SANDVIK

Toro® LH410

Safer.
Stronger.
Smarter.

Technical specification

Toro® LH410

Toro® LH410 is an underground loader with 10 000 kg payload capacity. It is compact in size, but yet it features advanced technical solutions, common with Sandvik large i-series loaders.

The advanced Toro® LH410 loader is equipped with Sandvik Intelligent Control System and 7'' touch screen display as standard, monitoring equipment productivity and health, and enabling multiple smart solutions. The numerous available options include e.g. a state of the art Stage V Volvo engine, sidetipping and ejector buckets, Integrated Weighing System (IWS), traction control, operator speed assist, and full AutoMine® loading capability.

Toro® LH410 delivers best in class performance in productivity with its high ramp speeds and fast bucket filling. To make truck loading easy, the loader offers superior lift height compared to any other loader of the same size class.

Toro® LH410 is a matching pair for threepass loading with the TH430 dump truck.

Capacities	
Maximum tramming capacity	10 000 kg
Break out force, lift	20 390 kg
Break out force, tilt	19 340 kg
Standard bucket	4.0 m^3

Speeds forward & reverse (Level/loaded) With Volvo TAD11140VE engine	
1st gear	5.5 km/h
2nd gear	10.2 km/h
3rd gear	17.5 km/h
4th gear	31.7 km/h

Bucket motion times	
Raising time	6.7 sec
Lowering time	4.3 sec
Dumping time	2.7 sec

Operating weights *	
Total operating weight	28 500 kg
Front axle	12 850 kg
Rear axle	15 650 kg

Loaded weights *	
Total loaded weight	38 500 kg
Front axle	28 250 kg
Rear axle	10 250 kg

* Unit weight depends on selected options

Operational conditions and limits	
Environmental temperature	From -20°C to +50°C
Standard operating altitude	With engine Volvo TAD1140VE from -1500 m to +3000 m at 25°C without rated power derate

Requirements and compliance
Compliance with 2006/95/EC Low voltage directive
Compliance with 2004/108/EC Electromagnetic compatibility directive
Compliance with 2006/42/EC Machinery directive (Equipment for EU area, achieved with relevant options)
Design based on EN 1889-1. Machines for underground mines. Mobile machines working underground. Safety. Part 1: Rubber tyred vehicles.
Design based on MDG 15. Guideline for mobile and transportable equipment for use in mines. (Equipment for Australia, achieved with relevant options)
Electrical system based on IEC 60204-1. Safety of machinery – Electrical equipment of machines – Part 1: General requirements
Contains fluorinated greenhouse gases (closed cabin option) Refrigerant R134a under pressure max 38 bar/550 PSI: Filled weight: 2,0 kg CO_2e: 2,860 tons GWP: 1430 Information based on the F Gas Regulation (EU) No 517/2016

Engine	
Diesel engine	Volvo TAD1140VE
Output	235 kW @ 2100 rpm
Torque	1568 Nm @ 1300 rpm
Number of cylinders	In-line 6
Displacement	10.84 l
Cooling system	Liquid cooled and piston pump driven cooler fan
Combustion principle	4-stroke, direct injection, turbo with intercooler
Air Filtration	Two stage filtration, dry type
Electric system	24 V
Emissions	Tier 2, Euro Stage II
Ventilation rate	CANMET 8.07 m^3/s MSHA 16,000 CFM
MSHA	16,000 CFM
Particulate index	MSHA 5,500 CFM
Compatible with paraffinic diesel fuel (EN 15940)	Yes
Exhaust system	Catalytic purifier and muffler with Proventia thermal insulation system exhaust pipe
Average fuel consumption at 40% load	26 l/h
Fuel tank refill capacity	280 l

Converter	
Dana C5472	With lock-up

Transmission	
Power shift transmission with modulation	Dana transmission with automatic gear shift control, four gears forward and reverse

Axles	
Front axle, spring applied hydraulic operated brakes. Fixed.	Kessler D102, limited slip differential
Rear axle, spring applied hydraulic operated brakes. Oscillating ± 8°.	Kessler D102, limited slip differential

Tires	
Tire size (Tires are application approved. Brand and type subject to availability.)	18,00x25 L5S 28 ply

Cabin (Cabin option replaces the standard canopy)
ROPS certification according to EN ISO 3471
FOPS certification according to EN ISO 3449
Sealed, noise suppressed and over pressurized cabin with air conditioning and heating
Sound absorbent material to reduce noise
Laminated glass windows
Cabin mounted on rubber mounts to the frame to reduce vibrations
Air conditioning unit located outside the cabin to reduce noise inside the cabin
Cyclone pre-filter for A/C device
Adjustable joysticks
No high pressure hoses in the operator's compartment
Inclinometers to indicate operating angle
Emergency exit
Floor washable with water to reduce dust
Three-point contact access system with replaceable and colour coded handles and steps
12 V output
Remote circuit breaker switch

Canopy (Standard)
ROPS certification according to EN ISO 3471
FOPS certification according to EN ISO 3449
Adjustable joysticks
No high pressure hoses in the operator's compartment
Inclinometers to indicate operating angle
Emergency exit
Floor washable with water to reduce dust
Three-point contact access system with replaceable and colour coded handles and steps
12 V output
Remote circuit breaker switch

Operator's seat
Low frequency suspension
Height adjustment
Adjustment according to the operator's weight
Padded and adjustable arm rests
Two-point seat belt
Fore-aft isolation (with cabin option)
Adjustable lumbar support (with cabin option)
Selectable damping (with cabin option)

Control system, dashboard and displays
Sandvik Intelligent Control system
Critical warnings and alarms displayed as text and with light
7" color display with touch screen functionality, adjustable contrast and brightness
Illuminated switches on instrument panel
My Sandvik Digital Services Knowledge Box™ on-board hardware
Supports 3G, 4G, LTE and WLAN data transfer

Illumination	
Illuminance E_{av} with 4 pieces of LED lights at a distance of 20 m in front of the loader:	Low beam (28 W): 4 lights E_{av} : 14.04 lx High beam (50W): 2 lights E_{av} : 14.76 lx
Illuminance E_{av} with 4 pieces of LED at a distance of 20 m behind the loader:	Reverse (28W): 3 lights E_{av} : 25.62 lx
Toro® LH410 is compliant with South African Mine health and safety act 29 of 1996, because average light intensity in the direction of travel is more than 10 lux at a distance of 20 m.	

Rear and front frame
High strength structure with optimized material thicknesses. Reduced own weight for higher overall hauling capacity and long structural lifetime. Welded steel construction.
Central hinge with adjustable upper bearing
Rear tanks are bolted to frame, hydraulic tank and cabin base are both bolted and welded to frame
Automatic central lubrication

Hydraulics
Door interlock for brakes and boom, bucket, and steering hydraulics
Oil cooler for hydraulic and transmission oil, capability up to 52°C ambient temperature
ORFS fittings
MSHA approved hoses
Hydraulic oil tank capacity 240 l
Sight glass for oil level, 2 pcs

Steering hydraulics	
Full hydraulic, centre-point articulation, power steering with two double acting cylinders. Steering lock. Steering controlled by electric joystick	
Steering main valve	Open circuit type
Steering hydraulic cylinders	125 mm, 2 pcs
Steering pump	Piston type, LS Controlled
Steering and servo hydraulic pumps	Piston type

Bucket hydraulics	
The oil flow from steering hydraulic pump is directed to bucket hydraulics when steering is not used.	Joystick bucket and boom control (electric), equipped with piston pump that delivers oil to the bucket hydraulic main valve.
Boom system	Z-link
Lift cylinders	160 mm, 2 pcs
Dump cylinder	200 mm, 1 pc
Main valve	Open circuit type
Pump for bucket hydraulics	Piston type, LS controlled

Brakes
Service brakes are spring applied; hydraulically operated multidisc wet brakes on all wheels. Two independent circuits: one for the front and one for the rear axle. Service brakes also function as an emergency and parking brake. Brake system performance complies with requirements of EN ISO 3450, AS2958.1 and SABS 1589.
Neutral brake
Automatic brake activation system, ABA
Electrically driven emergency brake release pump
Brake oil tank capacity 75 l

Electrical equipment	
Alternator	24 V, 150 A
Batteries	2 x 12V, 145 Ah
Starter	24 V, 5,5 kW
Driving lights	LED lights: 4 pcs in front 4 pcs in rear 4 pcs in cabin
Working lights	LED light, 1 pc under boom
Parking, brake and indicator (blinkers) lights	LED lights: 2 pcs in front 2 pcs in rear
Control system with 7" color display, 5 modules, inbuilt system diagnostics	
Reverse alarm	
Flashing beacon	

Fire safety
Portable fire extinguisher, 12 kg
Hot side – cold side design
Isolation of combustibles and ignition sources
Heat insulation on exhaust manifold, turbo, and isolated exhaust pipe

Energy isolation
Lockable main switch, ground level access
Emergency stop push buttons according to EN ISO 13850: 1 pc in cabin and 2 pcs in rear
Pressure release in the expansion tank cap
Automatic discharge for pressure accumulators (brake system and pilot circuit)
Frame articulation locking device
Mechanical boom locking device
Wheel chocks and brackets

Optional engine	
Diesel engine	Volvo TAD882VE
Output	210kW @ 2200 rpm
Engine brake	Yes, modulating engine brake
Emissions	Euro Stage V (CE)
Ventilation rate	CANMET T 4.67 m^3/s, MSHA 9,500 CFM
Particulate index	MSHA 500 CFM
Average estimated fuel consumption at 40% load	21 l/h
Compatible with paraffinic diesel fuel (EN 15940)	Yes

Documentation	
Operator's Manual	English and other EU languages
Maintenance Manual	English and other EU languages
Parts Manual	English
Service and Repair Manual	English, Russian
ToolMan	2 x USB stick in pdf format, includes all the manuals
Decals	English, Finnish, Swedish, Spanish, Russian, French, Polish, Portuguese, Turkish, German, Norwegian, Estonian, Chinese

Options
ANSUL Twin fire suppression system with checkfire (mandatory with RRC) (CE)
ANSUL Twin fire suppression system without checkfire (CE)
Arctic package 120V (preheater for hydr. oil tank and engine block)
Arctic package 230V (preheater for hydr. oil tank and engine block)
AutoMine® Loading Onboard Package
AutoMine® Loading Readiness
Battery isolation switch
Boom suspension (ride control)
CE Declaration of conformity
Cover grills for lamps
Direct feed for beacon
Disabled 3rd / 4th gear
Door latch and seat belt monitoring system
Driving direction lights (red / green)
Eclipse™ Fire suppression system with auto shutdown, Sustain or Extreme agent delivered separately (CE)
Electric loader towing kit
Electrical filling pump for hydraulic oil
Emergency steering (CE)
Harsh condition package
Integrated weighing system for loaders (IWS)
Jump start
Line of sight radio remote control, CAN, complete
Line of sight radio remote control, CAN, complete, with video camera
Monitoring camera system
Proximity Detection System Interface
Radio remote control interface, analogue
Recorder for monitoring camera system
Retrieval hook (hydraulic brake release by pulling the hook)
Safety rails
Spare rim 13.00-25/2.5 (for tyres 18.00 R25)
Starter isolator
Traction control
Tyre Pressure Monitoring System
Wiggins quick filling set for fuel and oils
Wiggins quick filling set for fuel

Available buckets			
Type	**Volume SAE heaped (2:1) ***	**Width**	**Material broken density with fill factor 100%**
G.E.T. (standard)	4.0 m^3	2588 mm	2500 kg/m^3
G.E.T.	4.6 m^3	2588 mm	2100 kg/m^3
G.E.T.	5.0 m^3	2588 mm	1900 kg/m^3
G.E.T.	5.4 m^3	2588 mm	1700 kg/m^3
G.E.T. Half Arrow	4.6 m^3	2700 mm	2000 kg/m^3
G.E.T. Half Arrow	5.4 m^3	2700 mm	1700 kg/m^3
Bare Lip	4.0 m^3	2550 mm	2600 kg/m^3
Bare Lip	4.6 m^3	2550 mm	2200 kg/m^3
Bare Lip	5.0 m^3	2550 mm	2000 kg/m^3
Bare Lip	5.4 m^3	2550 mm	1800 kg/m^3
Ejector bucket Bare Lip	4.6 m^3	2770 mm	1900 kg/m^3
Side tipping bucket	4.6 m^3	2830 mm (total width) 2550 mm (lip width)	1800 kg/m^3

Note: Depending on the bucket size and type, the actual payload may deviate from the nominal payload.

Grade performance									
Volvo TAD1140VE, EU Stage II, Tier 2 (3% rolling resistance)									
Empty									
Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0
Ratio					1:12	1:10	1:8	1:7	
1st gear (km/h)	5.5	5.5	5.5	5.5	5.4	5.4	5.4	5.4	5.4
2nd gear (km(h)	10.2	10.2	10.1	10.0	10.0	9.9	9.9	9.8	9.8
3rd gear (km/h)	17.6	17.4	17.3	17.1	16.9	16.3	14.2	13.1	9.5
4th gear (km/h)	31.9	31.3	30.8	25.7	21.6				
Loaded									
Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0
Ratio					1:12	1:10	1:8	1:7	
1st gear (km/h)	5.5	5.5	5.5	5.4	5.4	5.4	5.4	5.3	5.3
2nd gear (km(h)	10.2	10.1	10.0	10.0	9.9	9.8	9.7	9.1	8.1
3rd gear (km/h)	17.5	17.3	17.1	16.9	15.0	13.1			
4th gear (km/h)	31.7	30.9	25.5						

Volvo TAD882VE, EU Stage V (3% rolling resistance)									
Empty									
Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0
Ratio					1:12	1:10	1:8	1:7	1:6
1st gear (km/h)	6.0	5.9	5.9	5.9	5.8	5.8	5.8	5.7	5.7
2nd gear (km(h)	11.0	10.9	10.8	10.7	10.6	10.4	10.3	10.2	9.4
3rd gear (km/h)	18.8	18.5	18.1	17.8	16.7	14.8	11.7		
4th gear (km/h)	33.6	32.5	27.3						
Loaded									
Percent grade	0.0	2.0	4.0	6.0	8.0	10.0	12.5	14.3	17.0
Ratio					1:12	1:10	1:8	1:7	1:6
1st gear (km/h)	5.9	5.9	5.9	5.8	5.8	5.7	5.7	5.6	5.6
2nd gear (km(h)	11.0	10.8	10.6	10.5	10.3	10.0	8.9	8.2	
3rd gear (km/h)	18.6	18.1	17.7	15.2	12.9				
4th gear (km/h)	33.0	27.5							

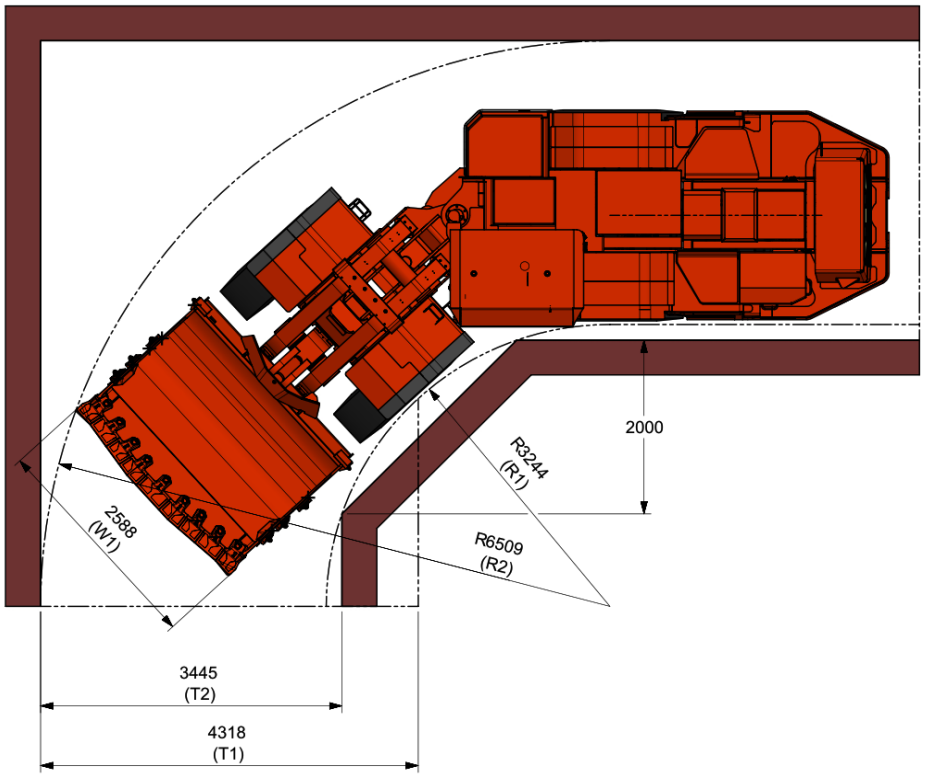
Dimensions				
Volume SAE heaped 2:1 (m^3) *	**4.0 (standard)**	**4.6**	**5.0**	**5.4**
Max material broken density with fill factor 100% (kg/m^3)	2500	2100	1900	1700
Lip plate type	GET	GET	GET	GET
L1 (mm)	9742	9830	9869	9961
L2 (mm)	3052	3140	3179	3271
L3 (mm)	1298	1427	1469	1569
L4 (mm)	2811	2968	3023	3155
L5 (mm)	2447	2531	2569	2660
H1 (mm)	1622	1752	1792	1887
H2 (mm)	2319	2233	2196	2109
H3 (mm)	3431	3455	3452	3445
H4 (mm)	5083	5216	5257	5353
H5 (mm)	5463	5541	5610	5704
W1 (mm)	2588	2588	2588	2588
R1 (mm)	3244	3244	3244	3244
R2 (mm)	6509	66550	6568	6606
T1 (mm)	4215	4256	4274	4312
T2 (mm)	3445	3485	3504	3542

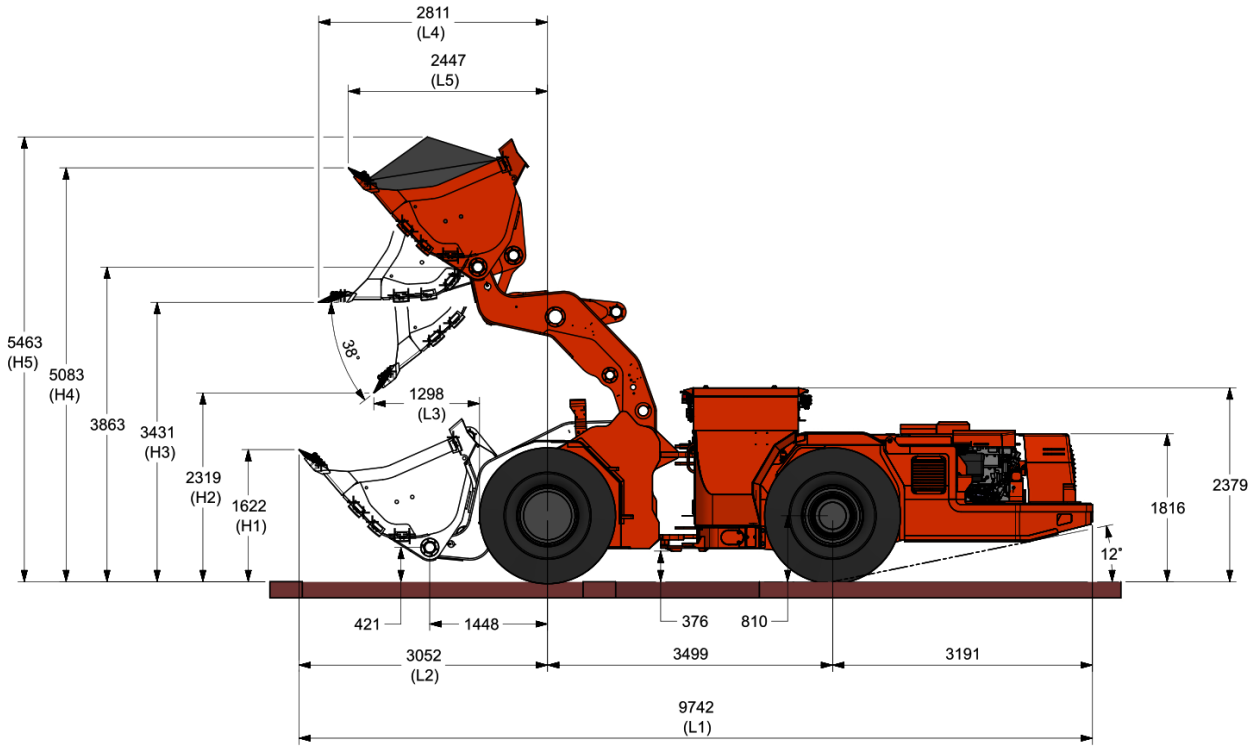
Dimensions						
Volume SAE heaped 2:1 (m^3) *	**4.0**	**4.6**	**5.0**	**5.4**	**4.6**	**5.4**
Max material broken density with fill factor 100% (kg/m^3)	2600	2200	2000	1800	2000	1700
Lip plate type	Bare Lip	Bare Lip	Bare Lip	Bare Lip	Half Arrow	Half Arrow
L1 (mm)	9711	9800	9848	9921	9855	10016
L2 (mm)	3021	3110	3158	3231	3165	3326
L3 (mm)	1280	1437	1488	1567	1415	1910
L4 (mm)	2797	2954	3022	3126	2973	3209
L5 (mm)	2417	2501	2547	2619	2556	2715
H1 (mm)	1635	1763	1812	1887	1738	1910
H2 (mm)	2326	2263	2219	2149	2208	2055
H3 (mm)	3458	3482	3479	3473	3427	3418
H4 (mm)	5092	5226	5276	5353	5203	5377
H5 (mm)	5462	5541	5610	5698	5541	5698
W1 (mm)	2550	2550	2550	2550	2700	2700
R1 (mm)	3244	3244	3244	3244	3244	3244
R2 (mm)	6439	6482	6504	6538	6625	6680
T1 (mm)	4145	4188	4210	4244	4331	4387
T2 (mm)	3375	3418	3439	3473	3560	3616

* According to ISO 7546

Standard dimensions (with standard bucket)

in the drawing, necessary changing dimensions in a table.





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