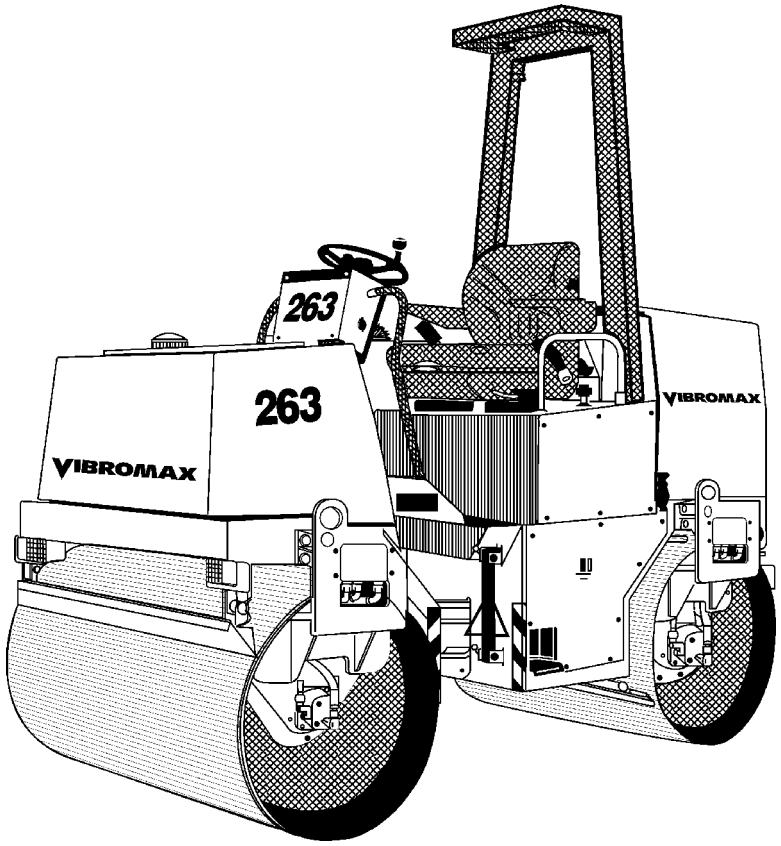
Open front screen

VIBROMAX

253 / 263 TANDEM ROLLER

SERVICE MANUAL SM60001

July 1998



AFTER S/N JKC5300100

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.

SECTION ONE

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SECTION ONE

GENERAL INFORMATION

CALIFORNIA
Proposition 65 Warning
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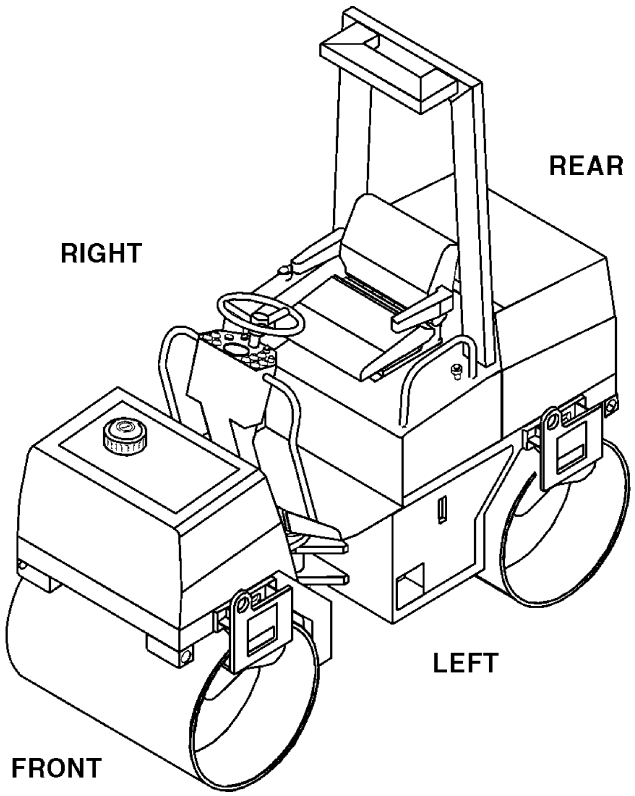
NOTES

MACHINE DESCRIPTION



The 253 Series vibratory roller is a “new from the ground up” machine, replacing the 252. The 253 is a 2.5 metric ton, tandem drum machine with articulated steering, hydrostatic drive and a hydraulically driven vibration system. The 253 has a 1000 mm (39 inch) drum width while the 263 is the 1200 mm (47 inch) drum width version.

A Kubota D1403B, water cooled, three cylinder in-line diesel engine, mounted in the rear chassis, provides the power for the machine. The engine has a 29.0 Net Horse Power rating at 2600 RPM.

A Sauer Sunstrand variable displacement hydrostatic pump, used for machine propulsion, is mounted to the flywheel end of the engine. It provides oil for the front and rear Poclain, fixed displacement, drum drive motors in a parallel path. The motors are located on the right hand side of the drums and are connected directly to the drum, without gear reduction.

The vibration system consists of a fixed displacement gear pump mounted to the back of the propulsion pump. This gear pump drives the two gear motors (one on each drum, left hand side) in a series flow path, with options of vibration to the front drum only, rear drum only, both drums or neither drum. Oil from the vibration circuit passes through an air to oil cooler at the engine radiator. The exciter shafts and the drum bearings are oil lubricated, eliminating the need for grease zerks.

Front and rear parking brakes are provided on the 253/263. The drum brakes are integral to the drive motors. The brakes are spring applied / hydraulically released and are controlled by a switch on the dash and by an emergency stop switch on the right operators console. A tow valve, located under the operators seat, provides for brake release for towing purposes.

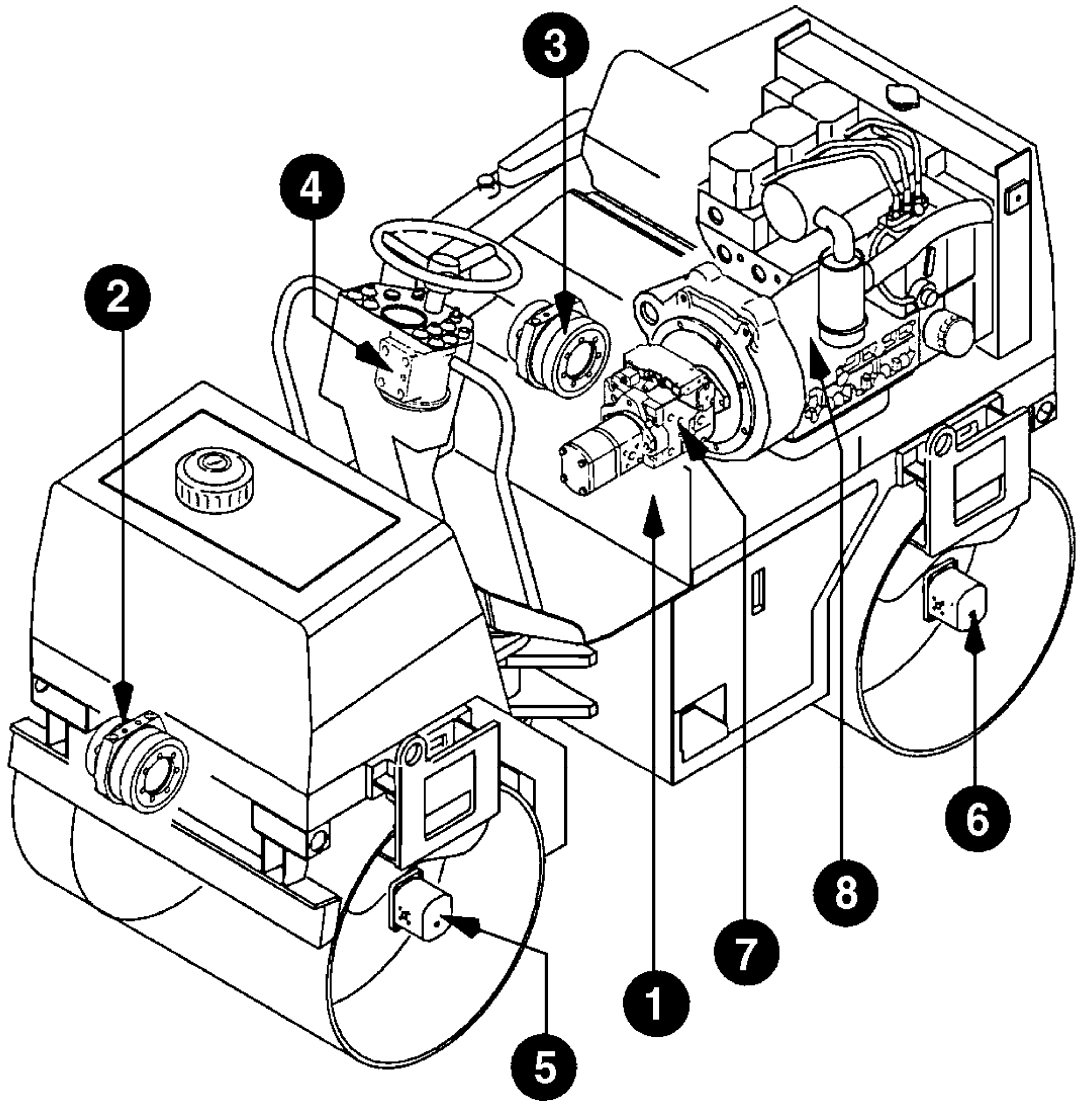
A steering pump, mounted to the back of the vibration pump, provides oil for the steering control valve and a single steering cylinder at the articulation joint. The joint is maintenance free, providing 40 degrees of articulation and 15 degrees of oscillation. An articulation joint safety lock completes the steering system.

The return oil flow from the vibratory circuit and the steering circuit passes through a 10 micron oil filter mounted in the top of the hydraulic reservoir. A filter bypass and a pressure differential switch completes the filter circuit. The hydraulic reservoir is located below the operators platform on the left side of the rear chassis. The modular design of the reservoir makes it possible to completely remove the reservoir if necessary.

Pressure testing of the hydraulic system has been simplified by the location of a test station in the left side of the engine compartment. Pressure testing of the drive, charge, brake release, vibratory and steering systems can be performed from one location.

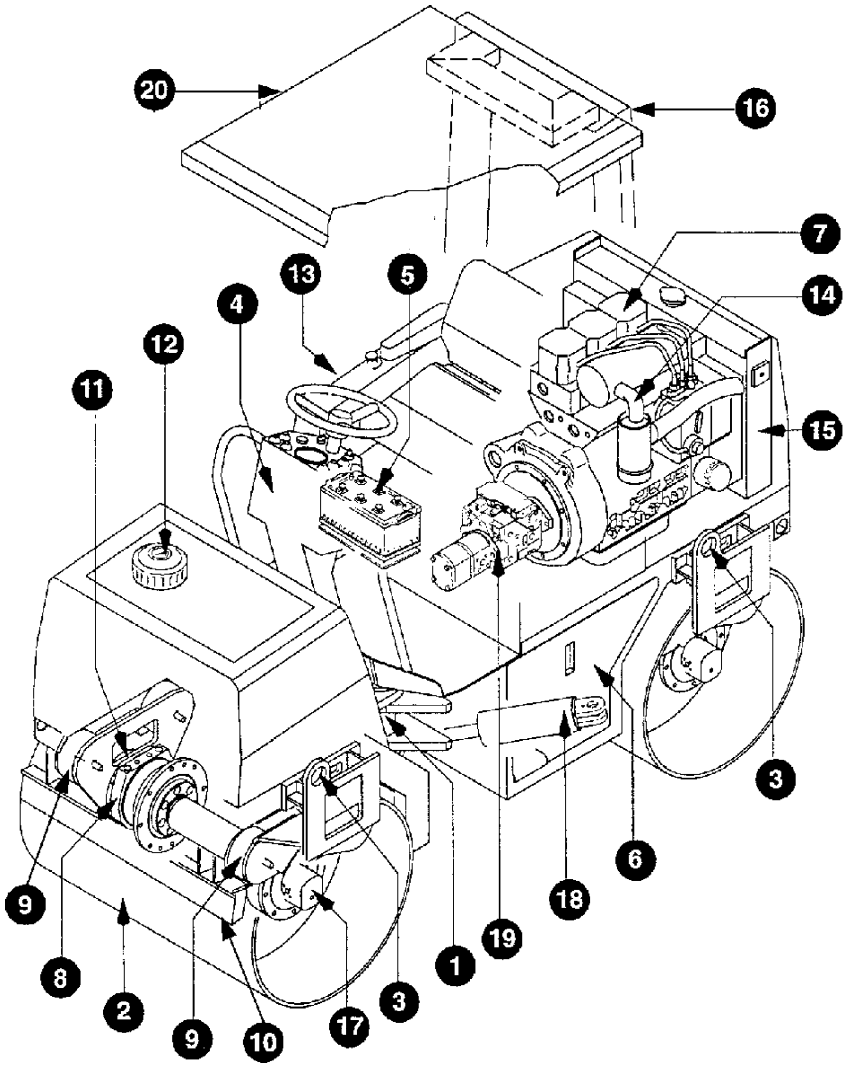
The electrical system consists of the standard starter, battery and charging circuit along with optional lighting, hazard and directional lights. The instrument panel includes switches for vibration, sprinklers, lights and brakes along with the standard instrument cluster of warning lights and an hour meter. An emergency stop button is located right of the operator's seat, just to the front of the lockable access panel for the fuse compartment. All electrical control components are located behind a removable panel on the right side of the operators platform.

A 53 gallon water tank is located on the front chassis, providing water for the asphalt sprinkler system. The tank's modular design allows for easy removal if necessary. Fixed position scrapers on the front and rear of each drum and a pressurized sprinkler bar on each drum, complete the system.



SERIAL NUMBERS

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



IDENTIFYING MACHINE COMPONENTS

1	Articulation joint	11	Spring loaded brake
2	Smooth drum	12	Water tank
3	Lifting eye	13	Fuel tank
4	Operator's stand	14	Air filter canister
5	Battery	15	Water - oil cooler
6	Hydraulic tank	16	Roll over protection
7	Engine	17	Vibration motor
8	Drum drive motor	18	Steering cylinder
9	Rubber buffer	19	Hydraulic pumps
10	Scraper	20	Sun roof

SAFETY, GENERAL

The information in this manual does not replace any safety rules and laws used in your area. Before you operate 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.

Your safety and the safety of other persons in the work area are dependent on your correct operation of this machine.

- 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.

SPARK ARRESTER

NOTE: Rules or laws in some areas can make it necessary for this machine to be equipped with a spark arrester or spark arrester muffler. Check the rules or laws in your area.

SAFETY, PERSONAL

⚠ WARNING ***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.***

⚠ WARNING ***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.***

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

⚠ WARNING ***Always use the seat belt when operating the machine. Make sure the buckle for the seat is fastened correctly.***

⚠ WARNING ***Make sure cab windows are clean and unobstructed.***

⚠ WARNING ***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.***

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

⚠ WARNING ***Check machine controls for proper operation prior to starting the machine.***

⚠ WARNING ***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.***

⚠ WARNING ***Electrical cables, gas pipes, water pipes, sewers, or other underground objects can cause injury or death. Know the location of underground hazards before you operate your machine in a new work area.***

⚠ WARNING ***Not doing, or wrong machine inspection and maintenance can cause accidents. Always follow the instructions in this manual for machine inspection and maintenance.***

SAFETY, MACHINE OPERATION

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

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

⚠ WARNING ***Do not permit other persons to ride on the machine.***

⚠ WARNING ***Look at the instruments and gauges frequently when you operate. Make sure all systems are in the proper operating range.***

⚠ WARNING ***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.***

⚠ WARNING ***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.***

⚠ WARNING ***Operating your machine in, on, or near a trench, high bank, or overhang is extra dangerous and can cause injury or death. You must make a judgement if your machine can be safely operated near any of these areas. Use wall supports if necessary.***

⚠ WARNING ***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.***

⚠ WARNING ***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.***

⚠ WARNING ***The vibrations from this machine can cause the walls of a trench or high bank to collapse. If you must operate this machine close to a trench or high bank, 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.***

⚠ WARNING ***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!

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	23 feet (7m) plus 1/2 inch (13mm) for every 1000 volts over 345,000 volts	16 feet (5 meters)

SAFETY, MAINTENANCE

⚠ WARNING ***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.***

⚠ WARNING ***Flammable cleaning solvents can cause injury or death. Use nonflammable cleaning solvents for cleaning purposes.***

⚠ WARNING ***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.***

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

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

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

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

⚠ WARNING ***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.).***

⚠ WARNING ***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.***

⚠ WARNING ***Batteries produce explosive gases. Keep sparks and flame away. Ventilate when charging. Always wear eye protection when working near batteries. Do not wear jewelry or watch bands when working on batteries.***

⚠ WARNING ***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.***

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

⚠ WARNING ***Never wear rings or other jewelry when working on machine maintenance. Severe burns can result when jewelry is shorted on an electrical system.***

⚠ WARNING ***Never wear loose clothing which can catch on objects or be tangled in moving parts.***

⚠ WARNING ***Use suitable floor (service) jacks and safety stands when lifting the machine off the ground.***

⚠ WARNING ***Hydraulic oil under pressure can penetrate the skin. If hydraulic oil has penetrated the skin, seek medical treatment immediately. Do not use your hands to check for hydraulic leaks, use a piece of cardboard or wood.***

⚠ WARNING ***Keep your work area clean and free of spilled oil and grease to avoid accidental slipping.***

GENERAL INFORMATION

CLEANING

Clean all metal parts, except bearings, in mineral spirits or by steam cleaning. Do not use caustic soda when steam cleaning. After cleaning, dry and put oil on all parts. Clean oil passages with compressed air. Clean bearings in kerosene, dry the bearings completely and put oil on the bearings.

INSPECTION

Check all parts as they are disassembled. Replace all parts that have wear or damage. Small scoring or grooves can be removed with a hone or crocus cloth. Complete visual inspection for indications of wear and pitting. Replacement of bad parts will prevent early failure.

BEARINGS

Check bearings for easy movement. If bearings have a loose fit or rough action, replace the bearing. Wash bearings in kerosene and allow to air dry. DO NOT USE COMPRESSED AIR TO DRY BEARINGS.

NEEDLE BEARINGS

Before pressing needle bearings into a bore, always remove any metal protrusions in the bore or at the edge of the bore. Before pressing bearing, lubricate the inner and outer diameters as needed.

GEARS

Check and replace all gears that have wear or damage.

OIL SEALS, O-RINGS, & GASKETS

Always install new oil seals, o-rings and gaskets. Put petroleum jelly or the specified oil on seals and o-rings.

SHAFTS

Check all shafts for wear damage. Check the surfaces where bearings and oil seals operate for signs of wear.

SERVICE PARTS

Always install genuine Vibromax service parts. When ordering refer to the parts manual for the correct part numbers. Failure to use genuine Vibromax replacement parts can void your warranty.

LUBRICATION

Use the oils and lubricants specified in the Operator's or Service Manual. Failures due to the use of non specified lubricants are not covered by warranty.

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. Loctite products also act as a lubricant.

STANDARD TORQUE SPECIFICATIONS +/- 10%

	GRADE 8.8		GRADE 10.9		GRADE 12.9	
SIZE	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
20MM X 1.5	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
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

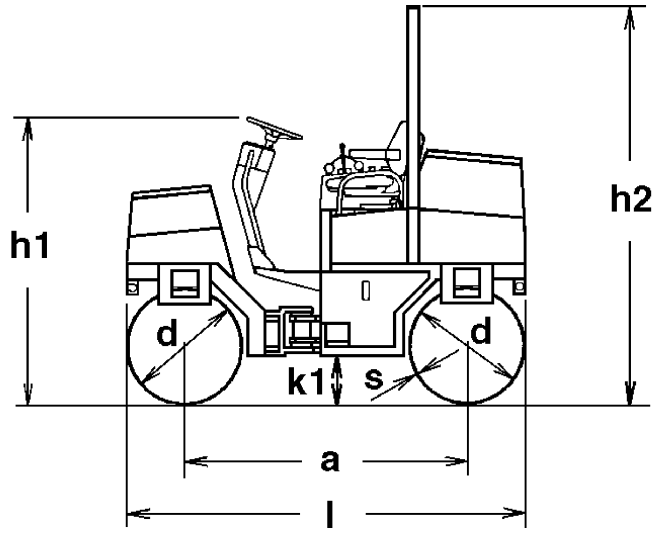
FLANGES

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

METRIC/USA CONVERSIONS

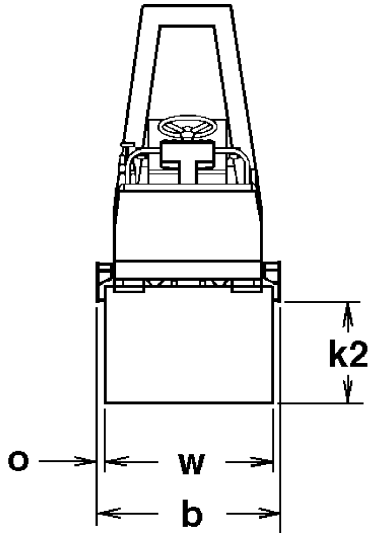
METRIC UNITS	CHANGE TO	ARITHMETIC
millimeters (mm)	inches (in)	mm x .03937 = inches
bars	pound per sq. in. (psi)	bar x 14.22 = psi
kilograms (kg)	pounds (lb)	kg x 2.204 = pounds
kilowatts (kW)	horsepower (hp)	kW x 1.341 = horsepower
celsius (^{o}C)	farenheit (^{o}F)	^{o}C x 1.8 + 32 = ^{o}F
newton meters (Nm)	pounds feet (lb ft)	Nm x .737 = lb ft
newton meters (Nm)	pounds inch (lb in)	Nm x 8.85 = lb in
liters (L)	U.S. gallon	liters x .264 = gallons
liters (L)	U.S. quarts	liters x 1.056 = quarts
cubic centimeters (cm^3)	cubic inches (in^3)	cm^3 x .061 = in^3

MACHINE SPECIFICATIONS



SIDE VIEW
253 / 263

	in.	mm
a	66.9	1700
d	27.6	700
h1	67.7	1720
h2	98.4	2500
k1	11.4	290
l	94.5	2400
s	0.5	12



FRONT VIEW
253 / 263

	model	in.	mm
b	253	43.1	1096
	263	51.0	1296
k2	253	22.4	570
	263	22.4	570
o	253	1.9	48
	263	1.9	48
w	253	39.4	1000
	263	47.2	1200

ENGINE DATA

Make / Model / Type	Kubota, 3 cylinder, diesel
Cooling	Water
Displacement - cu.in. (cc)	85.7 (1400)
HP, SAE net (kW) @ 2600 rpm	29 (21.5)
Air Cleaner	Dual replacement elements
Fuel filter	Cartridge
Fuel Consumption - gal/hr (liter/hr)	1.32 (5)
Fuel capacity - gal (liter)	13.2 (50)
Electrical system	12 volt
Battery, amp hours	88

DRIVE SYSTEM DATA

Propulsion - front and rear	Infinitely variable hydrostatic
Travel speed - mph (km/hr)	0 - 6.6 (0-11)
Theoretical gradeability, forward -%	40
Brakes, operating	Hydrostatic braking thru ground drive
Brakes, parking	Spring applied, hydraulic release
Steering	Articulated, hydraulic powered
Articulation/oscillation - degrees	40 / 15

OPERATING DATA

	253	263
Operating Weight - lbs (kg)	5500 (2500)	5720 (2600)
Static linear drum load - lb/in (kg/cm) ea.drum	69.8 (12.5)	60.6 (10.8)
Centrifugal force per drum - lbf (kN)	6744 (30)	8100 (36)
Centrifugal force/rolling width - lbf/in (N/cm)	171 (300)	171 (300)
Total applied force/rolling width - lbf/in (N/cm)	240.8 (312.5)	232.2 (297.4)
Frequency - vpm (Hz)	3480 (58)	3480 (58)
Nominal Amplitude - in. (mm)	.020 (0.5)	.020 (0.5)
Drum shell thickness - in. (mm)	0.50 (12)	0.50 (12)
Water tank capacity - gal (liter)	52.8 (200)	52.8 (200)

FLUID SPECIFICATIONS

MACHINE PART	CAPACITY USA (metric)	SPECIFICATIONS
Fuel tank	13.2 gal (50 l)	see diesel fuel
Engine crankcase	6 qts(5.6 l)	engine oil API classification API-CD MIL-L-2104C multigrade engine oil (see oil chart) single grade engine oil (see oil chart)
Hydraulic system Reservoir only	15.9 gal (60 l) 12.4 gal (47 l)	cold weather HLP 46 DIN 51524 hot weather HLP 68 DIN 51524 Mobil DTE 25,26 Shell Tellus OL 46,68,100 Amoco Rykon HD 46,68,100 Texaco Rando HD 46,68,100
Vibration system 253 263	(each drum) 1.3 qts. (1.2 l) 1.9 qts. (1.8 l)	Mobil Gear 627
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	8.5 qts (8 l)	50% ethylene glycol and 50% water
Sprinkling Device	52.8 gal (200 l)	Tap water

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.

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

MINIMUM REQUIREMENTS FOR #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)

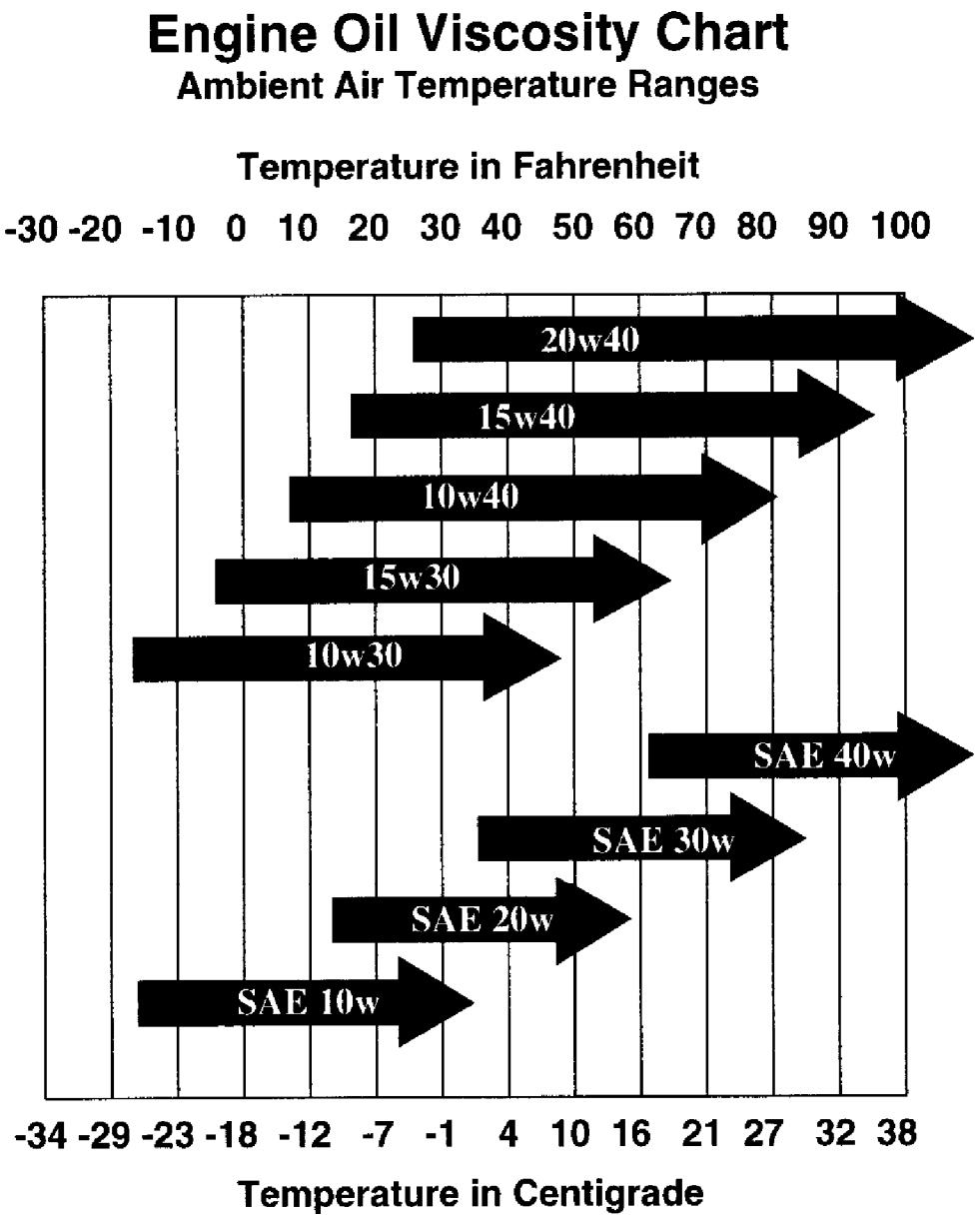
Viscosity at 100°F (38°C)
Centistokes .....2.0 to 4.3
Saybolt Universal Seconds (SUS) .....32 to 40
Copper strip test, 3 hours @ 212°F (100°C)..... No 3 ASTM
Minimum API gravity 30

ENGINE OIL SPECIFICATION

Use multigrade or single grade engine oil with API engine oil service classification “CD”.

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 range



SECTION TWO

ENGINE R&I

NOTES