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BRODERSON MFG. CORP.  
LENEXA, KANSAS 66215

# OPERATION AND MAINTENANCE MANUAL IC-200-1B & 2B

OWNER:

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SOLD AND SERVICED BY:

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MODEL NO. \_\_\_\_\_

SERIAL NO. \_\_\_\_\_

Effective: January 1, 1996

## **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 180 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 six (6) 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.**

IC-200

INTRODUCTION

The BMC IC-200 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, we feel 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 to reach 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 BMC IC-200 Owner's Manual P/N 0-990-30034.

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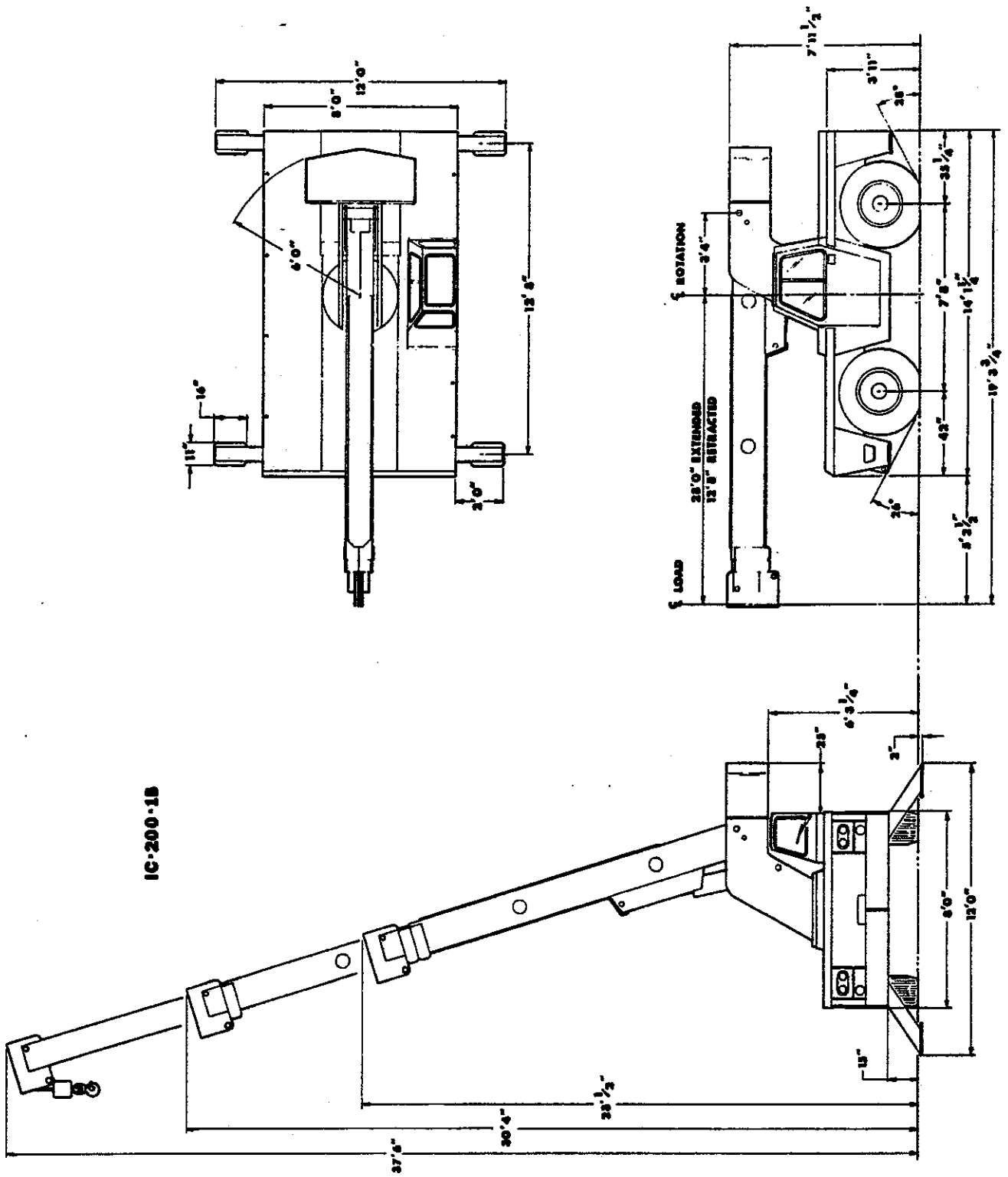
## GENERAL DESCRIPTION

The BMC IC-200 is a self-propelled vehicle designed for the lifting, placement and material handling normally associated with in-plant maintenance, manufacturing, and other process operations.

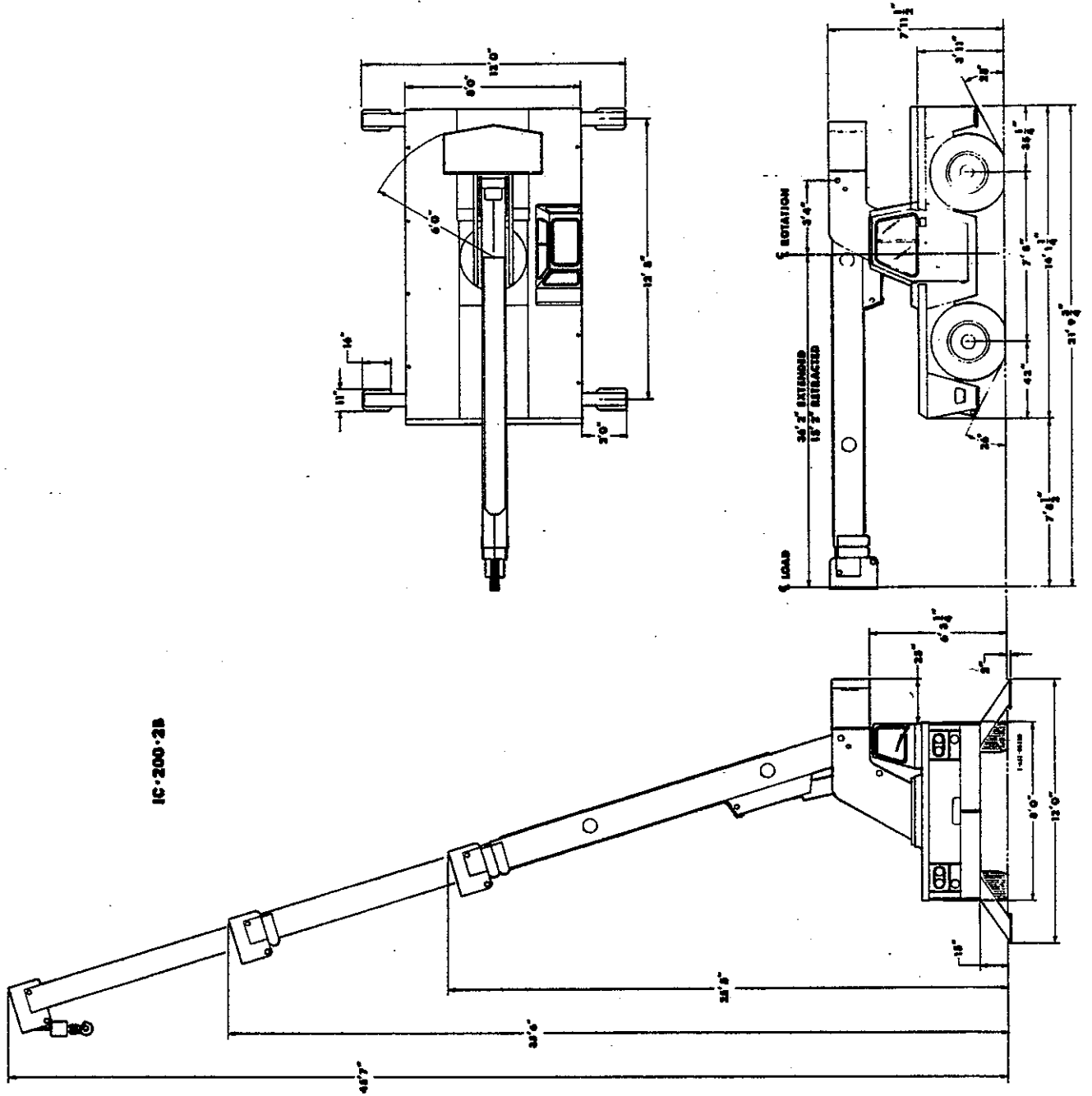
The vehicle is self-contained, and consists of the self-propelled chassis and the hydraulic-powered crane assembly. The chassis frame is of all welded, unitized construction. The drive system consists of an engine, torque convertor, reversing transmission, 4-speed transmission, driveline, differential driving axle, and steering axle assembly. The front drive/steer axle is mounted rigidly to the frame. The rear steering axle is pin-connected to the frame to allow 1-1/2° of oscillation. The unit is equipped with four-wheel hydraulic brakes and a mechanical handbrake. The full power, hydraulic steering control is mounted on the operator's control panel. This, coupled with the placement of gear shift, transmission control, brake, accelerator and crane controls, provides the operator full-vehicle control during normal travel and crane operations. The chassis is equipped with four hydraulic actuated outriggers for maximum crane stability.

The crane assembly is fully powered, and consists of a rotating boom support, and a 3-section telescopic boom hinged to the turret. Double-acting cylinders elevate and telescope the boom assembly. A hydraulically-powered winch is mounted in the turret weldment. A hydraulic motor driving through a worm gear assembly powers the rotating turret assembly.

DIMENSIONAL DATA



# DIMENSIONAL DATA



## BASIC SPECIFICATIONS AND COMPONENT MANUFACTURERS' DATA

The BMC IC-200 has many components which are common to production trucks and other equipment. The following descriptive information is provided as a guide for obtaining the proper replacement parts for components not manufactured by BMC. Your BMC dealer is equipped to service your Yardrunner and will be happy to assist you in locating any parts you may require.

### STANDARD GAS ENGINE, FORD MODEL CSG-649 (SPARE PARTS, PAGE 25)

Displacement - 300 cubic inches  
Bore - 4.0 inches  
Stroke - 3.98 inches  
Weight - 473 pounds  
Governed Speed - 2600 RPM  
Horsepower - 112 at 2500 RPM  
Torque - 246 pounds ft. at 2000 RPM  
Fuel - (R+M)/2 Octane 87  
Oil Crankcase Capacity - 6 qts. (7 with filter change)  
Oil Pressure - 35-60 PSI at 2000 RPM (HOT)  
Firing Order - 1-5-3-6-2-4  
Cooling System Capacity - 15 Qts.

### PREVIOUS STANDARD GAS ENGINE CHRYSLER MODEL HB225 (SPARE PARTS, PAGE 21)

Displacement - 225 cubic inches  
Bore - 3.4 inches  
Stroke - 4.125 inches  
Weight - 475 pounds  
Governed Speed - 2600 RPM  
Horsepower - 97 at 2600 RPM  
Torque - 198 pounds ft. at 2000 RPM  
Fuel - Regular Grade Gasoline  
Oil Crankcase Capacity - 5 Qts. (6 with filter change)  
Oil Pressure - 50 PSI at 800 RPM  
Firing Order - 1-5-3-6-2-4  
Cooling System Capacity - 12 quarts

Engine is the same as used in Dodge Model 300 truck except this industrial version has stellite faced exhaust valves with valve rotators and exhaust seal inserts.

### OPTIONAL PERKINS DIESEL MODEL 4.236 (SPARE PARTS, PAGE 30)

Displacement - 236 cubic inches  
Bore - 3.875 inches  
Stroke - 5.0 inches  
Weight - 545 pounds  
Governed Speed - 2500 RPM  
Horsepower - 80 at 2500 RPM  
Torque - 197 pounds ft. at 1300 RPM  
Fuel - No. 2 Diesel  
Oil Crankcase Capacity - 10 quarts  
Oil Pressure - 57 PSI at 2600 RPM



OPTIONAL JOHN DEERE DIESEL MODEL 4239D (SPARE PARTS, PAGE 35)

Displacement - 239 cubic inches  
Bore - 4.19 inches  
Stroke - 4.33 inches  
Weight - 845 pounds  
Alternator Output - 65 amps  
Governed Speed - 2500 RPM  
Horsepower - 80 at 2500 RPM  
Torque - 208 lbs ft at 1000 RPM  
Fuel - No. 2 Diesel  
Oil Crankcase Capacity - 9 quarts  
Oil Pressure - 50 PSI at 2000 RPM.

OPTIONAL CUMMINS DIESEL MODEL 4B3.9 (SPARE PARTS, PAGE 40)

Displacement - 239 Cubic Inches  
Bore - 4.02 inches  
Stroke - 4.72 inches  
Weight - 715 pounds  
Alternator Output - 62 amp  
Governed Speed - 2500 RPM  
Horsepower - 76 at 2500 RPM  
Torque - 184 pounds ft. at 1200 RPM  
Fuel - No. 2 Diesel  
Oil Crankcase Capacity - 10 quarts  
Oil Pressure - 30-60 PSI

TORQUE CONVERTOR:

Borg & Beck Model L-11 with stall torque ratio of 2.0.  
Attached to engine flywheel.

TRANSMISSION:

Borg Warner Model PR-1/T18. Consists of a reversing gear box and manual shift four-speed gear box. Multiple disc clutch packs in the reversing gear box provide reverse, neutral and forward. Shifting is accomplished by a hand lever control in the operator's compartment. The manual shift gear box is synchronized in second, third and fourth speeds. A conventional stick shift lever is located in the operator's compartment. An oil cooler for torque converter and reversing gear box oil is standard equipment.

The Gear Ratios are:

1st	6.324 to 1.0
2nd	3.092 to 1.0
3rd	1.686 to 1.0
4th	1.00 to 1.0

DRIVE LINE:

Equipped with Spicer 1550 Series Universal Joints.

FRONT DRIVE/STEER AXLE:

Clark Model 12S0736 (Planetary Type)  
Ratio - 19.54:1  
Oil Capacity - 20 pints - Differential - 8 pints each hub  
Oil Type - Universal Gear Lubricant, 80W-90 (MIL2105C)

REAR STEERING AXLE:

Rockwell Standard Model FL-931 steering axle.  $1\frac{1}{2}^{\circ}$  oscillation in either direction.

TIRES:

Standard - 15.00 X 22.5 - 16-ply rating - highway type.

BATTERY:

For gasoline engine - BCI Group 27 - 540 CCA (after 6-15-88)  
For diesel engine - BCI Group 31 - 950 CCA (after 6-15-88)

WIRE ROPE:

Length - 220 feet  
Diameter - 1/2 inch  
Construction - 6 X 25 IWRC - EIP  
BMC No. 0-861-16012

PUMP DRIVE:

Spicer 1310 series drive shaft.  
BMC No. 3-333-10040 or 3-333-10070 (Cummins)

WINCH AND EXTENSION CONTROL VALVE:

Gresen 25P per P-4822-A  
4-way, 3-position - Two Spool  
Pilot Operated Relief - Adjustable  
2500 PSI  
BMC No. 0-550-00075

BOOM AND OUTRIGGER CONTROL VALVE:

Gresen V-20-1826-A  
4-way, 3-position - 4-spool  
Poppet Relief Valve  
2600 PSI  
BMC No. 0-550-00080 (Standard 4-spool)  
BMC No. 0-550-00081 (Optional 5-spool - Req'd w/opt. Front Winch)

OUTRIGGER CYLINDER HOLDING VALVE:

Gresen LO-25-DA; B4-5204  
Double Acting - Flange-Mounted  
Non-Adjustable  
BMC No. 0-552-00013

BOOM ELEVATION CYLINDER HOLDING VALVE:

Sarasota #2983050  
Gasket Mounted - Single Valve - Adjustable  
- BMC No. 0-552-00041

BOOM EXTENSION CYLINDER HOLDING VALVE:

Sarasota #2983050  
Gasket-Mounted - Single Valve - Adjustable  
BMC No. 0-552-00041

OUTRIGGER CYLINDERS:

Double-Acting Hydraulic  
3" Bore - 29-1/2" Stroke - 1-1/2" Rod  
BMC No. 3-540-10034

BOOM ELEVATING CYLINDER:

Double-Acting Hydraulic  
8-1/2" Bore - 33-3/8" Stroke - 3-1/2" Rod  
BMC No. 3-540-80025

BOOM EXTENSION CYLINDER:

Double-Acting Hydraulic, Rod Fed

For IC-200-1B  
4" Bore - 92" Stroke - 3" Rod; Base Section 92" Stroke  
BMC No. 3-540-40043; Tip Section - 3-540-40044

For IC-200-2B  
4" Bore - 126" Stroke - 3" Rod; Base Section 126" Stroke  
BMC No. 3-540-40047; Tip Section - 3-540-40038

SUCTION STRAINER:

Marvel #881  
100 Mesh (141 Micron) 200 sq. in.  
Reuseable Wire Filter Element  
BMC No. 0-501-01010

RETURN LINE FILTER:

Gresen #F101-100E  
10 Micron Filtration  
22 GPM  
BMC No. 0-501-01018

PUMP:

Vickers 2520 VQ17 A11-11-BD-20L  
Tandem High Performance Vane Type  
Driven direct off engine crankshaft  
Shaft End Section 34 GPM @ 2500 PSI and 2500 RPM  
Cover End Section 22 GPM @ 2500 PSI and 2500 RPM  
BMC No. 0-520-00021

STEERING UNIT:

Char-Lynn Orbitrol Model 213-1007  
Open-Center - Load Blocked in neutral  
11.8 cu. in. per revolution  
BMC No. 0-559-00003

STEERING CYLINDER:

Bruning #7906-017 (for rear steer axle)  
3" Bore - 9-1/2" Stroke - 1" Rod  
BMC No. 0-540-20025

STEERING CYLINDER:

Bruning Hydraulics (for front drive and steer axle)  
3" bore - 9" Stroke - 1" Rod  
BMC No. 0-540-20027

TURRET ROTATION MOTOR:

Char-Lynn Orbitrol Motor - 2000 Series  
BMC No. 0-530-30012

TURRET ROTATION GEAR BOX:

Worm Gear Drive  
Worm Gear Reduction: 30 to 1  
Spur Gear Cut on Output Shaft  
BMC No. 4-280-00124

PLANETARY GEAR WINCH:

Gear Products Model #116-00050-1  
Capacity - 10,000 pounds  
Double Planetary Reduction  
Planetary Ratio 36:1  
Drum Diameter - 9-3/4"  
Drum Length - 13-1/4"  
Flange Diameter - 13-3/4"  
Internal Safety Brake  
Spring Engage  
Hydraulically Released  
BMC No. 0-280-00138

PLANETARY GEAR WINCH MOTOR:

Commercial Intertech Model No. WM51-997-BEOL-22-25  
BMC No. 0-530-20032

OPERATION

## INSTRUMENTS AND CONTROLS

The BMC IC-200 dashboard is equipped with a standard instrument package showing electrical system amperage, fuel level, oil pressure, converter oil temperature, and water temperature. The ammeter shows amount of charge being generated by, or used by, the electrical system. An hour-meter is also included in the instrument package.

The ignition switch is key operated and has "ACC'SY.", "RUN" and "OFF" positions. A push button start switch is located slightly below and to the left of the ignition switch. The ignition switch should always be turned off and the key removed when the vehicle is left unattended.

The BMC IC-200 is equipped with a standard lighting package; an on-off switch and a high beam indicator are on the dashboard. The dimmer switch is located near the cab floor at the left front of the operator's compartment. 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; moving the lever up indicates a right turn. The emergency flasher lights are actuated by pulling outward on the lever when it is in the neutral position. This turn signal is not self-cancelling.

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.

The brake and accelerator pedals are located and operated as they are in other vehicles already familiar to the operator.

The hand-operated lever, near the right front corner of the operator's seat, controls the forward and reverse transmission. When this lever is in neutral, the main transmission can be shifted into first, second, third or fourth gear. Moving the lever forward shifts the forward and reverse transmission for forward travel. To put this transmission in reverse, the machine should be brought to a complete stop. The lever then is pulled rearward - through the neutral position, into reverse.

The transmission and drive train components can be severely 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 in starter circuit prevents starting engine with forward-reverse transmission engaged. Shift lever must be in neutral to start engine.

The transmission gear shift lever is located to the right of the operator's seat which provides first, second, third and fourth gear speed ranges. A dash-mounted placard shows the shifting pattern.

The steering wheel is direct mounted to the valve of the full hydraulic power steering system. The steering system will provide limited steering even though the engine should stop running.

Every effort has been made to make the IC-200 a stable vehicle, however, with the rigid front axle suspension and the oscillating rear axle suspension, the operator should control the vehicle speed to be compatible with conditions of rough roads or uneven terrain.

The controls for operating the outriggers, boom rotation, boom elevation, boom extension and winch are located along the forward dashboard area. These handles are direct-connected to the 4-way hydraulic valves. The placard located adjacent to these handles identifies the function controlled and movement resulting from each handle actuation.

## SEQUENCE OF OPERATION

### Driving the Vehicle

The following procedure is recommended for driving the vehicle to the job site:

1. Apply hand brake.
2. Place forward and reverse transmission control lever in neutral.
3. Start engine and allow a warming period.
4. Check to see that boom is retracted.
5. Check to see that boom is centered.
6. Check to see that boom is lowered.
7. Check to see that winch line is snug.
8. Check to see that outriggers are retracted.
9. Shift manual transmission lever to desired travel speed.
10. Release hand brake.
11. Shift forward and reverse transmission control lever to desired travel position.
12. Depress accelerator pedal to reach travel speed.

### Operating the Crane

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

1. Apply hand brake.
2. Start engine and allow warming period.
3. All outriggers must be fully extended at all times before operation is conducted and remain extended until work operations are completed and boom is restored to road travel position, except for pick and carry operation.
4. During operations, the controls should always be metered when beginning or terminating movement to prevent sudden starting or stopping, which imposes undue shock loads on the equipment, especially when handling heavy loads. The control should be slightly actuated to begin movement and then slowly increased to fully actuated position for maximum operating speed. The results obtained from metering the control lever can also be achieved by coordinating the throttle control.

Never hold 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 reduce service life.

When conducting lifting operations, the operator must have studied the capacity placard and adhere to the load capacities and radii of handling given. The information provided on this placard is indicative of both

structural capacities and tipping factors. Therefore, if any doubt arises about a given load or radius, the operator must refer to this chart.

Maximum load capacity ratings on this equipment are given on the basis that operations are to be conducted on firm and level terrain with outriggers extended firmly to ground. These capacity ratings are reduced in proportionate degree to the extent of deviation from the prescribed conditions. Any unfavorable environmental conditions, such as soft, sloping, or uneven terrain, constitute a deviation.

All capacities are given in direct relationship to the radius at which the load is being handled. The greatest load that may be handled by the BMC IC-200 is 30,000 pounds, but only at a 6' radius. All variations of loads and radii of handling are shown on the load capacity chart and on the capacity placards. These placards are provided near the operator's seat for the express purpose of informing the operator when a load can or cannot be safely handled.

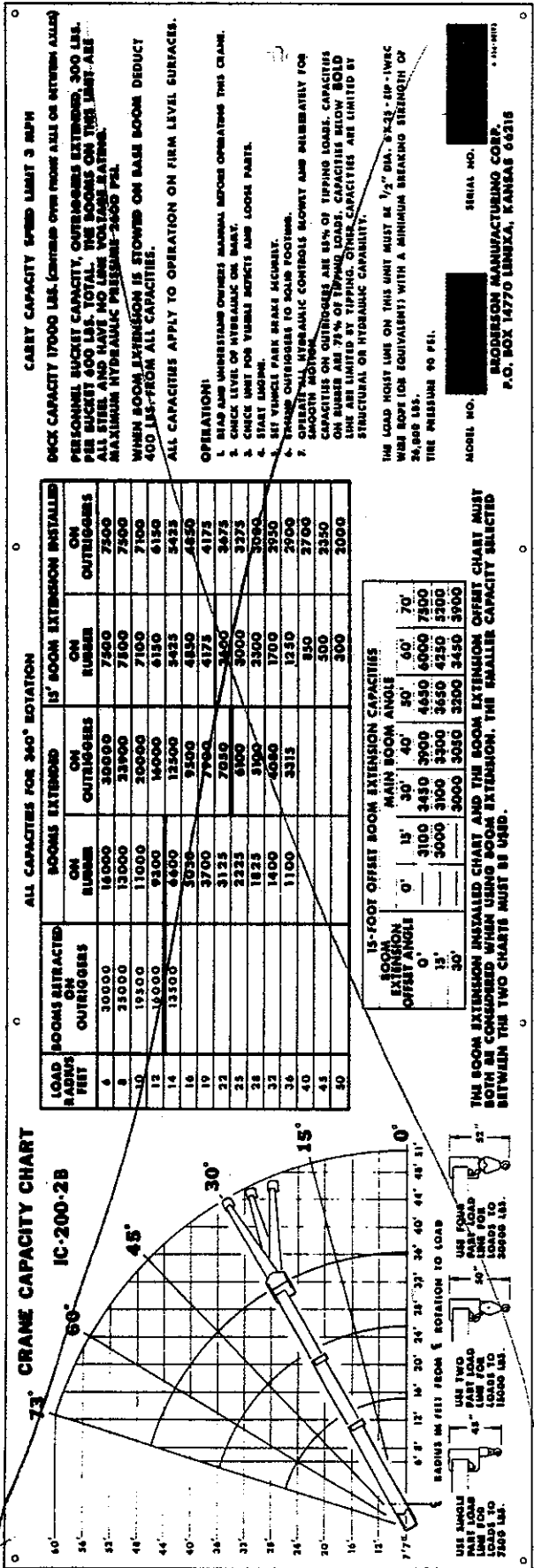
The capacities shown on the capacity chart apply to the entire 360° rotation of the boom, and are maximum allowable at the indicated radius. All radii are measured from the centerline of turret rotation to load-line.

#### C A U T I O N

\*\*\*\*\*  
\*  
\* The capacities of this crane are based on all outriggers being \*  
\* fully extended to a firm, level surface. 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. 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 \*  
\*       of 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. \*  
\*  
\*       C. Crane operated on a hill or sloping surface. \*  
\*       1. Crane will tip at less than rated capacity when \*  
\*       load is lifted on downhill side. \*  
\*  
\*\*\*\*\*

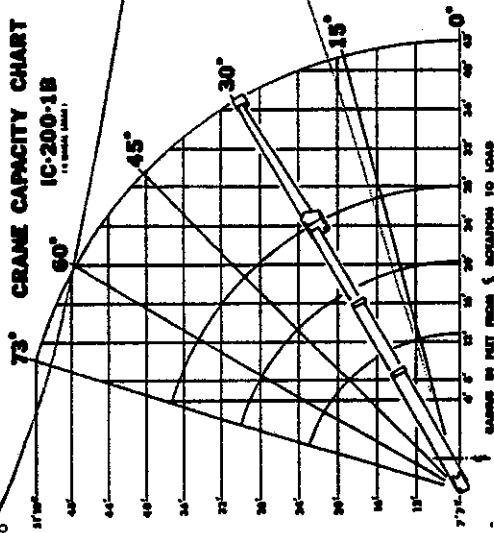
A capacity load may be carried on the boom, or a capacity load may be carried on the deck. DO NOT carry capacity deck loads and capacity boom loads at the same time.





CAPACITY CHARTS

73° CRANE CAPACITY CHART  
IC-200-1B  
(11' TOWER)



ALL CAPACITIES FOR 340° ROTATION

LOAD RADIUS FEET	BOOMS EXTENDED		15' BOOM EXTENSION INSTALLED	
	ON RUMBLE	ON OUTRIGGERS	RUMBLE	ON OUTRIGGERS
6	18000	30000	7500	2500
8	13000	24000	7500	2500
10	11000	20000	7100	2100
12	9300	16000	6150	1850
14	8000	14000	5425	1625
16	7025	12500	4850	1450
18	6275	11250	4375	1300
20	5675	10200	3975	1175
22	5175	9300	3650	1075
24	4750	8500	3375	9875
26	4375	7800	3100	9000
28	4025	7200	2875	8250
30	3700	6600	2675	7500
32	3400	6100	2475	6800
34	3125	5600	2275	6100
36	2875	5200	2100	5500
38	2650	4800	1900	5000
40	2450	4500	1700	4500
42	2275	4200	1500	4000
44	2100	3900	1300	3500
46	1950	3600	1100	3000
48	1800	3300	975	2500
50	1650	3000	850	2000

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



CARRY CAPACITY SPEED LIMIT 3 MPH

DECK CAPACITY 17000 LBS. (LIMITS OVER FRONT AXLE OR BETWEEN AXLES) PERSONNEL SUCKET CAPACITY, OUTRIGGERS EXTENDED 300 LBS. PER SUCKET 600 LBS. TOTAL. THE BOOMS ON THIS UNIT ARE ALL STEEL AND HAVE NO LIMB VIBRATION DAMPERS. MAXIMUM HYDRAULIC PRESSURE 3400 PSI.

WHEN BOOM EXTENSION IS STOWED ON RISE BOOM: PRODUCT 300 LBS. FROM ALL "ON OUTRIGGERS" CAPACITIES. PRODUCT 375 LBS. FROM ALL "ON RUMBLE" CAPACITIES.

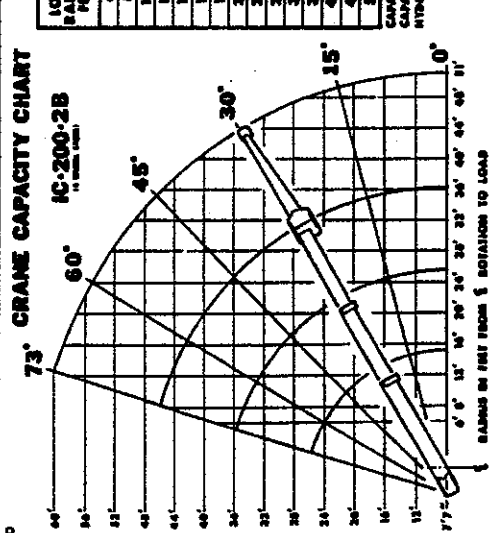
ALL CAPACITIES APPLY TO OPERATION ON FIRM LEVEL SURFACE. OPERATION!

1. READ AND UNDERSTAND OVERSIZ MANUAL BEFORE OPERATING THIS CRANE.
2. CHECK LEVEL OF HYDRAULIC OIL BUILT.
3. CHECK UNIT FOR VIBRAL DEFECTS AND LOOSE PARTS.
4. LEAK DRAINAGE.
5. 20" VEHICLE PARK BRAKE SECURITY.
6. EXTEND OUTRIGGERS TO SOLID FOOTING.
7. OPERATE ALL HYDRAULIC CONTROLS SLOWLY AND DELICATELY FOR SMOOTH MOTION.

THE LOAD HOIST LINE ON THIS UNIT MUST BE 1/2" DIA. & 2 1/2"-ID-1/4" WIRE ROPE FOR EQUIVALENT WITH A MINIMUM BREAKING STRENGTH OF 24,000 LBS. TIME PRESSURE 90 PSI.

MODEL NO. [REDACTED] SERIAL NO. [REDACTED]  
BROOKSESON MANUFACTURING CORP.  
P.O. BOX 14770 LENEXA, KANSAS 66213

73° CRANE CAPACITY CHART  
IC-200-2B  
(11' TOWER)



ALL CAPACITIES FOR 340° ROTATION

LOAD RADIUS FEET	BOOMS EXTENDED		15' BOOM EXTENSION INSTALLED	
	ON RUMBLE	ON OUTRIGGERS	RUMBLE	ON OUTRIGGERS
6	18000	30000	7500	2500
8	13000	24000	7500	2500
10	11000	20000	7100	2100
12	9300	16000	6150	1850
14	8000	14000	5425	1625
16	7025	12500	4850	1450
18	6275	11250	4375	1300
20	5675	10200	3975	1175
22	5175	9300	3650	1075
24	4750	8500	3375	9875
26	4375	7800	3100	9000
28	4025	7200	2875	8250
30	3700	6600	2675	7500
32	3400	6100	2475	6800
34	3125	5600	2275	6100
36	2875	5200	2100	5500
38	2650	4800	1900	5000
40	2450	4500	1700	4500
42	2275	4200	1500	4000
44	2100	3900	1300	3500
46	1950	3600	1100	3000
48	1800	3300	975	2500
50	1650	3000	850	2000

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



CARRY CAPACITY SPEED LIMIT 3 MPH

DECK CAPACITY 17000 LBS. (LIMITS OVER FRONT AXLE OR BETWEEN AXLES) PERSONNEL SUCKET CAPACITY, OUTRIGGERS EXTENDED 300 LBS. PER SUCKET 600 LBS. TOTAL. THE BOOMS ON THIS UNIT ARE ALL STEEL AND HAVE NO LIMB VIBRATION DAMPERS. MAXIMUM HYDRAULIC PRESSURE 3400 PSI.

WHEN BOOM EXTENSION IS STOWED ON RISE BOOM: PRODUCT 300 LBS. FROM ALL "ON OUTRIGGERS" CAPACITIES. PRODUCT 375 LBS. FROM ALL "ON RUMBLE" CAPACITIES.

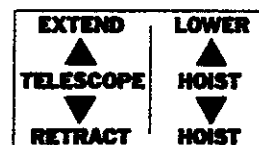
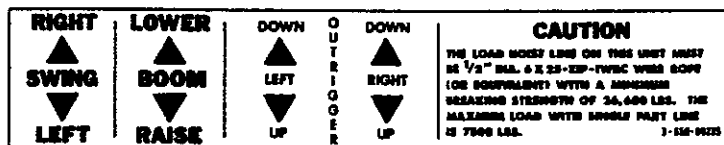
ALL CAPACITIES APPLY TO OPERATION ON FIRM LEVEL SURFACE. OPERATION!

1. READ AND UNDERSTAND OVERSIZ MANUAL BEFORE OPERATING THIS CRANE.
2. CHECK LEVEL OF HYDRAULIC OIL BUILT.
3. CHECK UNIT FOR VIBRAL DEFECTS AND LOOSE PARTS.
4. LEAK DRAINAGE.
5. 20" VEHICLE PARK BRAKE SECURITY.
6. EXTEND OUTRIGGERS TO SOLID FOOTING.
7. OPERATE ALL HYDRAULIC CONTROLS SLOWLY AND DELICATELY FOR SMOOTH MOTION.

THE LOAD HOIST LINE ON THIS UNIT MUST BE 1/2" DIA. & 2 1/2"-ID-1/4" WIRE ROPE FOR EQUIVALENT WITH A MINIMUM BREAKING STRENGTH OF 24,000 LBS. TIME PRESSURE 90 PSI.

MODEL NO. [REDACTED] SERIAL NO. [REDACTED]  
BROOKSESON MANUFACTURING CORP.  
P.O. BOX 14770 LENEXA, KANSAS 66213

## CONTROLS AND FUNCTIONS



All controls are identified by placard, and the directions of actuations for desired movement are indicated on the same placard.

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.

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

Telescope: Pulling back on the lever will retract the boom; pushing forward will extend the boom.

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

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

### SAFETY DEVICES

There are certain safety devices on the Yardrunner that are designed to maintain control of a load even though 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 flange-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 flange-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 Extension 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 Device:

Prevents damage to hoist rope and/or machine components from accidentally pulling load hook against boom tip. Consists of pivot arm at boom tip which is moved upward by load hook as hook approaches boom tip. Pivot arm-actuated electric switch, which is connected through cable reel mounted on boom, to solenoid dump valve in hydraulic circuit. This valve will dump the "hoist raise", "telescope extend" and "boom lower" 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 instrument panel.

### W A R N I N G

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 judgement.

### W A R N I N G

Even though this crane is equipped with an anti-two-block device, we strongly recommend that the operator always watch the downhaul weight or load hook when they are close to the tip sheave plates, and stop lifting before two-blocking occurs. Two-blocking can break the load hoist rope and let the load fall. This could cause death or serious injury.

## SAFETY RULES

1. Since the manufacturer has no direct control over machine application and operation, conformance with good safety practice is the responsibility of the user or his operating personnel.
2. The operator shall not engage in any practice which will divert his attention while actually operating the crane.
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. Always refer to Crane Capacity Chart in operator's compartment before handling load. Do not exceed load ratings. Under some conditions, even the full standard capacity ratings cannot be recommended, and must be adjusted downward to compensate for special hazards, such as supporting ground and other factors affecting stability, wind, hazardous surroundings, operator experience, etc.
5. Inspect load hoist rope and wedge socket daily. We recommend rope inspection, replacement and maintenance be in accordance with ANSI B30.5-1982, Section 5-2.4.
6. Do not allow anyone to stand or pass under a load on the hook.
7. The operator shall not leave his position at the controls while the load is suspended.
8. Do not use crane to drag loads sideways.
9. Do not hoist, lower, swing, or travel while anyone is on the load or hook.
10. Always keep crane boom at least 10 feet away from electric power lines. If boom should accidentally contact a power line, keep ground personnel away from crane.
11. Crane shall not be refueled with the engine running.
12. Always use adequate parts of load hoist line for lifting heavy loads. Consult Crane Capacity Chart.
13. Always be sure the rope is properly seated and wound level on hoist drum.
14. Keep hands away from load hoist rope when winch is being operated.
15. When handling loads below ground level, be sure at least five wraps of rope are left on the hoist drum to insure against rope pulling out of its anchor.
16. 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.

## SAFETY RULES

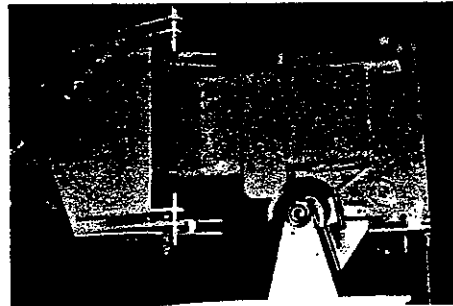
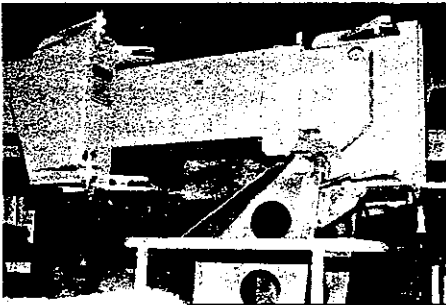
17. For Pick and Carry Operation - Traveling with suspended loads involves so many variables, such as ground conditions, boom length, momentum in starting and stopping, etc., that it is impossible to devise a single standard rating procedure with any assurance of safety. For such operations, the user 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. Travel speed reduced to suit conditions (3 mph max.)
  - e. Maintain specified tire pressures.
  - f. Avoid sudden starts and stops.
  - g. Provide tag or restraint lines to snub swinging of the load.
  - h. Do not carry maximum boom loads and maximum deck loads at the same time.
  
18. For Carrying Loads on Decks.
  - a. Boom must be retracted, centered, and lowered to horizontal.
  - b. Retract all outriggers.
  - c. A 17,000-pound load can be carried on the deck when centered over front axle or centered between axles. When decks are loaded to capacity, do not "Pick & Carry" load on boom.
  - d. Travel in first gear only - 3 mph when carrying capacity deck loads.
  
19. Avoid "Two-Blocking".
  - a. Stop raising hoist line before downhaul weight 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.
  
20. Before beginning operation each day, thoroughly inspect the entire crane to be sure it is in good operating condition.
  
21. If crane is equipped with a cab, keep all window glass clean. Keep gauges clean, also.
  
22. Keep operator's compartment and decks free of mud and grease.
  
23. When raising the boom or moving the unit with boom elevated, be sure there is adequate overhead clearance for boom.
  
24. Cranes with rear steering require close watch because of "tail swing" when operating in close quarters.
  
25. When servicing or repairing this crane, always stop engine and remove key from ignition.
  
26. When this crane is to be parked on a downgrade, block wheels or extend outriggers fully.
  
27. The above list of rules is only a supplement to all federal, state and local safety rules that may apply.

## STOWING BOOM EXTENSION

When Boom Extension is mounted on the tip section Boom, here are the steps to follow to stow the Boom Extension along side of the base Boom.

1. Lower the boom to horizontal and retract the booms fully.
2. Remove cable retaining pins at outer end of Boom Extension. Remove cable from sheave and replace pins.
3. Uncouple anti-two-block cable. Remove 1" pins from left side of boom. Swing Boom Extension 170° to right (along side of base boom). Remove pin from support tube on base Boom. Swing Boom Extension inward so lugs line up, and pin Boom Extension to Base Boom.
4. Remove 1" pins from lugs on right side of tip section Boom, and stow these pins in outside lugs of Boom Extension.
5. Remove pin from rear lugs on base Boom, swing tip end of Boom Extension inward and pin to base Boom.
6. Install cable in main boom sheave.
7. Main boom is now ready for normal crane use.
8. Boom Extension is installed in reverse order.

### W A R N I N G



The illustrations above show that when the Boom Extension is stowed on the Base Boom and Work Platform, or Bucket is installed on the Tip Section, the Tip Section cannot be fully retracted. Personal injury and/or structural damage can occur when boom is retracted under these conditions.

For SAFETY'S SAKE - to workmen and the cranes structure - REMOVE BOOM EXTENSION - from Base Boom when using Work Platform or Personnel Bucket/s.

### STOWING OFFSET BOOM EXTENSION

1. If boom extension has been placed in the 15 deg. or 30 deg. offset position, return it to the 0 deg. horizontal position.
2. Lower boom and retract to within 8" of fully closed.
3. Remove load line from boom extension.
4. Disconnect anti-two block wiring harness at base end of boom extension. Stow harness end in clamp at side of support box weldment.
5. Remove the left upper and lower attachment pins from boom extension mounting lugs. Swing boom extension to clear lugs on main boom and stow pins in empty lugs on boom extension.
6. Remove stow and boom lock pins from stow brackets on the right side of main boom.
7. Swing boom extension 180 deg. to the right, pull boom extension tight against rub pad on main boom. Begin retracting main boom. Boom extension will ramp up stowage bracket and engage fork & 1" pin when fully retracted. Install 1/2" pin & hairpin in stowage bracket.
8. Remove the right upper and lower attachment pins from boom extension mounting lugs. Swing boom extension to clear lugs on main boom and stow pins in empty lugs on boom extension.
9. Align holes in inner stow bracket on boom extension with holes in inner stow bracket on main boom. Install boom lock pin through brackets and insert hairpin to retain pin.
10. Install load line and tackle to main boom.
11. Before using main boom or boom extension, check to insure that all load line retaining pins have been replaced.
12. Unstow boom extension in reverse order.



## SETTING THE BOOM EXTENSION OFFSET ANGLE

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 dashboard.

### **WARNING**

Be careful not to operate the "CROWD" 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.

### **WARNING**

Vapors can be formed inside a fuel tank and cause a build-up of pressure that can result in a sudden expulsion of gasoline and gasoline vapors from the filler neck when the gasoline cap is removed from a hot tank.

**WARNING!** Remove cap slowly. Fuel spray may cause injury.

## THE OVERLOAD ALERT SYSTEM

(Optional on Units before Serial Number 30002 )

This system is designed to prevent STRUCTURAL DAMAGE to crane.

This system WILL NOT prevent TIPPING at all load radii.

This system is inoperative when the boom topping cylinder is fully retracted (boom completely lowered).

This system does not protect the tires from overload.

This system does not protect crane from side load pulls with winch or severe shock.

This system does not protect the optional boom extension.

The Overload Alert System consists of a pilot-operated unloader valve installed in the pressure lines between the pump and the control valves. The pilot port in the unloader valve is piped to the holding valve on the boom topping cylinder. The unloader valve is set to open at 2650 PSI. As the boom load is increased, the pressure in the base end of the topping cylinder is increased accordingly and the pilot line in the holding valve carries this pressure through a 1/4-inch hose to the pilot port in the unloader valve. At a pressure of 2650 PSI in the base of the topping cylinder, the machine will lift from 10 to 30% (depending on boom angle) over rated capacities shown on the load chart. Once the unit is overloaded, the unloader valve is opened by the pilot line pressure, and all oil flow from the pump is dumped directly back to tank, and all functions will become inoperable. A spring-loaded override valve is provided in the return line to tank to temporarily resume oil flow to control valves to allow the overload to be lowered. This override valve should be used only to return the unit from an overloaded condition, and will return to normal position when released.

## BOOM STRUCTURAL PROTECTION SYSTEM

(Optional on Units after Serial Number 29659 )

This system helps prevent structural boom damage by stopping the "hoist raise", "boom lower" and "telescope extend" functions when the hydraulic pressure in the "boom raise" cylinder exceeds 3100 PSI. A pressure switch does this by actuating the Anti-Two-Block valve.

This system WILL NOT PREVENT TIPPING in some boom positions.

This system is INOPERATIVE WITH BOOM FULLY LOWERED.

This system WILL NOT PROTECT AGAINST SIDE PULLS OR SHOCK LOADS.

To correct a condition which has activated the system, use "hoist lower", "boom raise" or "telescope retract" functions. If an electrical malfunction prevents this, use the emergency override keyswitch under the dashboard. Use great care when operating the emergency override to prevent overloading the crane further.

## IC-200 MAINTENANCE

The BMC IC-200, like all hydraulically operated mechanical equipment, will perform with high efficiency for longer periods if a program of inspection, lubrication, adjustment and general preventive maintenance is followed. We recommend the following schedule.

NEW UNIT INSPECTION AND TEST

Each BMC IC-200 undergoes a thorough inspection and operations test at the factory. At this time, all adjustments are made and it is determined that the unit is properly assembled, and that the unit performs in accordance with the specifications.

The following new unit 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. General Inspection:

- (a) Check for physical damage.
- (b) Check for leaks in hydraulic fittings.
- (c) Check radiator coolant level.
- (d) Check engine oil level.
- (e) Check hydraulic oil reservoir level.
- (f) Check torque convertor oil level.
- (g) Check fuel tank level.
- (h) Check battery water level.
- (i) Check tire pressure (90 psi).
- (j) Check for loose pins, bolts and retainers.

## 2. Operational Test:

- (a) Operate forward and reverse transmission control lever for forward, neutral and reverse positions.
- (b) Operate foot brake - check for operation.
- (c) Operate hand brake - check for operation and adjustment.
- (d) Operate accelerator pedal - check for operation.
- (e) Start engine.
- (f) Check oil pressure.
- (g) Check ammeter.
- (h) Check power steering for operation.
- (i) Check transmission shift lever for operation.
- (j) Check all lights and turn signals for operation.
- (k) Test drive unit and check for normal operation.
- (l) Check anti-block for proper operation.
- (m) Check operation of hydraulic outriggers.
- (n) Check boom rotation.
- (o) Check boom elevation.
- (p) Check boom extension (payout winch cable during power extension).

## OPERATOR MAINTENANCE

An operator, in the course of normal crane operation, should make certain observations, inspections, and tests, to determine that the unit is ready and able to perform safely at rated capacities.

- DAILY:**
1. Check radiator coolant level.
  2. Check engine oil level.
  3. Check fuel level.
  4. Check hydraulic oil level.
  5. Check general condition of tires.
  6. Visually inspect for loose bolts, pins, oil leaks, or physical damage.
  7. Check engine oil pressure.
  8. Check engine coolant temperature.
  9. Check battery charging amperage.
  10. Check convertor oil temperature.
  11. Check forward and reverse transmission control lever operation.
  12. Check hydraulic brake operation.
  13. Check hand brake operation.
  14. Check power steering operation.
  15. Observe chassis for normal driving operation.
  16. Observe boom operation for normal power and speed.
  17. Check for winch line damage.
  18. Check anti-two block for proper operation.
- WEEKLY:**
1. Check tire pressure - 90 PSI.
  2. Check axle mounting bolts for tightness.
  3. Check wheel nuts for tightness.
  4. Check battery water level.
  5. Check lights and turn signals.
  6. Check brake lines for damage.
  7. Check power steering lines for damage.
  8. Check transmission fluid level.
- MONTHLY:**
1. Check rotation gear attachment to frame for tightness.
  2. Check backlash in rotation gear train.
  3. Check outrigger cylinder holding valves for operation.
  4. Check boom topping cylinder holding valve for operation.

5. Check boom extension cylinder holding valve for operation.
6. Check hydraulic centerpost for leaks.
7. Visually inspect all hydraulic fittings for leaks.
8. Visually inspect all bolts for tightness.
9. Visually inspect all hinge pins for secureness.
10. Visually inspect all welds for cracks.
11. Check brake fluid level.

## LUBRICATION SCHEDULE

ITEM	DESCRIPTION	LUBE SYMBOL	LUBRICATION INTERVALS (HOURS)					NOTES
			DAILY	50	500	1000	YEARLY	
1.	Engine Oil	EO	X					Check Per Mfg. Reccom.
2.	Engine Oil Drain	EO		-				
3.	Hydraulic Oil	HO	X			X		Replace Semi-Annual
4.	Powershift Trans. 4 Speed Trans.	ATF MPL		X X			X X	
5.	Drive Axle	MPL		X			X	Replace Yearly
6.	Drive Shaft	MPG		X				
7.	PTO Shaft	MPG		X				3 Zerks 2 Zerks
8.	Steering Cyls. Ends	MPG			X			
9.	Tie Rod Ends	MPG			X			4 Zerks Clean & Repack
10.	Wheel Brgs.	WBG					X	
11.	Boom Hinge Pin	MPG			X			1 Zerk 2 Zerks
12.	Topping Cyl.	MPG			X			
13.	Tip Sheaves	MPG			X			2 Zerks 2 Zerks
14.	Axle Pivot Point	MPG			X			
15.	Control Valve Links	EO		X				At Wear Points 1 Zerk
16.	Accel. Linkage	MPG			X			
17.	Shift Linkage	EO		X				At Wear Points At Wear Points
18.	Hand Brake Link	EO		X				
19.	Planetary Hub	MPL			X		X	Replace Yearly Replace Yearly
20.	Winch	MPL*					X	
21.	Rot. Gear Box	MPG						Repack @ Overhaul Coat Teeth
22.	Rot. Gear	OGG		X				
23.	Sheave Block	MPG		X				1 Zerk 8 Zerks
24.	King Pins	MPG			X			
25.	Rot. Gear Brgs.	MPG		X				1 Zerk At Rub Pads
26.	Outrigger Leg	MPG		X				
27.	Aux. Front Winch	MPL			X		X	Replace Yearly

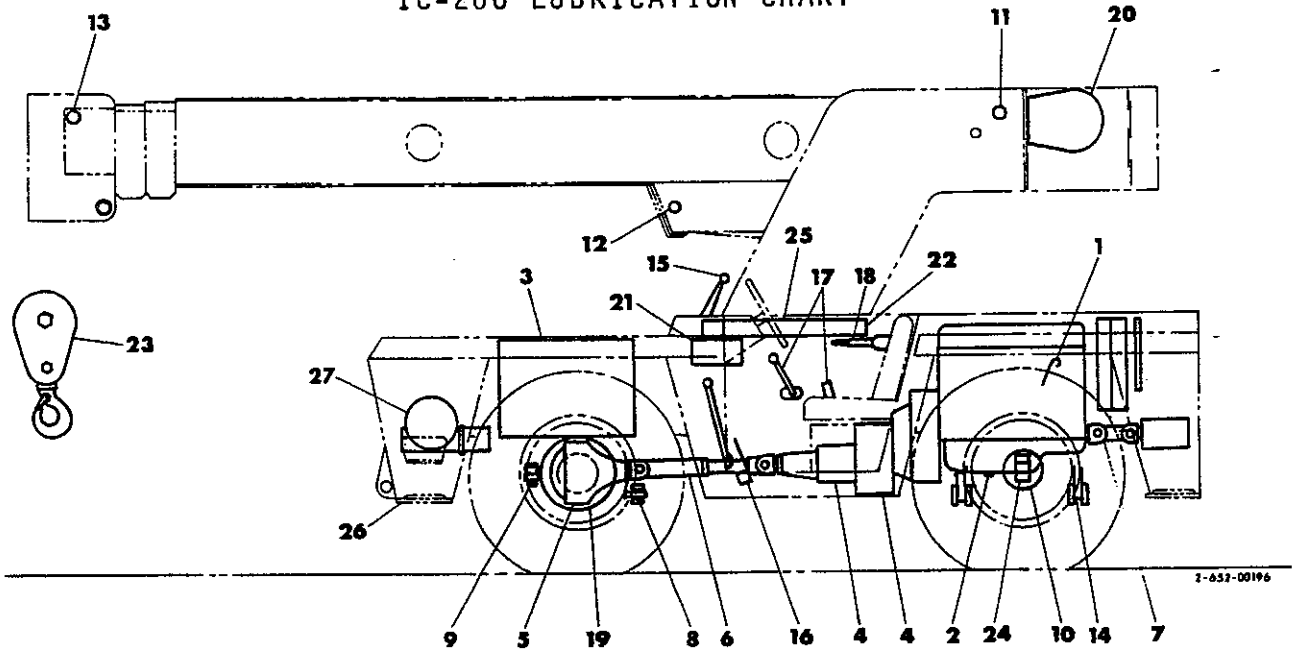
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### LUBE SYMBOLS

MPG - Multipurpose Grease  
MPL - Multipurpose Gear Lub - SAE 90  
MPL\*- Multipurpose Gear Lub - SAE 140  
WBG - Wheel Brg. Grease  
HO - Hydraulic Oil  
EO - Engine Oil  
OGG - Open Gear Grease - Example: Mobilkote S  
ATF - Automatic Trans. Fluid - Example: Mobilfluid #423

NOTE: Under extremely dusty conditions intervals should be shortened. The above are only minimum recommended schedules.

## IC-200 LUBRICATION CHART



### HYDRAULIC SYSTEM:

The hydraulic system is the "heart" of the BMC IC-200. To obtain the most efficient operation and longest life from the machine, it is important that certain principles be followed.

### Care of Hydraulic Oil:

The hydraulic oil and filter must be changed regularly to reduce the effects of contamination by dirt, metal particles, water and acids.

The BMC IC-200 is equipped with a 100 mesh, reusable, suction line strainer to remove the larger particles from the oil before they enter the pump and other components. In the return line, there is a 10 micron filter to remove fine particles. The filter must be serviced after the first 50 hours of operation to eliminate from the system the unavoidable products of manufacturing processes and initial run-in. To minimize oil loss, close the "shut-off" valve before servicing the filter.

**BE SURE THE SHUT-OFF VALVE IS OPENED FULLY BEFORE PUTTING THE PUMP BACK IN OPERATION.**

The return line filter requires a new disposable cartridge for proper servicing. All parts should be cleaned and reassembled with a new cartridge in the same manner as an automotive oil filter is changed. Return line filter element should be replaced every 250 hours of operation.

Although the filter keeps the system clean and free of particles, it is impossible to eliminate the water and acids which build up in the oil due to condensation and oxidation. It is, therefore, important that the oil be drained from the system and replaced with fresh oil after each 500 hours of operation and/or each year. Suction strainer should be serviced at this time.

The suction strainer is located in the suction line between the hydraulic tank and hydraulic pump. This strainer has a reuseable wire screen element. To service this strainer, remove four bolts holding the housing to the base. The housing can then be lifted off the base. Remove the element from the base by turning the element counterclockwise. Wash the element in cleaning solvent and allow to drain dry. Check by-pass valve in the center of the element to be certain no foreign matter is lodged in the valve. Screw element back into filter base and reassemble.

#### HYDRAULIC OILS FOR IC-200

AMBIENT TEMP. RANGE:	<u>-40<sup>0</sup> to 75<sup>0</sup> F.</u>	<u>-15 to 110<sup>0</sup> F.</u>	<u>50<sup>0</sup> to 130<sup>0</sup> F.</u>
POUR POINT	-40 <sup>0</sup> F MAX	-15 <sup>0</sup> F. MAX.	0 <sup>0</sup> F. MAX
VISCOSITY INDEX	140 MIN	95 to 100	95 to 100
VISC SSU @ 100 <sup>0</sup> F:	200 MAX	230 MAX	340 MAX
SSU @ 210 <sup>0</sup> 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 HD46	MOBIL AW-68 MOBIL DTE-26 CONOCO SUPER 68 TEXACO HD68

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

The IC-200 is factory filled with hydraulic oil for the -15<sup>0</sup> to 110<sup>0</sup> F. range. If significant portions of time are spent operating below 20<sup>0</sup> F or above 100<sup>0</sup> F, the oil should be replaced with an extreme temperature oil.



The oils shown on the opposite page are compatible with and may be combined with MS 10W or MS20-20W motor oil if it is necessary to add oil between changes and the recommended oils are not available. These MS motor oils are not suitable substitutes when changing hydraulic oil because they lack certain additives which make the DTE oils superior 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.

The fluid level in the reservoir should be checked with all hydraulic cylinders retracted.

#### CAUTION

Serious damage to the pump will result if it is run with the shut-off valves closed or with insufficient oil level in the reservoir.

Observe the operation of the machine. If the oil is too heavy, the machine will get sluggish and should be warmed up further before sustained hard work is attempted. If the oil is too light, leakage will increase, pump efficiency will go down, system will lose pressure, and moving parts will not be properly lubricated. Be certain machine is filled with the proper oil for the prevailing operating temperature. If operating temperature is excessive, rapid deterioration of the oil will result and moving parts will wear more quickly. The cause of the excess heat should be determined and corrected. Other indications of an excessive operating temperature are:

- a. Control handles become more difficult to operate.
- b. Control handles stick instead of returning to neutral.

### Pressure Settings:

The hydraulic system is divided up into two separate pressure circuits, each having its own protective adjustable relief valve.

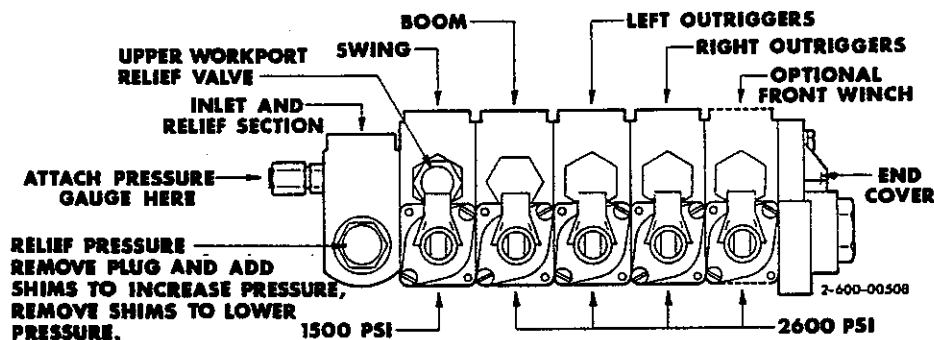
1. Winch and Extension Circuit - 2500 PSI at full flow.
2. Boom and Outrigger Circuit - 2600 PSI at full flow.

A good quality pressure gauge with at least 3000 PSI scale is required to make adjustments properly. A piece of high pressure hose with adapters to fit the 3/8" tube pressure port is required to install the gauge where it can be read easily.

The following procedures are suggested when taking pressure readings:

1. Winch and Extension Circuit: Remove the 3/8" cap from the 90° fitting on the side of the Gresen Control Valve, and install 3000# test gauge. To obtain full flow reading, run pump at 2000 RPM and actuate telescope control to "retract" position, and hold until maximum reading is made. If a pressure of 2500# is not possible, check the following:
  - a. Broken mechanical connection to the pump shaft.
  - b. Low oil level in the reservoir.
  - c. Clogged suction filter or shut-off valve not fully opened.
  - d. Valve spool linkage not allowing control valve to fully open. Valve spool should move 3/8" each way from neutral position.
  - e. Adjust relief valve by removing plug in top of relief cartridge and turning slotted screw clockwise to increase pressure or counterclockwise to lower pressure.
  - f. Foreign particle in pilot-operated relief.
  - g. Worn or defective hydraulic pump.
2. Boom and Outrigger Circuit: Remove 3/8" cap from the tee fitting on the right outrigger line, and install 3000# gauge. Check pressure with pump running at 2000 RPM, using outrigger control fully opened at end of stroke. Pressure should read 2600#.

Adjust relief valve by removing plug in top of relief cartridge and turning slotted screw clockwise to increase pressure or counter-clockwise to lower pressure.



The relief valve pressure setting at the inlet end of valve is 2600 PSI. This pressure is required for all circuits except swing. Two work port relief valves are installed in the swing circuit. These relief valves are set at 1500 PSI as indicated in the illustration above.

The relief pressure at the inlet end of valve can be adjusted with a wrench and heavy screwdriver. The cap must be removed from the fitting on the inlet end of the valve and a 3000 PSI pressure gauge attached. Actuate the right outrigger lever when making this adjustment.

While the pressure gauge is attached, the swing circuit may be checked by capping the two work ports of the swing section with #8-JIC tube caps and actuating the swing control lever in each direction. If the pressure is improper, either or both work port relief valves can be removed, and shims added or removed as needed. Part numbers for the work port relief valve 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).

**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.

#### Leaks:

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 BMC IC-200 use an "O" ring type seal, and if tightening the fitting fails to stop the leak, the "O" ring should be replaced. Do not over-tighten a pipe thread connection on which Teflon Sealer has been used. Leaks in component parts, such as pumps, valves, and motors, which 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 an owner should attempt on component parts unless they have a well-equipped shop, with mechanics trained in hydraulic component overhaul.

Leakage in the pump suction lines 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 and listen for a change in the noise, and watch for oil being "sucked" into a minute opening in the connection. When the reservoir is full, the "shut-off" 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 hose should be replaced for maximum economy for the user.

### MECHANICAL ADJUSTMENTS

#### General:

All fasteners on the BMC 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 bolts, bull gear bolts, rotation assembly bolts, winch bolts, etc. All bolts used in assembly are heat-treated Grade 5 except the bolts attaching the bull gear to the mainframe and turret, which are Grade 8. The torque of the bull gear mounting bolts (3/4 dia.) must be maintained at 280 ft-lbs. A regular torque chart can be used on all other bolts.

#### Rotation Gear Box:

The rotation gear box 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 in the frame backplate. It is further restrained from torsional movement by four bolts in the frame sideplates. Proper adjustment exists when there is .010 inch backlash between the pinion and bull gear teeth. If adjustment is required, loosen the gear box mounting bolts and the side bolts. Tighten the two rear setscrews until proper adjustment is obtained. Tighten the mounting bolts and the side bolts. Lock setscrews and bolts into position.

## MECHANICAL ADJUSTMENTS (continued)

### Boom Cylinder Holding Valve:

A holding valve is flange-connected to the base of the topping cylinder barrel and to the base of the extension cylinder rod. These valves are designed to hold the boom in position should loss of power or pressure line failure occur.

To check and adjust the topping cylinder holding valve, place the boom in a horizontal position and lift a rated load about three feet above the ground. An example of rated load is approximately 7600 pounds at a 22-foot radius. Turn the engine off and move the boom topping lever to the "lower" position. If the boom moves down, the valve should be adjusted. Loosen the jam nuts on the holding valve adjusting screw and tighten screw until unpowered boom movement stops. Retighten the jam nuts to hold the proper adjustment.

The extension cylinder valve should be checked with the boom elevated to the maximum practical position and the boom extended several feet. Twenty-thousand (20,000) pounds on a three-part line is desired for this test. The extension cylinder may be required to lift this first load off the ground. The radius of the test load should be within the rating on the capacity chart. The same test and adjustment procedure described for the topping cylinder should be used except that the extension lever should be moved to the "retract" position.

### Wheel Bearing Adjustment:

Wheel bearing adjustment must be maintained at all times. Adjustment is made each time the bearings are repacked (1,000 hours, or annually). Wheel bearings are adjusted by the adjust nut. This nut should be tightened until only a slight drag is felt when rotating the wheel.

## WHEEL ALIGNMENT

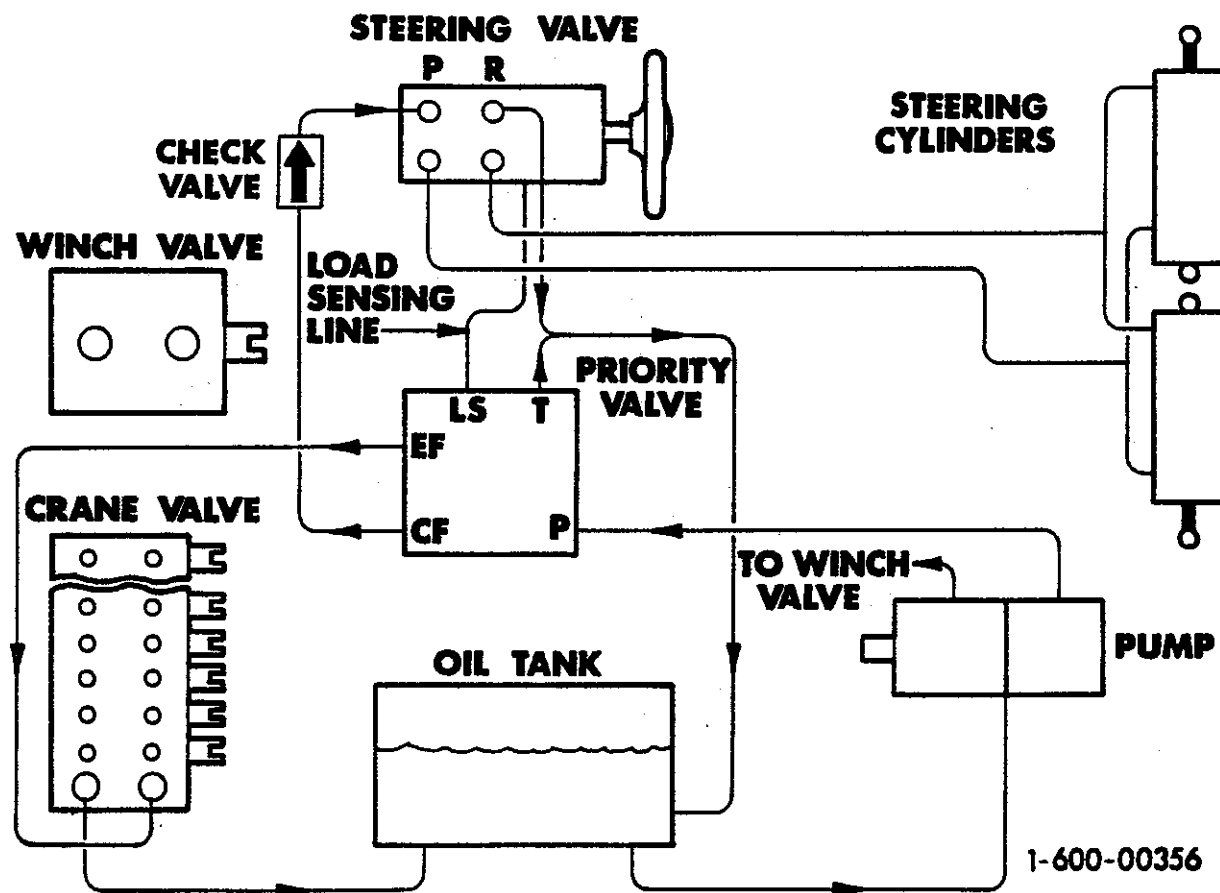
Wheels must be kept in proper alignment in order to assure ease of steering and satisfactory tire life. The steering axle wheels should be set at zero toe-in.

## STEERING SYSTEM

Your BMC IC-200 is equipped with a full time power steering system. Most power steering systems use a belt or gear-driven hydraulic pump for power steering. The BMC IC-200 system is designed to use power from the main hydraulic pump only when steering power is needed, and eliminate the conventional separate steering pump.

This is a load sensing power steering system which uses a demand-type priority valve that diverts all of the flow not used in the steering circuit to the main hydraulic system.

The following diagram and comments will explain how the system operates.



Oil from the small (rear) 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 and power are not affected, since there is no loss of volume or pressure by passing through this Priority Valve.

When the steering wheel is turned, and steering power is required, the load sensing line signals the Priority Valve to divert the required amount of oil to the Steering Valve to meet the steering system requirements. The excess oil, not required for steering, flows to the

Crane Valve as usual. Since the amount of oil required for steering is usually a small portion of the pump output, the Crane 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 system pressure was set at 1500 PSI at the factory and should not need adjustment.

## PRESSURE CHECK AND ADJUSTMENT

1. Retract boom and lower to fully lowered position.
2. Remove 38" tube cap from tee on unloader valve, and install 3000 PSI pressure gauge. Unloader valve is located on underside of machine above front axle.
3. Raise boom slightly from fully lowered position and hook loadline to a static load (a load that the unit cannot lift).
4. Tighten loadline with winch until unloader valve opens. Pressure at opening should read 2650 PSI.
5. Adjust pressure if necessary. Pressure adjusting screw is located on end of unloader valve neck. To increase unloading pressure, turn adjusting screw counter-clockwise; to lower pressure, turn adjusting screw clockwise.
6. After proper adjustment has been obtained, lower boom to fully lowered position, remove pressure gauge, and install cap on tee.

## POWER RANGER TRANSMISSION MAINTENANCE

The PR-1 Transmission is bolted directly to the flywheel housing of the engine. The fluid specified in Hydraulic Transmission Type C-3. The following is a partial listing of fluids that meet this requirement:

<u>Fluid Type</u>	<u>Supplier</u>
Amoco C3 Fluid	Amoco Oil Company
Chevron Torque Fluid 5	Chevron Oil Company
Torque Fluid 47	Exxon Company, USA
Gulf HT Fluid C-3	Gulf Oil Corporation
Power Fluid C-3	Mobil USA
Type C-2/C-3 Fluid	Phillips Petroleum Company
Shell Hydraulic Fluid C-3	Shell Oil Company
Sunfleet C-2/C-3 Fluid	Sun Petroleum Products Company
Torque Fluid C-3	Texaco, Incorporated
Union C-3 Fluid	Union Oil Company

The transmission is equipped with an oil cooling system and a filter. Total fluid capacity is 11 quarts and should be changed every 500 hours of operation. The filter element is a Gresen #K22001 which should be changed every 500 hours of operation or semi-annually. The fluid level should be checked weekly by the following procedure:

With the transmission hot and the engine running at idle speed -

1. Engage the parking brake.
2. Put 4-speed gear box in neutral.



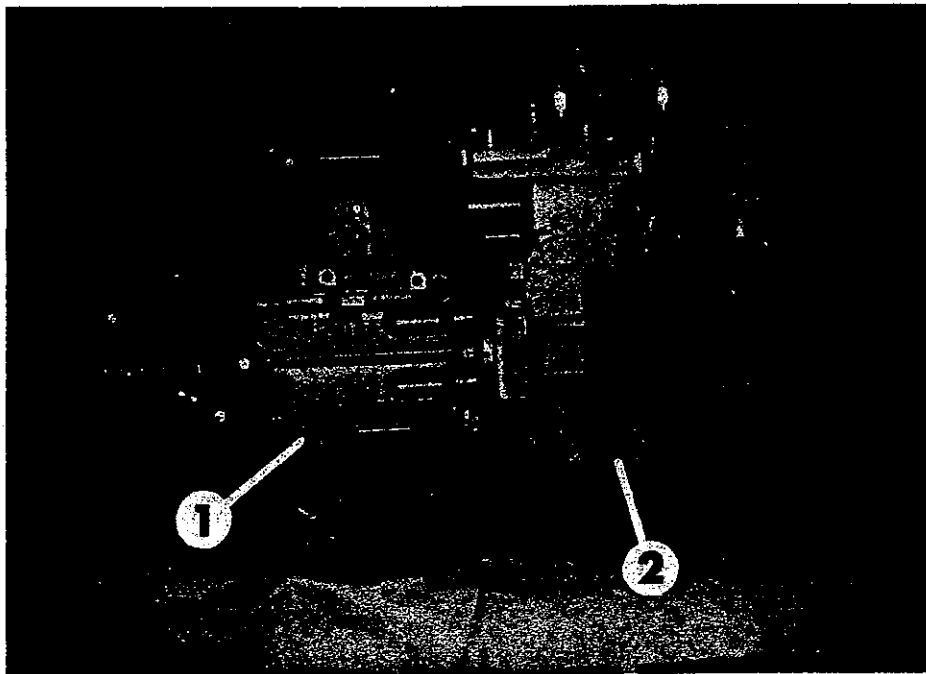
### Procedure for Checking Fluid Level (continued)

3. Place forward/reverse selector in neutral.
4. Check the fluid level on the dipstick located on the transmission on the right side of the crane.

The forward/reverse valve control spool is located at the top rear of the PR-1 transmission. This valve is cable operated, and its adjustment is important for proper operation of the transmission.

The valve spool has three detent positions: forward, neutral, and reverse. When the valve spool is in the center (neutral) position, the control cable length should be adjusted so the shift lever, in the operator's compartment, is in the neutral position.

Transmission fluid level check and drain.



1. Fluid level check and fill (T-18).
2. Fluid drain (PR-1).

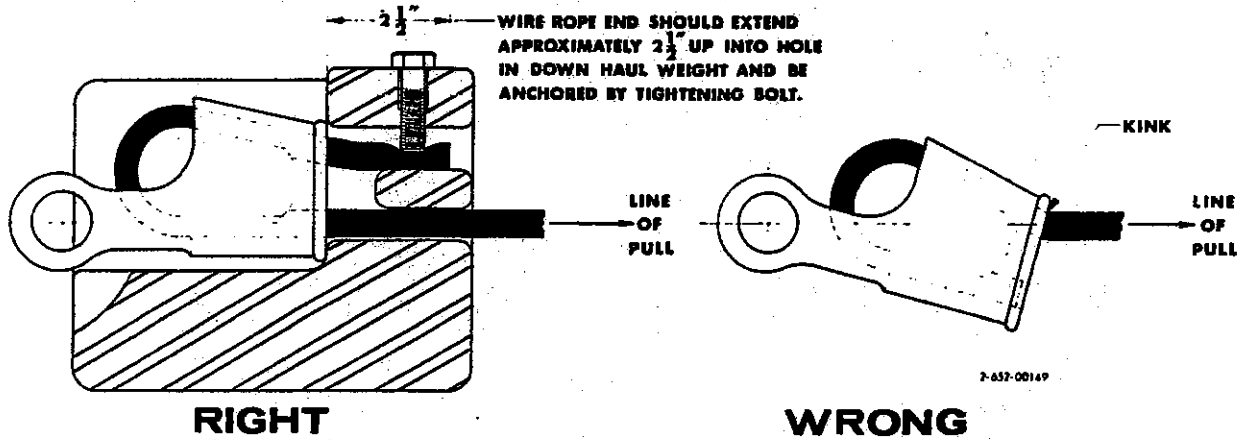
## Load Hoist Rope Care

Greater safety and longer life can be expected from the load hoist rope supplied with your BMC crane if these suggestions are followed.

For rope break in, install a sheave block for two or more parts of line as needed to lift the maximum rated load. Lower the outriggers. Attach a light load - 500 to 1000 pounds. Elevate boom fully and telescope boom fully. Raise and lower this load several times and check the rope on the winch drum to be sure it is winding smooth and even. Add more load and repeat to be sure rope winds evenly on which drum.

Never lift more load with a given number of parts of line than recommended on the Crane Capacity Chart. For rope lubrication we recommend Amovis Lubricant #2-X or equivalent. We suggest a light coat of this lubricant be applied to the load hoist rope while the required periodic inspection is being made.

### WIRE ROPE INSTALLATION



**WARNING**

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.

2-651-00060

SUGGESTED MAINTENANCE CHECKLIST - BMC IC-200  
(Always check the Owner's Manual for complete instructions)

Check

- Engine starts easily and runs smoothly.
- Hydraulic lines and fittings for leaks or damage.
- Radiator and oil cooler fins clean.
- Hydraulic functions for proper operations-
- Service brakes for proper operations.
- Proper operation of transmission shift linkage.
- Proper operation of parking brake.
- Check winch cable for damage and proper spooling.
- Check air cleaner.
- Check defroster fan (if equipped).
- Check exhaust system.
- Check steering for proper operation.
- Check tire pressures and condition of tires (90 PSI).
- Check for loose fasteners.
- Condition of sheave blocks (if equipped).
- Rotation gear box for proper adjustment.
- Back-up alarm (if equipped).
- Check operation of heater (if equipped).
- Cable retainers on boom and boom extension.
- Check operation of lights.
- Check operation of windshield wiper (if equipped).
- Check cab door (if equipped).
- Check operation of instrument panel gauges.
- Check engine drive belts for proper adjustments.
- Boom extension - properly stored and all pins in proper location (if equipped).
- Check condition of all control, warning, and capacity charts.
- Check glass (if equipped).
- Inspection of boom sections for visible signs of overload, shock loads, and recommended replacement or repair.
- Operation of overload alert (if equipped).
- Operation of anti-two-block.

SUGGESTED MAINTENANCE CHECKLIST (continued)

Lubricate: W-Weekly; M-Monthly

Fluid Levels - Check Daily  
Before Starting.

- Boom slide pads (W) (Silicone spray or ways lube).
- Control lever linkage (W) (WD-40)
- Boom sheave pins (W) (Chassis lube).
- Rear axle pivot pin (W) (Chassis lube).
- Steering cylinder ends (W) (Chassis lube).
- Drive lines and U-joints (W) (Chassis lube).
- Gear shift and throttle linkage (W) (WD-40)
- Rotation gear teeth (M) (Open gear lube).
- Rotation gear race (Semi-annual, or 500 hours of operation) (Chassis lube).
- Outrigger leg pads (M) (Ways lube).
- Pump driveshaft U-joints (W) (Chassis lube).
- Steering king pins (M) (Chassis lube).
- Axle differential Lubricant level. (M) (EP-90)
- Manual transmission (M) (EP-90)
- Shuttle transmission (W) (Type C-3 Fluid).

- Radiator coolant.
- Battery.
- Hydraulic oil reservoir.
- Engine oil.
- Brake master cylinder.

UNIT MODEL # \_\_\_\_\_ UNIT SERIAL # \_\_\_\_\_ HOUR METER \_\_\_\_\_

Comments: \_\_\_\_\_

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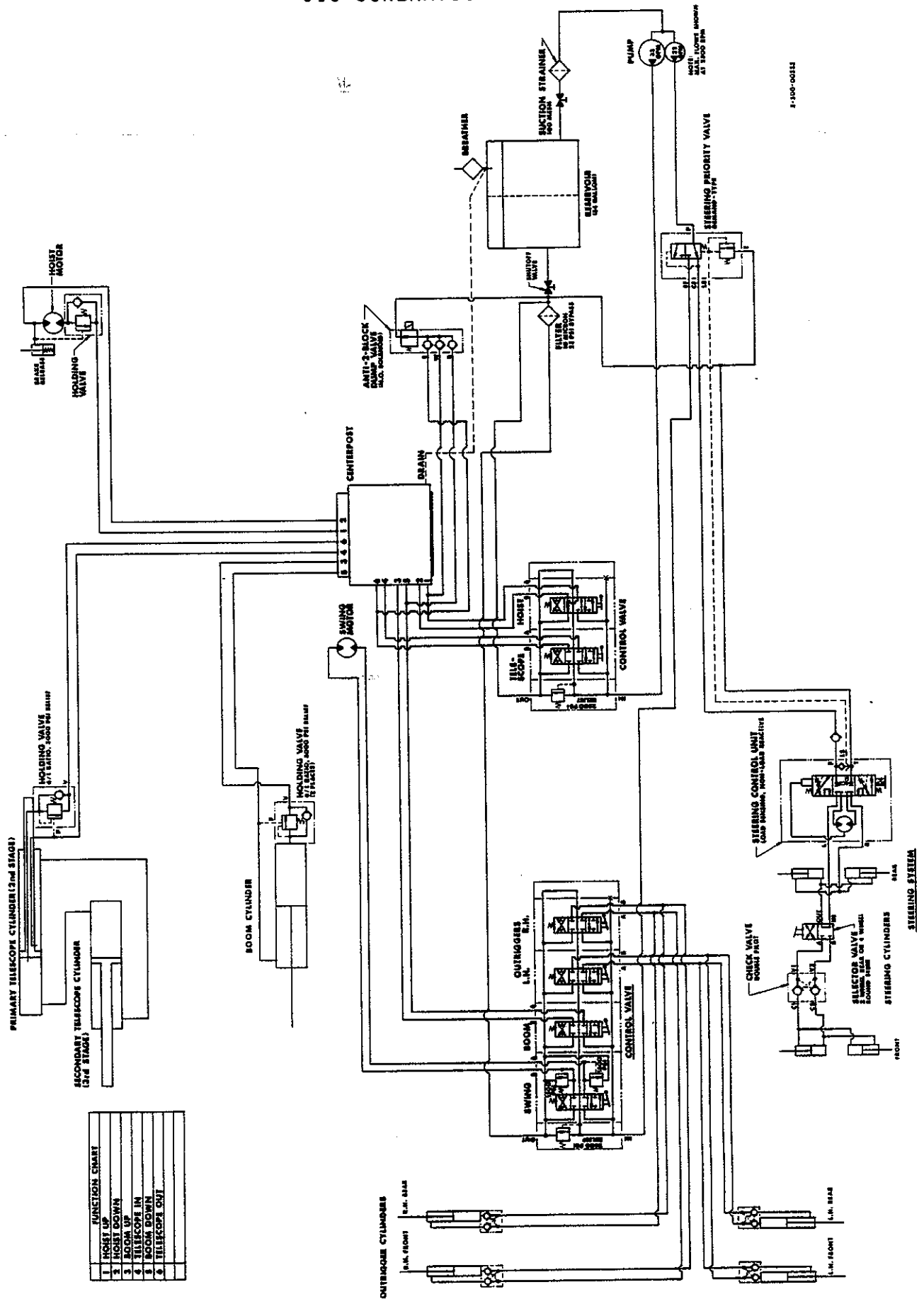
Time Spent: \_\_\_\_\_ Parts Required \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date: \_\_\_\_\_ Serviceman: \_\_\_\_\_

# JIC SCHEMATIC



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