

MicroGuard[®] 586 Retrofit

Rated Capacity Indicator System



Calibration



Consider Yourself Warned.[™]

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Introduction

This manual describes the calibration process for the MicroGuard 586 Retrofit Rated Capacity Indicator System (hereinafter referred to as “the system”) in an on-site environment and assumes that there is no prior knowledge of the geometry of the crane other than data provided by the manufacturer.

This document also assists personnel in obtaining necessary measurements for calibration and in maintaining a record of the measurements and test results for review and/or comparison when changes are made. Recording measurements and test results during the calibration process will ensure an organized and easy to follow calibration.

Preliminary Checks and Measurements

⚠WARNING

AT ALL TIMES, OBSERVE SAFE PRACTICES. MAKE SURE THAT CRANE CAPACITY LIMITATIONS ARE UNDERSTOOD, AND THAT THE CRANE CAPACITY PLATE IS FOLLOWED. DO NOT EXCEED MANUFACTURER'S SPECIFIED LIFTING LIMITATIONS.

Required Tools

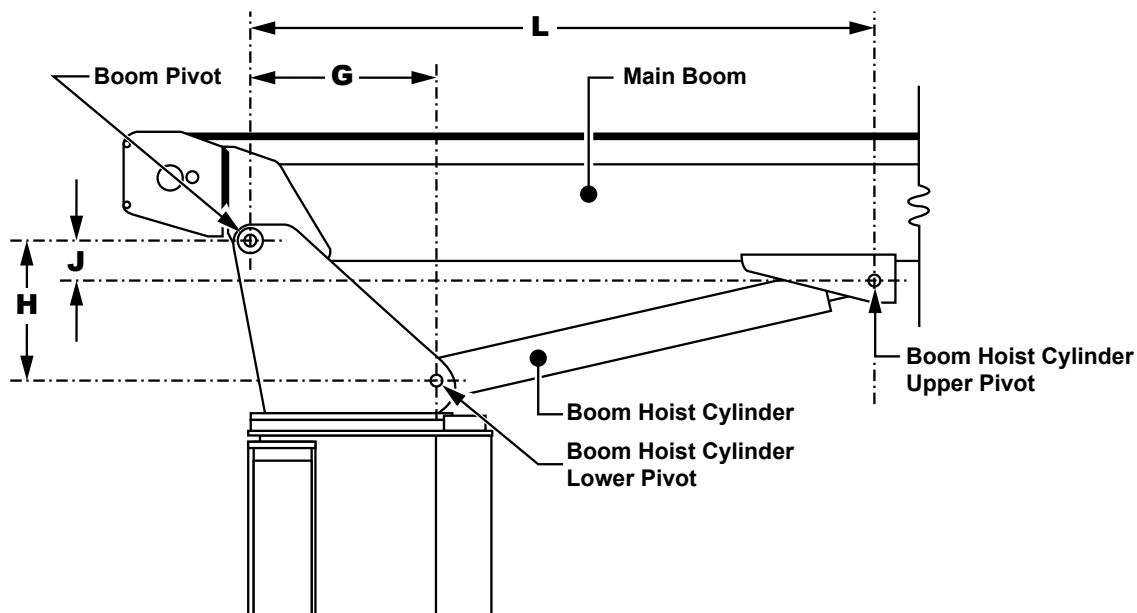
- Phillips Screwdrivers
- Bubble Level – Accurate to 0.1° at level
- Measuring tape (100 ft) – fiber-type with tenths of feet
- Digital Voltmeter

The following pages provide a list of measurements that must be recorded and double-checked for accuracy. Any data supplied by the crane manufacturer in the crane application data sheet stored in the system must be validated before calibration begins. All dimensions entered into the computer must be in feet and tenths of a foot.

Boom Pivot Dimensions

Use the space provided in Appendix A to record the measurements.

The boom should be in a horizontal position (0°) when taking the following measurements:



Dimension "L" – The horizontal distance between the center of the boom pivot and the center of the boom hoist cylinder upper pivot.

Dimension "J" – The vertical distance between the center of the boom pivot and the center of the boom hoist cylinder upper pivot.

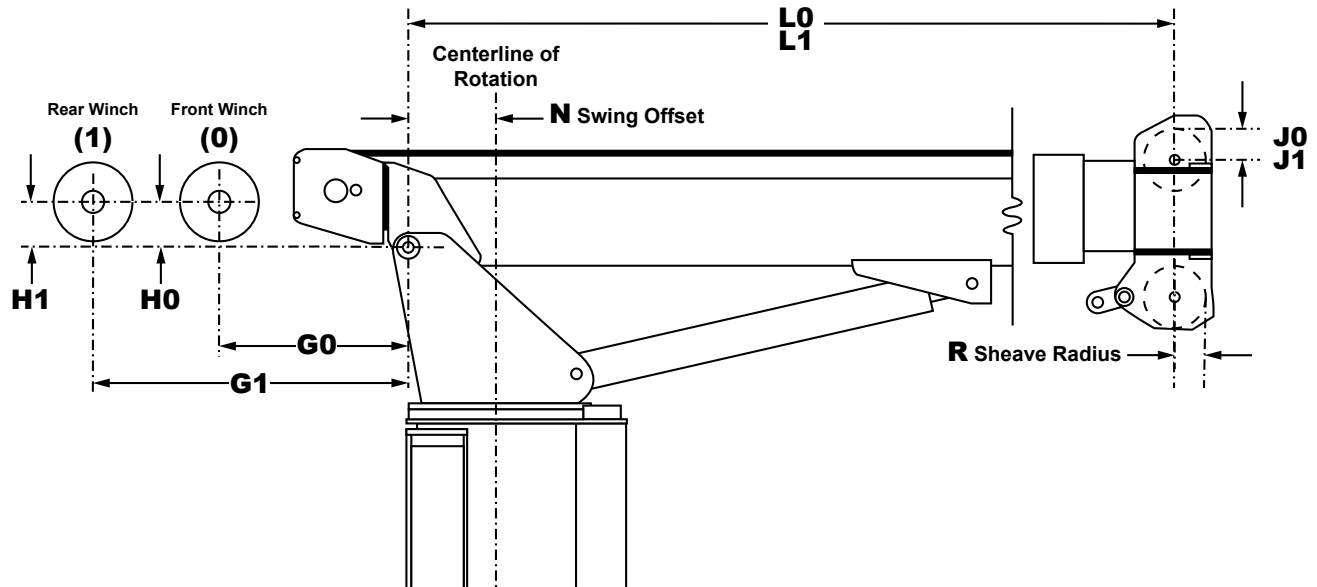
NOTE If the boom pivot is above the boom hoist cylinder upper pivot the dimension is negative.

Dimension "G" – The horizontal distance between the center of the boom pivot and the center of the boom hoist cylinder lower pivot.

Dimension "H" – The vertical distance between the center of the boom pivot and center of the boom hoist cylinder lower pivot.

Winch Dimensions

Use the space provided in Appendix A to record the measurements.



Dimension “G0” and “G1” – The horizontal distance between the center of the front and rear winch (respectively) and the center of the boom pivot.

Dimension “H0” and H1” – The vertical distance between the center of the front and rear winch (respectively) and the center of the boom pivot.

Dimension “J0” and J1” – The distance between the top sheave and the centerline of the boom pivot parallel to the horizontal boom plane (measurement may be identical).

Note: If the boom pivot is above the boom hoist cylinder upper pivot as shown in the illustration, dimension “J” will be negative. Make sure to indicate a positive (+) or negative (-) value when noting the measurement.

Dimension “L0” and “L1” – The distance between the centerline of the boom pivot perpendicular to the horizontal boom plane and the center of the bottom sheave (measurement may be identical).

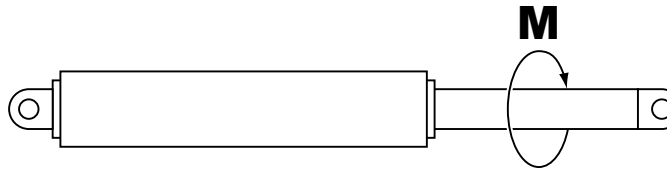
Dimension “N” Swing Offset – The horizontal distance between the center of the boom pivot and the centerline of rotation.

Note: If the centerline of rotation is ahead of the boom pivot as shown in the illustration, the dimension will be negative. Make sure to indicate a positive (+) or negative (-) value when noting the measurement.

Dimension “R” Sheave Radius – The distance between the center and the outside edge of the bottom sheave.

Boom Cylinder Dimensions

Use the space provided in Appendix A to record the measurements.



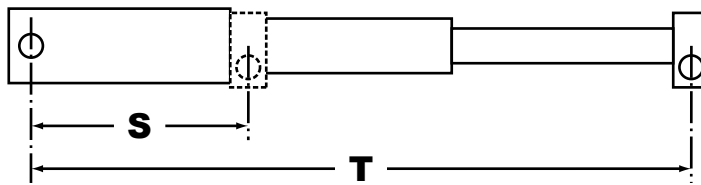
Dimension "M" - This is the distance measured around the outside of the cylinder rod, divided by 12.

Span Dimensions

Use the space provided in Appendix A to record the measurements.

⚠WARNING

SETTING SPANS ON THE CRANE WILL REQUIRE FULL EXTENSION OF THE BOOM. MAKE SURE THE CRANE IS SET UP ACCORDING TO THE MANUFACTURER'S OPERATION MANUAL TO ENSURE MAXIMUM STABILITY. FAILURE TO COMPLY WITH MANUFACTURER'S RECOMMENDATIONS MAY RESULT IN SERIOUS INJURY OR DEATH.



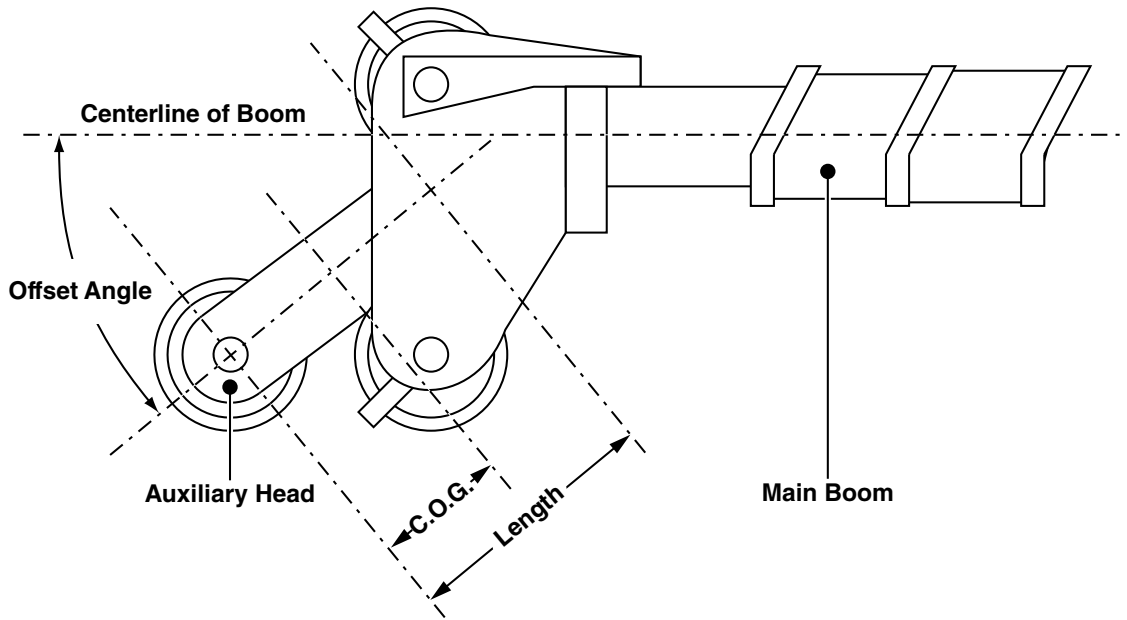
Dimension "S" - This is the distance between the center of the boom pivot and the center of the sheave with the boom fully retracted.

Dimension "T" - This is the dimension between the center of the boom pivot and the center of the sheave with the boom fully extended.

The span of the boom is calculated by subtracting Dimension "S" from Dimension "T" ($T - S = \text{span}$).

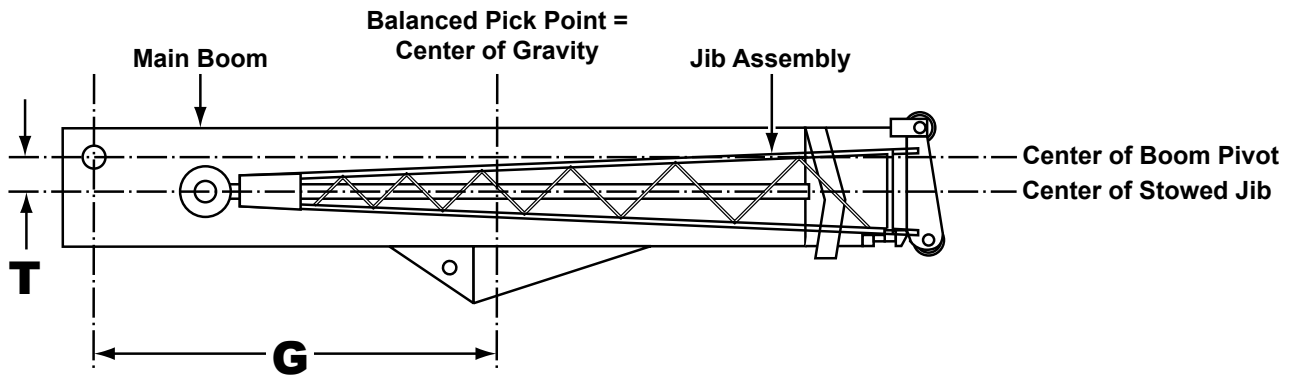
Auxiliary Head Dimensions

Use the space provided in Appendix A to record the measurements.



Stowed Jib Dimensions

Use the space provided in Appendix A to record the measurements.

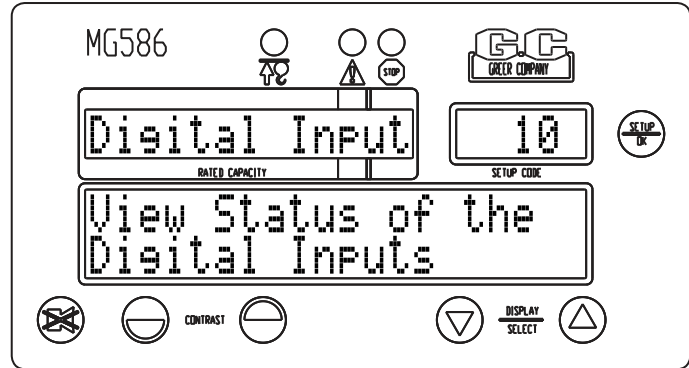


Dimension "G" - This is the distance between the center of the boom pivot and the center of gravity of the stowed jib.

Installation Checks

Check wiring and EPROM installations.
See page 4 of the Troubleshooting Manual (W450589) for terminal block functions and wiring.

Check swing switches, if fitted. Use the digital monitor screen (located under Menu 10 - Digital Inputs) to ensure that the switches operate properly.



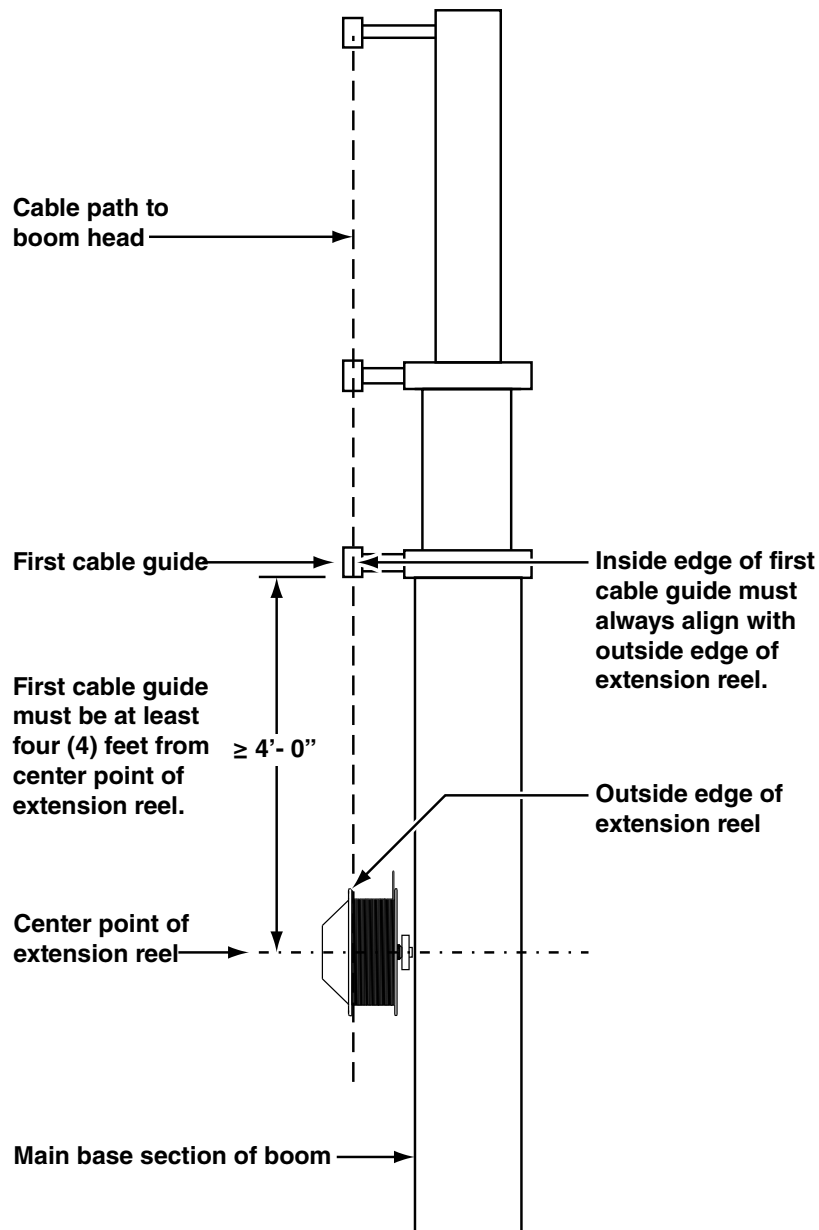
Installing the Reel-Off Cable

NOTE

The reel-off cable must be properly pre-tensioned. This procedure keeps the cable taut at all times, with controlled, steady exit from the extension reel.

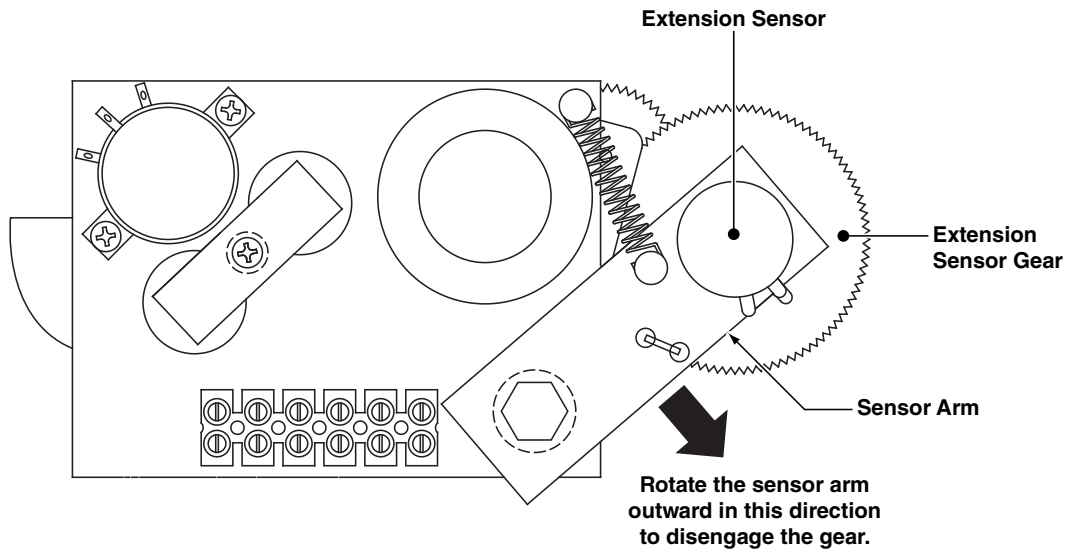
Pre-Tension Steps

1. Fully retract the boom.
2. Slowly rotate the extension reel clockwise until a “click” is heard, indicating that the clutch inside the reel is engaged.
3. Turn the extension reel counterclockwise five (5) complete rotations.
Note: A temporary marker placed on the Extension Reel can facilitate the rotation count.
4. The reel must be restrained from turning farther while enough cable is taken off the drum to reach the boom tip. (3 wraps = 10 ft.) Then the cable must be tied off at the boom tip (strain relieved).
5. Pretension is complete.



Adjusting the Extension Sensor

1. With the level on the boom reading 0° , rotate the extension sensor arm outward to disengage the gear.



2. Rotate the extension sensor clockwise until the end of the pot is reached. Then, continue to rotate [applying more force] to cause the clutch to slip [this is usually identified by a click].
3. Rotate the sensor exactly $1/2$ turn counter-clockwise to establish a proper voltage signal. Refer to "Extension Reel Voltage Check" on page 3 of the Troubleshooting Manual (W450589). After achieving the proper voltage setting, the Zero may be established by the calibration routine on page 19.
4. With the boom still level, measure the voltage of the angle sensor, refer to "Extension Reel Voltage Check" on page 3 of the Troubleshooting Manual (W450589). After achieving the proper voltage setting, the Zero may be established by the calibration routine on page 18.

NOTE

This check should be performed on older model cranes in the event the sensor has been removed and reinstalled, or repositioned incorrectly.

Entering Calibration Data

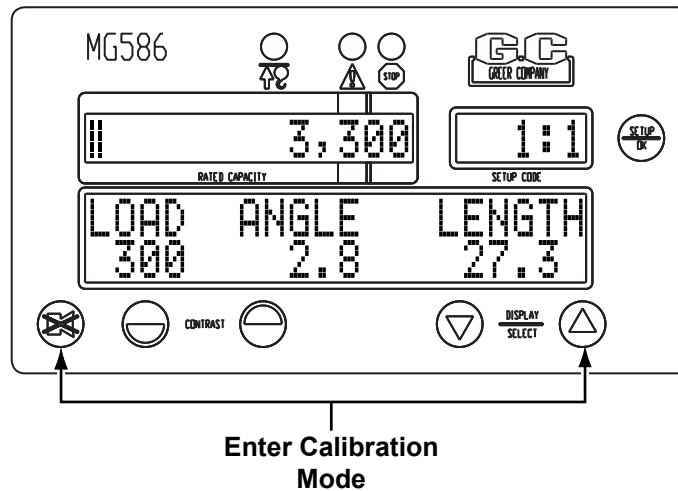
⚠WARNING

WHEN THE SYSTEM IS IN CALIBRATION MODE, AUTOMATIC OVERLOAD CONTROLS ARE DISABLED. THE CRANE OPERATOR IS RESPONSIBLE FOR PROPER LOADING OF THE CRANE WHILE PERFORMING CALIBRATION.

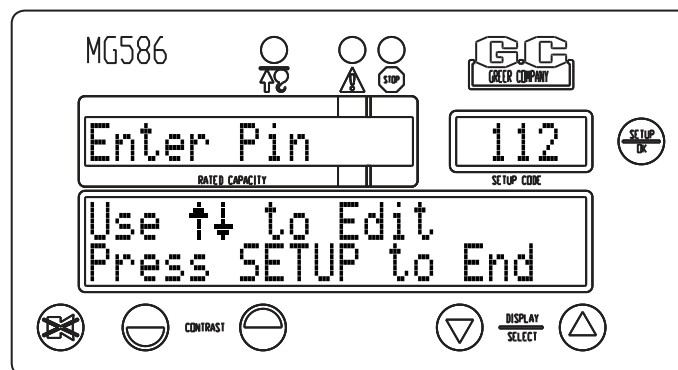
To enter calibration data it is necessary to put the system in calibration mode.

To access calibration mode:

1. Hold down the **CANCEL** and **UP ARROW** keys simultaneously for about six (6) seconds.



2. A message will appear in the information window prompting you to enter the security code. The security code for the system is "112".
3. Use the **UP ARROW** or **DOWN ARROW** keys to change the number in the Setup Code window. When the correct number is showing, press the **SETUP/OK** key to enter the code.



NOTE

If the incorrect code is entered, the system will return to normal operation.

NOTE

To exit calibration mode at any time, press the **CANCEL** key to return to normal operation. If the system remains powered on, the calibration routine can be accessed at any time without having to re-enter the security code.

The system is now in calibration mode and ready to receive calibration data. Press the **UP ARROW** or **DOWN ARROW** key to scroll through the following menus:

00 Information – Displays system specific information.

01 Reset Data – Displays the status of the system personality.

02 Dimensions – Enables entry of crane dimensions.

03 Angle Sensor – Enables calibration of the angle sensor.

04 Extension Sensor – Enables calibration of the extension sensor.

05 Pressure – Enables calibration of the boom hoist cylinder diameter.

06 Radius/Moment – Enables calibration of the moment and radius of the boom.

07 Deflection – Enables entry of boom deflection correction.

08 Calibrate Fly – Enables data entry and calibration of fly/jib dimensions.

09 Stowed Jibs – Enables data entry and calibration of stowed jib dimensions.

10 Digital Input – Enables viewing of digital input status.

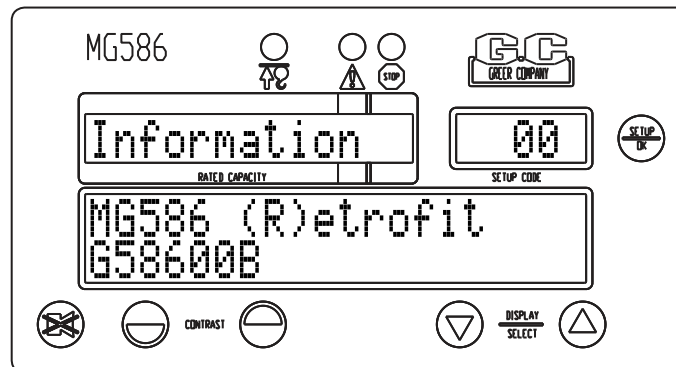
11 Angle Rate – Enables entry of load compensation.

12 Data Viewer – For developmental use only. No description is included in this document.

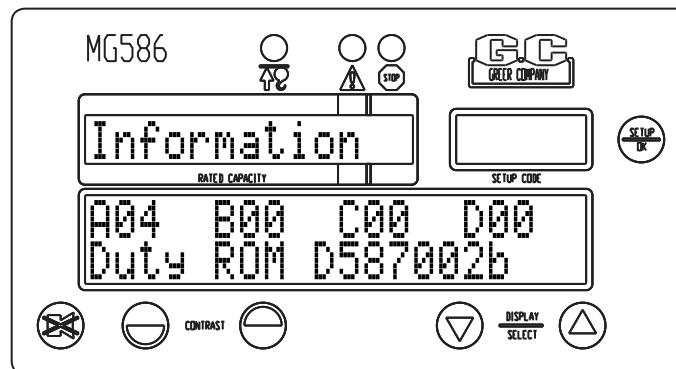
00 Information

This menu enables viewing of system specific information, error codes, and recommended diagnostic procedures.

The Main Information screen shows you the display model and crane data chart used.

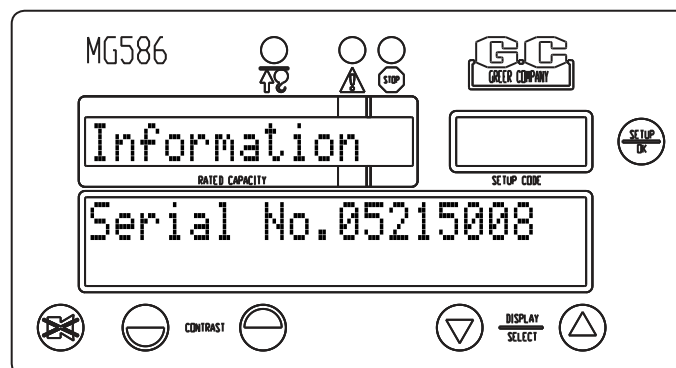


The Error Codes screen enables you to view system error codes (see System Fault Messages on page 1 of the Troubleshooting Manual (W450589) for description). From the Main Information screen, press the **SETUP/OK** key.

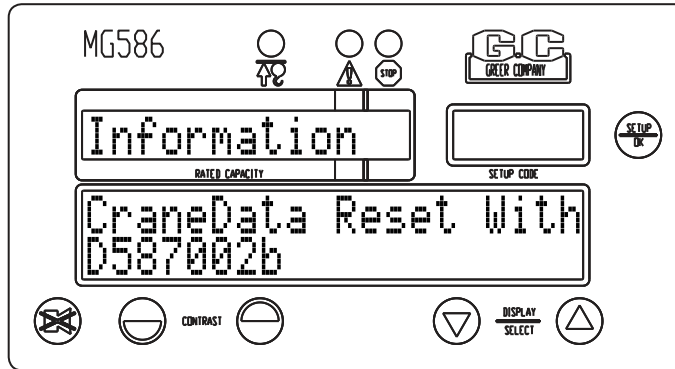


The Serial Number screen shows the serial number of the unit. From the Error Codes screen, press the **UP ARROW** key.

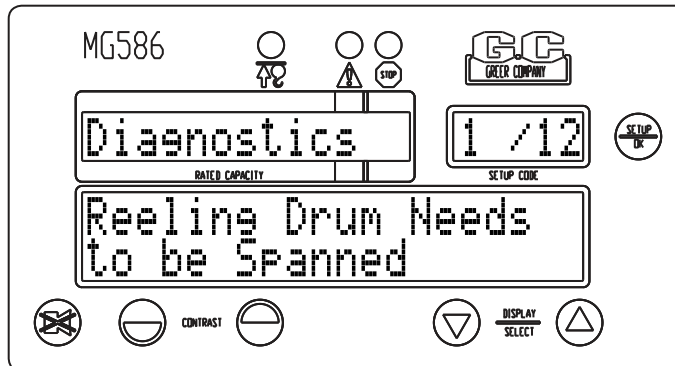
NOTE The serial number displayed should match the serial number label on the computer.



The Crane Data screen shows the crane data chart number. This file is used for system RESET. From the Serial Number screen, press the **UP ARROW** key.



The Diagnostics screens display a number of recommended procedures necessary to complete the calibration. This list may vary depending on previous calibrations. All calibration functions are not pertinent to all cranes; therefore, some recommended diagnostics may not apply. From the Crane Data screen, press the **UP ARROW** key, or from the Error Codes screen, press the **DOWN ARROW** key.



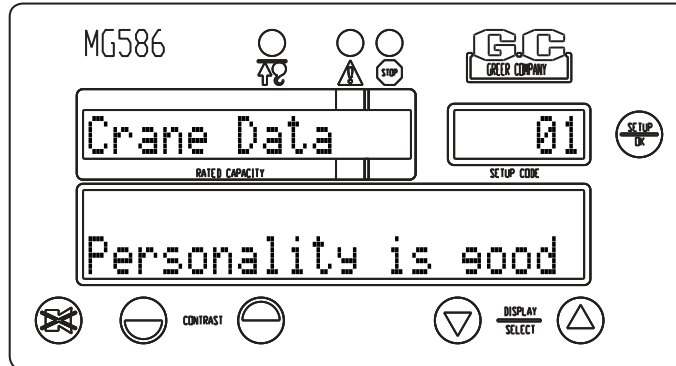
Only the **UP ARROW** key is enabled. Continually pressing the **UP ARROW** key will cycle through all diagnostic screens. At the last screen, pressing the **UP ARROW** key will return to the first diagnostic screen.

Press the **CANCEL** key to exit the diagnostics list and return to the main Information screen.

Press the **UP ARROW** key to go to the next menu.

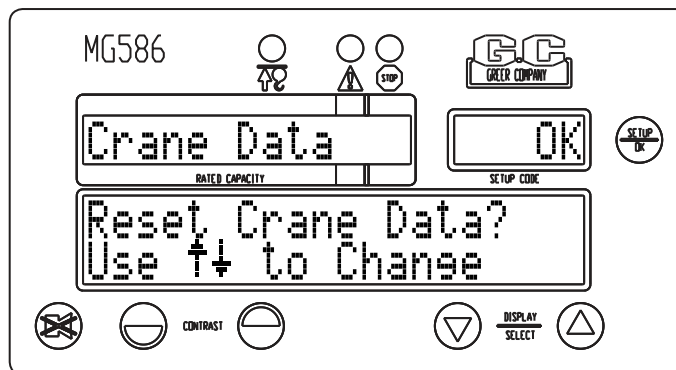
01 Crane Data

This menu will display the status of the system personality. If the system has been reset and is functioning correctly, the display will read "Personality is good." If the system has been altered or is not functioning correctly, the display will read "Personality is bad."

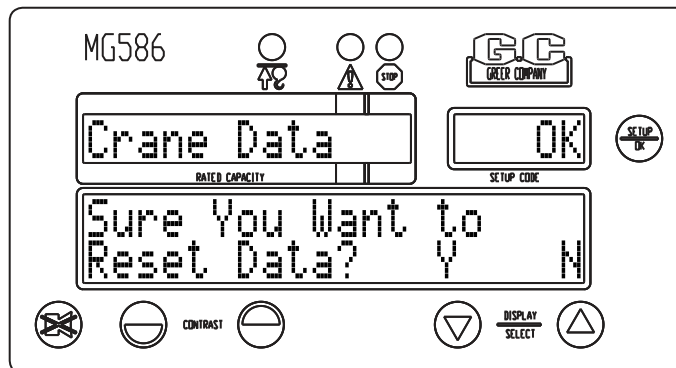


In order for a new calibration to begin, the crane data must be reset. This will erase any existing personality data which stores crane specific data and dimensions. It will also copy any known data from the on-board ROM applications file to the working personality memory for use by the system.

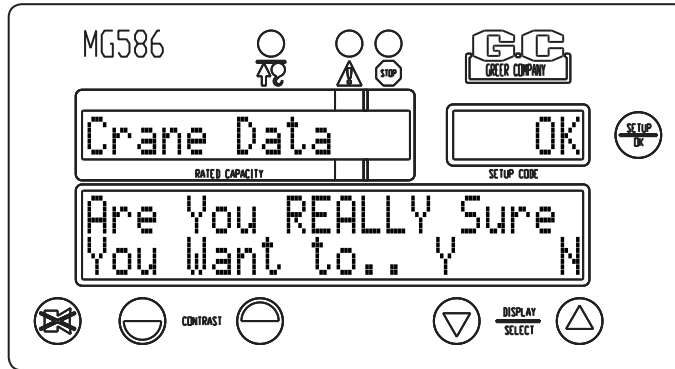
To reset crane data, press the **SETUP/OK** key.



You will be prompted to confirm the reset command by pressing "Y" (**DOWN ARROW** key), or "N" (**UP ARROW** key).



You will be prompted again to confirm the reset command by pressing “Y” (**DOWN ARROW** key), or “N” (**UP ARROW** key).



You will be prompted one more time to confirm the reset command by pressing “Y” (**DOWN ARROW** key), or “N” (**UP ARROW** key).

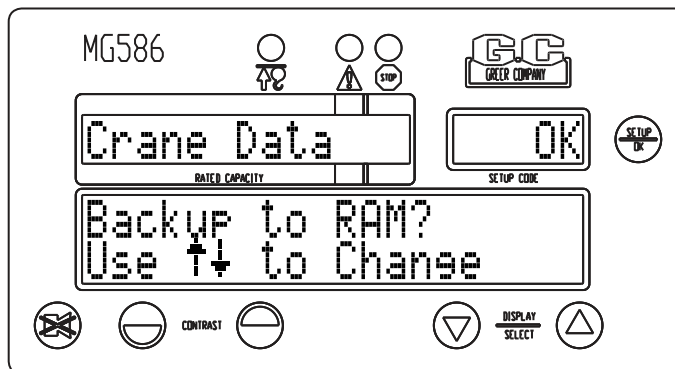
If yes is selected, the system will erase any and all calibration data stored. While it is resetting, the percent of rated capacity meter will act as a progress bar. When it is completed, the screen will show “Finished” and then automatically return to the Reset Crane Data screen.

The system also contains a backup function that allows the installer/calibrator to retain a copy of the personality information after the unit is calibrated.

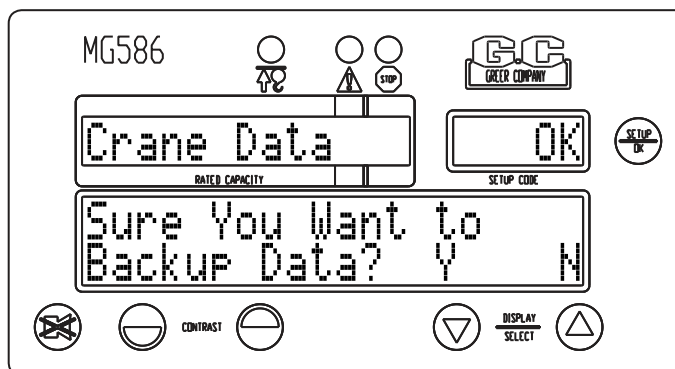
NOTE Once the calibration has been completed and the results are satisfactory, make sure you backup the calibration data.

Press the **UP ARROW** key to go to the backup menu.

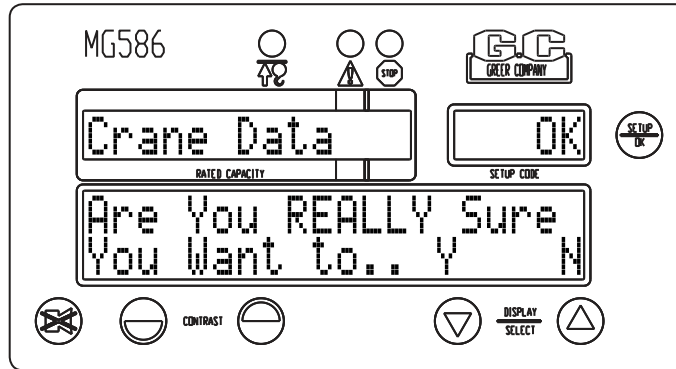
To backup the crane data, press the **SETUP/OK** key.



You will be prompted to confirm the reset command by pressing “Y” (**DOWN ARROW** key), or “N” (**UP ARROW** key).



You will be prompted again to confirm the backup command by pressing “Y” (**DOWN ARROW** key), or “N” (**UP ARROW** key).

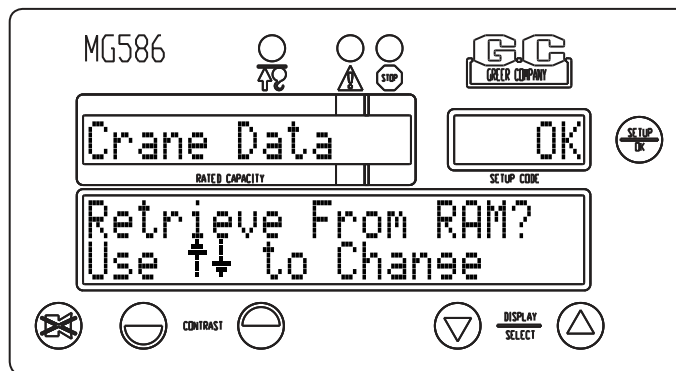


If yes is selected, the system will backup all calibration data from the personality chip to the RAM. While it is resetting, the percent of rated capacity meter will act as a progress bar. When it is completed, the screen will show “Finished” and then automatically return to the Backup Data screen.

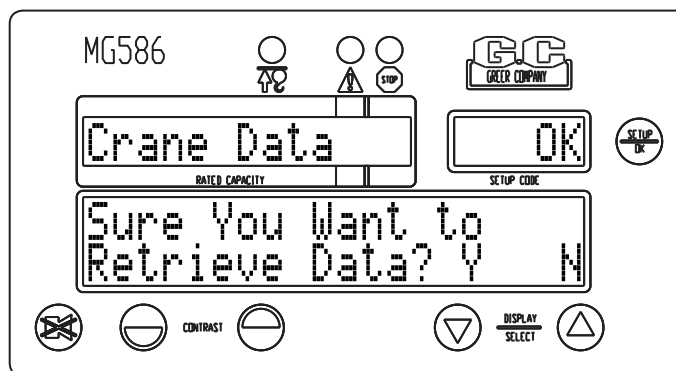
The system also contains a retrieval function that allows the installer/ calibrator to restore a copy of the personality information to the program capacity chip in the event of an error.

Press the **UP ARROW** key to go to the reset menu.

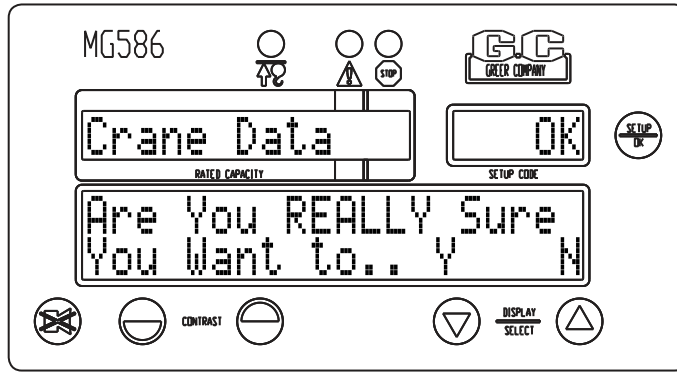
To retrieve the crane data, press the **SETUP/OK** key.



You will be prompted to confirm the retrieve command by pressing “Y” (**DOWN ARROW** key), or “N” (**UP ARROW** key).



You will be prompted again to confirm the retrieve command by pressing “Y” (**DOWN ARROW** key), or “N” (**UP ARROW** key).



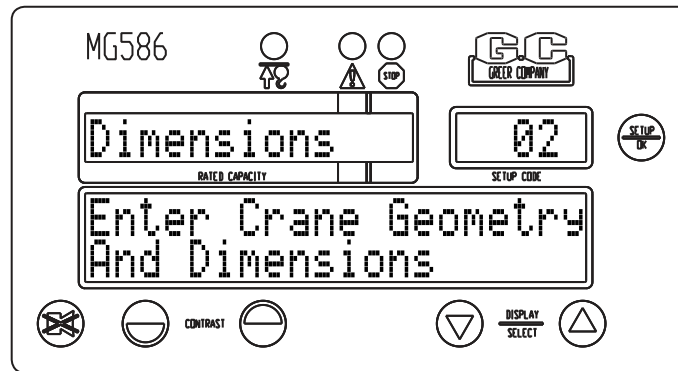
If yes is selected, the system will retrieve all calibration data from the RAM to the personality chip. While it is retrieving, the percent of rated capacity meter will act as a progress bar. When it is completed, the screen will show "Finished" and then automatically return to the Retrieve Data screen.

Press the **CANCEL** key to exit the diagnostics list and return to the main Crane Data screen.

Press the **UP ARROW** key to go to the next menu.

02 Dimensions

This menu is for entering the dimensions recorded in Appendix A.



Press the **SETUP/OK** key to enter the routine. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed values. When the correct value is displayed, press the **SETUP/OK** key to save and continue. Press the **CANCEL** key to exit the routine.

Enter the following dimensions from the Measurement Record in Appendix A: Swing Offset, Ram L, Ram J, Ram G, and Ram H.

The system will then ask, "Is the winch mounted on the boom?" Press "Y" (**DOWN ARROW** key), or "N" (**UP ARROW** key). If "YES," the system will not require additional information regarding the crane winch and continue to the next entry. If "NO," the system will ask, "Calibrate Hoist Rope Dimensions?" Unless previously calibrated, press "YES" and work through the following calibration procedure. If the winch is mounted on the boom, all dimensions should be set to "0".

Calibrating the Hoist Rope

Follow the instructions provided on the screen, instructing the operator to move the boom to a high and low angle while fully telescoped in.

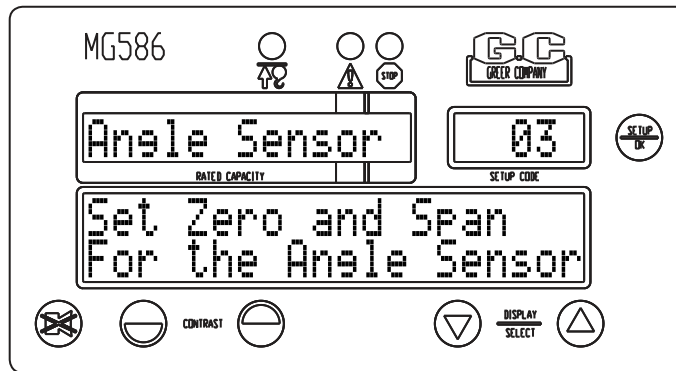
Measure the shortest distance from the boom pivot to the hoist rope. This can be done by placing one end of the tape on the pivot and arcing the tape to find the shortest distance.

The dimensions entered are "High Angle W" and "Low Angle W." Refer to Appendix A for previously recorded measurements.

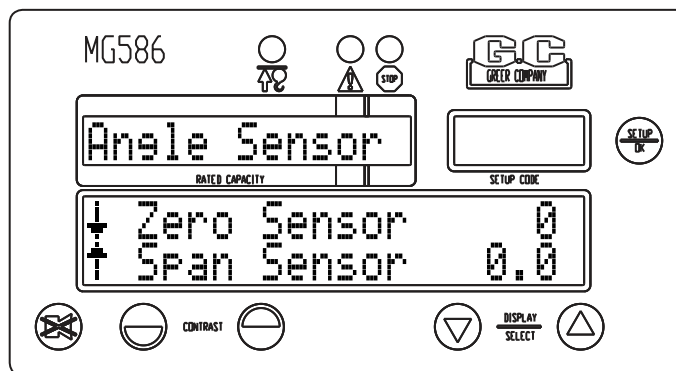
1. Head Shv. Rad
2. RopeLim (may be located on the crane's rope and reeving load chart)
3. Max POL (may be located on the crane's rope and reeving load chart)
4. Max Ext (maximum boom extension allowed)
5. Load Scale (a load multiplier, usually set to 1.0)
6. Length Offset (display offset added to length)
Example: If measured retracted length = 35.6 feet, length in crane data manual = 36.0 feet, length offset would be 0.4; if measured retracted length = 36.8 feet, length in crane data manual = 36.0 feet, length offset would be -0.8 feet.
7. Retracted Length (retracted length of boom - Measure it!)

03 Angle Sensor

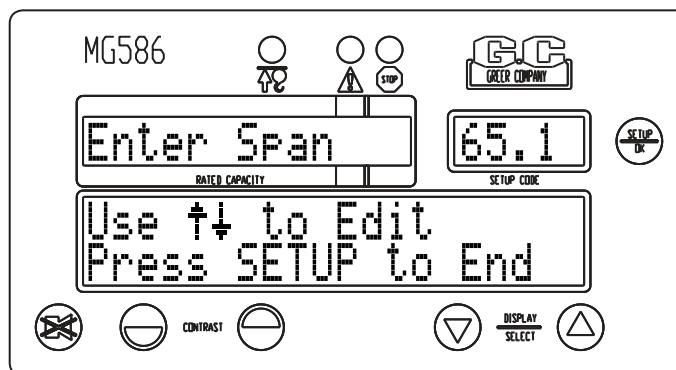
This routine is used to set the zero and span of the angle sensor.



1. Press the **SETUP/OK** key to enter the routine.
2. Position the boom at zero degrees and press the **DOWN ARROW** key. The angle sensor is now zeroed.



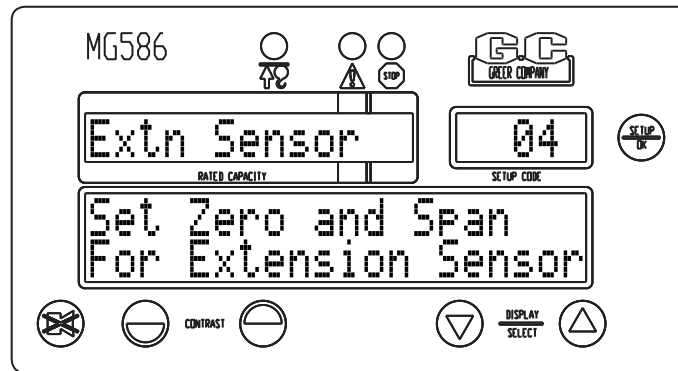
3. Raise the boom to an angle of 65-70° and measure the angle of the boom with an approved digital level or other instrument.
4. Press the **UP ARROW** key to set the angle span. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUP/OK** key to enter the span.



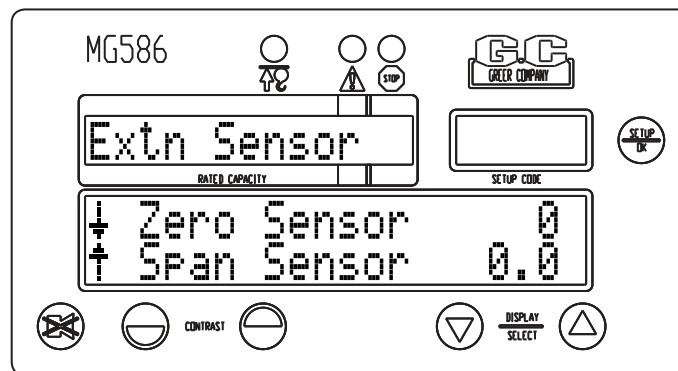
5. Press the **SETUP/OK** key again when finished to return to the main menu.

04 Extension Sensor

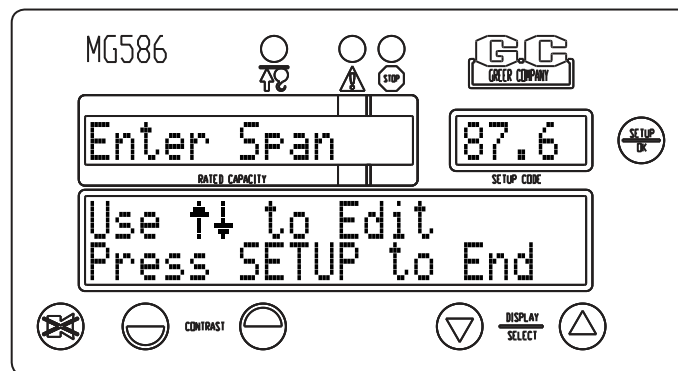
This routine is used to set the zero and span of the extension sensor.



1. Press the **SETUP/OK** key to enter the routine.
2. Fully retract the boom and press the **DOWN ARROW** key. The extension sensor is now zeroed.



3. Fully extend the boom and measure the length of the fully extended boom.
4. Press the **UP ARROW** key to set the extension span. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUP/OK** key to enter the span.

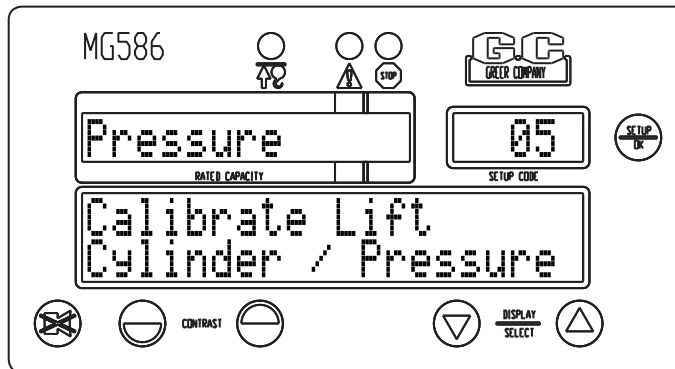


5. Press the **SETUP/OK** key again when finished to return to the main menu.

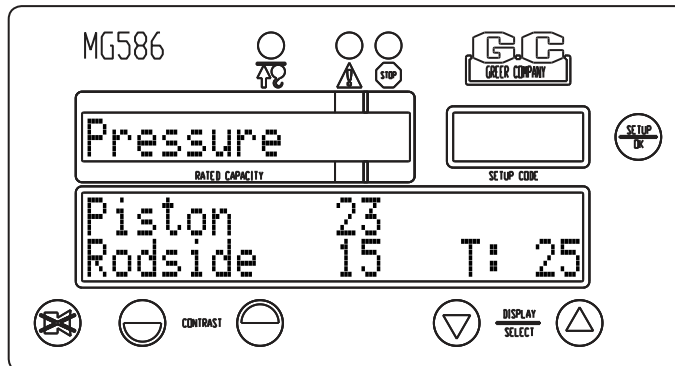
05 Pressure

This routine uses a calibration load to compute the diameter of the hoist cylinder, if the diameter is already known or is easily measured, simply skip the calibration option and enter the value directly at the end of this routine.

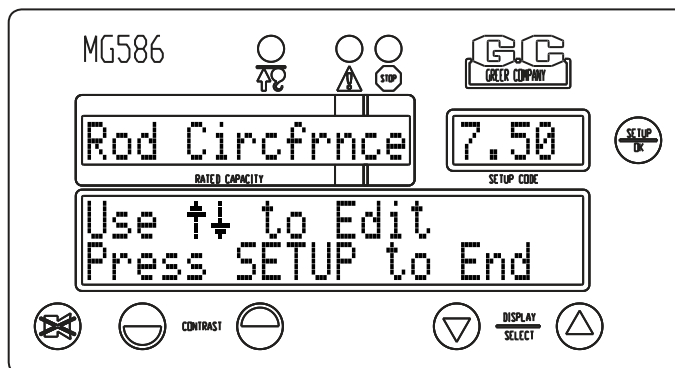
NOTE This dimension is critical and should be measured to within 1/10th inch.



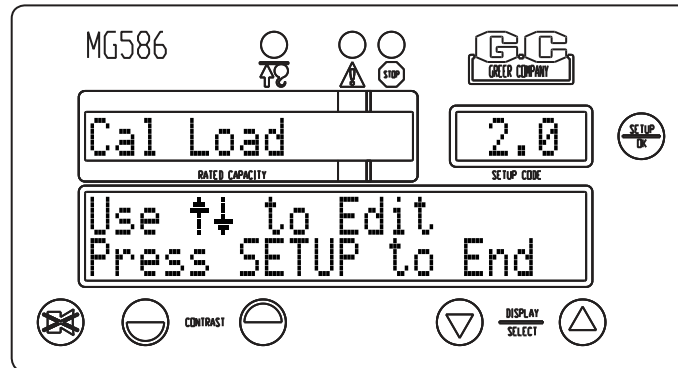
1. Press the **SETUP/OK** key to enter the routine.
2. Examine the piston and rod-side pressures. These should read positive numbers of approximately 20 to 3000 PSI with the boom slightly elevated. Press the **SETUP/OK** key to continue.



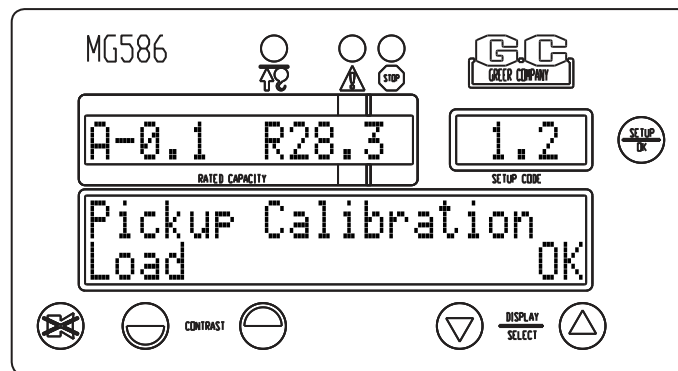
3. Enter the rod circumference recorded in Appendix A.



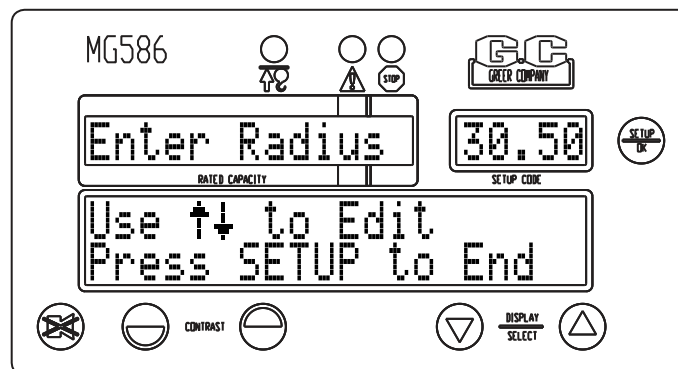
- Enter the weight of the calibration load including all shackles and hook weights. The load should be as large a mass as is safe for the crane to pick with the boom as far retracted as possible at an angle of approximately 60°. If only small test loads are available, use a longer boom length and possibly a little lower boom angle to induce more pressure in the cylinder base.



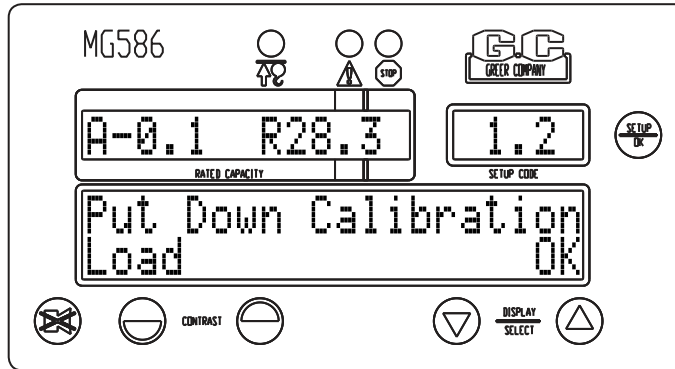
- Pick up the calibration load and hold it steady to settle any pressure fluctuations. Press "OK" [**UP ARROW** key] to continue.



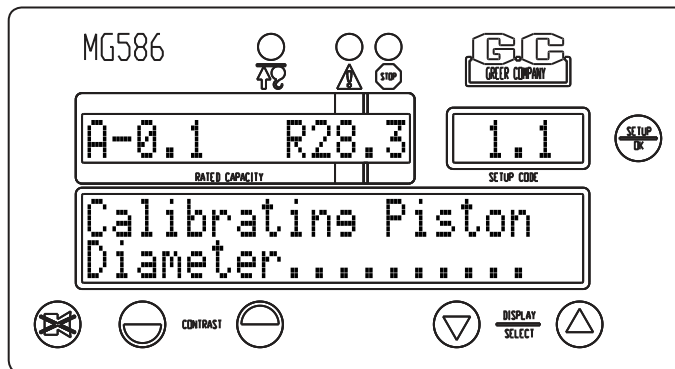
- Measure the radius of the suspended load. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUP/OK** key to enter the radius.



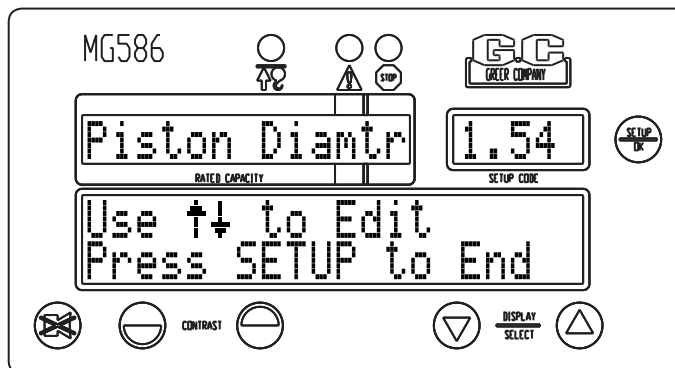
- Set down the calibration load, allow it to settle, and then confirm the weight. Press "OK" (**UP ARROW** key) to continue.



- The computer will then calibrate the piston diameter.



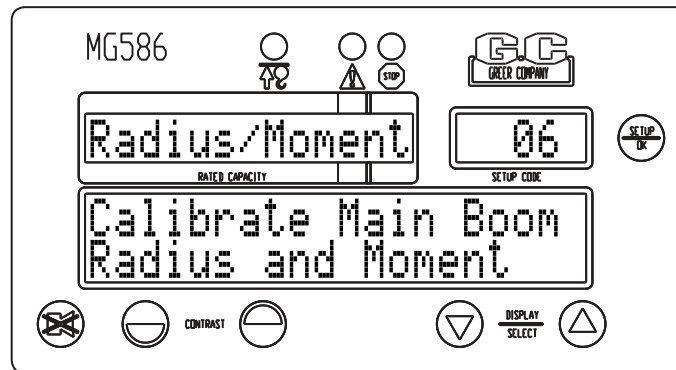
- If the piston diameter was known prior to entering the routine, enter the value. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUP/OK** key to enter the diameter.



- Press the **SETUP/OK** key to exit and return to the main menu, and then press the **CANCEL** key to return to normal operating mode.
- Pick up the weight again. Check that the displayed load rises by the correct amount.
- Reenter the Calibration Mode and adjust, as appropriate.

06 Radius/Moment

This routine calibrates the natural moment and radius of the boom, taking into account its deflection under its own weight.



⚠WARNING

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NOTE

Main boom calibration is not recommended with stowed or erected attachments on the unit. make sure to remove and stowed attachments from the main boom before continuing.

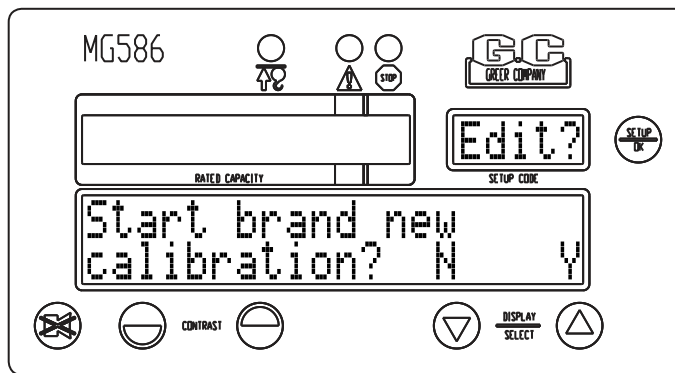
Up to seven points may be stored and must include: 1) boom fully retracted and, 2) boom fully extended. Intermediate points should include individual boom sections extended and/or other individual boom sections that stop telescoping as the boom is extended. Some booms will exhibit a deflection or droop when nearing full extension. This may be due to the design and fitting of wear pads inside the boom, which allows sections to hang on each other when nearing full extension. Though this has little effect on main boom radius accuracy, the radius of a fly or jib may be still be affected. Therefore it is essential to add an extra calibration point at 90% of the boom extension.

For each extension calibration, the system requires a stable measurement of the moment (taken from its own pressure sensors) and radius (taken from manual measurements from the center of rotation, to the center of the load) at both high and low boom angles. Select angles of between 60° and 70° for high boom angles, and as close to zero degrees as possible for low boom angles. Take care to accurately measure the radius at each calibration point. Using a single part of line will aid in this.

The routine can be exited at any time by pressing the **CANCEL** key.

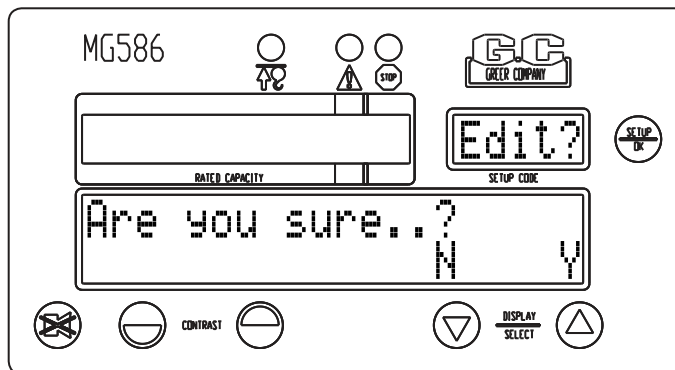
USE THE SPACE PROVIDED IN APPENDIX A TO RECORD THE MEASUREMENTS.

Press the **SETUP/OK** key to enter the routine.



To start a new calibration, press "Y" (**UP ARROW** key), otherwise press "N" (**DOWN ARROW** key) to check an existing calibration. If no is selected, you will be prompted for a boom length to calibrate. You may re-calibrate any boom length, by extending to that length and calibrating.

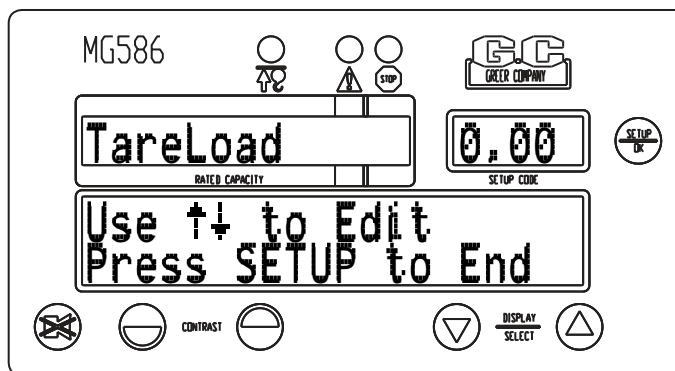
If "Yes" is pressed, you will be asked to confirm your request. Press "Y" (**UP ARROW** key) to continue.



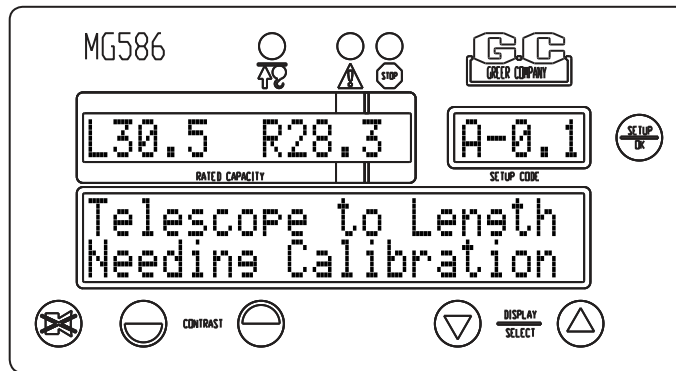
NOTE Selecting "Yes" will start a new radius moment calibration and all existing data will be erased.

Follow the instructions for each length/calibration point:

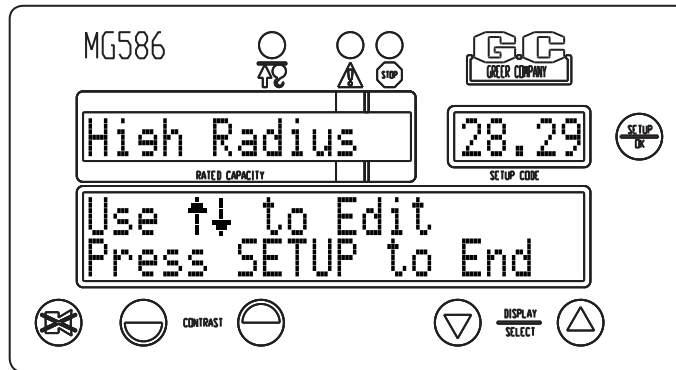
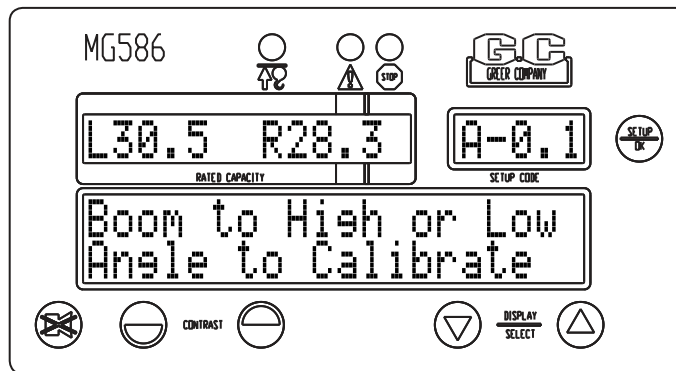
1. Enter the tare load (the only weight should be that of the hook block; if there is a block hanging, add this to the tare). Also, the unit must be configured with a single part line. When entering the tare load in the calibration routine, adding 100 pounds (0.1) to the actual weight will help guarantee a slightly positive load reading in all operating configurations.



- Telescope to the desired length.



- Boom to a high or low angle. Always check the computer to ensure that the angle is identified as a 'high' or 'low' angle. If the display has indicated a different setting, use the **UP ARROW** key to change to "high" angle, or the **DOWN ARROW** key to change to "low" angle.



- Measure and enter the radius. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUP/OK** key to enter the diameter. Allow the boom bounce to settle, and then move on.
- Boom to the next angle. Measure and enter the radius.

- Confirm the calibration. Press “Y” (**UP ARROW** key) to store the calibration point, otherwise press “N” (**DOWN ARROW** key) to correct any errors.

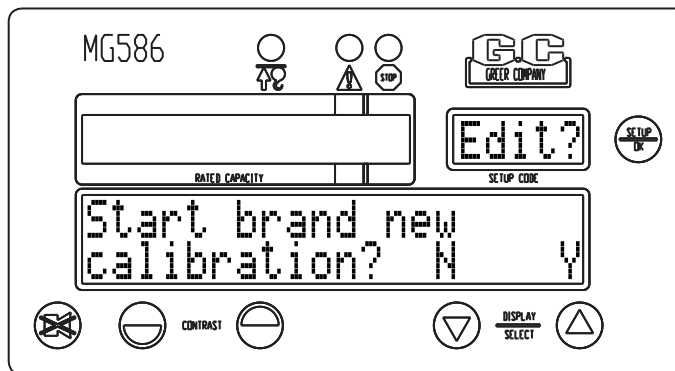


To restart a calibration length, press the **CANCEL** key.

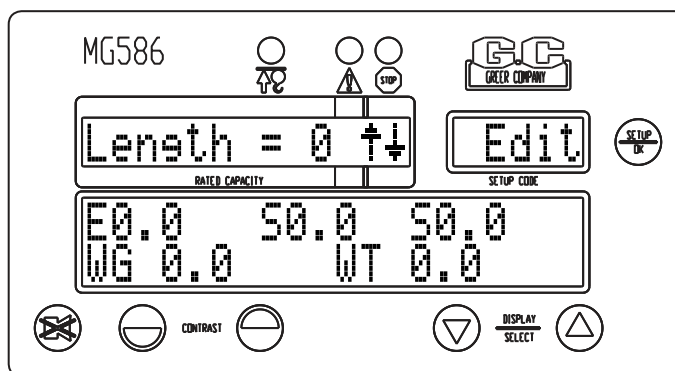
Calibrated lengths are stored in personality memory. To re-enter a single length, restart the radius/moment routine. Select “No” for a single length. Select “yes” for a brand new calibration.

The boom parameters computed during a radius/moment calibration can be entered manually or adjusted using the “EDIT” function available when first entering the routine.

- Press the **SETUP/OK** key to edit the boom parameters manually.



- Press either the **UP ARROW** or **DOWN ARROW** key to change the boom configuration point.
- Press the setup/ok key to enter the information for that point.



- Enter the required values when prompted.
- Press either the **UP ARROW** or **DOWN ARROW** key to change to the next boom configuration point.
- Continue until you have entered the required values for all boom configuration points.
- Press the **CANCEL** key when finished.

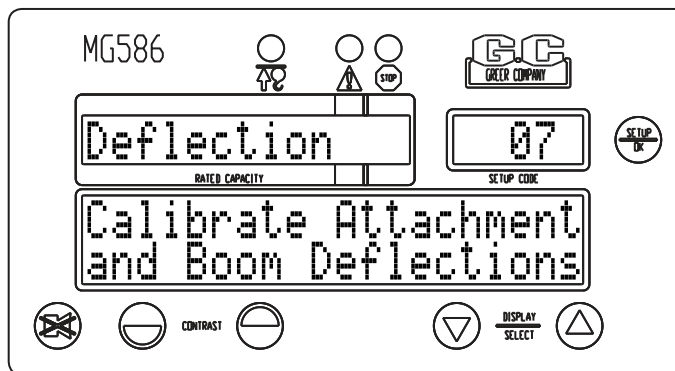
TIP

After saving this calibration point, the system will be showing the proper hook weight and working with the corrected radius. You can boom up to 45° and recheck the radius (45° is probably the worst case angle, so if the radius still checks good here you can move on to the next point with confidence).

Continue until all boom length points have been entered. When finished, press the **CANCEL** key. After calibrating the radius moment, reenter the radius moment routine, and select "N" (**DOWN ARROW** key) when prompted to start a new calibration. This will take you to an edit screen and will enable you to view the data for each boom length calibrated. Writing these numbers down will save time should the calibration data be lost for any reason (refer to Appendix A to record values).

07 Deflection

This routine is used to quantify the amount that a boom or attachment bends, or deflects under load. The boom has its own bending factor called “F.” Each jib combination can have its own independent “F” value. Before entering the routine, the display will show the angle of the boom head under no load and under the current load.



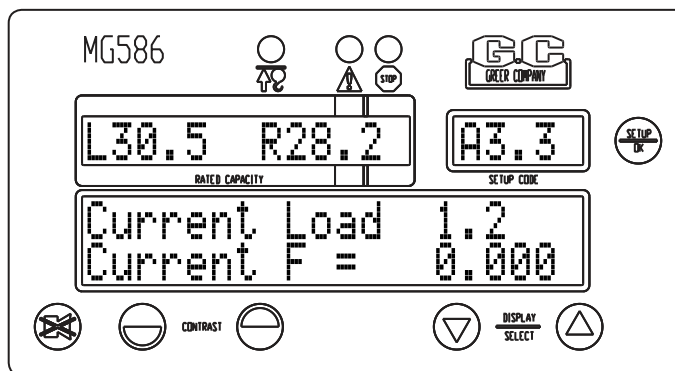
⚠WARNING

MAKE SURE THE CRANE IS SET UP IN ACCORDANCE WITH THE MANUFACTURER'S OPERATION MANUAL FOR MAXIMUM STABILITY. ENSURE THAT ALL BOOM EXTENSIONS AND LOADS LIFTED ARE WITHIN THE APPROPRIATE LOAD CHARTS AND LIMITS. FAILURE TO COMPLY WITH MANUFACTURER'S LIMITS MAY RESULT IN SERIOUS INJURY OR DEATH.

NOTE

Make sure that the crane is configured to pick off the main boom and that there are no erected and unused attachments.

1. Fully extend the boom at a high angle of greater than 60 ° and lift a suitable calibration load. The load should induce significant deflection in the boom.
2. Press the **SETUP/OK** key.

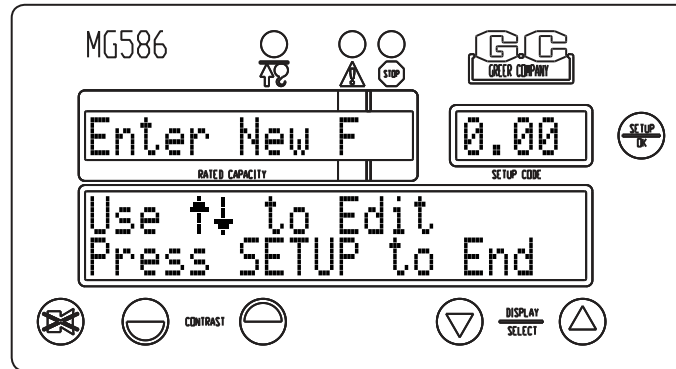


3. Measure the loaded main boom radius. Press the **SETUP /OK** key and enter the radius value. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUP/OK** key to enter the radius. It is a good idea to add 0.1ft to the radius when entering the radius in the calibration for boom deflection. This will help ensure a slightly positive radius in most operating conditions.
4. Check that the new displayed radius matches (or slightly exceeds) the actual measured radius.

5. Press either the up arrow key or the down arrow key to edit the “F” number manually without entering a radius; this is useful to trim the BDC up or down a bit. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUP/OK** key to enter the “F” number.

NOTE

This number is generated by the system during the procedure and should not be entered manually without express permission from the manufacturer.

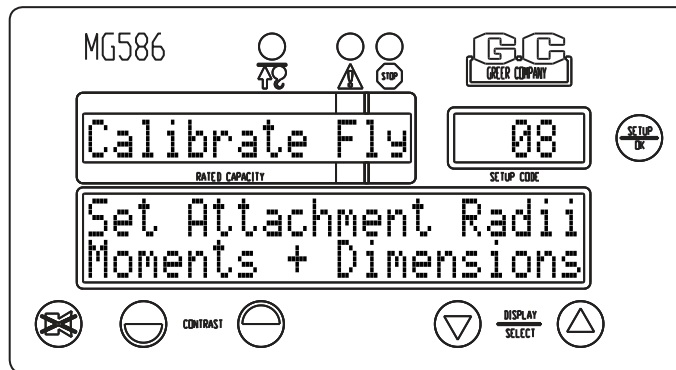


6. Press the **CANCEL** key to exit the routine.

Ensure that the main boom calibrations have been completed (refer to section “Preliminary Checks and Measurements” on page 6) and boom functions have been thoroughly tested before calibrating the attachments (refer to section “08 Calibrate Fly” on page 33). These actions are essential for the collection of good calibration data. Use the worksheet in Appendix A to record test results for lifts.

08 Calibrate Fly

This routine is used to perform a calibration on each jib configuration. The “edit” option can be used to manually enter pre-calibrated data. This option assists in trimming an existing calibration.

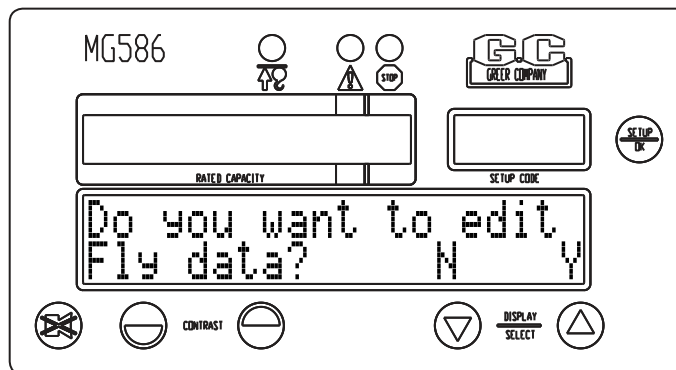


⚠WARNING

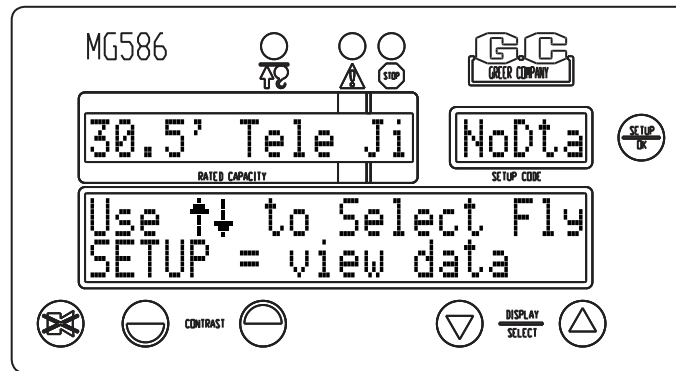
MAKE SURE THE CRANE IS SET UP IN ACCORDANCE WITH THE MANUFACTURER'S OPERATION MANUAL FOR MAXIMUM STABILITY. ENSURE THAT ALL BOOM EXTENSIONS AND LOADS LIFTED ARE WITHIN THE APPROPRIATE LOAD CHARTS AND LIMITS. FAILURE TO COMPLY WITH MANUFACTURER'S LIMITS MAY RESULT IN SERIOUS INJURY OR DEATH.

For each fly/jib combination, the system must gather data about the jib moment (through the pressure sensors) and the jib radius contribution (through the engineer's radius measurements). Data must be gathered at high and low angles and for a retracted and extended main boom for EACH configuration.

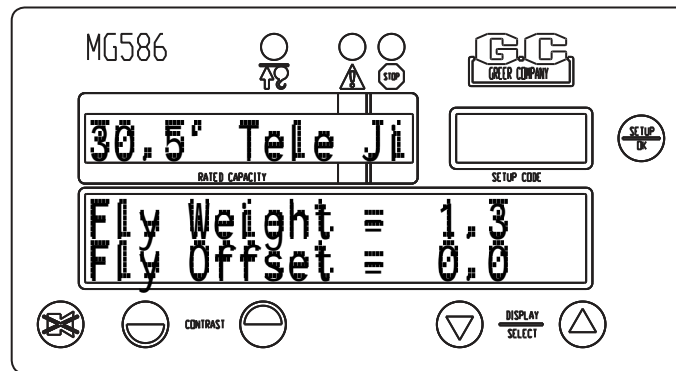
1. Make sure that the crane is configured to be picking off the jib to be calibrated.
2. Press the **SETUP/OK** key to enter the routine.
3. The system will prompt you to edit the data for the selected fly. Select “N” (**DOWN ARROW** key) and continue to step 10 to calibrate the selected fly, otherwise, select “Y” (**UP ARROW** key) and continue to step 4 to enter the data for the selected fly.



4. Press the **SETUPIOK** key to edit the data for the selected fly.



5. Press the **SETUPIOK** key again to enter the data. If jib data is known, it is okay to enter it. If not the system will calibrate the length, weight of jib, etc.



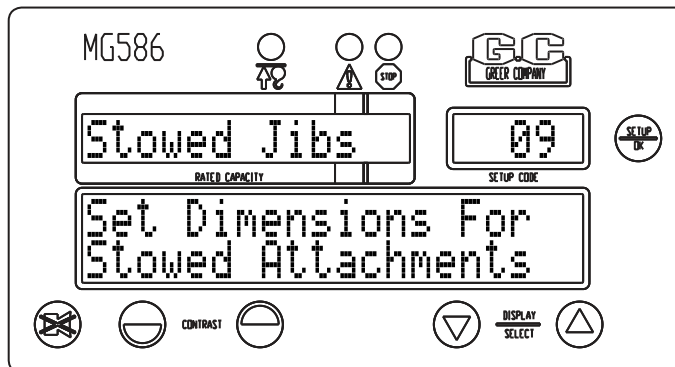
6. Enter the weight of the fly (in tenths of pounds). Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUPIOK** key to enter the weight. Enter the offset of the selected fly. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUPIOK** key to enter the offset.
7. Press the **UP ARROW** key to select the next group of data to enter and press the **SETUPIOK** key. Enter the remaining data as described previously. When all the data has been entered, press the **CANCEL** key to return to the main menu.
8. At the main menu, press the **SETUPIOK** key to enter the routine. When prompted to edit the fly data, select "N" (**DOWN ARROW** key) to enter the calibration data.
9. Enter the main hook weight (in thousandths of pounds) if there is an unused hook picking off the main boom; otherwise enter 0.0. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUPIOK** key to enter the weight.
10. Enter the weight of the fly hook (in thousandths of pounds) and any other shackles and rope weights suspended from the fly pick point. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUPIOK** key to enter the weight.
11. Follow the on-screen prompts to position the boom (fully retracted low angle, fully retracted high angle, fully extended high angle, fully extended low angle). After the boom is positioned, let it settle for several seconds, then, measure and enter the radius. After the four points are finished, the system will store the calibrated values and exit.
12. Check the validity of the calibration with a test load before moving to the next jib combination.

Upon completion of a jib calibration, record the test results on the worksheet in Appendix A.

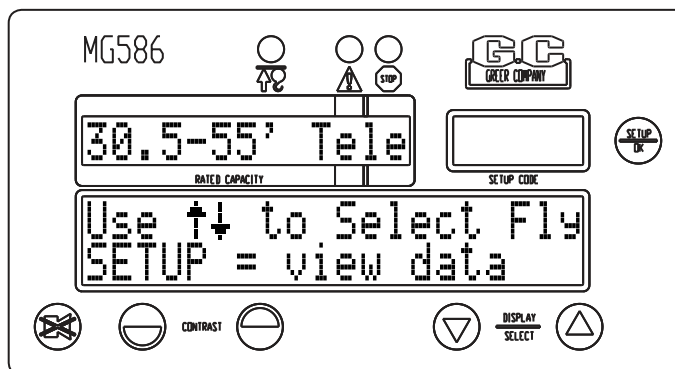
09 Stowed Jibs

This routine is used to enter data for stowed attachments.

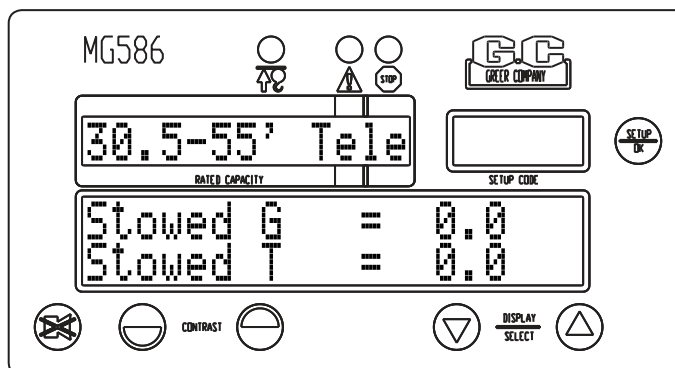
NOTE This information should be entered before performing a main boom radius/moment calibration, if it is to be calibrated with a stowed attachment.



1. Press the setup/ok key to enter the routine.



2. Press the **SETUP/OK** key to edit the data for the selected jib.



3. Press the **SETUP/OK** key again to enter the data.
4. Enter the center point (stowed G) of the jib. Use the data recorded in Appendix A. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUP/OK** key to enter the dimension. Enter the offset (stowed T) of the selected jib. Use the data recorded in Appendix A. Press either the **UP ARROW** or **DOWN ARROW** key to modify the displayed value and press the **SETUP/OK** key to enter the offset.

5. Press the **UP ARROW** key to select the next group of data to enter and press the **SETUP/OK** key. Enter the remaining data as described previously. When all the data has been entered, press the **CANCEL** key to return to the main menu.

NOTES Stowed G – Balance the jib on the hook to find the center point. Compute the distance from the boom pivot to this center point when jib is stowed. As an approximation, use the halfway point along the jib.

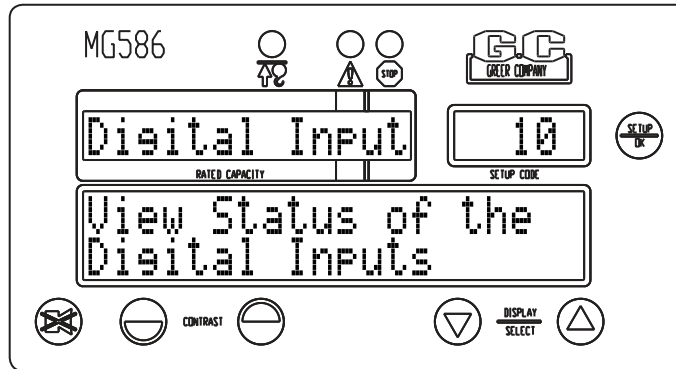
Stowed T – Measure from the boom pivot to the centerline of the jib when stowed, which should be a few inches. The number will be negative if the jib centerline is above the boom pivot (most likely).

Stowed Deduction – Data should be written on the chart or cab plate.

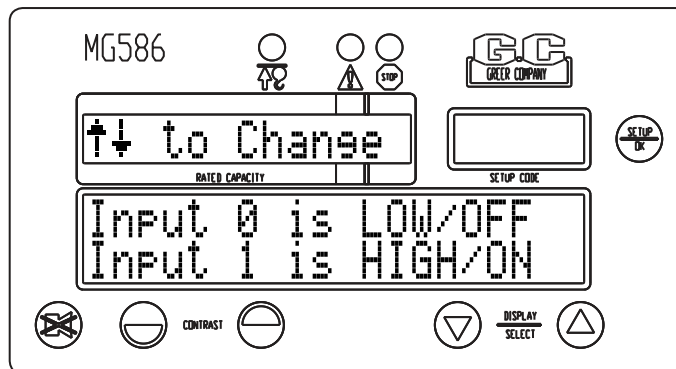
Jib Weight – Use the data gathered during the erected attachment calibration. Refer to the “Edit” function in 08 Calibrate Fly on page 33.

10 Digital Input

This routine shows the status of digital inputs and outputs.



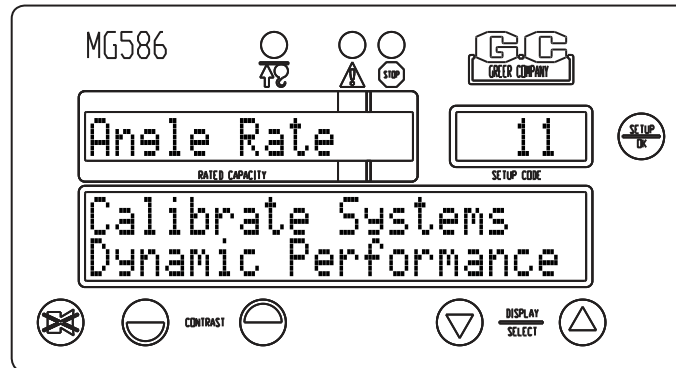
1. Press the **SETUP/OK** key to enter the routine.



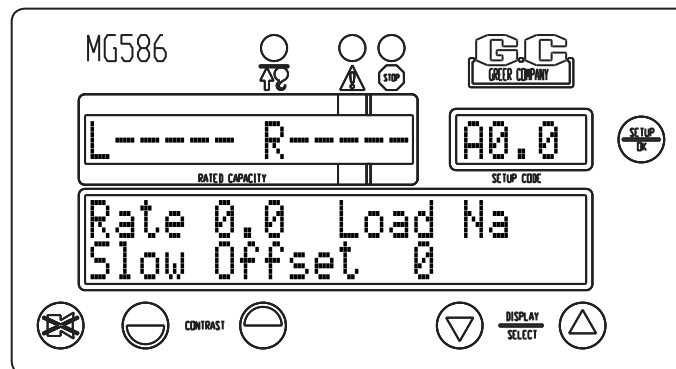
2. Press the **UP ARROW** key or **DOWN ARROW** key to view the status of the inputs.

11 Angle Rate

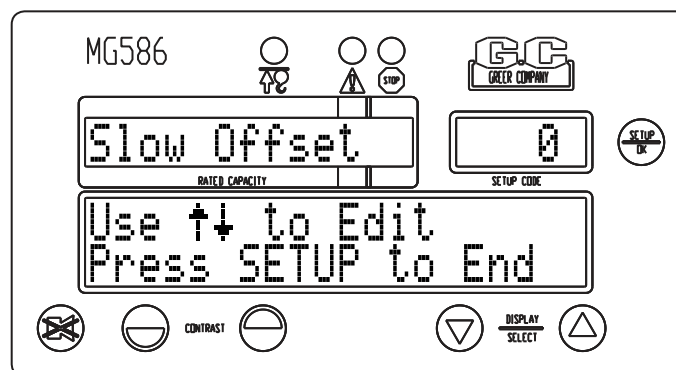
Often loads will change drastically when booming down. This routine compensates for this type of change. Two compensation speeds are allowed: "Slow" rate compensation and "Fast" rate compensation. The "Actual" rate of boom movement is also displayed in this routine.



1. Press the **SETUP/OK** key to enter the routine.
2. Press either the **UP ARROW** key or the **DOWN ARROW** key to select the desired compensation rate and then press the **SETUP/OK** key to edit.



3. Press either the **UP ARROW** key or the **DOWN ARROW** key to select the desired compensation rate and then press the **SETUP/OK** key to enter the compensation rate.



4. Press either the **UP ARROW** key or the **DOWN ARROW** key to select the next compensation rate and repeat as previously stated to enter the data.
5. Press the **CANCEL** key to exit the routine.

NOTE "Compensation ONLY" switches in when booming down. The word "BUMP" appearing on the screen indicates that the machine was handled in a rough manner and an additional bump filter was switched in to try and remove the pressure spikes.

Appendix A - Measurement Record

Use the space provided below to enter the necessary dimensions. Dimensions must be entered into the system in feet and tenths of a foot. Please make sure to convert any measurements if necessary before recording them.

Callout	Description	Measurement
Boom Pivot Dimensions		
L	The horizontal distance between the center of the boom pivot and the center of the boom hoist cylinder upper pivot.	
J	The vertical distance between the center of the boom pivot and the center of the boom hoist cylinder upper pivot. Note: If the Boom Pivot is above the boom hoist cylinder upper pivot the dimension is or negative.	
G	The horizontal distance between the center of the boom pivot and the center of the boom hoist cylinder lower pivot.	
H	The vertical distance between the center of the boom pivot and center of the boom hoist cylinder lower pivot.	
Winch Dimensions		
GO	The horizontal distance between the center of the front winch and the center of the boom pivot.	
G1	The horizontal distance between the center of the rear winch and the center of the boom pivot.	
HO	The vertical distance between the center of the front winch and the center of the boom pivot.	
H1	The vertical distance between the center of the rear winch and the center of the boom pivot.	
JO	The distance between the top sheave and the centerline of the boom pivot parallel to the horizontal boom plane.	
J1	The distance between the top sheave and the centerline of the boom pivot parallel to the horizontal boom plane.	
LO	The distance between the centerline of the boom pivot perpendicular to the horizontal boom plane and the center of the bottom sheave.	
L1	The distance between the centerline of the boom pivot perpendicular to the horizontal boom plane and the center of the bottom sheave.	
N	Swing Offset – The horizontal distance between the center of the boom pivot and the centerline of rotation.	

Callout	Description	Measurement
R	Sheave Radius – The distance between the center and the outside edge of the bottom sheave.	
Boom Hoist Cylinder Dimensions		
M	This is the distance measured around the outside of the cylinder rod, divided by 12.	
Span Dimensions		
T	This is the dimension between the center of the boom pivot and the center of the sheave with the boom fully extended.	
S	This is the distance between the center of the boom pivot and the center of the sheave with the boom fully retracted.	
Auxiliary Head Dimensions		
	Auxiliary Head Weight	
	Auxiliary Head Offset Angle	
	Auxiliary Head Center of Gravity	
	Auxiliary Head Length	
Stowed Jib Dimensions		
G	This is the distance between the center of the boom pivot and the center of gravity of the stowed jib.	

Radius/Moment Data (0,0)							
Boom Length	0.0 (fully retracted)						(fully extended)
S1							
S2							
WG							
WT							

Load Verification								
Test #	Displayed Length	Displayed Angle	Displayed Radius	Measured Radius	Radius Error	Displayed Load	Actual Load	Load Error

Additional Notes and Measurements

Use the space provided to write down any other important notes or measurements.

COMMENTS?
SUGGESTIONS?
CORRECTIONS?

Send your feedback to:

jmillette@greercompany.com

Please include your name, company, and crane type.



Consider Yourself Warned.™

Voice: 918-249-6125

Fax: 918-459-2501

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