

SPECIFICATIONS



SPECIFICATIONS FOR SOLAR 220LC-6



CAUTION!

Follow all safety recommendations and safe shop practices outlined in the front of this manual or those contained within this section.

Always use tools and equipment that is in good working order.

Use lifting and hoisting equipment capable of safely handling load.

Remember, that ultimately safety is your own personal responsibility.

MODEL	SERIAL NUMBER RANGE
Solar 220LC-6	222221 and UP

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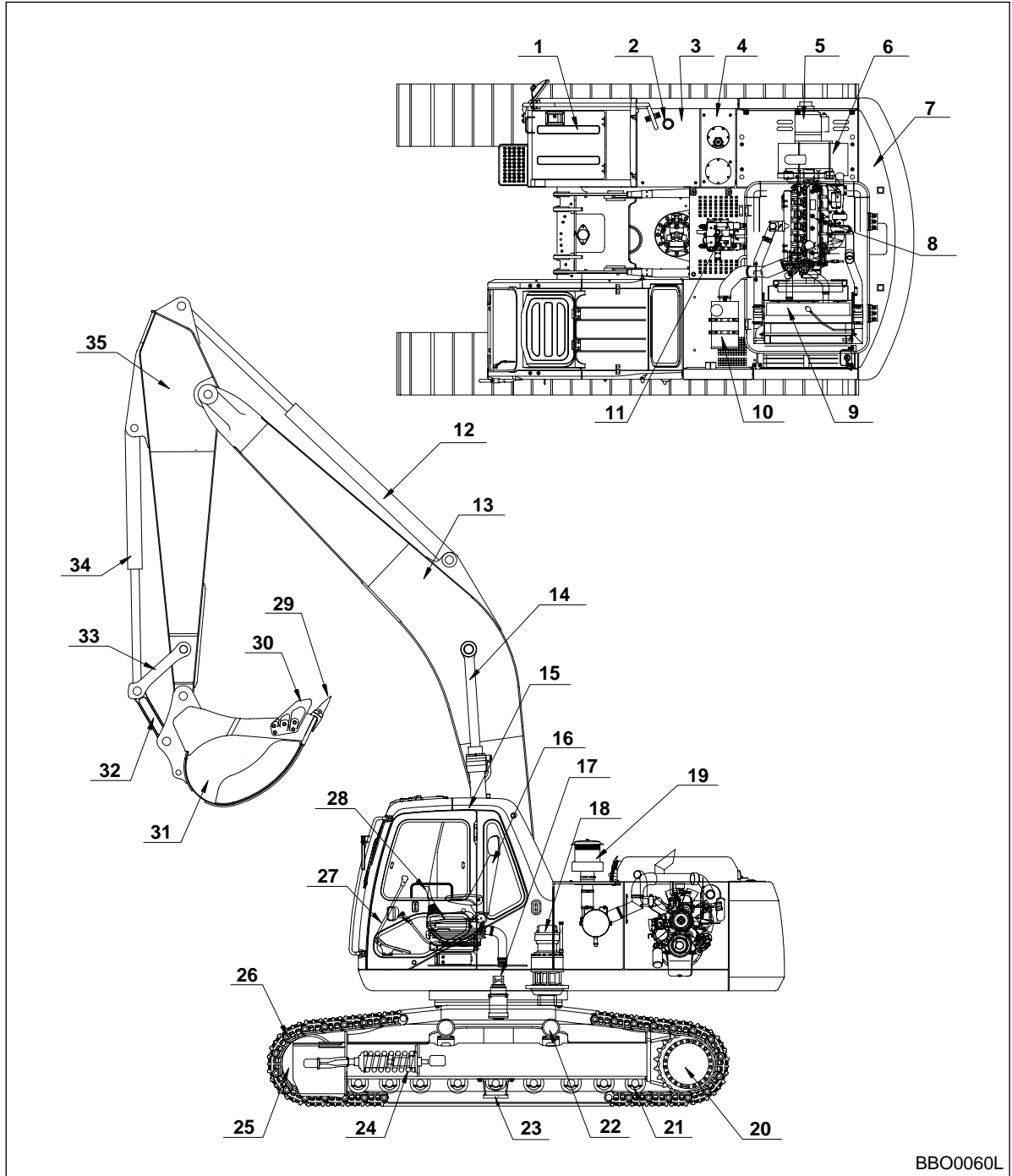
GENERAL DESCRIPTION

The excavator has three main component sections:

- The Upper Turntable
- The Lower Undercarriage and Track Frames
- The Excavator Front-end Attachment

The following illustration identifies main components and their locations. (See Figure 1 on page -4.)

COMPONENT LOCATIONS



BBO0060L

Figure 1

1. BATTERY
2. FUEL TANK FILL CAP
3. FUEL TANK
4. HYDRAULIC OIL TANK
5. PUMPS
6. MUFFLER
7. COUNTERWEIGHT
8. ENGINE
9. RADIATOR AND OIL COOLER
10. AIR CLEANER
11. CONTROL VALVES
12. ARM CYLINDER
13. BOOM
14. BOOM CYLINDER
15. CAB
16. SEAT
17. CENTER JOINT
18. SWING MOTOR
19. PRECLEANER
20. TRAVEL MOTOR
21. LOWER ROLLER
22. UPPER ROLLER
23. TRACK GUIDE
24. TRACK ADJUSTER
25. IDLER
26. TRACK LINK AND SHOE
27. TRAVEL LEVER
28. WORK LEVER (JOYSTICK) CONTROLS
29. TOOTH POINT
30. SIDE CUTTER
31. BUCKET
32. PUSH LINK
33. GUIDE LINK
34. BUCKET CYLINDER
35. ARM

GENERAL DIMENSIONS

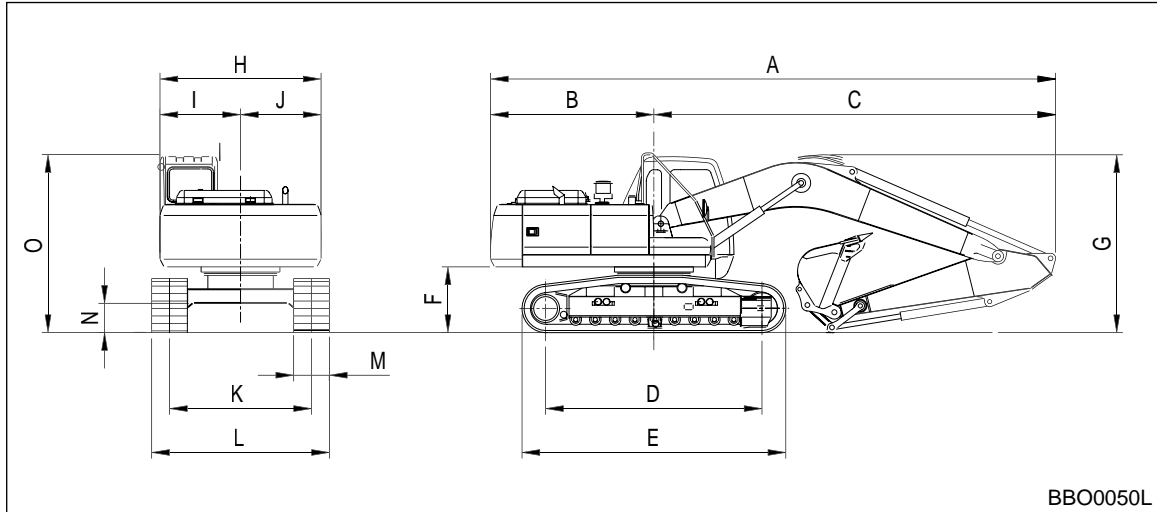


Figure 2

DIMENSION	5.7 M (18.7 FT) BOOM		
	2.4 M (7.87 FT) ARM	2.9 M (9.5 FT) ARM	3.5 M (11.48 FT) ARM
A	9,530 mm (31' 3")	9,550 mm (31' 4")	9,540 mm (31' 4")
B	2,750 mm (9')		
C	6,780 mm (22' 3")	6,800 mm (22' 4")	6,790 mm (22' 3")
D	3,645 mm (11' 12")		
E	4,440 mm (14' 7")		
F	1,105 mm (3' 8")		
G	3,228 mm (11' 0")	3,030 mm (9' 11")	3,690 mm (12' 1")
H	2,710 mm (8' 11")		
I	1,350 mm (4' 5")		
J	1,360 mm (4' 6")		
K	2,390 mm (7' 10")		
L	2,990 mm (9' 10")		
M	600 mm (23.62 in)		
N	480 mm (18.90 in)		
O	3,000 mm (9' 10")		

WORKING RANGE

WARNING!

The actual value for dimension "L" Digging Reach, depends on the stability and support provided by ground conditions. Digging too far underneath the excavator if soil conditions are wet, loose or unstable can collapse ground support, which could cause injury and/or equipment damage.

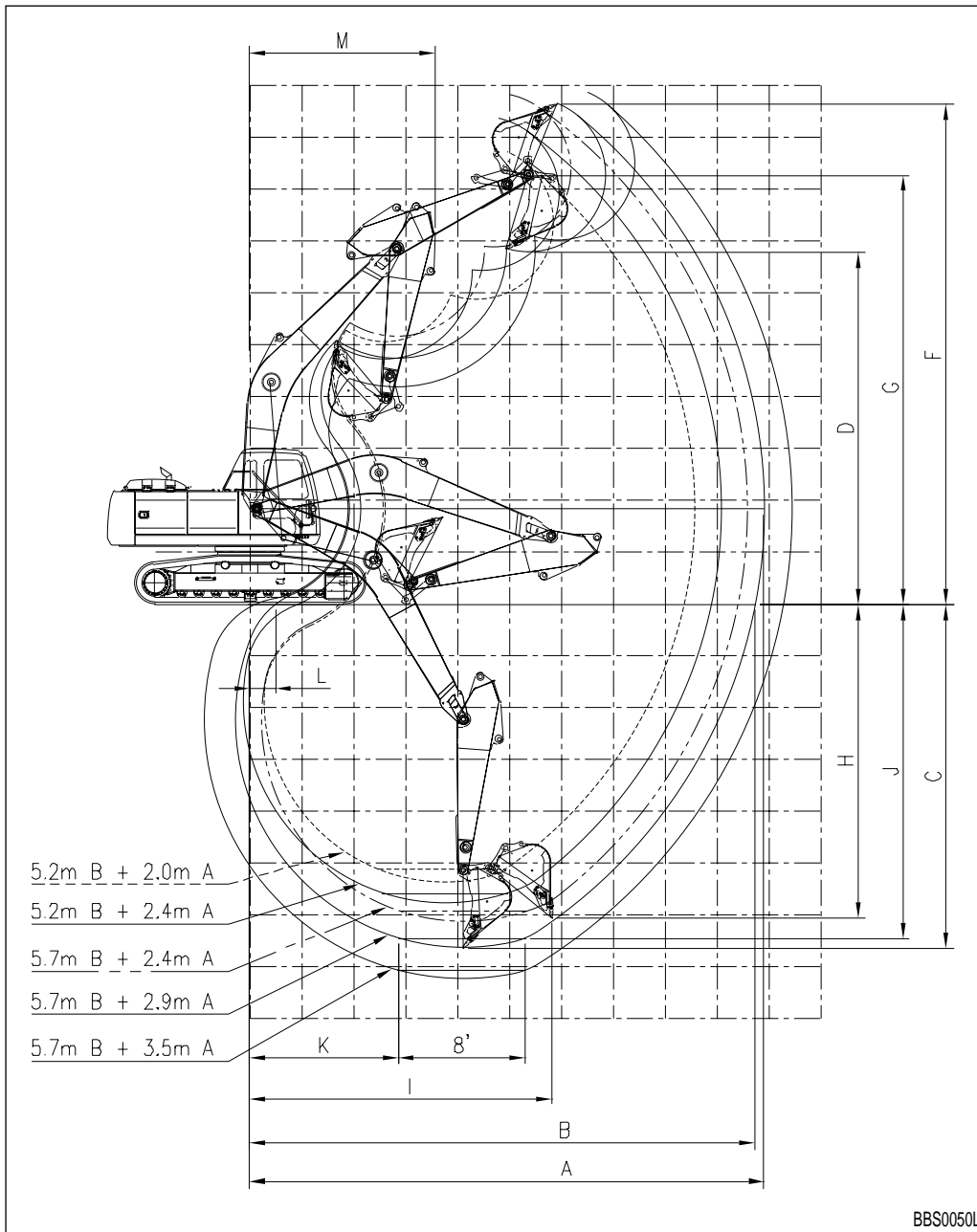


Figure 3

Dim.	Boom Type	Boom 5.2 m		Boom 5.7 m		
	Arm Type	2.0 m (6.56 ft)	2.4 m (7.87 ft)	2.4 m (7.87 ft)	2.9 m (9.51 ft)	3.5 m (11.48 ft)
	Bucket Type (PCSA)	1.28 m ³ (1.67 yd ³)	1.17 m ³ (1.53 yd ³)	1.05 m ³ (1.37 yd ³)	0.93m ³ (1.22 yd ³)	0.81 m ³ (1.06 yd ³)
A	Max. Digging Reach	8,565 mm (28' 1")	9,080 mm (29' 9")	9,580 mm (31' 5")	9,910 mm (32' 6")	10,445 mm (34' 3")
B	Max. Digging Reach (Ground)	8,365 mm (27' 5")	8,890 mm (29' 2")	9,400 mm (30' 10")	9,735 mm (31' 11")	10,230 mm (33' 8")
C	Max. Digging Depth	5,370 mm (17' 7")	5,770 mm (18' 11")	6,125 mm (20' 1")	6,630 mm (21' 9")	7,230 mm (23' 8")
D	Max. Loading Height	5,875 mm (19' 3")	6,435 mm (21' 1")	6,885 mm (22' 7")	6,795 mm (22' 3")	7,020 mm (23' 02")
F	Max. Digging Height	8,720 mm (28' 7")	9,370 mm (30' 9")	9,825 mm (32' 2")	9,570 mm (31' 8")	9,870 mm (32' 4")
G	Max. Bucket Pin Height	7,360 mm (24' 2")	7,920 mm (25' 11")	8,370 mm (27' 5")	8,280 mm (27' 2")	8,500 mm (27' 0")
H	Max. Vertical Wall	4,670 mm (15' 3")	5,650 mm (18' 6")	6,035 mm (19' 9")	6,045 mm (19' 10")	6,560 mm (21' 6")
I	Max. Radius Vertical	5,450 mm (17' 10"))	4,710 mm (15' 5")	5,045 mm (16' 6")	5,830 mm (19' 1")	6,020 mm (19' 9")
J	Max. Radius 8 ft Line	5,120 mm (16' 9")	5,575 mm (18' 3")	5,930 mm (19' 5")	6,445 mm (21' 2")	7,070 mm (23' 2")
K	Min. Radius 8 ft Line	2,470 mm (8' 1")	2,545 mm (8' 4")	2,895 mm (9' 6")	2,865 mm (9' 5")	2,860 mm (9' 4")
L	Min. Digging Reach	1,790 mm (5' 10")	945 mm (3' 11")	1,730 mm (5' 8")	120 mm (0.3' 11")	500 mm (1' 7")
M	Min. Swing Radius	3,440 mm (11' 3")	3,340 mm (10' 11")	3,580 mm (11' 9")	3,570 mm (11' 8")	3,630 mm (11' 10")

GENERAL SPECIFICATIONS

Shipping Weight	21.5 metric tons (47,400 lb), includes 10% fuel, boom, 2,900 mm (9' 6") arm, standard bucket and standard shoes
Operating Weight	Add weight of full fuel tank and operator.
Shipping Weights With Optional Track Shoes	Add 300 kg (660 lb) for 700 mm (28") shoes
	Add 600 kg (1,320 lb) for 800 mm (32") shoes
	Add 900 kg (1,980 lb) for 900 mm (35.4") shoes
Major Component Weights	Standard Boom 1,374.0 kg (3,023 lb)
	2,400.0 mm (7' 10") Arm 801.0 kg (1,762 lb)
	2,900.0 mm (9' 6") Arm 817.0 kg (1,797 lb)
	3,500.0 mm (11' 6") Arm 956.0 kg (2,103 lb)
	6,200.0 mm (20' 4") Arm 1,554.0 kg (3,419 lb)
	Boom Cylinders 171.0 kg (376 lb) each
	Arm Cylinder 257.0 kg (566 lb)
	Bucket Cylinder 144.0 kg (317 lb)
	Counterweight 3,900.0 kg (8,580 lb)
	Upper Turntable 5,950.0 kg (13,090 lb)
Lower - below Swing Bearing 7,850.0 kg (17,270 lb)	
Digging Forces:	
Bucket Cylinder	119 KN or 12,100 kg (26,620 lb) - with 2,900 mm (9' 6") arm
	117 KN or 12,000 kg (26,400 lb) - with 2,400 mm (7' 10") arm
Arm Cylinder	100 KN or 10,200 kg (22,400 lb) - with 2,900 mm (9' 6") arm
	121 KN or 12,300 kg (27,060 lb) - with 2,400 mm (7' 10") arm
Fuel Tank Capacity	350 liters (92.5 gal)
Hydraulic System Capacity	240 liters (63.4 gal.)
Hydraulic Reservoir Capacity	140 liters (37 gal)
Bucket Heaped Capacity Range	PCSA 0.50 - 1.18 m ³ (0.65 - 1.55 yd ³)
	IMPORTANT: Refer to the Load Weight, Bucket and Arm Length Compatibility Table for information on which bucket sizes may be used safely with which arm length, for load material weights.
Shoe Type	Triple Grouser
Shoe Width and Optional Sizes	600 mm (24") - standard
	700 mm (28") - optional
	800 mm (32") - optional
	900 mm (35") - optional
Ground Pressure Ratings:	
Standard 600 mm (24") shoe -	0.45 kg/cm ² (6.4 psi)
Optional 700 mm (28") shoe -	0.39 kg/cm ² (5.5 psi)
Optional 800 mm (32") shoe -	0.35 kg/cm ² (5.0 psi)
Optional 900 mm (35") shoe -	0.31 kg/cm ² (4.4 psi)

Transport Dimensions	
Overall Shipping Length (standard boom and arm)	9,550 mm (31' 4")
Overall Shipping Width (standard shoes)	2,990 mm (9' 10")
Overall Shipping Height (to top of cylinder hose)	3,030 mm (9' 11")
Track Shipping Length	4,440 mm (14' 7")
Transport Trailer Capacity	30 tons (33 short tons), minimum load capacity
Transport Loading Ramp Allowable Slope	15° angle CAUTION: Refer to Transport Maximum Procedure for Safe Shipping Instructions.

ENGINE PERFORMANCE CURVES (PER DIN 6270 STANDARD)

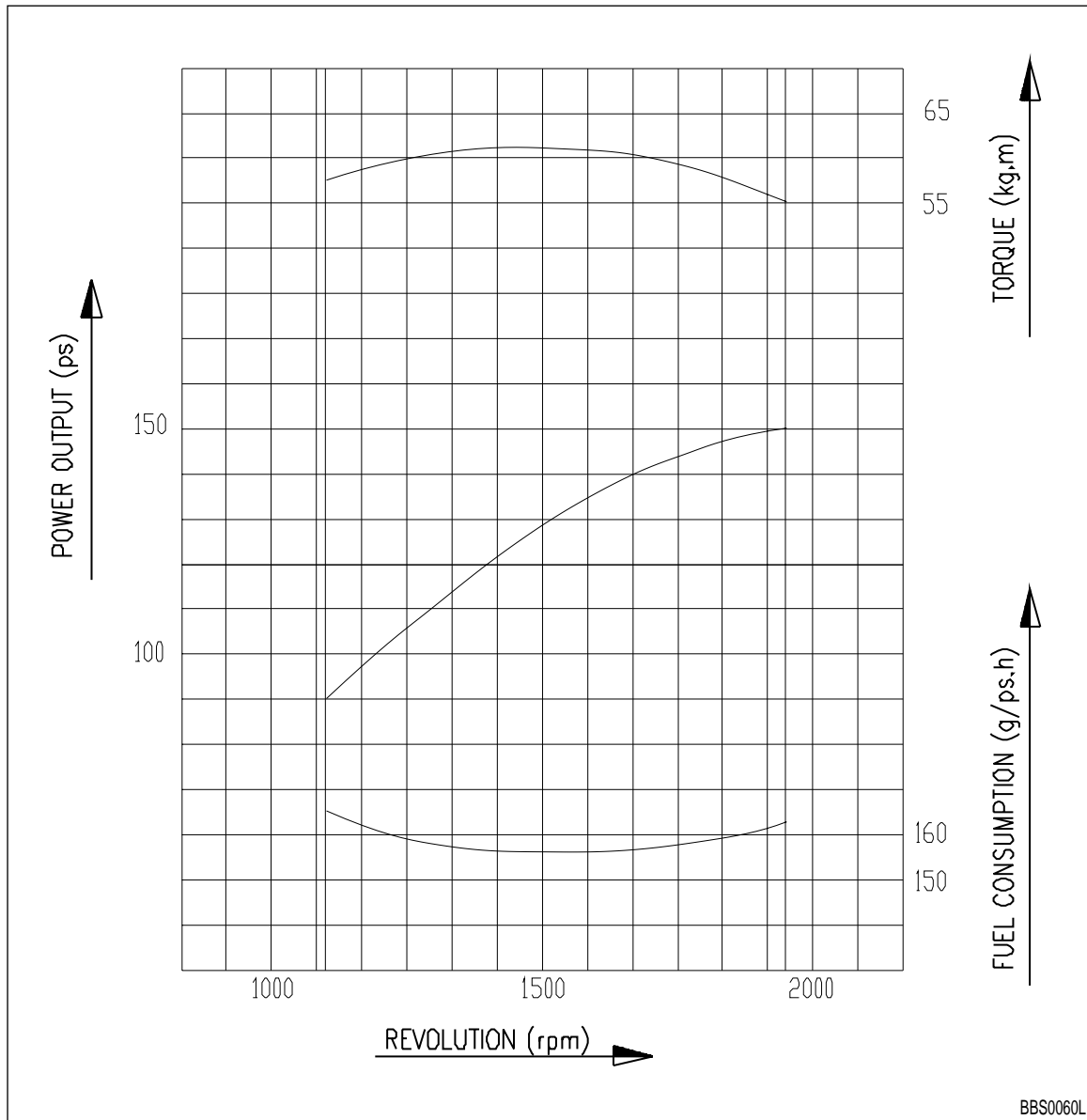


Figure 4

Condition	Specification
Engine Model	DB58TIS
Barometric Pressure	760 mmHg (20°C (68°F))
Cooling Fan	625 mm, SUCKER (24.6 in)
Alternator	24V x 50A
Air Cleaner	Installed
Muffler	Installed

Performance Standard	DIN 6270
Power	150 ps @ 1,950 rpm (148 hp @ 1,950 rpm)
Max. Torque	61.5 kg•m @ 1,400 rpm (443 ft lb @ 1,400 rpm)
Fuel Consumption (Rated)	163 g/ps•h (5.75 oz/hp•h)

APPROXIMATE WEIGHT OF WORKLOAD MATERIALS

IMPORTANT

Weights are approximations of estimated average volume and mass. Exposure to rain, snow or ground water; settling or compaction due to overhead weight, chemical or industrial processing or changes due to thermal or chemical transformations could all increase the value of weights listed in the table.

MATERIAL	LOW WEIGHT OR DENSITY 1,100 KG/M ³ (1,850 LB/YD ³), OR LESS	MEDIUM WEIGHT OR DENSITY 1,600 KG/M ³ (2,700 LB/YD ³), OR LESS	HIGH WEIGHT OR DENSITY 2,000 KG/M ³ (3,370 LB/YD ³), OR LESS
Charcoal	401 kg/m ³ (695 lb/yd ³)	-----	-----
Coke, blast furnace size	433 kg/m ³ (729 lb/yd ³)	-----	-----
Coke, foundry size	449 kg/m ³ (756 lb/yd ³)	-----	-----
Coal, bituminous slack, piled	801 kg/m ³ (1,350 lb/yd ³)	-----	-----
Coal, bituminous r. of m., piled	881 kg/m ³ (1,485 lb/yd ³)	-----	-----
Coal, anthracite	897 kg/m ³ (1,512 lb/yd ³)	-----	-----
Clay, DRY, in broken lumps	1,009 kg/m ³ (1,701 lb/yd ³)	-----	-----
Clay, DAMP, natural bed	-----	1,746 kg/m ³ (2,943 lb/yd ³)	-----
Cement, Portland, DRY granular	-----	1,506 kg/m ³ (2,583 lb/yd ³)	-----
Cement, Portland, DRY clinkers	-----	1,362 kg/m ³ (2,295 lb/yd ³)	-----
Dolomite, crushed	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Earth, loamy, DRY, loose	-----	1,202 kg/m ³ (2,025 lb/yd ³)	-----

MATERIAL	LOW WEIGHT OR DENSITY 1,100 KG/M³ (1,850 LB/YD³), OR LESS	MEDIUM WEIGHT OR DENSITY 1,600 KG/M³ (2,700 LB/YD³), OR LESS	HIGH WEIGHT OR DENSITY 2,000 KG/M³ (3,370 LB/YD³), OR LESS
Earth, DRY, packed	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Earth, WET, muddy	-----	-----	1,762 kg/m ³ (2,970 lb/yd ³)
Gypsum, calcined, (heated, powder)	961 kg/m ³ (1,620 lb/yd ³)	-----	-----
Gypsum, crushed to 3 inch size	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Gravel, DRY, packed fragments	-----	-----	1,810 kg/m ³ (3,051 lb/yd ³)
Gravel, WET, packed fragments	-----	-----	1,922 kg/m ³ (3,240 lb/yd ³)
Limestone, graded above 2	-----	1,282 kg/m ³ (2,160 lb/yd ³)	-----
Limestone, graded 1-1/2 or 2	-----	1,362 kg/m ³ (2,295 lb/yd ³)	-----
Limestone, crushed	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Limestone, fine	-----	-----	1,602 kg/m ³ (2,705 lb/yd ³)
Phosphate, rock	-----	1,282 kg/m ³ (2,160 lb/yd ³)	-----
Salt	929 kg/m ³ (1,566 lb/yd ³)	-----	-----
Snow, light density	529 kg/m ³ (891 lb/yd ³)	-----	-----
Sand, DRY, loose	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Sand, WET, packed	-----	-----	1,922 kg/m ³ (3,240 lb/yd ³)

MATERIAL	LOW WEIGHT OR DENSITY 1,100 KG/M³ (1,850 LB/YD³), OR LESS	MEDIUM WEIGHT OR DENSITY 1,600 KG/M³ (2,700 LB/YD³), OR LESS	HIGH WEIGHT OR DENSITY 2,000 KG/M³ (3,370 LB/YD³), OR LESS
Shale, broken	-----	1,362 kg/m ³ (2,295 lb/yd ³)	-----
Sulphur, broken	529 kg/m ³ (1,620 lb/yd ³)	-----	-----

PERFORMANCE TESTS

1. Main Relief Pressure

normal operation: 330 kg/cm² (4,689 psi)

with "Pressure Up": 350 kg/cm² (4,970 psi)

2. Actuator Speeds

Operation		Unit	Standard Mode	Power Mode
Boom	Up	sec.	3.3 ±0.4	3.0 ±0.4
	Down	sec.	2.5 ±0.3	2.3 ±0.4
Arm	Dump	sec.	2.7 ±0.3	2.6 ±0.4
	Crowd	sec.	3.7 ±0.4	3.5 ±0.4
Bucket	Dump	sec.	2.4 ±0.3	2.3 ±0.4
	Crowd	sec.	3.9 ±0.4	3.6 ±0.4
Swing (3 Revolutions)		sec.	16.0 ±1.5	14.6 ±1.5
Jack-Up Speed (3 Turns)	High	sec.	19.5 ±1.5	18.0 ±0.7
	Low	sec.	35.0 ±2.0	33.0 ±1.2
Travel Speed 20 m (65.62 ft)	High	sec.	13.5 ±1.0	12.5 ±1.0
	Low	sec.	23.5 ±1.5	22.5 ±1.5
Travel Deviation 20 m (65.62 ft)		mm (in)	150 (6)	150 (6)

EXCAVATOR PERFORMANCE STANDARDS

Evaluation of equipment performance and operating condition can be made by running the excavator through a series of different tests, and recording results with a stop watch and tape measure.

Compare results of performance tests against the specifications and standards that follow, which are for equipment in new or renewed condition.

TEST CONDITIONS

1. All tests should be performed on a flat, level, firmly supporting ground surface.
2. All recommended, applicable maintenance and adjustment service should be completed prior to testing.
3. Hydraulic fluid and engine oil should be of appropriate viscosity for ambient weather conditions. Warm up hydraulic oil to standard operating temperature, between 45° - 55°C (112° - 135°F).
4. Run all tests with the engine speed control set to maximum RPM.
5. Repeat tests with Power Mode engine control settings at both Standard Mode (standard work mode) and Power Mode (high speed mode). Travel speed tests should also be repeated at both high and low speed.

TRAVEL SPEED AND TRAVEL MOTOR BALANCE (STEERING DEVIATION) TESTS

Speed Test

Prepare the excavator for travel speed tests by extending all hydraulic cylinders - boom, arm and bucket - to the fully extended position, shown in Figure 5.

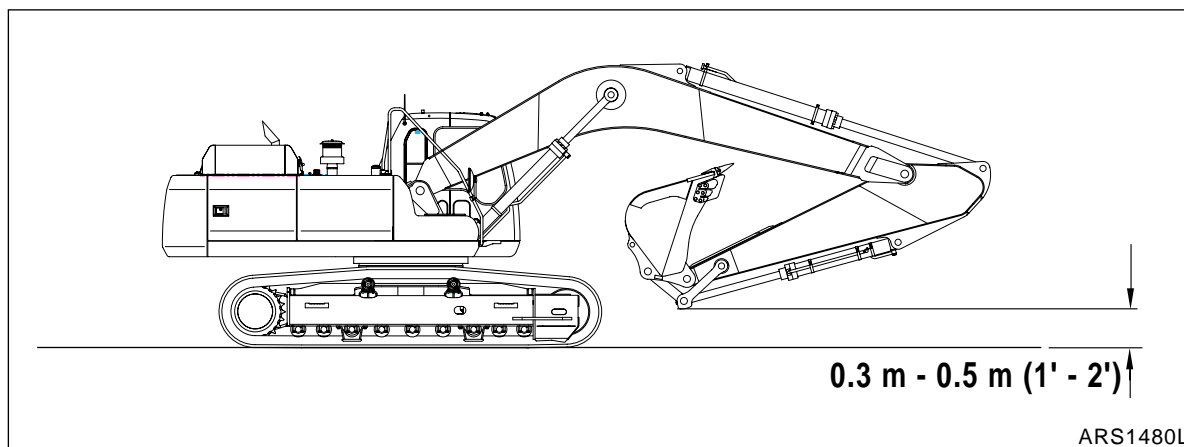


Figure 5

The lowest part of the bucket linkage should be 0.3 - 0.5 m (1' - 2') off the ground.

Mark off a 20 m (65' 7-1/2") test distance, with a 3 - 5 m (10' - 15') run-up area, and a 3 - 5 m (10' - 15', or longer) speed run-off distance.

Travel the excavator back and forth to be sure steering is centered and side frames are perfectly parallel with the test course.

Operate both travel levers at the fully engaged position and measure the time it takes to cross 20 m (65' 7-1/2"). Compare measured results against the standard for new machines:

RATE OF TRAVEL	TIME	
	STANDARD MODE	POWER MODE
High Speed	13.5 ±1.0 seconds	12.5 ±1.0 seconds
Low Speed	23.5 ±1.5 seconds	22.5 ±1.5 seconds

Rotate the turntable 180°. Both tests should be repeated three times. Average all results to obtain a final value.

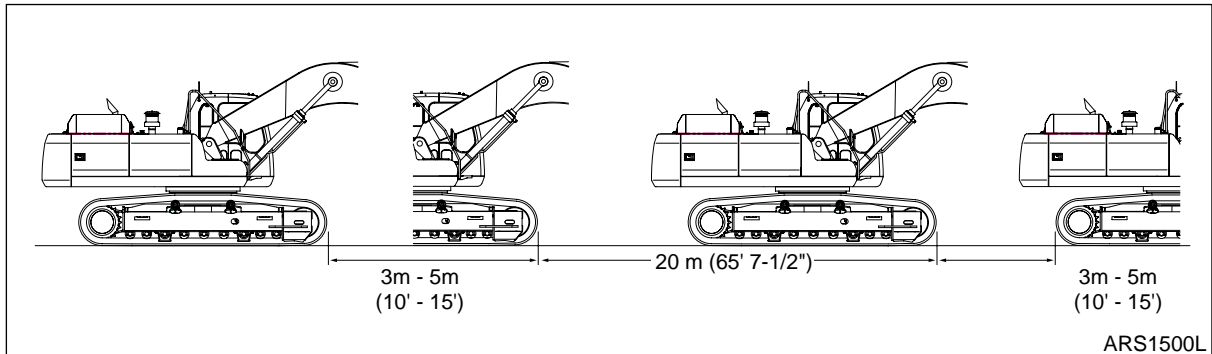


Figure 6

Travel Deviation

To check steering deviation (travel motor balance), use a long tape or rope, or the edge of an undeviating straight road curb or other marker to verify side-to-side travel motor uniformity.

Deviation distance should always be measured at the 20 m (65' 7-1/2") "finish line." Repeat the test in reverse to measure in both directions, with starting point becoming the finish line, and vice versa. (Figure 6)

A greater amount of deviation is allowed with the travel control set for high speed.

RATE OF TRAVEL	MAX. DISTANCE
High Speed	150 mm (6 in)
Low Speed	150 mm (6 in)

SWING SPEED AND DECELERATION FORCE TEST

Swing Speed Test

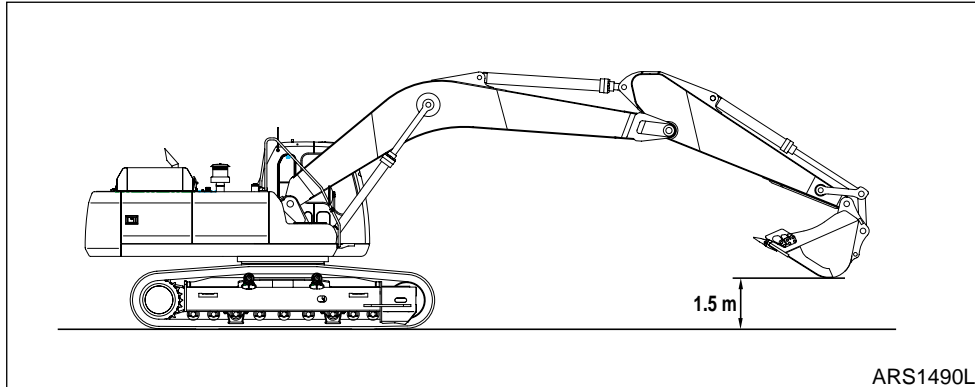


Figure 7

Extend the bucket cylinder completely and retract the arm cylinder, as shown in Figure 7, to test swing speed. The lowest point of the bucket will be approximately 1.5 m (3') off the ground.

Use paint marks at the same point on the turntable and undercarriage, or select alternate measuring locations and use a stopwatch to time 3 full 360° rotations. The time required for 3 revolutions should be between 14.5 and 17.5 seconds in Standard Mode, 13.0 and 16.0 seconds in Power Mode.

Swing Deceleration Force Test

With the boom, arm and bucket in the same position as for the swing speed test, rotate the turntable so that the boom is evenly centered between the side frames, pointing straight ahead. Locate the 90° reference point, perpendicular to the boom. Mark the turntable and undercarriage with paint at the 90° point.

Make several attempts to rotate the turntable exactly 90°, starting from the boom straight ahead position. Engage the swing lever and brake at the 90° point, shown as "swing stop" in Figure 8.

Record how far the turntable drifts past the stop point, measuring the distance between paint marks. Maximum distance should be less than 900 mm (35.43"), in both Power Mode and Standard Mode.

Reference Number	Description
1	Start Swing
2	90° Swing
3	Swing Force
4	Swing Stop

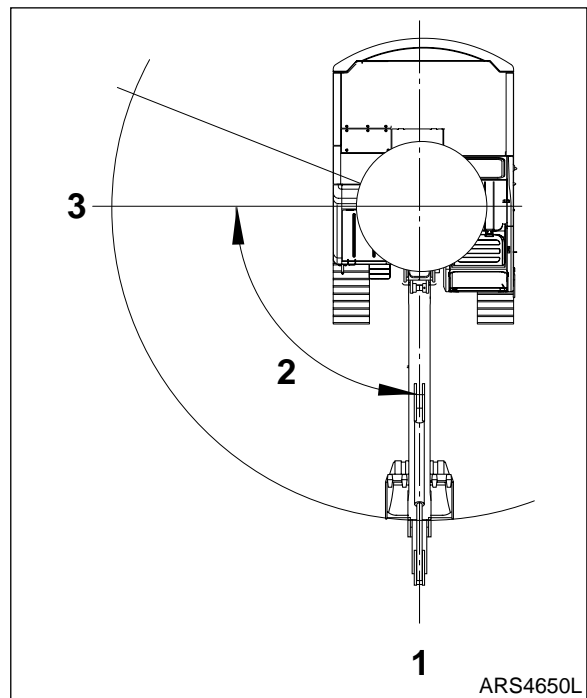


Figure 8

CYLINDER PERFORMANCE TESTS

NOTE: All tests are performed with standard boom, arm and bucket configuration. The bucket should be empty.

Boom Cylinders Test

The starting points for the test are with the boom and arm extended away from the excavator, and the bucket curled inward. The arm cylinder should be fully retracted; boom and bucket cylinders must be extended. Test movement in both directions, several times, and average results for both Standard Mode and Power Mode.

Arm Cylinder Test

Start with the boom up and the arm cylinder fully retracted. Test movement in both directions several times, between the "crowd" and "dump" positions, and average the results of both tests, in both standard and extra-duty power modes.

Bucket Cylinder Test

Start with the boom up and the teeth of the bucket hanging vertically, 500 mm (1-1/2' - 2') above the ground. Dump and crowd the bucket several times, and average results, for both standard and extra-duty power modes.

OPERATION	STANDARD MODE	POWER MODE
Boom Up	2.9 -3.7 seconds	2.6 - 3.4 seconds
Boom Down	2.2 - 2.8 seconds	1.9 - 2.7 seconds
Arm Dump	2.4 - 3.0 seconds	2.2 - 3.1 seconds
Arm Crowd	3.3 - 4.1 seconds	3.1 - 3.9 seconds
Bucket Dump	2.1 - 2.7 seconds	1.9 - 2.7 seconds
Bucket Crowd	3.5 - 4.3 seconds	3.2 - 4.0 seconds

Hydraulic Cylinder Natural Drop Test

To check boom and arm cylinder tightness against the specified performance standard for new cylinders, put a full load of dirt in the bucket and move the attachment cylinders so that the arm cylinder is extended 20 - 50 mm (1" - 2") and boom cylinders are retracted the same amount, 20 - 50 mm (1" - 2"). The top of the bucket should be approximately 2 m (6' - 7') off the ground.

Turn off the engine and measure cylinder drop after 5 minutes. Bucket cylinder should not show more than 40 mm (1.57") change, while the arm and boom cylinders should not fall more than 10 mm (0.39").

Travel Motor Jack-up Test

Test travel motor operation on each side by painting or chalking a mark on one crawler shoe, with a corresponding mark on the travel frame. Use the attachment to jack up one side of the machine and operate the raised travel motor. Record the number of seconds it takes the crawler shoe to make 3 full rotations, during both high speed and low speed operation.

OPERATION	STANDARD MODE	POWER MODE
High Speed	18.0 - 21.0 seconds	17.3 - 18.7 seconds
Low Speed	33.0 - 37.0 seconds	31.8 - 34.2 seconds

