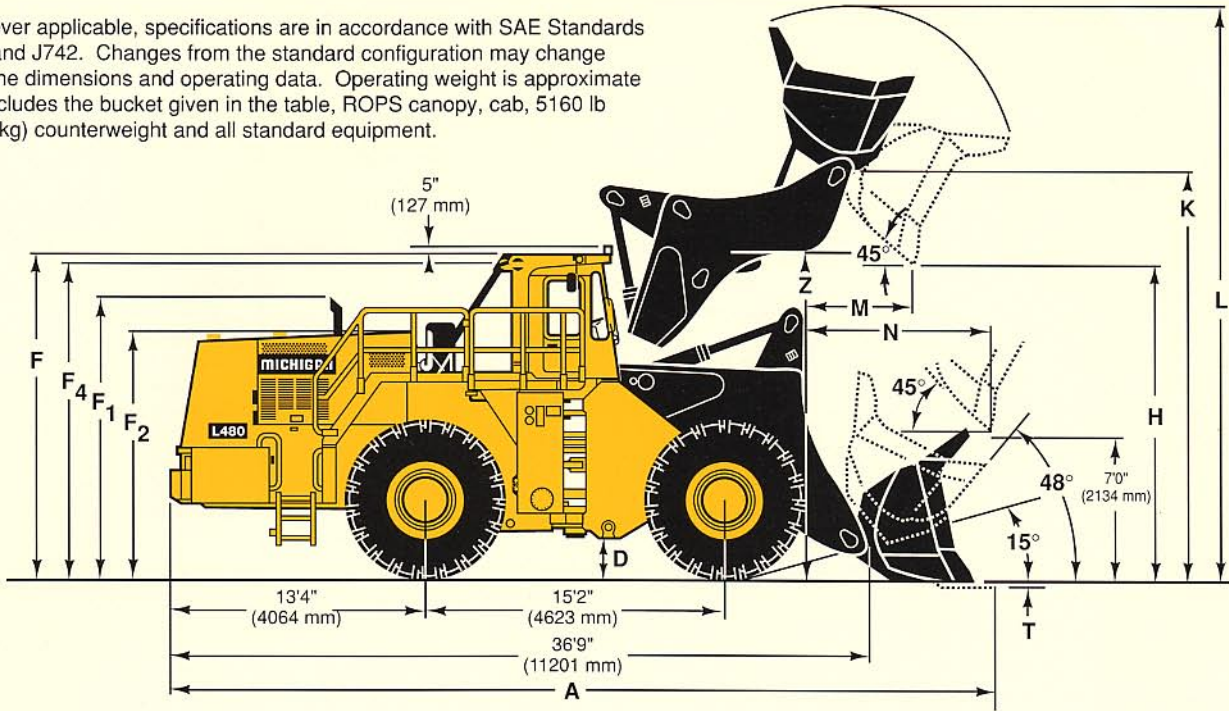
Filtration: Full-flow, 10 micron filter.

Pressure setting	3000 psi	(20,7 MPa)
Service brake, disc dia.	29.0 in	(737 mm)
thickness	1.25 in	(32 mm)
Parking brake, disc dia.	20.0 in	(508 mm)
thickness	0.50 in	(13 mm)

OPERATIONAL DATA & DIMENSIONS-MICHIGAN L480

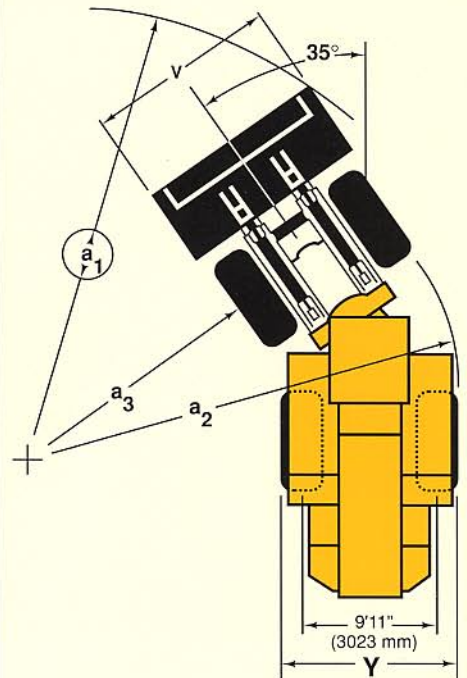
Tires: 41.25/70-39 (34PR) L-5

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, ROPS canopy, cab, 5160 lb (2341 kg) counterweight and all standard equipment.



BUCKET TYPE

		Straight Edge Rock	Spade-Nose Rock
Volume, heaped	yd ³	12.5	12.5
	(m ³)	(9.6)	(9.6)
struck	yd ³	10.57	10.78
	(m ³)	(8.08)	(8.24)
Bucket weight	lb	14,100	14,700
	(kg)	(6396)	(6668)
Static tipping load, straight	lb	109,560	109,090
	(kg)	(49 700)	(49 480)
full turn	lb	96,130	95,730
	(kg)	(43 600)	(43 420)
Breakout force	lbf	142,000	125,000
	(kN)	(631.7)	(556.0)
A Δ	ft in	42'5"	43'2"
	(mm)	(12 929)	(13 157)
H \ominus	ft in	15'6"	15'0"
	(mm)	(4724)	(4572)
L	ft in	28'8"	28'8"
	(mm)	(8738)	(8738)
M \oplus	ft in	6'1"	6'8"
	(mm)	(1854)	(2032)
N \oplus	ft in	9'11"	10'6"
	(mm)	(3023)	(3200)
T \square	in	3.9"	3.9"
	(mm)	(99)	(99)
V	ft in	14' 4.2"	14' 4.2"
	(mm)	(4374)	(4374)
a ₁ Clearance circle (over bucket in carry position)	ft in	68'2"	68'2"
	(mm)	(20 777)	(20 777)
Operating weight	lb	177,280	177,860
	(kg)	(80 410)	(80 680)



- \oplus Add 9.7" (246 mm) for bucket teeth
- \square Add 2.6" (66 mm) for bucket teeth
- Δ Add 13.2" (335 mm) for bucket teeth
- \ominus Subtract 9.0" (228 mm) for bucket teeth

DIMENSIONS AFFECTED BY TIRE SIZE

MACHINE DIMENSIONS		41.25/70-39 (34PR) L-5	41.25/70-39 (42PR) L-5	37.5-39 (44PR) L-5	37.5R39 XRD2AT*
D	ft in (mm)	1'11" (584)	1'11" (584)	2'1" (635)	1'11" (584)
F	ft in (mm)	16'0" (4877)	16'0" (4877)	16'2" (4928)	16'0" (4877)
F ₁	ft in (mm)	14'0" (4267)	14'0" (4267)	14'2" (4318)	14'0" (4267)
F ₂	ft in (mm)	11'10" (3607)	11'10" (3607)	12'0" (3658)	11'10" (3607)
F ₄	ft in (mm)	15'7" (4750)	15'7" (4750)	15'9" (4801)	15'7" (4750)
H	ft in (mm)	15'6" (4724)	15'6" (4724)	15'8" (4775)	15'6" (4724)
K	ft in (mm)	20'7" (6274)	20'7" (6274)	20'9" (6325)	20'7" (6274)
L	ft in (mm)	28'8" (8738)	28'8" (8738)	28'10" (8788)	28'8" (8738)
M	ft in (mm)	6'1" (1854)	6'1" (1854)	6'0" (1829)	6'1" (1854)
N	ft in (mm)	9'11" (3023)	9'11" (3023)	9'10" (2997)	9'11" (3023)
T	ft in (mm)	3.9" (99)	3.9" (99)	1.9" (48)	3.9" (99)
Y	ft in (mm)	13'6" (4115)	13'6" (4115)	13'1" (3988)	13'6" (4115)
Z	ft in (mm)	17'0" (5182)	17'0" (5182)	17'2" (5232)	17'0" (5182)
a ₂	ft in (mm)	31'2" (9500)	31'2" (9500)	31'1" (9474)	31'2" (9500)
a ₃	ft in (mm)	17'4" (5283)	17'4" (5283)	17'5" (5309)	17'4" (5283)

SUPPLEMENTAL OPERATING DATA		Change in operating weight	Change in static tipping load straight	Change in static tipping load at full turn
Air conditioner (removal)	lb (kg)	-150 (-68)	-170 (-77)	-165 (-75)
Bucket points and adapters (57R)	lb (kg)	1056 (479)	-1190 (-540)	-1320 (-600)
Bucket points and adapters (57ARL)	lb (kg)	1180 (535)	-1330 (-605)	-1470 (-670)
Bucket points and adapters (57TF)	lb (kg)	1172 (532)	-1320 (-600)	-1460 (-660)
Cab (removal)	lb (kg)	-850 (-386)	-610 (-227)	-590 (-267)
Counterweight	lb (kg)	4000 (1814)	8360 (3792)	7320 (3320)
Fenders, front	lb (kg)	478 (217)	0 (0)	0 (0)
ROPS canopy (removal)	lb (kg)	-2400 (-1089)	-1800 (-816)	-1640 (-744)
Secondary steering	lb (kg)	120 (54)	170 (77)	160 (73)
3rd hydraulic control	lb (kg)	300 (136)	0 (0)	0 (0)
Optional tires:				
41.25/70-39(34PR) L-5 STD.	lb (kg)	0 (0)	0 (0)	0 (0)
41.25/70-39(42PR) L-5	lb (kg)	816 (370)	1024 (465)	931 (423)
37.5-39(44PR) L-5	lb (kg)	1424 (646)	1787 (811)	1624 (737)
37.5R39 XRD2AT*	lb (kg)	-1672 (-758)	-2099 (-952)	-1907 (-865)



STEERING

Articulated frame: Full hydraulic steering system with speed sensor hydraulics provides adequate volume of oil to the steer valve for positive control at all engine speeds.

Pump: One gear-type, mounted on the torque converter.

Supply system: The system is served by a steer pump and a switch pump which is speed sensitive and feeds either the main hydraulic system or, below 1150 rpm, the steering system.

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

Steering cylinders, no.	2	
Bore	6.00 in	(152 mm)
Stroke	23.8 in	(605 mm)
Relief pressure	2500 psi	(17,2 MPa)
Steer pump output	86 US gal/min	(326 l/min)
at pressure	1000 psi	(6,9 MPa)
and engine speed	2100 rpm	(35 rps)
Switch pump output	65 US gal/min	(246 l/min)
at pressure	1000 psi	(6,9 MPa)
and engine speed	1150 rpm	(19,2 rps)
Articulation	35 deg	



CAB

Cab: (non-ROPS) with two lockable doors. Sound insulating lining. Sliding self-locking windows. Tinted safety glass in all windows.

Canopy: ROPS/FOPS (SAE J1040, ISO 3471)

Heater/Defroster/Air Conditioner: Provides filtered (10 microns) fresh air and has a three-speed fan and a defroster for the front and side windows.

Heater	45,000 Btu/h	(13,2 kW)
Air conditioner	21,500 Btu/h	(6,3 kW)
Sound level in closed cab, max.	84 dB(A)	

Operator's seat: Fully adjustable air suspension seat with seat belt (SAE J386).



HYDRAULICS

Closed and pressurized load-sensing system with a sturdy plate-steel tank. Hydraulic 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: Three gear-type pumps mounted on torque converter.

Supply system: Below 1150 rpm, the system is supplied by two main pumps. Above 1150 rpm, it is also supplied by the switch pump.

Valve: Split-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 during raise.

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

Cylinders: Double-acting.

Filters: Full-flow 10 micron return filter (with four elements), located in hydraulic oil tank.

Relief pressure	2825 psi	(19,5 MPa)
Pump output, total	241 US gal/min	(912 l/min)
at pressure	1000 psi	(6,9 MPa)
and engine speed	2100 rpm	(35 rps)
Output, by pump		
Main No. One	86 US gal/min	(325,5 l/min)
Main No. Two	69 US gal/min	(261 l/min)
Switch Pump	86 US gal/min	(325,5 l/min)
Lift cylinders, no.	2	
Bore	10.5 in	(267 mm)
Stroke	58.4 in	(1483 mm)
Tilt cylinders, no.	2	
Bore	10.5 in	(267 mm)
Stroke	33.4 in	(848 mm)
Raising time (loaded)	11.4 s	
Dumping time (loaded)	4.0 s	
Lowering time (empty)	5.8 s	
Total cycle time	21.2 s	

STANDARD EQUIPMENT

<p>AIR CLEANERS (2), DRY TYPE, DUAL ELEMENT WITH EXHAUST ASPIRATED PRECLEANERS</p> <p>ALTERNATOR, 24V, 100A</p> <p>BATTERY DISCONNECT SWITCH, LOCKABLE</p> <p>BOOM & BUCKET CONTROL LEVERS, FINGERTIP</p> <p>BOOM & BUCKET LINKAGE, SEALED PINS</p> <p>BOOM KICKOUT, AUTOMATIC, ADJUSTABLE</p> <p>BRAKES, 4-WHEEL HYDRAULIC, DRY DISC</p> <p>BRAKE SYSTEM, SECONDARY</p> <p>BUCKET LEVELER, AUTOMATIC</p> <p>CAB ACCESS STEPS & HANDRAILS (SAE J185)</p> <p>CAB (Non-ROPS): Acoustical Lining Doors (2); Lockable with Self-Locking, Sliding Glass Windows Door Hold-Open Struts (2) Electrical System: 24V, Circuit Breaker Protected, Rewired for Optional Accessories</p>	<p>Environmental Control: Air Conditioner, 21,500 Btu/h (6,3 kW) Heater/Defroster/Pressurizer, 45,000 Btu/h (13,2 kW) With Three-Speed Blower Fan, Filtered Air</p> <p>Floor Mat</p> <p>Interior Lights, Red & White</p> <p>Interior Rearview Mirror</p> <p>Safety Glass, Tinted</p> <p>Seat, Air Suspension, 6-Way Adjustable</p> <p>Seat Belt (SAE J386)</p> <p>Steering Wheel Spinner Knob</p> <p>Sun Visor</p> <p>Windshield Wiper & Washer, Front & Rear</p> <p>COLD START AID, ETHER INJECTION</p> <p>DIFFERENTIALS: LIMITED SLIP, FRONT & REAR</p> <p>DRAWBAR WITH PIN</p> <p>DRIVE SHAFT GUARD, Converter to Transmission</p> <p>FENDERS, REAR WITH STEPS</p> <p>GRILLE, REAR SWING-UP</p> <p>HYDRAULIC FLUID TO AIR COOLER</p> <p>HYDRAULIC PRESSURE TEST PORTS, QUICK CONNECT</p> <p>INSTRUMENTS/GAUGES: Air Cleaner Restriction</p>	<p>Indicator (2)</p> <p>Engine Coolant Temperature Gauge</p> <p>Engine Oil Pressure Gauge</p> <p>Fuel Gauges, Tank & Dash Mounted</p> <p>Hourmeter</p> <p>Sight Gauges: Hydraulic Fluid Level Transmission Fluid Level</p> <p>Transmission/Torque Converter Fluid Temperature Gauge</p> <p>Voltmeter</p> <p>ISOLATION MOUNTS: Cockpit, Engine, Radiator, Transmission</p> <p>LIFTING LUGS</p> <p>LIGHTS: Work (70W) Halogen, 5 Front, 2 Side, 2 Rear Stop & Tail Combination, 2 Rear</p> <p>LUBRICATION POINTS, MANIFOLD TYPE, GROUND LEVEL</p> <p>MIRRORS, REARVIEW (2), EXTERIOR</p> <p>NEUTRAL START FEATURE</p> <p>RADIATOR RECOVERY TANK</p>	<p>ROPS CANOPY (SAE J1040) (ISO 3471)</p> <p>SIDE PANELS, ENGINE HOOD, LOCKABLE</p> <p>STEERING FRAME LOCK</p> <p>TIRES: 41.25/70-39(34PR)L-5</p> <p>TRANSMISSION: Powershift, with Directional Clutch Modulation Declutch Pedal with Dash Mounted On/Off Switch Shift Control, Single Lever Electric</p> <p>VANDALISM LOCK, PROVISION FOR: Batteries, Engine Coolant, Fuel, Hydraulic Fluid, Transmission/Torque Converter Fluid</p> <p>WARNING ALARMS: Horn, Electric Reverse Alarm (SAE J994)</p> <p>WARNING & MONITORING LIGHTS: Air Conditioner Malfunction Brake Pump/Differential Pressure Brake System, Front Brake System, Rear Parking Brake Applied Transmission Filter Restriction</p>
--	--	---	--

OPTIONAL EQUIPMENT

<p>Accessory Power Converter, 12V/6A</p> <p>Air Conditioner (Removal)</p> <p>Beacon, Rotating, Amber</p> <p>Bucket (See Operational Data)</p> <p>Points & Adapters</p> <p>Cutting Edge Wear Caps</p> <p>Cab (Removal)</p> <p>Counterweight, 4000 lb (1812 kg)</p> <p>Engine Oil Fill & Evacuation (Wiggins)</p>	<p>Engine Preheater, Coolant & Oil (220V)</p> <p>Engine Shutdown to Idle Kit: High Coolant Temperature Low Engine Oil Pressure</p> <p>Engine Warning System: High Coolant Temperature Low Coolant Level Low Oil Pressure</p> <p>European Accessory Kit</p> <p>E.E.C. Sound Reduction Kit</p> <p>Fan, Sucker</p> <p>Fenders & Mud Flaps, Front</p>	<p>Fire Extinguisher</p> <p>Fuel, Fast Fill Coupler (Wiggins)</p> <p>Guards: Rear Light Transmission</p> <p>Hydraulic Fluid Fill & Evacuation (Wiggins)</p> <p>Lights, Work, 70W Halogen (2)</p> <p>Lubrication System: Automatic (Trabon) Single Point, Manual (Trabon)</p> <p>Radiator Sand Grid</p>	<p>ROPS Canopy (Removal)</p> <p>Secondary Steering (Electric)</p> <p>Tachometer</p> <p>Tiefbau Kit (for German Regulations)</p> <p>Transmission Fluid Fill & Evacuation (Wiggins)</p> <p>Tires: 37.5-39(44PR)L-5 37.5R39 XRD2AT★ 41.25/70-39(42PR)L-5</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 Industries North America

A Business Unit of VME Americas Inc.

P.O. Box 178017
Cleveland, Ohio 44117-8017

FORM NO. L-524
DATE 7/91
Printed in U.S.A.