

Gammill®

PLUS MACHINE MANUAL

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Plus™ Stitch Regulation

The Gammill Plus Control Center is a custom designed, state of the art stitch regulator system for quilting machines. The system provides two basic operational modes, Manual (constant motor speed) and Automatic (regulated stitch).

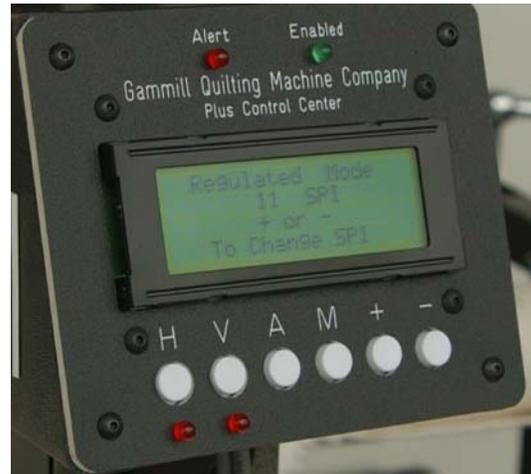
Some features of Plus Stitch Regulation are:

- Sensors and alerts for top thread break and/or low bobbin thread.
- Switch selectable ½ stitch and full stitch operations are available in either manual or automatic mode.
- Dual Liquid Crystal Display (LCD) units to operate the sewing head from either front or back.
- Dual channel locks (horizontal and vertical) that can be enabled or disabled while sewing.
- Needle position function to set the needle to stop in the up or down position.
- Safety feature in automatic mode whereby the motor shuts off automatically if the machine is not moved within five seconds.

Controls

A Plus Control Center display unit is located on both the front and back of the machine. Each consists of a 4-line LCD display, several push button switches, and one toggle switch on the left side. In addition to the display unit, there are two buttons on the ends of the machine handles. The left handle has the black Needle Position (NP) switch

and the right handle has the red Run/Stop (RS) switch.



The buttons on the front of the display unit include:

H	Enables or disables the Left/Right (horizontal) channel lock
V	Enables or disables the Front/Back (vertical) channel lock
A	Selects automatic (stitch regulation) mode
M	Selects manual (constant speed) mode
+	Increases stitches per inch or motor speed
-	Decreases stitches per inch or motor speed

A toggle switch on the left side of the display unit is for the needle positioner. Use this switch to select either the needle position (1/2 stitch) function or the single stitch (full stitch) function.

The right side handle switch is the **Run/Stop** button. It enables or disables automatic stitching mode or turns the motor on or off in manual mode.

The left side handle switch is the **Needle Position** switch. The function is determined by the setting of the toggle switch on the side of the display unit.



Indicators

Indicators are lights, sounds or messages that indicate the system status and include:

Alert	This is a red LED on the upper middle portion of the display unit. It is illuminated when low bobbin or thread breakage as been detected.
Enabled	This is a green LED on the middle upper portion of the display unit. It is illuminated when the stitch regulation function is activated.
Beeper	An audible beeper is sounded when first entering stitch regulation mode or when low bobbin or thread breakage has been detected.
Display	A four line, 20 character LCD is provided to communicate settings and other information to the operator.
Channel Lock LED	Below the (H) and (V) buttons are red LED's which are illuminated when the channel lock magnets are activated.

Stitch Regulation (Automatic Mode)

In this mode you will set the desired stitches per inch. The stitching does not start until you move the machine head. While stitching in this mode you may change the number of stitches per inch. You cannot switch from automatic mode to manual mode while stitching in either mode.

1. Press **A** to enter Automatic mode. The word "**Regulated**" is displayed on the control center.
2. Press the **+** (plus) or **-** (minus) button to increase or decrease the stitches per inch. You can press these keys while stitching as well to increase or decrease the stitches per inch as you sew.
3. To begin sewing, press and release the right handle switch. Immediately after releasing the switch, an audible beep sounds and the green LED is illuminated on the display unit. If the needle is positioned down, the needle will rise up out of the fabric. The display unit will warn you that automatic mode is enabled and sewing head movement will cause the sewing motor to run.
4. Move the sewing head to begin sewing. While in automatic mode you are free to speed up or slow down movement of the sewing head while still maintaining even stitch length, however, rapid speed changes should be avoided. Moving the machine rapidly or suddenly slowing the machine after rapid movement may result in a variation in stitch

length. Smooth machine movement will result in better quality stitching.

5. If you wish to increase or decrease the stitch length as you sew, simply press the **+** (plus) or **-** (minus) button while continuing to move the sewing head.
6. After sewing is complete, press and release the run/stop switch.
 - If the needle positioner was set in the down position before you started stitching, the needle will take a ½ stitch and remain down in the fabric.
 - If the needle positioner was set in the up position, it will stop in the up position.

Constant Speed (Manual Mode)

In this mode you set the motor speed then press the **Run/Stop** switch. This starts the motor running at a constant speed. You must coordinate the movement of the machine with the motor speed. To enter Manual Mode, press the **M** button. Set the motor speed by pressing the **+** (plus) or **-** (minus) to set the desired motor speed from 1 to 99% with **+** (plus) increasing the speed and **-** (minus) decreasing the speed. This speed can be adjusted as you sew as well.

To begin sewing, press and release the run/stop switch. The motor starts running immediately after it is turned on so you must be ready to coordinate the movement of the machine with start of the motor. Try to maintain a smooth, even movement of the sewing head which

gives you even stitch length. Slowing down produces smaller stitches and speeding up produces bigger stitches.

To stop sewing press and release the run/stop switch. Immediately after releasing the switch the motor stops. When the motor stops the needle returns to the position in which it was started.

Thread Break Detection

The Plus line of sewing heads includes a thread break sensor wheel. The top thread should be wrapped around this sensor wheel when threading the machine. In either automatic or constant speed mode, if the top thread breaks as you are sewing, the sensor no longer turns and a beeper sounds continuously until the run/stop switch is pressed. The words “Main Thread Breakage Detected” are displayed on the screen notifying you of a thread break.

To stop the beeps, press and release the run/stop switch. The thread break sensor will continue sensing a thread break during the next sewing cycle. To disable the thread break sensor, press the **M** button on the display unit. Sensing is then disabled until the machine is turned off.

Low Bobbin Sensing

The bobbin thread is used up at the same rate as the top thread. A bobbin usage gauge is included in the Plus line of quilting machines. This estimation is based on the bobbin being full and consistently wound. To obtain the most accurate bobbin usage you should clip the top

and bottom threads at the same time. If the top thread is cut and the bobbin thread is allowed to spool off when the machine is moved, the bobbin thread will run out before the system alerts you it is low.

When the bobbin gauge determines that the bobbin thread is low the low bobbin alert beeps continuously until the run/stop switch is pressed and released.

To turn off the bobbin sensor press the **M** button on the display. Bobbin sensing will then be disabled until the machine is turned off.

To Check Amount of Bobbin Thread Remaining

Press and hold the **M** button then press and hold the **A** button. Release the **M** button and then release the **A** button. The remaining value of the bobbin thread is displayed. If the value is low, you may wish to insert a full bobbin before continuing. You may wish to have a full bobbin before stitching the next row of an all-over design to avoid running out of bobbin in the middle of the row.

If you change the bobbin you will need to reset the bobbin counter by pressing the **+** (plus) button. If you do not change the bobbin press the **-** (minus) button to exit the bobbin counter without resetting it. The bobbin counter should be reset each time the bobbin is changed.

Needle Positioning

The needle position switch provides needle position control. A toggle switch on the side of the display unit selects needle position or single stitch mode. You may choose to take ½ stitches (needle position setting) or full stitches (single stitch setting).



To Position the Needle Up or Down

Flip the switch down to the **Needle Position** setting. Press and release the needle position switch. If the needle was positioned up, it takes a ½ stitch down. If the needle was positioned down, it takes a ½ stitch up.

Each time you stop stitching, the needle positions itself in this setting. To change this position simply press and release the left hand handle switch. There are times when you want the needle to remain in the fabric when stitching is stopped to prevent the needle from wobbling out of the stitch path. These times might include stitching in the ditch or using templates or rulers.

To Take a Single Stitch

Flip the switch up to the **Single Stitch** position.

Press and release the needle position switch. The needle takes a complete stitch returning to its original position.

Slow Stitching

To take a series of slow stitches, such as when securing threads, press and hold the needle position switch. If the toggle is set to **Needle Position** a series of half stitches are taken as the button is held down. If the toggle is set to **Single Stitch** a series of full stitches are taken as the button is held down.

Troubleshooting Encoder Problems

Checking Operation of Encoders

The proper operation of the encoders and encoder cables can be checked without operating the machine:

1. To enter Diagnostic Mode do the following:
 - a) Turn the power **OFF**.
 - b) Hold down the black, single stitch button and turn the power **ON**.
 - c) After a few seconds, release the button.
2. The top line of the diagnostic screen should read "encoder".
3. When either encoder wheel is turned, the word "encoder" should go from small letters to capital letters. This indicates proper operation of the encoder circuit.

4. If the word "encoder" is missing or does not change from small letters to capital letters, then further diagnostics is required.
5. If one encoder is working properly and the other is not working properly, then switch the plugs at the back of the machine.
6. If the problem has switched to the other encoder then the problem is either the encoder cable or the encoder. Most likely it would be the encoder cable.
7. If the problem is still with the "original" encoder then the problem most likely resides in the motherboard.
8. Exit diagnostic mode by turning the power **OFF** then **ON**.

Regulated Stitch Electrical Adjustments

After your Gammill Plus machine has been used awhile there is a possibility some of the electrical values may need to be adjusted slightly. Some indications that adjustments are needed include:

- Needle over rotates.
- Stitch length is different than setting indicates.
- Bobbin counter needs adjustment.
- Needle Up/Down speed needs adjustment.

To make these adjustments you need to enter set-up mode. This is done using the run/stop switch and the control center from either side of the machine. However, once you

enter set-up mode you need to make all the adjustments from the same side. While in set-up mode none of the new adjustment values can be tested. You will need to turn the power **OFF** then **ON** to save and test the new values.

To Enter Set-up Mode

1. If power is **ON**, turn it off. Press and hold the run/stop switch while turning on the power and continue holding down the run/stop switch for an additional two seconds after the power is turned on.
2. The display screen now shows the first of 17 functions that can be adjusted or selected. Adjustments to the displayed function are made by pressing + (plus) or – (minus).
3. Press and quickly release run/stop to advance to the next function. You can only advance to the next function and cannot go back to a preceding function. The last function, number 18, exits set-up.
4. There is no need to cycle through all 17 functions if you only want to change a few of them. However, in order to enter the new adjustment values into the system, you will need to advance to the next function (press run/stop). This can be compared to hitting **Enter** on your computer.

Each function in set-up mode is described below:

Needle Position Range

160 – 200

This number indicates the range of speeds available when adjusting Needle Up Speed (#2) and Needle Down Speed (#3) below.

Needle Up Speed

6 - 10

Adjusts the speed at which the needle rises up when the needle positioner is used. Settings for this function are very sensitive so adjustments should be no more than plus or minus 1. Additionally, movement of the needle bar is coordinated with that of the take-up lever. If the setting is too high, the needle and take-up lever will coast past their proper stopping points. The thread take-up lever should stop at the corner of the casting in its upward motion when machine is automatically positioning the needle upward. If the needle and/or take-up lever are stopping past the proper stopping point, press – (minus) once to slow down the needle up speed.

Needle Down Speed

6 – 10

Adjusts the speed at which the needle goes down when the needle positioner is used.

Single Stitch Range

160 – 200

This number indicates the range of speeds available when adjusting Single Stitch Speed (#5) and Single Stitch Time (#6) below.

Single Stitch Speed

6 - 10

Adjusts the speed the needle travels while making a complete stitch when in single stitch mode.

Single Stitch Time

Usually 110

Electrical value needed to allow position sensor time to travel far enough to lose the effect of the position stop switch so machine can complete a single stitch.

Time Out

Usually 02

When in Regulated Stitch Mode if machine is no longer being moved and if run switch is not turned off, the machine will turn itself off automatically after a few seconds.

Regulated Move Count

Always 01

Determines the sensitivity of movement signal supplied to motor with 1 being the most sensitive setting.

Eight Stitches per Inch

Usually 27

Electrical value normally used to achieve 8 stitches per inch. Note: 3 units = 1 stitch per inch. Example – if you go from 27 to 33 you would get 10 stitches per inch.

Nine Stitches per Inch

Usually 30

Electrical value normally used to achieve 9 stitches per inch.

Ten Stitches per Inch

Usually 33

Electrical value normally used to achieve 10 stitches per inch.

Eleven Stitches per Inch

Usually 36

Electrical value normally used to achieve 11 stitches per inch.

Twelve Stitches per Inch

Usually 39

Electrical value normally used to achieve 12 stitches per inch.

Auto Break Delay

Usually 06

In automatic mode, when the thread break sensor stops turning due to a thread break, this function sets the time delay before beeper and alert light are activated.

Manual Break Delay

Usually 04

In manual mode, when the thread break sensor stops turning due to a thread break, this function sets the time delay before beeper and alert light are activated.

Bobbin Count Enabled

Yes or No

If **No** is chosen, the bobbin counter is not active. If **Yes** is chosen, the bobbin counter is active. The Bobbin Multiplier (#16) below will need to be set for the type of thread used.

Bobbin Multiplier

Usually 15

The top thread is wrapped around the signal wheel. This causes the signal wheel to rotate as the thread is used. The number of revolutions of the signal wheel determines when the bobbin is running low. The bobbin multiplier entered is multiplied by 64 to determine when the low bobbin alert is activated. We have

determined that 15 x 64 is the most accurate setting when using average thread. If coarse thread is used, you should set the bobbin multiplier at 14 or 13. If fine thread is used you should try 16 or 17.

Exit Screen --This screen tells you that all new values are saved in memory and to turn the power **OFF** then **ON** to resume operations with the new values.

Reset Bobbin Count

You can check the value of the bobbin counter at any time. To access the Bobbin Count Screen Press **M** then **A**, release **M** then release **A**. The number of counts left, if any is displayed on the screen. Each time the top thread rotates the signal wheel; the computer lowers the total count by one number starting with the Bobbin Full Count (BFC).

Example: 64-62-62-61...

When BFC reaches 0 the Bobbin Full Multiplier (BFM) lowers by one number.

Example: 15-14-13-12...

Each time the BFM drops a number the BFC returns to 64 and starts counting down again. When the BFM count reaches 0 an audible alert is sounded and the red light flashes to alert you to check the bobbin thread amount.

Example:

64-63-62.....3-2-1, 14,
64-63-62... 3-2-1, 13....

Each time a full bobbin is inserted in the machine, the bobbin count screen should be accessed and **+** (plus) should be pressed to reset it back to the full count. Failure to reset bobbin count when full bobbin is installed will result in false alarms.

Bobbin count screen can be accessed at any time to check the number of counts remaining even though alerts have not been activated. Run/Stop and Needle Position switches will not operate while bobbin count screen is open. Touch **-** (minus) to exit screen and return to normal operation.

Motor Run-Time Clock

To read the built-in Run-Time Clock, press **M** on the display panel while turning on the power. Hold **M** for approximately two seconds to allow for run time clock to boot up. The hours and minutes shown represent the total time the motor on this machine has run.