

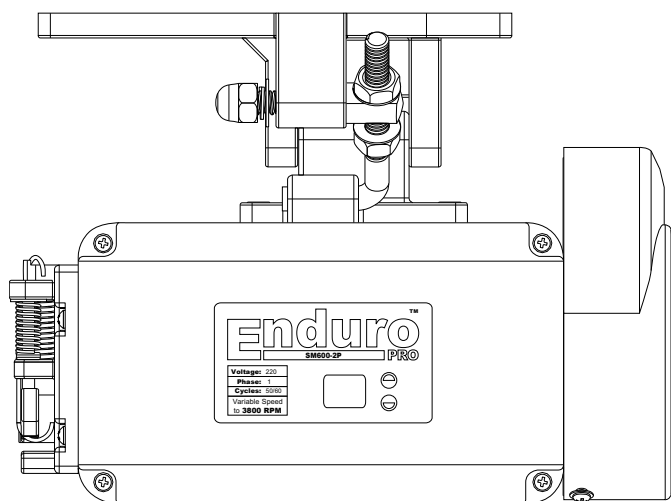
EnduroTM PRO

SM600-2P

SERVO MOTOR WITH POSITIONER USER INSTRUCTIONS & PARTS LISTING

**INSTRUCTION ET LISTE DES PIÈCES DE L'UTILISATEUR
DU MOTEUR SERVO DE POSITIONNEUR**

**INSTRUCCIÓN DE USE DE MOTOR SERVO CON
POSICIONADOR & LISTA DE PARTES**



SM600-2P ENDUROTM PRO

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SM600-2P ENDURO™ PRO SERVO MOTOR WITH POSITIONER USER INSTRUCTIONS

Congratulations!

You have purchased the Enduro™ Pro SM600 motor that pays for itself with a remarkable 60% to 80% energy savings compared to clutch motors. With the high and rising cost of electricity, you just can't afford to run a clutch motor any longer. The power and dependability of the brushless Enduro™ Pro SM600 is adequate for light duty sewing.

Please read these instructions carefully before installation, operation or maintenance.

General Introduction

The Enduro™ Pro SM600 Servo Motor is designed to meet almost all basic light duty requirements of various commercial sewing machines. It utilizes extremely powerful rare-earth Neodymium permanent magnets. The motor produces almost no noise, saves energy and is brushless, speed adjustable and durable. It provides a high starting torque even at low speed or from a complete stop.

By using a modern technologically advanced microprocessor, Hall sensor and Pulse-Width Modulation technology, the Enduro™ Pro SM600 can be set to rotate at different maximum speeds, in either normal or reverse directions, and can start with different accelerating speeds. It will stop automatically with any interruption such as in-line voltage, electrical surge, radio frequency interference or overloading. It is fully protected by the software and will give error messages indicating which problem is encountered. It even works well in environments with an unstable electrical power supply.

CAUTION

1. Remove your foot from the pedal when turning the power ON.
2. Turn the power switch OFF before replacing or threading the needle.
3. Turn the power OFF when leaving the machine.
4. **When performing maintenance on the sewing machine, turn the motor power switch to the OFF position. Remove the power cord from the back of the motor to completely disable all power to the sewing machine.**
5. Always ground the grounding wire.
6. **Always turn off the power switch before connecting or disconnecting each connector.**
7. **To avoid an accident, do not alter this motor and control box.**

Warranty

This product is covered with a 1 year limited warranty. If the motor fails to perform its designed function due to manufacturer's defects, contact the place you purchased it from for repair or replacement.

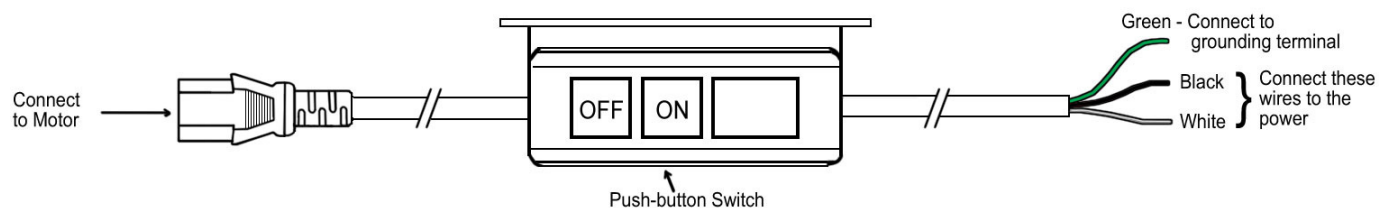
This warranty does not cover defects due to dropping, power surge, spikes or misuse.

Installation

Put the mounting bracket of the motor upwards to the bottom of the tabletop and fix the motor to the tabletop with the bolts provided. Connect the treadle rod with the connecting rod joint. Install the female plug of the cable from the switch box into the power inlet socket in the back of the motor box.

Wiring

For 220 volt single phase motor follow the diagram below:



Note: When wiring the motor to the power source, connect both the black and white wires to achieve 220 Volts (green to ground). If you are in an area (China / Europe) that supplies 220 Volts from a single lead, then connect the power source to the black wire. The white wire will then be the neutral and the green wire will be the ground.

Error Message and Trouble Shooting

- E2: Motor Phase signal error.
- E3: Motor protected against over-current.
- E4: Circuit board error.
- E5: Display module and control module communication error.
- E6: Pedal position sensor error.
- E8: Can not find position DOWN.
- E9: Can not find position UP.

Setting Up

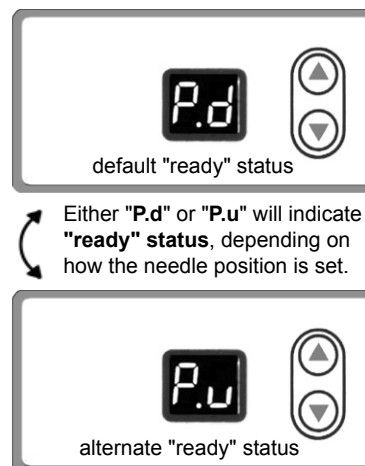
Turn on the switch located on the switchbox. The display will show "P.d", which means the motor is in **"ready" status**, ready to work or be set.



Ready Status

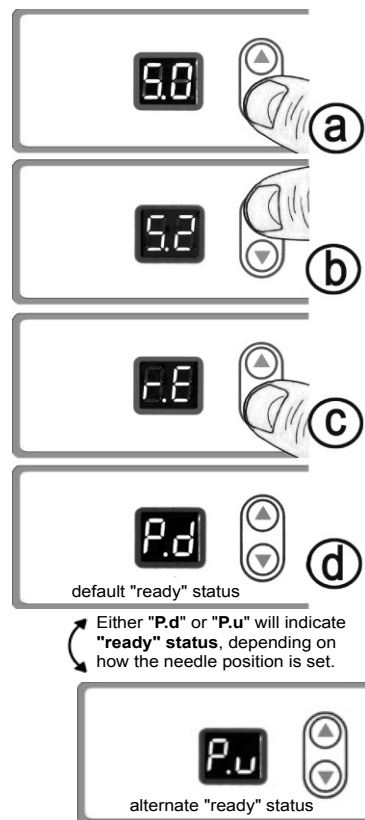
"P.d" is the factory default **"ready" status** setting and means the needle position setting is **POSITION DOWN**. "P.d" is **"ready" status** while default setting is not changed.

Once the needle position setting is changed to "P.u" (which means the needle position setting is **POSITION UP**), then "P.u" becomes the **"ready" status**.



Motor Rotating Direction Setting Setting up Number 2

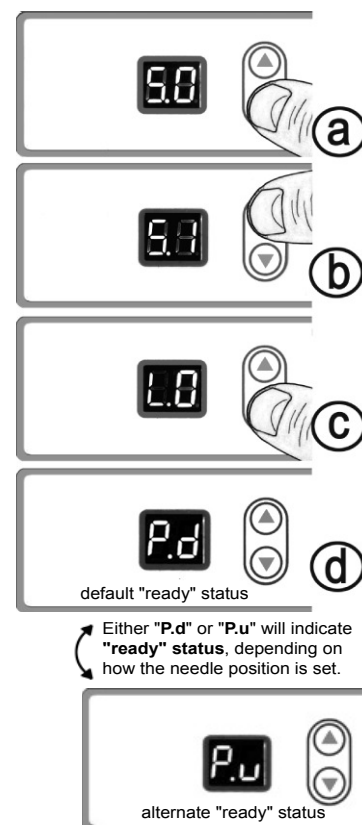
- Keep "▼" button pressed for several seconds, until LED display indicates "S.0".
- Press "▲" button 2 times to indicate "S.2", which means **"Setting up No. 2"**.
- Press "▼" button and LED will indicate "r.E" or "r.P"
Press "▼/▲" to switch between E and P, to meet the requirement of sewing machine.
"E" means the motor will run in reversed direction.
"P" means the motor will run in normal direction.
- Setting will be automatically saved 5 seconds after no buttons are pressed. The motor returns to **"ready" status**.



Slow Starting Speed Setting up Number 1

1. The "slow period time" = 128 milliseconds * X, (slow starting setting), X = 0~9 (as setting up in the motor).
2. Example: The treadle is depressed approximately half way down producing a motor speed of about 2,000 RPM and if the Slow Starting is set at **9**, then the time from 0 to 2000RPM is theoretically 128 milliseconds X 9 = 1152 milliseconds, plus the electrical-mechanical delay which is about 0.8 seconds.
3. If the Slow Starting is set at 0, the "real starting time" and time from 0-2000RPM is about 0.8 seconds, which is due to the unavoidable electrical-mechanical delay only.

- a. Keep "**▼**" button pressed for several seconds, until LED display indicates "**S.0**".
- b. Press "**▲**" button 1 time to indicate "**S.1**", which means "**Setting up No. 1**".
- c. Press "**▼**" button and LED indicates "**L.X**" (X is 0-9), Press "**▼/▲**" to adjust from 0 to 9 according to your own application. 0 means the quickest. 9 means the slowest. The manufacturer's default setting is 0.
- d. Setting will be automatically saved 5 seconds after no buttons are pressed. The motor returns to "**ready**" status.

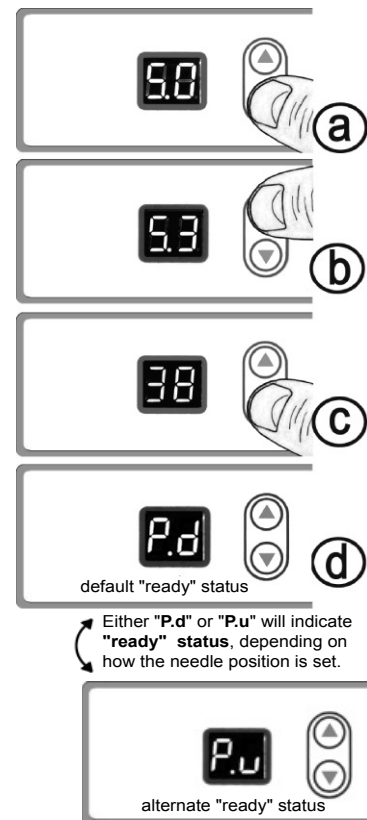


Maximum Speed Setting

Setting up Number 3

- Keep "▼" button pressed for several seconds, until LED indicates show **"S.0"**.
- Press "▲" button 3 times to indicate **"S.3"**, which means **"Setting up No. 3"**.
- Then press "▼" button and LED indicates **"XX"**(XX is 1-38), which means the highest motor speed in RPM. ("38" means 3800rpm, and "10" means 1000 rpm)

Press "▼/ ▲" to adjust the Maximum Speed from 100rpm to 3800rpm. The manufacturer's default setting is 3800rpm.
- Setting will be automatically saved 5 seconds after no buttons are pressed. The motor returns to **"ready" status**.



STITCHES PER MINUTE AT 3800 RPM MOTOR SPEED

MOTOR PULLEY DIAMETER	SEWING MACHINE HANDWHEEL PULLEY SIZE					
MM / INCHES	50 = 2	60 = 2-3/8	70 = 2-3/4	85 = 3-3/8	115 = 4-5/8	150 = 6
50 = 2	3800	3200	2800	2200	1700	1300
60 = 2-3/8	4500	3800	3300	2700	2000	1500
75 = 3	5700	4800	4200	3400	2500	1900
80 = 3-1/4	6200	5200	4500	3700	2700	2100
90 = 3-5/8	7000	5800	5000	4100	3000	2300
100 = 4	7600	6400	5500	4500	3300	2500

Changing the Pulley

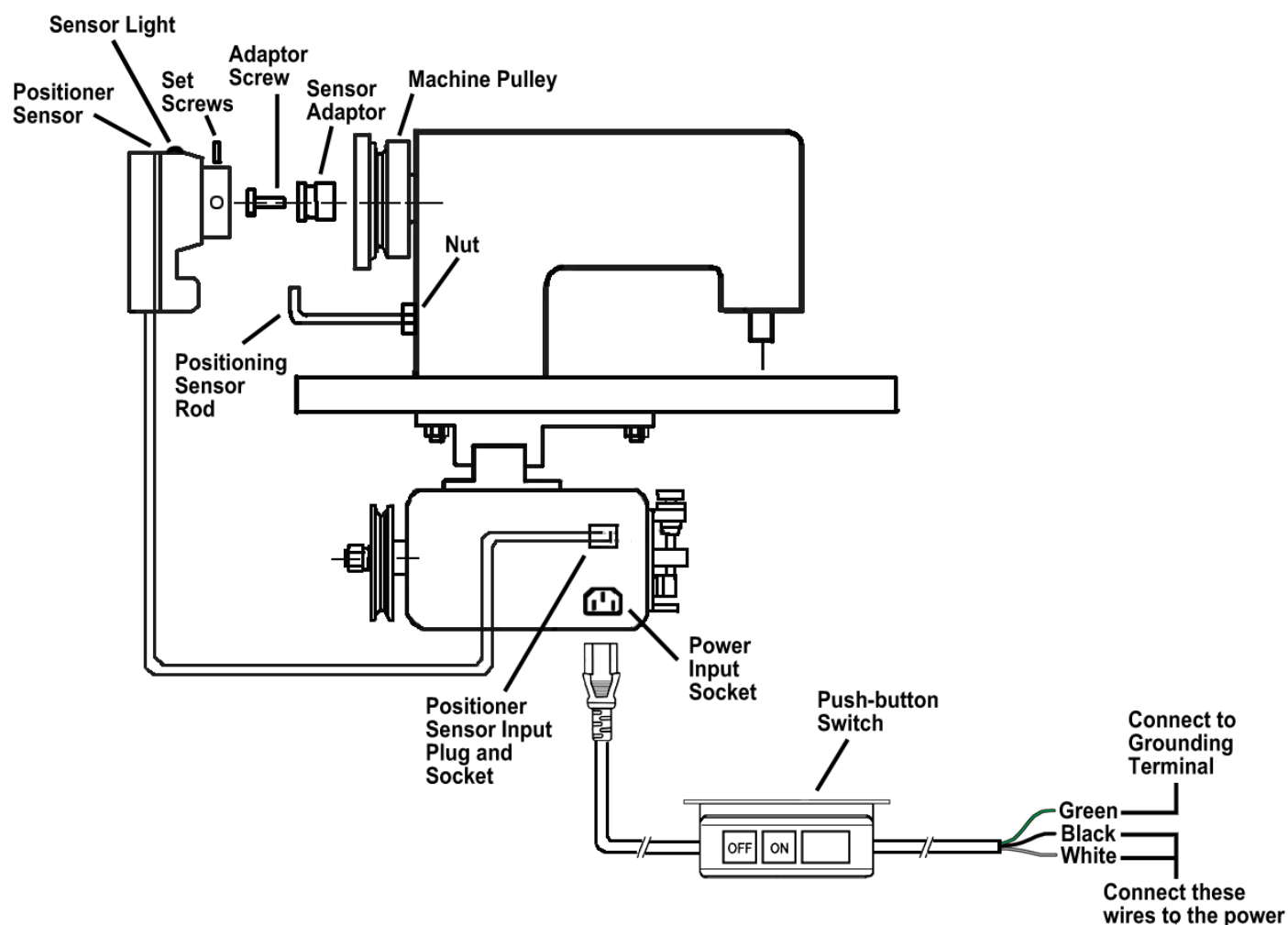
Remove pulley cover and pulley.

Securely tighten the new chosen pulley.

Caution – Incomplete tightening may cause malfunctions. Also, be sure the pulley cover is correctly positioned to avoid rubbing against the pulley or the V-belt.

Motor pulley outer diameter (mm)	=	$\frac{\text{Normal sewing machine speed}}{(*) \text{ Motor Speed}}$	x	Sewing machine pulley diameter	+ 5 mm
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Installation of Positioner on SM600-2P



1. Be sure the female power cord is disconnected from the power inlet socket.
2. Remove the screw on the machine pulley. Install the sensor adapter (supplied) onto the pulley with the adapter screw (supplied).
3. Install the positioner sensor onto the sensor adapter and fasten with the two set screws. Install the positioner sensor rod into the groove on the sensor and lock the rod onto the machine with the nut (supplied).
4. Connect the sensor signal wire plug to the socket on the rear panel of the motor box.
5. Plug the power cord from the switch box into the power input socket on the rear panel of the motor.
6. Power ON the motor.
7. Check the position of the needle with the motor working.
8. If the needle is incorrect, loosen the set screws on the sensor and move the belt pulley until the sensor light shows for correct needle position by illuminating.
9. **WARNING: DO NOT MAKE THE SENSOR RUN DURING THIS POSITIONER SETUP PROCESS.**
10. Make sure positioner is correct. Then tighten the two (2) set of screws on the sensor.

Needle Position Setting

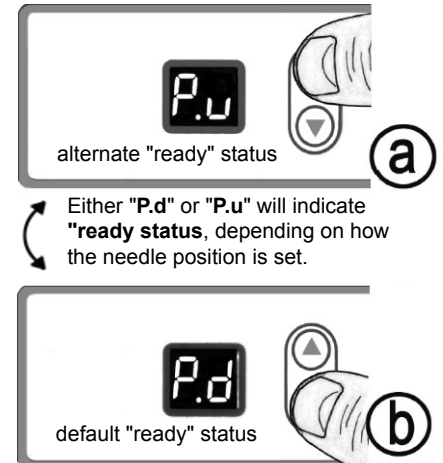
Setting up Number 4

- a. At any time when the motor is on but not running, press the up button "▲".

If the LED indicates: "**P.u**" it means the needle position setting is **POSITION UP**.

If the LED indicates: "**P.d**" It means the needle position setting is **POSITION DOWN**. This is the default factory setting.

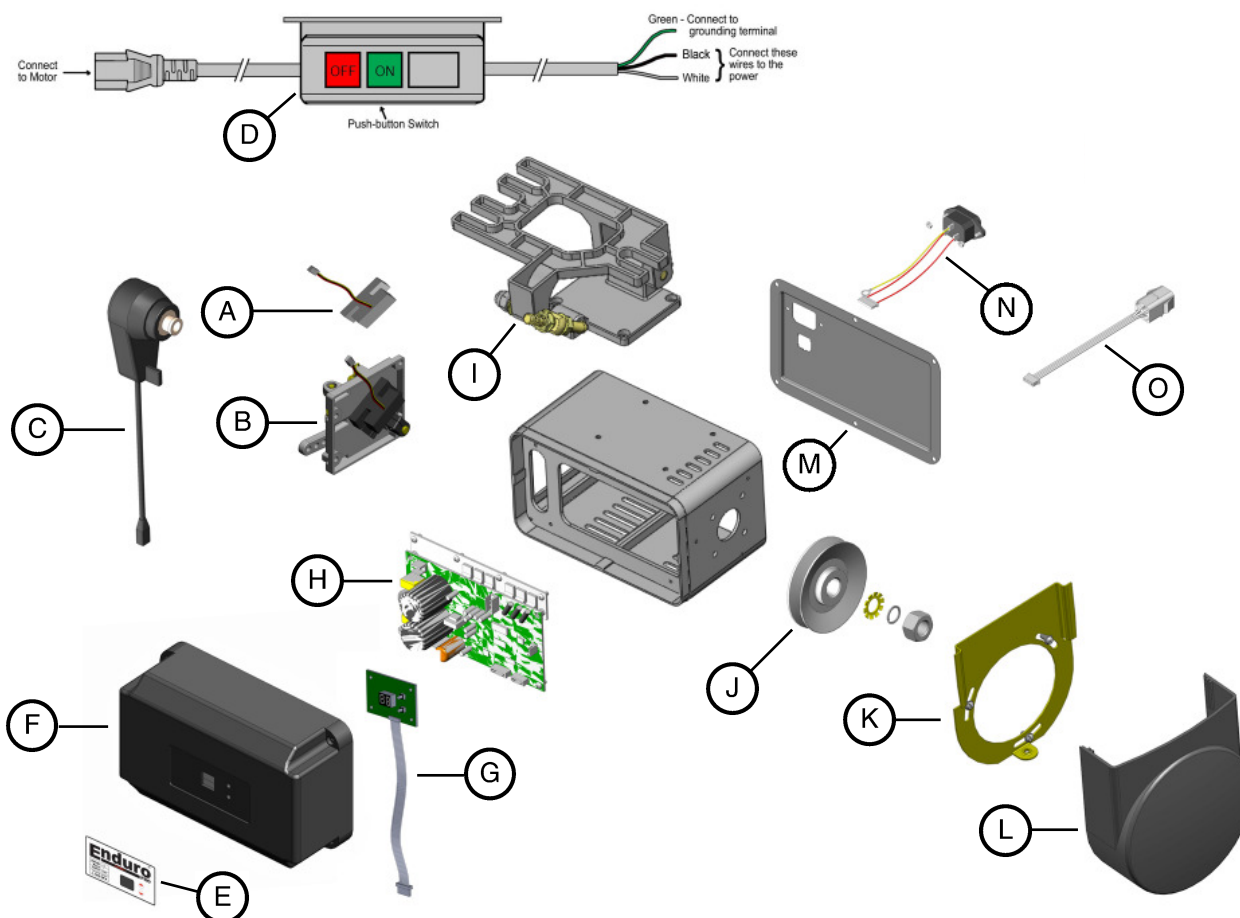
- b. Press "▼/ ▲" to switch the setting of the needle position between either UP or DOWN.



When positioner sensor is set correctly to the **UP** position and you stop sewing, the needle will stop at the **UP** position. If you then heel the treadle, the motor will rotate to put the needle in the **DOWN** position.

When the position sensor is set to the **DOWN** position and you stop sewing, the needle will stop at the **DOWN** position. If you then heel the treadle, the motor will rotate to put the needle in the **UP** position.

SM600-2P PARTS LISTING



No. Fig. Description

SM76	A	Sensor only with screws (dual channel for motors with positioner)
SM604	B	Treadle Sensor Plate Assembly complete with 4 screws (dual channel for motors with positioner) (431C)
SM77	C	Replacement positioner sensor kit complete
SM78	D	Complete horizontal wire harness for 220 volt models (431C)
SM624	E	SM600-2P label
SM625	F	SM600 Pro control box cover with 4 screws (431C Matte)
SM627	G	2 Digit LED display with screws
SM630	H	SM600-2P Circuit board with 6 screws
SM631	I	Motor mounting bracket complete with 4 screws (431C)
SM50	J	50mm pulley with mounting hardware
SM60	J	60mm pulley with mounting hardware
SM75	J	75mm pulley with mounting hardware
SM80	J	80mm pulley with mounting hardware
SM90	J	90mm pulley with mounting hardware
SM100	J	100mm pulley with mounting hardware
SM79	K	Pulley cover bracket with screws and washers
SM86	L	Pulley cover with screw and washer (431C Matte)
SM633	M	Rear motor cover panel SM600-2P with 6 screws (431C)
SM81	N	Power inlet receptacle with wires, terminals and screws complete
SM82	O	White positioner socket