

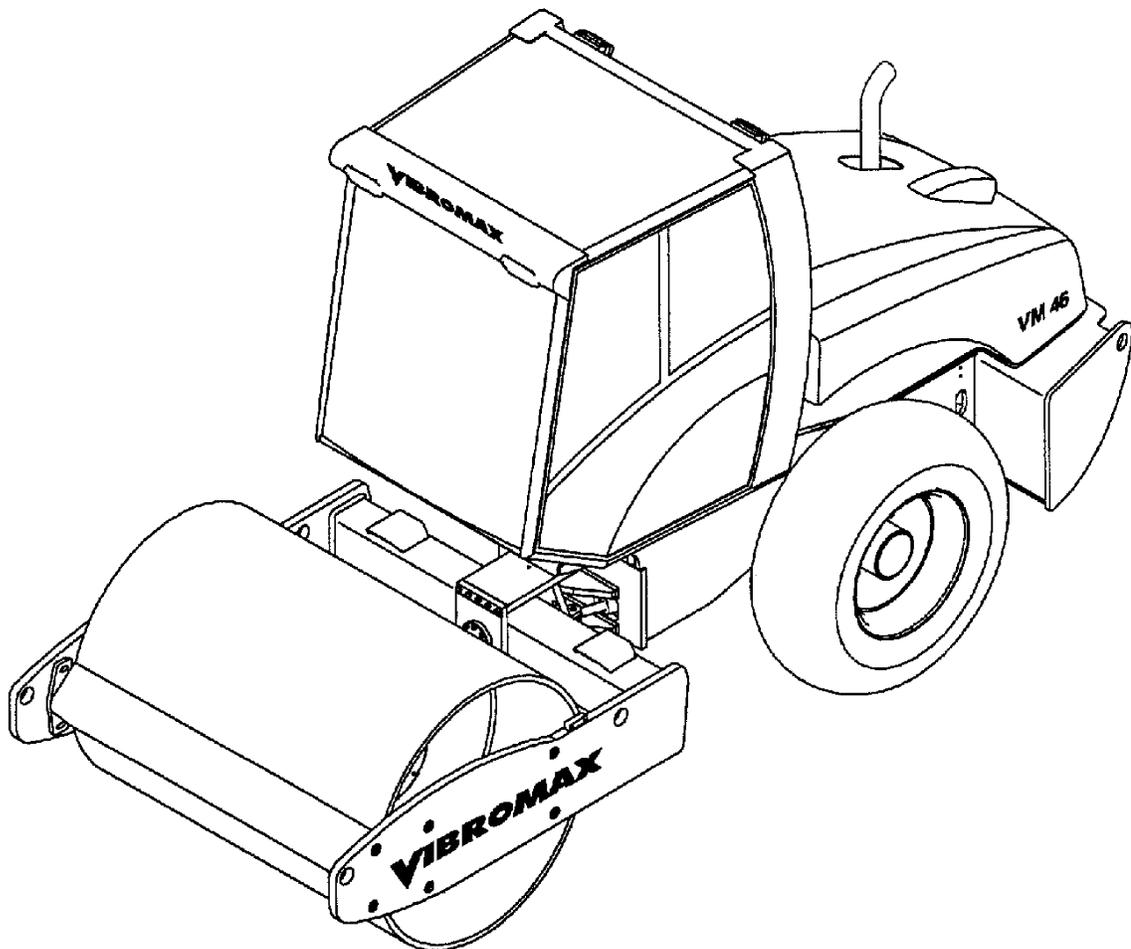


SINGLE DRUM ROLLER

SERVICE MANUAL SM86046

August 2004

Model VM 46





CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

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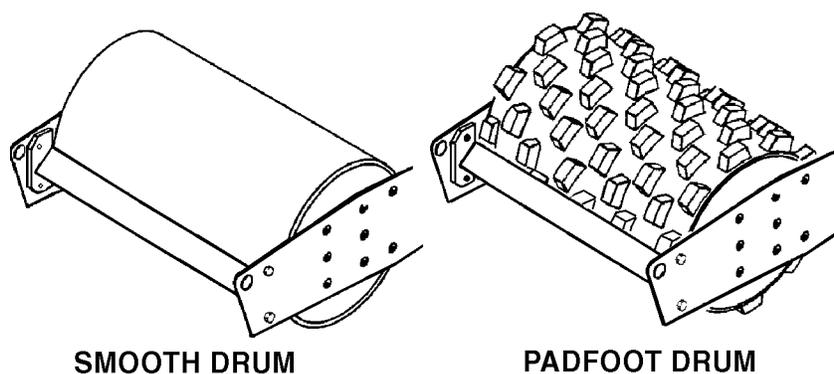
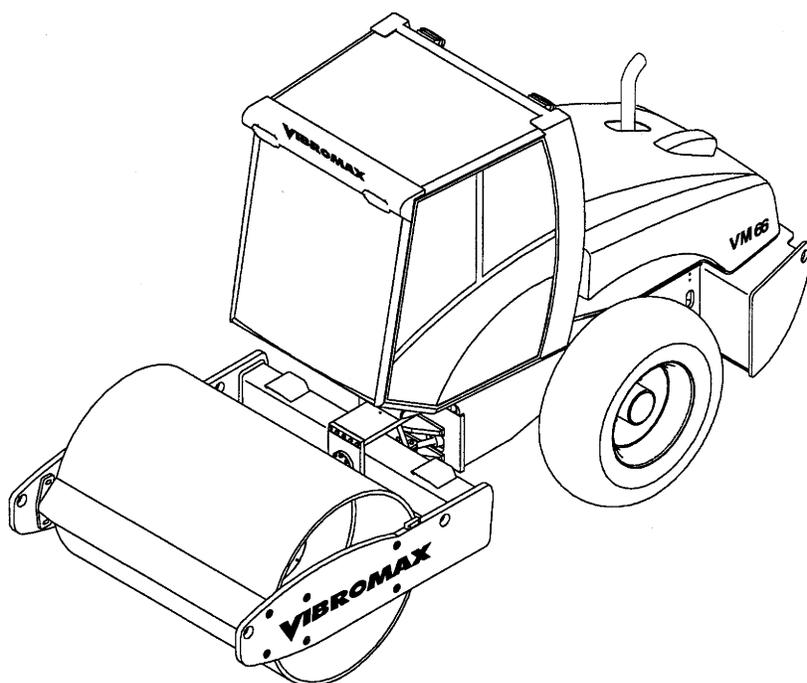
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SECTION ONE

GENERAL INFORMATION

MACHINE DESCRIPTION



SMOOTH DRUM

PADFOOT DRUM

This book introduces the new Vibromax 6 series single drum rollers. Included within the pages of the book are materials covering the Model VM46.

The new roller uses the Cummins 3.3 liter 4 cylinder engine. The engine is tuned to meet the latest EPA emissions standards.

A Mannesman Rexroth variable displacement, axial piston hydrostatic pump, used for machine propulsion, is mounted to the flywheel end of the engine. It provides oil to a Rexroth 2 speed drum drive motor and a 2 speed axle drive motor in a parallel path. The Rexroth drum motor is mounted on the left side of the drum, drives through a L&S planetary gearbox and is isolated from the drum by rubber buffers. This arrangement is used in the heavy roller models with a great deal of success. The axle drive motor is attached directly to the gearbox incorporated into the rear axle.

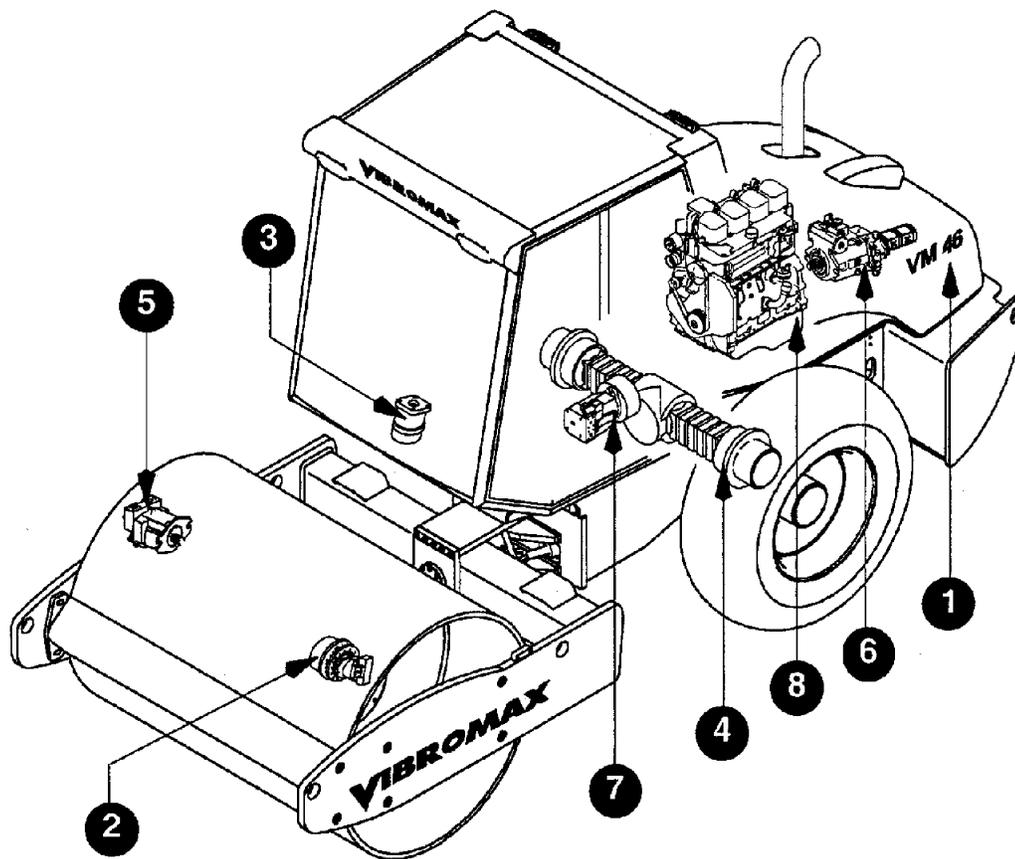
The vibration system on the VM46 uses a Rexroth gear pump mounted directly behind the propulsion pump. The vibratory pump supplies oil through the vibration control valve to a Rexroth hydrostatic motor mounted at the right side of the drum. This operates the exciter shaft at a single frequency of 32 Hz or 1920 vibrations per minute on both the smooth drum and pad foot versions.

A steering pump, mounted to the rear of the vibratory pump, provides the oil needed for steering. The steering pump also acts as the charge pump in the propulsion system. The steering pump draws oil from the reservoir, passes it through the steering control valve, through the inline hydraulic filter, and into the charge circuit.

This machine comes standard with parking brakes at both the front drum and the rear axle. A spring applied-hydraulically released multi disc brake is part of the drum drive motor gearbox. The axle uses a spring applied hydraulically released multiple disc brake at each axle shaft.

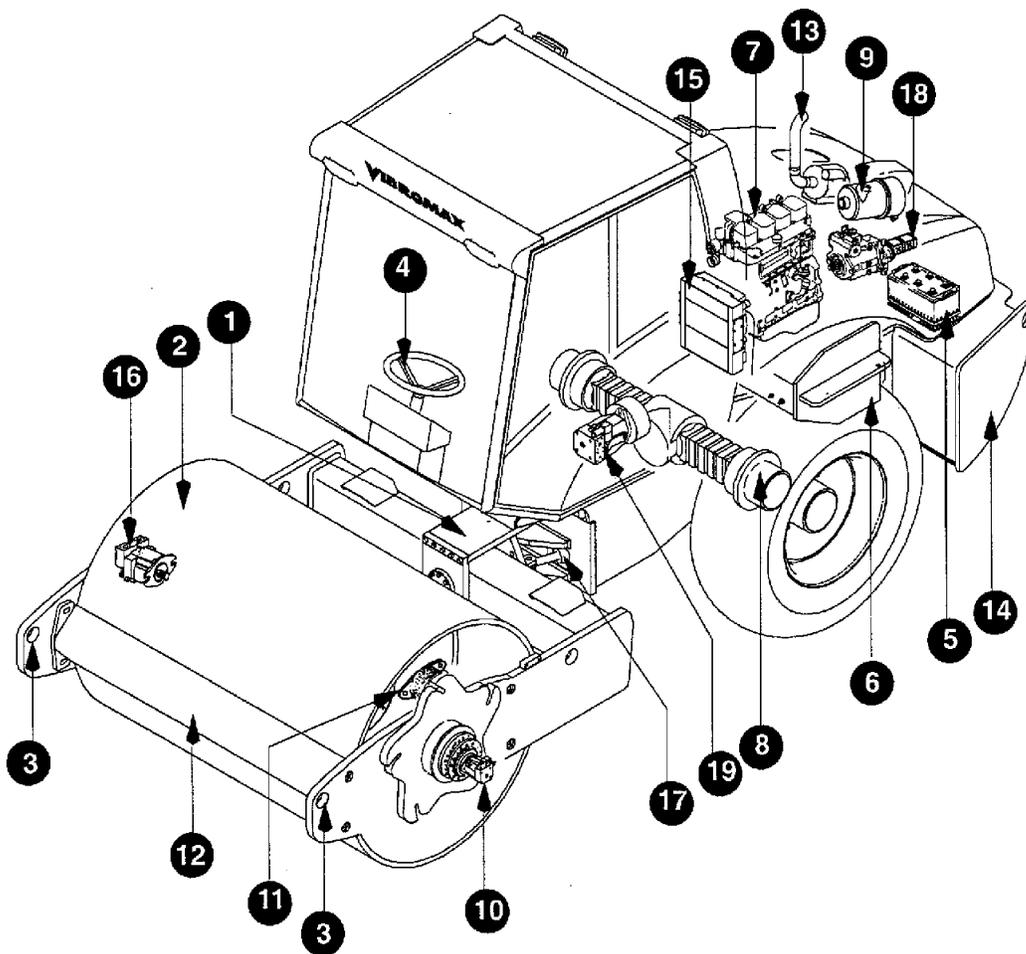
Pressure testing has been made easier by placing all the test ports at a centrally located test station under the engine hood.

The electrical system consists of a 12 volt battery, starter, alternator system, optional lighting and standard instrumentation.



SERIAL NUMBERS

1	Model / Serial Number	
2	Front Drum Drive Motor S/N	
3	Steering Unit S/N	
4	Axle S/N	
5	Vibratory Motor S/N	
6	Hydraulic Pumps S/N	
7	Axle Drive Motor S/N	
8	Engine S/N	



IDENTIFYING MACHINE COMPONENTS

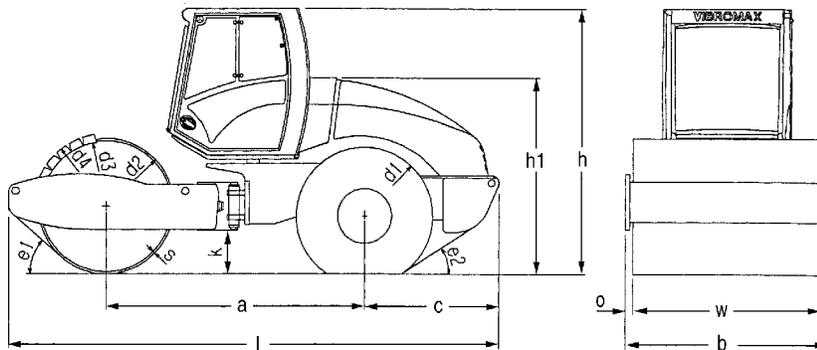
1	Articulation joint	11	Isolation buffer
2	Smooth drum	12	Scraper
3	Lifting and towing eyes	13	Engine exhaust
4	Operator's platform	14	Fuel tank
5	Battery	15	Cooling system
6	Hydraulic tank	16	Vibration motor
7	Engine	17	Steering cylinder
8	Axle	18	Hydraulic pumps
9	Air filter	19	Axle drive motor
10	Drum drive motor		

FLUID SPECIFICATIONS

MACHINE PART	CAPACITY USA (metric)	SPECIFICATIONS
Fuel tank	47.5 gal (180 l)	see diesel fuel
Engine crankcase	8.5 qts(8.0 l)	engine oil API classification API-CI-4 multigrade engine oil (see oil chart)
Hydraulic system Reservoir only	15.9 gal (60 l) 9.2 gal (35 l)	cold weather HLP 46 DIN 51524/2 hot weather HLP 68 DIN 51524/2 Mobil DTE 25,26 Shell Tellus OL 46,68 Amoco Rykon HD 46,68 Texaco Rando HD 46,68
Differential gear Planetary (each)	6.9 qts (6.6 l) 0.8 qts (0.8 l)	SAE 90 API GL-5 gear lubricant Alternate SAE 85/140 API GL-5 gear lubricant
Drum gearbox	1.4 qts (1.3 l)	CLP 220 LS 2 DIN 51517/3 Mobilgear 630 Mobilgear SHC 220 Texaco Syngear 220
Vibration system	2.6 qts (2.5 l)	CLP 150 DIN 51517/3 Mobil Gear 629 Shell Omala 150 Texaco Meropa 150
Battery	as required	Distilled water
Grease	as required	KP3K DIN 51502 Mobil Oil - Mobilux 3 Shell Oil - Alvania 3 Texaco Oil - Starplex 3
Engine coolant	14.8 qts (14 l)	50% ethylene glycol and 50% water -34 degrees F (-37 degrees C)
Tire ballast	none	Calcium Chloride (77%CaCl ²)

MACHINE SPECIFICATIONS

MODEL VM46



	in.	mm
a	86.6	2200
b	59.8	1520
c	53.1	1350
d1	35.9	912
d2	39.4	1000
d3	35.8	910
d4	42.1	1070
h	103.9	2640
h1	75.4	1915
k	13.2	335
l	172.2	4375
o	2.4	60
s	0.8	20
w	55.1	1400
e1	37 degrees	
e2	25 degrees	

ENGINE Make/Model/Type/Displacement - cu. in. (cc) HP, SAE net (kW) @2200 rpm Air Cleaner / Fuel filter Fuel Consumption- gal/hr (l/hr) Fuel capacity - gal (ltr)	Cummins 4B3.3, 4 cylinder diesel (water cooled), 199 cu.in. (3620cc) 60 (45) Dual replaceable elements, Spin-on cartridge 1.8 (6.7) 47.6 (180)		
	VM46D		VM46PD
Operating weight CECE with ROPS cab -lb (kg)	10141 (4600)		10803 (4900)
Weight, front-lb (kg)	4850 (2200)		5512 (2500)
Weight, rear axle - lb (kg)	5291 (2400)		5291 (2400)
Static applied linear drum load lb/in (kg/cm)	88 (15.7)		-----
Articulation/oscillation-degrees	32/12		32/12
Turning radius-inside-in (m)	122" (3.1)		122" (3.1)
Drum shell thickness-in. (mm)	0.8 (20)		0.8 (20)
Number of pad feet/height of foot - in. (mm)	-----		77/3.1 (80)
Tire size	12.00 R20 diamond tread		12.4 -24 tractor tread
Travel speed - 1st range mph (km/hr)	0 - 3.6 (0 - 5.8)		0 - 3.6 (0 - 5.8)
- 2nd range mph (km/hr)	0 - 7.9 (0 - 12.7)		0 - 7.9 (0 - 12.7)
Theoretical gradeability, forward - %	58		58
Brakes - front drum	disc		disc
- rear axle	disc		disc
	1st Stage		1st Stage
Max compaction depth - in. (cm)	26 (65)		28 (70)
Frequency - vpm (Hz)	1920 (32)		1920 (32)
Amplitude - in. (mm)	.071 (1.8)		.059 (1.5)
Centrifugal force - lbf (kN)	22841 (101.6)		22841 (101.6)
Centrifugal force/drum width - lb/in. (N/cm)	414 (726)		414 (726)

STANDARD TORQUE DATA

Where no special torque data is specified, the following torque figures should be applied. Threads should be lubricated with engine oil or grease.

STANDARD TORQUE SPECIFICATIONS +/- 10%

SIZE	GRADE 8.8		GRADE 10.9		GRADE 12.9	
	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm
5mm	4	5.5	5.5	7.5	6.6	9
6mm	6.6	9	9.2	12.5	11	15
8mm	16.5	22.5	23	31.5	26.5	36
10mm	32	44	45	62	55	75
12mm	57	77.5	81	110	95	130
14mm	88	120	125	170	155	210
16mm	140	190	195	265	236	320
18mm	192	260	269	365	320	435
20mm	273	370	383	520	457	620
22mm	369	500	516	700	619	840
24mm	471	640	665	900	796	1080
27mm	702	950	996	1350	1195	1620
30mm	955	1300	1328	1800	1593	2160

NUTS FOR TUBES AND HOSES

DIAMETER & PITCH	NEWTONS/METER	POUNDS/FOOT
16MM X 1.5	20	14.5
18MM X 1.5	35	26
20MMX1.45	45	33.2
24MM X 1.5	60	44

FITTINGS, CONNECTIONS AND PLUGS

DIAMETER & PITCH	NEWTONS/METER	POUNDS/FOOT
10MM X 1	20	14.5
12MM X 1.5	35	26
14MM X 1.5	45	33.2

FITTINGS, CONNECTIONS AND PLUGS

DIAMETER & PITCH	NEWTONS/METER	POUNDS/FOOT
16MM X 1.5	60	44
18MM X 1.5	70	51
22MM X 1.5	100	73
27MM X 2	200	147
33MM X 2	280	207
42MM X 2	380	281

FLANGES

DIAMETER & PITCH	NEWTONS/METER	POUNDS/FOOT
8MM X 1.5	28	21
10MM X 1.5	55	41
12MM X 1.75	90	67
14MM X 2	145	107
16MM X 2	230	170

DIESEL FUEL SPECIFICATION

If fuel is stored for a long time, foreign particles or water can collect in the fuel storage tank. Many engine problems are caused by contaminated fuel. Store fuel outside and keep the fuel as cool as possible. Drain water from the fuel storage tank at regular intervals.

NOTE: Paraffin crystals will start to form in fuel when the fuel temperature falls below the fuel's cloud point. These paraffin crystals will clog the fuel filter and cause the engine to stop or lose power. At ambient temperatures above 32°F (0°C) use #2 diesel fuel. At temperature below 32°F (0°C) use #1 diesel fuel blend.

Different brands of fuel can exhibit different properties. Make sure that the number 2 diesel fuel you use meets the following minimum requirements.

MINIMUM REQUIREMENTS FOR NO.2 DIESEL FUEL:

Maximum cloud point	-10°F (-23°C)
Maximum pour point	42°F (6°C) below the lowest ambient air temperature at which the engine must start
Cetane number, min	40 (45 to 55 in winter or at high altitude)
Max. sulphur content, by weight	0.50%
Max. water content & sediment by volume	0.05%
Max, ash content, by weight	0.01%
Max. carbon residue (10% point)	0.20%
Distillation temperature @ 90% point	540 to 625°F (282-329°C)
Distillation temperature @ end point	675°F (357°C)
Minimum flash point	125°F (52°C)
Viscosity at 100°F (38°C)	
Centistokes	2.0 to 4.3
Saybolt Universal Seconds (SUS)	32 to 40
Copper strip test, 3 hours @ 212°F (100°C)	No 3 ASTM
Minimum API gravity	30

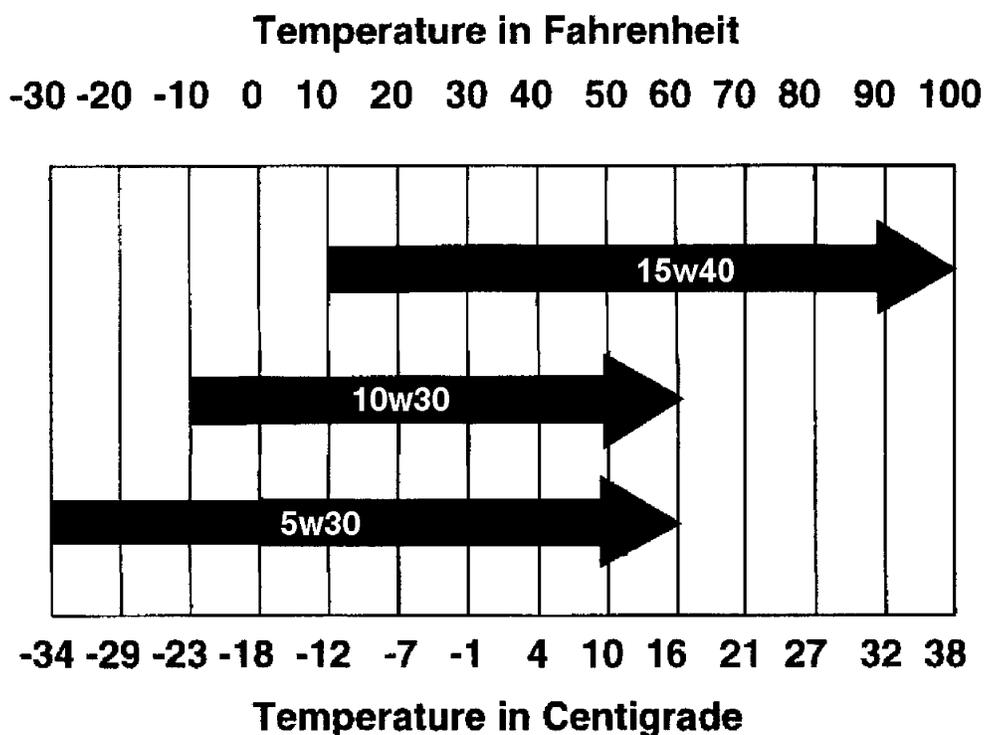
ENGINE OIL SPECIFICATION

Use multigrade engine oil with API engine oil service classification CI-4.

NOTE: DO NOT use performance additives or other oil additives in your engine crankcase.

See the chart below for recommended oil viscosity at the various ambient air temperature ranges.

Engine Oil Viscosity Chart
Ambient Air Temperature Ranges



SAFETY, GENERAL

The information in this manual does not replace any safety rules and laws used in your area. Before operating this machine, learn the rules and laws for your area and make sure your machine has the correct equipment according to these rules and regulations. Before starting the engine study the operator's manual.

- Know the location and function of all machine controls.
- Clear the area of other persons before you start the engine.
- Check all controls in a safe area before you operate the machine.
- Understand the limits of the machine.
- Do not try to do too much too fast.
- Keep the machine under control at all times.

The following decal is located on the left side of the machine on the fuse box door. Check the decal daily. Clean or replace as needed.



SPARK ARRESTER

NOTE: Rules or laws in some areas may require that this machine be equipped with a spark arrester or spark arrester muffler. Check the rules or laws in your area.

PERSONAL



Loose clothing and jewelry can cause an accident. Do not wear loose clothing or jewelry that can catch on controls, etc. Do wear safety shoes, hard hat, heavy gloves, etc. when required for your protection.

Foreign materials and loose objects on the steps, hand rails, and in the operators compartment can cause accidents and injury. Keep the steps, hand rails, and operator's compartment clear at all times.

Make sure cab windows are clean and unobstructed.

Know and understand the arrangements for movement of trucks, machines, and persons on your job site. Understand and follow the instructions of flagmen, road signs, or signals.



Check machine controls for proper operation prior to working the machine.

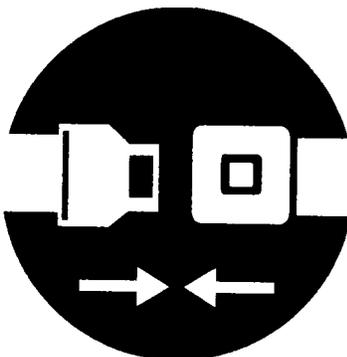
A fire can cause injury or death. Always have a fire extinguisher on the job site near the machine. Make sure the fire extinguisher is serviced according to the manufacturer's instructions.

Holes, obstructions, debris, and other work area hazards can cause injury or death. Always walk-around and look for these and other hazards before you operate your machine in a new work area.

Lack of, or incomplete, machine inspection and maintenance can cause accidents. Always follow the instructions in this manual for machine inspection and maintenance.

Always use the seat belt when operating the machine. Make sure the buckle is fully secured.

The following decal is located on the instrument panel. Check the decal daily. Clean or replace as needed.



Always wear the proper ear protection when operating this machine. Permanent hearing loss can result from extended exposure to loud noises.

The following decal is located on the instrument panel on machines without cabs. Check the decal daily. Clean or replace as needed.



MACHINE OPERATION



Dust, smoke, fog, etc. can decrease your vision and cause an accident. Always stop or slow the machine until you can clearly see your work area and the surrounding traffic.



Operate the controls from the operator's seat only, and keep your hands on the controls during operation.

The following decal is located on the right side of the operator seat box. Check the decal daily. Clean or replace as needed.



Do not permit other people to ride on the machine as passengers.

Sparks from the electrical system or engine exhaust can cause a fire or explosion. Before you operate this machine in an area with flammable dust or vapors, use good ventilation to remove the flammable dust or vapors.

Engine exhaust fumes can cause injury or death. If you operate this machine in an enclosed area, use good ventilation to replace the exhaust fumes with fresh air.

The vibrations from this machine can cause the walls of a trench or high bank to collapse. Make sure the walls of the trench or bank are braced. If you do not follow these instructions, you can cause personal injury or death to persons working in these areas.

This machine uses an articulating joint. Keep all persons clear of this pinch area when the engine is running. Machine movement can cause personal injury.

The following decal is located on each side of the machine's front frame in the articulation joint area. Check the decals daily. Clean or replace as needed.



The following decal is also located on both sides of the rear frame in the area of the articulation joint and symbolizes the danger of the pinch point. Check the decals daily. Clean or replace as needed.



A machine out of control can cause injury or death. You must make a judgement if weather and earth conditions will permit safe operation on a hill, ramp, or rough ground. Adjust machine operation accordingly.

Operating this machine too close to High Voltage electrical lines can cause injury or death. Follow the guide lines listed below.

NOTE: IF THE CLEARANCES IN THE SPECIFICATIONS BELOW ARE LESS THAN THE CLEARANCES GIVEN IN THE RULES AND LAWS OF YOUR AREA, YOU MUST FOLLOW THE RULES AND LAWS OF YOUR AREA!

Table 1: Electrical Safety Rules

Cable Voltage	Minimum Clearance From Cable When Machine is Working	Minimum Clearance From Cable When Transporting Machine
50,000 volts or less	10 feet (3 meters)	4 feet (1.2 meters)
50,000 volts to 345,000 volts	10 feet (3m) plus 1/2 inch (13mm) for every 1000 volts over 50,000 volts	10 feet (3 meters)
345,000 volts to 750,000 volts	10 feet (3m) plus 1/2 inch (13mm) for every 1000 volts over 50,000 volts	16 feet (5 meters)

MAINTENANCE



Engine fuel is flammable and can cause a fire or an explosion. Do not fill the fuel tank or service the fuel system while the machine is running, or near an open flame, welding, burning cigars and cigarettes, etc.

Machine movement without an operator can cause injury or death. If you must service this machine with the engine running, have another person help you and follow the instructions in the machine manuals. Lock the articulation joint and do not leave the machine when the engine is running.

Improper service or repair can cause injury or death. If you do not understand the service procedures for this machine, see your Vibromax dealer.

Flammable cleaning solvents can cause a fire hazard. Use nonflammable cleaning solvents for cleaning purposes.

Missing shields, guards, or access panels can cause injury or death. Always install all shields, guards, or access panels before you start the engine.

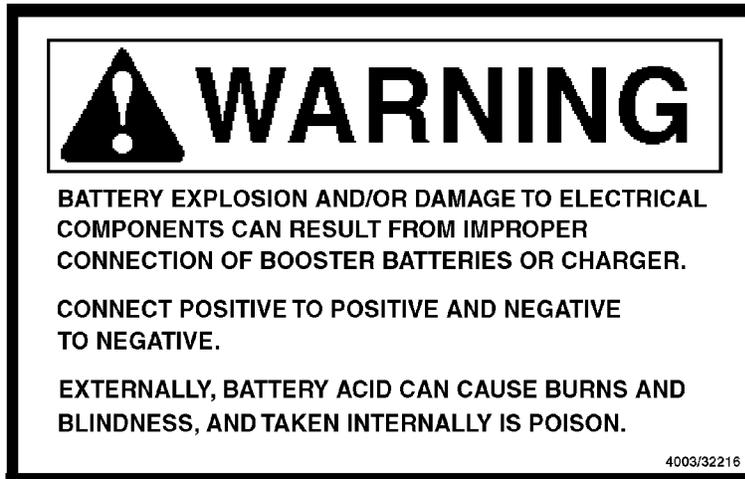
Do not make any modifications or repairs to the machine ROPS. If your ROPS is damaged, replace it with new parts. Welding, drilling, etc. can weaken the ROPS structure.

Metal chips or debris can cause eye injury. Wear eye protection when you service this machine. If you use a hammer to drive hardened pins or for other service, use a hammer with a soft face (brass, plastic, etc.).

Unauthorized modifications to cast iron parts can cause injury or death. Welding can cause cast iron parts to break. Do not use welding to repair or attach items to cast iron parts on this machine.

Batteries produce explosive gases. Protect from and keep flames away. Ventilate when charging. Always wear eye protection when working near batteries. Do not wear jewelry or watch bands when working on batteries.

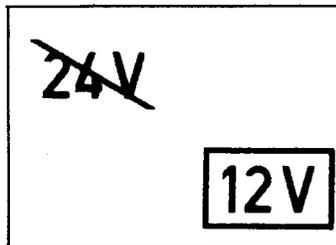
The following decal is located inside the battery box door. Check the decal daily. Clean or replace as needed.



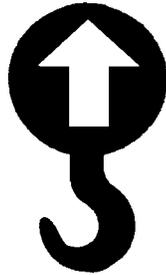
When you install a battery or use a booster battery, connect the negative ground cable last. When you remove a battery or booster battery, disconnect the negative ground cable first.

Never charge or jump a battery when the electrolyte is frozen. If you do not follow this instruction the battery can explode.

The following decal is located inside the battery box door and shows that this machine has a 12 volt electrical system. Check the decal daily. Clean or replace as needed.

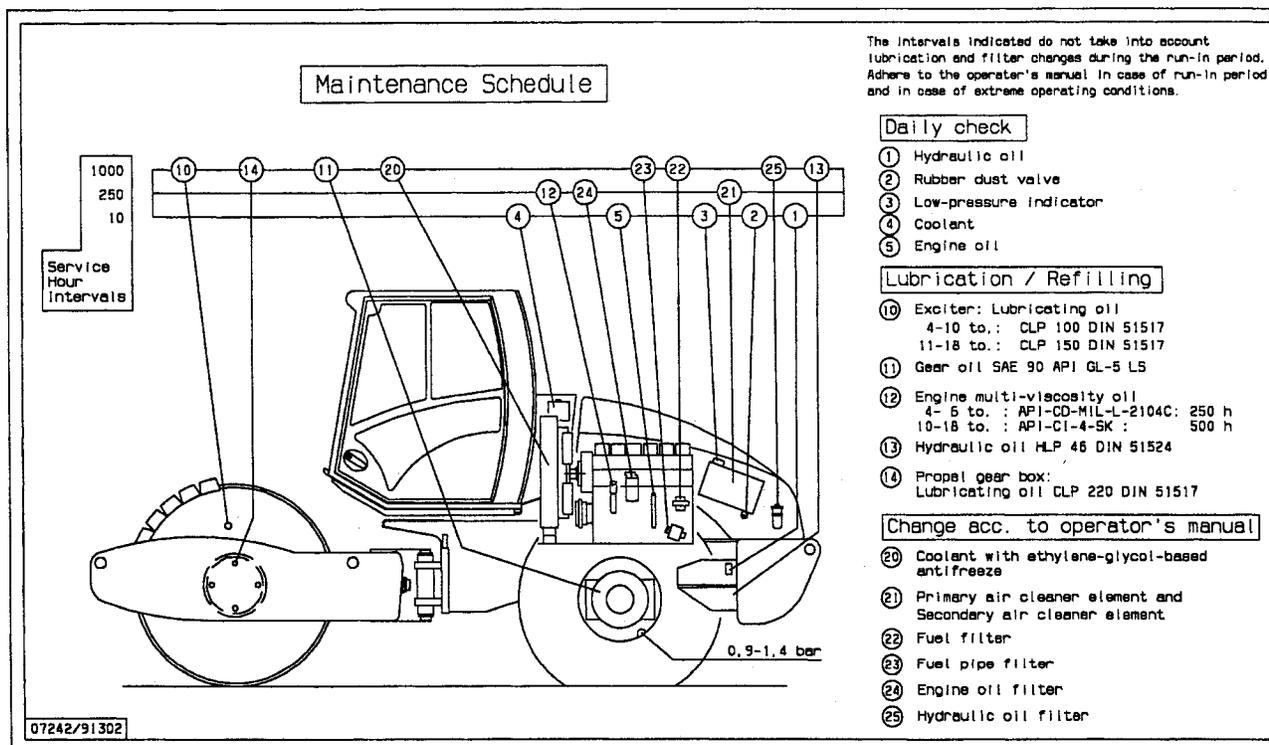


The following decal is located in six places on the machine at the lift and anchor points. Check the decals daily. Clean or replace as needed



⚠ DANGER

Unauthorized modifications to this machine can cause injury or death. Never make modifications to this machine without prior written approval from Vibromax.



MAINTENANCE SCHEDULE

The intervals given in this maintenance schedule must not be exceeded. If the machine is operated under severe conditions (high temperature, dust, water, etc.) shorten the interval.

As Required

- Clean the machine
- Check the air cleaner intake stack
- Fill the fuel tank
- Service the air cleaner if warning light is lit
- Service the hydraulic oil filter if warning light is lit
- Check the condition of the engine belts
- Check the torque of the wheel nuts

Every 10 hours or daily

- Perform a daily walk-around inspection
- Clean or replace decals that cannot be read
- Clean the rubber dust valve on air cleaner
- Check the engine oil level
- Check the hydraulic reservoir oil level
- Check the drum scrapers
- Check tire condition and pressure
- Check the condition of the engine belts
- Check the coolant reservoir fluid level
- Check the wheel nuts

After the first 250 hours of operation

- Change the oil in the drum gearbox
- Check engine valve lash

Every 250 hours of operation

- Check all air and coolant hoses
- Check engine mounts
- Change engine oil
- Replace the engine oil filter
- Check the axle oil levels
- Clean battery and check fluid level
- Check the engine belt tension
- Check the oil in the drum gearbox
- Check the drum buffers

After the first 500 hours of operation

- Change the axle oil

Every 500 hours of operation

- Drain the water from the fuel tank
- Clean the fuel filler inlet strainer
- Replace the fuel filters

-drum-roller-service-repair-workshop-manual-sm86046/

Every 1000 hours of operation or once each year

- Change the hydraulic oil filter
- Change the hydraulic oil
- Clean the hydraulic oil filler screen
- Change the vibration system oil
- Change the axle oil
- Check and clean cooling system (outside)
- Change the oil in the drum gearbox
- Check bolt torque on ROPS
- Check seat belts and seat torques
- Cummins service inspection

Every 2000 hours of operation

- Clean and flush cooling system
- Change the engine coolant