

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL CRANE-SHOVEL,
BASIC UNIT, CRAWLER MOUNTED, 40 TON, 2 CU YD, DIESEL DRIVEN
(W/HARNISCHFEGGER ENGINE MODEL 687C-18-ES) (W/CATERPILLAR ENGINE
MODEL D333TA) (HARNISCHFEGGER MODEL 855BG-2) NON-WINTERIZED,
FSN 3810-542-3048 WINTERIZED, FSN 3810-542-3049 (HARNISCHFEGGER
MODEL 855BG-31 NON-WINTERIZED, FSN 3810-786-5200

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OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

**CRANE-SHOVEL, BASIC UNIT, CRAWLER MOUNTED, 40 TON,
2 CU YD, DIESEL DRIVEN (W/HARNISCHFEGER ENGINE
MODEL 687C-18-ES) (W/CATERPILLAR ENGINE MODEL
D333TA) (HARNISCHFEGER MODEL 855BG-2)
NON-WINTERIZED, FSN 3810-5423048
WINTERIZED, FSN 3810-5423049
(HARNISCHFEGER MODEL 855BG-3)
NON-WINTERIZED, FSN 3810-786-5200**

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CHAPTER 1 INTRODUCTION

Section I. GENERAL

1-1. Scope

a. These instructions are published for the use of personnel to whom the Crane-Shovel is issued. They provide information on the operation and organizational maintenance of the equipment. Also included are descriptions of main units and their functions in relationship to other components.

b. Numbers in parentheses following nomenclature callouts on illustrations indicate quantity. Numbers preceding nomenclature callouts indicate preferred maintenance sequence of removal or disassembly, and reassembly or installation should be performed in reverse order.

c. Report all Equipment Improvement Recommendations as prescribed in TM 38-750.

1-2. Forms and Records

a. DA Forms and records used for equipment maintenance will be only those prescribed in TM 38-750.

b. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to the Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSMEMPP, 4300 Goodfellow Boulevard, St. Louis Mo. 63120.

Section II. DESCRIPTION AND DATA

1-3. Description

a. General. The Harnischfeger Models 855BG-2 and 855BG3 Crane-Shovels are crawler mounted, two cubic yard, 40 ton capacity, diesel engine driven units. The booms are interchangeable, enabling conversion to shovel, crane, clamshell, dragline, backhoe, or piledriver operation.

b. *Revolving Frame.* The revolving frame (fig. 1-1) upon which are mounted the engine, upper machinery, and gantry, revolves around a center gudgeon and a live roller circle mounted on the crawler. It carries four hook rollers (two in front and two at rear), which ride on the underside of the roller path, and prevents tipping of the rotating base. A counterweight is fastened at rear of revolving frame. A gantry frame which contains gantry sheaves and harness is mounted on the revolving frame, along with a collapsible high gantry which is provided for use in crane, clamshell, dragline, or piledriver service.

c. Cab. The cab (fig. 1-1) completely encloses all machinery on the revolving frame. It consists of rigid steel frame work and panels. Several

hinged doors and sliding panels provide access for removal of engine or machinery. Framed glass windows in operator's compartment can be opened for ventilation or additional visibility. Hand levers and foot pedals in operator's compartment control all motions of revolving frame operating machinery (para 2-8), and are easily within reach of the operator from his adjustable seat.

d. *Crawler Mounting.* Crawler mounting (fig. 1-2) consists of two crawler tracks and the carbody. Each crawler track consists of forged steel side bars, (pinned together), with track shoes bolted on. Tracks are chain driven by the tread sprocket, and supported by a large idler roller and numerous track rollers. The carbody houses the propelling and steering mechanism.

e. *Engine.* The crane-shovel units are powered by six-cylinder diesel engines, which operates both deck machinery and crawlers, and are equipped with electrical starting motors. The engine may be either a Harnischfeger Model 687C-18-ES or a Caterpillar Model D333TA,

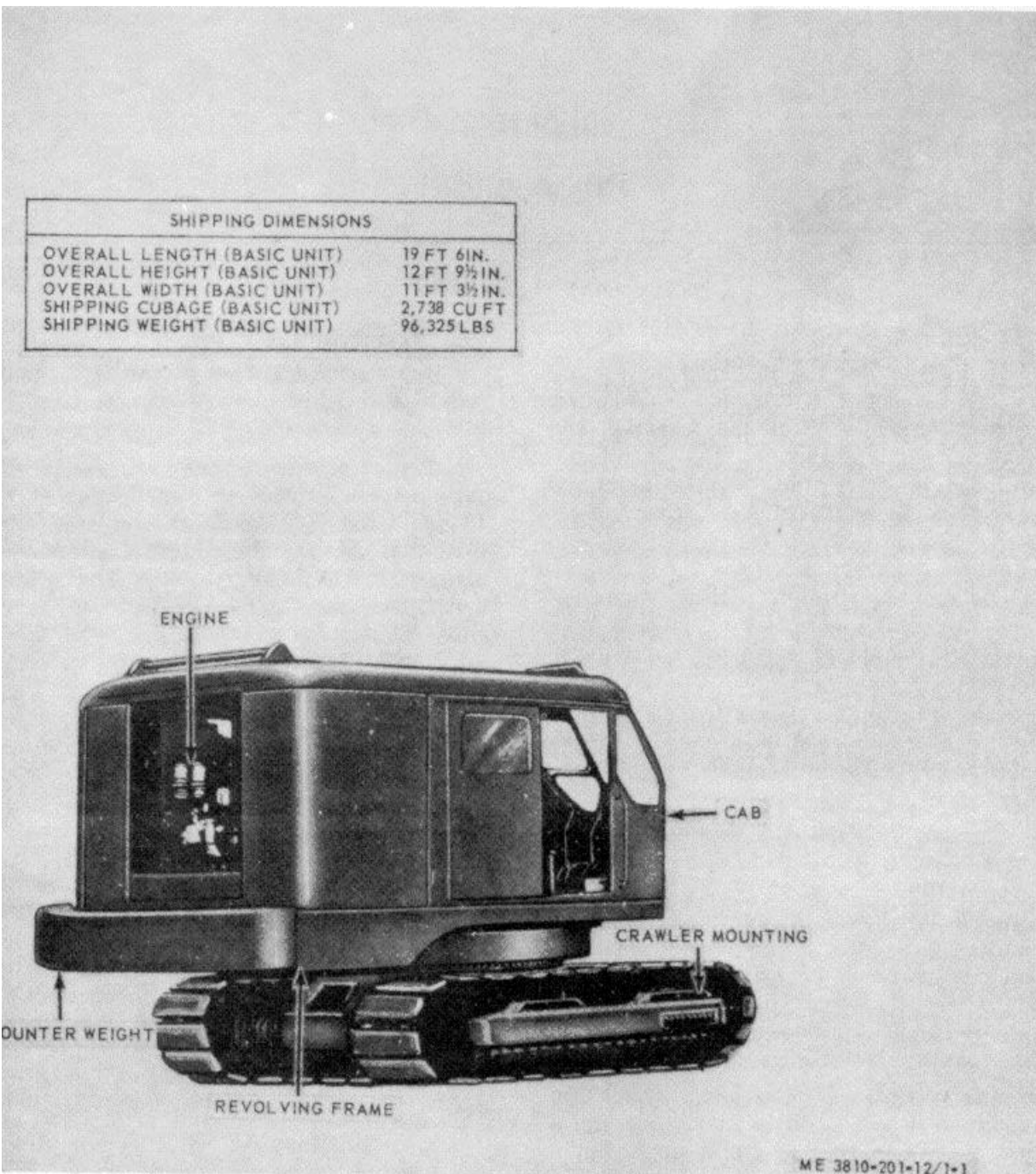


Figure 1-1. Crane-shovel basic unit, non-winterized, right $\frac{3}{4}$ rear view, and shipping dimensions.

therefore in this manual the component position on engine will be described in relation to radiator as front end, or flywheel as the rear end. As an example, on Model 687C-18-ES the starting motor is at rear on left side, the generator at front on 'right side. On Model D333TA, the alternator is at front on left side, and starting motor at rear on right side. The cylinders are numbered from front to rear.

f. *Winterization.* Winterized units are

equipped with three heaters (fig. 1-3) mounted on rear of cab, just above the counterweight. Tubing and ducts direct flow of heated air to operator's compartment and defrosters; engine, water and oil, and battery compartment. A separate fuel tank supplies fuel to these heaters.

1-4. Identification and Tabulated Data

a. *Identification.* The crane-shovel basic unit has eleven major identification plates which this

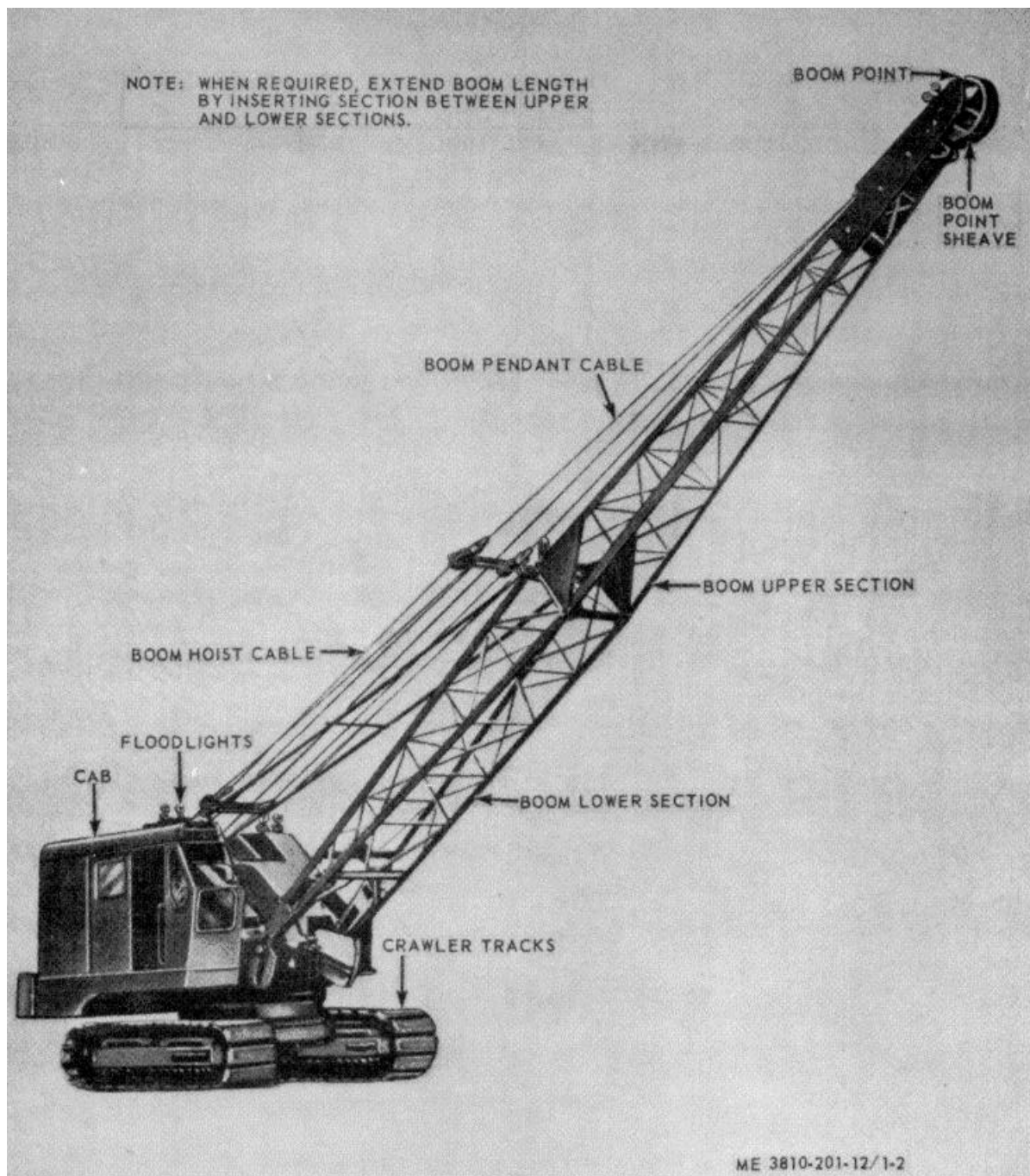


Figure 1-2. Crane-shovel basic unit, non winterized, with crane boom installed.

paragraph locates and described. Data contained on them is listed in b below.

(1) *Corps of Engineers identification plate.*

This plate is mounted at right of the transportation data plate ((11) below). It specifies the class, nomenclature, stock number, model number, manufacturer's name, and serial number.

(1) *Manufacturer's identification plate.* This plate is mounted on right front of operator compartment directly below the front window. It

gives the manufacturer's name and the unit serial number.

(3) *Engine identification plate.*

(a) The model 687C18-ES engine identification plate is mounted on upper left side of flywheel housing and gives the manufacturer's name, model number, engine number, bore stroke, horsepower revolutions per minute, and firing order.

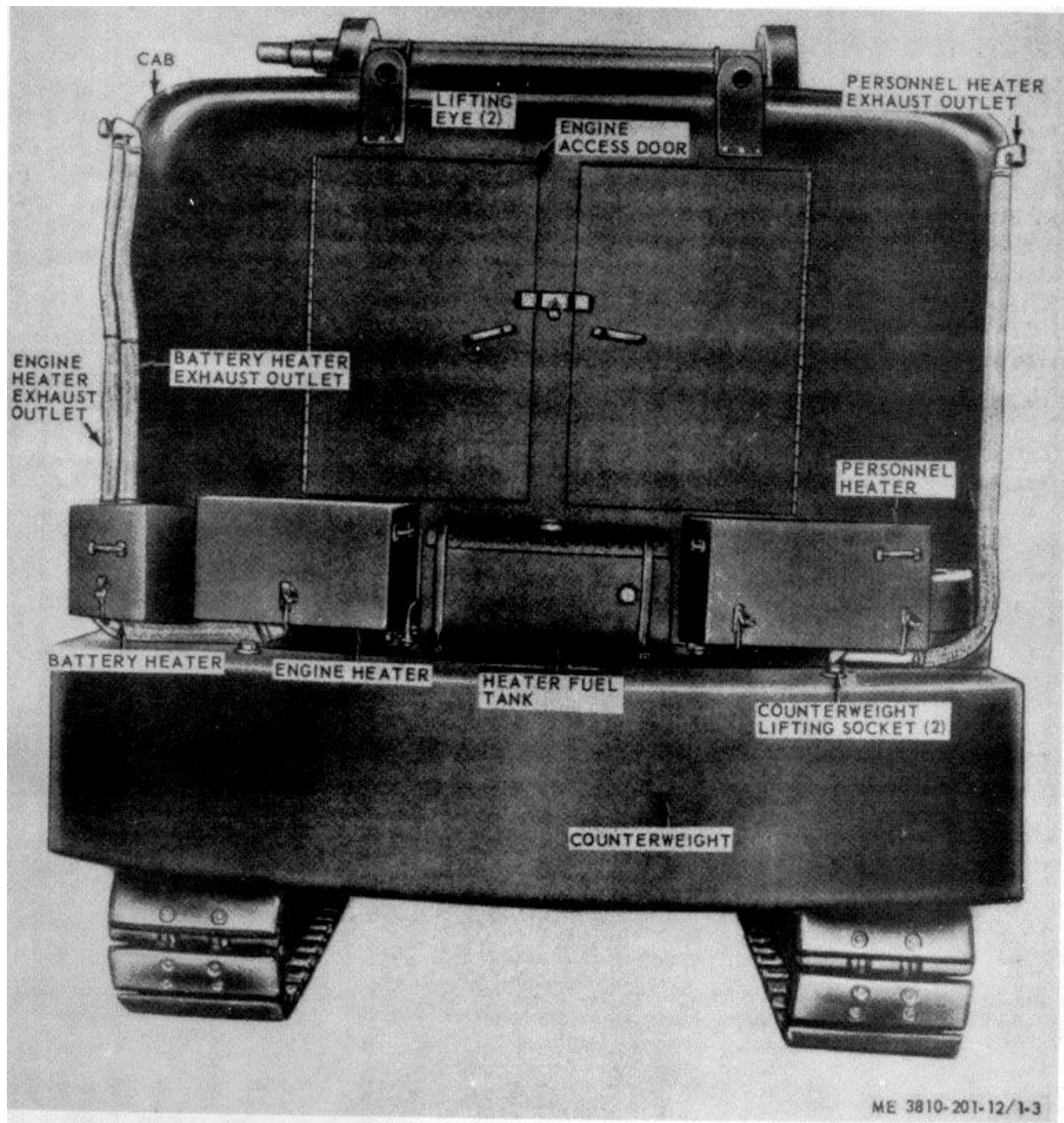


Figure 1-3. Crane-shovel basic unit, winterized, rear view.

(b) The model D333TA engine identification plate is mounted on left hand side of No. 6 cylinder wall and gives manufacturer's name and engine serial number.

(4) *Engine specification plate.*

(a) The model 687C-18-ES engine specification plate is mounted on right side of valve cover, and gives engine model number, number of cylinders, displacement in cubic inches, valve lash, type of fuel, injection pump timing, and cooling system capacities.

(b) The model D333TA engine specification plate is mounted on fuel filter and gives model number, number of cylinders, bore, stroke, high idle engine rpm, full head engine rpm, rack setting, hp rating at sea level, and warning of turbocharger setting and altitude above sea level.

(5) *Rated load capacity identification plate.* This plate is mounted inside operator's compartment and is located on panel to right of cab door. It specifies operating radius, angles, boom lengths, and lifting capacity in pounds.

(6) *Loading identification plate.* This plate is

located on right front side of revolving frame cab. It specifies position of slings for loading.

(7) *Heater operating instruction plate.* This plate is on all winterized models, located on inside of door to operator's compartment below the door glass. It provides operation instructions and location of all heaters.

(8) *Personnel heater identification plate (model E-510).* This plate is mounted on inside of heater compartment door. Heater compartment is at right rear of cab, just above counterweight. It gives manufacturers name, model number, volts, and output capacity in BTU's.

(9) *Engine heater identification plate (model E-511).* This plate is located inside door of heater compartment. Heater compartment is just to left of heater fuel tank at rear of cab, above counterweight. It gives the manufacturer's name, model number, volts, and output capacity in BTU's.

(10) *Battery heater identification plate (model MH15-B2).* This plate is located on top of battery heater, which is in compartment at left rear of cab just above counterweight. It gives manufacturer's name, model number, volts, and output capacity in BTU's.

(11) *Transportation data plate.* This plate is located directly below the loading identification plate ((6) above.) It specifies dimensions, cubage, tonnage, height, length, and weights of the crane-shovel unit.

b. *Tabulated Data.*

(1) *General.*

(a) *Crane-shovel basic unit, model 855BG-2.*

ManufacturerHarnischfeger Corp.
Model855BG-2
Designed for use asBackhoe, clamshell, crane,
dragline, piledriver, and
shovel

(b) *Crane-shovel basic unit, model 855BG-3.*

ManufacturerHarnischfeger Corp.
Model855BG-3
Designed for use asBackhoe, clamshell, crane,
dragline, piledriver, and
shovel

(2) *Engines.*

(a) *Model 687C-18-ES,.*

ManufacturerP & H Diesel Division,
Harnischfer Corp.
Model687C-18-ES
Cycle2
Compression ratio.....16 to 1
Displacement.....522 cu in. (cubic inches)
Number of cylinders.....6
CoolingLiquid
Horsepower190 HP (horsepower) at
1,700 rpm (revolutions per
minute)

Idle speed500 rpm
Rotation at flywheel endCounterclockwise
Fire order1-6-2-4-3-5
Governed full load speed1,800 rpm
Weight1,900 lbs (pounds)

(b) *Model D33STA.*

ManufacturerCaterpillar Corp.
ModelD333TA
Bore4.5 in. (inch)
Stroke.....5.5 in.
Number of cylinders.....6
Displacement.....522 cu in.
Horsepower (HP)190 HP without fan
Idle speed600 rpm
Governed full load speed2,000 rpm

(3) *Dimensions and weights.*

(a) *Overall length.*

(Less boom)19 ft 6 in.
(With 60 ft crane boom)67 ft 5 in.
(With 50 ft crane boom and
15 ft jib).....80 ft 4% in.
(With 50 ft dragline boom)67 ft 5 in.
(With 50 ft clamshell
boom)67 ft 5 in.
(With 24 ft shovel boom).....47 ft 7 in.
(With 23 ft backhoe boom).....41 ft 1 in.

(b) *Overall width.*

(27 ½ in. shoes).....11 ft 8% in.

(c) *Overall height.*

(Less boom and gantry)12 ft 9 ½ in.
(With 23 ft backhoe boom).....21 ft

(d) *Shipping cubage.*

(Basic unit)2,738 cu ft
With 50 ft boom).....9,675 cu ft
(With 50 ft boom and 15 ft
jib)11,600 cu ft
(With 50 ft dragline boom)9,675 cu ft
(With 50 ft clamshell boom)9,675 cu ft
(With 24 ft shovel boom).....6,775 cu ft
(With 23 ft backhoe boom).....9,725 cu ft

(e) *Operating weights (approximate).*

(Basic unit)101,025 lbs
(Backhoe)119,290 lbs
(Crane)106,400 lbs
(Shovel).....118,600 lbs
(Clamshell)107,000 lbs
(Dragline)107,500 lbs
(Piledriver).....118,600 lbs

(f) *Heater dimensions.*

Battery heater:
Width.....6 ½ in.
Length13 1/16 in.
Height.....10 in.
Personnel heater:
Width.....8 ½ in.
Length25 ¼ in.
Height.....12 ½ in.
Engine heater:
Width.....8 ½ in.
Length23 ½ in.
Height.....12 ½ in.