



WORKHORSE

550SM

Installation Instructions

Welcome to your Workhorse Servo Motor. We know you're going to love this quiet, energy-saving, durable motor with its great features like fully adjustable speed settings and high torque even from a complete stop. Follow these step-by-step instructions to get started!

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Safety Precautions

The Workhorse Servo Motor is designed specifically for sewing machines and is not warranted for other uses. Please follow the guidelines below to prevent injury or damage to the motor/sewing machine.

- Confirm the shaft of the motor rotates counterclockwise before operating the sewing machine (See p. 6 “Changing Motor Rotation” if the shaft rotates clockwise).
- Do not operate the motor without the pulley cover installed.
- Do not touch any moving parts when operating the Workhorse.
- Remove foot from the treadle when turning the power ON.
- Turn the motor power switch OFF before replacing or threading the sewing machine needle.
- Turn the motor power switch OFF when leaving the machine.
- When performing maintenance on the sewing machine, turn the motor power switch to the OFF position and remove the power cord from the wall.
- To avoid injury or damage to the motor, do not alter or tamper with the internal components.
- Do not cover the motor’s ventilation; it can cause the motor to overheat.

Work Environment

- **Power Voltage:** Do not use any Voltage but the one specified on the motor.
- **Electromagnetic Pulse Interference:** Keep the motor away from high electromagnetic machinery and electro pulse generators.

Temperature

- Do not operate in temperatures above 115°F (46°C) or under 40°F (4°C).
- Avoid operating in direct sun light.
- Avoid operating near a heater.

Atmosphere

- Avoid operating in dusty areas.
- Avoid operating near combustible or flammable items.
- Avoid water coming into contact with the motor/outlet.

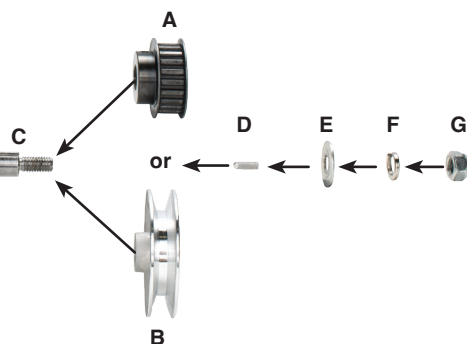
Power Cord

- Avoid placing heavy objects, excessive force or bends in the power cord.
- Ensure the power cord cannot be caught in the timing belt.
- Check that the outlet voltage matches the motor voltage before plugging in the power cord.



To see a step-by-step video on how to attach a pulley, watch the video on the Workhorse Servo Motor product page at sailrite.com.

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Attaching A Pulley

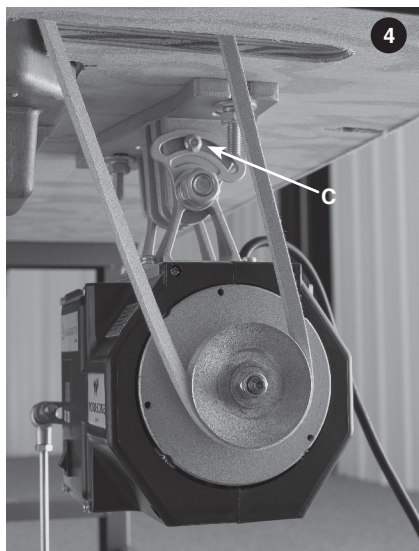
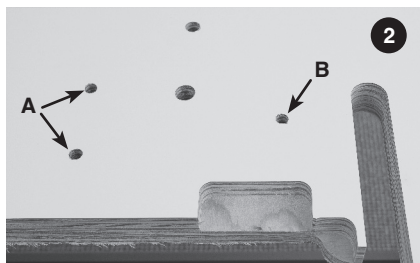
Two pulleys come with Sailrite's Workhorse Servo Motor, a standard 60mm silver pulley and Sailrite's 21-tooth cogged pulley. For Sailrite sewing machines utilizing a timing belt and the Stitch PRO Balance Wheel, install the 21-tooth cogged pulley (A). For a standard balance wheel with a smooth groove for a V-belt, install the silver 60mm pulley (B).

After choosing which pulley is needed for your machine:

- Place the pulley (A or B) on the shaft (C). **Note:** The extended hub of either pulley should be facing the motor.
- Line up the keyway in the pulley to the keyway on the motor shaft to create an open, square slot.
- Place the key (D) in the square slot created by the pulley and the motor shaft so that the rounded end of the key is toward to motor **Tip:** Needle nose pliers can be used to grip the key when installing the 21-tooth pulley.
- Push the key in as far as possible with your hand. **Do not use a hammer or other tool to pound it all the way in. This will ruin the motor and void the warranty.**
- Place the washer (E) on the motor shaft.
- Place the locking washer (F) on the motor shaft.
- Place the nut (G) on the motor shaft and tighten the nut as much as possible by holding the pulley with your hand and using a socket wrench to tighten the nut. This will force the key all the way into place.

Removing A Pulley

- Use vice grips or pliers to grip the pulley (use a soft cloth in between to minimize slip damage and try not to grip the belt flanges).
- While holding the pulley, use a socket wrench to loosen the nut on the motor shaft by twisting counterclockwise. Completely remove the nut, locking washer and washer.
- Use a gear puller to remove the pulley and key from the motor shaft.
- Follow the directions under "Attaching a Pulley" to attach the other pulley.



Installing the Workhorse Servo Motor

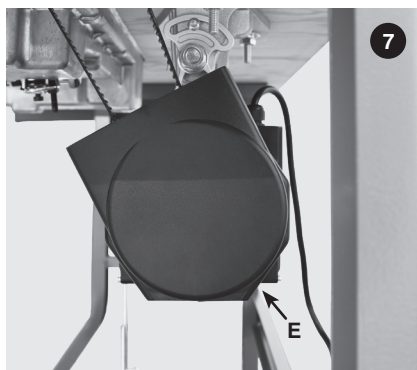
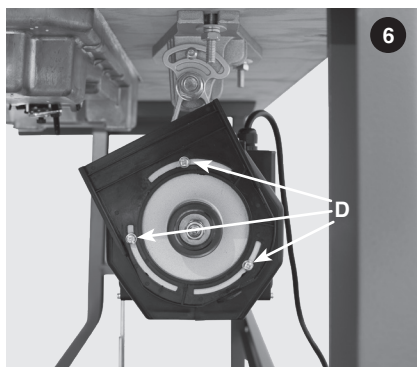
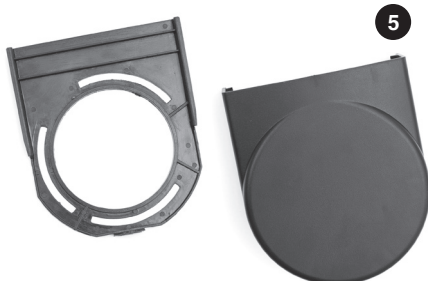
Clutch and Servo motors attach to the table with three carriage bolts. The holes are arranged in a triangle behind the machine cutout in the table top (**Figure 2**).

- Place two of the three included carriage bolts in the leftmost holes (**A**). The threaded side of the bolts will extend below the table.
- Place a washer, lock washer and then nut on each of the two bolts and thread them roughly half way. Then slide the motor bracket onto the two bolts so the washers and nuts are holding the motor to the table.
- Place the third carriage bolt through the remaining hole on the tabletop (**B**), making sure it is through the final slot in the motor bracket. Place the final washer, lock washer and nut on the bolt (**Figure 3**).
- Tighten all of the nuts after making sure the motor pulley lines up with the belt slot in the table. You can adjust the positioning of the motor left and right by moving the bolts within the slots of the motor bracket.
- **If installing with a Sailrite Industrial Sewing Machine**, see “Installing the Linkage Bar” in the guidebook now.
- **If installing with another sewing machine**, measure the distance around the machine’s balance wheel and motor pulley. If this measurement matches your current belt, proceed to the next step. If the measurement is more than one inch longer or shorter, you will need to purchase Belt V Power Twist 3L (#100815) by the foot at sailrite.com.
 - Once you have a proper belt, slip it over your machine’s balance wheel and guide it down and onto the motor pulley with the machine tilted back (**Figure 4**). Lower the machine back down. To adjust belt tension, adjust the motor angle forward or backward by loosening screw (**C**) and adjusting accordingly. Tighten the screw once the desired angle is achieved. Proper adjustment of the belt results in 3/8” of slack when the belt is depressed by finger at its center. Be sure the belt does not touch the table. Once the motor is in the correct position and all bolts are tightened, remove the belt so the pulley cover bracket can be installed.
 - Reattach the linkage bar from your existing treadle to the motor operation lever.

Installing the Pulley Cover

Do not install the pulley cover until after the motor is attached to the table so the correct positioning can be found. Before operating the motor, the motor belt cover must be fitted to prevent injury.

- Slide the belt cover off the bracket (**Figure 5**).
- Align the bracket with the screw holes on the motor so when the belt cover is positioned, the opening is at an angle where the belt can rotate without interference. Fasten the bracket to the motor with the three mounting screws (**D**) included with the motor (**Figure 6**).
- Slip the drive belt back over the machine's balance wheel track and guide it down and onto the motor pulley with the machine tilted back. Lower the machine back down. Again, be sure the belt does not touch the table and is near the center of the mouth of the bracket.
- Slide the belt cover onto the bracket (**Figure 7**). Be sure the belt does not touch the belt cover.
- Use the included self-tapping screw to lock the pulley cover to the bracket using the predrilled hole in the bottom of the belt cover (**E**).
- **If installing with a Sailrite Industrial Sewing Machine**, see "Attaching the Balance Wheel Belt Cover" in the guidebook now.



Speed Setting <i>with Standard Balance Wheel & Workhorse with 60mm Pulley</i>	
Speed Setting	Workhorse SPM
5	400
6	480
7	560
8	640
9	720
10	800
11	880
12	960
13	1040
14	1120
15	1200
16	1280
17	1360
18	1440
19	1520
20	1600
21	1680
22	1760
23	1840
24	1920
25	2000
26	2080
27	2160
28	2240
29	2320
30	2400
31	2480
32	2560
33	2640
34	2720
35	2800
36	2880
37	2960
38	3040
39	2130
40	3200
41	3280
42	3360
43	3440
44	3520
45	3600

Speed Setting <i>with Sailrite Stitch PRO Balance Wheel and Workhorse with 21-Tooth Pulley</i>	
Speed Setting	Workhorse SPM
5	123
6	148
7	172
8	197
9	222
10	246
11	271
12	296
13	320
14	345
15	370
16	394
17	419
18	443
19	468
20	493
21	517
22	542
23	567
24	591
25	616
26	640
27	665
28	690
29	714
30	739
31	764
32	788
33	813
34	837
35	862
36	887
37	911
38	936
39	961
40	985
41	1010
42	1035
43	1059
44	1084
45	1108

Operation

1. After installation, plug in and turn on the Workhorse Servo Motor.
2. Make sure there is no thread in the needle of the sewing machine.
3. Press the treadle slowly to make sure the machine balance wheel turns counterclockwise. If it rotates clockwise, see “Changing Motor Rotation”.

To change the speed:

- Press the “P” button and the LED display will change to “n0”.
- Press the “S” button to select a speed.
- Continue to press the “S” button until the desired speed between 5 and 45 is displayed. **See page 5 for speed settings.**
- Press the “P” button to save the displayed speed.



Once a setting is selected and saved, the motor will remember the selection even when turned off and unplugged. Set it once and forget about it!

Changing Motor Rotation

Do not run the Workhorse in a clockwise direction as it will bind the sewing machine and cause other problems. Make sure the motor is always running in a counterclockwise direction. If the motor is spinning clockwise, follow the instructions below to reverse the direction.

- Press the “P” button 4 times until the LED display reads “n3”.
- Press the “S” button to select between “0” and “1”.
- Select “1” and the motor will run clockwise.
- Select “0” and the motor will run counterclockwise (this is the setting the motor should be on).
- Press the “P” button to save the selection of “0”.

Error Codes

ERROR CODE (on LED Display)	SOLUTION
“E1”: Operational failure	Machine is locked. Check to see if the machine is difficult to turn by hand with the balance wheel. Remove material and attempt to operate, if it works, material was too heavy for motor.
“E2”: Over current or under voltage	Check the power source to ensure that the motor voltage matches the outlet voltage. Note: When turning the motor off, it is normal for “E2” to display briefly.
“E3”: The board cannot read the parameter	Turn the power off and on twice, and try again. If the problem still occurs, contact Sailrite.
“E4”: Hall signal error	Replace the main fuse. To do this, turn off and unplug the motor, remove the front external plastic cover and replace the main fuse with one of the extras sent with the motor. If the problem continues to persist, please contact Sailrite.
“E5”: Needle position problem	<ul style="list-style-type: none">• Press and release the “S” button and the LED display will change to “P”.• Press the “P” button 2 times and the display will change to “n1”.• Press the “S” button and the display will change to “1”.• Press the “S” button again and the display will change to “0” (disable needle positioner).• Press the “P” button to save the value.• Turn the power off and then on again to complete the programming.

Specifications

Voltage	110-120V or 220-240V (check motor to confirm voltage)
H.P.	3/4
Power	550W
Power Consumption	4.5 amps
Motor RPM	4,500
Speed Control	Digital
On-Off Switch	Built-in
Accessories	Treadle Rod, Mounting Hardware, Belt Guard & Extra Fuses
Motor Dimensions (Bracket Included)	9.75" L x 9" H x 6" W
Motor Weight	7.8 pounds (3.5kg)
Shipping Dimensions	13.2" L x 8" H x 11.4" W
Shipping Weight	10 pounds (4.5kg)
Warranty	Limited 1 Year

Sailrite Pulley (Cogged)

Pulley Type	21-Tooth Timing Pulley
Pulley Diameter	1-5/16" (33.34mm)

Additional Standard Pulley (Silver)

Pulley Type	V-Belt Pulley
Groove Diameter	2-23/64" (60mm)

Warranty

Sailrite warrants the Workhorse Servo Motor for one year starting at the date of sale. This guarantee covers defects in material and workmanship. Damage due to improper use, neglect, impact or normal wear are not covered under this warranty. Furthermore, this warranty is voided by disassembly, repair or alteration by owner or unauthorized third parties. This warranty is limited to the original purchase amount paid.

WARNING: Some products may be fabricated from materials which may contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.