



Cat[®] 6050/6050 FS

Hydraulic Shovel

Specifications

Electrical System (diesel drive)

System voltage	24 V
Batteries in series / parallel installation	6 x 210 Ah - 12 V each 630 AH - 24 V in total
Alternators	2 x 175 A each
Working spot lights	8 x high-brightness Xenon lights

- Battery isolation relays
- Emergency stop switches accessible from ground level, in engine module and in operator's cab

Hydraulic Oil Cooling

Oil flow of cooling pumps	
Diesel version	4 x 488 l/min (4x 129 US gal/min)
Electric version	4 x 491 l/min (4x 130 US gal/min)
Diameter of fans	4 x 1 170 mm (4 x 46 in)

- Cooling system is fully independent of all main circuits, i.e. controlled cooling capacity is available whenever engine is running
- Gear-type cooling pumps supplying high-volume, low-pressure oil to fans and aluminium coolers
- Fan speed and flow of oil to the coolers are thermostatically controlled
- Extremely high cooling efficiency to ensure optimum oil temperature

Electric Motor (optional)

Type	Squirrel cage induction motor
Output	1 600 kW
Voltage	6.6 kV +/- 10% (other on request)
Rated Current I _N	166 A (at 6.6 kV)
Frequency	50 Hz (60 Hz optional)
Revolutions	1,500 min ⁻¹ (1,800 min ⁻¹ optional)
Starting current	700 A (525 A optional)

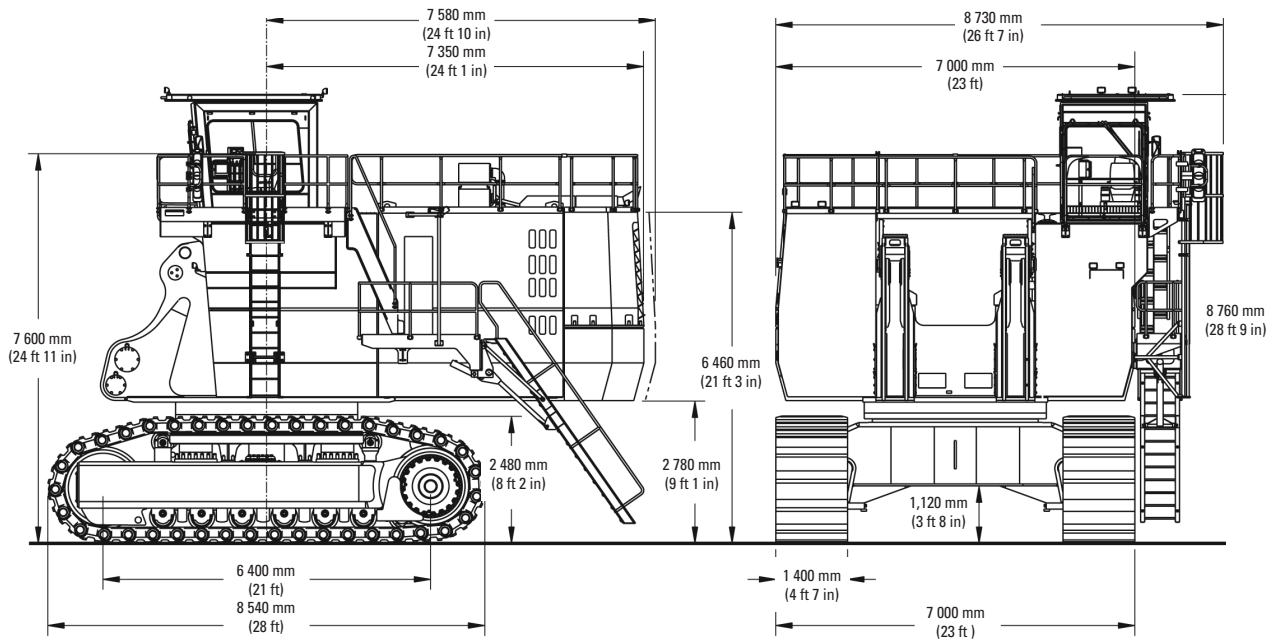
- Custom-made electric motor with increased gap between rotor and stator to withstand severe mining conditions
- Power limit control by Pump Management System

Diesel Engines

Engine Features

- | | |
|--------------------|-------------------------|
| Fuel tank capacity | 10 700 l (2,820 US gal) |
|--------------------|-------------------------|
- Hydraulically driven radiator fan with electronically controlled fan speed
 - Microprocessed engine control
 - Automatic rev. reduction
 - Heavy-duty air filters, STRATA 1 with automatic dust evacuation
 - Two-stage fuel filter incl. water separator
 - Additional high-capacity water separator
 - Pre-lube starting system
 - Eliminator with centrifuge for engine oil filtration

Hydraulic Shovel—6050/6050 FS



General Data

Operating Weight

Face Shovel	525 tonnes (579 tons)
Backhoe	534 tonnes (589 tons)

Engine Output SAE J 1995

Cummins® K1500E	1 880 kW 2,520 HP
Cummins® QSK38	1 880 kW 2,520 HP

Standard Bucket Capacity

Face Shovel (SAE 2:1)	26.0 m ³ 34.0 yd ³
Backhoe (SAE 1:1)	28.0 m ³ 36.6 yd ³

Features

- TriPower shovel attachment
- Independent oil cooling system
- Spacious walk-through machine house
- 5-circuit hydraulic system
- Electronic-hydraulic servo control
- Board Control System (BCS)
- Torque control in closed-loop swing circuit
- Automatic central lubrication system
- Xenon working lights

Operating Weight

Shovel

Standard track pads	1 400 mm (4 ft 7 in)
Operating weight	525 000 kg (1,157,420 lb)
Ground Pressure	25.7 N/cm ² (37.3 psi)

Additional track pads available on request

Backhoe

Standard track pads	1 400 mm (4 ft 7 in)
Operating weight	534 000 kg (1,177,260 lb)
Ground Pressure	25.7 N/cm ² (37.3 psi)

Additional track pads available on request

Hydraulic Shovel—6050/6050 FS

Diesel Engines

Version 1 - Cummins® K1500E Tier 1

Make and model	2 x Cummins K1500E
Total rated net power ISO 3046/1	1 880 kW (2,520 HP) 1,800 min ⁻¹
Total rated net power SAE J1349	1 880 kW (2,520 HP) 1,800 min ⁻¹
Total rated gross power SAE J1995	1 880 kW (2,520 HP) 1,800 min ⁻¹
No. of cylinders (each engine)	12
Bore	159 mm (6.25 in)
Stroke	159 mm (6.25 in)
Displacement	37.8 l (2,300 in ³)
Aspiration	Turbocharged and aftercooled
Max. altitude without deration	2 438 m (8,000 ft) a.s.l.

Version 2 - Cummins QSK38 Tier 2

Make and model	2 x Cummins QSK38
Total rated net power ISO 3046/1	1 880 kW (2,520 HP) 1,800 min ⁻¹
Total rated net power SAE J1349	1 880 kW (2,520 HP) 1,800 min ⁻¹
Total rated gross power SAE J1995	1 880 kW (2,520 HP) 1,800 min ⁻¹
No. of cylinders (each engine)	12
Bore	159 mm (6.25 in)
Stroke	159 mm (6.25 in)
Displacement	37.8 l (2,300 in ³)
Aspiration	Turbocharged and aftercooled
Max. altitude without deration	3 300 m (10,800 ft) a.s.l.
Emission certification	US EPA Tier 4i

Hydraulic System with Pump Managing System

Main pumps (Diesel and electric versions)	4 x variable flow axial piston pumps
Max. oil flow	
Diesel version	4 x 912 l/min (4 x 241 US gal/min)
Electric version	4 x 933 l/min (4 x 246 US gal/min)
Max. pressure, attachment	30 MPa = 300 bar (4,350 psi)
Max. pressure, travel	37 MPa = 370 bar (5,370 psi)
Swing pumps	
Diesel version	4 x reversible swash plate pumps
Electric version	3 x reversible swash plate pumps
Max. oil flow	
Diesel version	4 x 351 l/min (4 x 93 US gal/min)
Electric version	3 x 491 l/min (3 x 131 US gal/min)
Max. pressure, swing system	
Diesel version	32 MPa = 320 bar (4,640 psi)
Electric version	35 MPa = 350 bar (5,080 psi)

Total volume of hydraulic oil

Diesel version	Approx. 7 800 l (2,060 US gal)
Electric version	Approx. 7 300 l (1,930 US gal)

Hydraulic tank capacity

Diesel version	Approx. 5 500 l (1,450 US gal)
Electric version	Approx. 5 000 l (1,320 US gal)

• Pump Managing System contains:

- Electronic load limit control
- Flow on demand from main pumps depending on joystick position
- Automatic regulation of main pumps to zero flow without demand
- Automatic rpm reduction of engine speed during working breaks
- Reduced oil flow of main pumps at high hydraulic oil temperature or high engine temperature

• Pressure cut-off for main pumps

• Cooling of pump transmission gear oil

• Filters:

- Full-flow high-pressure filters (100 µm) for the main pumps, installed directly behind each pump
- High pressure filters (100 µm) for the closed swing circuit
- Full-flow filters (10 µm) for the complete return circuit
- Pressure filters (40 µm and 6 µm) for servo circuit
- Pressure filters (40 µm) for the feed pumps of the closed swing circuit
- Transmission oil filters (40 µm)

Undercarriage

Travel speeds (2 stages)	
1st stage	Max. 1.6 km/h (0.99 mph)
2nd stage	Max. 2.3 km/h (1.44 mph)
Max. tractive force	2 576 kN (578,900 lb)
Gradability of travel drives	Max. 50 %
Track pads (each side)	39
Bottom rollers (each side)	6
Support rollers (each side)	2 plus a skid plate in between
Travel drives (each side)	1 planetary transmission with 2 two-stage axial piston motors

Parking brakes

Wet multiple disc brake, spring-applied/hydraulically released

- Cast double-grouser combined pad links with bushings connected by hardened full floating pins
- All running surfaces of sprockets, idlers, rollers and pad links, as well as teeth contact areas of sprocket and pad links, are hardened
- Fully hydraulic, self-adjusting track tensioning system with membrane accumulator
- Automatic hydraulic retarder valve to prevent over-speed on downhill travel
- Acoustic travel alarm

Hydraulic Shovel—6050/6050 FS

Operator's Cab

Operator's eye level	approx. 7.6 m (24 ft 11 in)	
Internal dimensions	Length	2 200 mm (7 ft 3 in)
	Width	1 600 mm (5 ft 3 in)
	Height	2 150 mm (7 ft 1 in)

- Pneumatically cushioned and multi-adjustable comfort seat with lumbar support, seat heating, safety belt, head- and armrests
- Switch in seat cushion to automatically neutralize the hydraulic controls when operator leaves the seat
- Joystick controls integrated in independently adjustable seat consoles
- Fold-away auxiliary seat with safety belt
- FOPS (rock guard; approved acc. to DIN ISO 3449) integrated into cab structure
- All-round safety glass, armored windshield and sliding side window
- Windshield with parallel intermittent wiper / washer
- Roller blind at windshield
- Robust instrument panel incl. large colored BCS screen with transfective technology
- Board Control System (BCS) electronic monitoring and data logging system for vital signs and service data of engines, hydraulic systems and lubrication systems
- Machine access via retractable boarding ladder, hydraulically operated
- Sliding emergency ladder (kick-down type) with ladder cage

Swing System

Swing Drives	4 compact planetary transmissions with axial piston motors	
Parking Brakes	Wet multiple disc brake, spring-loaded / hydraulically released	
Max. swing speed	Diesel version	3.8 rpm
	Electric version	4.0 rpm
Swing ring	Triple-race roller bearing with sealed internal gearing	

- Closed-loop swing circuit with torque control
- Hydraulic braking of the swing motion by counteracting control
- All raceways of swing ring, as well as grease bath for internal gearing, supplied by automatic central lubrication system

Automatic Lubrication System

Capacity of grease container	1 000 l (264 US gal)
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- Dual-circuit system with hydraulically driven heavy-duty pump and electronic time relay control to adjust the pause / lube times
- Connected to the lubrication system are the swing roller bearing with internal gearing and all pivot points of attachment, bucket and cylinders
- System failures displayed by Board Control System
- Grease filters (200 µm) between service station and container, as well as directly behind grease pump

Retractable Service Station

Retractable service station installed underneath the engine module and easily accessible from ground.

Equipped with:

- Quick couplings for:
 - Diesel fuel
 - Engine coolant - left / right
 - Pump transmission gear oil - left / right
 - Engine oil (oil pan) - left / right
 - Engine oil (additional tank - optional) - left / right
 - Hydraulic oil tank
 - Grease container
- Cat jump-start socket
- Indicator lights for fuel tanks left/right full and grease container full

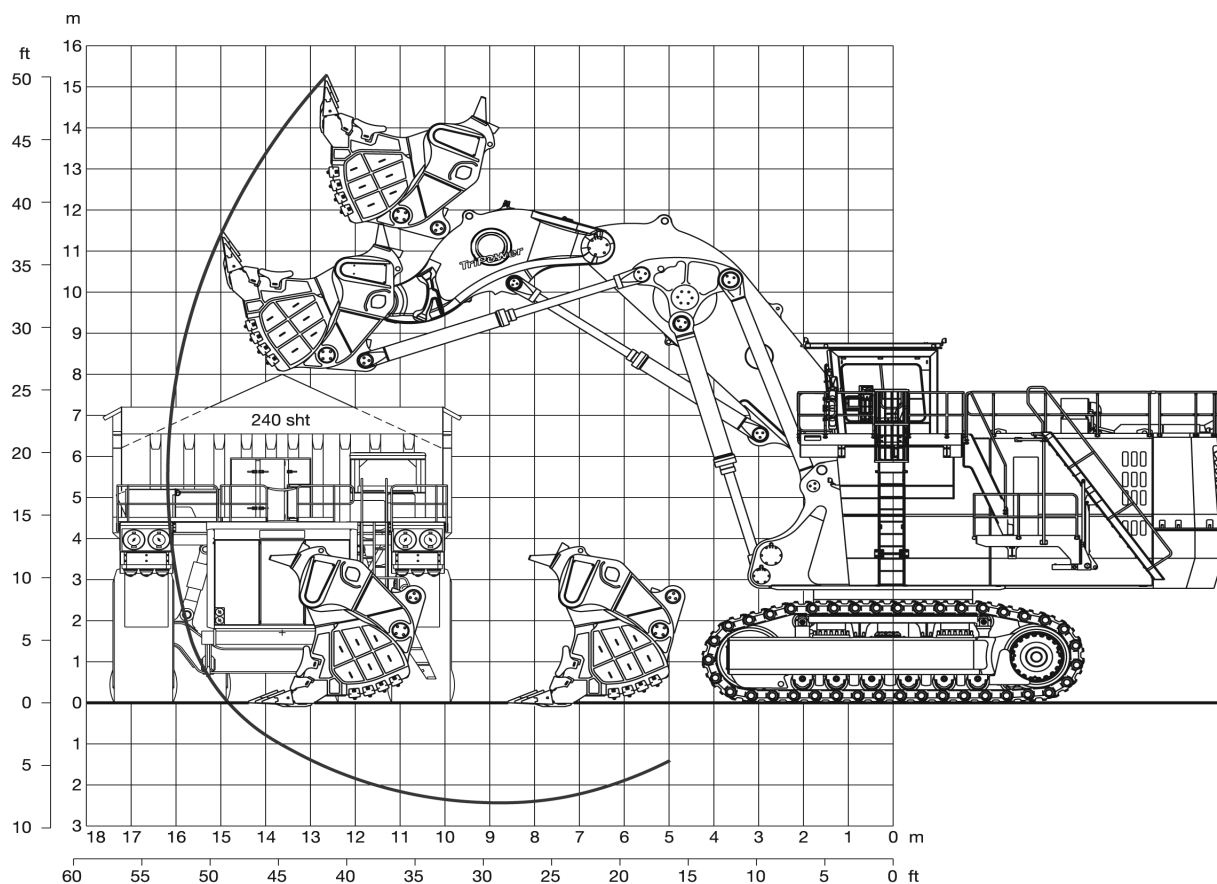
Attachments

- Booms and sticks are torsion-resistant, welded box design of high tensile steel with massive steel castings at pivot areas
- Welding procedures allow for internal counter-welding (double prep weld) wherever possible
- Booms and sticks are stress-relieved after welding
- Inspection hole in booms
- Catwalks with rails at booms
- Pressure-free lowering of boom (FS and BH) and stick (FS) by means of a float valve
- Shovel attachment with unique *TriPower* kinematics ensuring the following main features:
 - Horizontal automatic constant-angle bucket guidance
 - Vertical automatic constant-angle bucket guidance
 - Automatic roll-back limiter to prevent material spillage
 - Kinematic assistance to hydraulic forces
 - Constant boom momentum throughout the entire lift arc
 - Crowd force assistance
- All buckets (FS and BH) are equipped with a universal wear package suitable for all standard applications, which consists of:
 - Special liner material covering main wear areas inside and outside of bucket
 - Lip shrouds between teeth
 - Wing shrouds on side walls
 - Heel shrouds at bottom edges
- Special wear packages for highly abrasive materials on request

Hydraulic Shovel—6050/6050 FS

TriPower Face Shovel Attachment (FS)

Working Diagram - Boom 8.0 m (26 ft 2 in) - Stick 5.1 m (16 ft 9 in)



Working Range

Max. digging height	15.3 m	50 ft 2 in
Max. digging reach	16.2 m	53 ft 2 in
Max. digging depth	2.4 m	7 ft 10 in
Max. dumping height	11.8 m	38 ft 9 in
Crowd distance on level	5.5 m	19 ft

Digging Forces

Max. crowd force	1 890 kN	424,740 lb
Max. crowd force at ground level	1 650 kN	370,800 lb
Max. breakout force	1 500 kN	337,100 lb

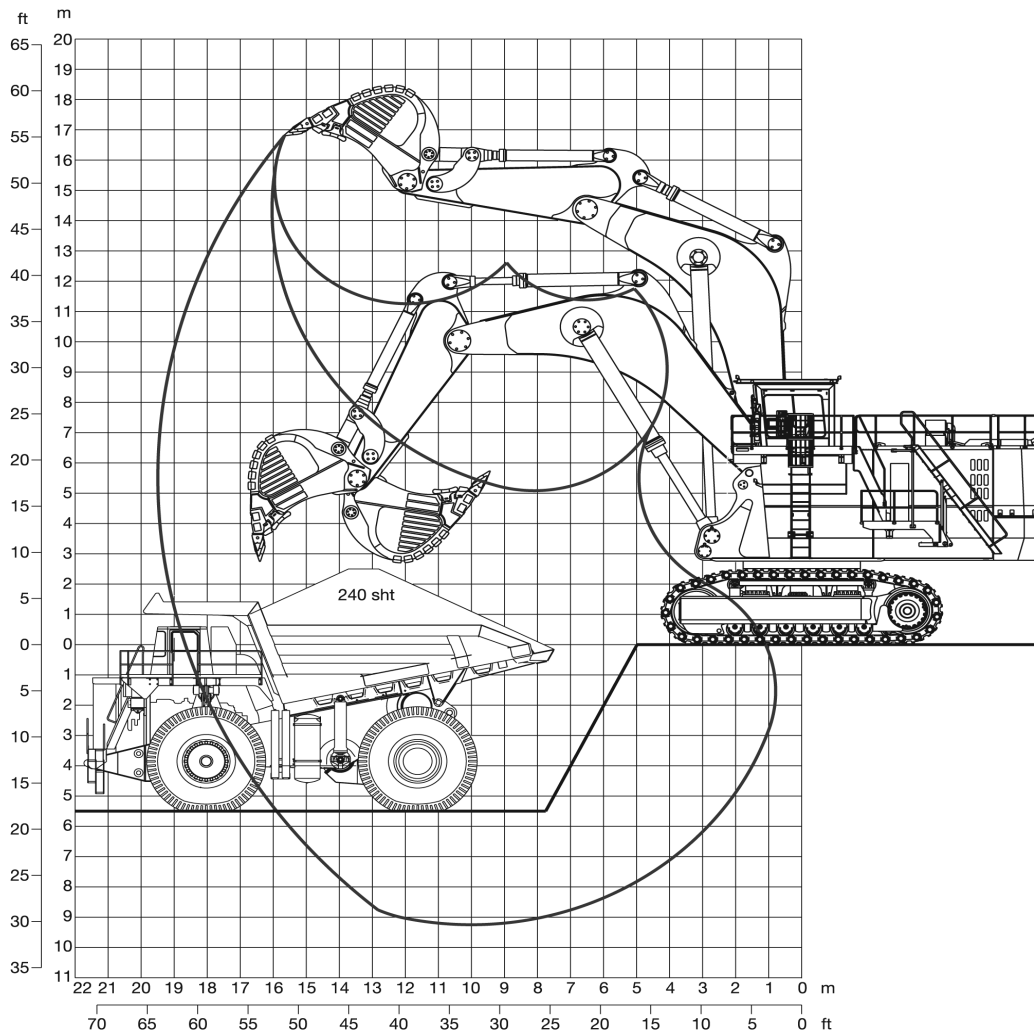
Face Shovels

Type	Iron ore shovel	Heavy rock shovel	Heavy rock shovel	Standard rock shovel	Light rock shovel
Tooth system	ESCO S130	ESCO S130	ESCO S130	ESCO S130	ESCO S130
Capacity SAE / PCSA 1:1	21.0 m ³ (27.5 yd ³)	24.5 m ³ (32.0 yd ³)	26.5 m ³ (34.7 yd ³)	30.5 m ³ (39.9 yd ³)	32.3 m ³ (42.2 yd ³)
Capacity SAE / CECE 2:1	18.0 m³ (23.5 yd³)	21.0 m³ (27.5 yd³)	23.0 m³ (30.1 yd³)	26.0 m³ (34.0 yd³)	28.0 m³ (36.6 yd³)
Total width	4 800 mm (15 ft 9 in)	4 800 mm (15 ft 9 in)	4 800 mm (15 ft 9 in)	4 800 mm (15 ft 9 in)	4 800 mm (15 ft 9 in)
Inner width	4 300 mm (14 ft 1 in)	4 300 mm (14 ft 1 in)	4 300 mm (14 ft 1 in)	4 300 mm (14 ft 1 in)	4 300 mm (14 ft 1 in)
Opening width	2 250 mm (8 ft 2 in)	2 500 mm (8 ft 2 in)	2 500 mm (8 ft 2 in)	2 500 mm (8 ft 2 in)	2 500 mm (8 ft 2 in)
No. of teeth	6	6	6	6	6
Weight including wear kit	40 400 kg (89,070 lb)	42 400 kg (93,480 lb)	41 800 kg (92,150 lb)	42 900 kg (94,580 lb)	43 100 kg (95,020 lb)
Max. material density (loose)	2.6 t/m ³ (4,380 lb/yd ³)	2.2 t/m ³ (3,710 lb/yd ³)	2.0 t/m ³ (3,370 lb/yd ³)	1.8 t/m ³ (3,030 lb/yd ³)	1.65 t/m ³ (2,780 lb/yd ³)

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Backhoe Attachment (BH)

Working Diagram - Boom 10.5 m (34 ft 5 in) - Stick 5.5 m (18 ft 1 in)



Working Range

Max. digging depth	9.2 m 30 ft 2 in
Max. digging reach	19.5 m 64 ft
Max. digging height	16.8 m 55 ft 1 in

Digging Forces

Max. crowd force	1 200 kN	269,680 lb
Max. breakout force	1 200 kN	269,680 lb

Backhoes

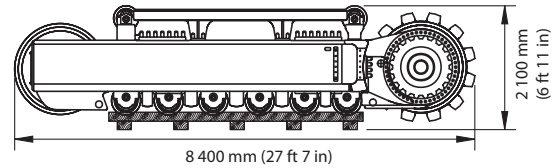
Type	Standard rock bucket (Other buckets on request)
Tooth system	ESCO size 110
Capacity SAE 1:1	28.0 m ³ (36.6 yd ³)
Capacity CECE 2:1	24.6 m ³ (32.2 yd ³)
Capacity struck	21.2 m ³ (27.7 yd ³)
Total width	4 440 mm (14 ft 7 in)
Inner width	4 040 mm (13 ft 3 in)
No. of teeth	6
Weight incl. universal wear kit	32 300 kg (72,210 lb)
Max. material density (loose)	1.8 t/m ³ (3,030 lb/yd ³)

Hydraulic Shovel—6050/6050 FS

General Packing List

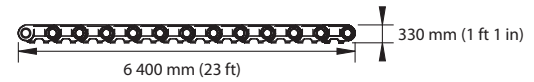
Crawler side frame (2 units)

Width 2 200 mm (7 ft 3 in) Gross weight 44 600 kg (98,330 lb)



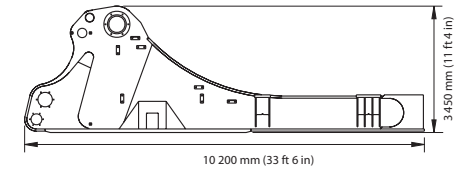
6 tracks consisting of 13 pad links each

Width 1 400 mm (4 ft 7 in) Gross weight (each) 10 700 kg (23,590 lb)



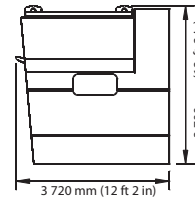
Superstructure Center Frame

Width 3 600 mm (11 ft 10 in) Gross weight 62 000 kg (136,690 lb)



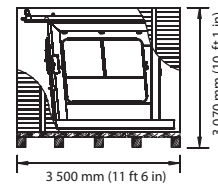
Cab pedestal module

Width 2 500 mm (8 ft 2 in) Gross weight 7 100 kg (15,650 lb)



Crate with cabin and FOPS

Width 2 610 mm (8 ft 7 in) Gross weight 3 500 kg (7,720 lb)



Above values are approximate. Details may vary depending on scope of supply and destination.
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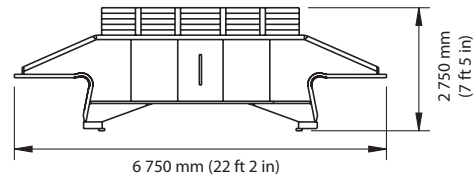


Hydraulic Shovel—6050/6050 FS

General Packing List

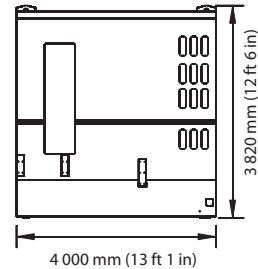
Undercarriage center frame with swing roller bearing

Width 3 800 mm (12 ft 6 in) Gross weight 42 300 kg
(93,250 lb)



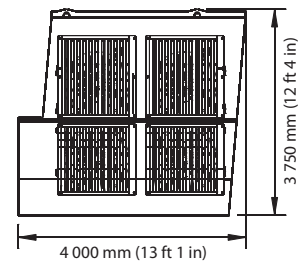
Engine module with diesel engines

Width 7 000 mm (23 ft) Gross weight 42 000 kg
(92,590 lb)



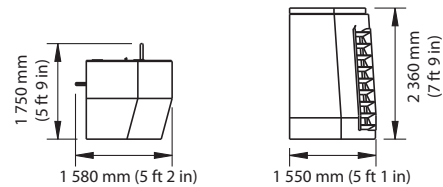
Oil cooler module

Width 2 000 mm (6 ft 7 in) Gross weight 9 750 kg
(21,490 lb)



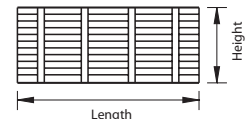
Counterweights

	Width	Gross weight
Lower part	7 000 mm (23 ft)	36 000 kg (79,370 lb)
Upper part	7 000 mm (23 ft)	19 300 kg (42,550 lb)



Crates

Content	Length	Width	Height	Gross Weight
Two radiators with fan	2 700 mm (8 ft 10 in)	1 950 mm (6 ft 5 in)	1 320 mm (4 ft 4 in)	2 460 kg (5,420 lb)
Four swing gears	1 350 mm (4 ft 5 in)	1 350 mm (4 ft 5 in)	2 100 mm (6 ft 7 in)	4 800 kg (10,580 lb)
Swing ring cover	2 200 mm (7 ft 3 in)	1 300 mm (4 ft 3 in)	1 030 mm (3 ft 5 in)	390 kg (860 lb)
Swing ring bolts, access ladder, etc.	3 300 mm (10 ft 10 in)	1 600 mm (5 ft 3 in)	1 260 mm (4 ft 2 in)	2 900 kg (6,390 lb)
Mufflers and covers	3 300 mm (10 ft 10 in)	1 600 mm (5 ft 3 in)	1 780 mm (5 ft 10 in)	1 620 kg (3,570 lb)
Grease container with pump	1 700 mm (5 ft 7 in)	1 300 mm (4 ft 3 in)	2 100 mm (6 ft 11 in)	1 470 kg (3,240 lb)
Barrels (hydraulic oil; grease)	2 500 mm (8 ft 2 in)	1 300 mm (4 ft 3 in)	1 270 mm (4 ft 2 in)	1 700 kg (3,750 lb)
Barrels (hydraulic oil)	2 500 mm (8 ft 2 in)	1 300 mm (4 ft 3 in)	2 700 mm (8 ft 10 in)	1 900 kg (4,190 lb)
Retractable ladder	5 570 mm (18 ft 3 in)	1 100 mm (3 ft 7 in)	2 000 mm (6 ft 7 in)	740 kg (1,630 lb)



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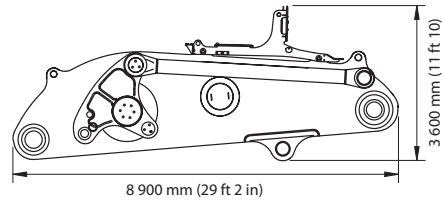


Hydraulic Shovel—6050/6050 FS

TriPower Shovel Attachment

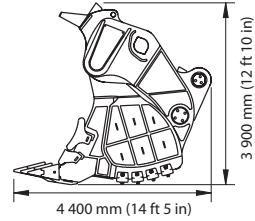
Boom with main valve block, TriPower linkages and rods

Width 3 050 mm (10 ft) Gross weight 46 800 kg (103,180 lb)



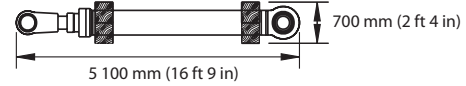
Face shovel incl. pin for stick

Capacity (2:1)	Width	Gross Weight
26.0 m ³ (34.0 yd ³)	4 800 mm (15 ft 9 in)	43 900 kg (96,780 lb)



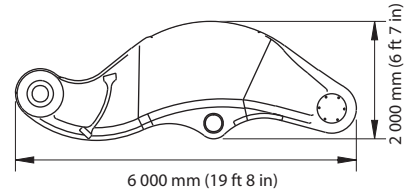
Bundle with 2 boom cylinders

Width 1 200 mm (3 ft 11 in) Gross weight 7 100 kg (15,650 lb)



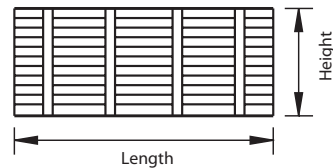
Stick

Width 2 400 mm (7 ft 10 in) Gross weight 17 300 kg (38,140 lb)



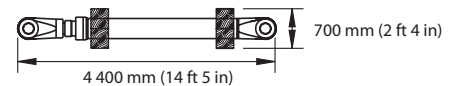
Crates with catwalks, railings and other parts

Length	Width	Height	Gross weight
4 270 mm (14 ft)	1 900 mm (6 ft 3 in)	1 700 mm (5 ft 7 in)	3 400 kg (7,500 lb)



2 Bundles with 2 stick cylinders and 2 bucket cylinders each

Width 1 200 mm (3 ft 11 in) Gross weight 5 200 kg (11,460 lb)



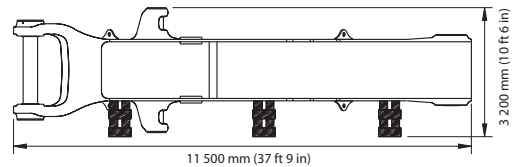
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Backhoe Attachment

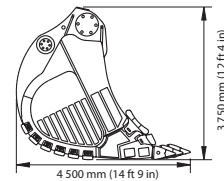
Monoboom without main valve block

Width 5 000 mm (16 ft 5 in) Gross weight 46 000 kg (101,410 lb)



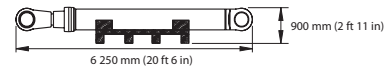
Backhoe bucket incl. pins for stick and linkage

Capacity (2:1)	Width	Gross Weight
28 m ³ (36.6 yd ³)	4 440 mm (14 ft 7 in)	34 500 kg (76,060 lb)



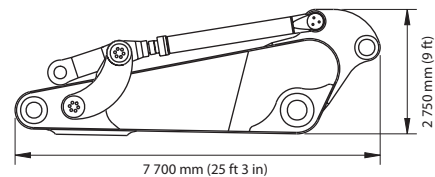
2 pallets with boom cylinders each

Width 800 mm (2 ft 7 in) Gross weight 7 180 kg (15,830 lb)



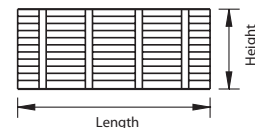
Stick with linkage and bucket cylinder

Width 2 300 mm (7 ft 7 in) Gross weight 28 000 kg (61,730 lb)



Crates with main valve block, catwalks, railings & other parts

Length	Width	Height
3 650 mm (12 ft)	2 170 mm (7 ft 1 in)	1 520 mm (5 ft)
4 300 mm (14 ft 1 in)	1 900 mm (6 ft 3 in)	1 700 mm (5 ft 7 in)
4 960 mm (16 ft 3 in)	1 900 mm (6 ft 3 in)	1 900 mm (6 ft 3 in)

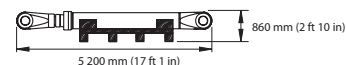


Gross weight

5 000 kg (11,020 lb)
3 260 kg (7,190 lb)
3 400 kg (7,500 lb)

2 pallets with stick cylinders each

Width 800 mm (2 ft 7 in) Gross weight 4 200 kg (9,260 lb)

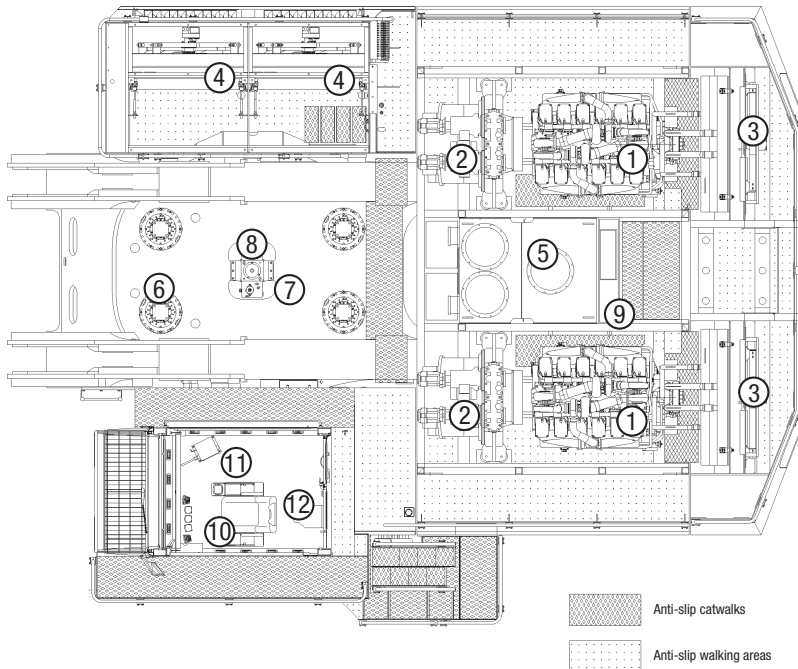


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Hydraulic Shovel—6050/6050 FS

Component Accessibility on Superstructure

1. Diesel Engines	4. Oil coolers	7. Rotary distributor	10. Operator's seat
2. Gearboxes with hydraulic pumps	5. Hydraulic tank	8. Travel valves	11. BCS tower
3. Engine radiators with hydraulically driven fan	6. Swing drives	9. Switch cabinet and battery box	12. Auxilliary seat



Optional Equipment

General

- Export crating
- Finishing as per end user's corporate colors
- Customizing of logos as per customer's specification

Superstructure

- Hydraulic service crane on superstructure with auxilliary engine
- Mesabi radiators instead of standard radiators
- Oil change interval extension for engine oil up to 1,000 hrs
- Folding access stairway, stairway angle approx. 45°
- Round container with a standard 200 l grease barrel (instead of 1,000 l grease container)
- Lubricated pinion for greasing of internal gearing of swing ring
- Various cold-weather packages

Additional optional equipment available on request

Cab

- Various heating and air-conditioning systems
- Roller blinds at all windows
- Rear windscreen wiper
- Additional instrumentation

Undercarriage

- Track pad width 1 600 mm (5 ft 3 in) or 1,800 mm (5 ft 11 in)
- Automatic lubrication of rollers by central lube system
- Cover plate under carbody (belly plate)

Attachment

- Guards for shovel cylinders of FS-attachment
- Xenon lighting on boom
- Special wear packages

Hydraulic Shovel—6050/6050 FS

For more complete information on Cat products, dealer services, and industry solutions, visit us on the web at mining.cat.com and www.cat.com

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