


1.5 Unit Specifications

1.5.1 Trailer

The trailer is a 100,000 lb Holland Neway TR-4100-B mechanical suspension trailer that is fitted with sixteen 315/80R22.5 tires. The trailer deck is covered with safety tread plate. Hydraulic leveling jacks are located at the front and rear of the trailer. Mechanical belly jacks are located at the middle of the trailer. The trailer also includes folding diamond grip walkways, handrails, and removable stairs located on both sides of the trailer.

Crown Energy Technologies Inc. (Crown ) is certified to manufacture Trailers and Carriers that meet all the required Canadian and United States Federal Motor Vehicle Safety Standards.

Crown Energy Technologies Inc. (Crown ) is registered with the National Highway Traffic Safety Administration as a manufacturer of Motor vehicles using the assigned WMI: 2C9/173 for trailers, and 2R9/678 for Trucks.

1.5.1.1 Running Gear

The running gear consists of a Holland Neway TR-4100-B mechanical suspension with sixteen 315/80R22.5 tires.

1.5.1.2 Highway equipment

The highway lighting package includes rear turn signal lights, clearance lights, stop/brake lights, and reflectors. All wires are routed through cable hangers located in the carrier frame and shielded to protect the wires from damage.

1.5.1.3 Leveling Jacks

Four hydraulic and four manual jacks, with pedestals, are used for leveling and supporting the carrier during rig operations.

1.5.1.4 Deadline Anchor

One deadline anchor for 1-1/8" line is included.

1.5.2 Engine

The DRS-00750 Drilling Rig is fitted with two Caterpillar C-15 engines rated at 475 HP @ 2100 RPM.

The Caterpillar C-15 DIT ATAAC Industrial diesel engine comes with the following standard equipment and accessories:

- Radiator
- Muffler and spark arrester
- Hydraulic power steering pump (engine MTD)
- Air inlet safety shutoff ASM (with all metal plumbing)
- Transmission oil cooler ASM (engine MTD)
- Fuel primer pump ASM (engine MTD)
- Alternator (12/24 V), 45 amp
- Air compressor (27 cfm) (Engine MTD)



- Air governor ASM (engine MTD)
- Plug Cover ASM
- Engine oil pan (HD-metal)
- Engine valve covers (metal)
- Oil filler and oil dip-stick ASM (all LH/operator/driller-side MTD)
- Air cleaner
- Instrument panel, four (4) gauge
- Starting electric (12 V) air shut-off, safety
- Air shut-off safety
- Horton fan hub assembly, sensors and switch
- 40 inch, 12 blade Crowley fan
- OEM pins and connector
- Low coolant level sensor
- Mag pick-up

1.5.3 Transmission

Two-Allison Model S5610-H series transmissions are coupled to the engines. This transmission is designed for diesel engines up to 550 net HP. Six forward ranges and one reverse make it best suited for off-highway applications.

Specifications:

Range	Ratios	Range	Ratios	Range	Ratios
First	4.00:1	Third	2.01:1	Fifth	1.00:1
Second	2.68:1	Fourth	1.35:1	Sixth	0.67:1
				Reverse	5.15:1

1.5.4 PTO

A pneumatically controlled Chelsea Power Take-off is mounted to each transmission.

1.5.5 Compound

The Crown two engine, chain driven compound comes with two mechanical disconnects.

1.5.6 Right Angle Gear Box

The Crown right angle gearbox supplies power to the drawworks and comes complete with a reversing box to drive the rotary table.

Features:

The right angle gear train is a spiral bevel gear set with hardened steel gears. The gearbox case is fabricated from high strength heavy steel tubing to minimize distortion. Gears and bearings are lubricated by oil bath arrangement.

All shafts are machined from high strength heat-treated steel. Input shaft bearings are double Timken with straight roller bearings at the pinion end. Output shaft is supported on spherical bearings.



1.5.7 Drawworks

The Crown Model CE750SD drawworks is rated for 650 through 900 HP. It is a single drum, double shaft drawworks mounted on a heavy-duty framework with sheet metal covers. Auxiliary braking is achieved with a McKinney 23S (or equivalent) water-cooled brake.

1.5.7.1 Drawworks Specifications:

Main Drum:	44 inches x 11 inches, with brake bands and brake linkage.
Core Diameter:	19-7/8 inches
Distance Between Flanges:	35-1/2 inches
Auxiliary Braking (hydro dynamic):	McKinney 23S Single
Grooved Jacket:	1-1/8 inch grooving

1.5.8 Mast

The mast is a 118 ft, 375,000 lb guyed telescoping mast with hollow structural steel framing, designed and built in accordance with API 4F using three dimensional non-linear dynamic finite element software. Maximum hook load capacity is 375,000 lb. The mast is manufactured with all HSS construction ensuring minimum weight and maximum stability.

1.5.8.1 Features

This mast is equipped with a ladder mounted on the off-driller's side. The safety platform, handrails, and a fall arrest post are included with the crown frame assembly. The mast is equipped with a block cradle and two load lines.

Two three-stage hydraulic cylinders are used for raising the mast and are equipped with safety chokes to prevent freefall in the event of a complete loss of hydraulic pressure. The mast is fitted with two single acting telescoping cylinders for raising the top section.

The crown platform provides safety when servicing the crown sheaves. The crown block assembly includes:

- Three 30 inch fleet sheaves
- One 36 inch fastline sheave
- One 30-inch deadline sheave

These steel sheaves are mounted on Timken tapered roller bearing inserts, thus ensuring that bearing failure will not damage the sheave. Fittings are provided for individual greasing of the bearings.



1.5.8.2 Mast Specifications

- Capacity: 375,000 lb
- Height: 118 ft
- Line String Up: 8 lines
- Wind Load: 69 mph (as per API 4F)

1.5.8.3 Included Options

The following options are included with this unit:

- Steel sheaves,
- Manual tong counterweights,
- 4" standpipe with gooseneck at the top and unions at top and bottom of pipe,
- Guy lines.

1.5.8.4 Racking Board

The mast is equipped with an automatically erecting racking board:

- Capacity for 7,400 feet of 4-1/2 inch drill pipe and 600 feet of 6-1/4 inch drill collars.
- Provisions to allow for drill pipe sizes from 3-1/2 inch to 6-5/8 inch, and drill collar sizes from 4 inch to 11 inch.
- Positioned for use with Range II tubulars in doubles.
- Complete with a rear escape system.

1.5.9 Hydraulic System

The rig hydraulic system supplies power for operation of the following carrier components:

- hydraulic winches,
- power tongs,
- mast raising cylinders,
- telescoping cylinders,
- leveling cylinders,
- make and break out cylinders.

The hydraulic system equipment consists of:

- a 300 gallon hydraulic tank;
- two hydraulic pumps, each mounted on an engine, and each rated at a capacity of 50 gpm;
- Two (2) hydraulic coolers mounted in front of the engine radiators.
- hydraulic inline filter, filler breather, all related valves, pressure gauge, and control valves.

NOTE: the hydraulic system is run from two pumps – one installed on each engine/transmission/PTO assembly. This provides failsafe operation.



1.5.9.1 Winches

This unit is fitted with two 12,000 lb hydraulic winches.

1.5.9.2 Make Up and Break Out Assembly

Features:

- two hydraulic cylinders, sheaves, rollers and cables,
- hydraulic controls for make up and breakout functions,
- make and break cylinders mounted on back of mast.

1.5.10 Pneumatic System (Air System)

The rig air system supplies air pressure for normal rig operation. System equipment consists of:

- engine mounted air compressors,
- air dryer and alcohol scrubber,
- pneumatic plumbing (valves, drains, lubricators, de-icers, filters and gauges).

1.5.11 Control Panel

The Operator's Control Panel consists of the following Controls and Gauges:

Controls

Hydraulic Pump (On/Off) (air)
Gear Selector (air)
Engine Stop (air)
Emergency Stop (air)
Fast Idle (air)
Horn (air)
Two Winches (up/down)(air/hyd)
Slips (in/out)(air)
Hoist (up/down) (air)
Rotary Table (air)

Gauges

Hydraulic Pressure
Main Air Pressure
Rotary Table Torque

1.5.12 Electrical

Equipment selection and classification of areas is in accordance with American Petroleum Institute Recommended Practice 500B (RP500B).

Wiring features:

- Where practical, lighting wiring is in rigid conduit with flexible terminations in liquid tight flex or rough service cord. Connection of derrick lights is with RL 80 cord connectors.
- Mast is equipped with nine explosion proof 110 volt fluorescent lights and receptacles for 24-hour operations.

1.5.13 Substructure

The unit comes with a 15-foot high substructure. It is skid mounted, manually raised, and built in accordance with API 4F. The substructure is complete with two sets of stairs, one layer of 4 inch timbers under the setback, mouse-hole, rat-hole, tong backup posts, Kelly pull back post,



handrails, rotary beams for rotary tables, and a pipe ramp. The substructure has the following specifications:

Floor Height:	15 ft.
Width (Working Floor):	19 ft. 6 in.
Length (Working Floor):	12 ft.
Width (Substructure Base):	36 ft.
Clearance Under Rotary Beams:	12 ft.
Clearance From the Bottom of the Crown to the Top of the Rotary Table Floor When Used with Mud Boat:	104 ft.
Roading Height:	11 ft. 6 in.
Setback Capacity:	300,000 lbs.
Rotary Capacity:	375,000 lbs.
Rotary Table Opening:	17-1/2 in.
Rotary Table Center:	44 in.
Recommended Clearance of Crown Saver From Bottom of the Crown:	6 ft.

1.5.14 Mud Boat

The mud boat runs the full length of the trailer and has provisions for tie down at both the front, and rear of the trailer. An integrated mudline is installed in the center of the mud boat. The mudline attaches to the standpipe, on the off-drillers side, by means of a kicker hose. Guide rails running the length of the mudboat allow alignment of the trailer to the substructure.



1.0 INTRODUCTION AND SPECIFICATIONS

1.1 Use of this Manual.....	1-1
1.2 Statement of Warranty	1-2
1.3 Photographs.....	1-3
1.4 General Dimensions and Weights	1-4
1.5 Unit Specifications	1-5
1.6 Assembly Drawings.....	1-11

2.0 OPERATING PROCEDURE

2.1 Introduction	2-1
2.2 Safety.....	2-3
2.3 Driving the Unit.....	2-5
2.4 Rig Controls and Instruments	2-7
2.5 Rigging Up.....	2-11
2.6 Extending the Top Section	2-13
2.7 Final Rigging Up	2-15
2.8 Care of Mast While Raised	2-17
2.9 Rig Operation	2-19
2.10 Rigging Down	2-21
2.11 General Care of the Mast and Hydraulic System	2-23
2.12 Troubleshooting	2-25
2.13 Recommended Fluids	2-33
2.14 Recommended Torque Values	2-35

3.0 CARRIER AND POWER UNIT

3.1 Assembly Drawings.....	3-1
3.2 Component Manufacturer Information.....	3-3

4.0 MAST

4.1 General Maintenance of the Mast	4-1
4.2 Reeving Diagrams	4-3
4.3 Assembly Drawings.....	4-5
4.4 Component Manufacturer Information.....	4-7

5.0 DRAWWORKS

5.1 Drawworks Specifications	5-1
5.2 General Maintenance of Drawworks Components.....	5-1
5.3 Assembly Drawings.....	5-3
5.4 Drawworks Power Layout and Performance Charts.....	5-5
5.5 Component Manufacturer Information.....	5-7

6.0 HYDRAULIC SYSTEM

6.1 Filtration	6-1
6.2 Hydraulic System Maintenance.....	6-1
6.3 Hydraulic Schematic and Drawings.....	6-3
6.4 Component Manufacturer Information.....	6-5



TABLE OF CONTENTS

7.0 PNEUMATIC SYSTEM

7.1 Pneumatic Schematic7-1
 7.2 Component Manufacturer Information.....7-3

8.0 ELECTRICAL SYSTEM

8.1 Electrical Schematics.....8-1
 8.2 Component Manufacturer Information.....8-3
 8.3 Electrical Parts List8-5

9.0 SUBSTRUCTURE AND MUDBOAT

9.1 Drawings9-1
 9.2 Component Manufacturer Information.....9-3

List of Figures

FIGURE 1-1, DRS-00750, Drilling Rig – Off-Driller's View1-3
 FIGURE 1-3, Unit Dimensions1-4
 FIGURE 2-1, Drillers Control Panel.....2-7
 FIGURE 2-2, Rig Up Control Stand2-9
 FIGURE 4-1, Mast Data Plate4-2
 FIGURE 4-2, Crown Sheave Arrangement4-3
 FIGURE 4-3, 4 Line String Up4-3
 FIGURE 4-4, 6 Line String Up4-4
 FIGURE 4-5, 8 Line String Up4-4

List of Drawings

100042234. 01/02 DRS-00750 GA Drilling Rig 7873A.....1-6
 100042234. 02/02 DRS-00750 GA Drilling Rig 7873A.....1-6
 100042235. DRS-00750-110 Trailer Group3-1
 100045237. Driveline Assembly DRS-007503-1
 100042236. DRS-00750-130 Engine Group3-1
 100033590. 01/02. Chain Compound Assembly DRS-007503-1
 100033590. 02/02. Chain Compound Assembly DRS-007503-1
 100033847. HOLLAND GROUP, INC. 172200026. Four Axle Suspension.....3-1
 100043859. Mast 118’ – 375K General Assembly.4-5
 100033643. 01/02. Mast 118’ – 375K Upper Assembly.4-5
 100033643. 02/02. Mast 118’ – 375K Upper Assembly.4-5
 100043860. Mast 118’ – 375K Lower Assembly.4-5
 100043910. Cables and Guylines Assy 118’ – 375K Mast.4-5
 100043405. Drawworks Assembly CE750SD5-3
 100043406. Maindrum Shaft Assembly CE750SD5-3
 100043168. Brake Shaft Assy Maindrum CE750SD.....5-3
 100042508. Right Angle Gearbox Ratio1.5:1 Off Driller SideCE750SD5-3
 100043403. Brake Hydromatic Assembly CE750SD5-3
 100042085. Reversing Box Assembly CE750SD.....5-3
 DOE Drawworks Layout Crown CE750SD (Hydromatic)5-5
 100042243. 01/02. Schematic Hydraulic Trailer Drilling Rig. BOM6-3
 100042243. 02/02. Schematic Hydraulic Trailer Drilling Rig.6-3
 100033850. Scoping Ram Assembly 5” x 642”.6-3
 100042244. Schematic Pneumatic Rig DRS-00750.7-1



100042242 01/07. Electrical Schematic. 7873A DOE Trailer
Mount Drilling Rig. Index.8-1

100042242 02/07. Electrical Schematic. 7873A DOE Trailer
Mount Drilling Rig. Battery Box.8-1

100042242 03/07. Electrical Schematic. 7873A DOE Trailer
Mount Drilling Rig. Air – Electric Interface Panel.8-1

100042242 04/07. Electrical Schematic. 7873A DOE Trailer
Mount Drilling Rig. Engine Wiring.8-1

100042242 05/07. Electrical Schematic. 7873A DOE Trailer
Mount Drilling Rig. Blank.8-1

100042242 06/07. Electrical Schematic. 7873A DOE Trailer
Mount Drilling Rig. Carrier Lighting Wiring.8-1

100042242 07/07. Electrical Schematic. 7873A DOE Trailer
Mount Drilling Rig. AC Lighting.8-1

CATERPILLAR. Dwg 135-257. Diagram – Wiring (3408 & 3412 IND).8-1

100042236. Substructure Assembly 16' DRS-007509-1

List of Component Manufacturer Information

- AKG. Hydraulic Motor Driven Oil Coolers. Technical Information (Section 6)
- BENDIX. MC-30 Trailer ABS Controller Assembly. Service Data. (Section 8)
- BENDIX. QR and QR-1 Quick Release Valves. Service Data. (Section 7)
- BENDIX. R-12 & R-14 Relay Valves. Service Data. (Section 7)
- BENDIX. SR-5 Trailer Spring Brake Valve. (Section 7)
- BENDIX. TW-1, TW-3, TW-4, TW-5 & TW-6 Control Valves. Service Data. (Section 7)
- BRADEN. Series PD12C Hydraulic Winch. Material List. (Section 6)
- BRADEN. Series PD12C, PD15B & PD17A Hydraulic Winch. Installation, Maintenance & Service Manual. (Section 6)
- BRADEN. Gearmatic Planetary Hoists. Special Operating Instructions. (Section 6)
- CHELSEA / PARKER. 852 (et al) Series Power Take-Off. Owner’s Manual. (Section 3)
- CHELSEA. 852 Series Power Take-Off. Parts List. (Section 3)
- COMMERCIAL / INTERTECH. Hydraulic Pump, P51 (et al). Service Manual. (Section 6)
- COMMERCIAL / PARKER. Mobile Cylinders, Installation, Operation and Maintenance Manual for Single and Double Acting Telescopic Hydraulic Cylinders. (Section 4)
- EATON. EB and ER Airflex Clutch. Installation, Operation and Maintenance. (Section 5)
- EATON. Rotorseals B3 (et al). Installation, Operation and Maintenance. (Section 5)
- EATON. VC (Clutch) Elements. Installation, Operation and Maintenance. (Section 5)
- EATON. VC (Clutch) Elements. Technical Information. (Section 5)
- HOLLAND. TR4100B Suspension. Welding Instructions. (Section 3)
- IMT CORPORATION. Trailer Axles. Installation and Maintenance Manual. (Section 3)
- INGERSOLL RAND. Manual Chain Hoists. Parts, Operation and Maintenance Manual. (Section 9)
- INGERSOLL RAND. PT and GT Series Plain and Geared Hook-On Trolleys 1/2 to 20 Ton Capacity. Parts, Operation and Maintenance Manual. (Section 9)
- MCKINNEY MACHINE COMPANY. Hydraulic Brake 23”. Drawing with Parts List. (Section 5)
- NRL LIGHTING PRODUCTS. DuraPro, Hazardous Area Fluorescent. Technical Information. (Section 8)



TABLE OF CONTENTS

- REXROTH. Type "A" Pilotair Directional Control Valves. Technical Information. (*Section 7*)
- SALA. Sealed, Self Retracting Lifelines. User Instruction Manual. (*Section 4*)
- SPICER / DANA. Universal Joints and Driveshafts, 1000 through 1880 Series Light, Medium and Heavy Duty Axles. Service Manual. (*Section 3*)
- SPM FLOW CONTROL, INC. Hammer Unions. Technical and Safety Information. (*Section 4*)