



BIG SHIPPER II

USER MANUAL ***Rated Capacity Limiter***



For Broderson IC-20, IC-35, or IC-80 Model Industrial Cranes

Rev 7 3-07-13



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INTRODUCTION

To obtain the best performance from this system we recommend that you read through this manual prior to using the device.

You will become familiar with its commands, operating modes, and optimize its service to you from the start.

Keep this manual for future reference.



You will find this mark on the components of your equipment. It certifies that the product conforms to the European Directives and North American Standards.

IMPORTANT SYSTEM RULES

For proper use of the system carefully read this page.

CABLE CARE

The connection cables shall be installed to avoid damaged during normal machine operation.

MACHINE MAINTENANCE

When maintenance is required on the machine, the systems power supply shall be disconnected for welding, battery replacement or charging, which can seriously damage the system.

MACHINE WASHING

The system has a weather integrity rating of IP65. When using high pressure spray all components shall be protected from spray. High pressure spray will damage the components.

STORING THE MACHINE

Disconnect the system from the power supply when the machine is not being used for long periods.

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GLOSSARY OF TERMS USED IN THIS MANUAL

Angle

Boom Angle The angle between the longitudinal centerline of the boom base section and the horizontal plane.

Boom Angle Sensor A device used to measure boom angle.

Boom Tip Height The vertical distance from the ground to the lower boom head sheaves.

Central Processor A device which integrates the inputs from sensors and the display and control panel and compares this data to the manufacturer's load charts for identical operating conditions.

Crane Configuration: The physical arrangement of the crane as prepared for a particular operation in conformance with the manufacturer's operating instructions and load-rating chart.

Display and Control Panel A device or instrument used to program or insert operational information into the system and which provides visual and audible information (the system's central processor may also be an integrated part of the display and control panel).

Length

Boom Length Boom Length is the distance from the centerline of the boom pivot pin to the centerline of the boom point load hoist sheave pin, measured along the longitudinal axis of the boom.

Boom Length Sensor A device which measures boom length (also called cable reel or spring-type cable reel). A boom angle sensor may be an integrated part.

Load

Actual Load The weight of the load being lifted, including all load attaching equipment such as blocks, hooks and slings; also referred to as working load.

Rated Load The load value shown on the applicable load-rating chart of the crane for a particular crane configuration, boom length, boom angle, or functions of these variables. For radii outside those shown on the load-rating chart, the rated load is to be considered as zero.

Radius-of-Load The horizontal distance from a vertical projection of the crane's axis of rotation to the supporting surface, before loading, to the center of the vertical hoist line or tackle with rated load applied.

Motion Limiter	A device which restricts or initiates the stopping of a crane motion or function.
Sensors	
Force Sensor	A device which produces an output signal proportional to weight or force applied (hydraulic pressure sensor, tension or compression load sensor, load pin, tensiometer etc.)
Geometric Sensor	A device which produces an output signal proportional to length or angle (<i>boom angle sensor, boom length sensor</i>)
Position Sensor	A device which produces an analog signal when a condition exceeds a rated value (two-blocking, switches to measure position of the superstructure related to the crane base, switches to measure position of the outriggers etc.)
Two-Block System	
Two-Blocking	Contact of the lower load block or hook with the upper load block, boom point, or boom point machinery.
Two-Block Sensor	A device which senses impending two-blocking
Two-Block Warning System	A device applied to cranes which warns of impending two-blocking.
Two-Block Limit System	A device applied to cranes which prevents two-blocking
Warning	
Audible Warning	A device (horn, buzzer, or bell) which produces a sound to provide an audible indication of a specific operational condition or mode of operation.
Visual Warning	A device (light, meter, or display) which produces a visual indication of a specific operational condition or mode of operation.

FOREWORD

This 3B6 Rated Capacity Limiter is a device that prevents the crane from operating outside the limits of positions and loads shown and /or described on the rated capacity chart of the crane's manufacturer.

Before using the 3B6 Rated Capacity Indicator/Limiter, be sure to familiarize yourself with the following points to ensure correct operation of the system:

IMPORTANT

- The system will sense and alert the Operator to impending overload conditions by use of electrical and mechanical components. Always remember that these components cannot be 100% fail-safe.
- Do not consider the system as a substitute for good judgement, experience or accepted safe crane operating practices.
- The Operator is solely responsible for operation of the crane.
- Certain programming of the Rated Capacity Limiter is necessary before starting a lift. If incorrectly programmed, the system will not alert the Operator to an impending overload condition or reaching of other limits which could result in loss of life, destruction of property and irreparable damage to the crane.
- This Rated Capacity Limiter should only be serviced by qualified individuals who have received proper training from 3B6 or their authorized distributors.

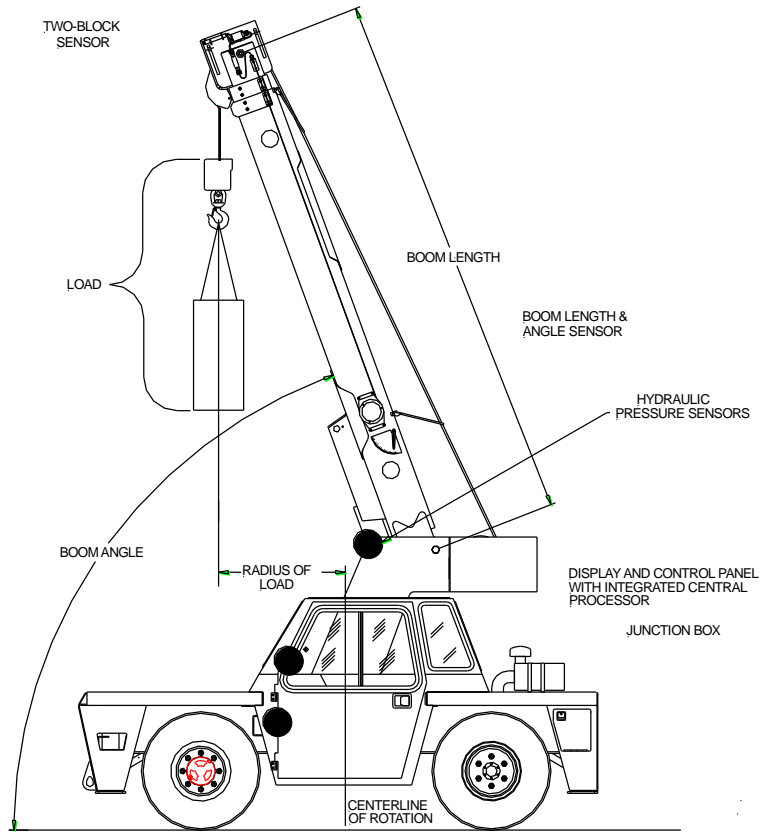
SYSTEM STRUCTURE

BIG SHIPPER II

BRODERSON USER MANUAL

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SYSTEM STRUCTURE



(FIG. 1)

(FIG 1.)

STANDARD SYSTEM COMPONENTS

Boom Length- / Angle Sensor (Cable Reel)

Boom length is measured by a cable attached to the boom tip which is wound on a spring loaded reel mounted on the base boom section. This cable also transfers anti-two-block system information from the boom tip or jib tip to the junction box.

Boom angle is measured by the boom angle sensor which is also integrated to the cable reel.

Force Sensors

Two hydraulic pressure sensors with integrated electronic amplifiers are installed to measure the piston-side and rod-side pressure in the boom lift cylinder(s) as a parameter of the actual load.

Two-Block System

A two-block system is installed at the main boom tip and on all other boom attachments where a load hoisting line is used.

When the trip arm on the boom tip is lifted by the hook block of the crane, an audible/visual alarm together with the motion shut-off output signal will be activated.

Display and Control Panel

The display and control panel located in the operator's cab displays information received from the central processor to the operator and transmits information selected by the operator to the central processor.

It contains also an audible alarm.

EMC Junction Box

This unit contains the terminals for connection of the different inputs to the central processor which is integrated to the display and control panel. Furthermore, it includes the EMC-filters to reduce electronic noise.

Motion Limiter By-Pass Key

The motion limiter by-pass key to by-pass the automatic motion shut-off is installed under the dash board of the crane cab.

IMPORTANT

The Rated Capacity Limiter provides output information to shut-off certain controls of the crane when the actual capacity on the crane exceeds the rated capacity to prevent conditions that will increase the overload condition and to prevent dangerous movements of the crane.

If correctly installed and connected the following crane functions will be disabled:

- Load hoisting up
- Telescoping out
- Boom down
- Boom swing

This overriding of the controls will remain until the overload has been removed.

CAUTION

By use of the motion shut-off by-pass key, the motion shut-off output of the Rated Capacity Limiter can be by-passed.

THIS KEY IS INTENDED FOR EMERGENCIES ONLY, NOT FOR OPERATING THE CRANE UNDER OVERLOAD CONDITIONS OR BEYOND OTHER LIMITS. IT SHALL BE USED WITH UTMOST CARE AS UNWARRANTED USE COULD RESULT IN LOSS OF LIFE, DESTRUCTION OF PROPERTY AND IRREPARABLE DAMAGE TO THE CRANE.

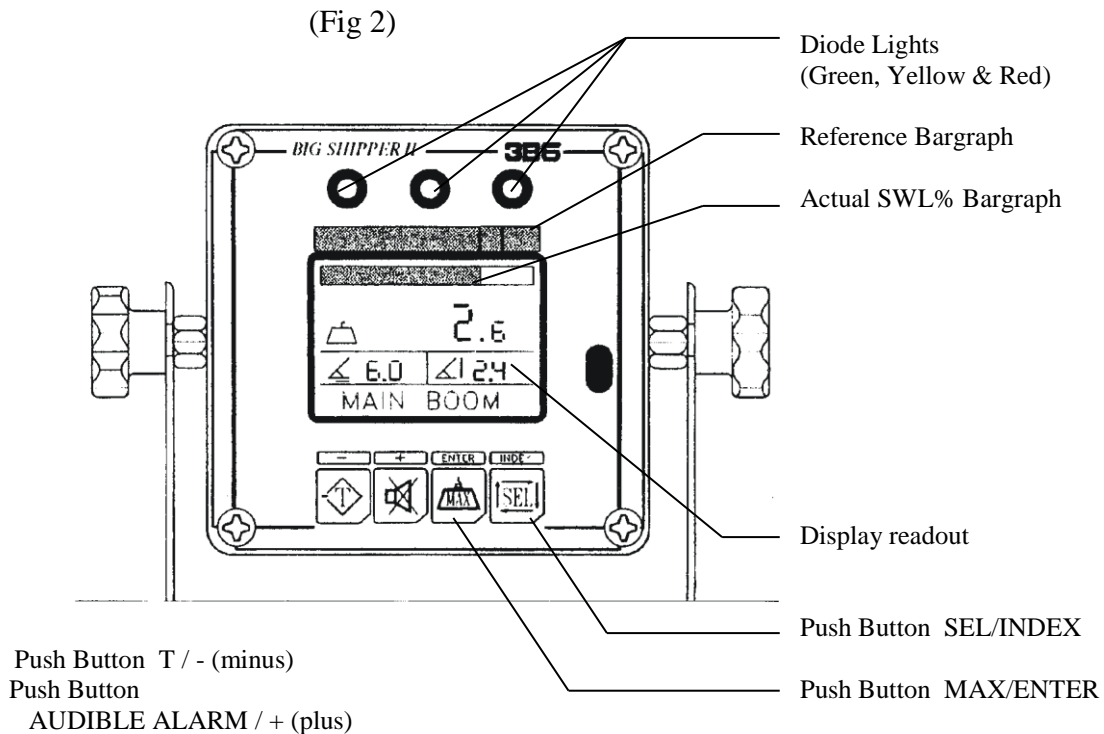
The use and the location of the key is to be controlled by the customer or his agent and is not controlled by 3B6 or its partners, agents, or dealers.

Position Switches (Optional)

Switches of different design (e.g. roller switches or proximity switches) together with other means (e.g. cams) are to provide data on the relative position of the crane components (e.g.: position of the superstructure to the carrier).

SYSTEM OPERATION

Layout of Display and Control Panel



Display

Backlit LCD instrument to display information

Reference Bargraph

Green area (Normal working)

Working permitted – The Actual Capacity is less than 90% of the Rated Capacity.

Yellow area (Prewarning)

Approaching to Rated Capacity – The Actual Capacity is between 90% and 100% (or a percentage layed down by local regulations) of the Rated Capacity.

Red area (Overload)

Overload – The Actual capacity is equal or greater 100% (or a percentage layed down by local regulations) of the Rated Capacity.

Actual Bargraph

Shows the Actual Capacity condition as explained by the Reference Bargraph.

Diode Lights

Green (Normal working), yellow (Prewarning) and red light (Overload) diodes, following the Actual Bargraph position and other conditions and limits.

Push Button T / - (minus)

Not Applicable with the Big Shipper

Push Button AUDIBLE ALARM / + (plus)

When pushed, the Audible Alarm is by-passed momentarily. It will reset automatically.

Push Button SEL / INDEX

When pushed, the Display will change to allow presetting of the actual configuration.

Push Button MAX / ENTER

When pushed during configuration setup, the selected machine configuration will be confirmed. When the system is in the normal operation mode, depressing and holding, will change the display to the indicate the Max (Rated) load, tip height and length information.

Accuracy Verification and Routine Maintenance

A **Daily inspection by the operator** before starting the crane operation shall include:

- A visual inspection of all system components (see “System Structure“ on page 8) to insure that no external damage will affect proper system operation.
- A visual inspection of all system cables for cuts or other physical damage.
- A test of the Two-Block system by lifting the trip arm. The red warning light on the display, a text message indicated on the bottom of the display and an audible alarm shall occur
- Check the cable of the cable reel connected to the boom tip for proper spooling and spring tension by extending and retracting the boom. Verify the length indicator is correct checking the readout at the fully retracted and fully extended boom lengths.
- Check the Angle Sensor accuracy by using a level at zero degrees. Then check the difference between the minimum and maximum angles and compare with the results of the weekly test.
- Check the Hydraulic Pressure Sensors and hydraulic connections for any leaks.

A **Weekly inspection by the operator** before starting the crane operation shall include:

- Performing the daily inspection procedure as listed above.

Below procedures require checking the actual information against the RCL readout.

- Accuracy verification of the boom angle checking the display readout indication by using an angle finder at minimum boom angle and at ten (10) degree increments up to the maximum boom angle. Record the difference between the minimum and maximum angles for for daily inspection.
- Accuracy verification of the load radius display indication by using a tape measure, checking load radius at minimum boom length, a medium boom length and maximum boom length.
- Accuracy verification of the actual load indication by lifting a known weight within the load chart rating.
- Accuracy verification of the RCL for shutdown of functions by lifting a known weight and using the machine load capacity chart, lifting the load and bringing it to the radius as per the load chart and verifying the system shuts down the hoist up, boom down and telescope extend functions. This should be checked for all configurations per the machine load chart.







WARNING!

Above procedures shall be done as a minimum verification of the RCL’s operational functions. Any system damage or function issues should be reported immediately to the person responsible for safe crane operations.

An annual inspection (or whenever required by local regulations) by an authorized Testing Company, shall include accuracy verification.

BRODERSON / 3B6 LEGEND

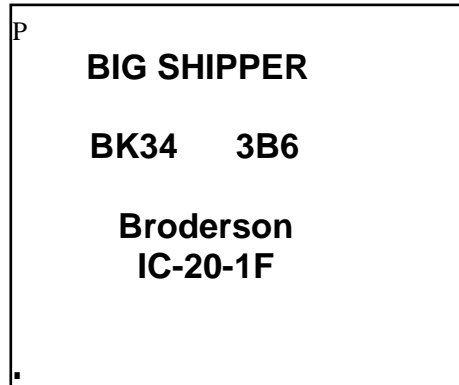
IC-20 / IC-35 / IC-80

ON SCREEN TERM	DEFINITION
MB RUBBER	MAIN BOOM IN USE ON RUBBER
MB OUTRIGGERS	MAIN BOOM IN USE ON OUTRIGGERS
RIGID JIB RUB.	RIGID BOOM EXTENSION IN USE ON RUBBER
RIGID JIB O.R.	RIGID BOOM EXTENSION IN USE ON OUTRIGGERS
JIB 0 RUB.	OFFSET BOOM EXTENSION AT 0° IN USE ON RUBBER
JIB 15 RUB.	OFFSET BOOM EXTENSION AT 15° IN USE ON RUBBER
JIB 30 RUB.	OFFSET BOOM EXTENSION AT 30° IN USE ON RUBBER
JIB 0 O.R.	OFFSET BOOM EXTENSION AT 0° IN USE ON OUTRIGGERS
JIB 15 O.R.	OFFSET BOOM EXTENSION AT 15° IN USE ON OUTRIGGERS
JIB 30 O.R.	OFFSET BOOM EXTENSION AT 30° IN USE ON OUTRIGGERS
SEARCH HOOK RUB	SEARCHER HOOK IN USE ON RUBBER
SEARCH HOOK O.R	SEARCHER HOOK IN USE ON OUTRIGGERS
No. ROPE = 1	1-PART LINE
No. ROPE = 2	2-PART LINE
	SYMBOL FOR MAXIMUM ALLOWABLE LOAD IN POUNDS
	SYMBOL FOR ACTUAL LOAD IN POUNDS
	SYMBOL FOR LOAD RADIUS IN FEET & TENTHS OF FEET
	SYMBOL FOR BOOM ANGLE IN DEGREES & TENTHS OF DEGREES
	SYMBOL FOR BOOM HEIGHT IN FEET & TENTHS OF FEET
	SYMBOL FOR BOOM LENGTH IN FEET & TENTHS OF FEET

OPERATING INSTRUCTIONS

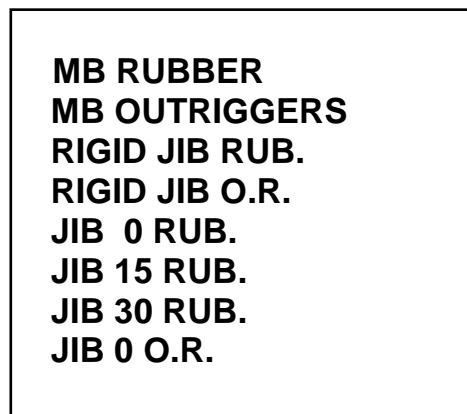
After power is applied, the system will run an automatic systems self test and the display will indicate product (Big Shipper), software version (BK34), company name (Broderson) and Crane model number (IC-20-1F). See Fig 3.

(Fig 3)

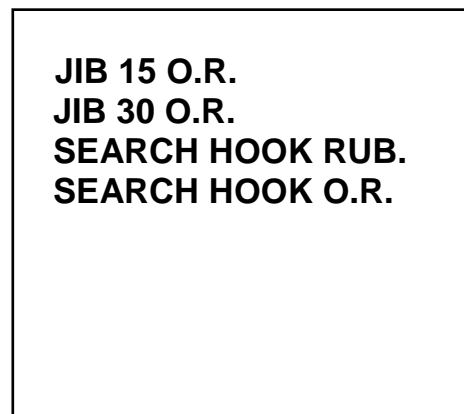


After the self test is completed the system will indicate the configuration menus, which consists of two pages. See fig 4 and 5.

(Fig 4) Page 1



(Fig 5) Page 2



Press and releasing the **SEL/INDEX pushbutton** will scroll the cursor down the page. Once the configuration mode is highlighted, press and release the **MAX/ENTER pushbutton** to confirm your selection.

WARNING!

The configuration of the Big Shipper must match the crane model number. All configuration modes may not be equipped on all machines. See the machine load chart for machine configurations.

Once the configuration is selected and confirmed the display will indicate the parts of line selection menu; See Fig 6

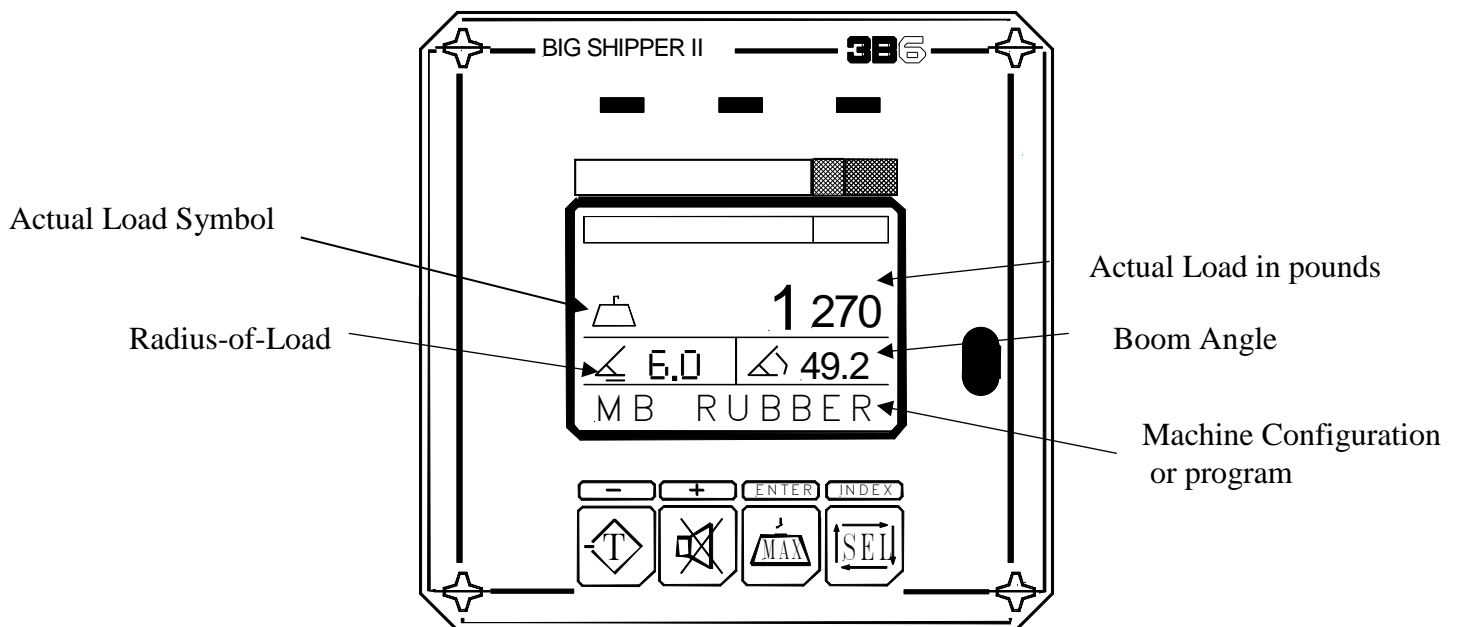
(Fig 6)

No. ROPES	1
No. ROPES	2
No. ROPES	3
No. ROPES	4

Press and release the SEL/INDEX pushbutton to scroll the cursor to the proper number of ropes and then **press and release the MAX/ENTER pushbutton** to confirm the information. The system will indicate the normal operating mode. To select a different operating mode, Press and release the **SEL/INDEX pushbutton** and to confirm your selection, press and release the **MAX/ENTER pushbutton**.

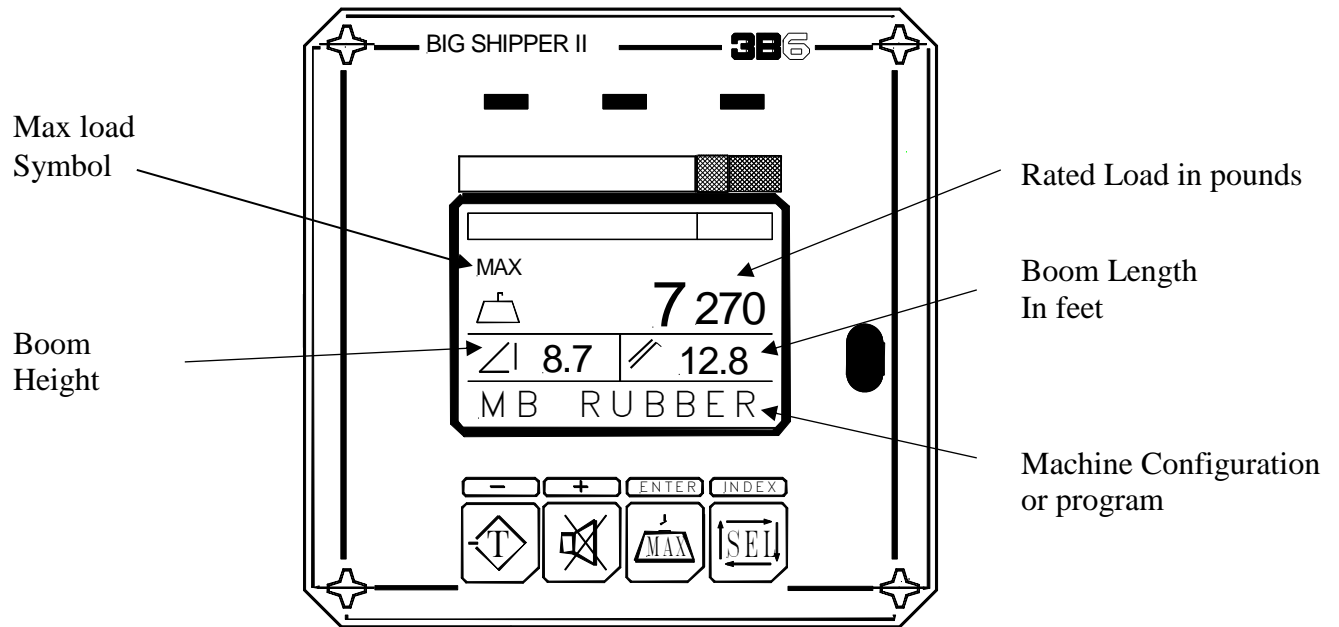
The display then will change to the operating mode. See Fig 7

(Fig 7)



To change from Actual Load to (Max) Rated Load, from Radius-of-Load to Boom Height and from Boom Angle to Boom Length press and hold the **MAX/ENTER** pushbutton and the display will change to indicate accordingly:

(FIG 8)



To return to Actual Load, Radius-of-Load and Boom Angle release the **MAX/ENTER** pushbutton. To change the system configuration, press **SEL/INDEX** pushbutton until the display will change to the configuration chart (see page 15).

SELF TEST DIAGNOSTICS

The Big Shipper continually self tests the System. If it detects an improper input, it will indicate a coded message on the bottom of the display. The following lists the possible solutions

IMPORTANT:

The system should only be serviced by qualified individuals who have received training by 3B6 or their authorized distributors.

<i>Message</i>	<i>Possible cause</i>	<i>Action</i>
PRESSL CODE 8	- Open Circuit from Hydraulic Pressure Sensor to Display and Control Panel	- Inspect entire cable and receptacle at the Hydraulic Pressure Sensor for proper wiring
	- Piston-side Hydraulic Pressure Sensor defect	- Replacement of Hydraulic Pressure Sensor
	- Defect of Central Processor	- Call Service
PRESSL CODE 9	- Short circuited cable from Hydraulic Pressure Sensor to Display and Control Panel	- Inspect entire cable and receptacle at the Hydraulic Pressure Sensor for proper wiring
	- Piston-side Hydraulic Pressure Sensor defect	- Replacement of Hydraulic Pressure Sensor
	- Defect of Central Processor	- Call Service
PRESSH CODE 10	- Open Circuit from Hydraulic Pressure Sensor to Display and Control Panel	- Inspect entire cable and receptacle at the Hydraulic Pressure Sensor for proper wiring
	- Rod-side Hydraulic Pressure Sensor defect	- Replacement of Hydraulic Pressure Sensor
	- Defect of Central Processor	- Call Service
PRESSH CODE 11	- Short circuited cable from Hydraulic Pressure Sensor to Display and Control Panel	- Inspect entire cable and receptacle at the Hydraulic Pressure Sensor for proper wiring
	- Rod-side Hydraulic Pressure Sensor defect	- Replacement of Hydraulic Pressure Sensor
	- Defect of Central Processor	- Call Service

<i>Message</i>	<i>Possible cause</i>	<i>Action</i>
CFG CODE 12	- Configuration error	- Call service
CFG CODE 13	- Configuration error	- Call service
SELEZ MODO	- No configuration selected	- Select configuration. (Follow “Operating Instructions“ Starting at page 10)
E2PROM CODE 1	- EEPROM of central Processor	- Call service
TRASD1 CODE 2	- Open Circuit from Boom Angle Sensor to Display and Control Panel	-Inspect entire cable from junction box to cable reel possible damage and proper wiring
	- Boom Angle Sensor defect	- Replacement of Boom Angle Sensor
	- Defect of Central Processor	- Call Service
TRASD1 CODE 3	- Short circuit of cable from Boom Angle Sensor to Display and Control Panel	- Inspect eintire cable from junction box to cable reel for possible damage and proper wiring
	- Boom Angle Sensor defect	- Replacement of Boom Angle Sensor
	- Defect of Central Processor	
TRASD1 CODE 4	- Open Circuit from Boom Length Sensor to Display and Control Panel	- Inspect entire cable form junction box to cable reel for possible damage and proper wiring
	- Boom Length Sensor defect	- Replacement of Boom Length Sensor
	- Defect of Central Processor	- Call Service
TRASD2 CODE 5	- Short circuit of cable from Boom Length Sensor to Display and Control Panel	- Inspect entire cable from junction box to cable reel for possible damage and proper wiring
	- Boom Length Sensor defect	- Replacement of Boom Length Sensor
	- Defect of Central Processor	- Call Service
CODE 6	- Reserved	
CODE 7	- Reserved	