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BRODERSON MFG. CORP.
LENEXA, KANSAS 66215

OWNER'S MANUAL IC-180-1A YARDRUNNER

OWNER:

SOLD AND SERVICED BY:

MODEL NO:

SERIAL NO:

1-900-00047

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.

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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.

BRODERSON MANUFACTURING CORP.

YARDRUNNER

INTRODUCTION

The BMC Yardrunner 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 Yardrunner Owner's Manual P/N 0-990-30016.

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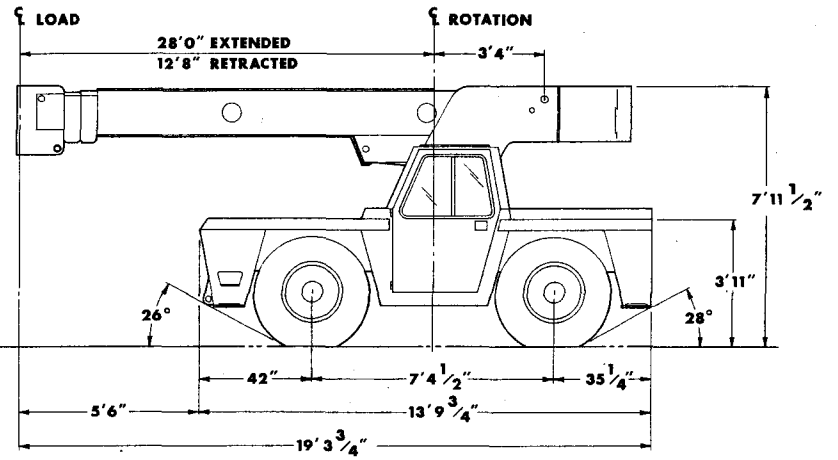
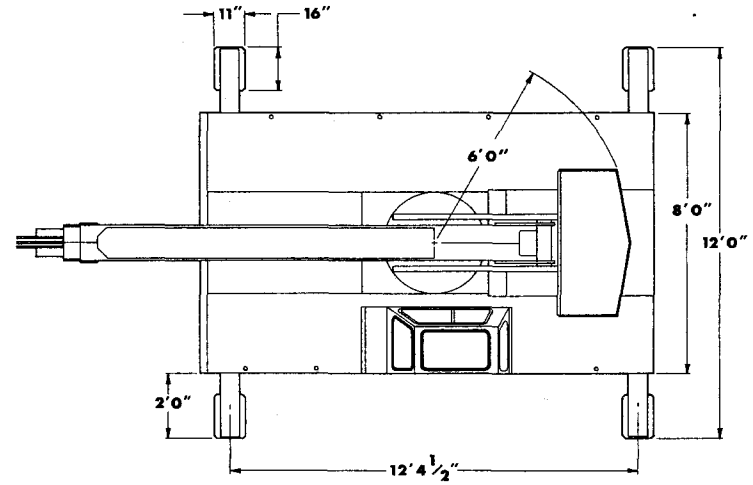
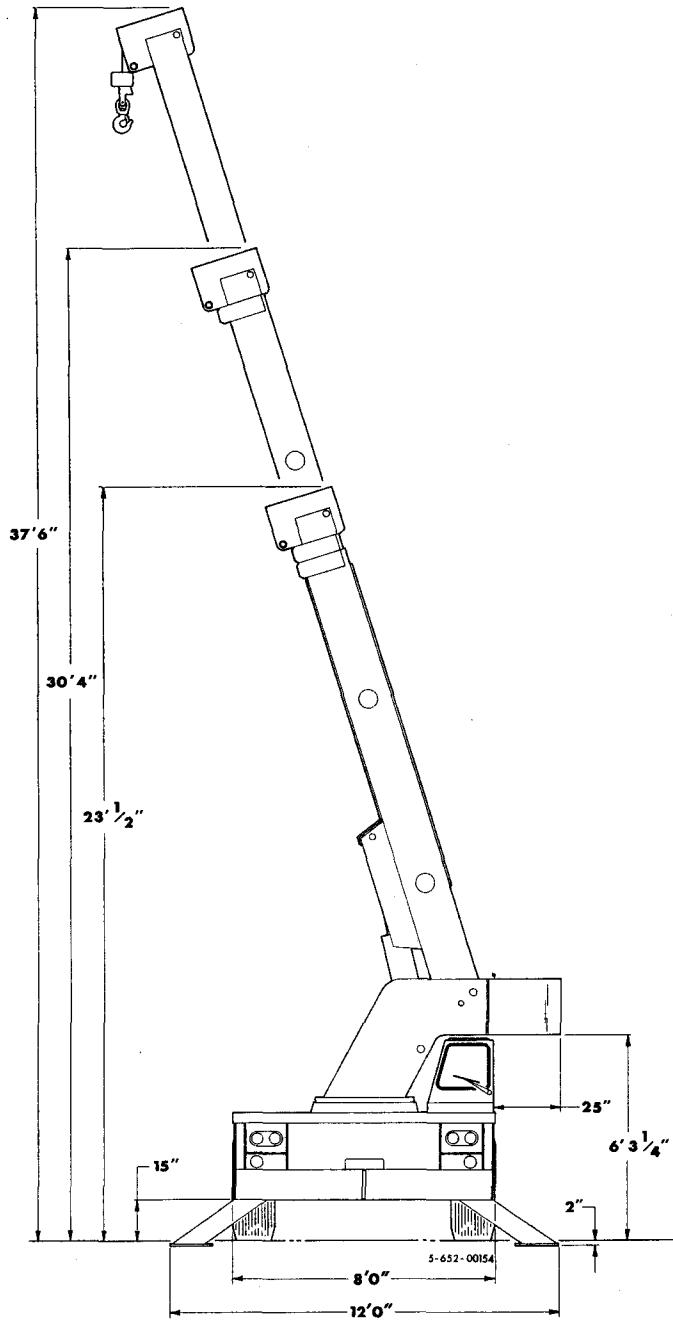
SECTION I

GENERAL DESCRIPTION

The BMC Yardrunner 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, 3-speed transmission, driveline, differential driving axle, and steering axle assembly. The front driving 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.



BASIC SPECIFICATIONS AND COMPONENT MANUFACTURERS' DATA

The BMC Yardrunner 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.

ENGINE: Chrysler Industrial HB225
(Standard) Displacement - 225 cubic inches
Bore - 3.4 inches
Stroke - 4.125 inches
Weight - 670 lbs.
Governed Speed - 2600 RPM
Horsepower - 97 at 2600 RPM
Torque - 198 lbs. ft. at 2000 RPM
Fuel - Regular Grade Gasoline
Oil Crankcase Capacity - 5 qts. (6 with filter change)
Oil Filter Cartridge - Fram #CH236APL, BMC #9-110-00351
Oil Pressure - 50 PSI at 800 RPM
Firing Order - 1-5-3-6-2-4
Air Cleaner - Dry Type - Cartridge - Fram #CA 100 APL-
BMC #0-600-12010
Cooling System Capacity - 12 qts.
Upper Radiator Hose - Gates No. VF-13-BMC #0-600-99087
Lower Radiator Hose - Gates No. VF-38-BMC #0-600-99082
V-Belt, Water Pump & Idler - Gates No. 7390-
BMC #0-335-06021
V-Belt, Alternator & Fan - Gates No. 7525-
BMC #0-335-06022

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.

ENGINE: John Deere Diesel - Model 4219D
(Optional) Displacement - 219 cubic inches
Bore - 4.02 inches
Stroke - 4.33 inches
Weight - 845 lbs.
Governed Speed - 2500 RPM
Horsepower - 70 at 2500 RPM
Torque - 169 lbs. ft. at 1200 RPM
Fuel - No. 2 Diesel
Oil Crankcase Capacity - 9 qts.
Oil Filter Cartridge - J.D. #T19044-BMC #9-111-00004
Oil Pressure - 50 PSI at 2000 RPM
Fuel Filter - J.D. #AR50041 - BMC #9-111-00003

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 three-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 and third 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	6.89 to 1.0
2nd	3.37 to 1.0
3rd	1.84 to 1.0

DRIVE LINE:

Equipped with Spicer 1550 Series Universal Joints.

FRONT DRIVING AXLE:

International Harvester Model RA-47 drive axle with 7.17 to 1.0 ratio. Rigid mounted. Oil capacity 31.5 pints.

REAR STEERING AXLE:

Rockwell Standard Model FL-931 steering axle. 1-1/2° oscillation in either direction.

TIRES:

Standard - 15.00 x 22.5 - 16 ply rating - highway type
Optional - 10.00 x 20 - Solid Rubber

BATTERY:

For gasoline engine
BCI Group No. 24F - 385 CCA
For diesel engine
BCI Group No. 27F - 550 CCA

WIRE ROPE:

Length - 230 ft.
Diameter- 1/2 in.
Construction - 6 x 25 IWRC - EIP
BMC No. 0-861-16012

PUMP DRIVE:

Spicer 1310 series drive shaft
BMC No. 3-333-10040

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 L0-25-DA; B4-5204
Double Acting - Flange Mounted
Non-Adjustable
BMC No. 0-552-00013

BOOM ELEVATION CYLINDER HOLDING VALVE:

Sarasota 25625-SAE 16G
Gasket Mounted - Single Valve - Adjustable
BMC No. 0-552-00034

BOOM EXTENSION CYLINDER HOLDING VALVE:

Sarasota 25625-SAE 16G
Gasket Mounted - Single Valve - Adjustable
BMC No. 0-552-00034

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
4" Bore - 92" Stroke - 3" Rod; Base Section 92" Stroke
BMC No. 3-540-40043; Tip Section - 3-540-40044

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
23 GPM
BMC No. 0-501-01018

Replaceable Filter Element - BMC No. 0-501-01019

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. 0-559-00033

STEERING CYLINDER:

Gould #7906-017
3" Bore - 9-1/2" Stroke - 1" Rod
BMC No. 0-540-20025

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 110-001R
Capacity - 10,000 lbs.
Double Planetary Reduction
Planetary Ratio 36:1
Drum Dia. - 9-1/2"
Drum Length - 13-1/4"
Flange Dia. - 13"
Internal Safety Brake
Spring Engage
Hydraulically Released
BMC No. 0-280-00014

PLANETARY GEAR WINCH MOTOR:

Commercial Shearing Model No. 303-9310-061 25X
2-1/4" Gear Size
BMC No. 0-530-20019

OPERATION

INSTRUMENTS AND CONTROLS

The Yardrunner dashboard is equipped with a standard instrument package showing electrical system amperage, fuel level, oil pressure, convertor oil temperature, and water temperature. The ammeter shows amount of charge being generated by, or used by, the electrical system. An hourmeter 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 choke knob is located at the left end of the dashboard.

The BMC Yardrunner 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 operators 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.

A hand operated lever, near the right front corner of the operators seat, controls the forward and reverse transmission. When this lever is in neutral, the main transmission can be shifted into first, second or third 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 and third 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 Yardrunner 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 control 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 extended firmly to ground 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.

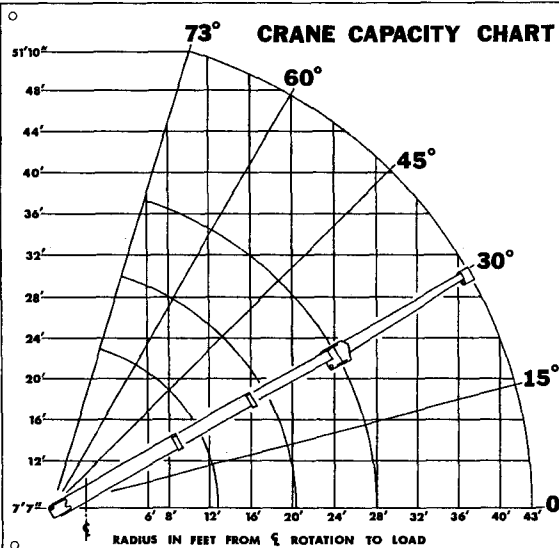
All capacities are given in direct relationship to the radius at which the load is being handled. The greatest load that may be handled by the BMC Yardrunner is 30,000 pounds but only at a 6' radius. All variances of loads and radii of handling are shown on the load capacity chart and on the capacity 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 loadline.

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 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.



ALL CAPACITIES FOR 360° ROTATION

LOAD RADIUS FEET	BOOMS RETRACTED ON OUTRIGGERS	BOOMS EXTENDED		15' BOOM EXTENSION INSTALLED	
		ON RUBBER	ON OUTRIGGERS	ON RUBBER	ON OUTRIGGERS
6	30000	14000	30000	7500	7500
8	25000	11000	24000	7500	7500
10	20000	9400	20000	7100	7100
12	16000	8000	16000	6150	6150
14		6800	11950	5425	5425
16		5700	10500	4850	4850
19		4325	8875	4175	4175
22		3350	7600	3675	3675
25		2775	6350	3275	3275
28		2400	5300	2950	3000
31				2350	3000
34				1925	3000
38				1475	3000
43				1100	2800

USE SINGLE PART LOAD LINE FOR LOADS TO 7500 LBS.



USE TWO PART LOAD LINE FOR LOADS TO 15000 LBS.



USE FOUR PART LOAD LINE FOR LOADS TO 30000 LBS.



CARRY CAPACITY SPEED LIMIT 3 MPH

DECK CAPACITY 17000 LBS. (CENTERED OVER FRONT AXLE OR BETWEEN AXLES)
 PERSONNEL BUCKET CAPACITY, OUTRIGGERS EXTENDED, 300 LBS. PER BUCKET 600 LBS. TOTAL. THE BOOMS ON THIS UNIT ARE ALL STEEL AND HAVE NO LINE VOLTAGE RATING. MAXIMUM HYDRAULIC PRESSURE 2600 PSI.

WHEN BOOM EXTENSION IS STOWED ON BASE BOOM: DEDUCT 200 LBS. FROM ALL "ON OUTRIGGERS" CAPACITIES. DEDUCT 275 LBS. FROM ALL "ON RUBBER" CAPACITIES.

ALL CAPACITIES APPLY TO OPERATION ON FIRM LEVEL SURFACES.

OPERATION:

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

THE LOAD HOIST LINE ON THIS UNIT MUST BE 1/2" DIA. 6 X 25-EIP-1WRC WIRE ROPE (OR EQUIVALENT) WITH A MINIMUM BREAKING STRENGTH OF 26,000 LBS.

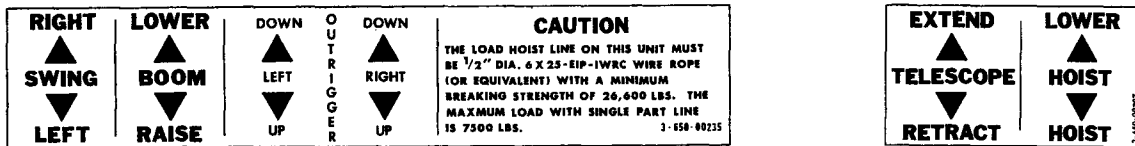
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SERIAL NO. [REDACTED]

BRODERSON MANUFACTURING CORP.
 P.O. BOX 14770 LENEXA, KANSAS 66215

4-654-00098

CONTROLS AND FUNCTIONS



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

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

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

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.

CAUTION

Avoid "Two Blocking." This happens when the downhaul weight or hook block is pulled against boom tip plates.

To avoid two blocking:

1. Stop raising hoist line before downhaul weight or hook block strikes tip plates.
2. Pay out hoist line while extending boom.
3. Maintain clearance between downhaul weight or hook block and boom tip while booming down.

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 instruction.

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 B30.5-1968, 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 lb. 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.

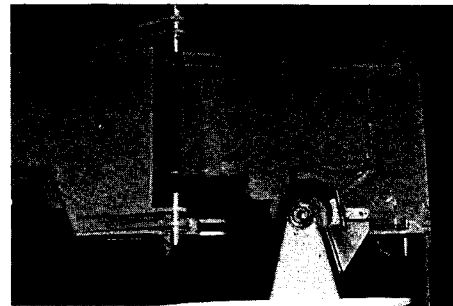
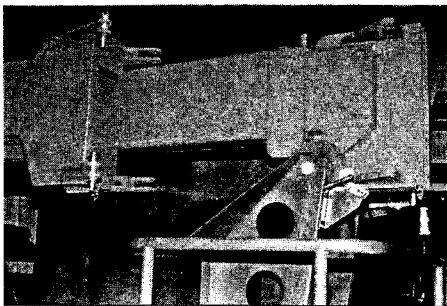
27. The above list of rules is only a supplement to all federal, state and local safety rules that may apply.

STOWING BOOM EXTENSION

When boom extension is mounted to tip section boom, here are steps to follow to stow boom extension along side of base boom.

1. Lower boom fully and retract within 2" of full closed.
2. Remove cable retaining pins at outer end of boom extension. Remove cable from sheave and replace pins.
3. Remove 1" pins from left side of boom. Swing boom extension 180° to right (along side of base boom.) Replace 1" pins in lugs on tip section boom.
4. Retract booms slowly the last 2". Pins on boom extension will engage forked lugs and holes will line up at rear stow tabs.
5. Install 3/4" detent pin in rear tab holes and remove 1" pins and store in outside boom extension lugs.
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.

WARNING



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.

SECTION III

YARDRUNNER MAINTENANCE

The Yardrunner, 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 Yardrunner 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 operation of hydraulic outriggers.
- (m) Check boom rotation.
- (n) Check boom elevation.
- (o) 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.
- Weekly:
1. Check tire pressure (90 psi).
 2. Check front 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.
- 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 center post 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.

PREVENTATIVE MAINTENANCE

General:

A good preventive maintenance program will provide a high degree of assurance that the Roadrunner will always be ready to operate in a safe efficient manner. The section is written to provide the basic information required to establish such a program for your particular conditions.

Lubrication:

<u>Point of Lubrication</u>	<u>Lubricant</u>	<u>Method</u>	<u>Interval</u>
1. Engine	Consult your Chrysler or John Deere Engine Manual		
2. Manual Transmission	Straight Mineral 90 wt. gear oil	Check & Fill... Change.....	Weekly 500 hrs. or Semi-annual
3. Powershift Transmission	Hydraulic Trans- mission Fluid Type C-3 (See Pg. III-14)	Check & Fill... Change.....	Weekly 500 hrs. or Semi-annual
4. Axle Differential	EP90 Hypoid	Check & Fill... Change.....	Weekly 500 hrs. or Semi-annual
5. Axle Pivot Pins	Pressure Gun Grease	Pressure Gun...	500 Hrs. or Semi-annual
6. Radial (Wheel) Bearings	Wheel Bearing Grease	Clean & Repack.	1000 Hrs.
7. Pressure Fittings	Mobilgrease Special	Pressure Gun...	Weekly
8. Hydraulic Oil Reservoir	Mobil DTE-23 Below 32°F Mobil DTE-26 Above 32°F	Check & Fill... Change.....	Weekly Semi-annual

Point of Lubrication	Lubricant	Method	Interval
9. Rotation Gear Teeth	Mobilkote "S"	Brush.....	Weekly
10. Rotation Gear Box	Texaco Marfak Multipurpose "O"	Repack.....	Overhaul
11. The planetary gear winch is filled with oil at the factory. Since there is no check plug accessible on this type of winch, drain oil from plug in bottom of drum and refill with EP140 oil in top plug of drum every year of operation. (Capacity - 5 pints)			
12. Control Linkage	SAE 10W	Oil Can.....	Weekly

NOTE: Tradenames are used only to describe the lubricant. In all cases lubricant equivalents to those listed are completely satisfactory.

Hydraulic System:

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

Care of Hydraulic Oil:

Hydraulic Oil does not wear out and could be left in a machine forever if it were not for contamination by dirt, metal particles, water, and acids.

The BMC Yardrunner is equipped with a 100 mesh 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 micron filter to remove particles down to 10 microns in size. All filters 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 filters. BE SURE SHUT-OFF VALVE IS OPENED FULLY BEFORE PUTTING THE PUMP BACK IN OPERATION.

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 element 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.

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.

Although the BMC Yardrunner has been equipped with an excellent filtering system, 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 spring and fall. Suction filter should be serviced at this time. Return line filter element should be replaced every 250 hours of operation.

The hydraulic oil selected should contain rust and oxidation inhibitors, antifoam agents, and antiwear additives. An equivalent of the following is strongly recommended.

Summer: Mobil DTE-26
Oil Temperatures 32°F to 195°F
Ambient Temperatures 32°F and above
Viscosity Index - 95
Viscosity @100°F - 300 SSU

Equivalents

American Oil Company RyKon 31
Shell L.O. Hydrax 133

Winter: (Wide Temperature Range)
Mobil DTE-23
Oil Temperatures -3° to 170°F
Ambient Temperatures -25°F to +85°F
Viscosity Index - 150
Viscosity @100°F - 150 SSU
 @ -3°F - 4000 SSU
 @170°F - 60 SSU
Minimum Pump Start-Up Temperature - 25°F

No Exact Equivalents Known

Winter: (Narrow Temperature Range)
Mobil DTE-24
Oil Temperatures 13°F to 158°F
Ambient Temperatures 0°F to 60°F
Viscosity Index - 95
Viscosity @100°F - 150 SSU

Equivalents

American Oil Company RyKon 15
Shell L.O. Hydrax 127

The above oils are compatible with and may be combined with MS 10W or MS 20-20W motor oil if it is necessary to add oil between changes and the DTE 23 or 26 is not readily 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.

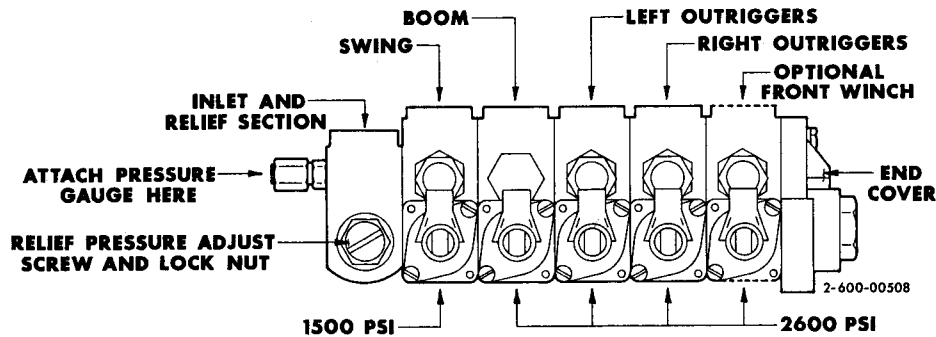
1. Winch and extension Circuit - 2500 PSI at full flow.
2. Boom and Outrigger Circuit - 2600 PSI at full flow.

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 counter-clockwise 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 actuating the swing control lever. If the pressure is improper, the 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).

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 Yardrunner 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 Yardrunner 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. lb.. 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 ADJUSTMENT 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 lbs. at a 22 ft. 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. 20,000 lbs. 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 (1000 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

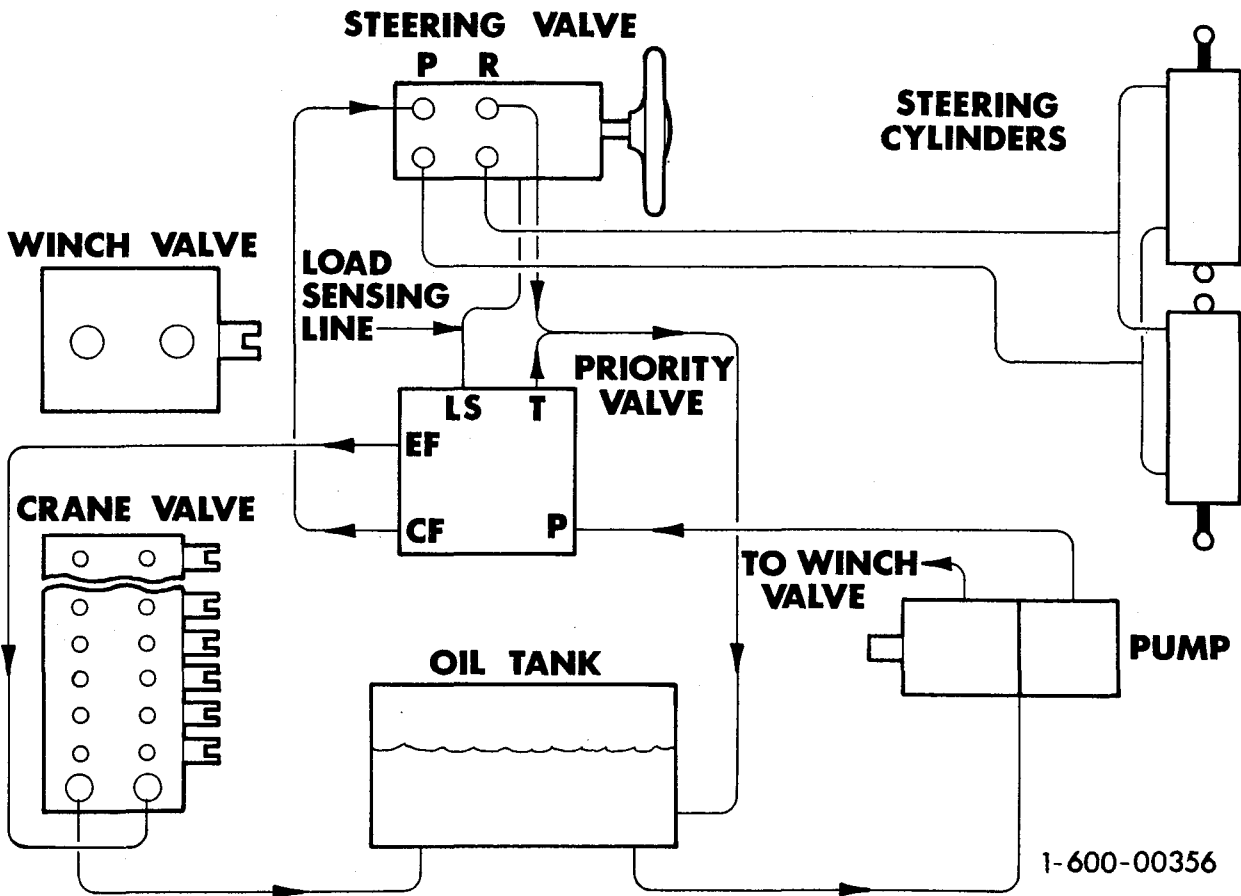
Wheels must be kept in proper alignment in order to assure ease of steering and satisfactory tire life. The steering axle wheels should be set at zero toe-in.

STEERING SYSTEM

Your BMC Yardrunner 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 Yardrunner 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 the 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.

OPERATION OF OVERLOAD ALERT SYSTEM

The Overload Alert System is basically a pilot operated unloader valve installed in the pump pressure lines between the pump and the control valves. The pilot port in this 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 approximately 5% 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.

The Overload Alert System can be neutralized simply by removing the spring from beneath the knob on the override valve, and leave the valve in the down position to perform any tests necessary. Extreme care should be used in this operation to prevent damage to unit or tipping due to extreme overloads. By installing the spring back on the override valve you can then return the overload alert to normal operation. (See next page for pressure check and adjustment instructions).

PRESSURE CHECK AND ADJUSTMENT

1. Retract boom and lower to fully lowered position.
2. Remove 3/8 tube cap from tee on unloader valve and install 3,000 lb. 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 2,650 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 is 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 Co.
Chevron Torque Fluid 5	Chevron Oil Co.
Torque Fluid 47	Exxon Company, USA
Gulf HT Fluid C-3	Gulf Oil Corp.
Power Fluid C-3	Mobil USA
Type C-2/C-3 Fluid	Phillips Petroleum Co.
Shell Hydraulic Fluid C-3	Shell Oil Co.
Sunfleet C-2/C-3 Fluid	Sun Petroleum Products Co.
Torque Fluid C-3	Texaco, Inc.
Union C-3 Fluid	Union Oil Co.

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.

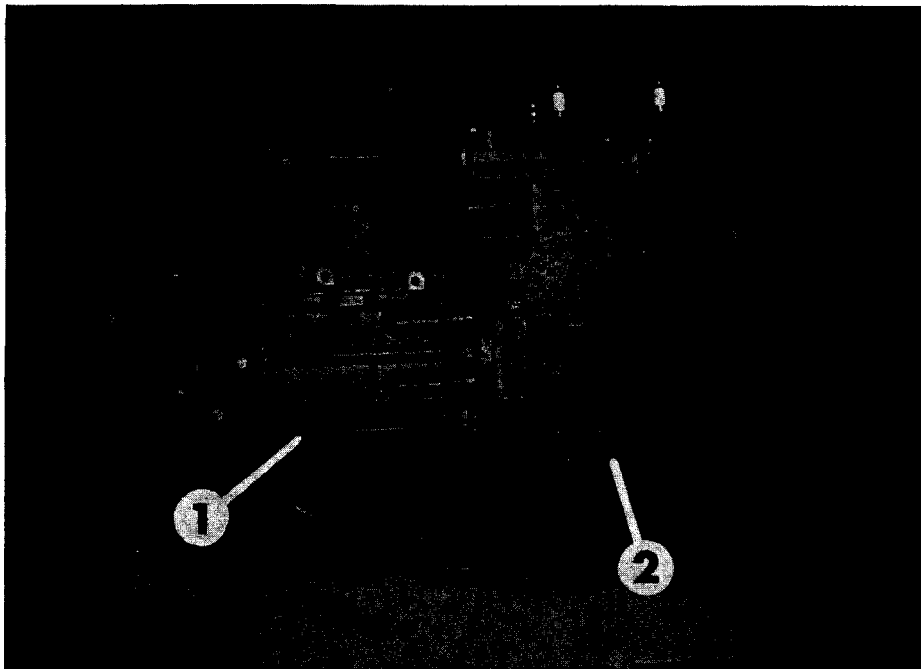
Procedure for checking fluid level (continued)

2. Put 3-speed gear box in neutral.
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).

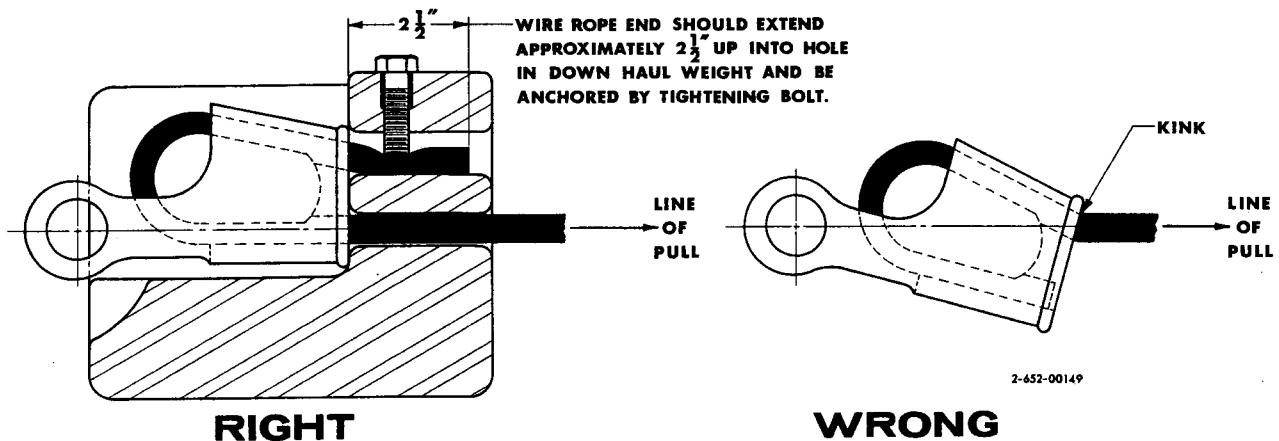
LOAD HOIST ROPE CARE

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 lbs. 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 winch 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



SUGGESTED MAINTENANCE CHECKLIST - BMC IC-180 YARDRUNNER
(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 & 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 for sheave blocks (if equipped).
- Rotation gear box for proper adjustment.
- Back-up alarm (if equipped).
- Check operation of heater (if equipped).
- Cable retainer's 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 laert (if equipped).
- Operation of anti-two-block (if equipped).

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 level linkage (W) (WD40)
- 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 hrs. 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: _____

Time Spent: _____ Parts Required: _____

Date: _____

Serviceman: _____