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Figure 0.1 – Innova 18” ( Pinky) on adjustable frame

ABM International would like to thank you for the purchase of an Innova Long Arm Sewing Machine. ABM is confident that this machine will meet or exceed your expectations.

If at anytime you experience problems with your ABM machine we ask that you contact us - 24 hours a day by calling our service department at (281) 443-4440. We can help you solve the problem quickly, and correctly. Your calls, questions, and comments will in turn help us to perfect the quality of our products and services in the future.

Once again, we thank you for your purchase.

ABM International, Inc.

Joe Podolski  
Vice President  
Engineering Department

## **Section 1: Safety**

### **1.0 Safety Introduction**

ABM is dedicated to assuring your safe operation of the Innova quilting machine. This section will alert you to many precautions that you can take to help avoid unnecessary accidents. Though ABM cannot anticipate all actions that may create an unsafe environment and we urge you to be aware, and extremely careful when operating the Innova quilting machine.

It is imperative that the operating person of the Innova quilting machine read and understand the information in this manual before operating the machine.

### **1.1 Safety Policy Statement**

The conservation of the assets of any company, which include the buildings, equipment, supplies and inventories as well as personnel, must be and is the responsibility of all levels of management. The purpose of a personnel and property conservation program is to insure that all phases of management recognize that personnel and property conservation are both inseparable parts of a company's objective...to produce quality products at the lowest possible cost.

Safety of personnel in every aspect must be of first consideration. The implementation of a conservation program will eliminate human suffering and effectively lower the direct and indirect costs resulting from employee injury. It will substantially reduce the exposure and probability of damage and / or loss of a company's physical assets.

### **1.2 Safety Practices**

The safety factors must be observed to ensure safe operation of the Innova .

1. Read and understand the operating instructions of the Innova before operating.
2. Use extreme caution when working around the Innova electrical controls.
3. Keep hands or other body parts away from the moving parts of the Innova.
4. Wear appropriate personal safety protection.
5. Stop the Innova immediately at any sign of malfunction or danger.
6. Never lean on the Innova Quilting machine.
7. Do not use the Innova quilting machine as leverage to lift yourself off a chair.
8. Do not crawl under or into the Innova for any reason during the operation of the machine.
9. Do not reach into the Innova at any time during the operation of the machine.
10. Do not climb, walk, or stand on the Innova at any time.
11. Do not tamper with factory installed guards and or safety devices.
12. Never operate machinery without all ABM installed guards and safety devices intact, and in working order.
13. Before starting the Innova, ensure that no loose tools, bars or parts are lying in or on any part of the machine.
14. Proper fire fighting equipment should be kept in good operating condition and kept near in the event of fire.
15. Do not wear loose clothing or jewelry when operating the Innova.
16. Always keep hair from coming in contact with moving parts.

## **SECTION 2.0 – Machine Setup**

The Innova ships fully tested ready to operate. As a result, this manual provides a section on machine setup so that you can install the machine. Please read this manual in its entirety and follow all ABM instructions, especially the inspections. Total setup time will take approximately 1 hour.

### **SETUP INSTRUCTIONS:**

**INSPECTION #1:** Upon receipt of the machine, check to ensure that there is no visible damage. Figure 0.1 and the front cover of this manual are enough for this inspection. **Note: that some components may be in different locations depending on the version of the machine.**

Determine the location in your facility for the quilting machine. Once a final position has been determined for the machine, plug it into your 110 volt receptacle, coil any excess cable and wire tie it to the table of the machine, which will reduce the risk of a tripping hazard.

The machine comes equipped with a 110V plug, and should be plugged directly into the wall receptacle or a surge protector (not supplied). ABM does not recommend the use of any type of extension cord to power the machine. As with any machine, power should be run properly through approved ducting with proper termination. You may connect the power to the machine at this time.

**INSPECTION #2:** Will confirm that the electronics of the Innova long arm quilting machine are functioning properly.



**WARNING: ELECTRICAL SHOCK HAZARD. NEVER ATTEMPT TO WORK ON OR OPERATE THE MACHINE WHILE THE ELECTRICAL COVERS ARE REMOVED. WHENEVER REMOVING THE ELECTRICAL COVERS PLEASE BE CERTAIN TO TURN-OFF THE MACHINE AND UNPLUG THE POWER RECEPTICAL.**

Upon power up, the PLC should power up and show up on the LCD. If this does not occur, check for incoming voltage at the outlet.

**WARNING – WHEN OPERATING THE MACHINE, YOU MUST ENSURE THAT THERE ARE NO LOOSE ITEMS SUCH AS TOOLS, FOOD, DRINKS, ETC. ON THE MACHINE AND THAT ALL PERSONNEL ARE CLEAR OF THE MACHINE.**

**Final Test:**

Inspect the front of the machine and ensure that the sewhead is free of obstructions. Upon power up the LCD will read UP or DN and display a speed.

Step 1: Press and release the (Red) left hand button and the needle will move to the up position.

Step 2: Press and release the (Red) left hand button again and the needle will move to the down position.

Step 3: Press and release the (Green) right hand button and the sewhead will start to run

Step 4: Press and hold the (Green) right hand button and the sewhead will increase sewing speed.

Step 5: Press and hold the (Red) left hand button and the sewhead will decrease sewing speed.

Step 6: Press and release the (Green) right hand button again and the sewhead will stop.

Setup and inspection is now complete.

**SECTION 3.0 – Machine Operation**

This section will discuss how to properly use the Innova 1018 and 1026 to fulfill all of your quilting needs.

**3.1 Rotating the Sewing Head**

ABM's has equipped the Innova with an industry "exclusive" rotating sewhead for ease of material, head, and roller removal, as well as ease of sewing machine maintenance. To properly rotate the head, follow these easy steps:

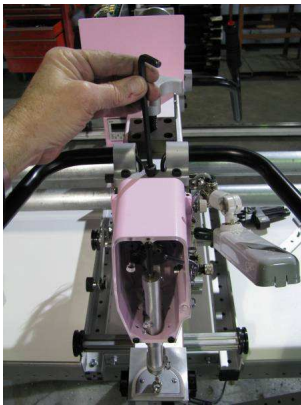


Figure 3.1 – Loosen Lock Screw

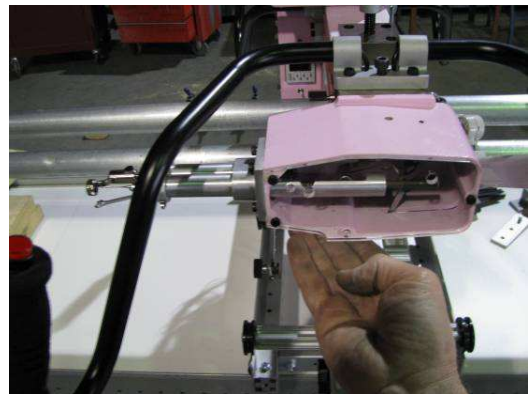


Figure 3.12 – Continue holding lever and rotate

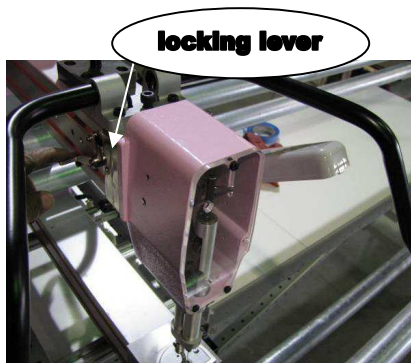


Figure 3.11 – Depress Locking Lever.

**WARNING – DEPRESSING THE LOCKING LEVER PAST THE SECOND GROOVE ON THE SIDE OF THE BEAM MAY DAMAGE THE MACHINE.**

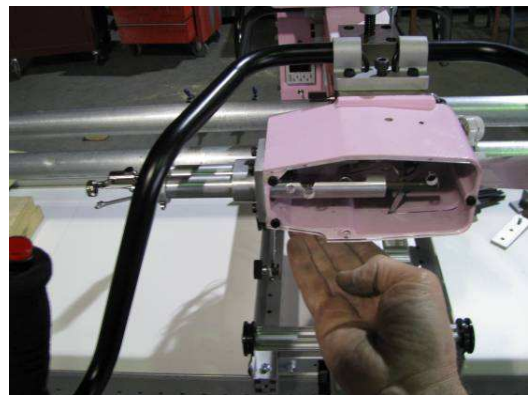


Figure 3.13 – Release lever and finish rotation

### 3.2 Rotating the Sewing Head Back

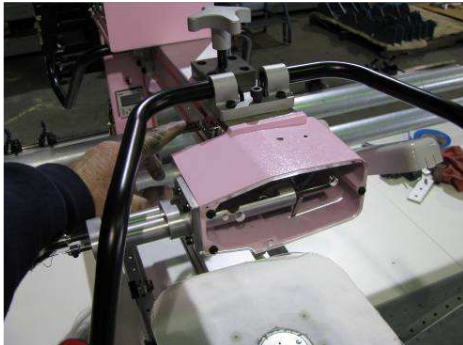


Figure 3.20 – Depress Locking Lever



Figure 3.23 – Press on the needle bar gently to center needle in hole



Figure 3.21 – Continue holding lever and rotate until the head locks

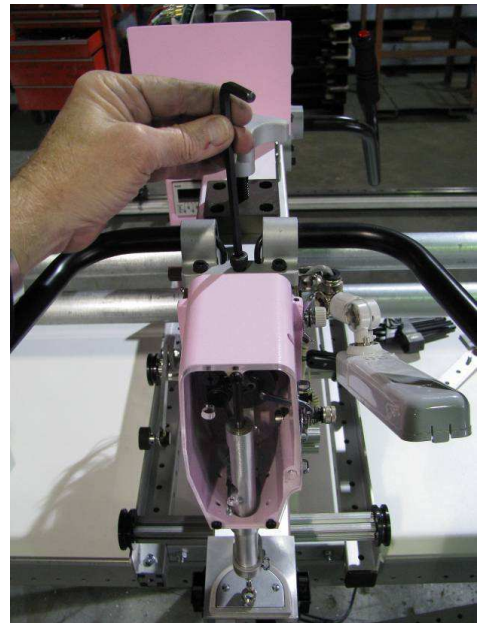


Figure 3.24 – Turn locking screw

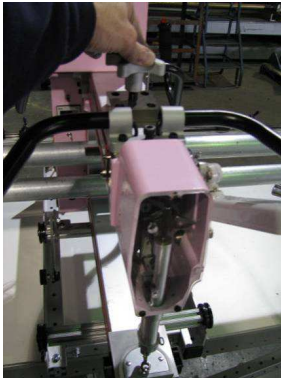


Figure 3.22 – Rotate hand wheel until needle nears hole in plate



### 3.3 Installing the Extension Plate

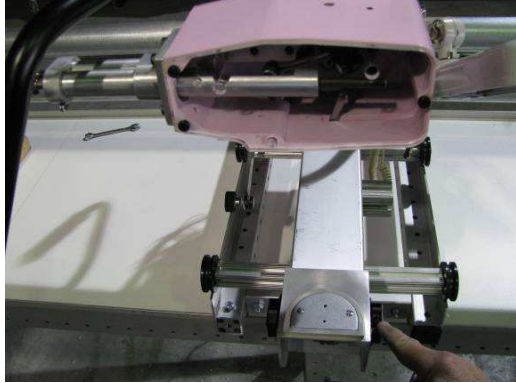


Figure 3.30 – Rotate the head



Figure 3.33 – Press plate down firmly

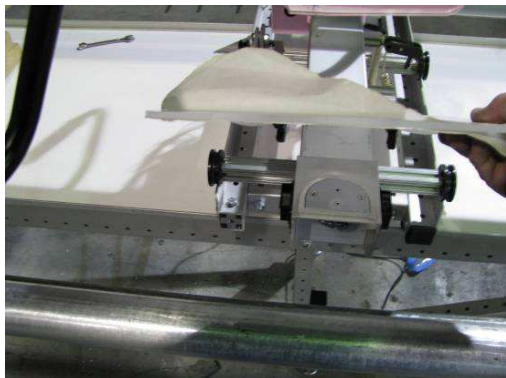


Figure 3.31 – Position plate over latches

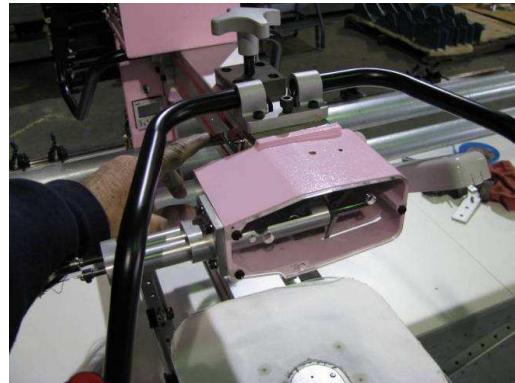


Figure 3.34 – Rotate the head and follow locking procedures



Figure 3.32 – Remove paper backing

### 3.4 THREADING THE SEWING HEAD

1. Pull thread from cone

2. Pass thread through upper thread guide on motor cover.

3. Pass thread through upper hole of thread post. Thread should go through the hole from the right to the left.

4. Bring thread around the post and back into the bottom hole of thread post. Thread should go through the hole from right to left.

5. Pass thread through the upper thread guide of the pre-tension.

6. Bring the thread clockwise around the pre-tension discs and pass through the lower thread guide hole of the pre-tension.

**NOTE: DO NOT WRAP THE THREAD COMPLETELY AROUND THE DISC. THE THREAD SHOULD TRAVEL FROM THE TOP HOLE TO THE BOTTOM HOLE AND PASS THROUGH THE DISCS ON THE RIGHT SIDE ONLY.**

7. Pass the thread through thread guide

8. Wrap the thread completely around the rotary tension assembly twice - clockwise. Pass thread over check spring.  
**NOTE: OIL FELTS ON ROTARY TENSION TO ENSURE SMOOTH MOVEMENT.**

9. Pass the thread through thread guide

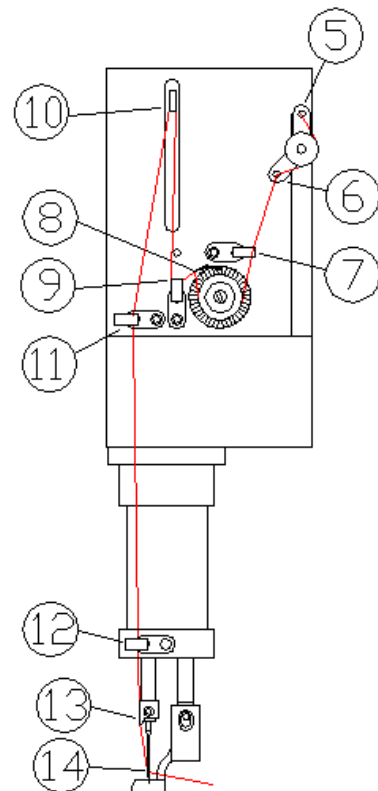
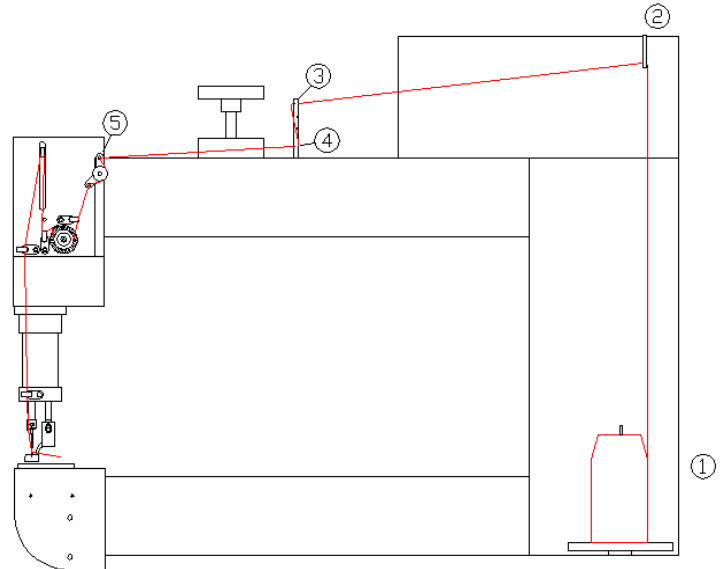
10. Pass the thread through the take-up finger. Make sure thread runs from right to left.

11. Pass thread through thread guide

12. Pass thread through thread guide at the bottom of the needle bar bushing.

13. Pass the thread through the needle bar thread guide located on the end of the needle bar.

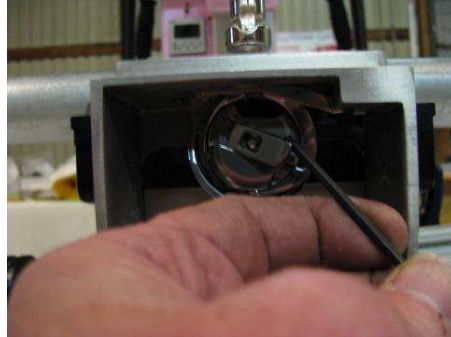
14. Insert thread through the eye of the needle from left to right. Pull thread to check for proper threading. As the thread is pulled through the needle, the check spring should move and thread should pull from the cone.



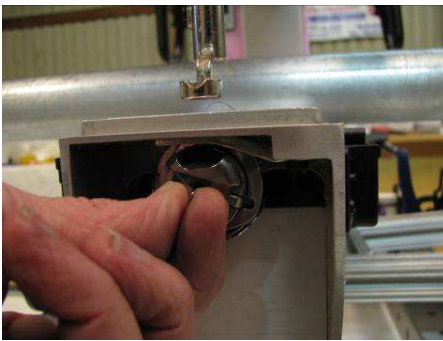
### 3.5 Changing the Bobbin



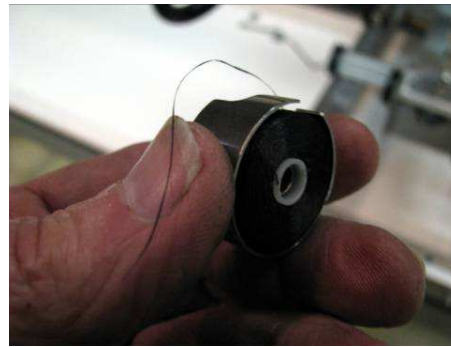
Large Bobbin- (M) -



Release Latch



Pull the release Latch and remove the bobbin case



Remove the old bobbin and press in the new bobbin. Inset the bobbin making sure it turns clockwise when the thread is pulled (viewed from the bobbin side). Pull the loose thread up and under the guide into the case. Route the thread under the tension spring, and through the guide hole. Place the loose thread through the case slot.

**Now press the case back into the hook and listen for the latch clicking into place. You are now ready to begin sewing.**

### 3.6 Controller Operations

The Innova is equipped with a machine controller that handles all of the electronic functions of the machine. The controller performs the following tasks:

- stop and start the sewing motor
- maintain and adjust sewing speed
- perform needle positioning - up and down
- display sewing speed
- display electronic error messages in case of failure
- maintain stitches per inch (if equipped)
- deactivation of stitch regulation if idle for more than 20 seconds (if equipped)

When the power switch is turned ON, the machine controller defaults to the main screen (Figure 3.60). From this screen, the user can turn stitch regulation ON or OFF (if equipped), adjust needle stop position UP or DN and adjust the sewing speed when in manual sewing mode.

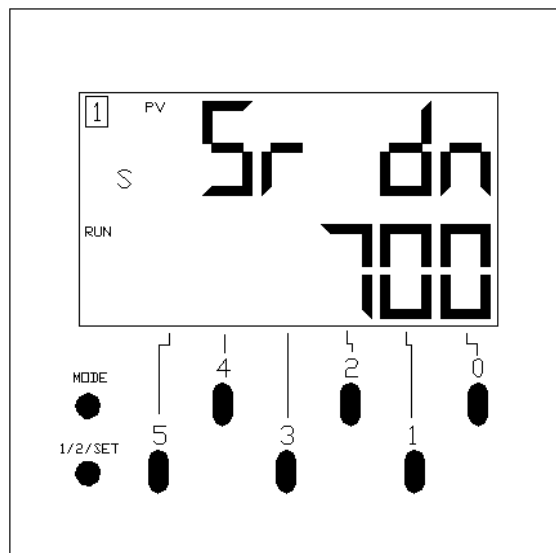


Figure 3.60 – Main Screen

The needle stop position is toggled between up and down by pressing the button marked “4”. The upper right section of the screen displays the current needle stop position “UP” or “dn” (down).

The stitch regulator, if equipped, is turned ON and OFF by pressing the button marked “5”. When stitch regulation is active, “Sr” will appear on the display. When stitch regulation is turned OFF, the “Sr” will not be visible and manual sewing mode is active.

Sewing speed in manual mode (SR off), can also be adjusted on the front of the control panel by using the buttons marked 0,1,2, and 3. Each time the button is pressed, the digit which corresponds to that button will increase by one. The 0 button adjusts speed from 0-9 in single digit increments. The 1 button adjusts speed from 10-90 in increments of 10. The 2 button adjusts speed from 100-900 in increments of 100 and the 3 button adjusts speed from 1000-3000 in increments of 1000. Any value entered that is less than 75 or greater than 3000 will revert to the closest default value, 75 or 3000.

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**ABM INTERNATIONAL, INC.**

The “mode” button allows the user to navigate through various screens that provided technical assistance as well as stitch regulation adjustment. The “mode” button may also be used to lock out the controller so that no modifications can be made. This may be helpful when allowing inexperienced users to use the machine unattended. Pressing and holding the “mode” button for more than 2 seconds will put the controller into “LOCK” mode. The word “LOCK” will be visible on the screen when enabled. To disable the lock, press and hold the “mode” button for more than 2 seconds. The word “LOCK” will turn off when the mode has been canceled.

Before setting the stitch regulator the user should understand the basics of the system. Stitch regulation is used to maintain stitches per inch during quilting. When in regulated mode the machine will automatically accelerate and decelerate based on the quilting operator’s movements. This occurs when the encoders mounted on the tracks send digital pulses to the controller which in turn increases and decreases the voltage to the motor running the sewhead. The number of stitches per inch is fully adjustable from 5-15 stitches per inch. We recommend that you set your machine between 8 and 12 stitches per inch to achieve the best results. The following steps will walk you through setting the stitches per inch, adjusting minimum stitch speed and turning stitch regulation (SR) on and off.

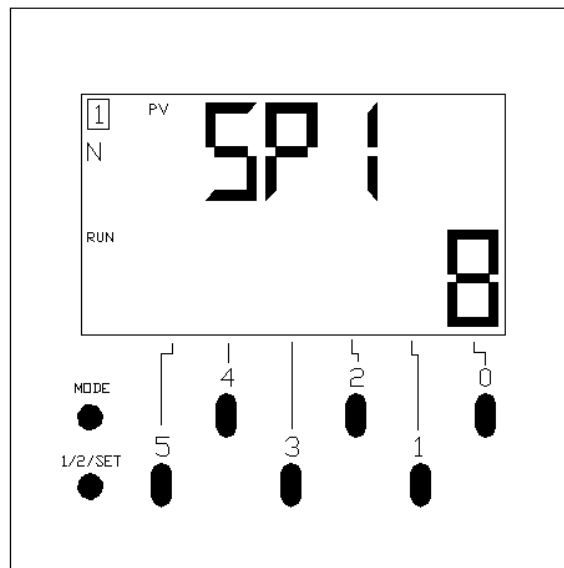


Figure 3.61 – Stitches per inch screen

From the main screen (Figure 3.60), press the “mode” button three times. The stitches per inch screen (Figure 3.61) will now be visible. From this screen, the user can adjust the stitches per inch between 5 and 15. Use buttons 0 and 1 to modify the value. Pressing the 0 button will adjust the SPI value between 0-9 in increments of 1. The 1 button will adjust the value between 0-90 in increments of 10 (NOTE: 15 is the maximum value allowed). When the value is modified, it will begin to flash. To store the modified value in memory, press and hold the “1/2/SET” button until the value stops flashing.

While in the stitches per inch screen (Figure 3.61), the operator may adjust the stitch regulator minimum speed (SrSPD). Quickly press and release the “1/2/SET” button. The stitch regulation minimum speed screen (Figure 3.62) will now be displayed.

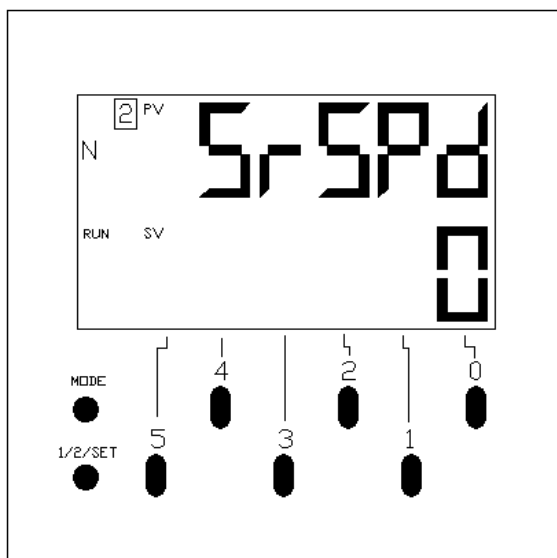


Figure 3.62 – Stitch regulation minimum sew speed screen

The SrSPD value controls the speed at which the quilting machine motor runs when the head is at rest (no movement). A value of zero would mean the head stops sewing when the operator stops moving the machine. A value greater than zero, between 75 and 500, means the sewhead runs at that set speed when the machine is at rest (no movement). ABM prefers to not use an SrSPD setting (factory set to 0). SrSPD has been used in the industry to combat large stitches when accelerating the machine from a stand still or in sharp corners. If the SrSPD is set too high, the user may notice a significant amount of very small stitches in sharp corners and starts and stops. Adjusting the SrSPD to a lower setting may help solve this problem. Again, the 0,1, and 2 buttons are used to set the value between 0 (off) and 75-500. The value will flash when it is being modified. Press and hold the “1/2/SET” button until the value stops flashing. This will lock the new value into memory. Quickly pressing and releasing the “1/2/SET” button will toggle between the SPI menu and SrSPD menu. Pressing the “mode” button once in either screen will bring the user back to the main screen (Figure 3.60).

Once all of the values are adjusted, the user may start stitch regulation. Press and release the green start button on the handle bar. If SrSPD is set to zero, the machine starts to sew only when the head is moved, maintaining the stitches per inch set. If SrSPD is set to some value other than zero, the machine will start to sew at the set speed. Stitching speed will only increase if the machine is moved fast enough to require a speed increase to hold the proper stitches per inch. (NOTE: Setting the SrSPD too high may result in poor stitches per inch consistency).

Press and release the green button again to stop stitch regulation. This will allow the user to move the quilting machine to a new position without sewing. The button marked “5” can be used to turn stitch regulation on and off. If “Sr” is not visible on the main screen, the machine is in manual sewing mode.

### **3.7 Quick Reference – manual and stitch regulated modes**

#### **Operating in manual mode –**

Step 1: Quickly pressing and releasing the (Red) left hand button will toggle the machine between needle up and down position.

Step 2: Press and release the (Green) right hand button and the sewhead will start to run

Step 3: Press and hold the (Green) right hand button and the sewhead will increase sewing speed.

Step 4: Press and hold the (Red) left hand button and the sewhead will decrease sewing speed.

Step 5: Press and release the (Green) right hand button again and the sewhead will stop.

#### **Operating in stitch regulated mode –**

Step 1: Quickly pressing and releasing the (Red) left hand button will toggle the machine between needle up and down.

Step 2: Press the #5 button on the control panel and stitch regulation (SR) is activated. The main screen of the display will show “Sr” when stitch regulation is activated.

Step 3: Press and release the (Green) right hand button and the sewhead will start to run

Step 4: The faster you move the machine the faster it will run.

Step 5: The slower you move the machine the slower it will run.

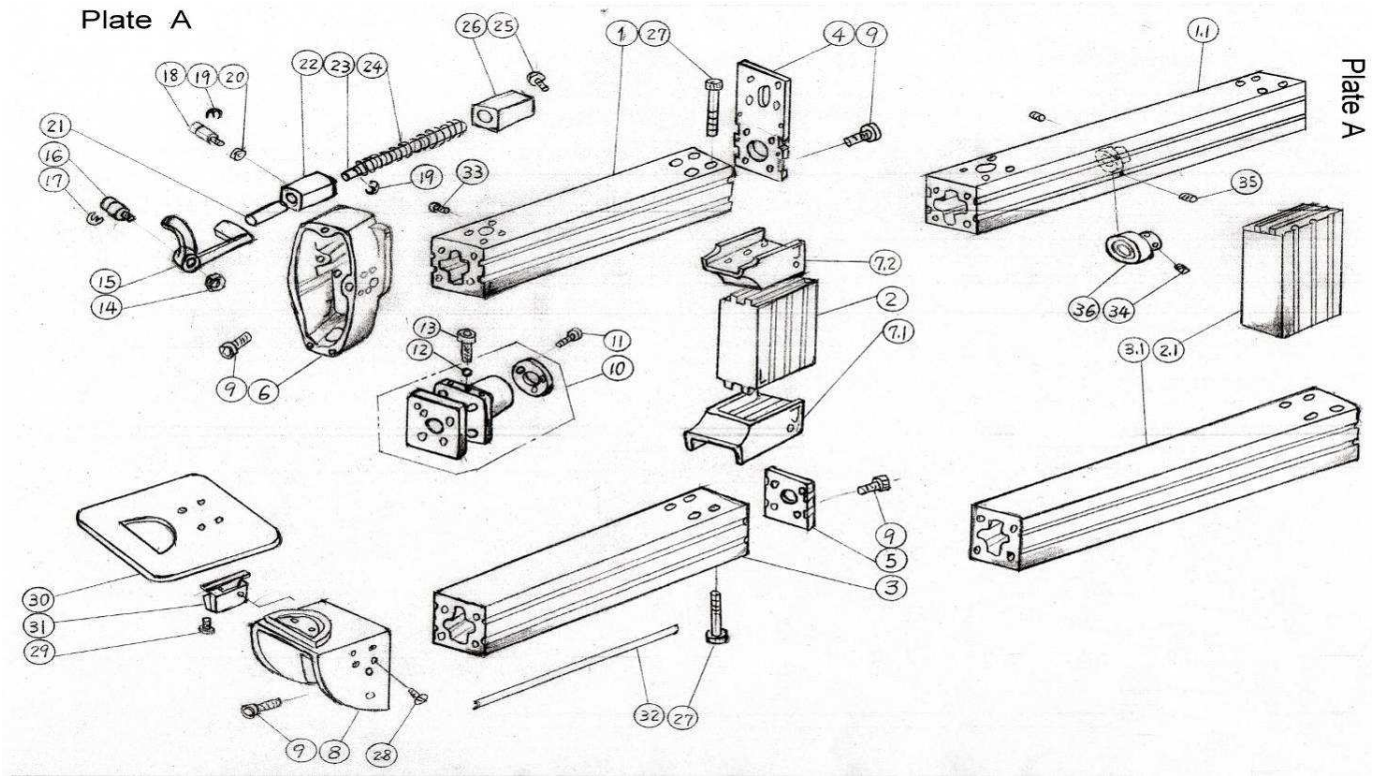
Step 6: Press and release the (Green) right hand button again and the sewhead will stop.

Step 7: Press the #5 button on the control panel and stitch regulation mode will turn off.

**SECTION 4.0 – Parts List**

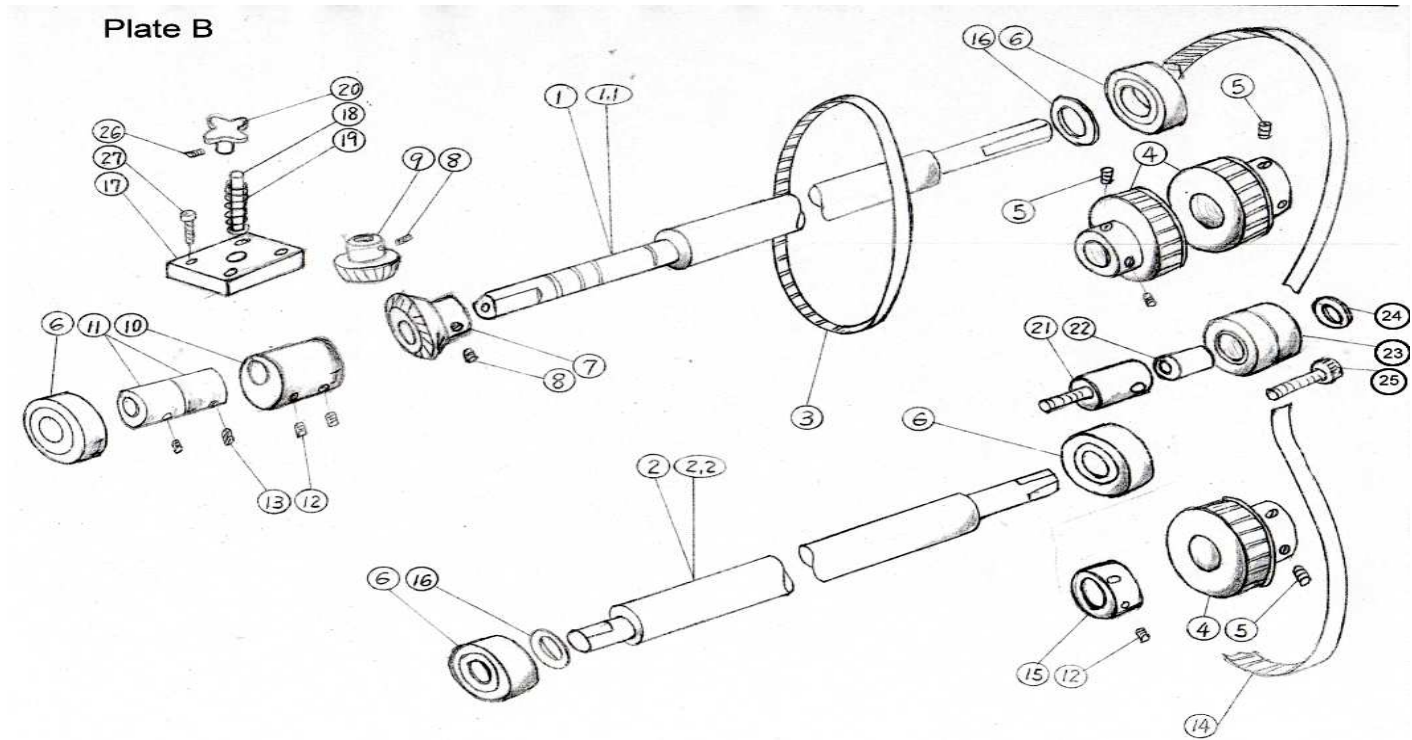
This section lists the ABM part numbers needed to order any part on the Innova 1018 and 1026. The section is divided into four drawings with the item description and ABM part number for all the components needed to completely rebuild a machine. ABM carries all of the components below in stock at all times. Any order placed before 6:00 P.M. CST can be shipped the same day for next day delivery. The parts/service department can be reached at (281)443-4440 or (888)99-QUILT. Buying the correct parts from ABM will ensure that your machines will operate their best. Buying parts from sources other than ABM will void your warranty.





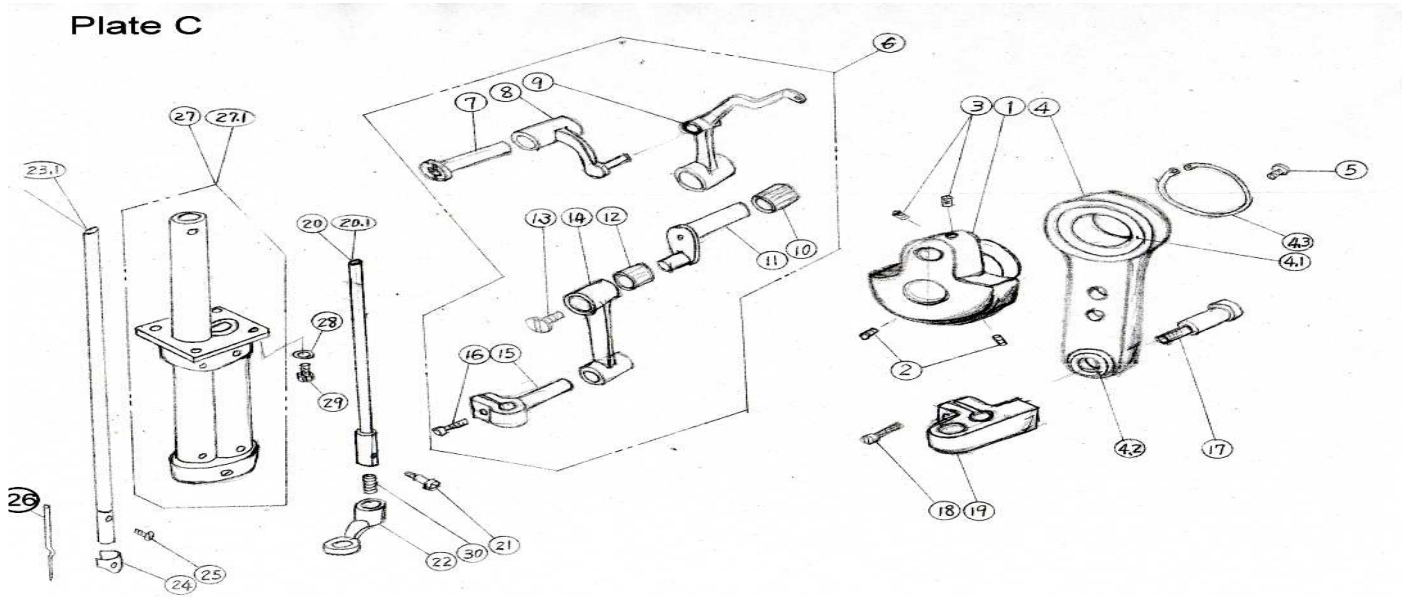
**1018-A00 Innova 18" (Pinky)**

No	Parts No	Description	Amt.	No	Parts No	Description	Amt.
1	1018-A01	Upper Profile 18"	1	20	BB-MR74ZZ	bearing	2
2	1018-A02	Vertical Profile	1	21	1018-A21	Shaft	1
3	1018-A03	Lower Profile 18"	1	22	1018-A22	Bushing	1
4	1018-A04	Backing Plate	1	23	1018-A23	Shaft	1
5	1018-A05	Backing Plate	1	24	1018-A24	Spring	1
6	1018-A06	Sewhead Casting Lwr	1	25	SR-4374006	Screw	1
7.1	1018-A071	Corner Casting Upr	1	26	1018-A26	Bushing	1
7.2	1018-A072	Corner Casting	1	27	SC-79418100	Screw5/16-18UNCX100L	8
8	1018-A08	Base Casting	1	28	SR-3174404	Screw	4
9	SC-7941819	Screw5/16-18UNCX19L	15	29	SR-4374008	Screw	4
10	1018-A10A	Spacer	(1)	30	1018-A30	Table	1
11	SC-40712	Screw M4X0.7X12L	3	31	1018-A31	Table latch	(2)
12	1018-A12	Ball φ 6.35	1	32	1018-A32	Shaft	(1)
13	1018-A13	Bolt	1	33	SR-4374006	Screw	1
14	HN-43740	Hex. Nut SM11/64X40	1	34	SD-607506	Screw M6X0.75X6L (26" )	2
15	1018-A15	Lever	1	35	SD-4374005	Screw SM11X64X40 (26" )	4
16	1018-A16	Pin	1	36	1026-C36A	Bearing 26"	(1)
17	ET-05	Clip E5	1	1.1	1026-A01	Upper profile 26"	1
18	1018-A18	Pin	1	2.1	1026-A02	Vertical profile 26"	1
19	ET-03	Clip E3	3	3.1	1026-A03	Lower Profile 26"	1



**1018-B00 Innova 18" ( Pinky)**

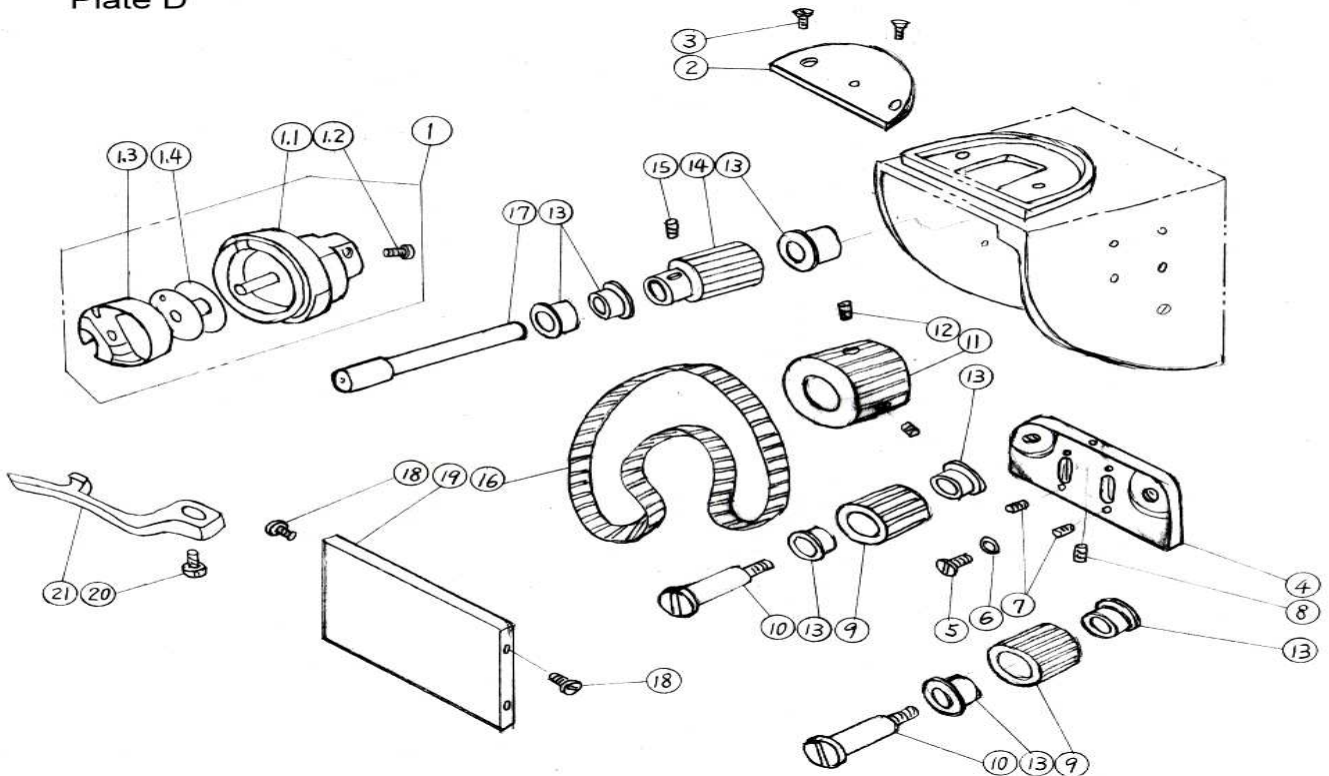
No	Parts No	Description	Amt.	No	Parts No	Description	Amt.
1	1018-B01	Upper Drive Shaft	1	16	WP-1271910	Spacer	1
2	1018-B02	Lower Drive Shaft	1	17	1018-B17	Hand Wheel Plate	1
3	1018-B03	Timing belt	1	18	1018-B18	Pin	1
4	1018-B04	Lower Pulley	4	19	1018-B19	Spring	1
5	SD-4763206	Screw 3/16-32NUF	8	20	1018-B20	Hand Wheel	1
6	BB-R8ZZ	Bearing	1	21	1018-B21	Shaft	1
7	1018-B07	Gear	1	22	1018-B22	Bushing	1
8	SD-6354006	Screw	2	23	BB-R8ZZ	Bearing	2
9	1018-B09	Gear	1	24	WP-081915	Spacer	1
10	1018-B10	Eccentric	1	25	SC-7941865	Screw 5/16-18UNC	1
11	1018-B11	Bushing	2	26	SD-607506	Screw M6X0.75X6L	1
12	SD-607506	Screw M6X0.75X6L	2	27	SC-6352830	Screw 1/4-28UNF	4
13	SD-50805	Screw M5X0.8X5L	2	1.1	1026-B01	Upper Drive Shaft 26"	1
14	1018-B14	Timing belt	1	2.2	1026-B02	Lower Drive Shaft 26"	1
15	1018-B15	Collar	1				



**1018-C00 Innova 18" (Pinky)**

No	Parts No	Description	Amt.	No	Parts No	Description	Amt.
1	1018-C01	Counterweight	1	16	SR-3574006	Screw	1
2	SD-607512	Screw M6X0.75	2	17	1018-D10	Presser Bar Pin	1
3	SD-607506	Screw M6X0.75	2	18	SC-40712	Screw M4X0.7X12L	1
4	1018-C04	Crank Rod	(1)	19	1018-C19	Presser Bar Bracket	1
4.1	BB-6805ZZ	Bearing	1	20	1018-C20A	Presser bar	(1)
4.2	BB-FR4ZZ	Bearing	2	21	1018-C21	Screw	1
4.3	CS-25	Clip	1	22	1018-C22	Hopping Foot	1
5	SR-4374007	Screw	1	23	1018-C23A	Needle Bar	(1)
6	1018-C06A	Take Up Assembly	(1)	24	1018-C24	Needle Bar Thread Guide	1
7	1018-C07	Pin	1	25	SR-3174404	Screw	1
8	1018-C08	Pin Lever	1	26	1018-C26	Needle #16 (DPX5)	1
9	1018-C09	Take Up Lever	1	27	1018-C27A	Needle Bar Frame	(1)
10	BN-8128	Bearing	1	28	WP-051008	Washer	4
11	1018-C11	Take Up Crank	1	29	SC-4763212	Screw 3/16-32UNF	4
12	BN-8128	Bearing	1	20.1	1026-C20A	Presser Bar 26"	(1)
13	1018-C13	Screw	1	23.1	1026-C23A	Needle Bar 26"	(1)
14	1018-C14	Take Up Main Body	1	27.1	1026-C27A	Needle Bar Frame 26"	(1)
15	1018-C15	Needle Bar Holder	1	30	1026-C28	Presser bar spring	1

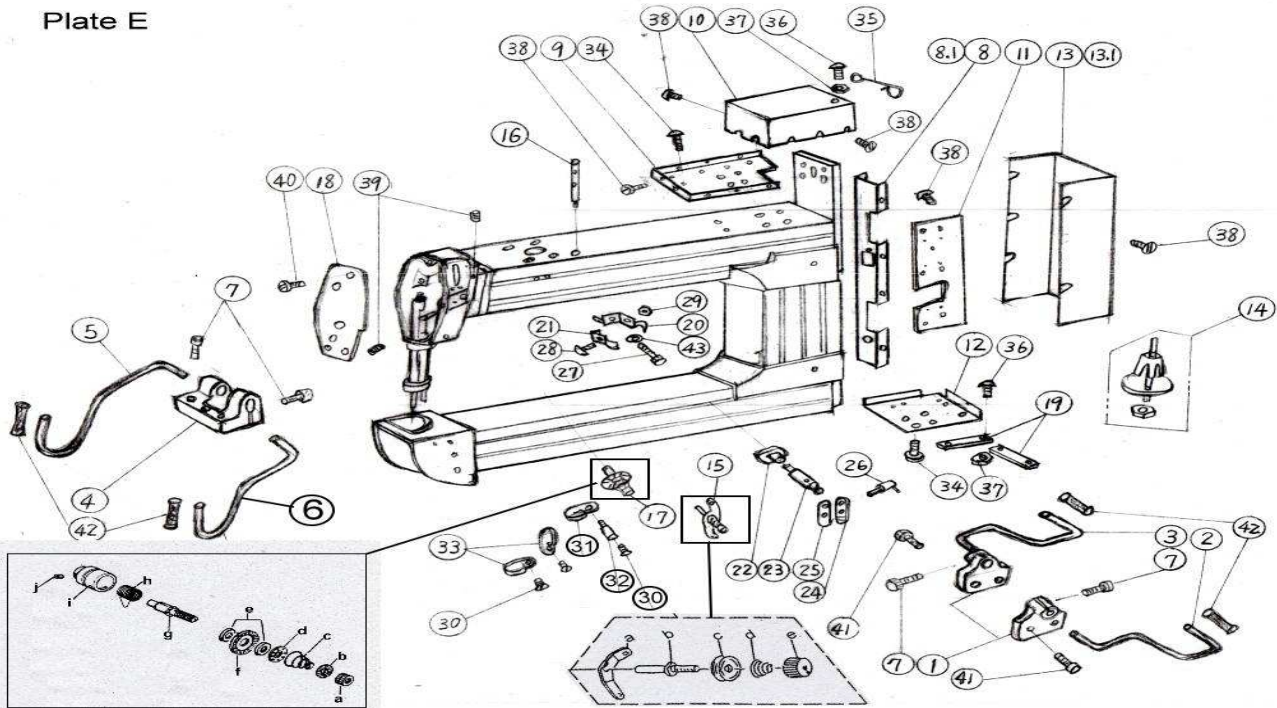
**Plate D**



**1018-D00 Innova 18" (Pinky)**

No	Parts No	Description	Amt.	No	Parts No	Description	Amt.
1	1018-D01A	Hook Assembly	1	10	1018-D10	Screw	2
1.1	1018-D011	Rotating Hook(18033C)	1	11	1018-D11	Hook Drive Gear	1
1.2	1018-D012	Screw	1	12	SD-4374005	Screw	2
1.3	1018-D013	Bobbin Case (SC33-LD)	1	13	BB-FR4ZZ	Bearing	7
1.4	1018-D014	Bobbin (18034AL)	1	14	1018-D14	Gear	1
2	1018-D02	Needle Plate	1	15	SD-4374004	Screw	1
3	SJ-4374009	Screw	2	16	1018-D16	Timing Belt	1
4	1018-D04	Backing Plate	1	17	1018-D17	Shaft	1
5	SK-4763210	Screw	2	18	SR-4374008	Screw	4
6	WP-051008	Washer	2	19	1018-D19	Plate	1
7	SD-3574006	Screw	4	20	SR-4374010	Screw	1
8	SD-4763206	Screw	1	21	1018-D21	Position Finger	1
9	1018-D09	Hook Drive Gear	2				

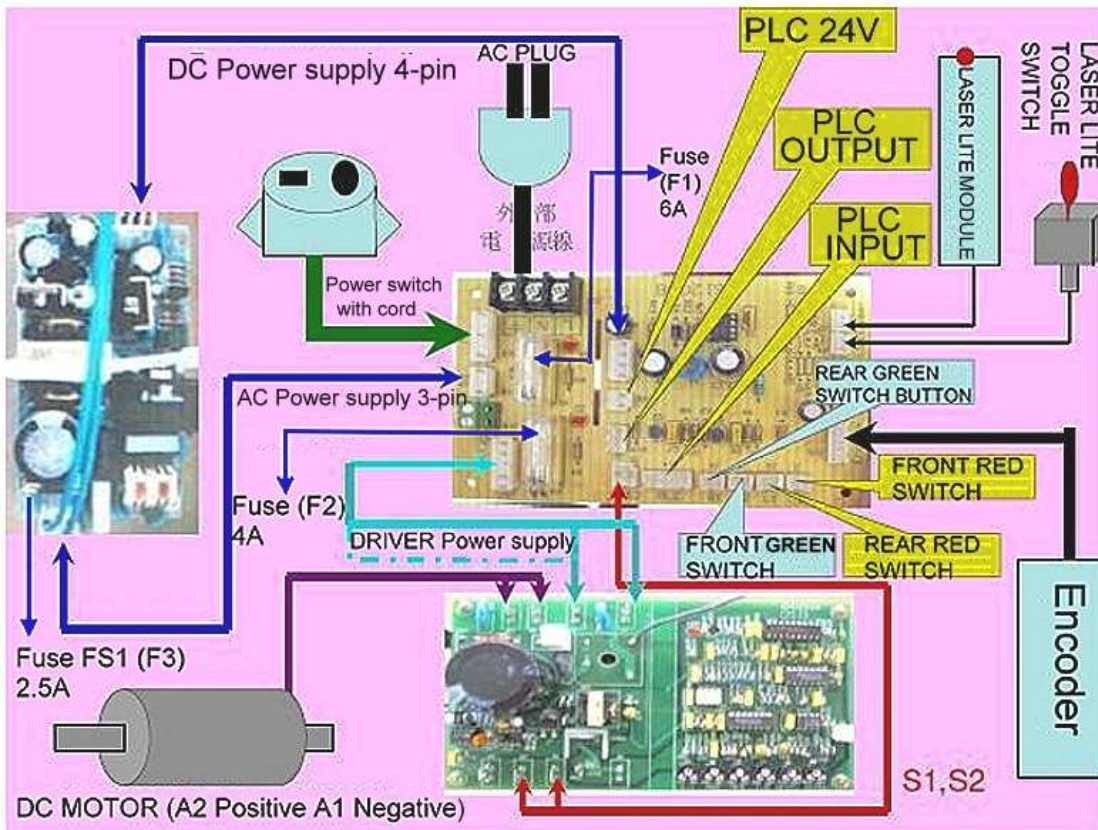
Plate E



**1018-E00 Innova 18" (Pinky)**

No	Parts No	Description	Amt	No	Parts No	Description	Amt.
1	1018-E01	Handle Bar Support Plate Rear	2	24	1018-E24	Clamp (A)	1
2	1018-E02	(L1) Handle Bar (red)	1	25	1018-E25	Clamp(B)	1
3	1018-E03	(R1) Handle Bar (green)	1	26	1018-E26	Pin	1
4	1018-E04	Handle Bar Support Bracket Front	1	27	SC-6352832	Screw 1/4-28UNFX32L	1
5	1018-E05	(L2) Handle Bar (red)	1	28	SI-7941819	Screw 5/16-18UNCX19L	1
6	1018-E06	(R2) Handle Bar (green)	1	29	HN-79418	Nut 5/16-18UNC	1
7	SC-061020	SCREW M6X1X20	20	30	SJ-3564007	Screw SM9/64X40X7L	3
8	1018-E08	PLC Support Bracket	1	31	1018-E31	Thread Guide	1
9	1018-E09	Motor Support Bracket	1	32	1018-E32	Screw	1
10	1018-E10	Motor Cover	1	33	1018-E33	Thread Guide	2
11	1018-E11	PLC Support Plate	1	34	SQ-6352832	Screw 1/4-28UNFX31L	6
12	1018-E12	Lower Support Plate	1	35	1018-E35	Thread Guide	1
13	1018-E13	Rear Cover	1	36	SQ-6352816	Screw 1/4-28UNFX16L	2
14	1018-E14	Thread Stand	1	37	HN-63528	Washer 1/4-28UNF	2
15	1018-E15	Thread Guide Assemble	1	38	SR-4374008	Screw SM11/64X40X8L	20
16	1018-E16	Thread Guide Pin	1	39	SD-4763206	Screw 3/16-32UNFX6L	2
17	1018-E17	Tension Complete	1	40	SR-4374010	Screw SM11/64X40X10L	3
18	1018-E18	Front Cover	1	41	SC-6352832	Screw 1/4-28UNFX32L	4
19	1018-E19	Locking Plate	2	42	1018-E42	Grip	4
20	1018-E20	Bracket(A)	1	43	WP-081915	Washer	1
21	1018-E21	Plate (B)	1	8.1	1026-E08	PLC Support Bracket 26"	1
22	1018-E22	Nut	1	13.1	1026-E13	Rear Cover 26"	1
23	1018-E23	Pin	1				

Wiring Diagrams:



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