VOLVO L90E
IN DETAIL

Engine

6 liter, 6-cylinder straight turbocharged diesel engine with electronically-controlled unit pumps and conventional injectors. The engine has dry replaceable cylinder liners and replaceable valve guides and valve seats. The throttle application is transmitted electrically from the throttle pedal or the optional hand throttle. Air cleaning: three-stage. Cooling system: Air-to-air intercooler and hydrostatic, electronically-controlled fan.

Engine	Volvo D6D LA E2
Max power at	32,0 r/s (1,900 rpm)
SAE J1995 gross	122 kW (166 hp)
SAE J1349 net	121 kW (165 hp)
Max torque at	23,3 r/s (1,400 rpm)
SAE J1995 gross	739 Nm (545 lbf ft)
SAE J1349 net	732 Nm (540 lbf ft)
Economic working range	1100–1600 rpm
Displacement	5,7 l (348 in³)

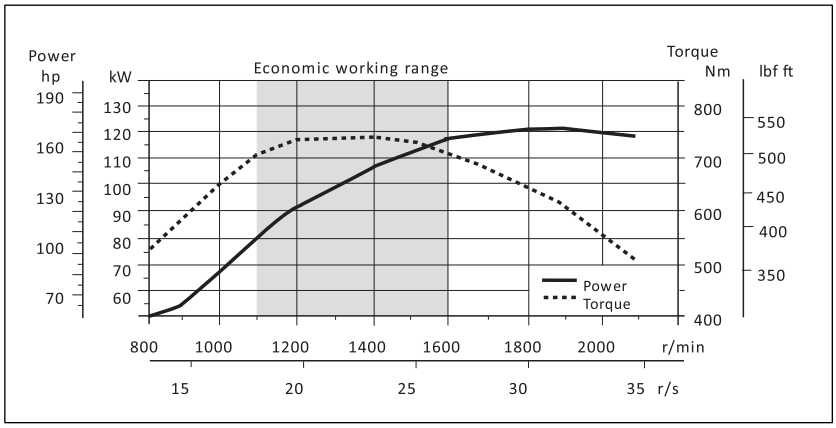
Electrical system

Central warning system: Central warning light for the following functions (buzzer with gear engaged): Engine oil pressure, charge-air temperature, fuel temperature, transmission oil pressure, brake pressure, parking brake applied, hydraulic oil level, steering pressure, low coolant level, coolant temperature, transmission oil temperature, hydraulic oil temperature, overspeeding in engaged gear, brake charging, axle oil temperature.

Voltage	24 V
Batteries	2x12 V
Battery capacity	2x110 Ah
Cold cranking capacity, approx	690 A
Reserve capacity, approx	206 min
Alternator rating	1920 W/80 A
Starter motor output	5,4 kW (7.3 hp)

Drivetrain

Torque converter: single-stage. Transmission: Volvo countershaft transmission with single lever control. Fast and smooth shifting of gears between forward and reverse with Pulse Width Modulation (PWM) valve. Gearshifting system: Volvo Automatic Power Shift (APS) with fully automatic shifting 1-4 and mode selector with 4 different gearshifting programs, including AUTO. Axles: Volvo fully fl oating axle shafts with planetary hub reductions and cast steel axle housings. Fixed front axle and oscillating rear axle. 100% differential lock on the front axle.



Transmission	Volvo HTE 202
Torque multiplication	2,45:1
Maximum speed, forward/reverse	
1	6,8 km/h (4.2 mph)
2	12,7 km/h (7.9 mph)
3	25,6 km/h (15.9 mph)
4	37,1 km/h (23.1 mph)
Measured with tires	20.5 R25 L2
Front axle/rear axle	Volvo/AWB 25/20
Rear axle oscillation	±13°

Ground clearance at 13° osc. 470 mm (18.5 in)

Brake system

Service brake: Volvo dual-circuit system with nitrogen charged accumulators. Outboard mounted hydraulically operated, fully sealed oil circulationcooled wet disc brakes. The operator can select automatic disengagement of the transmission when braking using Contronic. Parking brake: Fully sealed, wet multi-disc brake built into the transmission. Applied by spring force and electro-hydraulically released with a switch on the instrument panel. Secondary brake: Dual brake circuits with rechargeable accumulators. Either one circuit or the parking brake fulfi lls all safety requirements. Standard: The brake system complies with the requirements of ISO 3450.

Number of brake discs per wheel 1/1	front/rear
Accumulators	2x0,5 l (2x0.13 US gal), 1x1,0 l (1x0.26 US gal)
Accumulators for parking brake	1x1,0 l (1x0.26 US gal)

Steering system

Steering system: Load-sensing hydrostatic articulated steering. System supply: The steering system has priority feed from a load-sensing axial piston pump with variable displacement. Steering cylinders: Two double-acting cylinders.

Steering cylinders	2
Cylinder bore	80 mm (3.2 in)
Piston rod diameter	50 mm (2.0 in)
Stroke	345 mm (13.6 in)
Working pressure	21 MPa (3,046 psi)
Maximum fl ow	200 l/min (52.8 US gpm)
Maximum articulation	±40°

Cab

Instrumentation: All important information is centrally located in the operator's fi eld of view on the Contronic monitoring system's display unit. Heater and defroster: Heater coil with fi ltered fresh air and fan with four speeds. Defroster vents for all window areas. Operator seat: Ergonomic seat with

adjustable suspension and retractable seatbelt. The seat is mounted on a bracket, which is mounted on the rear cab wall. The forces from the retractable seat belt are absorbed by the seat rail. Standard: The cab structure is tested and approved according to ROPS (ISO 3471) and FOPS (ISO 3449). The cab meets all requirements according to ISO 6055 (Operator Overhead Protection - Industrial Trucks) and SAE J386 (Operator Restraint System).

Emergency exits	1
Sound level in cab according to ISO 6396	LpA 70 dB (A)
External sound level according to ISO 6395 (Directive 2000/14/EC)	vA 105 dB (A)

Ventilation	9 m³/min (318 ft³/min)
Heating capacity	11 kW (37,500 Btu/h)
Air conditioning (optional)	8 kW (27,300 Btu/h)

Hydraulic system

System supply: One load-sensing axial piston pump with variable displacement. The steering system always has priority. Valves: Double-acting 2-spool valve. The main valve is controlled by a 2-spool pilot valve. Lift function: The valve has four positions including lift, hold, lower and fl oat. Inductive/magnetic automatic boom kick-out can be switched on and off and is adjustable to any position between maximum reach and full lifting height. Tilt function: The valve has three functions including rollback, hold and dump. Inductive/magnetic automatic tilt can be adjusted to the desired bucket angle. Cylinders: Double-acting cylinders for all functions. Filter: Full fl ow fi ltration through 20 micron (absolute) fi lter cartridge.

Working pressure maximum

	26,0 MPa (3,771 psi)
Flow	175 l/min (46.2 US gpm)
at	10 MPa (1,450 psi)
and engine speed	32 r/s (1,900 rpm)
Pilot system	
Working pressure	3,5 MPa (508 psi)
Cycle times Raise*	
	5,4 s
Tilt*	2,1 s
Lower, empty	2,5 s
Total cycle time	10,0 s

* with load as per ISO 14397 and SAE J818

Lift arm system

Torque Parallel Linkage (TP Linkage) with high breakout torque and parallel action throughout the entire lifting range.

Lift cylinders	2
Cylinder bore	120 mm (4.7 in)
Piston rod diameter	70 mm (2.75 in)
Stroke	733 mm (28.8 in)
Tilt cylinder	1
Cylinder bore	180 mm (7.1 in)
Piston rod diameter	90 mm (3.54 in)
Stroke	430 mm (16.9 in)

Service

Service accessibility: Large, easy-to-open service doors with gas struts. Swing-out radiator grille and cooling fan. Possibility to log and analyze data to facilitate troubleshooting.

Refi ll capacities

Fuel tank	205 l (54.1 US gal)
Engine coolant	36 l (9.5 US gal)
Hydraulic oil tank	115 l (30.4 US gal)
Transmission oil	40 l (10.6 US gal)
Engine oil	20 l (5.3 US gal)
Axles front/rear	30/25 l (7.9/6.6 US gal)

11

SPECIFICATIONS

Where applicable, specifi cations and dimensions

Standard boom		Long boom	
B 6020 mm	19'9''	6450 mm	21'2''
C 3000 mm	9'10''		
D 400 mm	1'4''		
F 3260 mm	10'8''		
G 2130 mm	7'0''		

J	3650 mm 12'0"	4080 mm 13'5"
K	3960 mm 13'0"	4380 mm 14'4"
O	56 °	57 °
P_{max}	45 °	____
R	43 °	46 °
R_1*	47 °	52 °
S	67 °	66 °
T	112 mm 0'4.4"	117 mm 0'4.6"
U	430 mm 1'5"	520 mm 1'8"
X	1960 mm 6'5"	____
Y	2490 mm 8'2"	____
Z	3260 mm 10'8"	3620 mm 11'11"
a_2	5370 mm 17'7"	____
a_3	2880 mm 9'5"	____
a_4	±40 °	____

Tires: 20.5 R25 L2

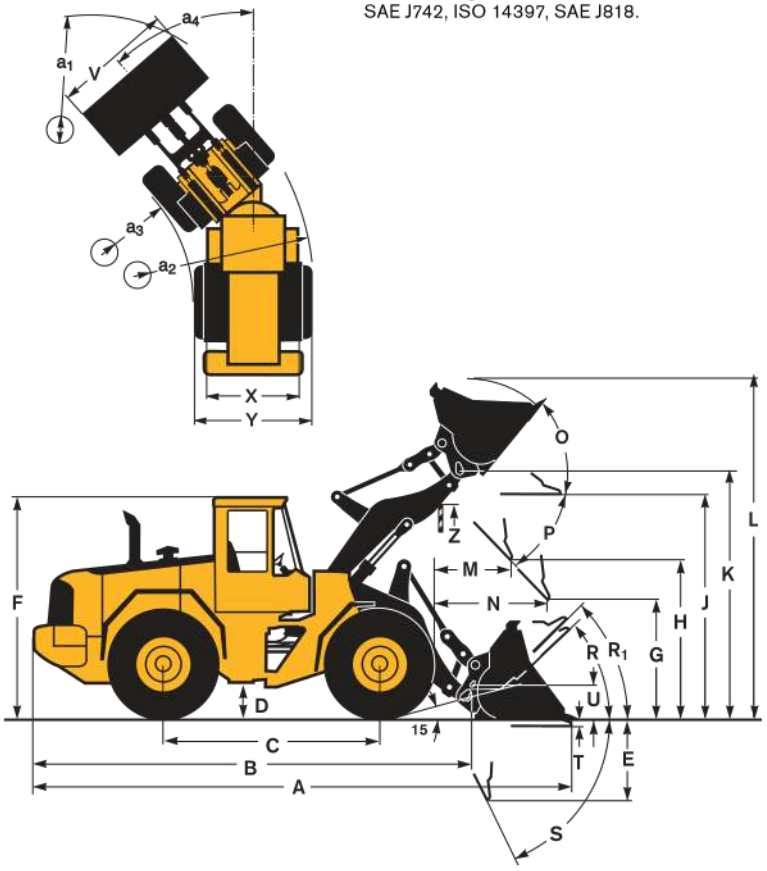
* Carry position SAE

Tires: 650/65 R25

Operating weight (incl. logging cw 680 kg **(1,500 lb)**): 16 740 kg **(36,900 lb)**

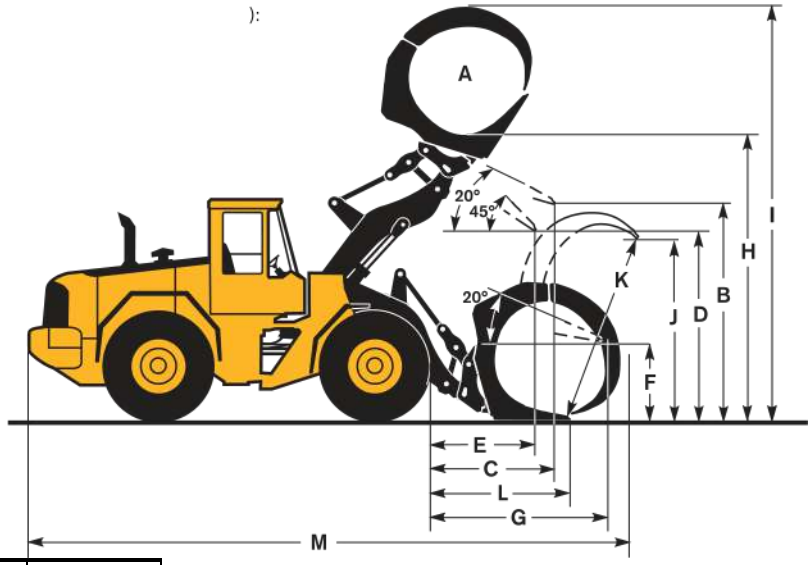
Operating load: 4600 kg **(10,140 lb)**

are according to ISO 7131, SAE J732, ISO 7546, SAE J742, ISO 14397, SAE J818.



A	2,4 m² 25,8 ft²
B	3420 mm 11'3"
C	1810 mm 5'11"
D	2800 mm 9'2"
E	1430 mm 4'8"
F	1450 mm 4'9"
G	2750 mm 9'0"
H	4530 mm 14'11"
I	6580 mm 21'7"
J	2790 mm 9'2"
K	2990 mm 9'10"
L	2130 mm 7'0"
M	8320 mm 27'3"

):



Supplemental Operating Data

Tires 20.5 R25 L2		**650/65 R25**		**650/65 R25**	
		Standard boom	**Long boom**		
Width over tires	mm in	+200	+7.87	+200	+7.87
Ground clearance	mm in	+10	+0.39	+10	+0.39
Tipping load, full turn	kg lb	+320	+705	+360	+794

Operating weight kg lb	+550 +1,212	+690 +1,520

Tires 20.5 R25 L2		GENERAL PURPOSE					FLAT FLOOR		LIGHT MATERIAL		LONG BOOM
		 Bolt-on edges	 Bolt-on edges	 Bolt-on edges	 Bolt-on edges	 Bolt-on edges	 Bolt-on edges	 Bolt-on edges	 Bolt-on edges	 Bolt-on edges	
Volume, heaped ISO/SAE	m^3 yd^3	2,7 3.5	2,7 3.5	2,5 3.3	2,5 3.3	2,3 3.0	2,6 3.4	2,6 3.4	7,0 9.2	4,1 5.4	——
Volume at 110% fi ll factor	m^3 yd^3	3,0 3.9	3,0 3.9	2,8 3.7	2,8 3.7	2,5 3.3	2,9 3.8	2,9 3.8	7,7 10.1	4,5 5.9	——
Static tipping load, straight	kg lb	11 230 24,760	10 560 22,280	11 060 24,370	10 650 23,480	10 830 23,880	11 130 24,537	10 460 23,060	9970 21,980	10 260 22,620	–1640 –3,620
at 35° turn	kg lb	9970 21,980	9340 20,590	9820 21,640	9430 20,790	9600 21,160	9880 21,782	9260 20,420	8750 19,290	9060 19,970	–1500 –3,310
at full turn	kg lb	9600 21,160	8980 19,800	9450 20,840	9070 20,050	9240 20,370	9520 21,782	8910 19,640	8390 18,500	8700 19,180	–1450 –3,200
Operating load*)	kg lb	4640 10,220	4340 9,560	4560 10,060	4380 9,660	4460 9,840	4600 10,140	4300 9,490	4050 8,930	4200 9,260	–700 –1,540
Breakout force	kN lbf	113,6 25,540	105,4 23,700	118,3 26,600	109,5 24,620	114,1 25,720	118,9 26,722	109,9 24,710	73,4 16,500	84,9 19,090	+2,0 +450
A	mm ft in	7470 24'6"	7560 24'10"	7410 24'4"	7500 24'7"	7440 24'5"	7410 24'4"	7500 24'7"	8190 26'10"	7890 25'11"	+410 +1'4"
E	mm ft in	1210 4'0"	1300 4'3"	1160 3'10"	1250 4'1"	1190 3'11"	1160 3'10"	1240 4'1"	1860 6'1"	1590 5'3"	–6,0 –0.2"
H**)	mm ft in	2810 9'3"	2750 9'0"	2850 9'4"	2780 9'1"	2820 9'3"	2840 9'4"	2780 9'1"	2340 7'8"	2540 8'4"	+420 +1'5"
L	mm ft in	5420 17'9"	5480 18'0"	5370 17'7"	5420 17'9"	5370 17'7"	5380 17'8"	5440 17'10"	5750 18'10"	5550 18'3"	+420 +1'5"
M**)	mm ft in	1130 3'8"	1210 4'0"	1090 3'7"	1170 3'10"	1130 3'8"	1090 3'7"	1150 3'9"	1680 5'6"	1470 4'10"	–50 –2.0"
N**)	mm ft in	1690 5'7"	1730 5'8"	1680 5'6"	1710 5'7"	1700 5'7"	1540 5'1"	1570 5'2"	1730 5'8"	1740 5'9"	+360 +1'2"
V	mm in	2750 108"	2750 108"	2650 104"	2650 104"	2650 104"	2650 104"	2650 104"	3000 118"	2750 108"	——
a_1 clearance circle	mmft in	11 960 39'3"	12 010 39'5"	11 840 38'10"	11 880 39'0"	11 850 38'11"	11 840 38'10"	11 880 39'0"	12 590 41'4"	12 190 40'0"	——
Operating weight	kg lb	15 160 33,420	15 510 34,190	15 120 33,330	15 380 33,910	15 340 33,820	15 214 33,555	15 350 33,840	16 060 35,410	15 630 34,460	+250 +542

*) Rated at Volvo's recommended maximum utilization for L90E.

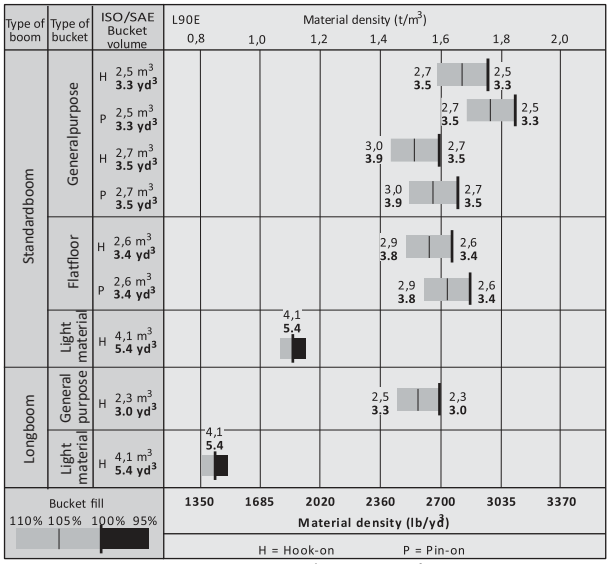
Note: This only applies to genuine Volvo attachments.

**) Measured to the tip of the bucket teeth or bolt-on edge. Dump height to bucket edge.
M easured at 45° dump angle.

Bucket Selection Chart

The chosen bucket is determined by the density of the material and the expected bucket fi ll factor. The actual bucket volume is often larger than the rated capacity, due to the features of the TP Linkage, including an open bucket design, good rollback angles in all positions and good bucket fi lling performance. The example represents a standard boom confi guration.
Example: Sand and gravel. Fill factor ~ 105%. Density 2,780 lb/yd³. Result: The 3.5 yd³ bucket carries 3.7 yd³. For optimal stability always consult the bucket selection chart.

Material	Bucket fi ll, %	Material density, t/m³	ISO/SAE bucket volume, yd³	ISO/SAE bucket volume, m³	Actual volume, lb/yd³	Actual volume, m³
Earth/Clay	~ 110	~ 1,80 ~ 3,035	2,5	3.3	~ 2,7	~ 3.5
		~ 1,70 ~ 2,865	2,6	3.4	~ 2,9	~ 3.8
		~ 1,65 ~ 2,780	2,7	3.5	~ 3,0	~ 3.9
Sand/Gravel	~ 105	~ 1,80 ~ 3,035	2,5	3.3	~ 2,6	~ 3.4
		~ 1,70 ~ 2,865	2,6	3.4	~ 2,7	~ 3.5
		~ 1,65 ~ 2,780	2,7	3.5	~ 2,8	~ 3.7
Aggregate	~ 100	~ 1,80 ~ 3,035	2,5	3.3	~ 2,5	~ 3.3
		~ 1,70 ~ 2,865	2,6	3.4	~ 2,6	~ 3.4
		~ 1,65 ~ 2,780	2,7	3.5	~ 2,7	~ 3.5
Rock	□100	~ 1,80 ~ 3,035	2,2	2.9	~ 2,2	~ 2.9



The size of rock buckets is optimized for optimal penetration and fi lling capability rather than the density of the material.

STANDARD EQUIPMENT

Engine
Three-stage air cleaner with ejector and inner fi lter
Indicator glass for coolant level
Preheating of induction air
Muffl er, spark arresting
Fuel fi lter, extra large with water trap
Fuel fi ll strainer
Coolant fi lter
Oil trap

Electrical system
24 V, prewired for optional accessories
Alternator, 24 V/80 A
Exchange battery
Battery disconnect switch
Battery boxes, steel
Fuel gauge
Hour meter
Electric horn
Reverse alarm, self-adjusting Instrument
panel with symbols Lighting:
- Twin halogen front headlights with high and low beams
- Parking lights
- Double brake and tail lights
- Turn signals with fl ashing hazard light function
- Halogen working lights (2 front and 2 rear)
- Instrument lighting

Contronic monitoring system
ECU with log and analysis system
Contronic display
Fuel consumption
Outdoor temperature
Engine shutdown to idle in case of malfunction indication:
- High engine coolant temperature
- Low engine oil pressure
- High transmission oil temperature

Start interlock when gear is engaged
Brake test
Test function for warning and indicator lights Warning
and indicator lights:
- Charging
- Oil pressure engine
- Oil pressure, transmission
- Brake pressure
- Hydraulic oil level
- Axle oil temperature
- Primary steering
- Secondary steering (if equipped)
- High beams
- Turn signals
- Rotating beacon (if equipped)
- Preheating coil (if equipped)
- Differential lock
- Coolant temperature
- Transmission oil temperature• Brake charging Level
  warnings:
- Coolant level
- Hydraulic oil level
- Washer fl uid level

Drivetrain
Automatic Power Shift with operator-controlled
disengagement function for transmission cut-out when
braking and mode selector with AUTO function
Fully Automatic Powershift 1-4
PWM-control between different gear positions
Forward and reverse switch by lever console
Differentials: front: 100% hydraulic diff lock,
rear: conventional

Tires
20.5 R25

Brake system
Wet oil-circulation cooled disc brakes on all four wheels
Dual brake circuits
Dual service brake pedals
Secondary brake system
Parking brake, el.-hydraulic Brake
wear indicator

Cab
ROPS (ISO 3471), FOPS (ISO 3449)
Lock kit, one combination
Acoustic inner lining
Ashtray
Cigarette lighter
Lockable door
Cab heating with fi lter, fresh-air inlet and defroster
Floor mat
Interior light
Interior rearview mirror
2 exterior rearview mirrors
Openable window right-hand side
Sliding window, right Sliding
window, door
Tinted safety glass
Hip retractable seatbelt (SAE J386)
Adjustable lever console
Adjustable steering wheel
Operator's seat with high backrest and electrical heating
Storage compartment
Sun visor
Beverage holder
Windshield washers front and rear
Windshield wipers front and rear
Interval function for front and rear windshield wipers
Service platforms with anti-slip surfaces on front and rear
fenders
Speedometer

Hydraulic system Main
valve, 2-spool
Pilot valve, 2-spool
Variable displacement axial piston pumps (3) for:
- working hydraulics
- steering system, pilot hydraulics and brakes
- fan motor

Boom lowering system
Boom kick-out, automatic, adjustable
Bucket positioner, automatic with position indicator,
adjustable
Hydraulic oil cooler

External equipment
Noise and vibration dampening suspension of cab, engine
and transmission
Lifting eyes
Easy-to-open side panels
Frame steering, joint lock
Vandalism lock prepared for batteries and engine
compartment
Tow hitch
Basic fenders with wideners for 20.5 R25 tires

Protective equipment
Cover plates, rear frame

Other equipment
Decals, USA

- Parking brake

OPTIONAL EQUIPMENT

Service and maintenance
Toolbox, lockable
Tool kit
Automatic lubrication system
Automatic lubrication system, stainless steel
Automatic lubrication system incl. long boom
Automatic lubrication system for attachment bracket, cast
Automatic lubrication system, stainless steel, for attachment bracket, cast
Refi ll pump for automatic lubrication system
Wheel nut wrench kit
Grease nipple guards Oil sampling valve

Engine equipment
Engine block heater, 120 V
Engine auto shut down
Air pre-cleaner, oil-bath type
Air pre-cleaner, turbo type, one-stage
Air pre-cleaner, Sy-Klone type, one-stage
Air pre-cleaner, Sy-Klone type, two-stage
Fuel fi lter with water trap and heating
Hand throttle control
Radiator, hydraulic oil cooler and fuel cooler, corrosion-protected
Fan air intake protection, extra close-meshed
Reversible cooling fan

Electrical system
Alternator, 80 A, including air fi lter
Battery disconnect switch, additional in cab
Work light, attachments
Work lights front, extra
Work lights rear, extra
Work lights front, on cab, dual
Work lights front, high intensity
License plate holder, lighting
Reverse lights, automatic
Warning beacon, rotating, collapsible
Warning beacon, fl ashing strobe light

Cab
Installation kit for radio, 11 A, 12 V, left and right in cab
Installation kit for radio, 20 A, 12 V
Radio with cassette player
Radio with CD-player
Sun blinds, front and rear windows
Sun blinds, side windows
Retractable hipbelt, longer and wider than standard
Air-conditioning
Air-conditioning with corrosion protected condenser
Air-conditioning with ATC (Automatic Temperature Control)
Air-conditioning with corrosion prot. condenser and ATC (Automatic Temperature Control)
Fan for AC condenser
Ventilation air fi lter for work in asbestos environment
Cab air pre-cleaner, Sy-Klone type
Operator's seat with low backrest
Operator's seat, air suspended with electrical heating
Operator's seat, with low backrest and electrical heating
Operator's seat, air suspended, with high backrest and electrical heating
Operator's seat, air suspended, heavy-duty (up to 350 lbs)
Armrest (left) for operator's seat
Steering wheel knob
Noise reduction kit
Rearview camera incl. monitor
Rearview camera, color, LCD monitor
Rearview mirrors, electrically heated
Foot steps, front frame
Cab ladder, rubber suspended

Drivetrain
Limited slip rear
Speed limiter 20 km/h (12.5 mph)
Speed limiter 30 km/h (18.6 mph)

Brake system
Parking brake alarm, audible Stainless steel brake lines

Hydraulic system
Single lever control
Single lever control for 3rd hydraulic function
3rd hydraulic function
3rd hydraulic function for long boom
3rd-4th hydraulic function
3rd-4th hydraulic function for long boom
Detent for 3rd hydraulic function
Boom Suspension System (BSS)
Single-acting lifting function
Biodegradable hydraulic fl uid
Attachment bracket, cast, visibility-optimized
Attachment bracket, side-tilting
Attachment bracket, side-tilting adapter
Mounting kit for side-tilting adapter
Arctic kit, attachment locking hoses Arctic kit, pilot hoses and brake accum.
Separate attachment locking, standard boom
Separate attachment locking, long boom

External equipment
Long boom
Front and rear fenders with wideners for 650/65 R25 tires
Full fenders for 650/65 R25 and 20.5 R25 tires
Mudfl aps for full fenders
Delete front fenders and rear fender wideners
Logging counterweight (with approval)

Protective equipment
Guards for front headlights
Guards for tail lights
Guards for tail lights, heavy-duty
Guards for side and rear windows
Guard for radiator grill
Guards for grease nipple
Guard for center hinge and rear frame
Guards for boom cylinder hose and tube
Guards for wheel/axle seals
Guard for front windshield
Cover plate, front frame, heavy-duty
Cover plate under cab
Belly guard, front
Belly guard, rear
Corrosion-protection, painting of machine
Corrosion-protection, painting of attachment bracket
Bucket teeth protection
Fire suppression system Anti-theft device

Other equipment
Comfort Drive Control, CDC
Secondary steering
Sign, slow moving vehicle
Decals English/Spanish

Tires
650/65 R25

Attachments
Buckets:
- Straight with teeth or bolt-on edges
- Spade nose
- High tipping
- Light materials
- Grading
- Refuse tamping bucket

Bolt-on or weld-on bucket teeth
Cutting edge in three sections, bolt-on, reversible
Fork equipment
Material handling arm
Log grapple