7578

BRODERSON MANUFACTURING CORP.

P. O. BOX 14770, LENEXA, KANSAS 66285 913-888-0606

PRINTED IN USA
P/N 990-30113

OPERATION AND MAINTENANCE MANUAL IC-200-2G & 3G

CUMMINGS
MDL QB3.3–C99
S/N 68303221

OWNER:_____

_____

_____

SOLD AND SERVICED BY:_____

_____

_____

MODEL NO._____ SERIAL NO._____

Effective: January 1, 2007

BRODERSON MANUFACTURING CORP.

STATEMENT OF WARRANTY

Broderson Manufacturing Corp. ("BMC") warrants its products to be free from defects in material or workmanship at the date of shipment from BMC. This warranty shall be effective only when validated by the return to BMC of its standard form of warranty validation certificate, duly completed and signed by the original purchaser from BMC and any subsequent purchaser who buys a BMC product as a new product, and then only as to defects reported to BMC in writing within 365 days from the date a product is placed in service, as evidenced by such warranty validation certificate. **THIS WARRANTY APPLIES TO ALL PARTS OF BMC'S PRODUCTS EXCEPT ENGINES, DRIVE TRAINS, HYDRAULIC SYSTEM COMPONENTS, OR ACCESSORY EQUIPMENT, WITH RESPECT TO WHICH BMC MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND NO OTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED**; the sole warranties, if any, with respect thereto being those made by the respective manufacturers thereof.

THE SOLE REMEDY FOR BREACH BY BMC OF THIS WARRANTY SHALL BE THE REPLACEMENT OF ANY PARTS OF ITS PRODUCTS WHICH WERE DEFECTIVE AT THE DATE OF SHIPMENT OR, IF (AND ONLY IF) REPLACEMENT OF DEFECTIVE PARTS IS IMPOSSIBLE OR IS DEEMED BY BMC TO BE IMPRACTICAL, REPLACEMENT OF THE ENTIRE PRODUCT OR, AT BMC'S OPTION, REFUND OF THE PURCHASE PRICE. The replacement remedies include labor in connection with the removal of defective parts and the installation of their replacements, as well as the cost of delivery and transportation of defective products or parts and the replacements thereof. The sole purpose of these remedies is to provide the purchaser with free replacement of defective parts or, in the limited circumstances specified, replacement of the entire product or a refund of the purchase price. These exclusive remedies shall not be deemed to have failed of their essential purpose so long as BMC is willing and able to replace defective parts or the entire product or to refund the purchase price. The remedies herein provided shall be available only if BMC is given reasonable access to the product, including all allegedly defective parts, promptly after the defect is discovered. BMC shall have the right to return any allegedly defective parts to its plant or any other location selected by it, for inspection and testing to determine whether they were defective at the date of shipment, prior to replacement thereof.

The warranty herein made is extended only to the original purchaser from BMC and any subsequent purchaser who buys a BMC product as a new product. **WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, BMC EXPRESSLY DISCLAIMS THAT THE WARRANTY MADE HEREIN EXTENDS TO A PERSON WHO RENTS OR LEASES ANY BMC PRODUCT OR WHO PURCHASES ANY BMC PRODUCT AS A USED PRODUCT.** For purposes hereof, a BMC product shall conclusively be deemed "used" after the expiration of twelve (12) months from its placement in service, as evidenced by a duly completed and signed warranty validation certificate actually received by Broderson, or after such earlier time as it has been operated for more than one hundred (100) hours. BMC shall have no liability hereunder with respect to products which have been subjected to misuse, negligence, accident or other external forces which may have caused or accentuated any apparent failure of such products to conform to the warranty herein made.

BMC does not warrant any of its products to meet any state, local or municipal law, ordinance, code, rule or regulation. The purchaser must assume the responsibility for maintaining and operating the products which are the subject of this warranty in compliance with such of the foregoing as may be applicable, and BMC shall not be liable for the purchaser's failure to meet such responsibility.

THE WARRANTY HEREIN MADE IS IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED. BMC MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER EXPRESS OR IMPLIED WARRANTY OF ANY KIND, TO ANY PURCHASER, LESSEE OR RENTER OF NEW OR USED BMC PRODUCTS OR ANY OTHER PERSON WHATSOEVER. NO PERSON IS AUTHORIZED TO ACT ON BEHALF OF BMC IN MODIFYING THE WARRANTY HEREIN MADE OR IN MAKING ANY ADDITIONAL OR OTHER WARRANTY.

IN NO EVENT SHALL BMC BE LIABLE FOR INCIDENTAL OR **CONSEQUENTIAL** DAMAGES OF **ANY KIND WHATSOEVER.** THIS EXCLUSION OF INCIDENTAL AND CONSEQUENTIAL DAMAGES IS INTENDED TO BE INDEPENDENT OF ALL OTHER PROVISIONS OF THIS STATEMENT OF WARRANTY AND SHALL BE GIVEN FULL EFFECT NOTWITHSTANDING THE UNENFORCEABILITY OR FAILURE OF THE ESSENTIAL PURPOSE OF ANY OTHER PROVISION OF THIS STATEMENT OF WARRANTY.

THE FOREGOING DISCLAIMERS OF WARRANTIES AND DISCLAIMER OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SHALL BE EFFECTIVE REGARDLESS OF WHETHER THE EXPRESS WARRANTY CONTAINED HEREIN BECOMES EFFECTIVE AS PROVIDED IN THE FIRST PARAGRAPH HEREOF.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

SECTION 3 MAINTENANCE

BRODERSON MANUFACTURING CORP.

IC-200-G INDUSTRIAL CRANE

INTRODUCTION

The Broderson IC-200-G was designed and built to provide safe dependable and efficient crane service. This we warrant by our testing and quality control procedures. To properly utilize the full potential of the equipment, the following customer controlled conditions must exist:

1. The operator must understand the equipment.
2. The operator must know the operating characteristics.
3. The operator must observe the safety rules.
4. The equipment must be given proper maintenance.

This manual was written to provide information required for these conditions. The recommendations for periodic inspection, test and maintenance are minimum standards for safe and economical performance.

When ordering parts, the unit serial number, unit model number, part number, part description and quantity must be provided.

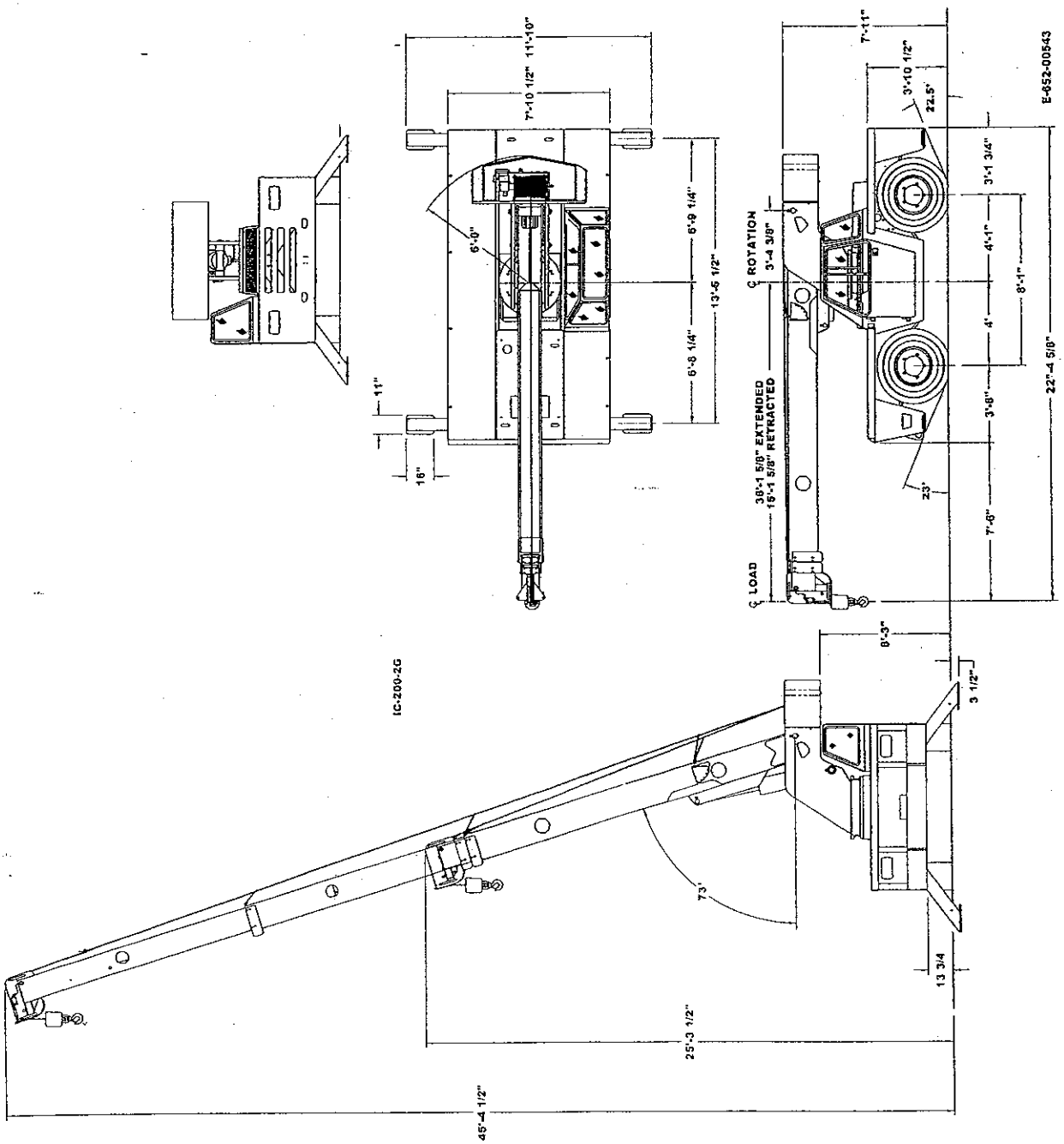
This unit must not be altered or modified without written factory approval.

To reorder this manual, ask for IC-200-G Operation and Maintenance Manual, Part Number-990-30113.

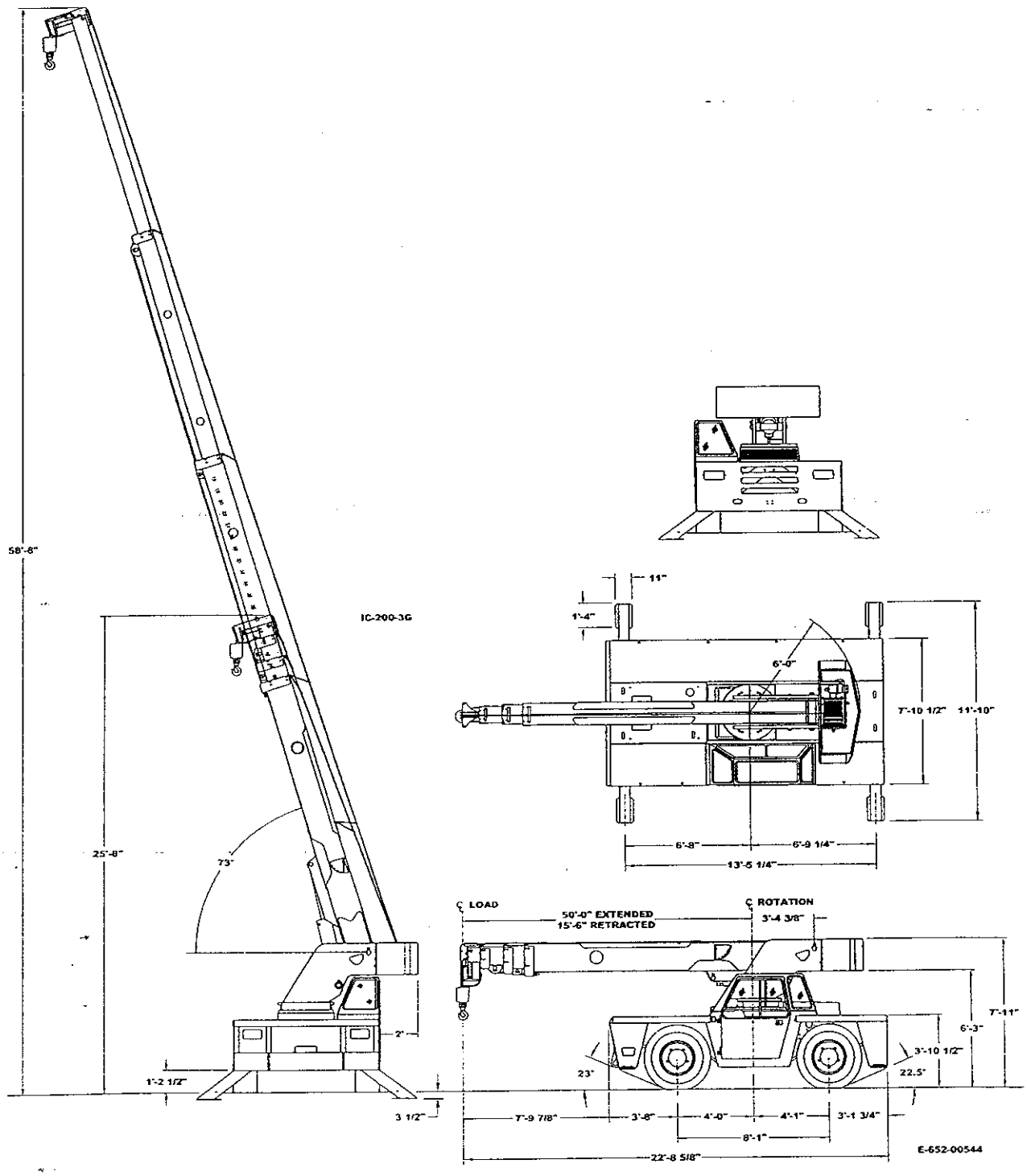
NOTICE

If this crane becomes involved in an accident, please call Broderson Manufacturing Corp. at 913-888-0606, and ask for the Legal Department or the Service Manager. Also, please notify your Broderson dealer.

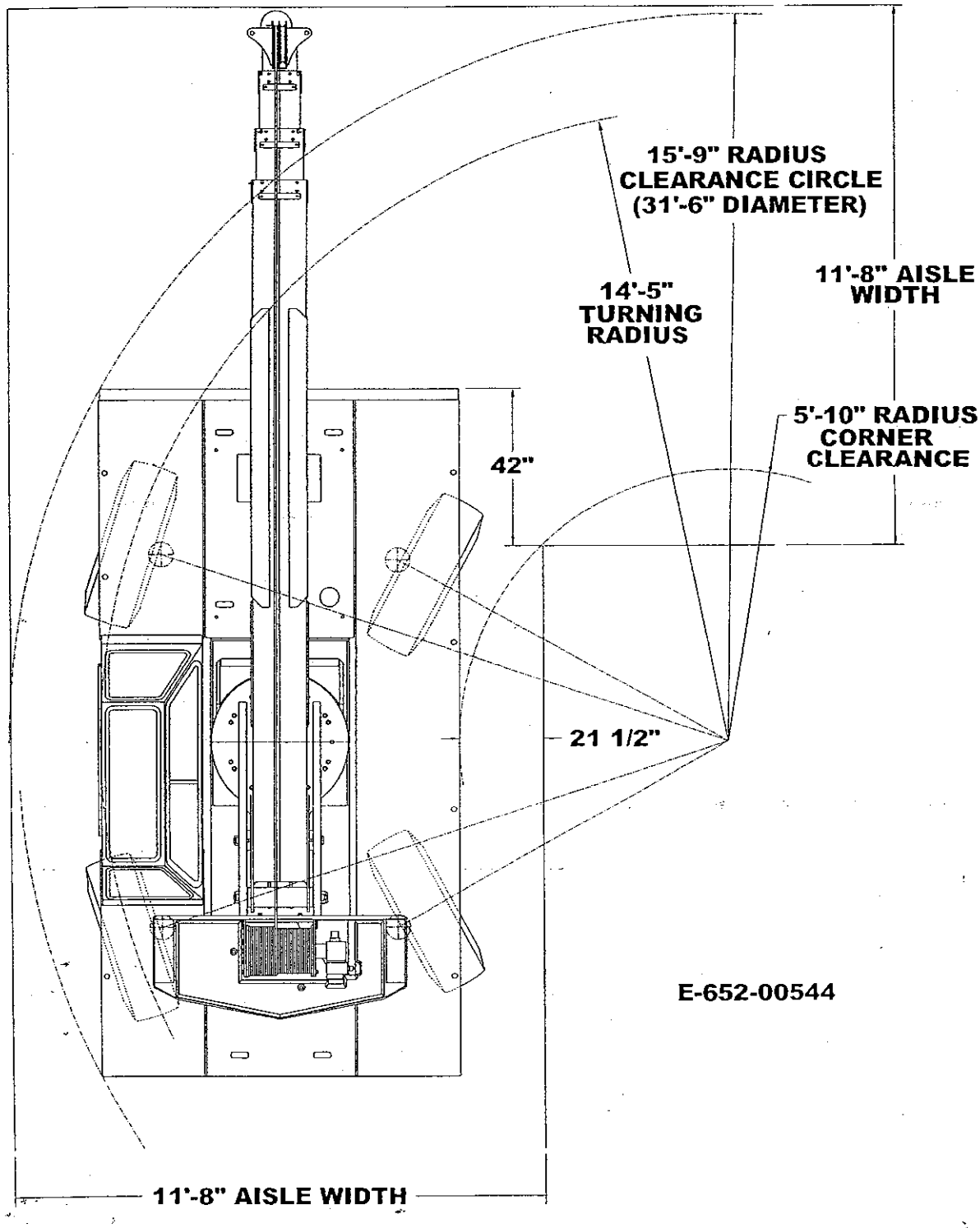
IC-200-2G DIMENSIONS



IC-200-3G DIMENSIONS



IC-200-G TURNING DIMENSIONS



SECTION 1

DESCRIPTION AND SPECIFICATIONS

The IC-200-G is a self-propelled Industrial Crane designed for material handling and installation, maintenance and repair of equipment, with special features of self-loading cargo decks, 4-wheel steer, and front-wheel drive (4-wheel drive optional). The basic unit consists of a chassis and hydraulic boom assembly. The chassis includes a frame, four hydraulic independently controlled outriggers, engine, torque converter, powershift 4-speed transmission, front planetary drive/steer axle and rear steer-only axle, fuel tank, hydraulic tank, control station, power steering and dual power brakes. The boom assembly includes a hydraulic powered continuous rotation turret, 3 or 4-section telescopic boom, hydraulic boom elevating cylinder, hydraulic boom telescope cylinders and hydraulic powered hoist. A Rated Capacity Limiter is standard.

IC-200-2G:

3-section hydraulically extended boom with capacity of 30,000 pounds at a 6 foot load radius. Horizontal reach of 36 feet and vertical reach of 45 feet.

IC-200-3G:

4-section proportional hydraulically extended boom with capacity of 30,000 pounds at a 6 foot load radius. Horizontal reach of 50 feet and vertical reach of 58 feet.

General:

	IC-200-2G	IC-200-3G
Weight:		
Front Axle	13,900 lbs.	15,400 lbs.
Rear Axle	14,300 lbs.	15,200 lbs.
Total	28,200 lbs.	30,600 lbs.
Length:		
Overall	22 ft. 6 in.	22 ft.10 in.
Chassis	14 ft. 11 in.	14 ft.11 in.
Width:	7 ft. 10 1/2 in.	
Height:		
Overall	7 ft. 11 in.	
Deck	3 ft. 10 in.	
Wheelbase:	97 in.	
Ground Clearance:	13 3/4 in.	
Angle of Approach:	23 degrees	

General (Cont'd):

Angle of Departure:	22 degrees
Outriggers:	
Spread	11 ft. 10 in.
Penetration	3 1/2 in.
Turning Radius:	
4-Wheel Steering	14 feet 5 inches
Aisle Width for 90° Turn	11 feet 8 inches
Steering Modes	Rear Steer, Round Steer, Crab Steer
Road Speed	18 MPH
Gradeability (Calculated)	54 percent (28 degrees)
Grade Limit	15 percent

Boom Movement:	**IC-200-2G**	**IC-200-3G**
Rotation	Continuous	Continuous
Elevation	0 to 73 deg.	0 to 73 deg.
Telescope	21 ft.	34 ft. 6 in.
Boom Speeds:		
Rotation	1.9 RPM	1.9 RPM
Elevation	20 seconds	20 seconds
Extension*	36 seconds	55 seconds
*With synchronized hoist cable.		
Sheave Height (Nominal):		
W/O Boom Extension	45 ft. 4 in.	58 ft. 8 in.
With Boom Extension	59 ft. 6 in.	73 ft. 8 in.
Horizontal Reach:		
W/O Boom Extension	36 ft.	50 ft.
With Boom Extension	51 ft.	66 ft.

Engine:

Standard:

GM 4.3L V-6, EPA Tier 2 Woodward Dual Fuel:

GM Model 4.3L V-6 industrial gasoline engine with multiport electronic fuel injection, dual fuel and engine management system. Water cooled, 262 CI displacement, 4.00 in. bore, 3.48 in. stroke, 93 HP at governed speed of 2,500 RPM. Maximum torque 206 ft. lbs. at 1650 RPM. Includes special exhaust valves, seats and valve rotators for use with LPG, 70-amp alternator, 30 gallon fuel tank and 43 pound LPG tank. High temperature and low oil pressure shutdown is included in engine management system. Throttle control switch for setting engine speed at 1200 or 1800 RPM.

Optional Engines and Engine Accessories:

Diesel Engine:

Cummins QSB3.3L Turbo, EPA Tier 3:

Cummins Model QSB3.3 turbocharged diesel engine. Water cooled, 4-cylinder, 199 CID, 3.74" bore, 4.53" stroke, 99 HP at governed speed of 2,500 RPM. Maximum torque is 304 ft. lbs. at 1,400 RPM. 120-amp alternator included. 30 gallon fuel tank capacity. High temperature and low oil pressure shutdown included in engine management system. Throttle control switch for setting engine speed at 1200 or 1800 RPM. (Net Weight: 200 pounds)

Spark Arrester Muffler:

Spark arrester muffler used in addition to standard muffler. (Net Weight: 10 pounds)

Catalytic Converter:

Catalytic converter for diesel engines. Reduces engine emissions. (Net Weight: 10 pounds)

Engine Heater:

Heater for engine. Engine coolant heater installed with hoses in coolant system to circulate warm water through engine. Plugs into 120 volt AC extension cord. 1,500 watts.

Transmission:

Standard 2-Wheel Drive:

Powershift transmission with four speeds in forward and reverse. Provides powershifts at any engine speed in any gear. All shifting is done with a single lever electrical control mounted on the steering column. Multiple-disc clutch packs operated by solenoid valves provide reverse, neutral, forward and speed selection. Equipped with oil cooler and filter.

Optional 4-Wheel Drive Transmission:

Same as 2WD transmission with an additional output shaft to drive the rear axle. Electro-hydraulic control for shifting between 2WD and 4WD. This option includes the 4-wheel drive axle listed below.

Transmission gear ratios:	Forward and Reverse (2WD & 4WD)
1st	5.72 to 1.0
2nd	3.23 to 1.0
3rd	1.77 to 1.0
4th	1.00 to 1.0

Torque Converter:

Standard:

Stall torque ratio of 2.2:1, attached to engine flywheel.

Front Axle:

Standard:

Planetary drive/steer front axle with 15.78 to 1.0 ratio. Differential equipped with "limited slip" feature. Driving effort is applied to wheel that has traction. Front axle mounted rigidly to frame.

Calculated Performance:

Gear	Drawbar Pull (pounds)	Travel Speeds (MPH)
1st	17,000*	3
2nd	8,900*	5
3rd	5,100*	10
4th	2,700*	18

*Calculated for GM 4.3L engine. Wheels will spin in 1st or 2nd gear before these values are reached with 2-wheel drive.

Rear Axle:

Standard 2-Wheel Drive:

Steering axle with 1 1/2 degree oscillation in either direction.

Optional 4-Wheel Drive:

Planetary drive/steer axle with 24.98 to 1.0 ratio. Differential is not "limited slip" in rear axle. 1 1/2 degree oscillation in either direction. (Axle ratio compatible with 4WD transmission output for front axle match.) (Net Weight: 160 pounds)

Steering:

Standard:

Hydraulic steering unit with two 3-inch cylinders attached to each axle. Allows limited steering when engine is not running. Rear axle is the primary steer. An electric switch in the operator's compartment is used to select rear-wheel steering, four-wheel round steering or crab steering. Electronic sensors and control box automatically align the steering when a new mode is selected.

Brakes:

Standard:

Split-system, four-wheel hydraulically-boosted multiple-plate wet disc brakes. Uses mineral oil. Hand lever actuated disc-type parking brake on transmission.

Tires:

Standard 2-Wheel & 4-Wheel Drive:

15x22.5, 16 ply rating.

Tire Options:

Non-Marking Pnuematic:

385/65D22.5 16 ply rating (Net Weight: 20 pounds)

Foam Filling of Tires:

Foam filling of four IC-200 tires. (Net Weight: 2000 pounds)

Spare Tire and Wheel Mounted Standard Tire:

Extra wheel with standard tire (15X22.5, 16 ply) mounted, ready for service. (Net Weight: 350 pounds)

Spare Tire and Wheel Mounted, Non-Marking Pnuematic:
Extra wheel with Non-Marking tire (385/65D22.5,16 ply) mounted, ready for service. (Net Weight: 350 pounds)

Chassis:

Standard:

Cargo Deck:
Total Deck Area: 72 Square Feet. A maximum of 17,000 pounds may be carried on the deck at creep speed when centered over or between axles. Seven stake pockets are provided along edges of deck for 1 inch pipe stakes. Stakes furnished. Cargo decks have skid resistant coating.

Lifting Rings:
Consists of four rings, one at each corner of the load deck, so sling can be attached for lifting crane. Rings hang below deck surface when not in use.

Steps:
A step is located on each front corner providing access to deck area.

Outriggers:
Four hydraulic outriggers of box-beam construction. Independent control for each outrigger. Hydraulic cylinders are equipped with direct-connected holding valves. Pad dimensions: 11 inches x 16 inches.

Pulling Eyes:
Two heavy eyes in front bumper provide for attachment of hook block so main winch line can be used for pulling loads at or near floor level. Also for anchoring tag lines from load on hook.

Accessory Storage Box:
Consists of front deck plate with removable and lockable cover, and box for carrying sheave block and other items. Storage box is 14" deep x 10 1/2" wide x 36 1/2" long.

Chassis Options and Accessories:

Auxiliary Winch:
Optional worm gear winch, mounted behind front bumper, with a single lever control at the operator's console. Hydraulic powered to provide bare drum line pull of 10,000 lbs. at 40 ft. per minute. Winch drum is 3 1/2" dia. by 10" long. This winch includes 115 ft. of 7/16" wire rope, hook and four-way roller guide. This rope can pull 5800 lbs. with a safety factor of 3.5:1. (Net Weight: 250 pounds)

Pintle Hook - Rear:
T-60-AOL Holland pintle hook mounted on rear frame member, provides capacity for 6,000 lbs. tongue weight and 30,000 lbs. trailer weight. (Net Weight: 15 pounds)

Pintle Hook - Front:
T-60-AOL Holland pintle hook mounted on front frame member, provides same capacity as PH-8. (Net Weight: 45 pounds)

Headlight and Taillight Grilles:

Consists of welded steel protective grilles for headlights and taillights. Easily removable for replacing bulbs. (Net Weight: 40 pounds)

Rearview Mirrors:

One right-hand and one left-hand mirror, 6" wide x 16" high, mounted on deck stakes. Pivot out of way when contacted by obstacle at side of deck. (Net Weight: 12 pounds)

Operator Compartment:

Standard:

Operator control station provides one-position access to all chassis and crane functions. Includes adjustable operator's seat and seat belt.

Operator Compartment Options and Accessories:

Operator Guard: (Not Available with Cab)

Tubular steel weldment with heavy expanded steel mesh top section, bolts over the operator's compartment. (Net Weight: 60 pounds)

Operator Guard Cover:

Clear vinyl cover goes over guard for inclement weather. Has zipper and velcro roll-up door. (Net Weight: 15 pounds)

Operator Guard Door:

Hinged door covers operator compartment side opening. Has latch handle outside and knob inside. Rubber gasket contacts chassis. (Net Weight: 40 pounds)

All Weather Cab:

Consists of rigid mounted canopy section and removable hinged door with safety glass. Rugged canopy structure with laminated glass front and top. Door is equipped with a keyed lock to protect operator's station. Includes defroster fan, dome light, 12,400 BTU heater with 2-speed fan and 12V electric windshield wiper. There are sliding windows in the door and right-hand side. (Net Weight: 220 pounds)

Cab Heater Only:

Provides 12,400 BTU heater with two-speed fan for units without All Weather Cab. (Net Weight: 12 pounds)

Windshield Washer:

Provides reservoir, pump and nozzle for windshield washer

Floor Mat:

Vinyl mat with foam backing covers floor, front wall and lower portion of right hand wall of operator's compartment. (Net Weight: 5 pounds)

Operator's Suspension Seat:

Provides additional operator comfort. (Net Weight: 15 pounds)

Noise Reduction Kit - Cab:
Includes vinyl floor mats and control valve cover and side panels of foam-backed, perforated vinyl for noise reduction. (Net Weight: 15 pounds)

Air Conditioning:
Complete system using R134a coolant has combination cooling and heating unit in cab. (Net Weight: 125 pounds)

Electrical System:

Standard 12 Volt DC:

Battery:
Gas Units: Group 27 with 540 CCA rating.
Diesel Units: Group 31 with 950 CCA rating.

Lighting Group:
Consists of two 12V lamps, with high and low beams for driving; tail, brake and turn signal lights and backup lights in rear; front turn signals; and emergency flasher switch at operator's station. 12V horn actuated by button located on shifting control.

Instrument Group:
Located at operator's station, includes fuel gauge and hourmeter which records hours only during actual engine operation. Also included are warning lights for low oil and transmission pressure, check engine, high coolant and transmission temperature, turn signals, high beams, hazard lights, parking brake and four-wheel drive.

Back-Up Alarm:
Provides pulsating sound from a 97 dB alarm when ignition is on and transmission is in reverse.

Outrigger Alarm System:
112 dB alarm with alternating two-tone sound is actuated by a switch when the "outrigger down" controls are operated.

Optional Electrical Accessories:

Strobe Lights:
Two yellow strobe lights, one on each side of turret weight box, for high visibility all around crane. Flashes 60-120 times per minute. Each strobe draws only one-half amp. Includes operator controlled switch. (Net Weight: 5 pounds)

Amber Rotating Beacons:
Amber rotating beacon mounted on each side of turret weight box. (Net Weight: 10 pounds)

Boom Work Lights:
Two halogen work lights, one on left side of boom to light boom tip, and one on right side of the turret to light ground under boom tip. Includes switch at operator's station. (Net Weight: 10 pounds)

Hydraulic System:

Standard:

Tandem pump, direct-driven by engine, delivers 29 GPM at 2,600 PSI and 34 GPM at 2,500 PSI at 2,500 RPM governed engine speed. System protected by relief valves, suction line strainer and 10 micron return line filter. 54 gallon reservoir equipped with breather and locking filler cap. (Maximum pressure on IC-200-3 is 3000 PSI on the 29 GPM section of the pump.)

Boom Assembly:

Standard:

Three or four-section, high strength steel construction, equipped with bearing pads for efficient support and extension. Double-acting hydraulic cylinder telescopes booms. The telescope cylinder and the double-acting boom elevation cylinder are equipped with direct-connected holding valves. The four sections on the -3G telescope proportionally. Boom angle indicator is on side of boom.

Boom Swing:

Standard:

Heavy-duty bearing swing gear with external teeth supports boom. Rotation is powered by hydraulic motor and worm gear drive. Swing gearbox may be adjusted as wear occurs to minimize backlash. Boom is attached by high strength steel weldment.

Boom Hoist:

Standard:

Turret-mounted planetary gear hoist is hydraulically powered to provide a bare-drum line pull of 10,000 pounds at a speed of 100 feet per minute. Hoist drum is 9 7/8 inch diameter by 16 1/2 inches long. The hoist includes 240 feet for -2G and 291 feet for -3G of 1/2 inch wire rope, 125 pound downhaul weight and swivel hook.

Boom Attachments:

Standard:

Anti-Two-Block Device:

Prevents damage to hoist rope and/or machine components from accidentally pulling sheave block or downhaul weight against boom tip. Consists of trip arm at boom tip which is moved upward by sheave block or downhaul weight as hook approaches boom tip. Trip arm actuates electric switch that is connected through cable reel mounted on boom to solenoid dump valve in the hydraulic circuit. This valve will dump the HOIST RAISE, TELESCOPE EXTEND, BOOM LOWER, SWING LEFT and SWING RIGHT circuits. No other circuits are affected. These circuits are returned to normal operation by operating the HOIST LOWER, BOOM RAISE or TELESCOPE RETRACT control. There is also an override keyswitch under the dashboard.

Rated Capacity Limiter:

Warns operator of impending overload with audible and visual signals. Has read-outs for load, boom angle, boom length and load radius. Prevents overload by dumping boom functions that cause overload: HOIST RAISE,

TELESCOPE EXTEND, BOOM LOWER, SWING LEFT and SWING RIGHT. These circuits are returned to normal by lowering load to a safe resting place with hoist or by retracting or raising boom to a shorter load radius. There is also an override switch under the dashboard.

Four-Part-Line Sheave Block:

Double sheave block for four-part-line requirements. 10 inch O.D. sheaves for 1/2 inch diameter wire rope. Swivel hook with safety latch. 200 pound weight provides positive overhaul. Includes bar on top to actuate trip arm of Anti-Two-Block Device.

Optional Boom Attachments:

Boom Extension - 15 Ft., 2G:

Provides 15 feet of additional length for lifting loads with load line. Boom extension may be stowed alongside base boom section when not in use. Tip sheave, attaching brackets and pins included. Deduct 400 pounds from Capacity Chart when boom extension is in the stowed position. Includes trip arm for Anti-Two-Block Device. (Net Weight: 520 pounds)

Boom Extension - 15 Ft. Offset, 2G:

Provides 15 feet of additional length for lifting loads with load line. Boom extension may be stowed alongside base boom section when not in use. Tip sheave, attaching brackets and pins included. Deduct 400 pounds from Capacity Chart when boom extension is in the stowed position. Includes trip arm for Anti-Two-Block Device. Boom extension will tilt through three positions, in line, 15 degree offset and 30 degree offset. (Net Weight: 670 pounds)

Boom Extension - 16 Ft. Offset, 3G:

Provides 16 feet of additional length for lifting loads with load line. Boom extension may be stowed alongside base boom section when not in use. Tip sheave, attaching brackets and pins included. Deduct 400 pounds from Capacity Chart when boom extension is in the stowed position. Includes trip arm for Anti-Two-Block Device. Boom extension will tilt through three positions, in line, 15 degree offset and 30 degree offset. (Net Weight: 550 pounds)

Two-Part-Line Sheave Block:

Single sheave block for two-part-line requirements. Block is shorter than normal, 21 1/2" from top to saddle of load hook. 10" O.D. sheave for 9/16" and 1/2" rope. Swivel hook with safety latch. Includes bar on top to actuate trip arm of Anti-Two-Block Device. (Net Weight: 124 pounds)

Searcher Hook: **(Nose Mount)**

5,000 pound capacity hook bracket is attached to the front of the boom tip with four pins through the boom extension attachment lugs. A hook with latch is pinned to the tip of the bracket. (Net Weight: 65 pounds)

***** Specifications subject to change without notice *****

OPERATION

SAFETY RULES

GENERAL:

1. Since the manufacturer has no direct control over machine application and operation, conformance with good safety practice is the responsibility of the user and his operating personnel.

2.

⚠ DANGER

YOU MUST NOT OPERATE THIS MACHINE
UNLESS YOU ARE QUALIFIED BY TRAINING AND EXPERIENCE IN THE SAFE OPERATION OF THIS MACHINE

TRAINING INCLUDES COMPLETE KNOWLEDGE OF YOUR EMPLOYER'S WORK RULES, ALL GOVERNMENTAL REGULATIONS AND MANUFACTURER'S OPERATOR AND SAFETY MANUALS RELATIVE TO THIS MACHINE'S SAFE USE.

AN UNTRAINED OPERATOR SUBJECTS HIMSELF AND OTHERS TO DEATH OR SERIOUS INJURY

B-651-00038

3. The operator shall be responsible for those operations under his direct control. Whenever there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle loads until safety has been assured.

4. The operator shall not engage in any practice which will divert his attention while actually operating the crane.

5. This list of rules is only a supplement to all federal, state, and local safety rules that may apply.

CRANE CONDITION:

1. Before beginning operation each day, thoroughly inspect the entire crane to be sure it is in good operating condition.

2. Inspect load hoist rope and wedge socket daily. We recommend rope inspection, replacement and maintenance in accordance with ANSI B30.5-1994, Sec. 5-2.4.

3. Keep operator's compartment and decks free of mud and grease.

4. If crane is equipped with a cab, keep all window glass clean. Keep gauges clean.

5. Tools, lubricants, or rags on the crane should be kept in a secured toolbox.

6.

⚠ WARNING

DO NOT USE CRANE UNLESS CABLE RETENTION PINS ARE IN PLACE OVER CABLE SHEAVE. DOWN HAUL WEIGHT AND HOOK CAN BE PULLED OVER END OF BOOM IF CABLE RETENTION PINS ARE NOT IN PLACE. PERSONS NEAR CRANE CAN BE STRUCK AND SERIOUS INJURY OR DEATH CAN RESULT.

A-651-00089

7.

⚠ WARNING

NEVER USE ROPE CLIP ON LIVE SIDE OF THE LOAD HOIST ROPE. THIS WILL SERIOUSLY WEAKEN THE ROPE. DEATH OR SERIOUS INJURY CAN RESULT FROM THE USE OF A ROPE CLIP ON THE HOIST ROPE.

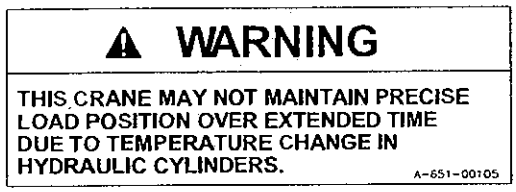
8. The Rated Capacity Limiter must be checked before each shift and after each setup for the proper operating configuration on the display. It must be inspected before each shift and tested with a known load at least once a month as described in the RCL operation manual.

LIFTING:

1. Always refer to Crane Capacity Chart in operator's compartment before handling load. Do not exceed load ratings. Under some conditions the standard capacity ratings cannot be recommended and must be adjusted downward to compensate for special hazards, such as weak supporting ground, wind, hazardous surroundings, operator inexperience, etc. The weight of the load should always be known.

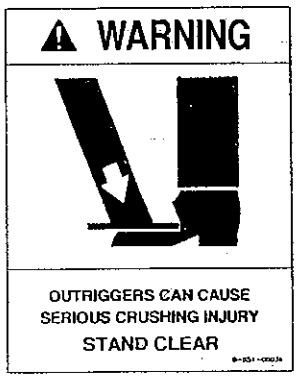
2. Be careful to prevent load swinging. A swinging load can cause instability or loss of control of the load. Be aware that the Anti-Two-Block System and the Rated Capacity Limiter can cause sudden stopping of boom movement which can cause the load to swing. Swing the boom slowly whenever these systems might stop the boom.

3. Do not allow anyone to put any part of his body under a load. The load may lower or fall if there are damaged parts in the crane. Also, the load may drop a short distance due to thermal contraction of the hydraulic oil in the cylinders.

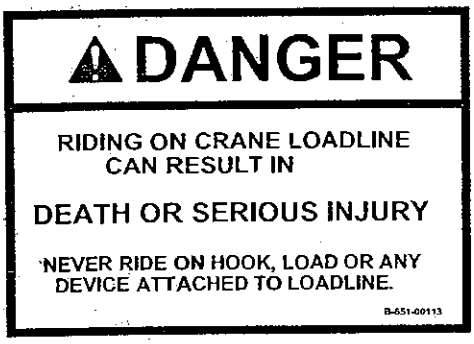


4. Do not use crane to drag loads sideways.

5.



6.



7. Level the crane before lifting. A small incline will significantly reduce the capacity. Use appropriate cribbing under the outriggers for leveling. All outriggers must be fully extended and tires must clear the ground to use the "ON OUTRIGGERS" ratings.

8. Always use outriggers if possible. If you must lift on rubber, keep the load as close to the ground as possible to prevent tipover. Move the load very slowly and use tag lines to prevent load swinging.

9. Crane may tip at less than rated loads if the surface is uncompacted or wet dirt, or soft soil with frozen crust, thin or cracked pavement, or surface near a hole or ledge. Always use adequate outrigger floats and/or cribbing. See page 2-11.

10. The operator shall not leave the controls while the load is suspended.

11. Always use adequate parts of load hoist line for lifting heavy loads.

12. Always be sure the rope is properly seated and wound level on hoist drum.

13. Keep hands away from load hoist rope when hoist is being operated.
14. Be sure at least five wraps of rope are left on the hoist drum to insure against rope pulling out of its anchor.

15. Never wrap the hoist rope around a load. Always use approved rigging.

16. Avoid pinch points such as between a rotating turret and the cab or operator guard or in access holes of a telescoping boom.

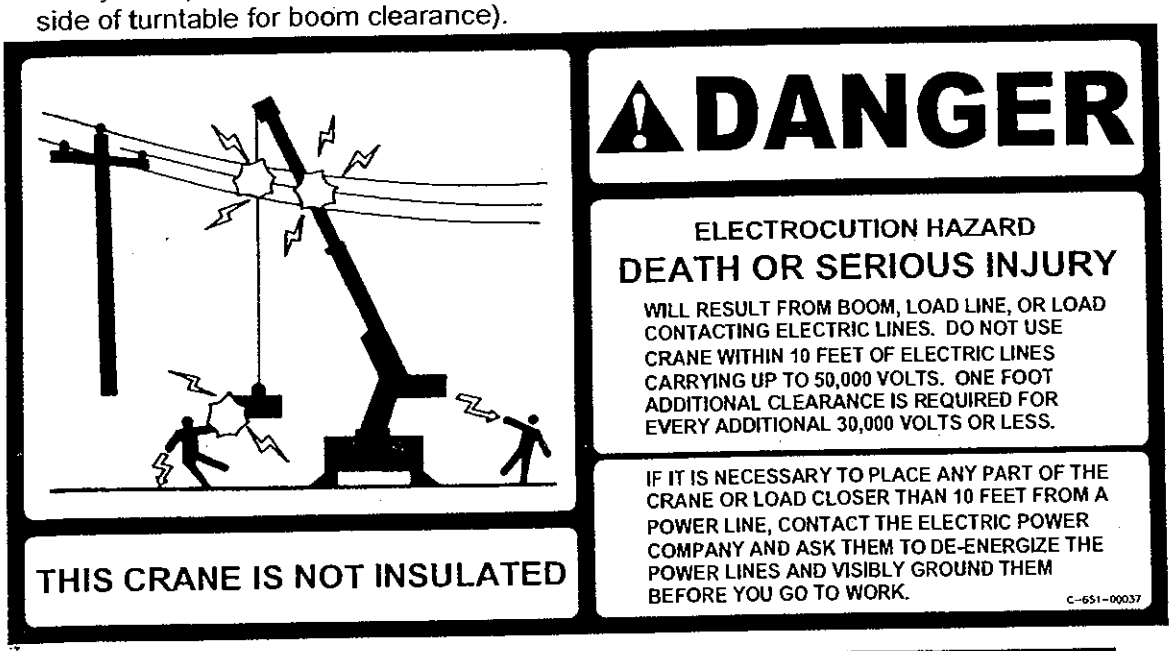
17. Avoid two blocking.
    A. Stop raising hoist line before downhaul or hook block strikes boom tip plates.
    B. Pay out hoist line while extending boom.
    C. Maintain clearance between downhaul weight or hook block and boom tip while booming down.

DANGER

Two blocking will abruptly stop boom lowering and boom swing as well as hoist and extend. If the boom is moving fast, this will cause the load to bounce or swing which could cause loss of control of load or tipping.

18. The amount of counterweight supplied with this crane should never be changed. Unauthorized addition of counterweight in the field to increase lifting ability constitutes a safety hazard.

19. Always keep crane boom at least 10 feet away from electric power lines. (See chart on side of turntable for boom clearance).



REQUIRED CLEARANCE FOR NORMAL VOLTAGE IN OPERATION NEAR HIGH VOLTAGE POWER LINES AND OPERATION IN TRANSIT WITH NO LOAD AND BOOM OR MAST LOWERED

Normal Voltage, kV (Phase to Phase)	Minimum Required Clearance ft	(m)
Operation Near High Voltage Power Lines		
to 50	10	(3.05)
Over 50 to 200	15	(4.60)
Over 200 to 350	20	(6.10)
Over 350 to 500	25	(7.62)
Over 500 to 750	35	(10.67)
Over 750 to 1000	45	(13.72)
Operation In Transit With No Load and Boom or Mast Lowered		
to 0.75	4	(1.22)
Over 0.75 to 50	6	(1.83)
Over 50 to 345	10	(3.05)
Over 345 to 750	16	(4.87)
Over 750 to 1000	20	(6.10)

REF. ASME/ANSI B30.5 - 1989

B-651-00097

20. If boom should accidentally contact a power line, keep ground personnel away from crane. Stay in the crane until the power source is de-energized. Move the crane away from electrical hazard if this does not cause new hazards. If it is absolutely necessary to leave the crane, **jump** clear of the crane with both feet together. Hop away from the crane with feet together. The ground surface may be energized.

TRAVEL:

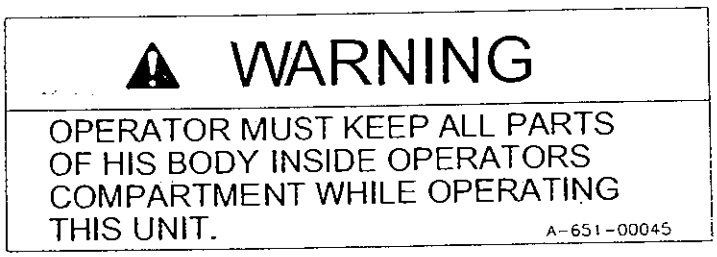
1. For Pick and Carry operation: Traveling with suspended loads involves so many variables, such as ground conditions, boom length and vehicle acceleration, that it is impossible to devise a single standard rating procedure with any assurance of safety. For such operations, the user must evaluate prevailing conditions and determine safe practices using precautions, such as the following:

    A. The boom shall be centered over front axle.
    B. Use shortest boom practical.
    C. Carry load as close to ground as practical.
    D. Reduce travel speed to suit conditions (3 MPH maximum).
    E. Maintain specified tire pressures.
    F. Avoid sudden starts and stops.
    G. Provide tag or restraint lines to snub swinging of the load.
    H. Hand-held tag lines should be nonconductive.
    I. Do not carry heavy boom loads and deck loads at the same time.
    J. Do not pick and carry with boom extension installed.
    K. Do not exceed the OVER FRONT, ON RUBBER capacity.

2. When raising the boom or moving the unit with boom elevated, be sure there is adequate overhead clearance for boom.

3. For carrying loads on decks:
    A. Boom must be retracted, centered and lowered as close as possible.
    B. 3 MPH maximum road speed. Reduce speed below 3 MPH to properly match condition of road surface and deck load.
    C. Remove load hook from load before traveling.

4. Cranes with rear steering require close watch because of "tail swing" when the chassis is turned in tight quarters.

5. 

6. Every effort has been made to make the BMC Industrial Crane a stable vehicle. However, with the rigid front axle and the unsprung oscillating rear axle suspension, the operator must take care to control the vehicle speed to be compatible with conditions of rough roads or uneven terrain.

7. When this crane is to be parked on a grade, set parking brake and block wheels or extend outriggers fully.

8. Shut off engine before refueling, and remove fuel cap slowly. Vapor pressure in tank can cause a burst of fuel and vapor when the cap is removed.

INSTRUMENTS AND CONTROLS

The IC-200 instrument panel is equipped with a fuel gauge, an hourmeter and a bubble level. Also included are warning lights for low oil and transmission pressure, check engine, high coolant and transmission temperature, turn signal, high beam, hazard lights, parking brake and optional four-wheel drive.

The ignition switch is key operated and has OFF, RUN and START positions. The ignition switch should always be turned off and the key removed when the vehicle is left unattended. A horn button is on the shifting control.

The BMC IC-200 is equipped with a standard lighting package. An on-off switch and a high beam indicator are on the instrument panel. The dimmer switch is located on the left hand steering column control. Stop lights are controlled by operating the foot brakes. The turn signal control is located on the left side of the steering column. Moving the lever down indicates a left turn; up indicates a right turn. The emergency flasher lights are actuated by a toggle switch on the instrument panel near the turn signal lever.

The hand brake lever is located on the right side of the operator's seat. To apply, lift the lever until the over-center position is reached. When adjustment is required, turn the knurled knob on the end of the lever clockwise to tighten. The brake must be released before adjustment can be made. A warning light shows when the hand brake is applied. The brake and accelerator pedals are located and operated as they are in other vehicles already familiar to the operator.

A lever on the steering column controls the powershift transmission. Moving the lever upward engages the transmission clutch for forward travel. Rotating the handle of the lever selects the gear that is desired (first through fourth) and engages the clutch for that gear. To put the transmission in reverse, the machine should be brought to a stop. The lever then is pulled downward, through the neutral position, into reverse. The transmission and drive train components can be damaged by shifting from forward to reverse or vice versa while the unit is in motion, or while the engine speed is above 1000 RPM. A neutral safety switch prevents starting the engine with the transmission engaged. The shift lever must be in neutral to start the engine. A parking brake interlock switch prevents driving with the brake on.

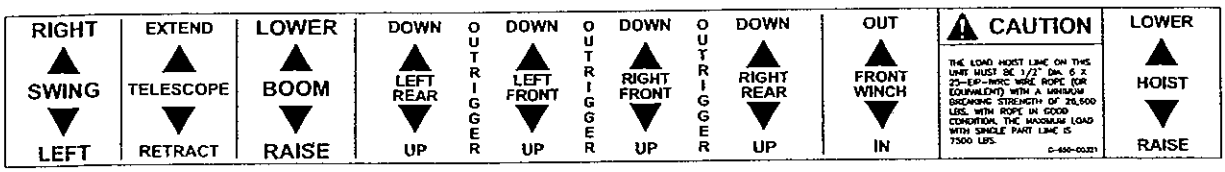
The optional four-wheel drive is controlled by a switch on the instrument panel. Select four-wheel drive when extra traction is needed. It is recommended to operate in two-wheel drive except when wheel slip is likely.

The IC-200-G is equipped with three-mode steering: four-wheel round steering can be used for making tight turns; two-wheel rear steering should be used for traveling long distances; crab steering can be used for maneuvering in tight places. A switch on the dashboard sets the mode. Electronic sensors and controls automatically align the wheels when a new mode is selected, as the wheels are steered past the centered position. The steering wheel is directly mounted to the steering control unit of the all-hydraulic power steering system. The steering system will provide limited steering even if the engine stops running.

The Rated Capacity Limiter display and input panel are mounted on the dashboard. Instructions are in the RCL Operation Manual and additional information is in the Operating the Crane section, the Crane Capacity section and Maintenance Section of this manual.

CONTROL VALVE FUNCTIONS

The controls for operating the outriggers, boom rotation, boom elevation, boom extension and hoist are located along the forward dashboard area. The control handles are directly connected to the 3-position hydraulic valves. The placard located next to these handles identifies the function and direction resulting from each handle movement.



Swing: Pulling back on the lever will rotate the boom to the operator's left; pushing forward will rotate it to the operator's right.

Telescope: Pulling back on the lever will retract the boom; pushing forward will extend the boom. **Retract at a low to medium engine speed only. Overspeed will heat hydraulic fluid and will not increase retraction speed.**

Boom: Pulling back will raise the boom; pushing forward will lower it.

Outriggers: The four outriggers may be operated simultaneously or individually. Special attention must be given to avoid hitting personnel or obstacles.

Hoist: Pulling back on the lever will raise the load line; pushing forward will lower the load line.

All controls may be used for simultaneous operation to achieve combinations of movements. Some controls must be used together. For instance, the boom telescope and the hoist controls must be used together to maintain clearance between boom and load line hook.

Avoid holding a control lever in the open position after the function has reached the end of its travel. This will impose unnecessary stresses on the components and heat the hydraulic system.

SEQUENCE OF OPERATION

DRIVING THE VEHICLE

The following procedure is recommended for driving the vehicle:

1. Perform the daily inspection and test. (See Page 3-4)
2. Apply park brake.
3. Place transmission control lever in neutral.
4. Start engine and allow a warming period.
5. While warming the engine, set up the Rated Capacity Limiter configuration.
6. Stow boom over front.
7. Pull hoist line snug.
8. Retract outriggers.
9. Step on the brake pedal.
10. Release park brake lever.
11. Shift transmission to desired gear.
12. Place forward/reverse lever in desired position.
13. Release brake and press on accelerator pedal.
14. Slow down when making turns.
15. Set park brake and lower outriggers or chock wheels to park.

OPERATING THE CRANE

The following procedure is recommended for placing the crane in operation:

1. Perform daily inspection and test. (See Page 3-4)
2. Apply park brake.
3. Place transmission control lever in neutral.
4. Start engine and allow a warming period at low RPM.
5. While warming the engine, set up the Rated Capacity Limiter configuration.
6. Move accelerator pedal to medium to full speed.
7. Set all outriggers fully down on firm, level surface. Use timber or steel plate cribbing under outrigger shoes as needed on soft or uneven surfaces. Outriggers should remain set during all crane operations except for pick and carry.
8. Meter the controls when beginning or ending movement. This prevents suddenly starting or stopping which causes unsafe load swinging and shock loads on the equipment. The control should be slightly actuated to begin movement and then slowly increased to desired speed. Metering can be improved by coordinating with the accelerator pedal.
9. You may use the throttle control switch to set the engine speed to 1200 or 1800 RPM when the park brake is on. Return to idle by releasing park brake momentarily.
10. Release accelerator during idle time and shut off engine, if practical.

NORMAL GAUGE READINGS

Level Indicator: Do not operate crane if it is not level.

Fuel: Do not allow fuel tank to become empty. The engine will be difficult to restart and may require "bleeding" of diesel injectors. Keep fuel tank full when idle to prevent condensation in tank.

WARNING

Vapors can be formed inside fuel tank and cause buildup of pressure that can result in sudden expulsion of gasoline and gasoline vapors from the filler neck when the fuel cap is removed from a hot tank. Remove cap slowly. Fuel spray may cause injury.

RATED CAPACITY LIMITER (RCL)

A rated capacity limiter is installed on the crane to assist the operator in estimating loads and measuring load radii. Please read the RCL Operation Manual for complete instructions on operation of the system. Following are some additional operating tips.

Always be aware that the RCL can stop boom movement at capacity load conditions and in two-blocking conditions. Use good judgment in controlling the speed of boom movements to prevent shock loads and swinging loads.

If the RCL system stops the crane movement there are various remedies that may be used to restart operation. If the hook is two-blocked, it should be lowered using the hoist control, if safe. The boom raise and telescope retract may also be used if this is safer. In some unusual circumstances it may be necessary to swing the boom before lowering the load. If you are sure this will not cause an overload, you can press and hold the CANCEL button on the RCL control and swing the boom to a safer position.

If the load is the maximum for the loadline or attachment, the load should be set down in a safe place using the hoist lower control and the load or attachment changed. Telescope retract may also be used and swing may be used, if safe, as described in the preceding paragraph. DO NOT USE THE BOOM RAISE CONTROL as this may increase the overload.

If the load is at the maximum allowable load radius, the boom can be raised or retracted to a safe radius or the load may be lowered to a safe place using the hoist control. If the boom extension is at its angle limit, the boom must be raised or the load hoisted down.

If the boom is fully lowered until it stops, (about 0°) the RCL will show an overload condition because the boom lift pressure sensors cannot read a useful pressure in this condition. To remedy this, raise the boom slightly. Or, if the boom is fully raised, (about 73°) the RCL may show an overload condition because the trapped pressure in the boom lift cylinder is sensed to be an overload. To correct this condition, the CANCEL button on the RCL control can be pushed and held and the boom lowered just slightly. Then check for other conditions before lowering further.

If there is a malfunction of the RCL or Anti-Two-Block system that causes loss of boom movement and cannot be remedied by the procedures above, the override keyswitch under the dashboard may be required to move the boom.

WARNING

We recommend the CANCEL button and emergency override switch be used with discretion. Improper or careless use of this switch can cause damage to the crane and endanger people and property. The operator who uses these overrides in an emergency should use good judgment.

There is a light on the dashboard to warn that one or more outriggers is not fully extended when using the "On Outriggers" setup on the RCL. Check the light daily when the outriggers are down and there is no load on the hook by raising and lowering each outrigger about three inches. The light should come on when an outrigger is up.

CRANE CAPACITY

Before lifting loads, the operator must read the **Crane Capacity Chart** and adhere to the load capacities and radii of handling given. The information provided on this chart is based on stability, structural strength and hydraulic capacity.

To operate the crane safely, the operator must know the weight of the load and handling devices and the radius of the lifting operation. The crane must not be loaded beyond the specifications of the capacity chart except for test purposes as provided in ASME B30.5 Section 5-2.2. The person responsible for the lift must be sure that the load does not exceed the crane ratings at any radius at which the load may be during the entire lifting operation. The weights of the hooks, blocks, downhaul weights, slings, and other handling devices must be added with the load. Please read the RCL Operation Manual.

The **Rated Capacity Limiter** on the crane is intended to assist the operator in estimating loads and measuring load radii and to alert the operator to impending overload conditions. The use of the Rated Capacity Limiter does not replace the requirements of the preceding paragraph. Verified weights and measured radii must take precedence over the Rated Capacity Limiter readings.

The Rated Capacity Limiter displays a load, load radius and boom angle that are obtained from electronic calculations using readings from pressure, length and angle sensors. These readings cannot be exact and should be treated as estimates. In general, the smaller the load and the higher the boom angle, the larger the percent of error. And the electronic and mechanical components cannot be 100% fail-safe.

Do not consider the system as a substitute for good judgment, training, experience or accepted safe operating practices. The operator is solely responsible for operation of the crane. Setting the Rated Capacity Limiter for the configuration of the crane is necessary before starting a lift. If incorrectly set, the system will not alert the operator to an impending overload, possibly resulting in the loss of life or destruction of property.

If the Rated Capacity Limiter is inoperative or malfunctioning, repair or recalibration of the unit must be done as soon as reasonably possible, and the person responsible for lifts must establish procedures for determining load weights and radii and conduct the lifts according to the second paragraph above.

The Rated Capacity Limiter is designed to stop crane functions that could cause an overload or two blocking. These are: BOOM LOWER, TELESCOPE EXTEND, HOIST RAISE, SWING LEFT and SWING RIGHT. Great care must be exercised when handling a load near capacity or near a two-blocking condition. If the boom is being lowered or swung, the load will tend to swing if the Rated Capacity Limiter stops the boom movement. If the load is moving too fast, the sudden stopping by the system can cause dangerous load swinging which can cause death or injury to personnel or property damage by impact with the load or by the crane tipping.

WARNING

The Rated Capacity Limiter can suddenly stop the boom lower and swing functions, causing the load to bounce or swing. Use great care when handing a load near capacity limits or near a two-blocking condition.

CRANE CAPACITY CHART DEFINITIONS AND RULES:

The load radius is the horizontal distance from the centerline of boom rotation (the center of the turntable when it is level), to the vertical load line with the load suspended. Because of deflections of the boom and carrier, the load radius increases when a load is hoisted from its resting place. The load radius may be measured with a measuring tape. If the desired load radius falls between two load radii on the chart, it is recommended to use the load radius with the lower capacity and not try to interpolate between the numbers.

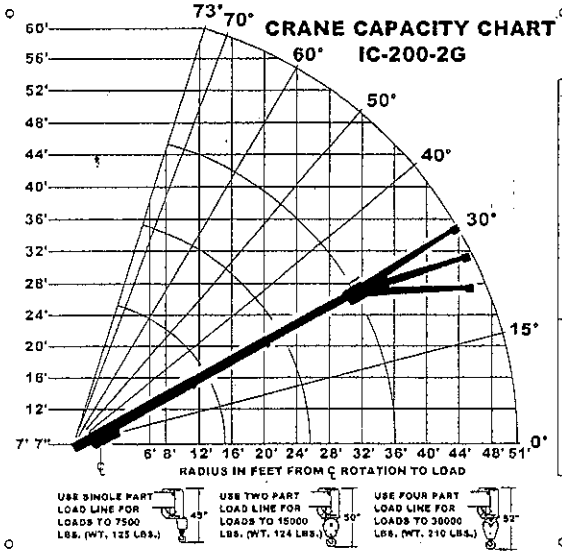
Load capacity ratings on this equipment are given on the basis that operations are to be conducted on firm and level terrain and in a safe environment. These capacity ratings are reduced in proportion to the deviation from the prescribed conditions. Any unfavorable environmental condition, such as soft, sloping or uneven terrain, high wind, or hazardous surroundings constitutes a deviation.

The main boom capacities are given in direct relation to the radius at which the load is being handled. Boom extension capacities depend on the boom angle as well as the load radius. The capacities shown on the capacity chart are the maximum allowable at the indicated radius. The greatest load that may be handled by the BMC IC-200 is 30,000 pounds, but only at a 6 foot radius and on outriggers. All variances of loads and radii of handling are shown on the crane capacity chart. A metal chart is attached near the operator's seat and a laminated chart is included in the literature compartment for the express purpose of informing the operator when a load can or cannot be safely handled.

The capacities shown in the "360° ROTATION" columns of the capacity chart apply to the entire 360 degree rotation of the boom and are maximum allowable at the indicated radius. The capacities OVER FRONT are limited to the work area sectors on the placard.

Note that the "360 DEGREE ROTATION" capacities at some load radii are much less than the OVER FRONT capacities. The least stable position of the boom is over the side of the crane. Use great care when swinging a load from the front or rear of the crane toward the side of the crane. The load must be known in order to assure that the crane will not tip.

CRANE CAPACITY CHART
IC-200-2G



USE SINGLE PART LOAD LINE FOR LOADS TO 7500 LBS. (WT. 125 LBS.) 49"

USE TWO PART LOAD LINE FOR LOADS TO 15000 LBS. (WT. 124 LBS.) 50"

USE FOUR PART LOAD LINE FOR LOADS TO 30000 LBS. (WT. 210 LBS.) 52"

CAPACITIES APPLY TO OPERATION ON FIRM LEVEL SURFACE

	LOAD RADIUS FEET	MAIN BOOM OR EXTENSION CAPACITIES IN POUNDS			
		360° ROTATION		OVER FRONT	
		ON RUBBER	ON OUTRIGGERS	ON RUBBER	ON OUTRIGGERS
MAIN BOOM	6	16200	30000	17000	30000
	8	13200	24000	13800	24000
	10	10600	19800	11500	19800
	12	7800	16100	9600	16100
	14	6100	13500	7900	13500
	16	4900	11200	6300	11200
	18	4000	10000	5100	10000
	20	3300	8800	4300	8800
	22	2800	7700	3600	7800
	24	2350	6600	3000	6900
	26	2050	5750	2600	6200
	28	1800	5150	2300	5700
	30	1600	4650	2100	5300
	32	1400	4200	1850	4900
	36	1150	3400	1500	4200
15' BOOM EXT.	40	900	3050	1200	3600
	44	650	2600	950	3100
	48	450	2200	750	2700
	51	250	1900	600	2400

BOOM EXTENSION ANGLE	15-FOOT BOOM EXTENSION - STRAIGHT OR OFFSET MAIN BOOM ANGLE						
	0°	15°	30°	40°	50°	80°	70°
0°	---	3100	3450	3900	4650	6000	7500
15°	---	3000	3100	3300	3650	4250	5200
30°	---	---	3000	3050	3200	3450	3900

CAUTION BOOM EXTENSION LOADS MUST NOT EXCEED MAIN BOOM CAPACITY.

CAPACITIES ON OUTRIGGERS ARE 85% OF TIPPING LOADS. CAPACITIES ON RUBBER ARE 75% OF TIPPING LOADS. CAPACITIES BELOW BOLD LINE ARE LIMITED BY TIPPING. OTHER CAPACITIES ARE LIMITED BY STRUCTURAL OR HYDRAULIC CAPABILITY.

DECK LOAD CAPACITY 17000 LBS, WITH EMPTY BOOM RETRACTED OVER FRONT, DECK LOAD CENTERED TO REAR OF FRONT AXLE, LESS THAN 2 MPH, 200 FT. MAX IN 30 MINUTES ON SMOOTH PAVEMENT.

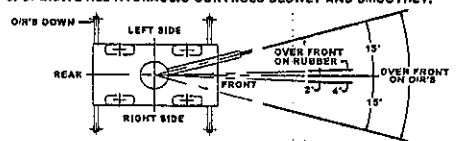
THE BOOMS ON THIS UNIT ARE ALL STEEL AND HAVE NO LINE VOLTAGE RATING.

MAXIMUM HYDRAULIC PRESSURE 2600 PSI.

BOOM EXTENSION DEDUCT: 400 LBS. WHEN STOWED ON BASE BOOM.

OPERATION:

1. READ AND UNDERSTAND OPERATION MANUAL BEFORE OPERATING CRANE.
2. CHECK LEVEL OF HYDRAULIC OIL DAILY.
3. CHECK UNIT FOR VISIBLE DEFECTS AND LOOSE PARTS.
4. SET VEHICLE PARK BRAKE SECURELY.
5. EXTEND OUTRIGGERS TO SOLID FOOTING AND LEVEL CRANE.
6. OPERATE ALL HYDRAULIC CONTROLS SLOWLY AND SMOOTHLY.



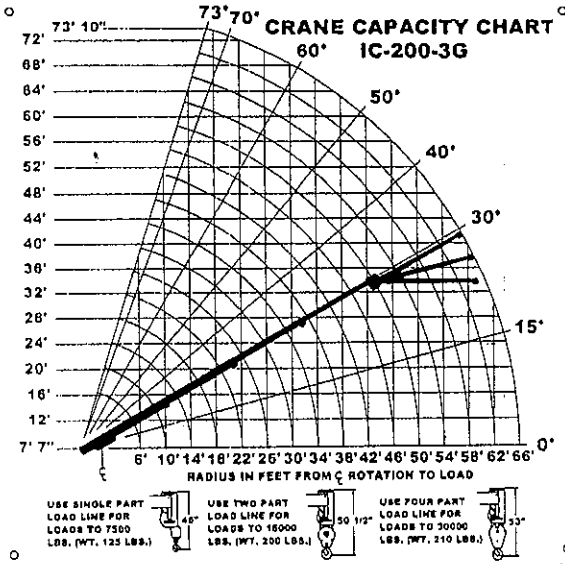
THE LOAD HOIST LINE ON THIS UNIT MUST BE 1/2" DIA. 6 X 25-EIP-IWRC WIRE ROPE (OR EQUIVALENT) WITH A MINIMUM BREAKING STRENGTH OF 26,250 LBS.

APPROVED TIRES: 385/65D22.5, 16 PLY - 120 PSI
TORQUE WHEEL NUTS TO 500 FT. LBS. (THESE CONDITIONS MUST BE MAINTAINED TO HANDLE RATED LOADS ON THIS CRANE)

MODEL NO.	SERIAL NO.	DATE OF MFR.
IC-200-2G		

BRODERSON MANUFACTURING CORP.
LENEXA, KANSAS

D-654-00484



CAPACITIES IN POUNDS FOR OPERATION ON FIRM LEVEL SURFACE

LOAD RADIUS	MAIN BOOM ONLY				BOOM EXTENSION			
	ON RUBBER		ON OUTRIGGERS		ON RUBBER		ON OUTRIGGERS	
FEET	360°	FRONT	360°	FRONT	360°	FRONT	360°	FRONT
8	16000	16400	30000	30000	---	---	---	---
8	12500	13000	22400	22400	---	---	---	---
10	10000	10500	18500	18500	7500	7500	7500	7500
12	8040	8700	15700	15700	7500	7500	7500	7500
14	6500	7200	13500	13500	7500	7500	7500	7500
16	5330	6200	10800	10800	6140	7500	7500	7500
18	4450	5400	9860	9860	5010	6440	7500	7500
20	3720	4700	8550	8550	4200	5430	7500	7500
22	3140	4200	7700	7700	3880	4860	6850	6850
24	2660	3700	6960	6960	3080	4030	6250	6250
26	2300	3200	6300	6350	2660	3630	5760	5760
28	1980	2800	5550	5800	2290	3100	5300	5300
30	1700	2460	4830	5320	1990	2710	4920	4920
32	1479	2150	4200	4900	1730	2400	4580	4580
34	1260	1850	3700	4620	1510	2130	4270	4270
36	920	1300	2670	3670	1140	1660	3530	3760
42	640	950	2400	3340	840	1320	2980	3340
46	390	650	1840	2890	600	1040	2440	2980
50	0	550	1750	2520	410	800	2040	2630
54	---	---	---	---	0	600	1710	2290
58	---	---	---	---	0	430	1370	2000
62	---	---	---	---	0	290	1140	1740
66	---	---	---	---	0	0	930	1500

BOOM EXT. ANGLE	BOOM EXTENSION - STRAIGHT OR OFFSET MAIN BOOM ANGLE						
	0°	15°	30°	40°	50°	60°	70°
0°	3000	3100	3450	3900	4650	6000	7500
15°	---	3000	3000	3000	3000	3700	5000
30°	---	---	2500	2500	2500	3100	3800

CAUTION BOOM EXTENSION LOADS MUST NOT EXCEED MAIN BOOM CAPACITY.

CAPACITIES ON OUTRIGGERS ARE 85% OF TIPPING LOADS. CAPACITIES ON RUBBER ARE 75% OF TIPPING LOADS. CAPACITIES BELOW BOLD LINE ARE LIMITED BY TIPPING. OTHER CAPACITIES ARE LIMITED BY STRUCTURAL OR HYDRAULIC CAPABILITY.

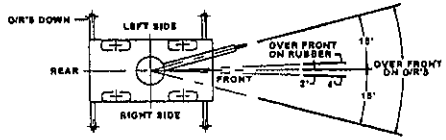
DECK LOAD CAPACITY 17000 LBS, WITH EMPTY BOOM RETRACTED OVER FRONT, DECK LOAD CENTERED TO REAR OF FRONT AXLE, LESS THAN 2 MPH, 200 FT, MAX IN 30 MINUTES ON SMOOTH PAVEMENT.

THE BOOMS ON THIS UNIT ARE ALL STEEL AND HAVE NO LINE VOLTAGE RATING.

MAXIMUM HYDRAULIC PRESSURE 3000 PSI.

BOOM EXTENSION DEDUCT: 400 LBS. WHEN STOWED ON BASE BOOM.

OPERATION:
1. READ AND UNDERSTAND OPERATION MANUAL BEFORE OPERATING CRANE.
2. CHECK LEVEL OF HYDRAULIC OIL DAILY.
3. CHECK UNIT FOR VISIBLE DEFECTS AND LOOSE PARTS.
4. SET VEHICLE PARK BRAKE SECURELY.
5. EXTEND OUTRIGGERS TO SOLID FOOTING AND LEVEL CRANE.
6. OPERATE ALL HYDRAULIC CONTROLS SLOWLY AND SMOOTHLY.



THE LOAD HOIST LINE ON THIS UNIT MUST BE 1/2" DIA. 6 X 25-EIP-IWRC WIRE ROPE (OR EQUIVALENT) WITH A MINIMUM BREAKING STRENGTH OF 26,250 LBS.

APPROVED TIRES: 385/65D22.5, 16 PLY - 120 PSI
TORQUE WHEEL NUTS TO 500 FT. LBS. (THESE CONDITIONS MUST BE MAINTAINED TO HANDLE RATED LOADS ON THIS CRANE)

MODEL NO.	SERIAL NO.	DATE OF MFR.
IC-200-3G		

BRODERSON MANUFACTURING CORP.
LENEXA, KANSAS

D-654-00485

CAUTION

A capacity load may be carried on the boom, or a capacity load may be carried on the deck, but not at the same time. Maximum combined boom and deck load is limited to the rated boom load or 17,000 pounds, whichever is less.

CAUTION

The "ON OUTRIGGER" capacities of this crane are based on all outriggers being FULLY EXTENDED to a FIRM, LEVEL surface with no load on the tires. The crane may tip at less than capacity loads if operated in the following manner:

A. Outriggers only partially extended and resting on curbing, shoring, etc. If the outriggers are not all the way DOWN, they are not all the way OUT.
B. Crane operated on a hill or sloping surface. Crane will tip at less than rated capacity when load is lifted on downhill side.
C. Outriggers extended to a surface that appears to be firm, but is unable to support the outrigger pad at full rated loads. Examples of this type surface are:
    1. Thin or cracked blacktop or concrete.
    2. Dirt that appears dry and firm on top but is moist or unpacked beneath the surface.
    3. Dirt with a frozen but thin crust.

The Construction Safety Association of Ontario (CSAO) has a general formula. Take the maximum rated capacity of a crane in tons and divide it by 5, and the result is the amount of cribbing you need in square feet. For a crane with maximum capacity of 15 tons, the formula is: 15/5 = 3sq.ft. = 1.73'x1.73' = (21"x21") of cribbing surface. Remember this is just a rule of thumb. You still have to use experience to adjust the formula up or down to suit your particular site conditions.

CAPACITY EXAMPLE (See Boom Extension Capacity Example Page 2-20)

Refer to the IC-200-3G capacity chart on the preceding page. A load 5' X 5' X 5' and weighing 14,000 pounds is to be lifted onto the deck of the crane for transport to a new location. We see on the chart that 7500 pounds is the maximum load on one-part line, so the sheave block is required. The charts show the weight of the standard sheave block to be 210 pounds. The rigger says that two slings are required, weighing a total of 50 pounds. The total load is 14,000+210+50=14,260.

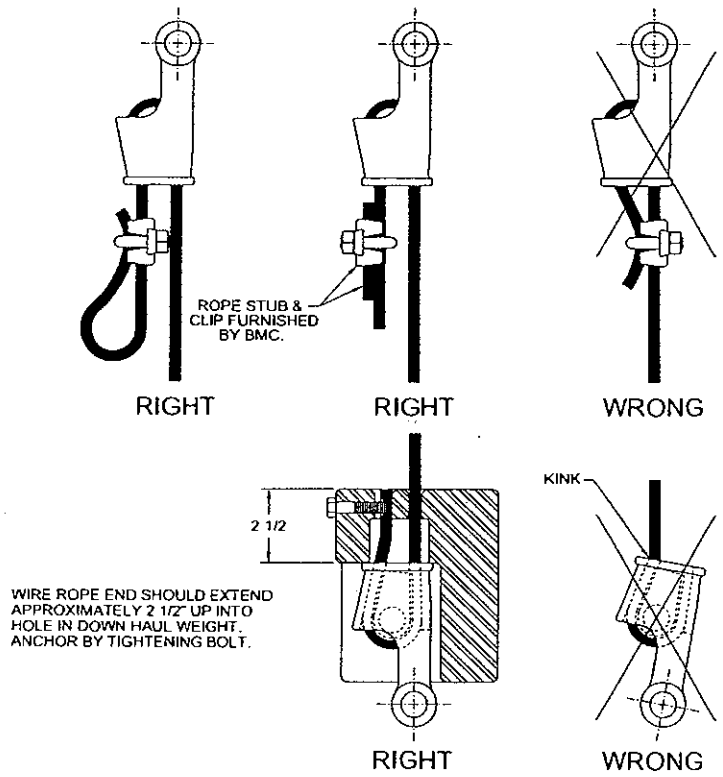
Looking at the "360° ROTATION, ON RUBBER" column we see that we can lift 16,000 pounds at a 6 foot load radius. However, this radius is less than the distance from the center of rotation to the center of the load, with the crane parked next to the load, so the load cannot be lifted this way. This leaves the ON OUTRIGGERS columns. The outriggers should always be used whenever possible anyway. We see that we can lift up to 18,500 pounds at a 10 foot load radius, either over the front or over the side. If possible, position the crane to lift the load over the front. This is the best position for stability. Checking the chart again, we see that the load is within the deck load limit of 17,000 pounds and that the travel speed with the load must be limited to creep speed. Creep speed is less than 2 MPH and not to exceed 200 feet in a 30 minute period. This is an approved relationship between load, tire pressure and speed. **REMEMBER THAT AS THE BOOM IS LOADED, DEFLECTION OF THE BOOM, TIRES, ETC. WILL INCREASE THE LOAD RADIUS. SO BE CONSERVATIVE IN YOUR CAPACITY ESTIMATE.**

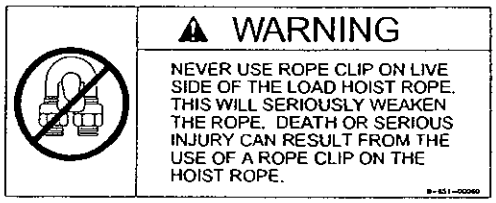
SHEAVE BLOCK AND DOWNHAUL WEIGHT

The capacity chart shows the approved hoist rope arrangements. The downhaul weight and sheave blocks supplied by Broderson are specially designed to operate the Anti-Two-Block system. Other blocks or downhauls may bypass this system and create a dangerous condition. Notice the load limit for each hoist rope arrangement.

The keeper pins that pass through the sheave plates must be locked in place with cotters to hold the line on the sheaves. The load line must pass through the center of the downhaul, through the wedge socket, and the dead end clamped in the block as shown in the figure below.

WIRE ROPE INSTALLATION



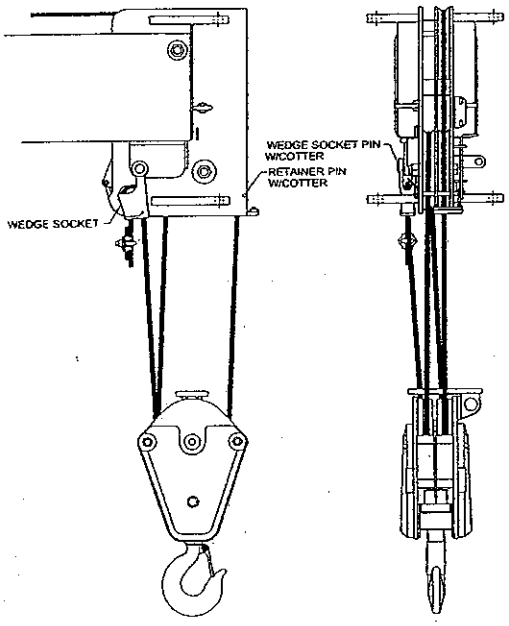


When resting the downhaul or sheave block on the ground for changing it, use the following procedure to prevent fouling the load line on the hoist. Raise the boom about 5 feet and lower the hoist until the hook nearly touches the ground. Then lay the hook on the ground by lowering the boom, not the hoist.

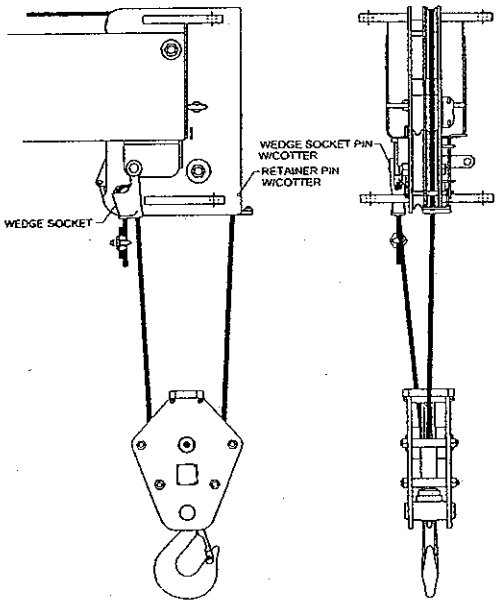
MULTI-PART LINE REEVING

For loads above 7,500 pounds the sheave block must be used. The four-part-line sheave block can be used for loads up to 30,000 pounds. The optional two-part-line sheave block can be used for loads up to 15,000 pounds. The wedge socket should be pinned to the wedge socket anchor as shown in the figure. The dead end of the rope in the wedge socket should be clamped as shown in the figures. **The clamp must not be used on the live part of the rope.** This will seriously weaken the rope. The sheave block should hang straight, and the top of the block should meet the boom sheave plates squarely when pulled up snugly.

IC-200-1G, 2G

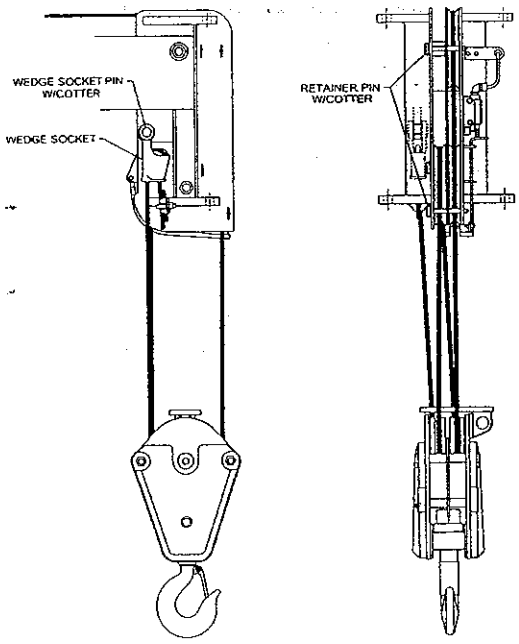


FOUR-PART-LINE REEVING

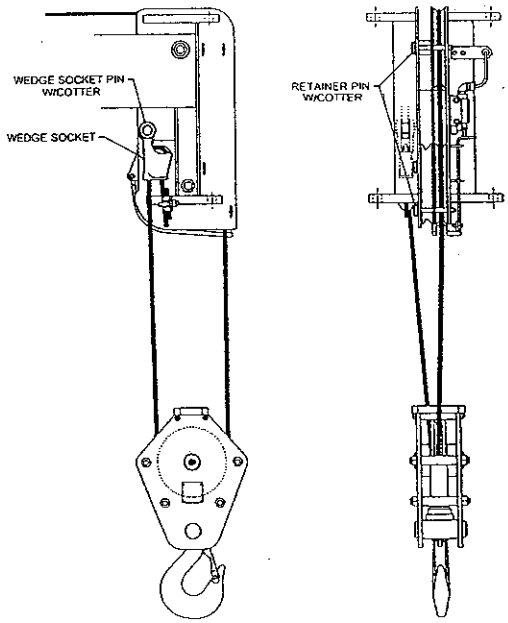


TWO-PART-LINE REEVING

IC-200-3G



FOUR-PART-LINE REEVING



TWO-PART-LINE REEVING

SAFETY DEVICES

There are certain safety devices on the IC-200 that are designed to maintain control of a load even if power or hydraulic line failure should occur. The operator should understand the function and operation of these devices so that a continual check on their performance can be made.

OUTRIGGER CYLINDER CHECK VALVE:
A double-acting check valve is integrally mounted on each of the outrigger cylinders. This valve holds the outrigger in the extended position should power or hydraulic line failure occur. This valve has no adjustment. If an outrigger creeps up while supporting a load, there is an internal leak in the valve or in the outrigger cylinder piston seal. In either case, maintenance is required.

BOOM ELEVATION CYLINDER HOLDING VALVE:
A single-acting holding valve is integrally mounted on the cylinder barrel. This valve holds the boom in the elevated position should power or hydraulic pressure line failure occur. This valve is adjustable to hold the desired load. If the boom creeps down with loads up through maximum capacity, this valve should be adjusted. If adjustment fails to correct the problem, there is an internal leak in the holding valve or the hydraulic cylinder. Refer to the maintenance instructions.

BOOM TELESCOPE CYLINDER HOLDING VALVE:
A single-acting holding valve is flange-mounted to the cylinder rod end. This valve holds the cylinder in the extended position should power or hydraulic pressure line failure occur. This valve is adjustable to hold the desired load. If the boom creeps in under load, this valve should be adjusted. If adjustment fails to correct the problem, there is an internal leak in the holding valve or the hydraulic cylinder. Refer to the maintenance instructions.

ANTI-TWO-BLOCK SYSTEM:
This system prevents damage to the hoist rope and machine components from accidentally pulling the load hook against the boom tip. A pivot arm-actuated electric switch is connected through a cable reel mounted on the boom to a solenoid dump valve in the hydraulic circuit. This valve will dump the HOIST RAISE, TELESCOPE EXTEND, BOOM LOWER, SWING LEFT, and SWING RIGHT circuits. No other circuits are affected. These circuits are returned to normal operation by operating the HOIST LOWER or TELESCOPE RETRACT control.

An emergency override switch is provided so the boom can be operated in case of system failure. This key-operated switch is located under the left side of the instrument panel.

WARNING

We recommend the emergency override switch be used with discretion. Improper or careless use of this switch can cause damage to the crane and endanger people and property. The operator who uses this key in an emergency should use good judgment.

OPTIONAL EQUIPMENT

INSTALLING BOOM EXTENSION ON TIP OF BOOM:

1. Set the outriggers.
2. Pay out 30 feet of load line.
3. Lower and retract boom and position over front.
4. If the sheave block is installed, remove it.
5. Remove load line from tip sheaves and lay over left-hand side of boom.
6. Make sure the front stow pin is in place and the attach pins are removed from the lugs on the boom tip and the mating lugs on the boom extension.
7. Remove the rear locking pin and swing the boom extension away from the rear end of the boom until the attaching lugs mesh on the right-hand side of the boom.
8. Insert the attach pins in the right-hand lugs and retain them with the hairpin cotters.
9. Remove the front stow pin and extend the boom about one foot.
10. Swing the boom extension around to the front until the left-hand lugs mesh, and insert the left-hand attach pins in their lugs and retain them with hairpin cotters.
11. Replace the lock pin and stow pin in their brackets for storage and insert their hairpin cotters.
12. Lay the load line over the main boom and extension tip sheaves and insert the cable retainer pins and cotters.
13. Install the downhaul weight, wedge socket and swivel hook on the load line if they are not already installed.
14. Disconnect the anti-two-block wiring cable from the switch on the main boom tip and connect it to the cable connector on the boom extension base.
15. Check the Anti-Two-Block System for proper operation.

CAUTION

Do not pick and carry with boom extension installed.

SETTING THE OFFSET ANGLE ON THE OFFSETTABLE BOOM EXTENSION:

1. The boom extension must be installed on the main boom tip and the load line, downhaul weight and wedge socket installed on the boom extension and secured with all of the retainer pins.

2. Draw the load line taut with the hoist by pulling the downhaul weight against the bottom of the tip sheave plates while holding the anti-two-block override switch under the control panel.

WARNING

Be careful not to operate the TELESCOPE lever while overriding the anti-two-block system. This may break the load line and allow the boom extension and downhaul weight to fall, causing death or serious injury to personnel.

3. Remove the offset index pin from the boom extension knuckle. To loosen the pin it may be necessary to rock the boom extension tip up and down manually while maintaining the proper tension in the load line.

4. Lower or raise the load line with the hoist until the 0, 15, or 30 degree offset holes align in the knuckle.

5. Insert the index pin in the knuckle and retain it with the hairpin cotter.

STOWING THE BOOM EXTENSION:

1. If the boom extension is offset to 15 or 30 degrees, return it to the zero offset position as described above.

2. Reverse the procedure described in steps 10 through 14 in the boom extension installation procedure above.

3. Telescope the boom to about one foot of extension.

4. Swing the boom extension alongside the main boom and hold it there while retracting the boom so that the stow bracket slides up the ramp on the main boom.

5. Insert the stow pin in the front stow bracket and replace the cotter.

6. Remove the attach pins from the right-hand boom lugs, swing the boom extension into place in the rear stow lugs, and replace the lock pin and cotter.

7. Lay the load line back in the tip sheaves and insert retainer pins and cotters.

8. Replace all of the pins in their lugs for storage and insert their cotters.

9. Install the sheave block or downhaul weight on the load line.

CAPACITY EXAMPLES FOR BOOM EXTENSION

The BOOM EXTENSION ANGLE and the LOAD RADIUS capacity charts must both be considered when using the boom extension. The smaller capacity specified by the two charts must be used. Refer to the IC-200-3G, Capacity Chart on page 2-13 for the following examples:

In this first example the boom is elevated to 30° over the side of the crane. The boom extension is offset to 15°, and the load radius is 32 feet. The outriggers are fully extended on concrete pavement and the crane is level. The column for BOOM EXTENSION, ON OUTRIGGERS 360° shows the capacity at the 32 foot load radius to be 4580 pounds. The column for BOOM EXTENSION, MAIN BOOM ANGLE 30° shows the capacity at the 15° boom extension angle to be 3000 pounds. Since 3000 pounds is less than 4580 pounds, the load (including the downhaul weight and slings) must be limited to 3000 pounds.

In the second example the boom is elevated to 40° over the side of the crane. The boom extension is offset to 0°, and the load radius is 38 feet. The outriggers are fully extended on concrete pavement and the crane is level. The column for BOOM EXTENSION, ON OUTRIGGERS 360° shows the capacity at the 38 foot load radius to be 3530 pounds. The column for 16 FOOT BOOM EXTENSION - STRAIGHT OR OFFSET, MAIN BOOM ANGLE 40° shows the capacity at the 0° boom extension angle to be 3900 pounds. Since 3530 pounds is less than 3900 pounds, the load must be limited to 3530 pounds.

FRONT AUXILIARY WINCH:

The front auxiliary winch is mounted behind the front bumper and is controlled from the operator compartment. The winch has 115' of 7/16" diameter XIP wire rope (20,200 pound breaking strength) and a 5-ton hook. It has a single-part-line pull of 7500 pounds on the bare drum.

The front auxiliary winch is designed for the following uses:

1. As a tag line for restraining loads on the boom load line during pick-and-carry operation.
2. To drag loads on the ground to a position where they may be safely lifted with the boom.
3. To pull the crane out of mud or other obstacles.
4. To pull a smaller vehicle that is stuck.

WARNING

The front winch is not designed for lifting personnel or loads. Observe the following safety rules:

1. Never lift or carry personnel with the winch and wire rope.
2. Do not allow anyone to stand near or under the load being moved.
3. Be sure the cable is securely anchored in the drum and that at least 5 wraps of rope remain on the drum to insure against the rope pulling out of its anchor.
4. Stand clear of a loaded winch cable. If it breaks, it can be very dangerous.
5. Keep hands clear of the winch and any sheaves that the cable passes over when the winch is being operated.

MAINTENANCE

SAFETY RULES

1. Lower load and boom, shutdown engine, remove key and put it in a safe place. Place warnings on the ignition switch and crane controls to prevent unauthorized starting or movement during maintenance. Disconnect battery when disabling crane. Disconnect battery, RCL and engine electronic module when welding on crane.

2. Relieve hydraulic pressure when working on hydraulic parts by cycling the controls with the engine shut down.

3. Allow fluids and parts to cool before working on them.

4. Read maintenance instructions before beginning work.

5. Do not check for hydraulic leaks with hands. If a mist of hydraulic oil is noticed around a line or component, use cardboard or other material to check for location of leaks. High pressure fluid leaking from a small hole, can be almost invisible, yet have enough force to penetrate the skin. If injured by escaping fluid, see a doctor at once. Serious reaction or infection can occur.

6. Wear safety glasses and shoes.

7. Do not wear loose-fitting or torn clothing.

8. Remove rings and other jewelry.

9. Wear heavy leather gloves when working on wire rope.

10. Keep clothing and hair away from moving parts.

11. To prevent falls, clean areas of crane that are stepped on for access to crane parts. Wear slip resistant footwear.

12. Avoid placing body parts in pinch points. Use tools that extend through the pinch points when possible. Block the moving parts securely when it is necessary to work in pinch points.

13. When inflating or adding air to a tire, place a tire cage over the tire and use a clip-on inflater chuck with an extension hose that will permit standing behind the tire tread when inflating.

14. Do not work on any machine that is supported only by jacks or a hoist. Always use adequate blocks or jack stands.

15. If it is necessary to work on the boom in an unstowed condition, block it to prevent it from dropping unexpectedly.

16. Use a hoist when lifting components that weigh 50 pounds or more. Follow all hoist and rigging safety rules.

17. Do not use lower grade fasteners if replacements are necessary.

18. When reinstalling wiring or plumbing after repairs, be sure that it will not be damaged by rubbing against sharp, rough or hot surfaces or edges.

19. Never use a rope clip on live side of the load hoist rope. This will seriously weaken the rope. Death or serious injury can result from the use of a rope clip on the hoist rope.

20. Replace any instruction or warning placards that are lost or damaged.

21. Always replace all guards and covers after working on the crane.

22. After working on the hydraulic system, remove air from the lines and cylinders involved by cycling them full stroke with the engine running until the functions operate smoothly.

23. When welding on the crane or on anything connected to the crane by wire rope or other conducting link, disconnect the battery, the Rated Capacity Limiter display and computer and the engine electronic control module.

24. When using pressure spray to clean the crane, cover all electronic components with sheets of plastic to protect them from spray.

MAINTENANCE

The Broderson IC-200 Industrial Crane will perform better and longer if a program of inspection, lubrication, adjustment and general preventive maintenance is followed. We recommend the following schedule:

NEW UNIT INSPECTION AND TEST

The following inspection and test should be made before placing the unit on the job. This will insure that no damage or loss of operating capability occurred during shipment.

1. Check for physical damage.
2. Check for leaks at fittings and drips under chassis.
3. Check radiator coolant level.
4. Check engine oil level.
5. Check hydraulic oil reservoir level.
6. Check transmission oil level.
7. Check fuel tank level.
8. Check tire pressure.
9. Check for loose pins, bolts, and retainers.
10. Check for operation of foot brake.
11. Check for operation and adjustment of parking brake. (pg. 3-25)
12. Check for operation of accelerator pedal.
13. Start engine.
14. Check power steering for operation.
15. Check operation of transmission gear selector lever.
16. Check lights for operation.
17. Test-drive unit and check for normal operation.
18. Check operation of hydraulic outriggers.
19. Check boom rotation.
20. Check boom elevation.
21. Check boom extension (pay out hoist cable during power extension).
22. Check boom chains and chain sheaves on IC-200-3.
23. Check anti-two-block system for proper operation and cutout of boom functions.
24. Perform a load test according to the Rated Capacity Limiter Operation Manual.
25. Check the outrigger warning light for proper operation as described on page 2-9.

WARNING

When the Rated Capacity Limiter is inoperative or malfunctioning, it must be repaired as soon as reasonably possible. When a lift must be made without a properly functioning load indicator or RCL, the designated lift supervisor must establish procedures for determining load weights and load radii and conducting the lift safely.

OPERATOR INSPECTION AND TEST

An operator, in the course of normal operation, should make certain observations, inspections and tests to assure that the unit is ready to perform safely.

Daily:

1. Check levels of engine oil, coolant and transmission fluid.
2. Drain water from diesel fuel filter.
3. Check air cleaner intake system for cracks or looseness.
4. Check general condition of tires.
5. Visually inspect for loose pins, bolts, physical damage and leaks.
6. Check hydraulic hoses, particularly those that flex during crane operation.
7. Check hydraulic oil level.
8. Check fuel level.
9. Check hydraulic filter indicator gauge after running at least twenty minutes.
10. Check hydraulic brake operation.
11. Check parking brake operation. (See park brake test and adjustment.)
12. Check power steering operation.
13. Observe chassis for normal driving operation.
14. Observe boom operation for normal power and speed.
15. Check load line and hooks for damage.
16. Check condition of sheaves and load line retainers.
17. Check anti-two-block system for proper operation.
18. Check back-up alarm for proper operation.
19. Check operation of all transmission gears, forward and reverse.
20. Clean all glass (if equipped) and check for cracks.
21. Check operation of all warning and safety devices.
22. Check operation of Rated Capacity Limiter according to the RCL Operation Manual.
23. Check the outrigger warning light for proper operation as described on page 2-9.

Weekly:

1. Check tire pressure: 120 PSI.
2. Check for loose wheel nuts. (500 foot-pounds torque required.)
3. Check lights and turn signals.
4. Check power steering lines for damage.
5. Check brake lines for damage.
6. Check operation of horn.
7. Check operation of hoist brake for smoothness.
8. Check outrigger holding valves for operation.
9. Check boom lift holding valve for operation.
10. Check rotation gears for looseness or backlash.
11. Check boom extension cylinder holding valve for operation.
12. Check operation of windshield wipers (if equipped).
13. Boom extension (if equipped) properly pinned with retainers in place.
14. Check boom chains and chain sheaves.

WARNING

Vapor can form inside a fuel tank and cause a buildup of pressure. This can result in a sudden expulsion of gasoline and vapor from the filler neck when the fuel cap is removed from a hot tank. Remove cap slowly. Fuel spray may cause injury.

IC-200 MAINTENANCE CHECKLIST

Refer to the component maintenance section of this manual and to the engine operator's manual for complete instructions.

50 HOUR INTERVAL:

1. 50 hour lubrication as shown on lube schedule.
2. Inspect wire rope thoroughly.
3. Inspect for physical damage and leaks.
4. Clean radiator fins and check coolant level.
5. Check tire pressure and condition. Inflate tires to 120 PSI.
6. Check fluid levels in engine, transmission, hydraulic tank, and brakes.
7. Clean air filter inlet screen and empty the precleaner dust cup.
8. Inspect air intake and exhaust systems for cracks, leaks and loose bolts.
9. Change engine oil and filter after first 50 hours and at 250 hours thereafter
10. Check tension and condition of fan and alternator belts.
11. Check the hydraulic filter indicator with warm oil; change element if indicated.
12. Check rotation gear and pinion fit and gear train backlash.
13. Check rotation bearing and gearbox bolt tightness.
14. Check axle mounting bolts and pins.
15. Torque wheel mounting nuts. (500 foot-pounds torque)
16. Check for loose pins or pin retainers.
17. Check steering lines for damage.
18. Inspect sheaves and hooks for damage or excessive wear.
19. Visually inspect welds on boom, turret and outriggers.
20. Perform a load test according to the Rated Capacity Limiter Operation Manual.
21. Check operation of outrigger warning light as described on page 2-10.
22. Clean the two steering alignment proximity sensors' tips with a rag.
23. Check park brake cable adjustment as described on page 3-25.

250 HOUR OR 3 MONTH INTERVAL:

1. 50 hour maintenance.
2. 50 and 250 hour lubrication.
3. Clean engine and battery.
4. Change engine oil and filter.
5. Clean crankcase breather.
6. Clean and inspect distributor and ignition wires.
7. Clean the air filter. (Clean element every 100 hours if used in dusty conditions.)
8. Check engine mounts and radiator mounts.
9. Inspect all bolts on the machine for tightness.
10. Visually inspect all welds for cracks.
11. Check hydraulic fittings and centerpost for leaks.
12. Adjust and lubricate boom chains and chain sheaves.

500 HOUR OR 6 MONTH INTERVAL:

1. 250 hour maintenance.
2. 50, 250 and 500 hour lubrication.
3. Change fuel filter element.
4. Change air filter element.
5. Check antifreeze for protection level and cleanliness.
6. Inspect engine fan.
7. Check water pump and connections for leaks.
8. Check fuel pump and connections for leaks.
9. Change hydraulic filter element, if not changed in the last 250 hours and inspect oil from element.
10. Change transmission filter element and inspect oil from element.
11. Check condition of all operational and warning placards.
12. Torque mounting bolts on rotation bearing and gearbox, winch and axles.
13. Inspect boom sections for signs of overload, excessive wear, or other damage.

1000 HOUR OR 12 MONTH INTERVAL:

1. 500 hour maintenance.
2. 50, 250, 1000 hour and 12 month lubrication.
3. Adjust engine valve clearance per engine manual.
4. Perform engine maintenance specified in engine manual.
5. Change hydraulic fluid and filter and clean breather and reservoir.
6. Change transmission fluid and filter and clean strainer.

24 MONTH INTERVAL:

1. 12 month maintenance.
2. Pressure test engine cooling system.
3. Flush cooling system.
4. Change engine thermostat.
5. Fill with new coolant and distilled water.
6. Perform engine maintenance specified in engine manual for 24 month interval.

S/N:_____ HOURS:_____ DATE:_____ BY:_____

COMMENTS & PARTS REQUIRED:_____

_____

_____

_____

_____

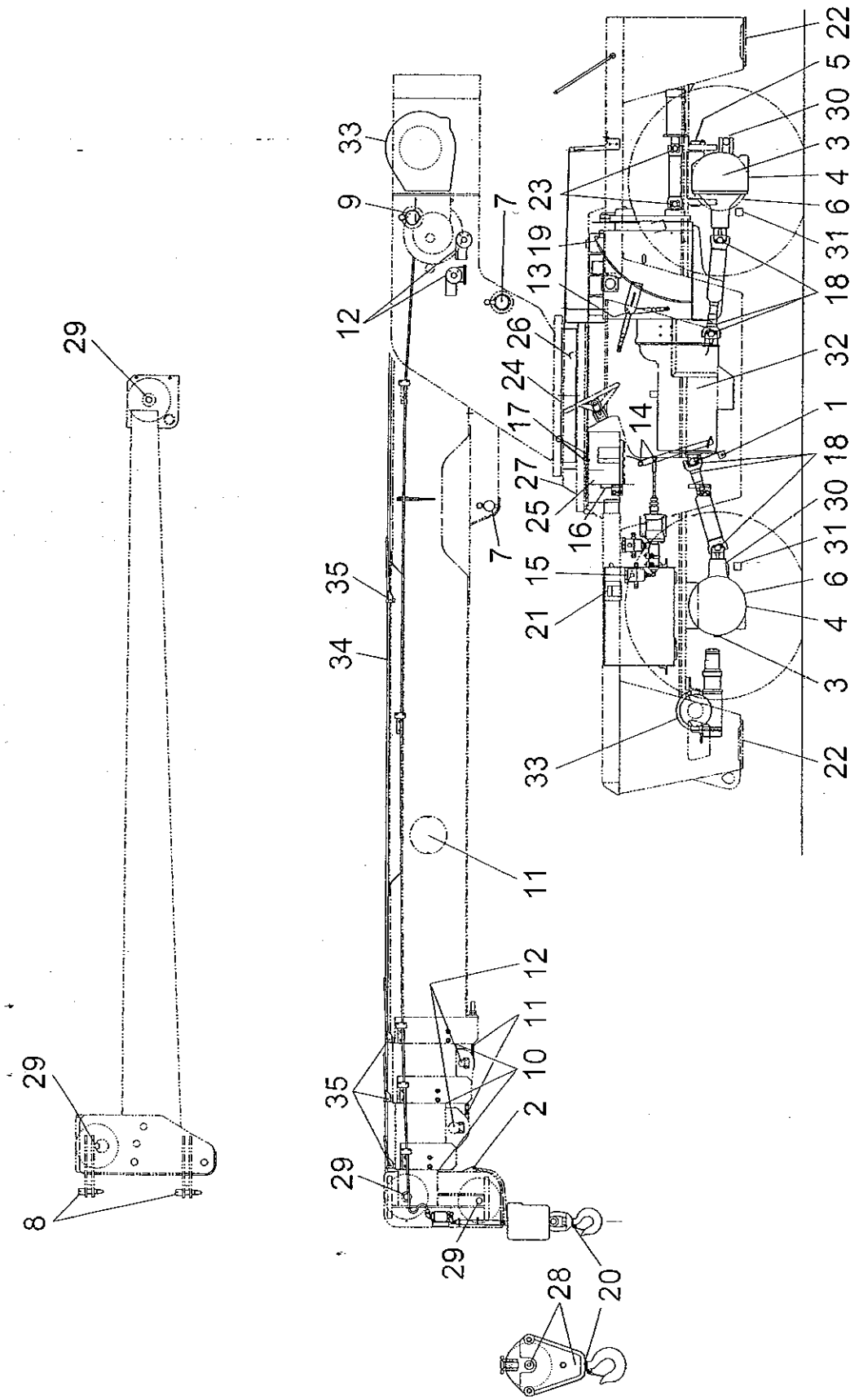
_____

_____

FLUID VOLUME

Hydraulic reservoir – 54 gallons
Fuel tank – 30 gallons
Planetary hoist – 2.5 quarts
Front auxiliary winch – 2 pints
4x2 & 4x4 Front axle – 5.98 gallons housing, .39 gallons each hub
4x4 Rear axle – 4.68 gallons housing, .44 gallons each hub
4x2 Rear axle – 0 gallons housing, .44 gallons each hub
Transmission – 17.5 quarts
Engine cooling system – 15 to 17 quarts depending on engine and heater

IC-200-G LUBRICATION CHART



IC-200-G LUBRICATION SCHEDULE

ITEM	DESCRIPTION	LUBE	LUBRICATION INTERVALS					NOTES
			50 HOUR	250 HOUR	500 HOUR	1000 HOUR	MONTHS	
1	Accelerator Pedal	MPG			X			1 Zerk, Diesel
2	Anti-Two-Block Arm	SIL	X					2 Points - Oilcan
3	Axle Differential	424	X				12	Check @50, Change @12 Mo.
4	Axle Kingpins	MPG	X					4 Zerks
5	Axle Pivot Pin	MPG			X			1 Zerk
6	Axle Planetary Hubs	424	X				12	Check @50, Change @12 Mo.
7	Boom Cylinder Pins	MPG			X			2 Zerks
8	Boom Ext. Pins	MPG	X					Wipe on.
9	Boom Hinge Pin	MPG			X			1 Zerk
10	Boom Rub Pads	SIL	X					Spray or Wipe
11	Boom Chain	EO		X				Spray or Wipe* IC-200-3
12	Boom Chain Sheaves	MPG		X				6 Zerks* IC-200-3
13	Brake Lever, Parking	SIL	X					
14	Brake Linkages	SIL	X					
15	Brake Reservoirs	DTE	X					Check @50, Change When Brakes are Serviced.
16	Cab Hinges & Latches	SIL	X					
17	Control Valve Links	SIL	X					
18	Drive Shaft Joints	MPG	X					3 Zerks 2WD, 6 Zerks 4WD
19	Engine Oil (Gas Engine)	EO	X	X			3 Max.	Check Daily, Change @50, then at 250 or 3 Mo. Max.
20	Hook Swivel & Pin	SIL	X					
21	Hydraulic Oil	HO	X			X	12 Max.	Check Daily, Change @1000 Hours or 12 Mo. Max.
22	Outrigger Legs	MPG	X					Wipe on Legs.
23	Pump Shaft	MPG	X					2 Zerks
24	Rotation Bearing	MPG	X					1 Zerk*
25	Rotation Gearbox	MPG						Repack @ overhual
26	Rotation Gear Teeth	OGG	X					Brush On.*
27	Rotation Pinion Bearing	MPG	X					1 Zerk*
28	Sheave Block	MPG			X			3 Zerks
29	Sheave Pins	MPG			X			2 Zerks Std, 2 Optional
30	Steering Cyl. Ends	MPG			X			8 Zerks
31	Steering Link Ends	MPG			X			4 Zerks
32	Transmission, 4-Speed	210		X			12 Max.	Check @250, Change @12 Mo.
33	Winch(es)	MPL		X			12	Check @250, Change @12 Mo.
34	Wire Rope	2-X	X					Spray, Brush or Soak.*
35	Wire Rope Retainers	SIL	X					

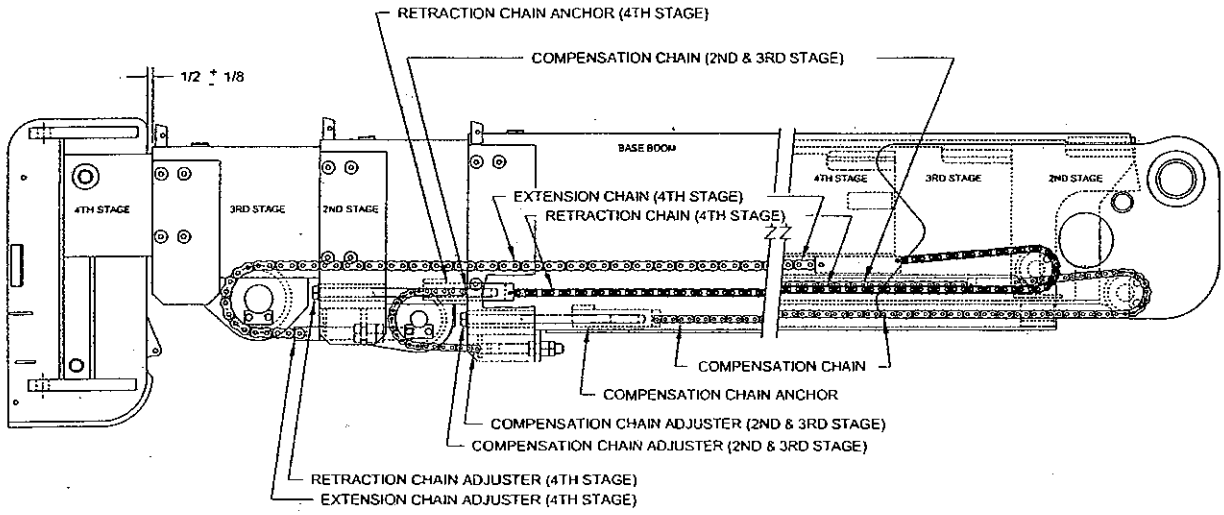
*See Procedures in Manual

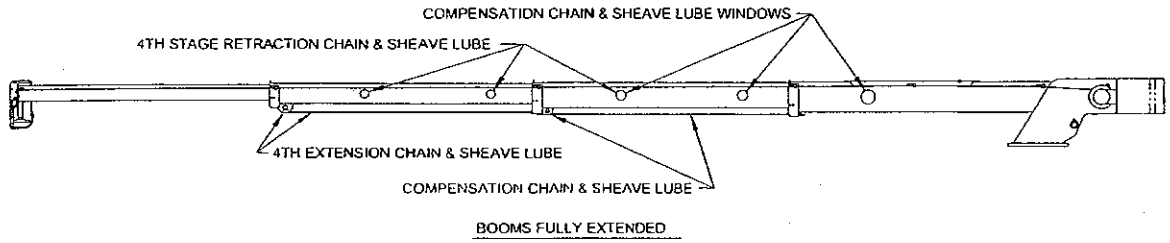
LUBE SYMBOLS

210 - Mobil ATF 210 or Equivalent
2-X - AMOVIS #2-x
424 - Mobil Fluid 424 or Equivalent
DTE - Mobil DTE 11M (Do Not Use Brake Fluid)
EO - Engine Oil - See Specs in Engine Manual
HO - Hydraulic Fluid - See Specs in Hyd. Sec.
MPG - Multi-Purpose Gun Grease
MPL - Multi-Purpose Gear Lube, SAE 80W-90
OGG - Open Gear Grease, Such as Mobilkote S
SIL - Silicone Lube, Aerosol with Concentrating Tube

IC-200-3 BOOM CHAIN LUBRICATION

Lubricate inner chains and chain sheaves through windows with boom fully extended and set horizontally. There are grease fittings on chain sheave shafts both inside and outside the boom. Reach in through boom windows with a long tipped oil can and spray chains generously and grease sheave fittings. Do not attempt to grease chain shafts or oil chains inside boom with engine running as boom may move while your hands are inside.





BOOMS FULLY EXTENDED

ROTATION BEARING LUBRICATION

There is one grease zerk in a hole on the right-hand side of the turntable base plate. This should be used to lubricate the bearing every 50 hours. Rotate the turntable about 45 degrees and pump some grease into the zerk. Repeat until the turntable has rotated two revolutions. Use about 8 ounces of grease each time the bearing is lubricated.

Lubricate the gear teeth of the rotation bearing at the 50 hour interval. Remove the pinion cover. Brush open gear grease, such as Mobilkote-S, on the teeth on each side of the pinion at four places around the bearing. Rotate the boom several times and check the coverage of the grease on all of the teeth. Also, lubricate the pinion bearings at the zerk below the pinion teeth. Replace the pinion cover.

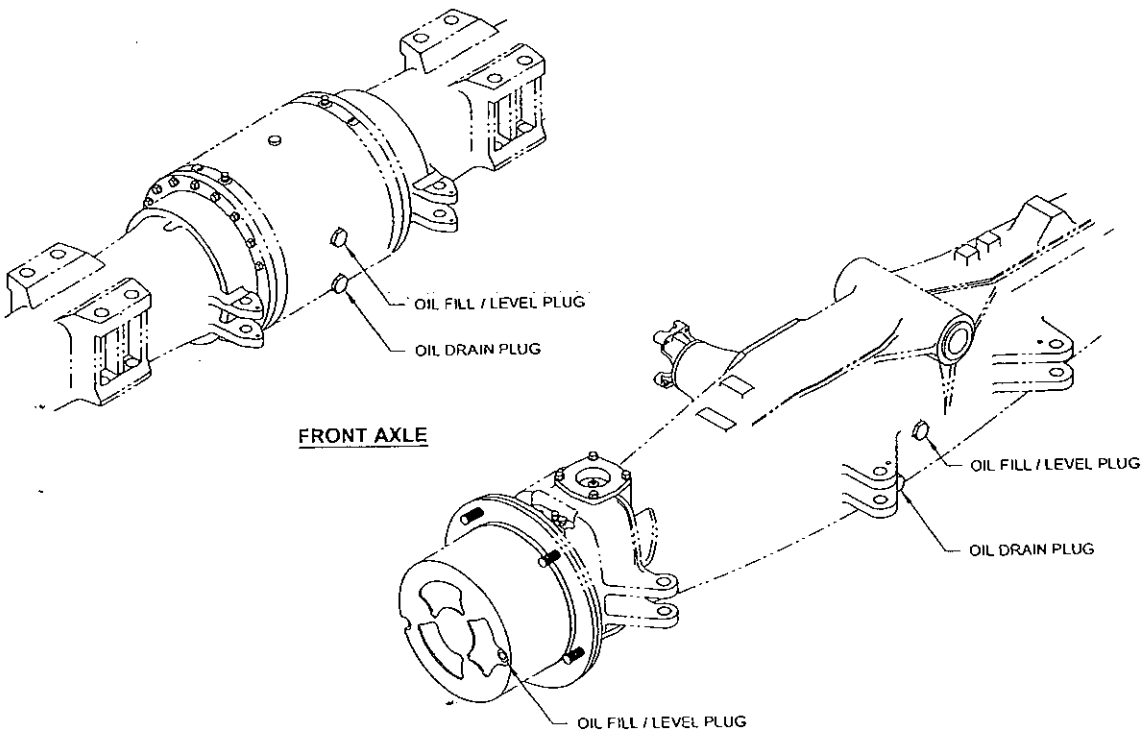
TRANSMISSION:

Check the transmission fluid with the dipstick and add fluid through the dipstick tube as required. Use Mobil ATF 210 or equivalent. Transmission factory service manuals are available from Broderson. Order BMC Part Number 990-00021.

DRIVE AXLES--HUBS AND DIFFERENTIALS:

Maintain lubricant to levels shown here with Mobil 424 or equivalent. Axle factory service manuals are available from Broderson. Order BMC Part No. 990-00020.

*No lubricant is required in the center section of the 2WD rear axle.



WIRE ROPE LUBRICATION

The wire rope should be cleaned and lubricated every 50 hours of normal operation and more frequently when used in dirty or corrosive environments. Whenever the rope is dirty or dry, it should be serviced. The rope should be cleaned with solvent and compressed air or solvent and rags. A wire brush may be used for difficult areas.

The recommended lubricant is AMOVIS #2-X. It should be sprayed or dripped onto the rope where it is bent as it passes over the tip sheave. Wrap rags around the wire rope behind the sheave and swab the excess oil that is carried along on the rope. Always wear heavy leather gloves when handling wire rope.

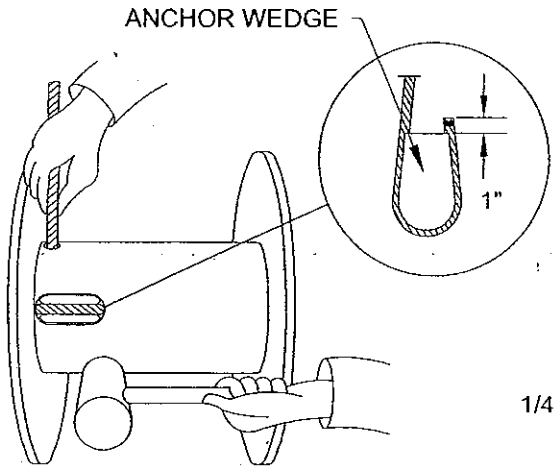
HOIST CABLE INSTALLATION AND INSPECTION

The following steps will assure that the wire rope winds smoothly and evenly on the hoist and will yield greater safety and longer cable life:

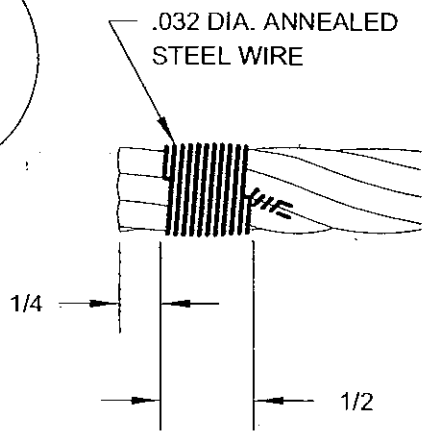
1. If possible, the cable should be rolled off a storage spool and straightened out on the ground in line with the boom. If the ground is not clean or the space is too limited, the cable can be wound directly from the storage spool onto the hoist, but the spool must rotate in the same direction as the hoist.

2. Check the seizings on the ends of the cable and replace them if they are missing or damaged.

3. Install the cable over the boom tip sheave and route it through the cable retainer loops to the hoist drum.



HOIST CABLE ANCHOR



WIRE ROPE SEIZING
FOR 1/2" DIA. ROPE

4. Position the hoist drum with the cable anchor on top.

5. Insert the cable through the anchor slot and wrap it around the anchor wedge. The end of the cable should extend past the wedge by about one inch.

6. Slide the cable and wedge into the drum socket and pull firmly on the free end of the cable to set the wedge. Seat the wedge securely with a brass or rawhide mallet.

7. Slowly rotate the hoist while applying tension on the cable in front of the boom. Wear heavy leather gloves and wrap rags around the cable to wipe off any dirt from the cable. Keep hands away from the sheaves and hoist drum while the cable is moving.

8. After two turns of the hoist drum, stop the hoist and push the cable into the drum groove if it has come out.

9. Slowly rotate the drum until the first layer of cable is on the drum. If any gaps between the rope appear, back up the hoist and rewind. There must be no gaps.

10. After the first layer is on the drum, the hoist may be turned a little faster until the remainder of the cable is installed.

11. Leave about 30 feet of cable on the ground to install the sheave block. See the Operation Section for instructions on reeving and wedge socket attachment.

12. Install the cable retainer pins and cotters in the tip sheave plates.

13. For the cable preloading, extend the outriggers and attach a load of about 2,000 pounds. Extend the boom fully. Position the load at a 10-foot load radius over the right-hand side of the crane. Hoist and lower the load three times and check winding of the rope on the hoist.

14. Attach about 5,000 pounds and repeat. Be sure that the cable winds evenly on the hoist.

15. If the cable appears to twist too much, remove the sheave block and rewind the cable on the drum as in Steps 7-11.

16. Never lift more than the rated load on the Capacity Chart for the parts of line and type of wire rope being used.

17. Lubricate the cable as recommended in the "Wire Rope Lubrication" section. Inspect, maintain and replace the cable in accordance with ANSI B30.5-1982, Section 5-2.4.

18. If the cable needs to be replaced use ½ diameter 6X25-IWRC-EIP wire rope (breaking strength 26,600 lbs).

HYDRAULIC SYSTEM

The IC-200 hydraulic system consists of two subsystems, driven by a double pump with a single inlet port. The 29 GPM vane pump supplies the hydrostatic steering function and the boom and outrigger functions. The hoist and brake booster are powered by the 34 GPM vane pump.

The boom, outriggers, hoist and optional front winch are controlled by one valve assembly. The 29 GPM pump flow enters the steering flow control valve first and then flows into the left-hand section of the control valve assembly supplying the swing, telescope, boom and outrigger sections. The flow from the 32 GPM pump enters the brake booster flow control valve first and all but 4 GPM is directed to the inlet section to the left of the hoist valve. Adjustment procedures for the crane hydraulic functions are given on page 3-20 through 3-21. The schematic of the hydraulic system is shown on the next page.

STEERING SYSTEM

The steering system is shown in the schematic on the next page. The IC-200 steering system is a load-sensing, demand-type system that takes only as much flow as is needed when steering and directs the excess flow to the control valve for boom and outrigger functions. The priority flow-control valve is in the line between the 29 GPM pump section and control valve.

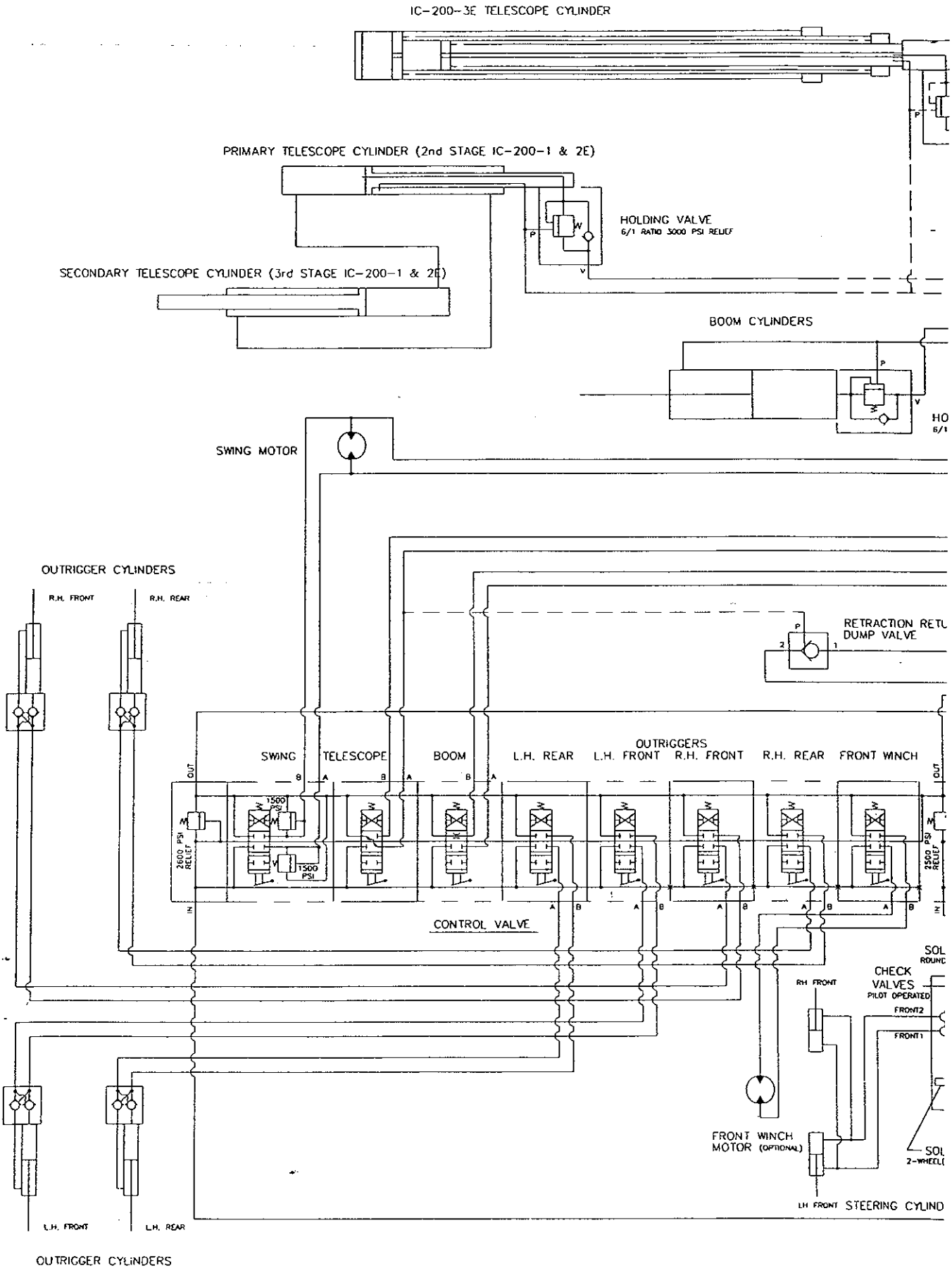
Oil from the 29 GPM section of the pump goes into the priority valve at port "P." When no steering is required, the entire flow goes through the priority valve and leaves through port "EF" to the crane valve. The crane operating speed is not affected, since there is no loss of volume passing through the priority valve.

When the steering wheel is turned, the load-sensing line signals the priority valve to divert the required amount of oil to the steering control unit to meet the steering system requirements. The excess oil, not required for steering, flows to the crane control valve as usual. Since the amount of oil required for steering is usually a small portion of the pump output, the crane control valve is always operational while the unit is being steered. Crane operation speed is reduced such a slight amount it is usually not noticed.

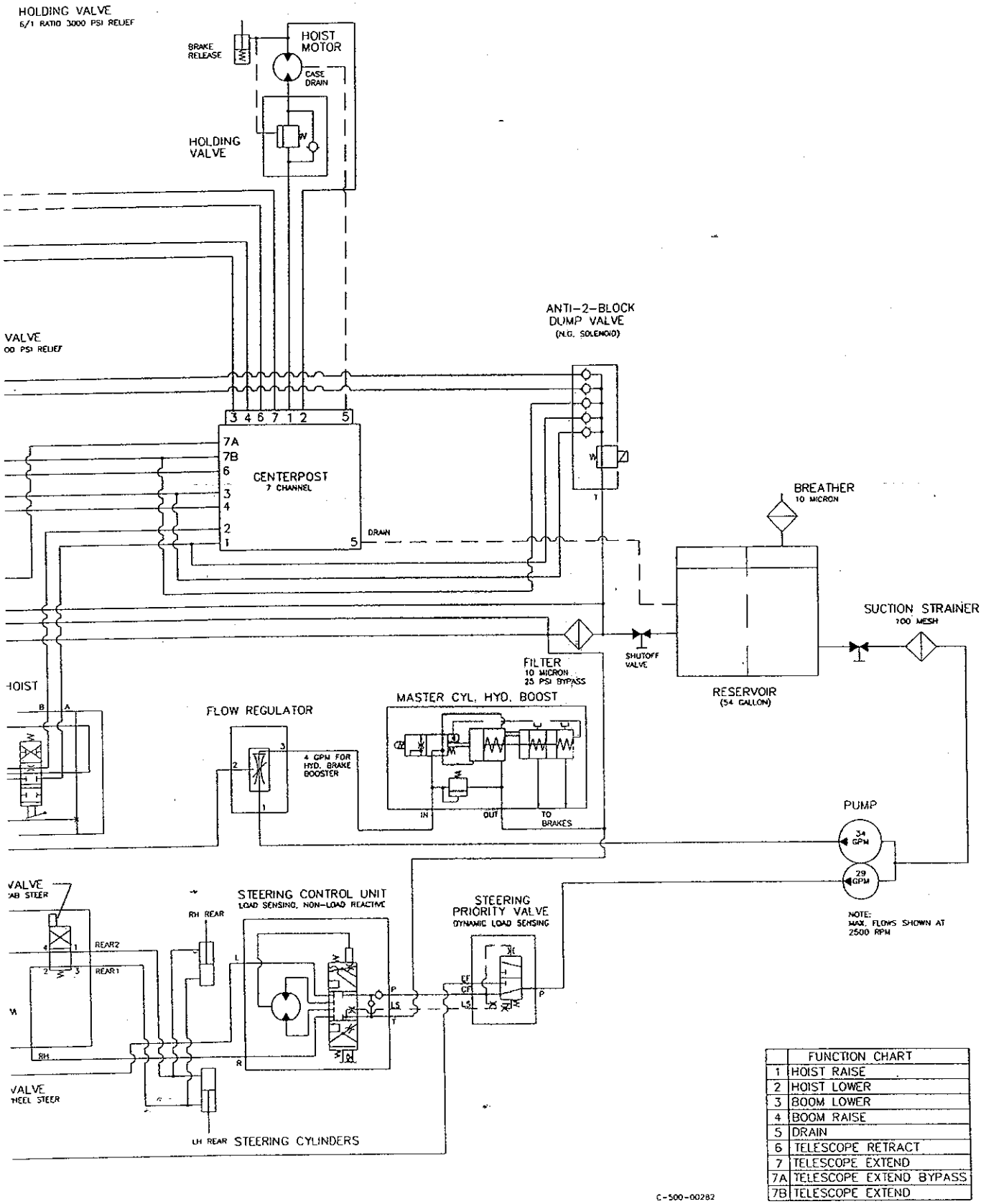
The steering control unit is non-load reactive. This means that bumps, curbs, and obstacles cannot change the steering angle and are not felt in the steering wheel. It also means that the wheels do not recenter when the steering wheel is released. The steering wheel must be turned back to center at the end of a turn.

There is a check valve in the pressure line between the priority valve and the steering control unit. This prevents pressure in the steering cylinders from venting back into the pressure line when the pressure is low. This eliminates steering wheel kickback when the steering wheel is released. The steering system pressure was set at 1800 PSI at the factory, and this should not need adjustment.

The three steering modes are selected by a switch on the dashboard which activates the automatic alignment system. Electronic proximity sensors and logic controls delay the switching of the steering mode until the wheels are centered. The proximity sensors should be cleaned periodically with a rag to prevent dirt buildup from blocking their operation.


IC-200-3E TELESCOPE CYLINDER
PRIMARY TELESCOPE CYLINDER (2nd STAGE IC-200-1 & 2E)
HOLDING VALVE
6/1 RATIO 3000 PSI RELIEF
SECONDARY TELESCOPE CYLINDER (3rd STAGE IC-200-1 & 2E)
BOOM CYLINDERS
SWING MOTOR
OUTRIGGER CYLINDERS
R.H. FRONT
R.H. REAR
RETRACTION RETU
DUMP VALVE
SWING
TELESCOPE
BOOM
OUTRIGGERS
L.H. REAR
L.H. FRONT
R.H. FRONT
R.H. REAR
FRONT WINCH
OUT
IN
2600 PSI RELIEF
1500 PSI
1500 PSI
2500 PSI
CONTROL VALVE
CHECK VALVES
PILOT OPERATED
RH FRONT
FRONT2
FRONT1
FRONT WINCH MOTOR (OPTIONAL)
LH FRONT
STEERING CYLIND
L.H. FRONT
L.H. REAR
OUTRIGGER CYLINDERS

IC-200-G JIC SCHEMATIC
WITH RATED CAPACITY LIMITER



	FUNCTION CHART
1	HOIST RAISE
2	HOIST LOWER
3	BOOM LOWER
4	BOOM RAISE
5	DRAIN
6	TELESCOPE RETRACT
7	TELESCOPE EXTEND
7A	TELESCOPE EXTEND BYPASS
7B	TELESCOPE EXTEND

C-500-00282

CARE OF HYDRAULIC OIL

The hydraulic system contains many highly pressurized, precision components. To protect these, it is very important to keep the hydraulic oil clean, at proper temperature, within the oil specification and to the proper fill level.

The IC-200 is equipped with a 100-mesh suction strainer, a breather filter, a 10-micron return-line filter and a 54-gallon tank. The filter must be changed whenever the filter indicator gauge under the control panel points to the red sector at full engine speed or at 500 hours or six months maximum. Note: The oil should be warmed by at least 15 minutes of normal operation to get a good reading. The indicator should be checked daily.

The filter is located to the rear of the front axle. Clean the filter and the surrounding parts with pressure washer before changing, to prevent dirt from getting into the clean oil tube. To minimize oil loss, close the shutoff valves under the tank.

BE SURE SHUTOFF VALVES ARE FULLY OPENED BEFORE STARTING ENGINE.

Remove the filter element and catch the hydraulic oil in a clean container. Pour the remaining oil out of the old element into the clean container and inspect the oil for water and excessive contaminants. If water is found, the oil should be changed in the reservoir and purged out of the cylinders. If excessive particles are found, the source should be located and fixed, and the oil should be purged.

Lubricate the new element seal and install the new element. Open the shutoff valves. Run the engine and check for any leaking around the seal.

The hydraulic oil should be changed every 1000 hours or once a year whichever is sooner. Wash the oil tank and filters before changing the oil. Retract the telescope, boom and outrigger cylinders. Leave the shutoff valves open and remove the drain plug. Catch the oil and dispose of it properly. Remove the breather from the top of the tank and clean the element with solvent and compressed air. Clean out the tank with solvent and compressed air.

The suction strainer is located under the hydraulic tank and has a reusable element. To service, remove the four bolts holding the two parts of the housing together. Remove the element from the housing by turning the element counter-clockwise. Wash the element in clean solvent and allow to dry. Reassemble the strainer.

Replace the filter as described previously and refill the tank with new hydraulic oil that meets the specifications in the table below. Start the engine and run it at low idle for 15 minutes to filter the new oil. Then cycle all of the hydraulic cylinders at low idle and low pressure. Add hydraulic oil to the dipstick full mark, if necessary, with cylinders retracted.

HYDRAULIC OILS FOR IC-200

AMBIENT TEMP RANGE:	-40° to 75°F	-15° to 110°F	50° to 130°F
POUR POINT:	-40°F MAX	-15°F MAX	0°F MAX
VISCOSITY INDEX:	140 MIN	95 to 100	95 to 100
VISC. SSU @ 100°F:	200 MAX	230 MAX	340 MAX
SSU @ 210°F:	44 MIN	47 MIN	53 MIN
EXAMPLES:	MOBIL DTE-13 MOBIL UNIV.-ATF TEXAMATIC TYPE F	MOBIL AW-46 MOBIL DTE-25 CONOCO SUPER 46 TEXACO HD 46	MOBIL AW-68 MOBIL DTE-26 CONOCO SUPER 68 TEXACO HD 68

OTHER REQUIREMENTS: Must contain rust and oxidation inhibitor, and antifoam and anti-wear agents. Must pass Vickers Vane Pump Test

The IC-200 is factory filled with hydraulic oil for the -l5° to 110°F range. If significant portions of time are spent operating below 20°F or above 100°F, the oil should be replaced with an extreme temperature oil.

The oils shown are compatible with and may be combined with SAE 10W or SAE 20W-20 motor oil if it is necessary to add oil between changes and the recommended oils are not available. These motor oils are not suitable substitutes when changing hydraulic oil because they lack certain additives that are needed for hydraulic system use.

CAUTION

Never add kerosene or other "thinners" to hydraulic oil. These fluids have low aniline points and consequently will cause rapid deterioration of certain packings and seals in the hydraulic system.

CAUTION

Serious damage to the pump will result if it is run with the shutoff valve closed or with insufficient oil level in the reservoir.

Observe the operation of the machine. If the oil is too cold, the machine will be sluggish and should be warmed up further to prevent damage before sustained hard work is attempted. If the oil is too hot, leakage will increase, pump efficiency will go down, and moving parts will not be properly lubricated. If operating temperature is excessive, rapid deterioration of the oil will result and moving parts and seals will wear more quickly. The cause of the excess heat should be determined and corrected. A possible indication of excessive oil temperature is a control valve lever that becomes hard to operate or sticks instead of returning to neutral.

HYDRAULIC SEALS

WARNING

Do not check for hydraulic leaks with hands. If a mist of hydraulic oil is noticed around a line or component, use cardboard or other material to check for location of leak. High pressure fluid leaking from a small hole, can be almost invisible, yet have enough force to penetrate the skin. If injured by escaping fluid, see a doctor at once. Serious reaction or infection can occur.

All hydraulic fittings and hose connections should be kept tight to prevent loss of fluid from the system and unnecessary dripping from the machine. Most hydraulic fittings on the IC-200 crane use o-ring seals, and if tightening the fitting fails to stop the leak, the o-ring should be replaced.

Notes:

1. When installing an o-ring fitting with an adjustable nut and washer, be sure to back off the nut, washer and o-ring as far as possible before threading the fitting into the port. Then turn the fitting into the port as far as possible with fingers and turn it backward until it is oriented properly. Torque the nut with a wrench, while holding the fitting with a wrench.

2. Lubricate all seals before assembling.

3. Take care not to over tighten pipe threads.

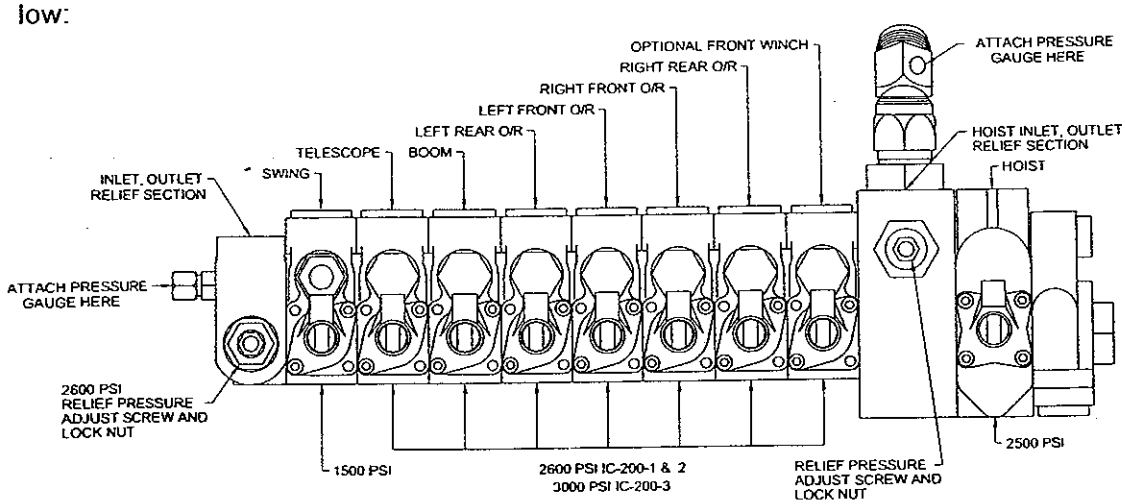
4. Do not use Teflon tape to seal pipe treads. Loctite-type (anaerobic) sealant is preferred.

Leaks in component parts, such as pumps, valves and motors, that cannot be stopped by tightening bolts, can usually be stopped by replacing the seals in the component. Seal and packing replacement is the only maintenance which owners should attempt on component parts, unless they have a well-equipped shop with mechanics trained in hydraulic component overhaul.

Leakage in the pump suction line may not cause oil to appear externally, but may allow air to enter the line during operation. The air entrained in the oil will cause pumps to be noisy, and if allowed to continue, can damage the pump. If a pump becomes noisy, immediately check the fluid level in the reservoir and be sure all suction fittings are tight. If noise continues, squirt hydraulic fluid on the suction connections. Listen for a change in the noise and watch for oil being sucked into a small opening in the connection. When the reservoir is full, the shutoff valve is open and all suction connections are tight, most pump noises will disappear. If they do not, a worn or faulty pump is indicated. On a routine basis, all hoses should be checked for wear, deterioration, and physical damage. Defective hoses should be replaced for maximum economy for the user.

PRESSURE SETTINGS:

The hydraulic system is divided into two pressure circuits, each having its own protective adjustable relief valve in the inlet sections of the control valve. The functions operated by the control valve sections require different pressures for different functions. These are shown below:



1. Hoist Circuit -- 2500 PSI at full flow.
2. Boom and Outrigger Circuit -- 3000 PSI at full flow.
3. Boom swing work ports -- 1500 PSI at full flow.

A good quality pressure gauge with at least a 3000 PSI scale is required to make adjustments properly. A 3000 PSI working pressure hose with adapters to fit the 3/8 tube pressure ports is required to install the gauge where it can be read easily.
The following procedures are suggested when taking pressure readings:

HOIST CIRCUIT:

Remove the 3/8" JIC cap from the fitting on the front of the control valve near the hoist control section and install a 3000 PSI pressure gauge. To obtain full flow reading, run pump full speed, pull hoist control to the RAISE position and hold until maximum reading is made. The anti-two-block override switch must be actuated. If a pressure of 2500 PSI is not possible, check the following:

1. Broken mechanical connection to the pump shaft.
2. Low oil level in the reservoir.
3. Clogged suction filter or shutoff valve not fully opened.
4. Valve spool linkage not allowing control valve to fully open. Valve spool should move 3/8" each way from neutral position.
5. Anti-two-block system malfunction.
6. Adjust relief valve by loosening nut on top of relief cartridge above winch gauge port and turning socket-head screw clockwise to increase pressure or counter-clockwise to lower pressure.
7. Foreign particle in pilot operated relief.
8. Worn or defective hydraulic pump.

BOOM AND OUTRIGGER CIRCUIT:

The relief valve pressure setting at the inlet for boom control sections is 2600 PSI for IC-200-1 & 2, 3000 PSI for IC-200-3. This pressure is required for all but the swing control section. Two work port relief valves are installed in the swing section. These relief valves are set at 1500 PSI.

The relief pressure at the inlet end of the valve can be adjusted with a wrench and an allen wrench. Loosen the nut and tighten the threaded stem with an allen wrench to increase pressure, and loosen the stem to decrease pressure. Lock in place with the nut. Actuate the BOOM LOWER or TELESCOPE RETRACT function with the cylinder fully retracted when making this adjustment.

While the pressure gauge is attached, the swing function may be checked by capping the two work ports of the swing section and actuating the swing control lever in each direction. If these pressures are improper, the work port relief valve can be removed and shims added or removed as needed. Part numbers for the work port relief valves and shims are listed below:

9-340-00070	Work Port Relief Valve-Gresen #7460-002 PS 1500 C
9-340-00032	Shim -- .010" -- Gresen #0462-001
9-340-00031	Shim -- .020" -- Gresen #0459-001
9-340-00030	Shim -- .040" -- Gresen #0458-001

(Pressure is changed approximately 100 to 125 PSI for each .010" shim).

BOOM CYLINDER HOLDING VALVE

A holding valve is directly connected to the base of the boom lift cylinder barrel and to the base of the primary telescope cylinder rod. These valves are designed to hold the boom in position should loss of power or pressure line failure occur.

To check the boom lift cylinder holding valve, set the outriggers, place the boom in the horizontal position over the front of the crane and raise rated load about six inches above the ground using the boom lift cylinder (not the hoist). The best load for this test is the rated load at the 16 foot load radius with outriggers extended and the boom over the front. Turn the engine off and move the BOOM lever to the LOWER position. If the boom moves down, adjust the holding valve.

WARNING

Before working on the holding valves or plumbing to the boom lift cylinders, always relieve trapped pressure by lowering the boom fully, turning off the engine, and cycling the BOOM lever.

To adjust the holding valve, loosen the jam nuts on the adjusting screw and tighten the screw until unpowered boom movement stops. Retighten the jam nuts. If adjusting the valve does not help, the cylinder may have internal leakage or the valve may be malfunctioning.

TELESCOPE CYLINDER HOLDING VALVE

A holding valve is directly connected to the base of the primary telescope cylinder rod. The valve is designed to hold the boom in position should loss of power or pressure line failure occur.

The holding valve should be checked with the boom elevated to the maximum angle and the boom extended to a 6 foot load radius. A 30,000 pound load on a four-part line is required for this test. Use the hoist to lift this load about six inches above the ground. The radius of the test load should be within the rating on the capacity chart. Use great care to prevent the load from hitting the crane.

Turn the engine off and pull the TELESCOPE lever to the RETRACT position. If the boom retracts, the valve should be adjusted.

To adjust the holding valve, loosen the lock nut on the adjusting screw and tighten screw until unpowered movement stops. Retighten the lock nut to hold the proper adjustment.

IC-200-3 BOOM CHAIN ADJUSTMENT

Study Illustrations 1,2 and 3 to understand the chain adjustment procedure. Proper adjustment is critical at time of boom assembly or scheduled maintenance.

Initial adjustment: Retract boom completely. The 4th stage extension and retraction chains set the position of the 4th stage relative to the 3rd stage. As shown in Illustration 1, ½" clearance must be held between the 4th stage tip and 3rd stage tip. To increase this distance, loosen the retraction adjustment and tighten the extension adjustment. To decrease this distance, loosen the extension adjustment and tighten the retraction adjustment.

Final adjustment: Extend boom completely while horizontal, then slightly retract the boom to let the chains relax. Measure the chain drape at the center of the rear 3rd stage and 2nd stage windows as shown in Illustration 3. See arrows in the windows for measuring locations. Snug the 4th stage extension and retraction chains until the chain tightness allows the dimensions of approximately ½" and 5" as shown in Illustration 3. Also snug the 2nd and 3rd stage compensation chains to the dimensions of 1" and 3 7/8" as shown. Assure that the drape in each pair of chains is matched so each chain carries its share of the load. Run boom in and out a few times and recheck all of the above dimensions. After proper settings retighten the adjustment lock nuts.

The numbers "3" shown in the small windows on the bottom of the 2nd stage and base boom show the adjustment is about midrange. These numbers run from 1 to 6 in 1" increments. Numbers in these windows are approximate adjustment and cannot be used for final adjustment. Important are the dimensions stated above taken at the large side windows.

IC-200-3 BOOM CHAIN ADJUSTMENT

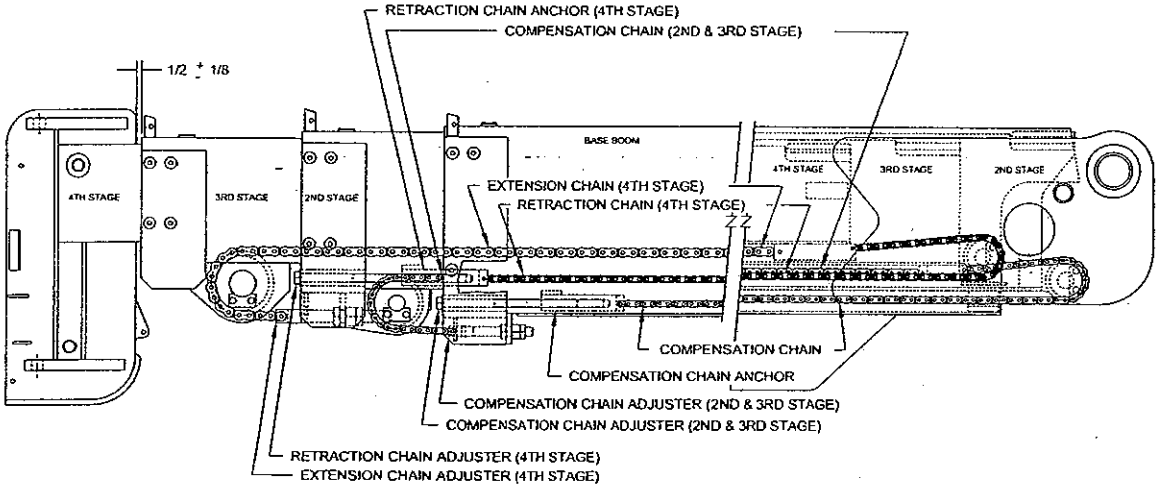
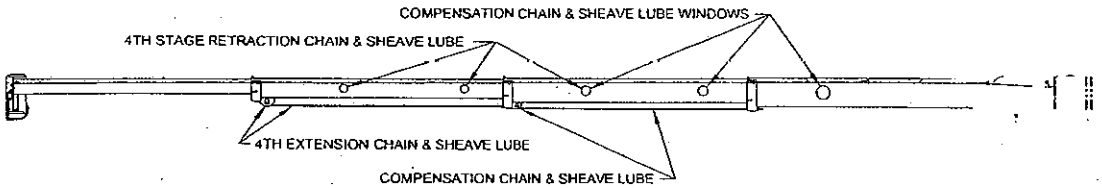


ILLUSTRATION 1



BOOMS FULLY EXTENDED

ILLUSTRATION 2

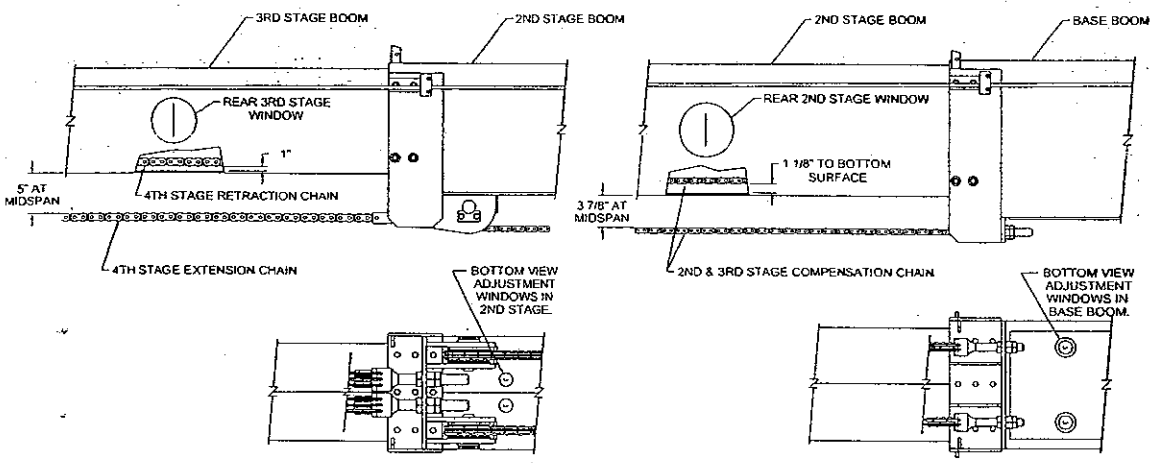


ILLUSTRATION 3

ENGINE MAINTENANCE:

Refer to the engine manual for engine maintenance.

AIR CLEANER SERVICE:

Clean out the dust cup every 50 hours. Loosen the clamps around the cup and housing and remove the cup. Dump dust out of cup. Clean gasket and sealing surfaces with a damp cloth. Replace cup gasket if it shows signs of damage. Replace cup with arrows pointing up and tighten clamp.

Clean the intake cap screen every 50 hours, and perform a thorough inspection of the air intake pipes and joints.

Clean the filter element every 250 hours or every 3 months, whichever comes sooner and replace the element every 500 hours or 6 months. Remove and clean the dust cup and gasket, and the intake cap. Remove the wing nut on the element and gently remove the element. Bumping the element during removal may cause dirt to fall into the clean air tube. Clean the inside of the housing carefully with a damp cloth. To clean the element, use a compressed air blower nozzle with less than 100 PSI and blow air from the inside of the element. Shake dust off of the outside of the element. Make sure the gaskets and element fit properly and reassemble, being careful not to allow any dust into the intake pipe.

Do not remove an element just for inspection. This may do more harm than good. You cannot judge the element condition by its appearance. If you think the filter may need service, remove it and replace or clean it before reassembling air cleaner.

Conditions where more dirt than usual is in the air, especially soot, will make more frequent service necessary. If there is a significant amount of dust in the dust cup when it is cleaned every 50 hours, clean the element every 100 hours and replace it every 200 hours--or more frequently in extremely dusty conditions. Excessive exhaust smoke or loss of power may indicate a plugged filter.

COOLING SYSTEM:
Check the level of coolant in the radiator overflow tank daily. Add a mixture of antifreeze and distilled water to the overflow tank as required to maintain the coolant level. Check the radiator fins for dirt or debris daily and wash the fins with a pressure or steam cleaner every 50 hours or as required. Check the antifreeze protection level every 500 hours. Every two years, flush the cooling system and replace the thermostat and coolant. Pressure test the system as specified by the engine manufacturer.

SPARE PARTS LIST:
A spare parts list (including oil filter, fuel filter, etc.) may be found in the Parts Manual, under Engine Installation.

MAJOR ENGINE SERVICING OR OVERHAUL:
Major servicing or overhaul is beyond the scope of this manual. Consult authorized engine service manual or rely on an authorized engine service center.

MECHANICAL ADJUSTMENTS

FASTENERS:
All fasteners on the IC-200 should be checked and retightened if required, as a part of the preventive maintenance program. Particular attention should be given to the drive axle mounting bolts, pump mounting bolts, pump drive shaft bolts, rotation bearing bolts, rotation gearbox bolts, winch bolts, etc. All bolts used in assembly are heat-treated Grade 5 or 8. Torque the rotation bearing mounting bolts (3/4",Gr. 8) to 280 foot-pounds, or the nuts to 240 foot-pounds. Torque the wheel nuts to 500 foot pounds. The torque chart on the next page can be used on all other bolts.

ROTATION GEARBOX:

The rotation gearbox assembly is attached to the chassis top plate by four capscrews. It is held in proper engagement with the external teeth on the bull gear by two setscrews. It is further restrained from torsional movement by two bolts on each side of the gearbox mounting flange. The gearbox should be adjusted with the boom centered over front of the chassis. This centers the gearbox pinion on the "high side" of the bearing gear teeth. Adjust the gearbox inward until there is "light contact" between pinion and bull gear teeth. Retighten the four mounting bolts and the four side bolts.

TRANSMISSION AND AXLE TROUBLESHOOTING AND OVERHAUL:

Procedures for transmission and axle troubleshooting and overhaul are beyond the scope of the BMC Maintenance and Parts Manuals. International Transmission Ltd. factory service manuals are available from BMC as follows:

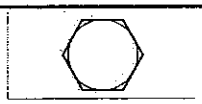
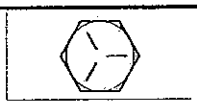
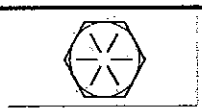
Transmission Service Manual, BMC Part Number 990-00021
Axle Service Manual, BMC Part Number 990-00020

PARK BRAKE TEST AND ADJUSTMENT:

1. Fully apply the parking brake
2. Start the engine, retract the boom to the appropriate traveling position and raise the outriggers.
3. Select fourth gear.

4. Push down hard on the foot brake pedal.
5. Select forward gear.
6. Move the park brake lever fractionally downward, just over center, slightly releasing it. Hold park brake lever switch in the off position (located in the lever bracket).
7. Slowly release the foot brake pedal.
8. If the machine has not moved, use maximum engine speed. The machine should not move.
9. Do not do this test for longer than 30 seconds.
10. Reduce engine speed to an idle.
11. Return the park brake lever to the fully on position from its partially applied position. Place transmission in neutral.
12. If the machine moved during the test, adjust the parking brake by checking the clearance between the park brake pad and brake disc. Maximum clearance is .010" with park brake lever in the OFF position, and repeat the test.

TORQUE DATA

BOLT GRADE	SAE GRADE 1 OR 2	SAE GRADE 5	SAE GRADE 8
MARKING			
MATERIAL	LOW CARBON	MEDIUM CARBON STEEL Q & T	MEDIUM CARBON ALLOY STEEL Q & T
MINIMUM TENSILE STRENGTH	64,000 PSI	120,000 PSI	150,000 PSI
BOLT SIZE	RECOMMENDED TORQUE VALUES (FT-LBS)		
1/4	5	7	10.5
5/16	9	14	22
3/8	15	25	37
7/16	24	40	60
1/2	37	60	92
9/16	53	88	132
5/8	74	120	180
3/4	120	200	296
7/8	190	302	473
1	282	466	714

THE FOLLOWING RULES APPLY TO THE CHART:

1. Consult manufacturers' specific recommendations when available.
2. The chart may be used with coarse and fine thread fasteners lightly lubricated.
3. Increase torque by 20% when multiple tooth (shakeproof) lockwashers are used.
4. The torque values are given in foot-pounds.
5. Inch-pounds equivalent may be obtained by multiplying by 12.