MicroGuard® 585
Rated Capacity Indicator/Limiter System

OPERATOR'S MANUAL

GREER COMPANY

Greer Company

MicroGuard® 585
Rated Capacity Indicator/Limiter

Crane Systems and Accessories

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Rated Capacity Indicator/Limiter System

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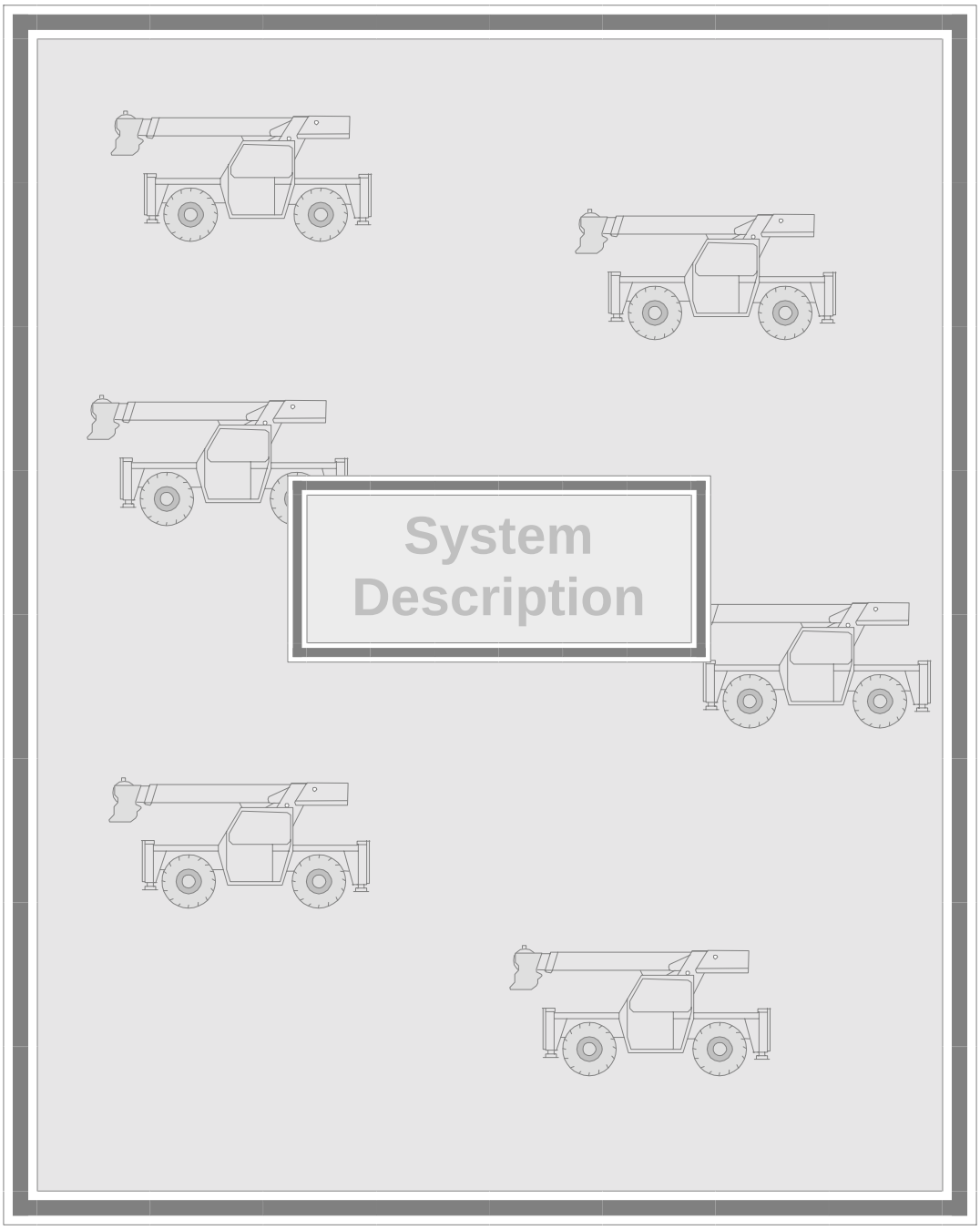
INTRODUCTION AND OVERVIEW

The MicroGuard® 585 Rated Capacity Indicator/Limiter System is an electronic System used in the operation of industrial cranes. The System is designed to provide the crane operator with information to aid in ensuring safe crane operation. The MicroGuard® 585 System is simple to operate. Providing the contents and instructions contained within this manual are carefully read, understood, and followed, the operator will have a clear indication of the rated capacity of the load, an approaching overload, and a two-block condition.

This manual describes the System and its operation.

WARNING

The MicroGuard® 585 Rated Capacity Indicator/Limiter System is designed for use as an aid to efficient crane operation. Do not use this System as a substitute for the experienced crane operator, who has been trained in crane operation and related safety guidelines, or for crane capacity information and guidelines supplied by the crane manufacturer.


System
Description

SYSTEM DESCRIPTION

The MicroGuard® 585 Rated Capacity Indicator/Limiter System is a visual and audible alert system used in the operation of industrial cranes. The System, which includes a computer, an operator's display console, an extension reel, and various types of cables and sensors, is designed to measure and display load weight, calculate and display maximum capacity and percent rated capacity, display code configuration numbers, and warn of an approaching overload or two-block condition for each crane configuration.

Please refer to Figure 1. The **Computer (L)** provides all of the functions necessary to read the System sensors, work out computations, and control the disconnect functions. In order to reliably calculate crane parameters, such as load and rated capacity, and interpret the crane capacity chart and code configuration numbers, information defining the physical characteristics of the crane has been loaded during factory setup.

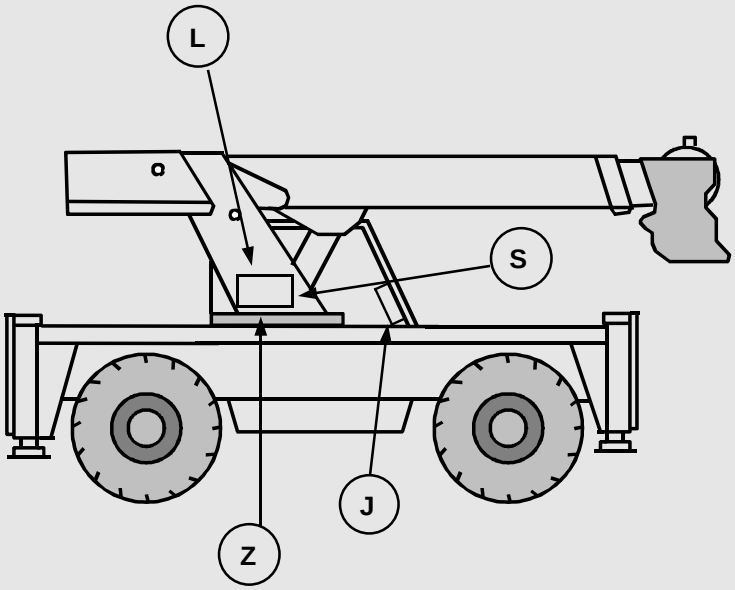
Two **Hydraulic Pressure Sensors (S)**, housed in the computer, measure the pressure in both sides of the boom hoist cylinder. Other System sensors, mounted elsewhere on the crane, are connected to the computer via electrical cables.

The **Extension Reel (P)** measures the extended length of the telescoping sections of the boom and enables calculation of crane radius, load weight, and percent rated capacity. The **Reel Off Cable (M)** provides a path, from the boom head to the computer, via the **Extension Reel Computer Cable (R).** This path is used to signal a possible two-block condition. The **Boom Angle Sensor (N)** measures the angle of the boom.

The **Operator's Display Console (J)** translates data received from the computer and displays the actual load weight and percent of rated capacity in the Display Console windows. Visual and audible warnings and alarms activate when capacity limits are approached or exceeded, or when a two-block condition is encountered.

Using the Manual

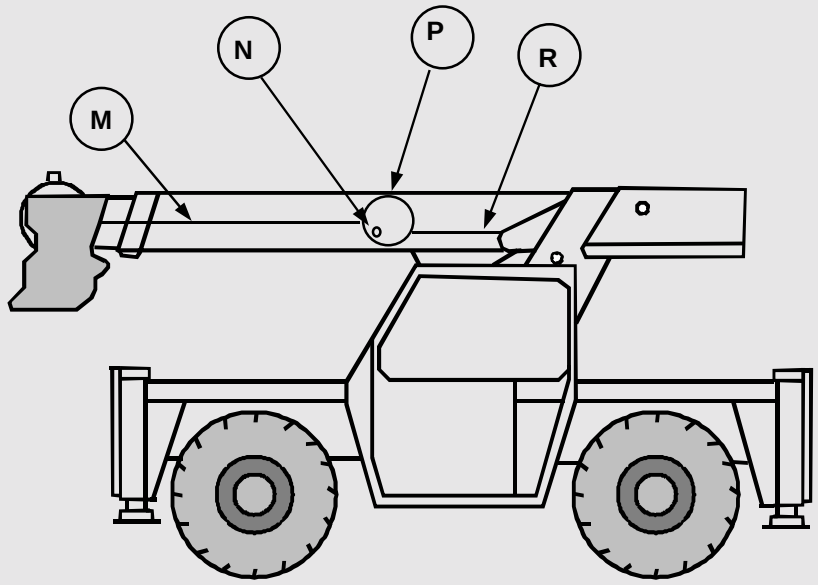
This Manual describes the System components and the operation of the System; it also includes maintenance recommendations. The Figure callout for each System or crane part is identified by the same letter or number throughout this manual.



L	Computer	**J**	Operator's Display Console
S	Hydraulic Pressure Sensors (2)	**Z**	Cable Input Connectors to Computer (4)

FIGURE 1 – REVERSE POSITION

The MicroGuard® 585
Rated Capacity Indicator/Limiter System



M Reel-Off Cable to Boom Head

N Boom Angle Sensor (inside reel)

P Extension Reel

R Extension Reel Cable to Computer

FIGURE 1

MicroGuard® 585
Rated Capacity Indicator/Limiter System

A System OK Signal

Turns **green** when the System is ready for operation. No faults found.

B Caution – Overload Warning Signal

Turns **yellow** when the crane is approaching an overload. The signal appears at 90% of Rated Capacity.

C Overload Warning Signal

Turns **red** when the crane reaches 100% or more of Rated Capacity.

D Two-Block Warning Signal

Turns **red** when the hook block nears contact with the head machinery on the end of the boom.

E Weight of Load

Registers the weight of the **Actual Load**.

F Bar Graph

Indicates the **Percent of Rated Capacity** of the load.

G Crane Setup Button

Allows the operator to select the **Code Number** that matches the crane setup configuration.

H Code Setup Indicator

Displays the **Code Number** for the crane configuration selected by the operator.

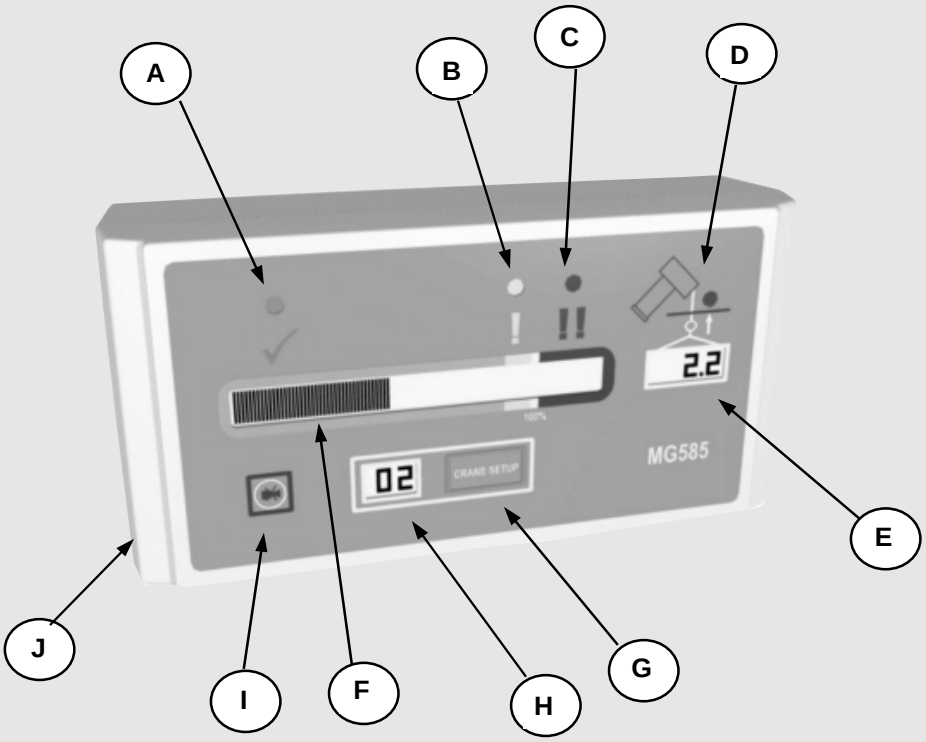
I Cancel Alarm Button

Allows **cancellation** of the **audible alarms and motion disconnect functions.**

J Operator's Display Console

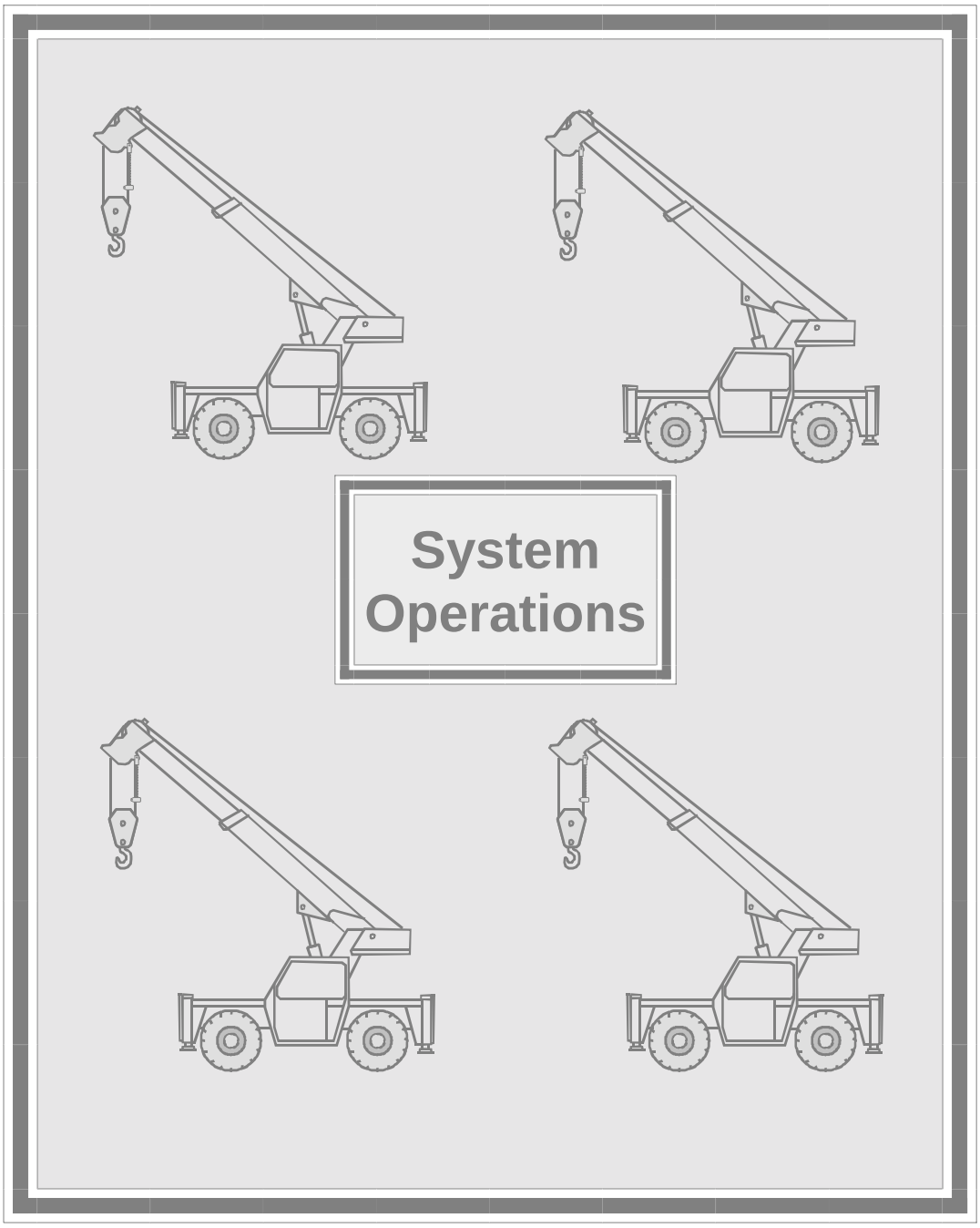
Allows the operator to view current crane conditions.

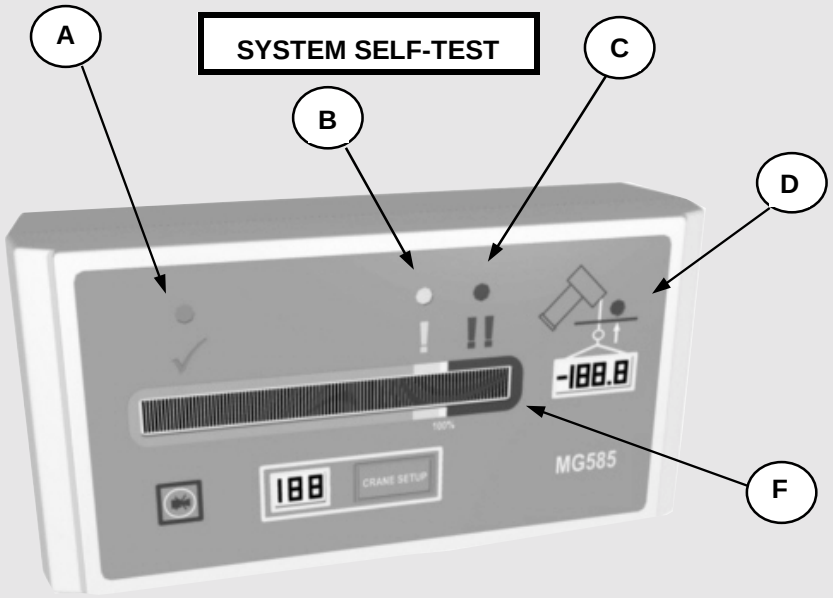
OPERATOR'S DISPLAY CONSOLE



Identification of each part will be represented by the same letter or number throughout this manual.

FIGURE 2


System
Operations



When the System is turned on, it goes through a self-testing process to ensure that all functions are operational.

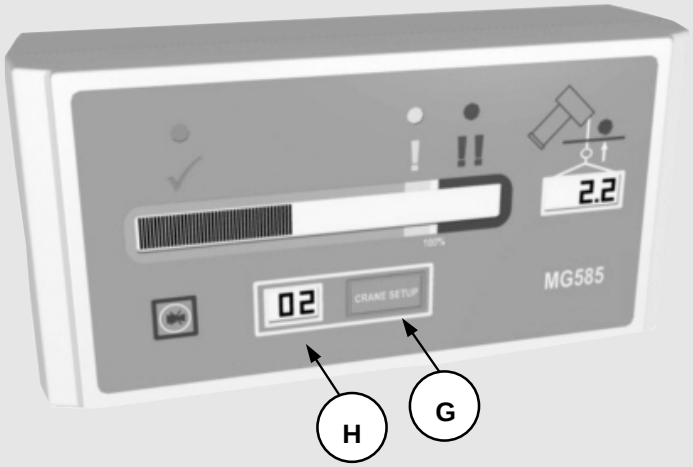
During Self-Test, the Display Console should look like the illustration shown above. **All four signal lights (A, B, C, & D)** will light up, the **bar graph (F)** showing Rated Capacity will expand to the full width of the window, and the numbers in the other windows should appear as shown. All audible alarms will sound for about three seconds.

When the Self-Test is completed and no problems are found, the System is operational, as long as the boom is in a working position[1]. The green **System OK (A)** signal will light up. **If this lamp does not light up**, do not attempt to use the System. Call your Service Representative.

[1] The boom must be in a **working position** for the System OK to light up, since the System interprets low pressure in the boom hoist cylinder as a fault.

FIGURE 3

CONFIGURATION SELECTION



Before operating your crane, hang the laminated chart (supplied with the MicroGuard® 585 System) called CRANE OPTIONS AND SETUP CODES in your cab within easy view. Follow the steps indicated on the chart to select the Code Number that corresponds to the crane configuration that you are using. This Code Number must be entered in the computer to correctly calculate the Load and Rated Capacity.

Reading across the chart from left to right, select the row that matches your crane configuration, including the **Parts of Line**. **Directly across from the Parts of Line**, you will find the correct Code Number for the configuration that you have selected. Refer to the EXAMPLE in Figure 5. DO NOT USE THE EXAMPLE CHART TO SELECT YOUR CODE NUMBER.

To set the Code Number, press the **CRANE SETUP Button (G)** repeatedly until the Code Number you have chosen appears in the **Code Setup Indicator (H)**. The Code Number will change by one row of the chart each time the button is pressed. The Code Number will not need to be reset unless the crane configuration is physically changed.

Warning: Check the Code Number at the beginning of each work shift to ensure that it has not been accidentally changed. Incorrect setting of the setup Code Number leads to invalid load and capacity calculations.

FIGURE 4

Crane Options and Setup Codes

Rating Chart Number: _____

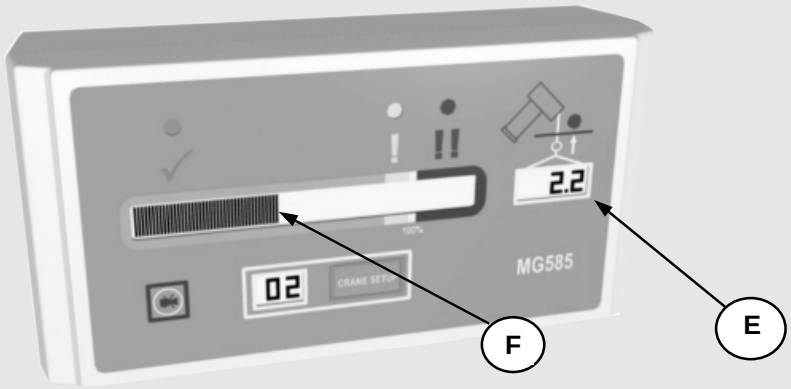
Chassis	Boom	Attachment	Lifting From	Parts of Line	Setup Code Number
On Outriggers	Main Boom 3-Section Fully Telescoping 11.55 to 25.4 ft	None	Main Boom	1 2	01 02
		Extension 9.85 ft	Extension	1	11
			Main Boom	1 2	21 22
	Main Boom 4-Section Fully Telescoping 18.55 to 32.35 ft	None	Main Boom	1 2	31 32
		Extension 9.85 ft	Extension	1	41
			Main Boom	1 2	51 52
On Wheels Static 360°	Main Boom 3-Section Fully Telescoping 11.55 to 25.4 ft	None	Main Boom	1 2	61 62
	Main Boom 4-Section Fully Telescoping 18.55 to 32.35 ft	None	Main Boom	1 2	71 72
On Wheels Static Over Front ±6°	Main Boom 3-Section Fully Telescoping 11.55 to 25.4 ft	None	Main Boom	1 2	81 82
	Main Boom 4-Section Fully Telescoping 18.55 to 32.35 ft	None	Main Boom	1 2	91 92
On Wheels 2.5 MPH Centered Over Front	Main Boom 3-Section Fully Telescoping 11.55 to 25.4 ft	None	Main Boom	1 2	101 102
	Main Boom 4-Section Fully Telescoping 18.55 to 32.35 ft	None	Main Boom	1 2	111 112

EXAMPLE

Warning: For correct *Actual Load* and *Capacity* information, the operator must select the code number that matches the crane configuration for the current crane operation.

FIGURE 5

NORMAL OPERATION



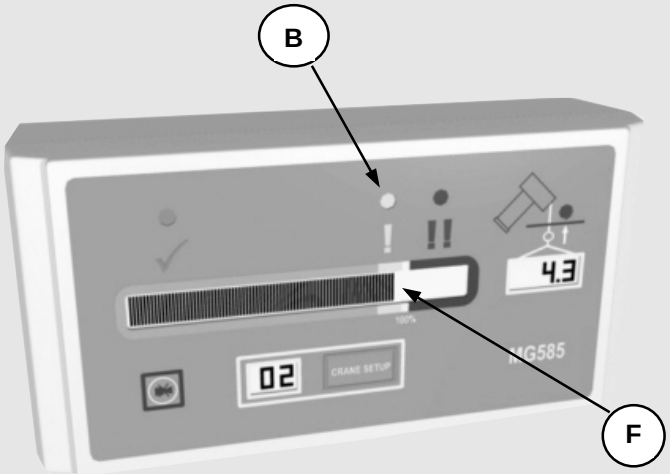
"Capacity" represents the heaviest load that the crane can carry in the configuration chosen and for the current crane position. The **"Percent of Rated Capacity"** indicates how near the operation is to full capacity and overload.

The **weight (E)** of the **"Actual Load"** is registered in the Display Console window on the right. The Actual Load includes the weight of the load plus the weight of everything hanging below the boom (hook block, etc.). The **Percent of Rated Capacity** is shown as a **Bar Graph (F)** in the window to the left. This Bar Graph progresses to the right as the **percentage** increases. As long as the bar graph remains within the green-bordered normal zone, the Percent of Rated Capacity is within normal operating limits.

Warning: The operator **must** select the correct crane configuration Code Number for each setup configuration change. Inaccurate or non-selection of the appropriate Code Number will result in incorrect calculations and readings of the **Actual Load** weight and **Percent of Rated Capacity.** Refer to Configuration Selection, Page 14.

FIGURE 6

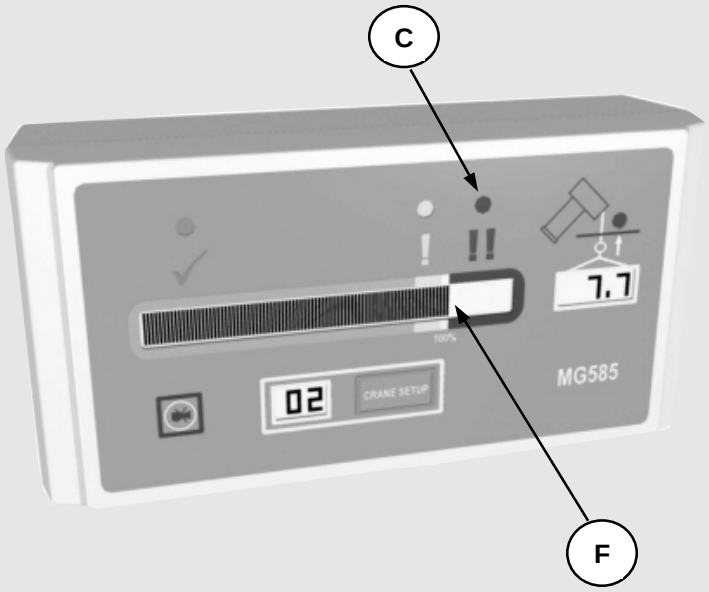
APPROACHING OVERLOAD



The System monitors the weight of the load suspended below the boom head and compares this information with data stored in the computer, which identifies maximum crane capacity for each configuration. When the Rated Capacity of the configuration reaches 90%, the **Bar Graph (F)** in the window of the Display Console progresses from the normal (green-bordered) zone into the caution (yellow-bordered) zone. A **yellow light (B)** above the caution zone of the Bar Graph lights up and an alarm beeps continuously.

FIGURE 7

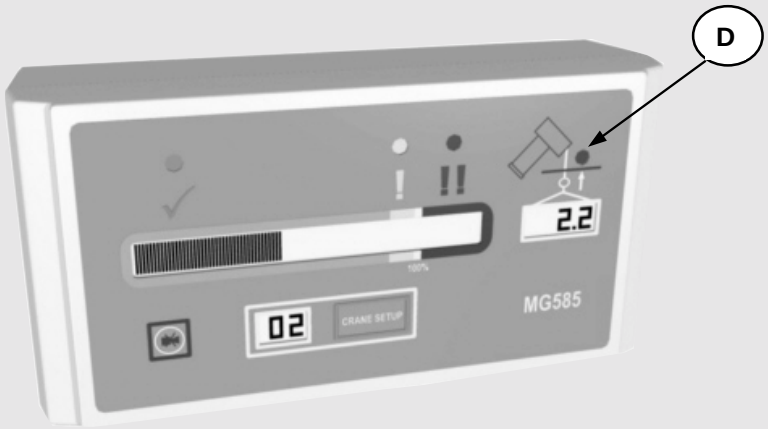
MAXIMUM CAPACITY AND OVERLOAD



When the Rated Capacity of the crane reaches 100%, the **Bar Graph (F)** in the window of the Display Console moves from the caution (yellow-bordered) zone into the warning (black-bordered) zone. A **red light (C)** above the alarm zone of the Bar Graph lights up and an alarm sounds continuously. Crane motions (boom extend, boom down, and winch up) are cut in order to prevent damage to the crane and the endangerment of persons near the lifting area. As the Bar Graph moves into the overload (red-bordered) zone, crane motions remain cut.

FIGURE 8

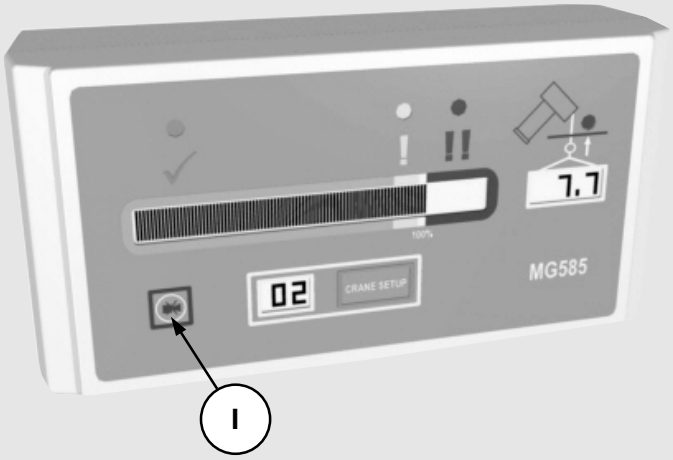
TWO-BLOCK WARNING



A **red light (D)** appears and an alarm sounds continuously when the hook block is on a collision course with the head machinery at the end of the boom. Crane motions (boom extend, boom down, and winch up) are cut in order to prevent damage to the crane and the endangerment of persons near the lifting area.

FIGURE 9

ALARM OVERRIDE



The **Alarm Override Button (I)** is used to temporarily silence the **current** audible alarms and to disable the automatic motion cutout operation built into the System for protection.

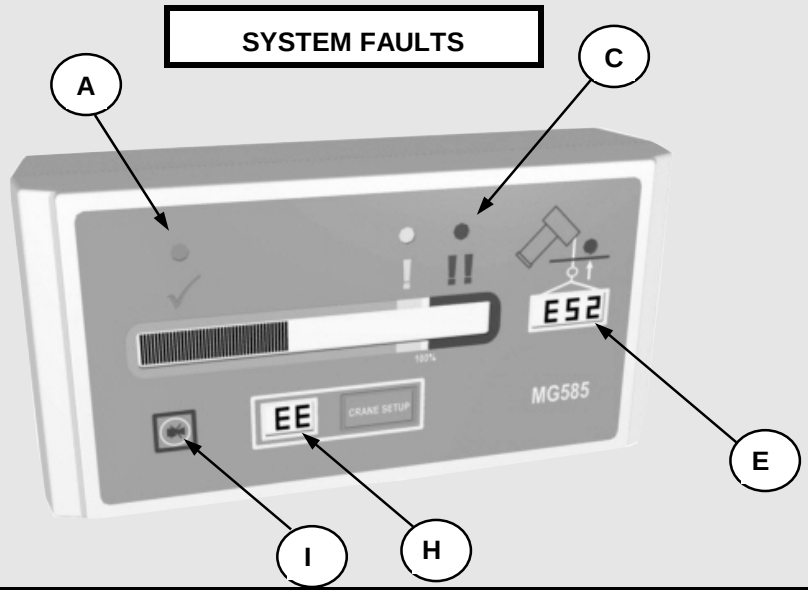
Conditions necessitating alarms occurring **after** the Override Button has been activated will cause a cancellation of the override action and reactivation of the alarms and motion cutout operation.

To deactivate the audible alarms, simply press the Override Button. Continue to hold the Button down for 5 seconds to cancel any existing motion cuts.

Warning: The Alarm Override Button should be used with caution. Automatic audible alarms warning against overload, two-block dangers, and hazardous tipping conditions are temporarily silenced when this option is activated. Motion cutout may also be discontinued.

FIGURE 10

SYSTEM FAULTS



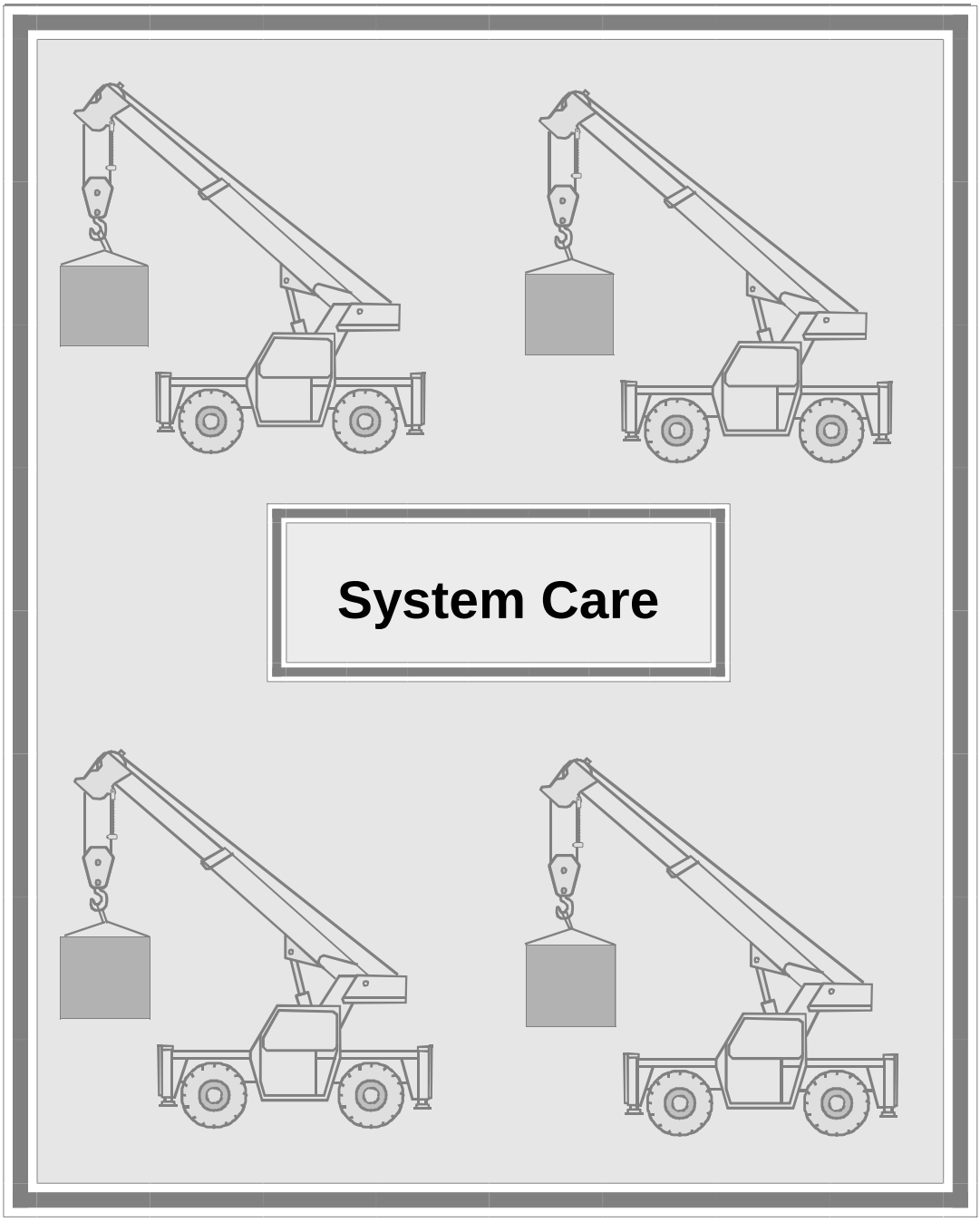
The System continuously checks for faults (errors) affecting the System computer or the Operator's Display Console and sensors.

When a fault occurs, e.g., Fault Code No. 52, the Display Console window for ***Actual Load*** **(E) will flash E52**. A Fault Code number will **always** be preceded by the letter "E." The Fault Code reading will **alternate** with the *Actual Load* reading. When the Fault Code number appears, the **Code Indicator (H)** on the Display Console **will flash *EE.* If more than one fault is detected, each of the Codes will flash in turn and continue cycling.**

The display of Fault Codes can be stopped or activated by pressing the **Cancel Alarm Button (I)**. Detected faults will cause the green System OK signal (A) to turn off, a red warning signal (C) to appear and an alarm to sound. Any **new** fault arising will cause **all** Fault Codes to be displayed again. If the **Cancel Alarm Button** is pressed to remove a Fault Code reading from the Display Console window, the red warning signal will remain on.

Fault Codes should be reported to the Service Representative along with any noticeable damage done during System installation or routine checks. Please refer to *Routine Checks and Maintenance* in this Manual. See pages 32-33 for a complete Fault Code listing.

FIGURE 11


System Care

ROUTINE CHECKS AND MAINTENANCE

We recommend that the System Checks, outlined below and described in the following pages, are carried out when using the the MicroGuard® 585 Rated Capacity Indicator/Limiter System.

Items to be Checked Before Each Shift or Crane Operation:

- Crane Configuration and System Setup
- Extension Reel – Reel-Off Cable to Boom Head – Extension Reel Cable to Computer
- Hydraulic Connections
- The Anti-Two-Block Weight
- The Anti-Two-Block Switch
- Checking the Two-Block Warning Signals and Cutout of Machine Motions

Minimum Monthly Checks:

- Load Test

ROUTINE CHECKS AND MAINTENANCE

Crane Configuration and System Setup

The **Crane Configuration** defines the physical setup of the crane. The **System Setup** defines the load parameters for each configuration.The data for these calculations are loaded in the **Capacity Chart** and installed in the crane computer prior to factory release.

Check Point:

- Ensure that the **Configuration Code Number** in the Display Console window identifies the **crane configuration** for the current operation. If in doubt, enter the Code Number again following the steps outlined on the laminated MicroGuard® 585 chart called CRANE OPTIONS AND SETUP CODES hanging in your cab. Refer to pages 14 and 15 in this manual.

CHECK THESE OPERATIONS BEFORE EACH SHIFT OR CRANE OPERATION

Extension Reel

The Extension Reel houses the Reel-Off Cable to the boom head, an Extension Reel cable from the Extension Reel to the computer, and the Boom Angle Sensor. The Extension Reel **provides the following signals** that are sent directly to the computer via the Extension Reel Computer Cable.

- **Boom Extension Signal –** generated within the Extension Reel, and controlled by the Reel-Off Cable, as the boom is extended or retracted. The Extension Reel measures the boom extension and provides a signal which enables the computer to calculate the operating radius of the crane, the weight of the actual load, and the percent of rated capacity.
- **Two-Block Signal** – transmitted from the boom head, through the Reel-Off Cable, to the Extension Reel and and Extension Reel Cable to the computer. This signal becomes active when the boom head Anti-Two-Block Switch opens, indicating a two-block condition. When this signal reaches the computer, it causes an immediate display of a flashing light and an audible alarm on the Operator's Display Console.
- **Boom Angle Signal –** generated within the Extension Reel and designed to measure the angle of the boom relative to the horizon.

CHECK THESE OPERATIONS BEFORE EACH SHIFT OR CRANE OPERATION

ROUTINE CHECKS AND MAINTENANCE

Reel-Off Cable

The Reel-Off Cable (extension cable) extends from the Extension Reel to the boom head, boom head Tie-Off Post, and Anti-Two-Block Switch Connector at the boom head. The Reel-Off Cable provides an electrical path for passage of the two-block warning signal from the boom head to the computer cable in the Extension Reel.

Check Points:

- Carefully examine the Reel-Off Cable for damage.
- Fully telescope the boom in and out. As you extend or retract the boom, ensure that the Reel-Off Cable is smoothly fed on and off the Extension Reel without drooping along the boom or jumping, especially as the boom is telescoped in.

Warning: The Extension Reel extension setting is factory preset. If the Reel-Off Cable has been broken, call your Service Representative. Do not attempt to repair a break in the Reel-Off Cable without consulting with your Service Representative.

Computer Cable

The Extension Reel Computer Cable acts as a channel for passage of signals to the System computer.

Check Points:

- Ensure that the Computer Cable exiting from the Extension Reel and running down the boom and around its pivot to the computer is free from damage. If this cable has been damaged in any way, it should be carefully tested and may need to be replaced to ensure accurate transmission of signals.carefully tested and may need to be replaced to ensure accurate transmission of signals.

CHECK THESE OPERATIONS BEFORE EACH SHIFT OR CRANE OPERATION

Hydraulic Connections

The two Hydraulic Pressure Sensors, mounted in the computer, measure the pressure within each side of the boom hoist cylinder. The Pressure Sensors are connected to the boom hoist cylinder valve block by two flexible hoses. Both hoses are subject to the full hydraulic pressure contained within the upper and lower sides of the boom hoist cylinder.

Check Point:

- Ensure that there are no hydraulic leaks at either connection end of both hoses. Check for signs of wear or damage along the length of each hose.

CHECK THESE OPERATIONS BEFORE EACH SHIFT OR CRANE OPERATION

The Anti-Two-Block System

The Anti-Two-Block System installed at the boom head and/or attachment may or may not have been supplied by Greer. For this reason, specific check or maintenance instructions cannot be provided here.

Check Points:

- Ensure that the Anti-Two-Block Switch and its associated parts are undamaged, in proper position, and correctly connected.

CHECK THESE OPERATIONS BEFORE EACH SHIFT OR CRANE OPERATION

Checking the Two-Block Warning Signals and Cutout of Machine Motions

The following test activates the anti-two-block warning signals and the function controlling cut out of crane motions to ensure proper operation. **No other pre-existing alarm conditions may be active when performing this test.**

Warning: Before performing this test, turn the crane power off and then on again to ensure that an existing two-block warning and/or motion cut has not been overridden.

Warning: During this test, **do not** use the Cancel Alarm Button to clear audible warnings or motion cuts; during this test, **do not** winch the hook block into the head machinery, in case the System does not cut the crane motions.

Test for Operation of Two-Block Warnings and Cutout of Crane Motions

1. Slowly raise the hook block until it lifts the anti-two-block weight and de-activates the anti-two-block switch.

   This action should cut out the *lift up* motion as well as the *boom down*, *boom extend* motions. Audible and visual alarms on the Operator's Display Console should become active.

2. Lower the hook block by winching down.

   This action should disable the audible and visual alarms on the Operator's Display Console and activate the boom motions.

CHECK THESE OPERATIONS BEFORE EACH SHIFT OR CRANE OPERATION

ROUTINE CHECKS AND MAINTENANCE

Load Test

The best way to identify a possible problem in the System is to do a Load Test. The accuracy of the Load Test is dependent upon accurate operation of all of the sensors in the System and the correct code number setting for the
configuration of the crane.

Before doing a Load Test, ensure that the crane configuration Code Number is set correctly.

Load Test Steps

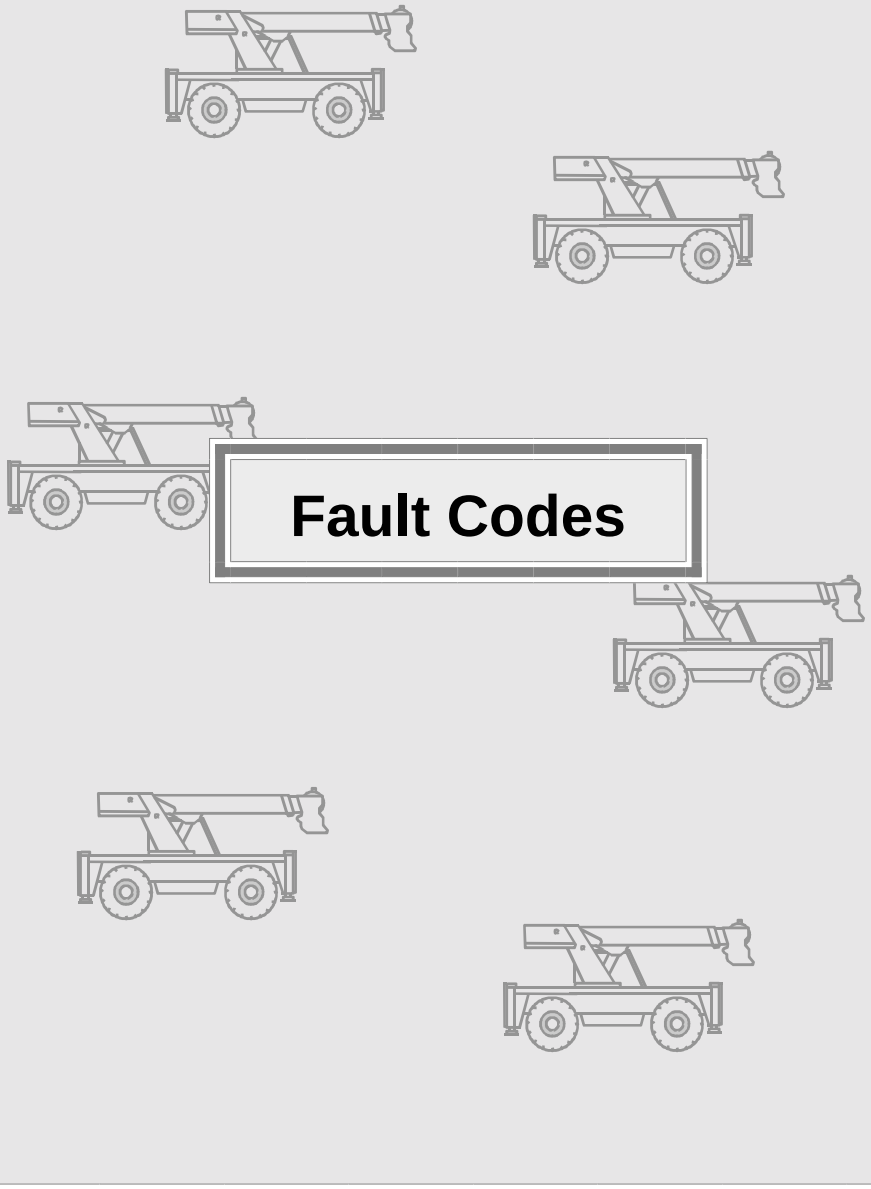
1. Select a known weight of at least 20% of Maximum Rated Capacity.

2. Calculate the weight of the total load, including the slings and hook block.

3. Lift the weight, and record the load weight displayed on the MicroGuard® 585 Operator's Display Console. The load weight on the console should be between 0 to 10% higher than the load that was lifted.
   Example:
   When lifting 5,000 lbs., the Display Console window should read between 5,000 and 5500 lbs.

   Warning: A load reading on the MicroGuard® 585 Operator's Display Console that falls outside of a 10% range may indicate a sensor problem. Call your Service Representative.

MINIMUM SIX MONTHLY CHECK



Fault Codes

FAULT CODES

Error/Fault Descriptions for MG 585

Fault Codes	Description of Error/Fault
10	No chart information available.
11	Chart duty error.
12	Bad checksum on single duty, duty chip corrupted.
13	No chart – incorrect or missing swing input.
14	No chart – incorrect or missing interlock input.
15	No chart – extension sensor input out of range.
16	Same as #15.
21	Main program error.
22	RAM read/write error.
23	Calibration data error.
24	Pre-calibration data error.
30	ADC for TXO (IC2 – AD7715) not responding.
31	ADC for TX1 (IC4 – AD7715) not responding.
40	Piston pressure sensor not present, connected, or responding.
41	Rod pressure sensor not present, connected, or responding.
50	Piston pressure not within required operating range.
51	Rod pressure not within required operating range.
52	Extension sensor not within operating range.
53	Angle sensor not within operating range.

FAULT CODES

Error/Fault Descriptions for MG 585

Fault Codes	Description of Error/Fault
54	Swing sensor (A) not within operating range.
55	Swing sensor (B) not within operating range.
56	Swing pot supply (+) not within operating range.
57	Swing pot supply (-) not within operating range.
60	Bad serial comms link to main working display.
70	FKO feed not present.
71	A2B feed shorted to ground.
72	FKO relay stuck open.
73	A2B relay stuck open.
74	Total moment values less than expected.

Greer Company

MicroGuard® 585
Rated Capacity Indicator/Limiter System

Crane Systems and Accessories

1918 East Glenwood Place
Santa Ana, CA 92705
Telephone: (714) 259-9702
Fax: (714) 259-7626