Attachment 2

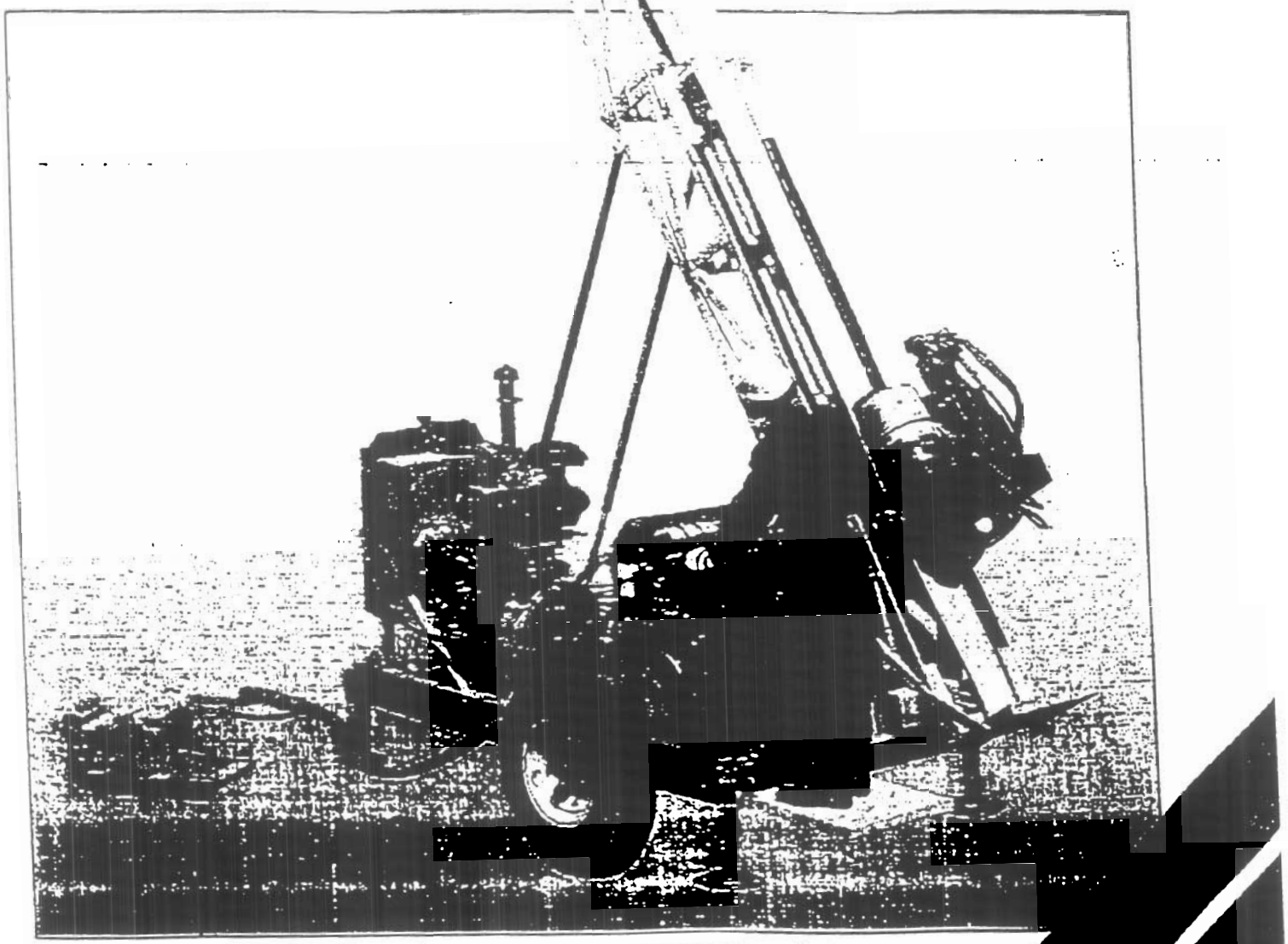
nwb2k1k

LONGYEAR

LF 70

Diamond Core Drill System

Designed to be a Portable, Practical and Powerful Surface Drilling System



All photographs are representations only and actual equipment should be verified with your Boart Longyear representative.

LONGYEAR

LF 70

Ideal for projects with demanding site access

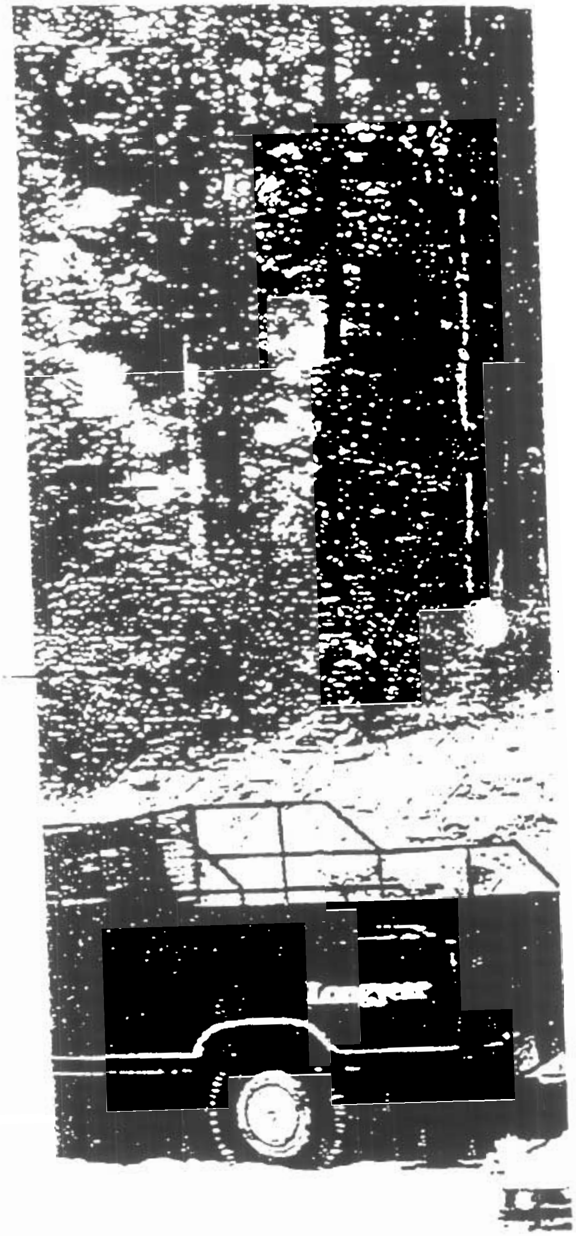
2 **Mobility. Reduced downtime between site moves and less environmental disruption. The modular LF 70 has been designed from the ground up as a compact, powerful, portable, light weight diamond core drill.**

The philosophy behind the LF 70 is a modular concept. Seven sub assemblies integrate to form a highly productive compact diamond core drill.

Modular Design

Expensive downtime is minimized when rigging the LF 70. In fact, it takes less than one hour to pull the rig down and the same amount of time to reassemble the machine if your next site dictates modular access. This impressive feature ensures the LF 70 is rapidly returned to making hole.

All components, such as hydraulic hose, fuel lines, battery connections, etc., feature quick disconnect couplings. These connections cannot be mismatched due to size and routing variances.



Light Weight

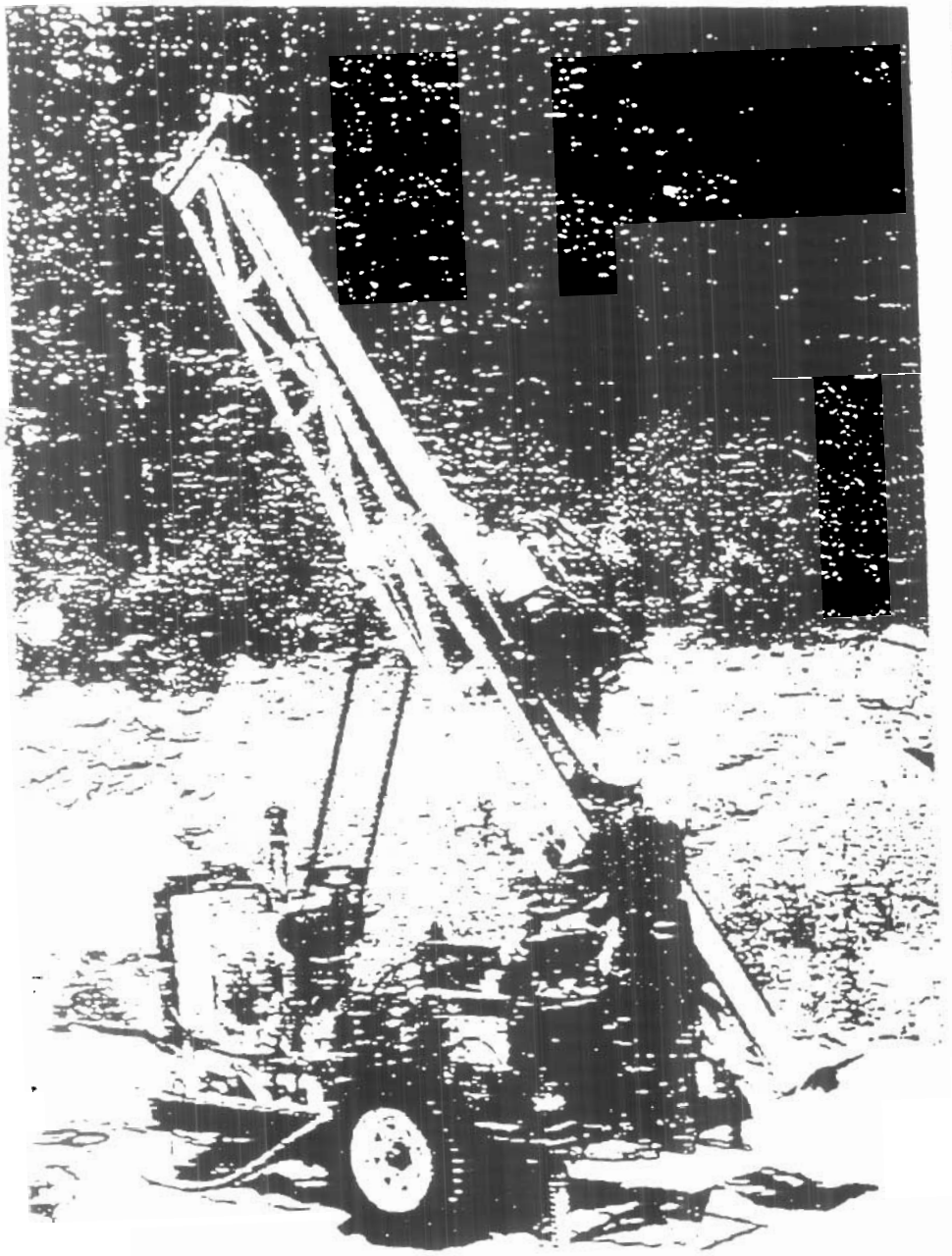
Weight and physical dimensions are major considerations on any drilling program. With its modular design, compact size and light weight rugged performance, the LF 70 gives you the versatility to undertake a broader range of projects other than conventional exploration.

The LF 70 is ideal for drilling in confined or awkward locations, helicopter transport, barge work, civil engineering assignments and dam site projects.

The features of the LF 70 will have the machine drilling while the others are still moving in, saving valuable time and money for both the operator and client.

All photog[illegible]

Conventional exploration — Boart Longyear LF 70



Simplified Maintenance

Because of its modular design and reduced bulk, access to all components is excellent. The highly efficient hydraulic system utilizes quality piston pumps and motors for maximum power transmission and component life.

Easy to Operate

Familiarization with the LF 70 is rapid. Clearly labelled levers control the functions while gauges for bit weight, system pressure (torque) and fluid pump pressure alert the driller to what is happening down the hole. Each drill is also supplied with a detailed Operations and Service Manual.

Quality and Support

Boart Longyear has been supplying high performance, quality products to the exploration and mining industry for over 100 years.

Technical support is available to assist with the commissioning of new drills, training of operators and service personnel, supply of genuine spare parts and to demonstrate how to achieve the maximum performance from Boart Longyear products.

LF 70

Powerful, Portable, Light Weight and

Dependable, consistent productivity is achieved through the use of an efficient hydraulic system which delivers maximum power to the bit.

Penetration rates and bit life are optimized through the precise control the operator has over rpm, torque, and bit weight.

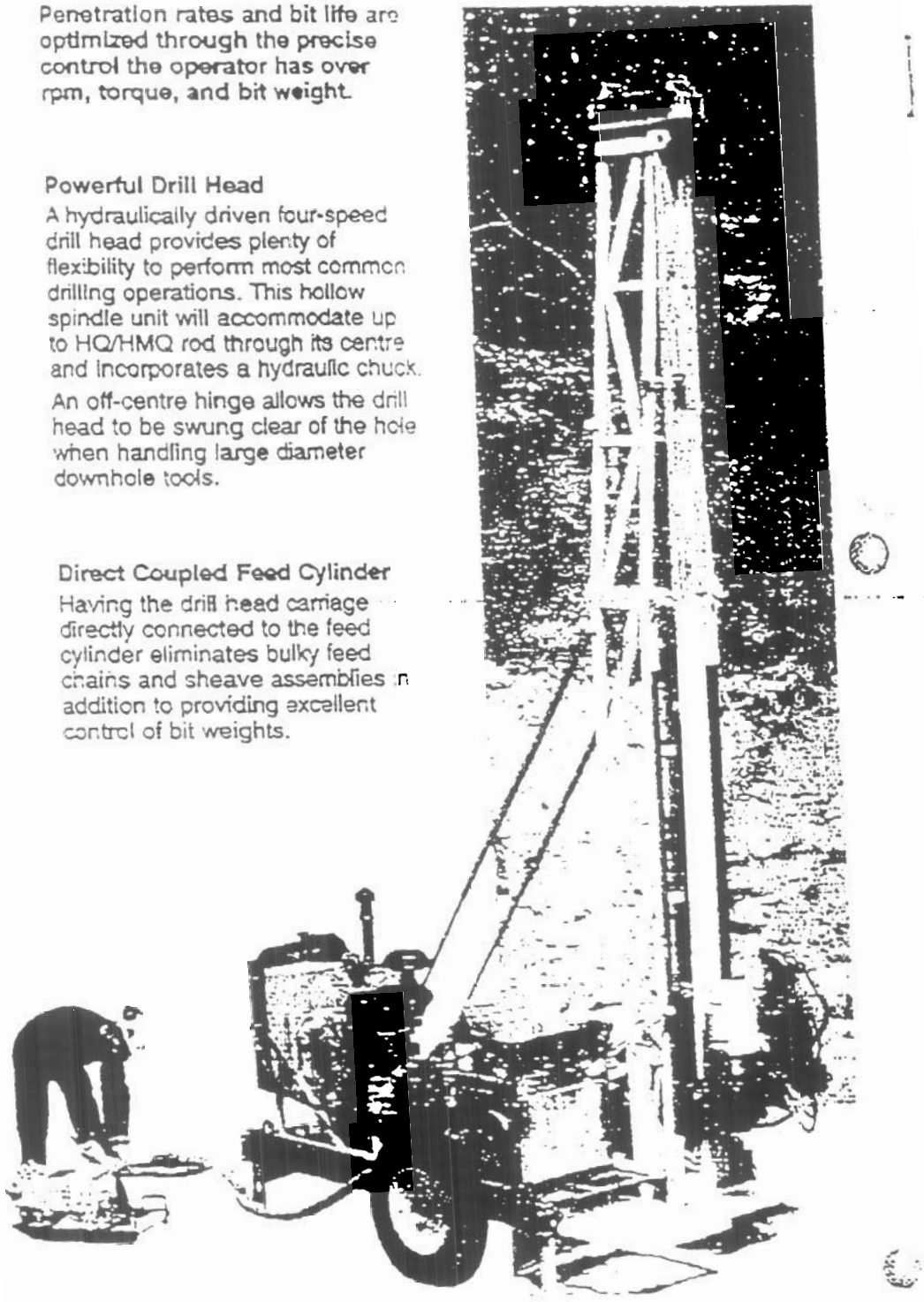
Powerful Drill Head

A hydraulically driven four-speed drill head provides plenty of flexibility to perform most common drilling operations. This hollow spindle unit will accommodate up to HQ/HMQ rod through its centre and incorporates a hydraulic chuck.

An off-centre hinge allows the drill head to be swung clear of the hole when handling large diameter downhole tools.

Direct Coupled Feed Cylinder

Having the drill head carriage directly connected to the feed cylinder eliminates bulky feed chains and sheave assemblies in addition to providing excellent control of bit weights.

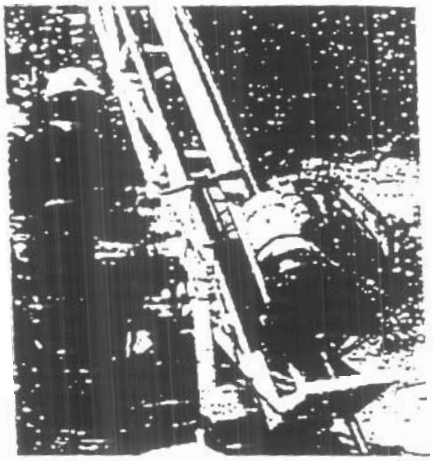


All photographs are [illegible] and actual equipment

mpact — Boart Longyear LF 70

Rod Handling

Tripping rods is fast and simple. The head is run to the base of the mast to act as a rod clamp when hoisting and lowering rods. A support bracket positions the pipe wrench which is backed up against the mast. The rod joint, now centered between the wrench and the chuck, is broken by the drill head when forward rotation is initiated. A simple yoked rod guide which is positioned in the mast (and operated from the driller's platform) centers the joint when adding or removing rods, thus reducing the amount of time and effort when making or breaking the string.



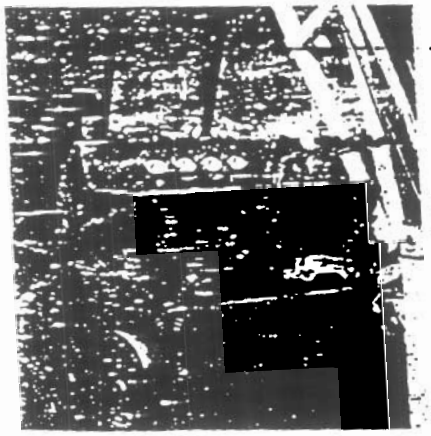
Hydraulic Module

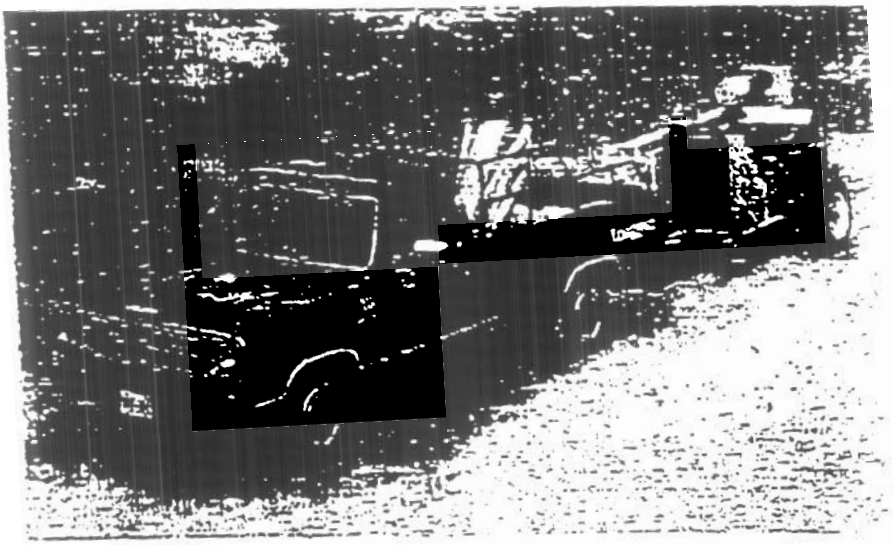
This self contained module does not require any disassembly other than separation from the power unit flywheel adapter plate, and quick disconnect couplings when it is time to dismantle the drill.

Powerful piston pumps and motors deliver maximum efficiency for the highest production. A separate auxiliary hydraulic circuit for a fluid pump is an option that is necessary when a water pump is ordered.

Rugged Light Weight Mast

The drill mast comes in three separate sections which allows for a 20 ft (6 m) rod pull above the head. Should the driller choose to work with 10 ft (3 m) rods, the centre section is removed. To ensure integrity and strength, critical sections of the mast are stress relieved after fabrication.





Options and Accessories

- ☐ Hydraulic Powered Fluid Pump
- ☐ Hydraulic Powered Mud Mixer
- ☐ Hydraulic Powered Cathead
- ☐ Detachable Mud Tanks
- ☐ Towing Group
- ☐ Power Unit Group (6 cylinder) for high altitudes
- ☐ Hydraulic Rod Clamp for PQ-HQ Casing

should be verified with your Boart Longyear representative.

LONGYEAR

LF 70

Modular Simplicity, Proven

Productivity through practicality is what the LF 70 delivers. Only three different bolt sizes are used to rig up or tear down the seven modules. You will be amazed at how easy the LF 70 comes together.

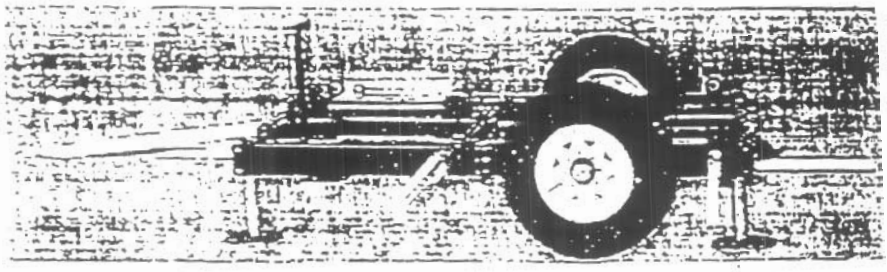
A first class finish is immediately obvious on the LF 70. Sliding bare metal components are anodized while the rest of the drill is finished in a high quality enamel with contrasting colors to identify mounting parts.

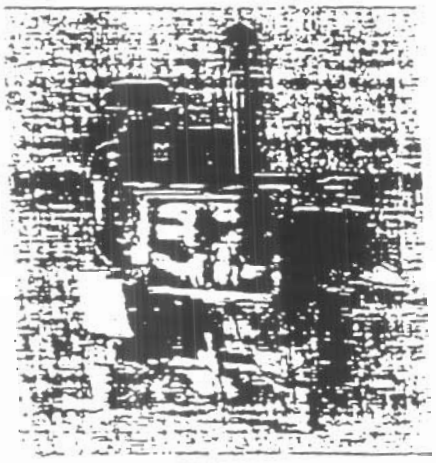
Drill Base

The flat upper surface allows all deck components to be easily slid into position when assembling the drill after a modular move. Both the aluminum diesel fuel tank and battery box feature quick disconnect couplings.

Draw Works Module

This module contains the main line hoist and wireline hoist which are positioned in the lower substructure and pivots the mast. Both feature independent hydraulic power and clutch protection. The main line hoist also comes equipped with a spring applied hydraulically released brake.





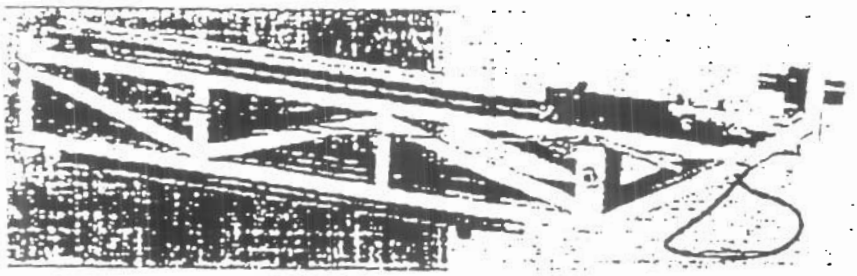
Diesel Engine Module

The standard power unit is a four cylinder turbocharged and after-cooled Deutz diesel. An optional power unit group for high altitudes is also available.

Hydraulic Module

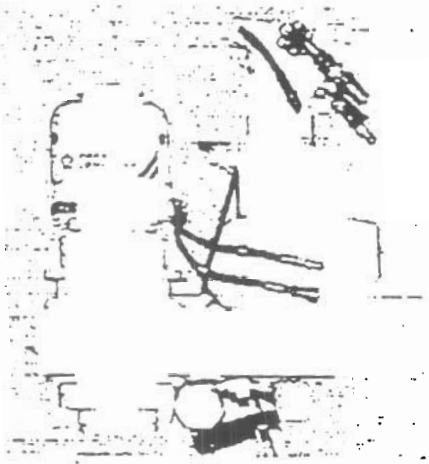
This unit contains the hydraulic pumps, valves, filters, oil reservoir and control console. A flywheel adapter plate facilitates rapid separation from the diesel engine.

All photographs are representational only and actual equipment



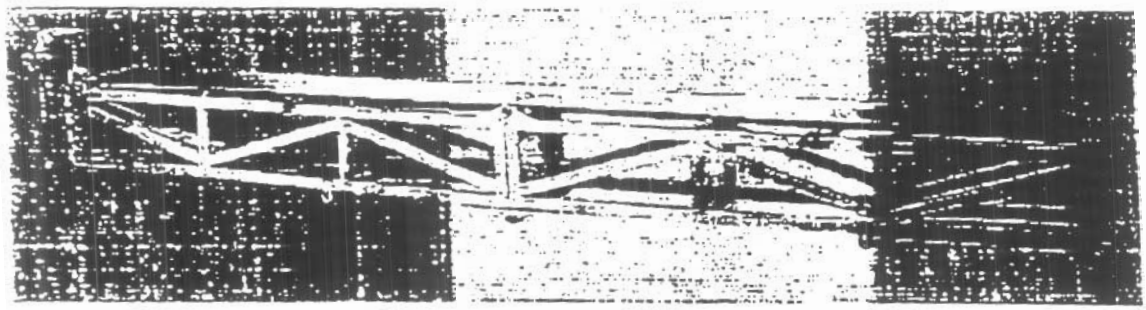
Lower Mast Section

This section pivots in the draw works substructure base to achieve the desired drilling angle and contains the feed cylinder which is directly coupled to the drill head carriage. The carriage features replaceable wear-guides which slide on precision machined surfaces on the mast face.



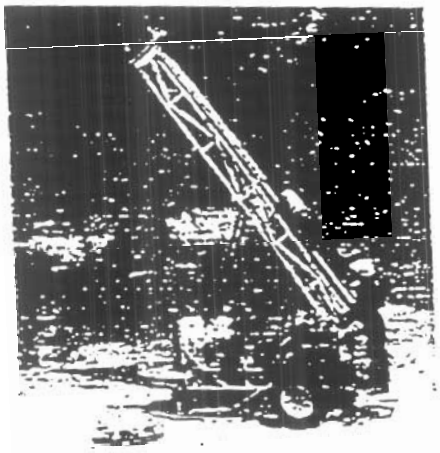
Drill Head

A variable displacement hydraulic motor driving a robust four-speed mechanical transmission is featured. A hydraulic chuck transfers the drill head output power to the rod string. Bearing life is extended by force fed, filtered lubricating oil.



Middle and Upper Mast Section

The middle mast section is added when operating with 20 ft (6 m) drill rod pulls. The upper mast section, housing the sheave block assembly, main line hoist and wireline hoist sheave wheels, is remotely located from the operator's platform.



Because of our commitment to constant innovation, Boart Longyear reserves the right to change specifications, price or published information at anytime, without notice.

For complete specifications please refer to the LF 70 Tech Data sheets or contact your Boart Longyear representative.

Options can be verified with your Boart Longyear representative.

LF70 Diamond Core Drill System

DRILLING DEPTH GUIDELINES

The figures in these tables have been calculated, based on field experiences, and may be reasonably expected.
Actual drilling capacity will depend on in-hole tools and conditions, drilling techniques and equipment used.

These variable factors will cause changes to depth obtained.
No claim is made for products listed that are not produced by Boart Longyear Inc. to perform at these depths.

	U.S. CUSTOMARY SYSTEM	METRIC SYSTEM
	Hole Depth (feet)	Hole Depth (metres)
CORING SYSTEM		
AQ	3,200	975
AQTK	4,100	1 250
BQ	2,500	760
BQTK	3,100	945
NQ	1,925	585
HQ	1,300	395

NOTE: Ratings are based on a vertical dry hole while using a KPL-12 hoist.

PRIME MOVER		
Standard Unit	Deutz BF4L913, 4 cylinder, air cooled, turbocharged diesel engine.	
Displacement	249 cubic inch	4,08 L
Net Power (intermittent)	106 hp	79 kW
Continuous Output	87 hp	65 kW
Max Rated RPM	2,500 rpm	

Optional Unit (for altitude ASL)	Deutz BF6L913, 6 cylinder, air cooled, turbocharged diesel engine.	
Displacement	374 cubic inch	6,13 L
Net Power (intermittent)	160 hp	119 kW
Continuous Output	132 hp	99 kW
Max Rated RPM	2,500 rpm	

LF70 Diamond Core Drill System

	U.S. CUSTOMARY SYSTEM	METRIC SYSTEM
HYDRAULIC SYSTEM		
Primary Pump	Eaton axial piston, variable displacement, pressure compensated with low pressure standby.	
Max Flow	43 Gpm	163 Lpm
Maximum Pressure (As used on LF 70)	3,500 psi	24,1 MPa
Secondary Pump	Eaton axial piston, variable displacement, pressure compensated.	
Max Flow	11 Gpm	41,6 Lpm
Maximum Pressure (As used on LF 70)	2,000 psi	13,8 MPa
Auxiliary Pump	Eaton axial piston, hydrostatic drive with manual swash plate control.	
Max Flow	10 Gpm	38 Lpm
Maximum Pressure (As used on LF 70)	2,000 psi	14 MPa
DRILL HEAD		
Hollow Spindle - Max. O.D. rod	3 3/4 in	95,2 mm
Rotation Motor	Rexroth bent axis, variable displacement piston motor with hydraulic swash plate control.	
Mechanical Transmission	Funk 4 speed	
Ratios	1st 6.63:1	
	2nd 3.17:1	
	3rd 1.72:1	
	4th 1.00:1	
Final Drive	Morse high velocity chain and gear drive.	
Ratio	2.478:1	
Hydraulic Auto Chuck	Hydraulically opened, spring closed.	

TORQUE AND RPM RATINGS	Rpm	Torque lbft	Nm
(Hydraulic motor at minimum displacement, prime mover at 2200 rpm)			
1st Gear	190	1,700	2 305
2nd Gear	400	800	1 085
3rd Gear	730	450	610
4th Gear	1,250	250	340

LF70 Diamond Core Drill System

	U.S. CUSTOMARY SYSTEM	METRIC SYSTEM
TORQUE AND RPM RATINGS	Rpm	Torque lbft	Nm
(Hydraulic motor at maximum displacement, prime mover at 2200 rpm))			
1st Gear	95	3,400	4 610
2nd Gear	200	1,600	2 170
3rd Gear	370	700	950
4th Gear	630	500	680

Drill Head Lubrication	Force fed bearings, oil bath for high velocity chain.
Drill Head Lubricating Oil Filtration	10 Micron spin on type oil filter.

DRILL MAST					
Lower Section	Feed Stroke	72	in	1 830	mm
	Length	126.5	in	3 213	mm
Middle Section					
	Length	129.3	in	3 284	mm
Upper Section					
	Length	106.5	in	2 705	mm

DRAW WORKS				
Main Line Hoist (KPL12)				
Hook Load (single part line)				
	Bare Drum	12,000	lbf	5 450 kg
	Full Drum	8,200	lbf	3 720 kg
Hoisting Speed (single part line)				
	Bare Drum	193	ft/min	59 m/min
	Full Drum	261	ft/min	80 m/min
Cable Capacity (maximum)		220	ft of 5/8" cable	67 m of 16 mm cable

NOTE: Do not use multiple part lines with the 12,000 lb hoist, use single part line ONLY.

LF70 Diamond Core Drill System

		U.S. CUSTOMARY SYSTEM		METRIC SYSTEM	
Wireline Hoist					
Line Pull	Bare Drum	2,190	lbf	990	kg
	Full Drum	502	lbf	277	kg
Line Speed	Bare Drum	337	ft/min.	100	m/min.
	Full Drum	1,470	ft/min.	443	m/min.
Cable Capacity		5,800	ft of 3/16" cable	1 768	m of 5 mm cable
		3,000	ft of 1/4" cable	915	m of 6 mm cable
FEED CYLINDER					
Thrust Capacity	@ 1500 psi	6,994	lbf	3 172	kg
	@ 2000 psi	9,326	lbf	4 231	kg
	@ 2500 psi	11,657	lbf	5 288	kg
Pull Capacity	@ 1500 psi	10,602	lbf	4 808	kg
	@ 2000 psi	14,137	lbf	6 414	kg
	@ 2500 psi	17,671	lbf	8 017	kg

LF70 Diamond Core Drill System

DIMENSIONS AND WEIGHTS *

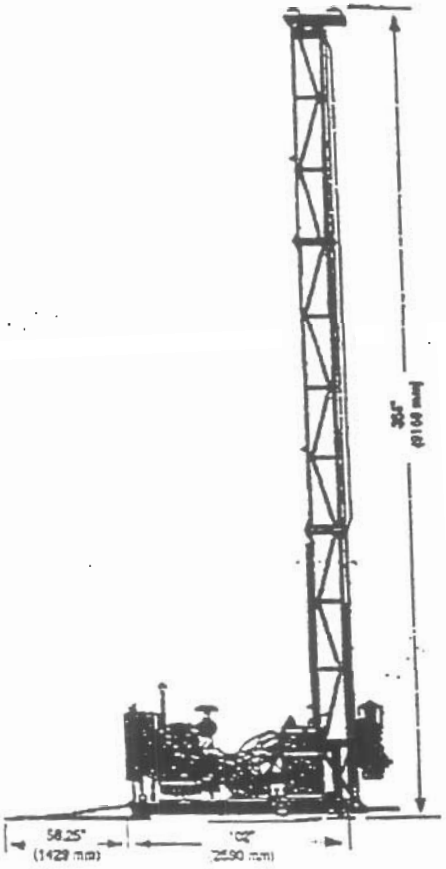
Side view of drill with mast in vertical position

Dimensions: Deduct 127.4" (3 235 mm) if Middle Mast section is removed

Note: Base dimensions are with mechanical stabilizer legs at the uppermost position. Overall height can be increased by 9-3/4" (24.7 cm) by adjusting legs downwards.

Wet Weight : 6,500 lb (2 948 kg)

Consists of: Deutz BF4L 913 Power Unit Grp.
Hydraulic Module
Draw Works Grp. c/w Cable
Lower Mast Assembly
Middle and Upper Mast Assembly
Rotational Unit Grp. c/w Auto Chuck
Base Frame Bare
Fuel Tank (Wet)
Battery
Stabilizer Legs (25 ea. x 4)
Operator Platform

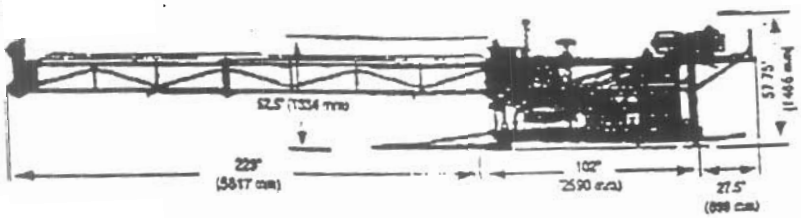


Side view of drill with mast in horizontal position

Dimensions: Deduct 127.4" (3 235 mm) from overhang if Middle Mast section is removed

Wet Weight: 6,500 lb (2 948 kg)

NOTE: Base dimensions are with mechanical stabilizer legs at the uppermost position. Overall height can be increased by 9-3/4" (24.7 cm) by adjusting legs downwards.



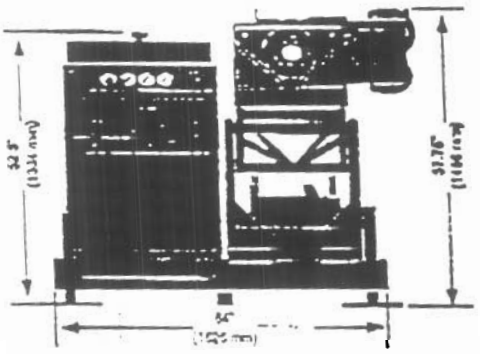
* Dimension and weights are nominal and Should be checked before crating or lifting. Conversion factors have been used to convert from Imperial to Metric measures.

LF70 Diamond Core Drill System

DIMENSIONS AND WEIGHTS *

Rear End View of Drill
(Includes all mast sections)

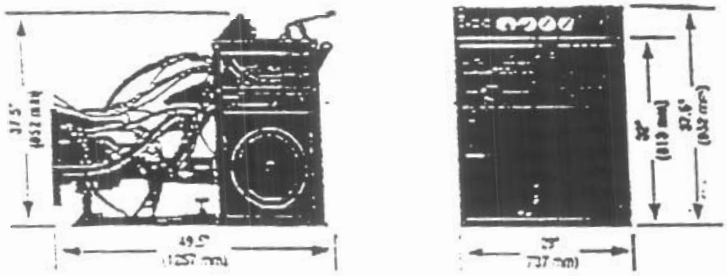
Wet Weight: 6,500 lb (2 948 kg)



NOTE: Base dimensions are with mechanical stabilizer legs at the uppermost position. Overall height can be increased by 9-3/4" (24,7 cm) by adjusting legs downwards.

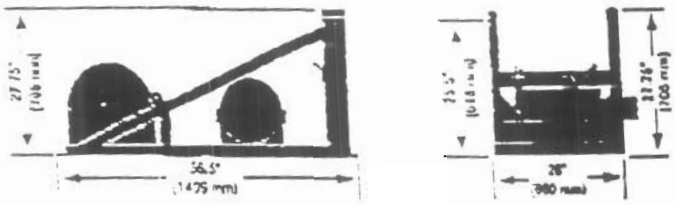
Hydraulic Module

Wet Weight: 920 lb (417 kg)



Draw Works Module (KPL12)

Weight: 795 lb (360 kg)
Without cable



Cable Weights

Main Line Hoist Cable

5/8" (15,9 mm) dia. x 75 ft (22,9 m) long, single part line - 58 lb (26 kg)

Wireline Hoist Cable

3/16" (4,8 mm) dia. x 4,200 ft (1 280 m) long - 260 lb (118 kg)

1/4" (6,35 mm) dia. x 2,300 ft (701 m) long - 244 lbs (111 kg)

(Lengths above do not represent the max. rated drum capacity, they are typical values only.

* Dimension and weights are nominal and should be checked before crating or lifting. Conversion factors have been used to convert from Imperial to Metric measures.

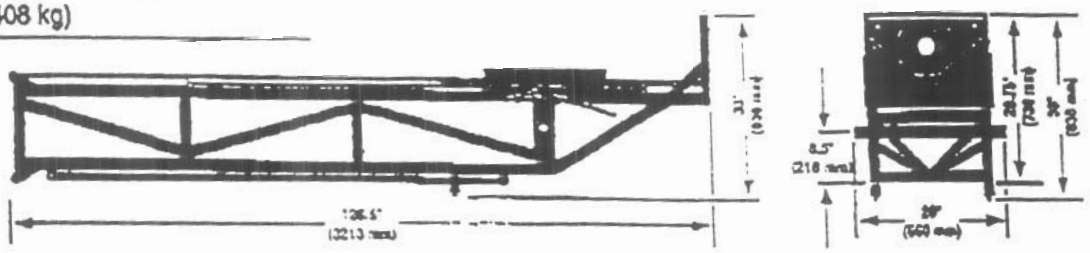
TECH DATA

LF70 Diamond Core Drill System

DIMENSIONS AND WEIGHTS *

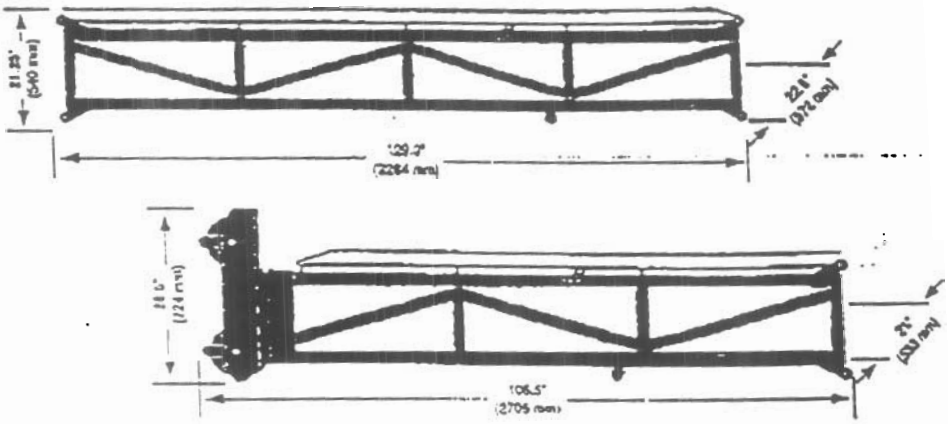
Lower Mast Section

Weight: 900 lb (408 kg)

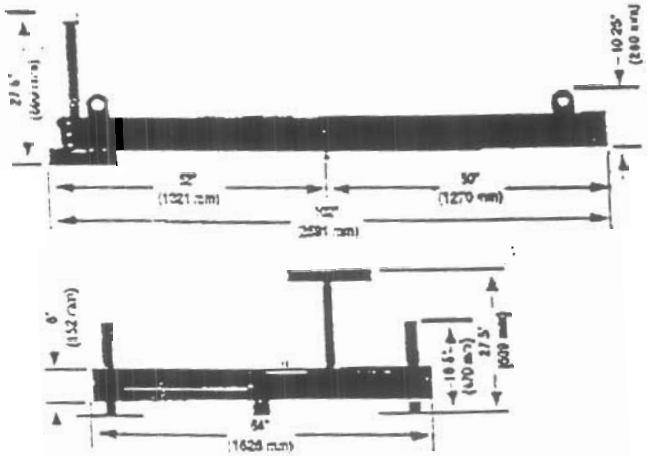


Middle and Upper Mast Sections

Combined Weight: 692 lb (313 kg)



Drill Base (bare)	630 lb	(286 kg)
Wheel and Stub Axle (each)	112 lb	(51 kg)
Towing Hitch	55 lb	(25 kg)
Fuel Tank (wet)	125 lb	(57 kg)
Battery Box (inlcuding battery)	134 lb	(61 kg)
Mud Tank Outriggers (each)	26 lb	(12 kg)
Stabilizer Legs (each)	25 lb	(11 kg)
Operator Platform	26 lb	(12 kg)



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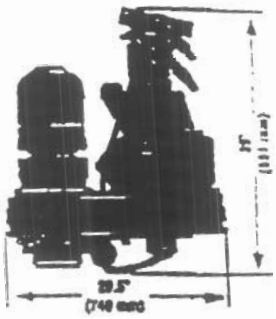
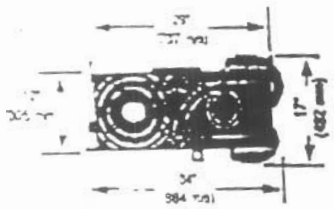
LF70 Diamond Core Drill System

DIMENSIONS AND WEIGHTS *

Drill Head (c/w Auto Chuck)

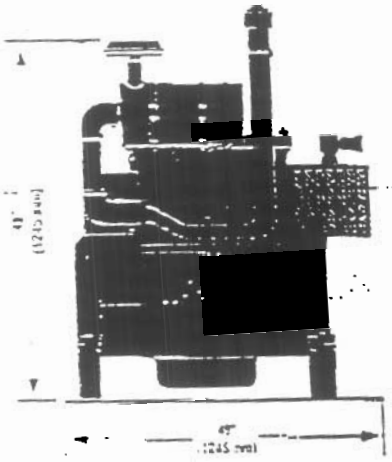
Wet Weight: 830 lb (376 kg)





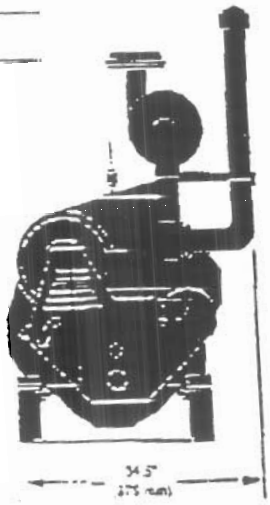
Diesel Engine Module (Deutz BF4L913)

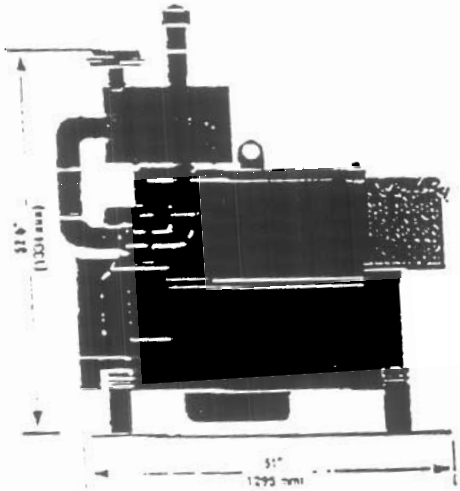
Dry Weight: 1,094 lb (496 kg)



Diesel Engine Module (Deutz BF6L913)

Dry Weight: 1,424 lb (646 kg)





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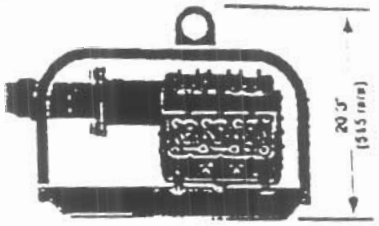
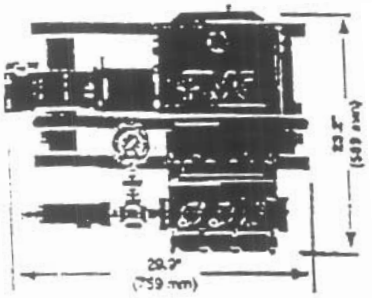
LF70 Diamond Core Drill System

DIMENSIONS AND WEIGHTS *

Fluid Circulation Pump Group (L09)

Wet Weight: 320 lb (145 kg)

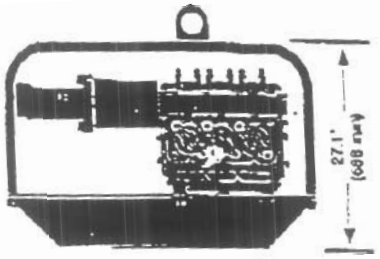


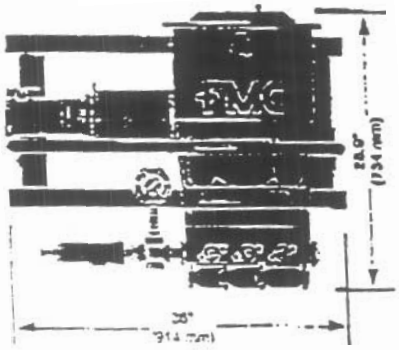


The max. output of the standard 2-speed motor for the L09 is as follows:
High vol./low pres. - 20 gpm @ 300 psi
Low vol./high pres. - 10 gpm @ 800 psi

Fluid Circulation Pump Group (W11)

Wet Weight: 560 lb (254 kg)



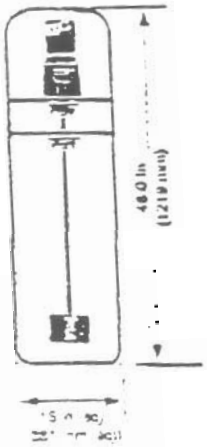


The max. output of the standard 2-speed motor for the W11 is as follows:
High vol./low pres. 35 gpm @ 300 psi 6.2 hp
Low vol./high pres. 17 gpm @ 800 psi 7.9 hp

If a higher output pressure system is required an optional 2-speed motor can be supplied with the following max. output:
High vol./low pres. 23 gpm @ 950 psi 12.7 hp
Low vol./high pres. 11 gpm @ 1000 psi 6.4 hp

Mud Mixer Assembly

Wet Weight: 68 lb (31 kg)



NOTE: Maximum speed of mud mixer shaft at full flow is 2300 rpm.

* Dimension and weights are nominal and should be checked before crating or lifting. Conversion factors have been used to convert from Imperial to Metric measures.