



# Cat<sup>®</sup>

## 6060/6060 FS

### Electric Drive

### Hydraulic Shovel

## Specifications

### Operating Weight

#### Shovel

Standard track pads	1 400 mm (4 ft 7 in)
Operating weight	542 300 kg (1,195,550 lb)
Ground Pressure	24.3 N/cm <sup>2</sup> (35.1 psi)
Additional track pads available on request	

#### Backhoe

Standard track pads	1 400 mm (4 ft 7 in)
Operating weight	545 500 kg (1,202,830 lb)
Ground Pressure	24.4 N/cm <sup>2</sup> (35.4 psi)
Additional track pads available on request	

### Electric Motor

Type	Squirrel cage induction motor
Output	1 800 kW
Voltage	6.6 kV +/- 10% (other on request)
Rated Current I <sub>N</sub>	185 A (at 6.6 kV)
Frequency	50 Hz (60 Hz optional)
Revolutions	1 500 min <sup>-1</sup> (1,800 min <sup>-1</sup> optional)
Starting current	450% of I <sub>N</sub> (350% of I <sub>N</sub> optional)

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

### Medium Voltage Electrical System

Standard supply voltage	6.6 kV +/- 10% (other on request)
Voltage transformer	6 600 V / 400 V
Current transformer	Ratio 200 : 5

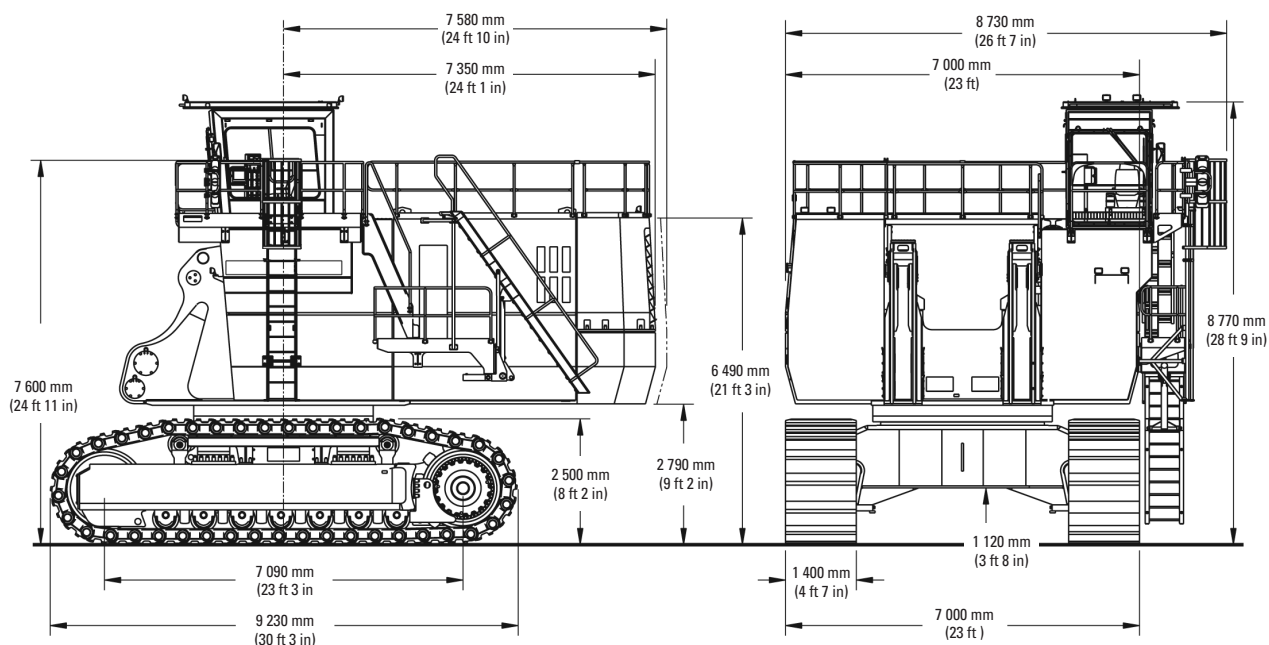
- Load breaking switch for 6600 V (emergency stop)
- Voltage monitor for each phase
- Fuse for on-board transformer 6600 V
- Vacuum contactors for motor start stop

### Low Voltage Electrical System

System voltage	4 V
Batteries	2 x 170 Ah - 12 V each
in series / parallel installation	170 Ah - 24 V in total
Working spot lights 8 x high brightness Xenon lights	

- Emergency stop switch accessible from ground level and in motor module

# Hydraulic Shovel—6060/6060 FS (Electric)



## General Data

### Operating weight

Face Shovel	542 tonnes	597 tons
Backhoe	546 tonnes	602 tons

### Electric Motor Output

Squirrel cage induction motor	1 800 kW
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### Standard bucket capacity

Face Shovel (SAE 2:1)	34.0 m <sup>3</sup>	44.5 yd <sup>3</sup>
Backhoe (SAE 1:1)	34.0 m <sup>3</sup>	44.5 yd <sup>3</sup>

## 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

# Hydraulic Shovel—6060/6060 FS (Electric)

## Hydraulic System with Pump Managing System

Main pumps	4 x variable flow axial piston pumps
Max. oil flow	4 x 933 l/min (4 x 246 US gal/min)
Max. pressure, attachment	32 MPa = 320 bar (4,640 psi)
Max. pressure, travel	37 MPa = 370 bar (5,370 psi)
Swing pumps	3 x reversible swash plate pumps
Max. oil flow	3 x 491 l/min (3 x 131 US gal/min)
Max. pressure, swing system	35 MPa = 350 bar (5,080 psi)
Total volume of hydraulic oil	approx. 7 300 l (1,930 US gal)
Hydraulic tank capacity	approx. 5,100 l (1,320 US gal)

- Pump Managing Systems contain:
- Electronic load limit control
  - Flow on demand from main pumps depending on joystick position
  - Automatic regulation of main pumps to zero flow without demand
  - Reduced oil flow of main pumps at high hydraulic oil 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 (200 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)

## Hydraulic Oil Cooling

Oil flow of cooling pumps	4 x 491 l/min (4 x 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

## Undercarriage

Travel speeds (2 stage)	1st stage 2nd stage	Max. 1.4 km/h (0.87 mph) Max. 2.0 km/h (1.24 mph)
Max. tractive force	2 956 kN (301 t = 664,300 lb)	
Gradability of travel drives	Max. 48 %	
Track pads (each side)	42	
Bottom rollers (each side)	7	
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

## Operator's Cab

Operator's eye level	approx. 7.6 m (24 ft 11 in)	
Internal dimensions cab	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, 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 transreflective technology
- Board Control System (BCS) electronic monitoring and data logging system for vital signs and service data of motor, hydraulic system and lubrication system
- Machine access via retractable boarding ladder, hydraulically operated
- Sliding emergency ladder (kick-down type) with ladder cage

# Hydraulic Shovel—6060/6060 FS (Electric)

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## 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	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

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## Automatic Lubrication System

Capacity of grease container 1 000 l (264 US gal)

- 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

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## Retractable Service Station

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

Equipped with:

- Quick couplings for:
  - Pump transmission gear oil - left / right
  - Hydraulic oil tank
  - Grease container
- Indicator light for grease container full

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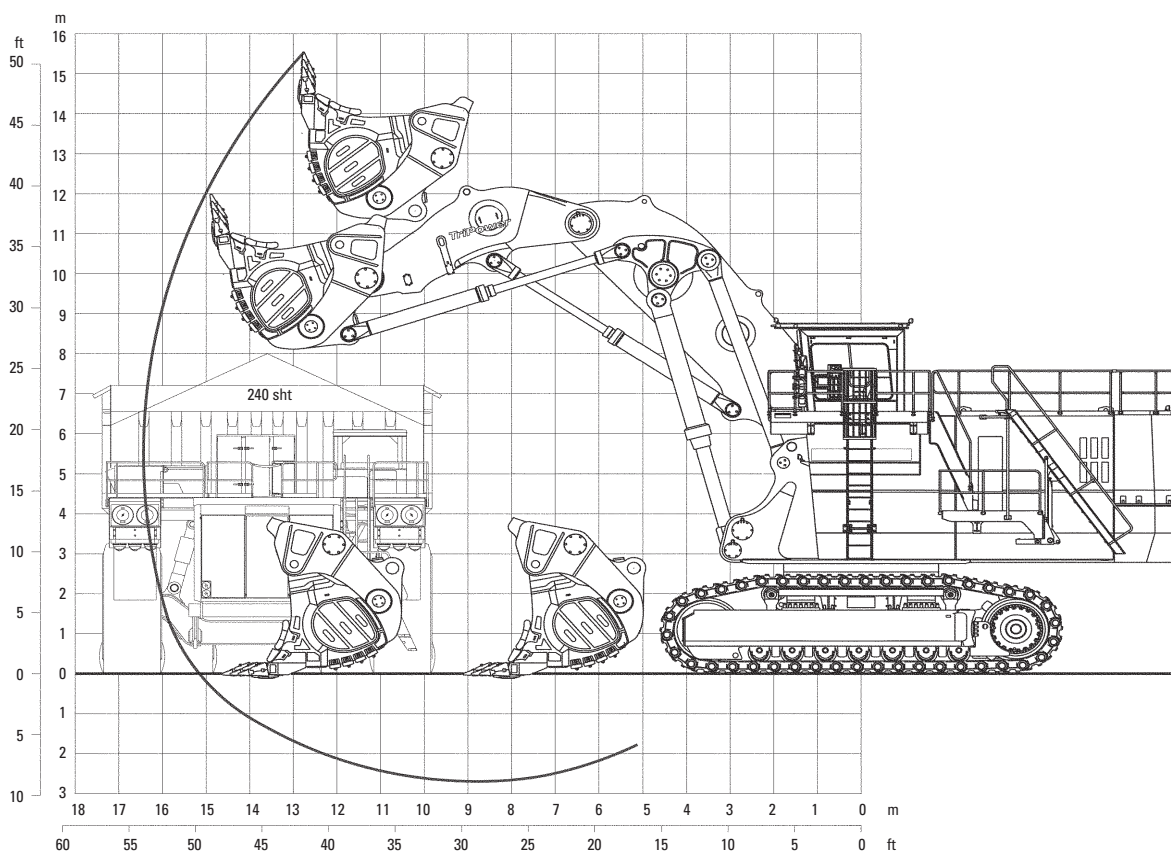
## Attachments

- 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
- Catwalks with rails at booms
- Inspection holes in booms (FS & BH) and stick (FS only)
- Pressure-free lowering of boom (FS and BH) and stick (FS) by means of a float valve
- Shovel attachment with patented 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 whole 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—6060/6060 FS (Electric)

## 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	15.5 m	50 ft 10 in
Max. digging reach	16.4 m	53 ft 10 in
Max. digging depth	2.7 m	8 ft 10 in
Max. dumping height	11.6 m	38 ft 1 in
Crowd distance on level	5.5 m	18 ft 1 in

#### Digging Forces

Max. crowd force	2 240 kN	503,400 lb
Max. crowd force at ground level	2 100 kN	471,930 lb
Max. breakout force	1 640 kN	368,560 lb

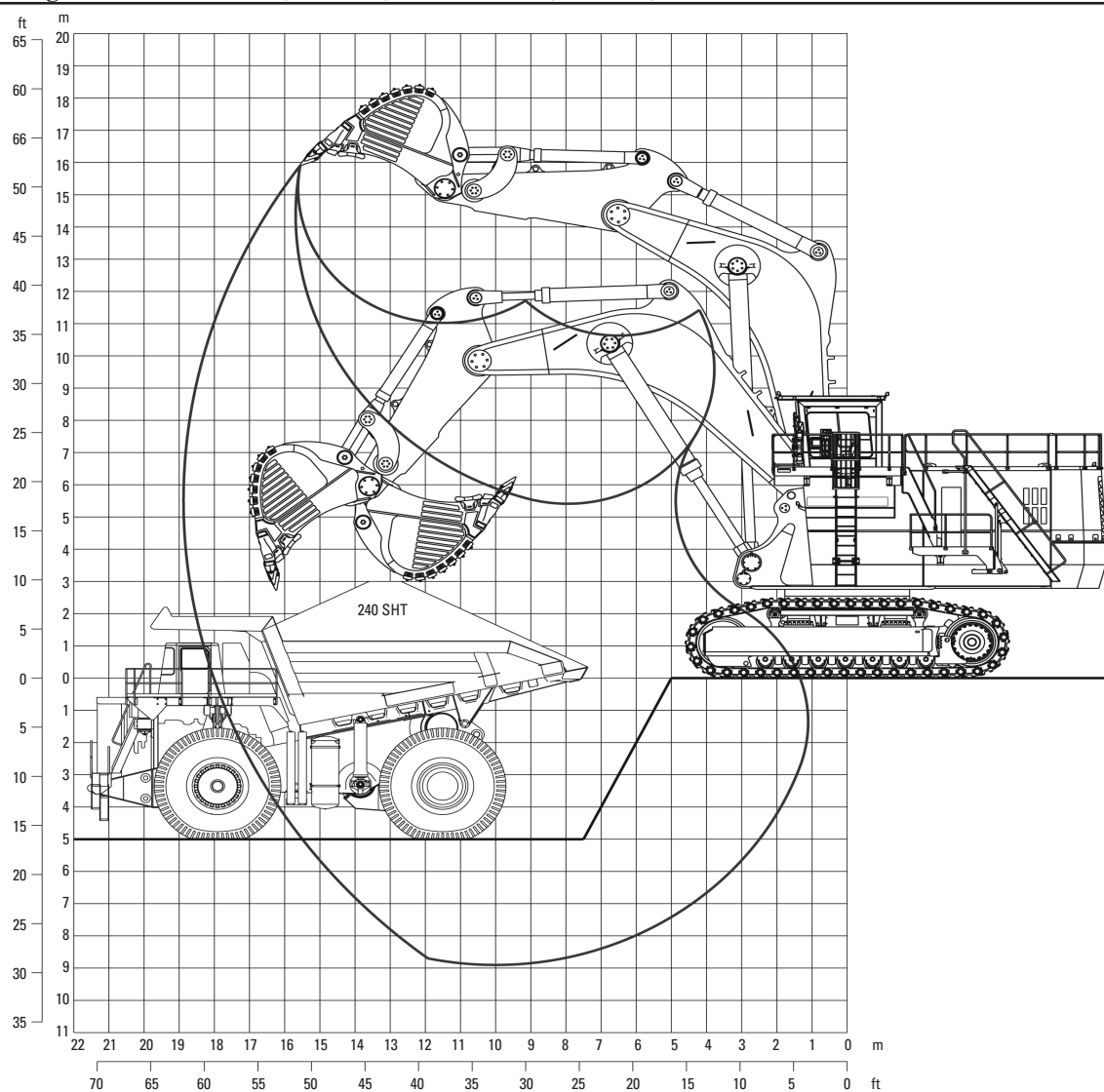
#### Face Shovels

Type	Iron ore shovel	Iron ore shovel	Heavy rock shovel	Heavy rock shovel	Standard rock shovel
Tooth system	ESCO S130	ESCO S130	ESCO S130	ESCO S130	ESCO S130
Capacity SAE / PCSA 1:1	24.5 m <sup>3</sup> (32.0 yd <sup>3</sup> )	26.5 m <sup>3</sup> (34.7 yd <sup>3</sup> )	32.5 m <sup>3</sup> (42.5 yd <sup>3</sup> )	36.0 m <sup>3</sup> (47.1 yd <sup>3</sup> )	39.5 m <sup>3</sup> (51.7 yd <sup>3</sup> )
Capacity SAE / CECE 2:1	21.0 m <sup>3</sup> (27.5 yd <sup>3</sup> )	23.0 m <sup>3</sup> (30.1 yd <sup>3</sup> )	28.0 m <sup>3</sup> (36.6 yd <sup>3</sup> )	31.0 m <sup>3</sup> (40.5 yd <sup>3</sup> )	34.0 m <sup>3</sup> (44.5 yd <sup>3</sup> )
Total width	4 800 mm (15 ft 9 in)	4 800 mm (15 ft 9 in)	4 800 mm (15 ft 9 in)	5 600 mm (18 ft 4 in)	5 600 mm (18 ft 4 in)
Inner width	4 300 mm (14 ft 1 in)	4 300 mm (14 ft 1 in)	4 300 mm (14 ft 1 in)	5 100 mm (16 ft 9 in)	5 100 mm (16 ft 9 in)
Opening width	2 600 mm (8 ft 6 in)	2 600 mm (8 ft 6 in)	2 600 mm (8 ft 6 in)	2 600 mm (8 ft 6 in)	2 600 mm (8 ft 6 in)
No. of teeth	6	6	6	6	6
Weight incl. wear kit	44 900 kg (98,990 lb)	44 300 kg (97,660 lb)	46 200 kg (100,530 lb)	50 100 kg (110,450 lb)	50 300 kg (110,450 lb)
Max. material density (loose)	3.0 t/m <sup>3</sup> (5,060 lb/yd <sup>3</sup> )	2.6 t/m <sup>3</sup> (4,380 lb/yd <sup>3</sup> )	2.2 t/m <sup>3</sup> (3,710 lb/yd <sup>3</sup> )	2.0 t/m <sup>3</sup> (3,370 lb/yd <sup>3</sup> )	1.8 t/m <sup>3</sup> (3,030 lb/yd <sup>3</sup> )

# Hydraulic Shovel—6060/6060 FS (Electric)

## Backhoe Attachment (BH)

### Working Diagram - Boom 10.5 m (34 ft 5 in) - Stick 5.0 m (16 ft 5 in)



#### Working Range

Max. digging depth	8.9 m	29 ft 2 in
Max. digging reach	18.9 m	62 ft
Max. digging height	15.9 m	52 ft 2 in

#### Digging Forces

Max. crowd force	1 270 kN	285,410 lb
Max. breakout force	1 240 kN	278,670 lb

#### Backhoes

Type	Heavy rock bucket	Standard rock bucket
Tooth system	ESCO Posilok S 110	ESCO Posilok S 110
Capacity SAE 1:1	28.0 m <sup>3</sup> (36.6 yd <sup>3</sup> )	34.0 m <sup>3</sup> (44.5 yd <sup>3</sup> )
Capacity CECE 2:1	24.6 m <sup>3</sup> (32.3 yd <sup>3</sup> )	30.3 m <sup>3</sup> (39.6 yd <sup>3</sup> )
Capacity struck	21.2 m <sup>3</sup> (27.7 yd <sup>3</sup> )	26.5 m <sup>3</sup> (34.7 yd <sup>3</sup> )
Total width	4 440 mm (14 ft 7 in)	4 700 mm (15 ft 5 in)
Inner width	4 040 mm (13 ft 3 in)	4 300 mm (14 ft 1 in)
No. of teeth	6	6
Weight incl. universal wear kit	31 600 kg (69,670 lb)	34 400 kg (75,180 lb)
Max. material density (loose)	2.2 t/m <sup>3</sup> (3,710 lb/yd <sup>3</sup> )	1.8 t/m <sup>3</sup> (3,030 lb/yd <sup>3</sup> )

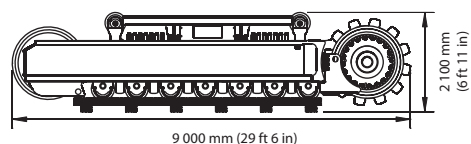


# Hydraulic Shovel—6060/6060 FS (Electric)

## General Packing List

### Crawler side frame (2 units)

Width 2 100 mm (6 ft 11 in)      Gross weight 47 900 kg  
(105,600 lb)



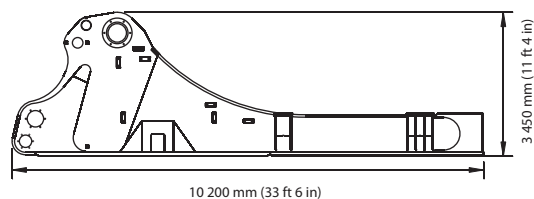
### 6 tracks consisting of 14 pad links each:

Width 1 400 mm (4 ft 7 in)      Gross weight (each) 11 500 kg  
(25,350 lb)



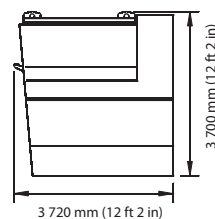
### Superstructure center frame

Width 3 600 mm (11 ft 10 in)      Gross weight 63 400 kg  
(136,690 lb)



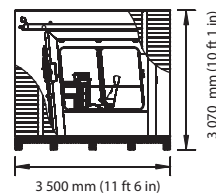
### Cab pedestal module

Width 2 700 mm (8 ft 10 in)      Gross weight 7 500 kg  
(16,530 lb)



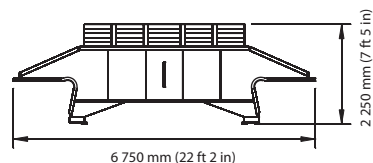
### Crate with cabin and FOPS

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



### Undercarriage center frame with swing roller bearing

Width 3 800 mm (12 ft 6 in)      Gross weight 43 100 kg  
(95,020 lb)



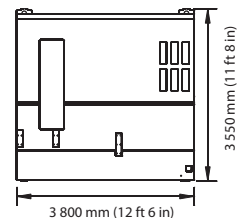
Above values are approximate. Details may vary depending on scope of supply and destination. Exact data subject to selected machine configuration and final packing list.

# Hydraulic Shovel—6060/6060 FS (Electric)

## General Packing List

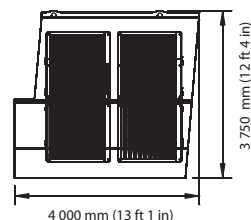
### Motor module with electric motor

Width 7 000 mm (23 ft)      Gross weight 37 700 kg (83,110 lb)



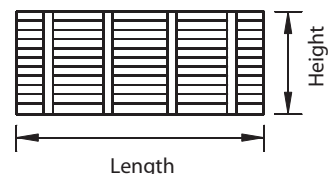
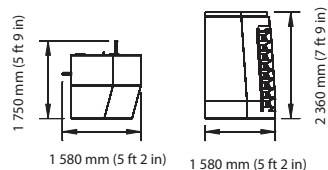
### Oil cooler module

Width 2 000 mm (6 ft 7 in)      Gross weight 10 100 kg (22,270 lb)



### Counterweight

	Width	Gross weight
Lower part	7 000 mm (23 ft)	36 500 kg (80,470 lb)
Upper Part	7 000 mm (23 ft)	29 300 kg (64,590 lb)



### Crates

Content	Length	Width	Height	Gross Weight
Cable guide	3 270 mm (10 ft 9 in)	3 000 mm (9 ft 10 in)	900 mm (2 ft 11 in)	1 260 kg (2,780 lb)
Four swing gears	1 350 mm (4 ft 5 in)	1 350 mm (4 ft 5 in)	1 900 mm (6 ft 3 in)	5 340 kg (11,770 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)
Bolts, tools, accessories, etc.	3 300 mm (10 ft 10 in)	1 600 mm (5 ft 3 in)	1 260 mm (4 ft 2 in)	3 500 kg (7,720 lb)
Catwalks and other parts	4 960 mm (16 ft 3 in)	1 900 mm (6 ft 3 in)	1 770 mm (5 ft 10 in)	3 400 kg (7,500 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)	1 050 kg (2,310 lb)
Retactable ladder (on pallet)	5 600 mm (18 ft 4 in)	1 000 mm (3 ft 3 in)	2 000 mm (6 ft 7 in)	740 kg (1,630 lb)
Emergency ladder (on pallet)	5 100 mm (16 ft 9 in)	1 000 mm (3 ft 3 in)	2 030 mm (6 ft 8 in)	500 kg (1,100 lb)
Barrels (hydraulic oil)	2 500 mm (8 ft 2 in)	1 300 mm (4 ft 3 in)	1 270 mm (4 ft 2 in)	1 900 kg (4,190 lb)
Barrels (oil; grease)	2 000 mm (6 ft 7 in)	1 350 mm (4 ft 5 in)	1 370 mm (4 ft 6 in)	1 100 kg (2,430 lb)

Above values are approximate. Details may vary depending on scope of supply and destination. Exact data subject to selected machine configuration and final packing list.

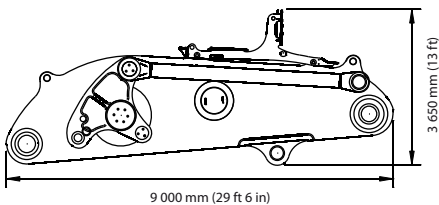


# Hydraulic Shovel—6060/6060 FS (Electric)

## TriPower Shovel Attachment

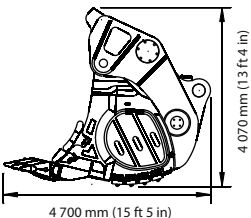
### Boom with main valve block, TriPower linkages and rods

Width 3 050 mm (10 ft)      Gross weight 44 600 kg (88,180 lb)



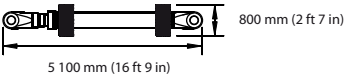
### Face shovel incl. pin for stick

Capacity (2:1)	Width	Gross Weight
34.0 m <sup>3</sup> (44.5 yd <sup>3</sup> )	5 700 mm (18 ft 8 in)	51 600 kg (113,760 lb)



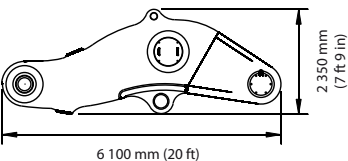
### 2 Bundles with 1 boom cylinder each

Width 500 mm (1 ft 8 in)      Gross weight 4 140 kg (9,130 lb)



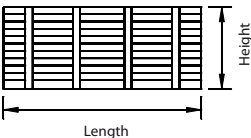
### Stick

Width 2 300 mm (7 ft 7 in)      Gross weight 16 300 kg (35,930 lb)



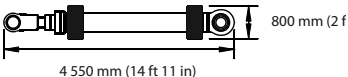
### Crates with catwalks, railings and other parts

Length	Width	Height	Gross weight
4 270 mm (14 ft)	1 900 mm (6 ft 3 in)	1 700 mm (5 ft 7 in)	3 260 kg (7,190 lb)



### 2 Bundles with 2 stick & 2 bucket cylinders each

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



Above values are approximate. Details may vary depending on scope of supply and destination. Exact data subject to selected machine configuration and final packing list.

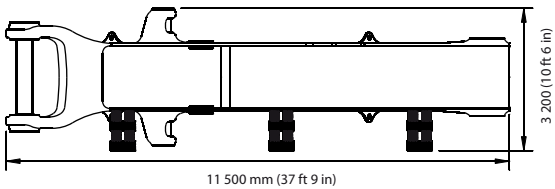


# Hydraulic Shovel—6060/6060 FS (Electric)

## Backhoe Attachment

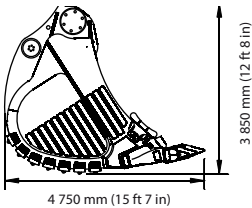
### Monoboom without main valve block

Width 5 000 mm (16 ft 5 in) Gross weight 42 800 kg (94,360 lb)



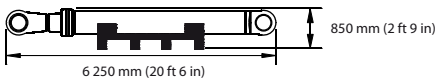
### Backhoe bucket incl. pins for stick and linkage

Capacity (1:1)	Width	Gross Weight
34 m <sup>3</sup> (44.5 yd <sup>3</sup> )	4 750 mm (15 ft 7 in)	36 000 kg (79,370 lb)



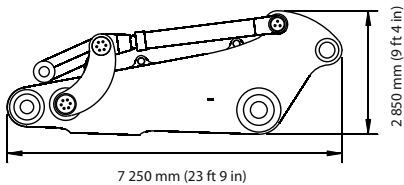
### 2 Pallets with 1 boom cylinder each

Width 800 mm (2 ft 7 in) Gross weight 6 700 kg (14,770 lb)



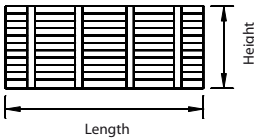
### Stick with linkage and bucket cylinders

Width 2 350 mm (7 ft 9 in) Gross weight 28 800 kg (63,490 lb)



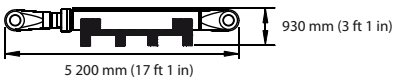
### Crates with main valve blocks, catwalks, railings and other parts

Length	Width	Height	Gross weight
4 900 mm (16 ft 1 in)	2 400 mm (7 ft 10 in)	2 130 mm (7 ft)	5 900 kg (13,010 lb)
4 270 mm (14 ft)	1 900 mm (6 ft 3 in)	1 700 mm (5 ft 7 in)	3 100 kg (6,830 lb)



### 2 Pallets with 1 stick cylinder each

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



Above values are approximate. Details may vary depending on scope of supply and destination. Exact data subject to selected machine configuration and final packing list.



# Hydraulic Shovel—6060/6060 FS (Electric)

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## Optional Equipment

### General

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

### Superstructure

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- Hydraulic service crane on superstructure with auxiliary engine
- 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
- 300 m trailing cable
- Power factor correction
- Starting aid transformer (soft-start)

### Cab

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

### Undercarriage

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- 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

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

Additional optional equipment available on request

# Hydraulic Shovel—6060/6060 FS (Electric)

For more complete information on Cat products, dealer services, and industry solutions, visit us on the web at [mining.cat.com](http://mining.cat.com) and [www.cat.com](http://www.cat.com)

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