

Control System Instruction Manual

Energy Saving Motor

ES DD

Hosang.



SINGER®

Safety Instructions

1.1

Important Safety Instructions

Important

When using the system, basic safety procedures must be followed. Read with attention all instructions before using and operation.

When using it, understand that all basic safety instructions are not limited to the following items. Read all instructions, take care of this manual, and use it as reference when necessary.

- Before running the machine, make sure all relevant safety specifications are adequate to specifications and technical standards in your country.
 - The machine should not be run without its safety devices.
 - The machine should only be operated by properly trained personnel.
 - For your safety, goggles must be used while running the machine.
 - Turn off or unplug the machine when the following situations arise:
 - Install the machine or Control System.
 - Insert or pull out any plug in the control box.
 - Passing the thread by the needle or replacing the bobbin or looper.
 - Replacing the needle, presser foot, throat plate, feed dog and sliding plate.
 - When the machine is in maintenance.
 - When the operator is not running the machine (Idle Mode).
 - In case of lubricant oil contact with the eyes or skin, washed the surface with plenty of icy water with a generous amount of cold water. In case of ingestion, seek medical help immediately.
 - Repair, fitting or maintenance should only be performed by properly trained personnel.
 - Maintenance and repair on electric equipment should only be made by qualified personnel. If any electric device is damaged, the machine should be immediately stopped.
 - Before starting the machine in full running, a test must be conducted to assure that machine and operator are able to perform the task.
 - The machine should not be placed next to a sound source as an ultrasonic welding machine and other equipment.
 - The machine should only be run with the proper electric cable and connectors, and also the adequate grounding.
 - The machine should only be used to sew materials as indicated in its instructions manual, and indications of use should be followed.
- Singer will not be held responsible for any damage caused by unauthorized changes in the product.

CAUTION!

- * Please read instruction manual carefully before operating.
- * Connect earth wire before using!
- * Do not use over voltages higher than 250VAC!
- * Do not open covers of the drive and motor!
- * The installation and operation must be operated by professional trained person.

1.2

Safe Operation

- ⚠ • To avoid the risk of electric shock, do not open the motor wiring box and do not touch the components assembled inside the wiring box.
- To avoid injuries do not run the machine without the belt cover or in case any other safety device is removed.
- To avoid possible injuries keep fingers, head and clothes far from wheel, belt and motor when the machine is running. Nothing should be placed near those parts.
- To avoid injuries never put your fingers next to the rotating hook and the thread take-up lever cover when the machine is running.
- To avoid possible injuries be careful when putting down or lifting the machine head.
- To avoid accident in case of a sudden start of the machine always turn it off when laying it down, or remove the belt cover and the belt.
- If you machine is equipped with a servomotor, it does not make noises while being driven. To avoid a possible accident caused by an unexpected start, be sure the machine is turned off.
- To avoid electrical shock, do not run the machine without proper grounding.
- ⚠ • To minimize the risk of accidents or damage in electric components caused by electric discharge turn the machine off before unplugging it.
- There should be 5 seconds separate during changes of power.

Product Description and Technical Specification

2.1

Controller Technical Data

ES (Energy Saving) Motor / ES DD (Energy Saving Direct Drive) Motor Controller

Type: ES55A29-CE

P/N: 3013001200

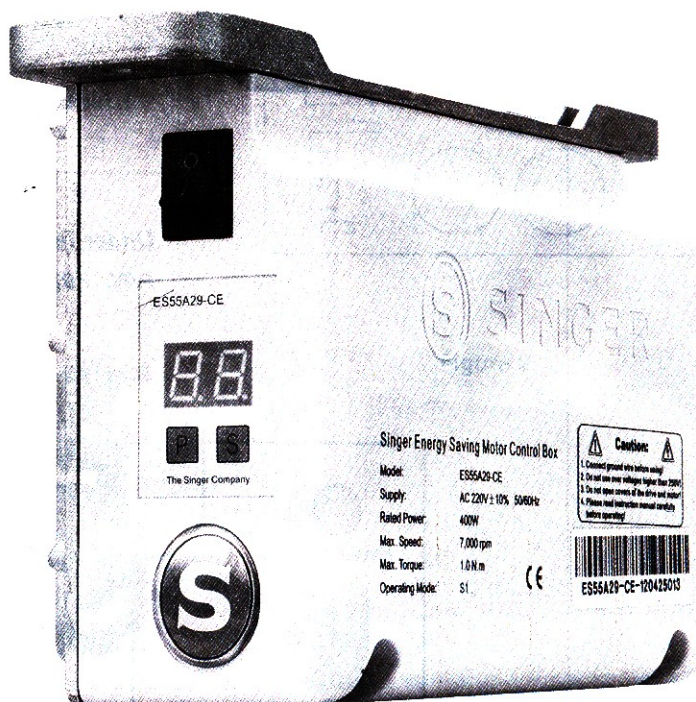


Table 1 – Controller Technical Data:

Singer® Model	Supply	Motor Power (Acc. Motor) P _N [W]	Operating Mode (Acc. IEC 34)	Drive Signal	ES DD Motor Max. Speed	ES DD Motor Max. Torque	Needle Up/Down Position
ES55A29-CE	Single Phase AC 220V±10% 50/60 HZ	400W/550W	S1 (Continuous Duty)	Trapezoidal drive using Hall sensor	7,000 min ⁻¹ (400W) 5,500 min ⁻¹ (550W)	3.0 N.m (400W) 4.5 N.m (550W)	*Standard

* Needle Up/Down positioning function is only available in ES DD motor.

2.2

Motor Technical Data

For 191D ES DD

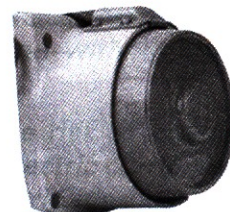
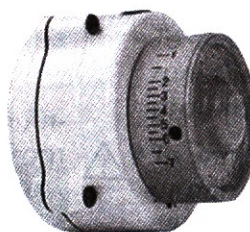
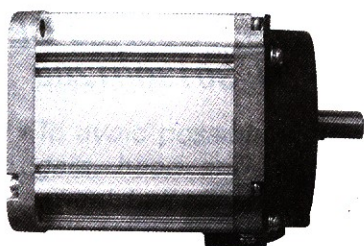
P/N: 11433013

For 321C ES DD

P/N: 2033300200

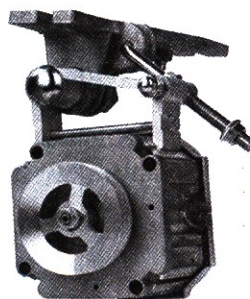
For 5x2D ES DD

P/N: 3013300600



Under-Table Mount

P/N: 7.02.01.002



Tabel 2 – Motor technical data

	ES Motor	ES DD Motor		
	550W	400W	550W	550W
Motor Type	Under-Table Mount	Direct Mount	Direct Mount	Direct Flange Mount
Max. Speed	5,500 rpm	7,000 rpm	5,500 rpm	5,500 rpm
Rating Torque	1.5 N.m	1.0 N.m	1.5 N.m	1.5 N.m
Max. Torque	4.5 N.m	3.0 N.m	4.5 N.m	4.5 N.m
Rating Power	550 W	400 W	550 W	550 W
Application	191D,321C,5x2D	321C ES DD	5x2D ES DD	191D ES DD

- Max. Torque can not be reached at Max. Speed;

3.1

Printed Circuit Board Assembly and Rear Panel

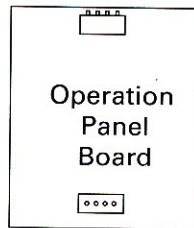


Figure 1

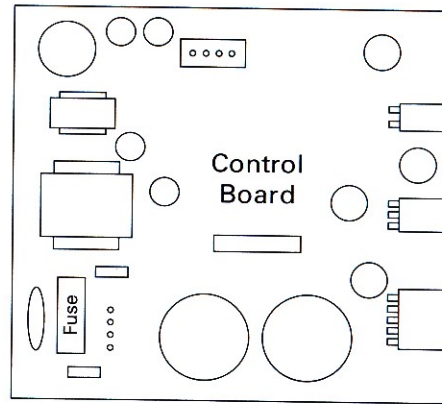


Figure 2

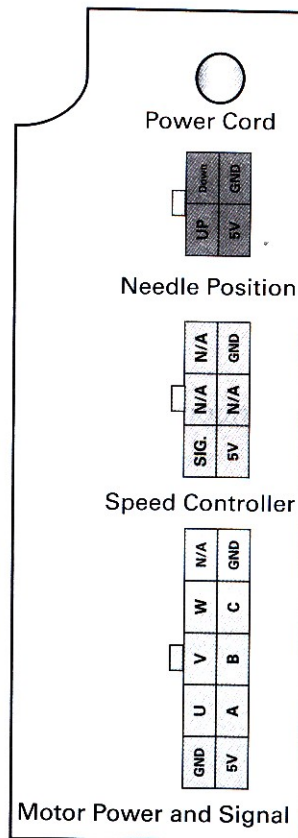


Figure 3

3.2

Power Cord and Plugs

A. Control box power supply code

The control box power supply input is single phase AC220V.

The power supply connects under the table,

Table 3 – Power Supply Code:

<i>Color</i>	<i>Definition</i>
<i>Brown</i>	<i>Live Line</i>
<i>Blue</i>	<i>Neutral Line</i>
<i>Yellow/Green</i>	<i>Earth Line</i>

B. Please select suitable plugs according to your country regulation.

3.3

Overview

The system has the advantages of energy saving, high efficiency, stable performance. it's the best replacement for clutch motor which used widely in industrial sewing machines.

A. The control box and a foot pedal controller. (Figure 4)

The power driver of motor in control box applies an intelligent power driver module which has a perfect protection to overvoltage, over current and overheating. Moreover the control box structure is perfect and efficient. The foot pedal controller is a part of motor speed control.

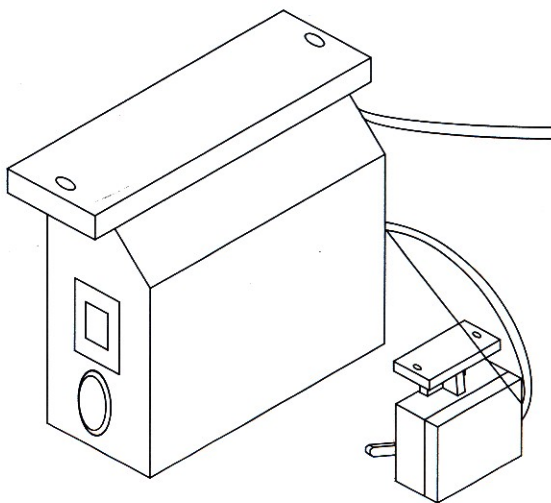


Figure 4

B. Motor.

The product has under-table mount type (Figure 5) and direct-drive type (Figure 6 and 7)



Figure 5

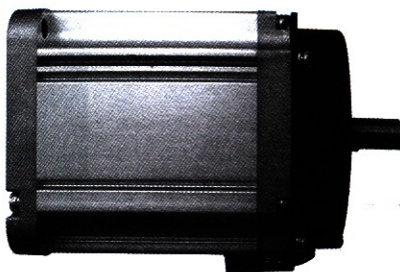


Figure 6



Figure 7

**(Only for
Under-table
Mount Type)**

C. Accessories.

Positioner, also called detector (Figure 8), which has a function of providing signal to the controller for needle position. It suits for the type with function of needle position.

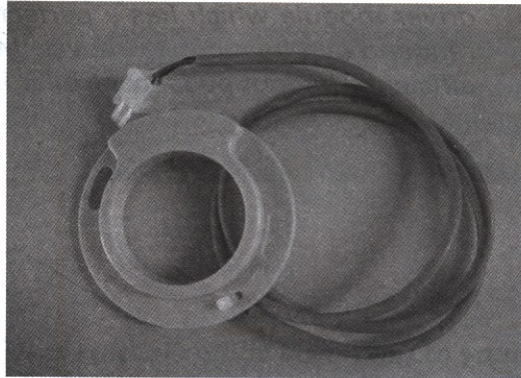


Figure 8

** For 191D,321C and 5x2D ES DD type, it's NOT necessary to mount positioner separately, it's a build-in function with the motors.*

4

Installation and Adjustment

4.1

Installation and Adjustment of Under-table Mount Type

Important

The electric power must be cut off in case of installation or dismantlement!

A. Installation of motor assembly (Figure 9)

1: Set three lifting screws into the holes in the table, and fix the motor and motor bracket under the table. Adjust the position of motor bracket and keep the motor belt pulley at the same lever as hand wheel belt pulley of sewing machine.

2: Adjustment of tightness: press the belt with a force of 1 kg. if the belt concave went down 1 centimeter means OK, if not, the belt need adjustment.

3: Install the belt cover.

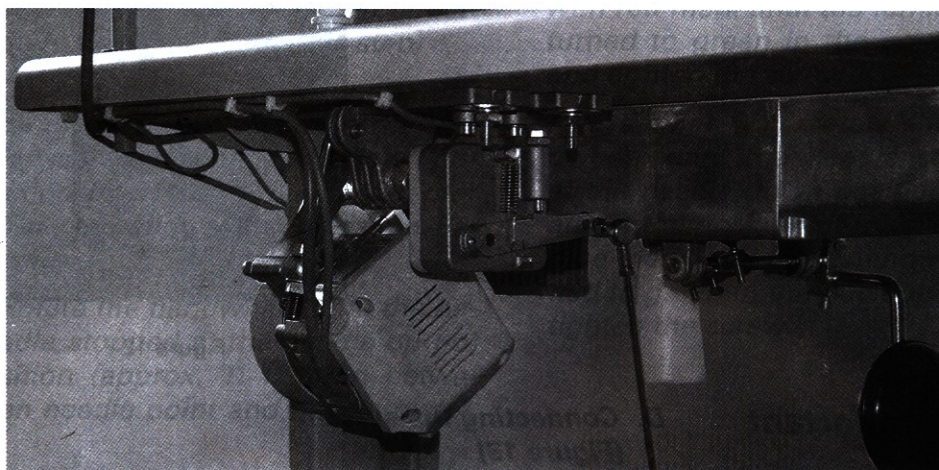


Figure 9

B. Installation of control box (Figure 10 and 11)

Cutting two holes for the depth of 2 cm by the drill of Dia. 3mm in the right hand front bottom of table, with the distance 195mm, then fix the control box tightly with wood screws in accessories bag.

Insert plugs of the motor, positioner (optional) and speed controller into relevant sockets, and then fix the power cord to the table where far away from belt.

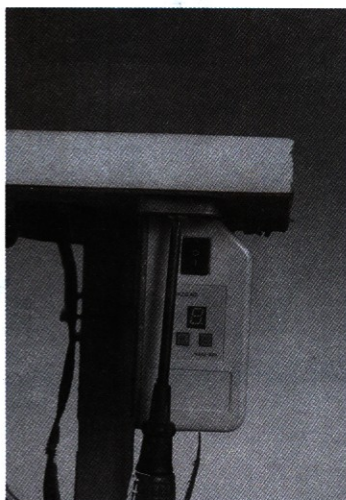


Figure 10

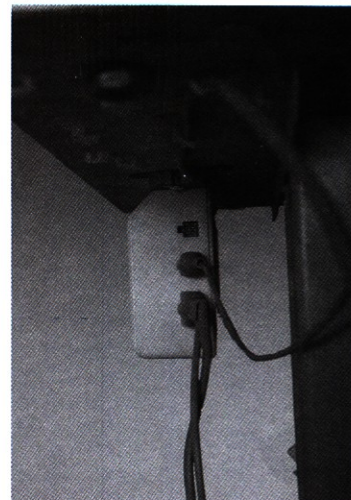


Figure 11

C. Installation of speed pedal (Figure 12)

Make sure the pitman rod be perpendicular to the pedal. Adjust the length of pitman rod, keep the foot

angel to the horizontal lever as about 15 degree.

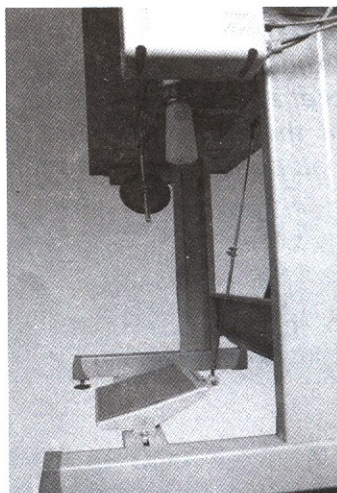


Figure 12

Important

D. Connecting the system (Figure 13)

Connect controller power cord into single phase 220V power supply system, which should have separate earth line, and the control box must be connect to earth securely.

When everything is ready, check if the connection firmly, then adjust the position of plastic sheath in order to cover the plugs completely.

GND	U	V	W	N/A
5V	A	B	C	GND

SIG.	N/A	N/A
5V	N/A	GND

UP	Down
5V	GND

**Motor Power and
Signal**

Speed Control

Needle Position

**Slot for the
power cord**

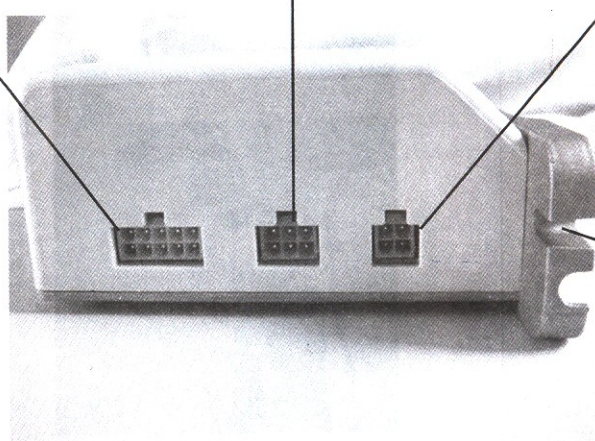


Figure 13

The electric power must be cut off in case of installation or dismantlement!

Make sure system securely connected to earth!

Working Mode set to "1" (only as request) while in under-table mount type!

4.2

Installation and Adjustment of Direct Drive Type

(Flange direct drive type NOT included)

Important

Make sure the system securely connected to earth BEFORE SWITCH ON THE CONTROL BOX!

Working Mode set to "0" (default setting) while direct drive type!

A. Installation of the motor.

Direct drive motor mounted and adjustment of positioner are NOT necessary, it's already done in the factory.

B. Installation of control box.

Speed control and connection of system please refer to Chapter 4.1.

C. Adjustment of positioner

Adjustment of needle Up/Down position, if needed. (Flange direct drive type can ignore this step)

Connect to the power, and turn on the main switch of control box. Press P to the needle Up/Down position Interface, (Refer to Chapter 5.1: Operating with Operation Panel)

Rotate the handwheel until the needle stopped at the needle up position (approx. 11-12.5mm between needle point and needle plate),

then adjust the position of magnet with red mark until the luminotron turned to green in the positioner, and tighten the screw.

In a similar way, rotate the handwheel until the needle stopped at the needle down position, then adjust the position of magnet with blue mark until the luminotron turned to green in the positioner, and tighten the screw.

5.1

Operating with The Operation Panel

Important

Wait 5 plus seconds
while turn off and turn
on the control box!

Keep foot away
from the pedal while
operating with
operation panel!

A. The operation panel display have double digit LED display. (Figure 14)

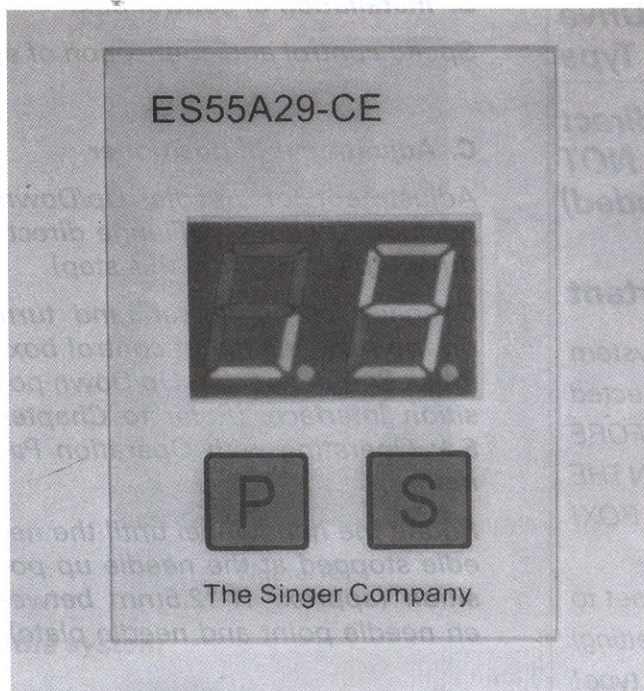


Figure 14

1. Power On Mode

When switch on the power, there's "P" and dynamically rotating circle show in the screen, this is Power On Mode. (Figure 15)

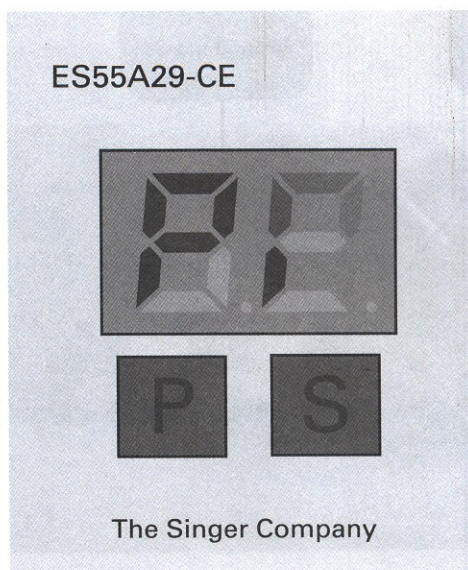


Figure 15

2. Motor Speed Setting

Press **P**, the LED display shows "v8" which is the motor speed setting interface. (Figure 16); then there

will be relevant setting speed such as "40" shows in the screen; Press **S** to set your speed. the motor will run with the set speed. (Figure 17);

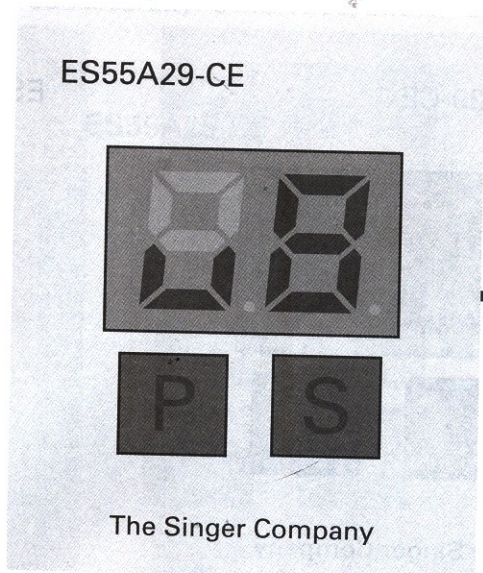


Figure 16

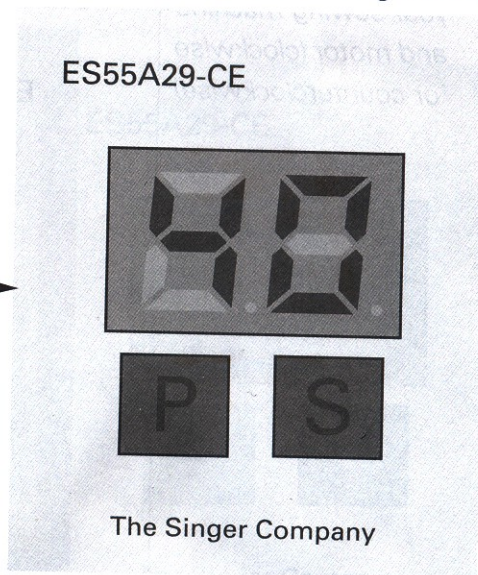


Figure 17

3. Needle Up/Down Position Setting

Press **P** again, then LED display will show "y "; this is the interface for setting needle Up/Down position.

Pressing the **S**, the bottom line of the second digit LED lightening shows for lower needle position

setting, (Figure 18)

Upper needle positioning when push the speed pedal backwards, the top line of the second digit LED lightening shows for up needle position setting. (Figure 19)

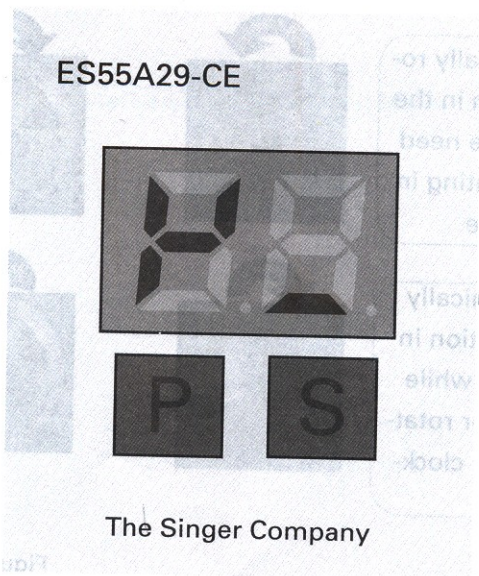


Figure 18

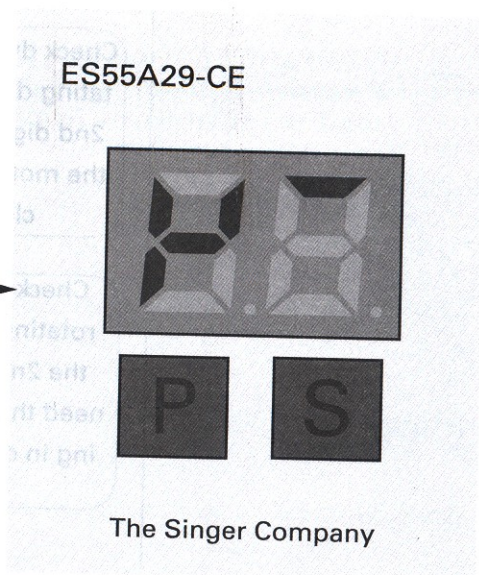


Figure 19

Important

Check the rotating direction of the shaft in your sewing machine and motor. (clockwise or counterclockwise)

4. Rotating Direction Setting

Press P again, display shows "b" is the rotating direction setting interface, (Figure 20 and 21); the 2nd di-

git will dynamically rotate as same as the motor rotating direction;

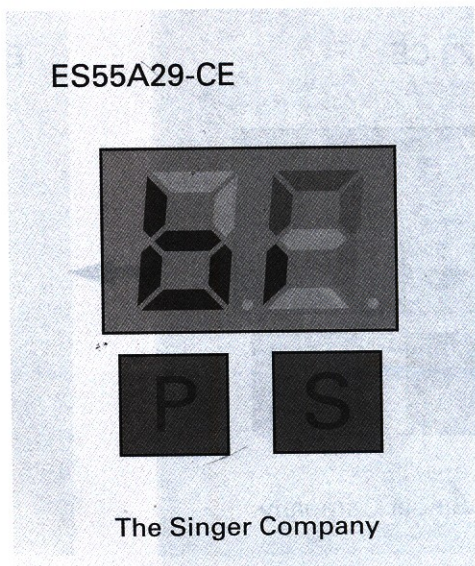


Figure 20

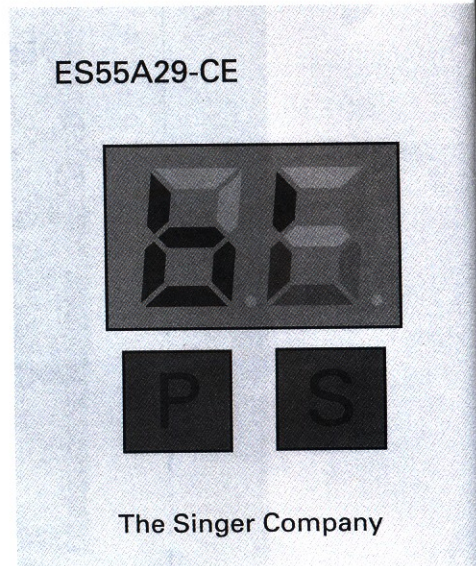


Figure 21

When the motor applied to different sewing machines, please adjust "control parameter of motor direction" BEFORE OPERATING!

5. Motor rotating direction for different type of application (Figure 22)

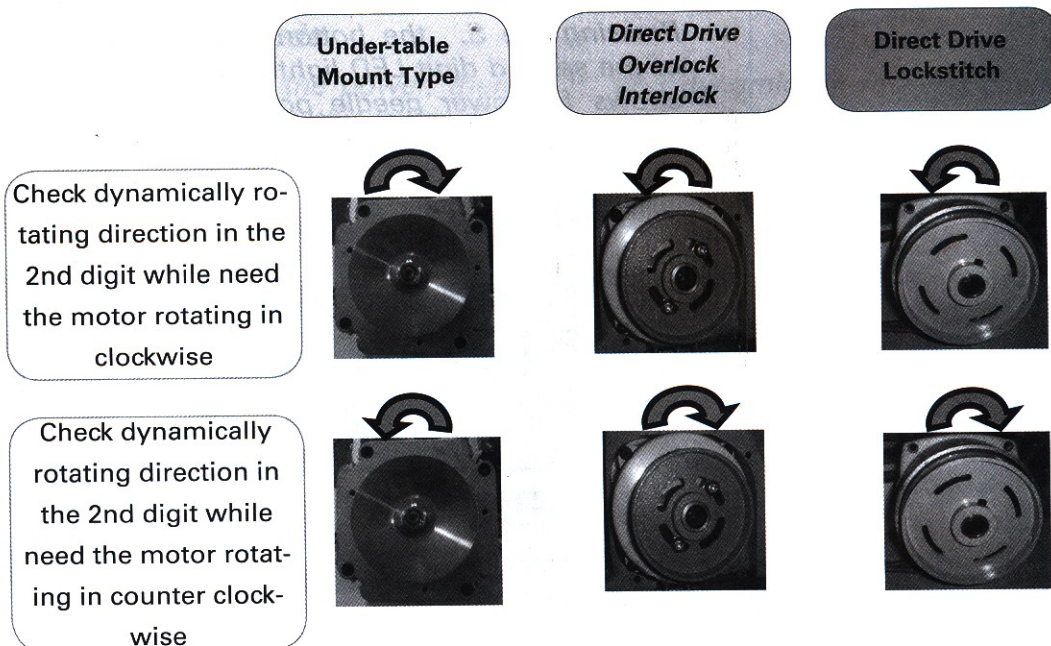


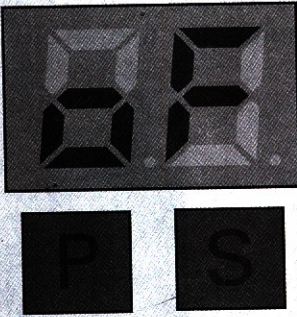
Figure 22

6. Data Saving

When all data is setting ready, press *P*, the LED display will show "oF", means "OK" when data is stored successfully. Otherwise, show "Er"

means failed. (Figure 23 and 24); If the data cannot be stored, turn the power off, and then turn on again in a while. Redo 1 to 6.

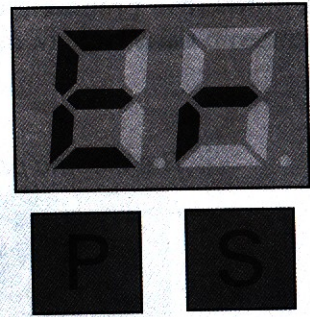
ES55A29-CE



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Figure 23

ES55A29-CE



The Singer Company

Figure 24

7. System Cold-Start

When the control-box cannot work properly, press and hold *S* (Approx. 5 seconds) on the Power On Mode till the LED display shows "oF", meaning "OK" which could reset all the system parameters to the default setting.

6

Troubleshooting

If the machine cannot run, maintenance and operation should be operated under professional trained person.

A. No reaction when turn on the power control box.

Please check if the power plug connected to the socket tightly, or the fuse is burnt, if yes, change the fuse. Open the cover of control box first, and then find the position of fuse (Figure 25), replace new one as same type as before.

IMPORTANT

The electric power plug must be plugged out in case of replacing parts inside control box!

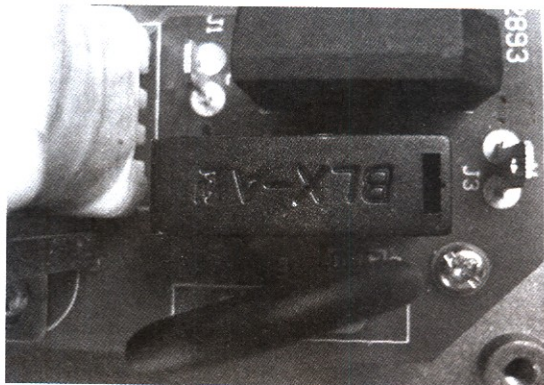


Figure 25

B. Control box power on, but the motor doesn't work when pushing the speed pedal.

Please check if the speed controller plug and motor plug are connected to the socket in control box correctly. Check if the speed controller is broken or not.

C. The rotating speed of motor sometimes fast and sometimes slow.

Please check if the belt is too loose, or the belt pulley slipped, or the pedal and pitman rod connection is loose.

D. The motor suddenly stopped during running.

Please check if the machine load too heavy first or there's any mechanical problems. Then check if the speed controller plug and motor plug are connected to the socket in control box correctly, then check the safety switch (if any) is broken.

E. The motor will run without stop when the control box turned on.

1: Check if the working mode is setting at 0, if setting at other mode without installation of the positioner, the motor will run without stop.

In such case, please reset working mode, contact Singer aftersales service;

2: Check if the position of magnet within speed controller changed. Per descriptions below, Open the plastic cover of speed controller, loose the fixed screw. Then adjust the position of swinging arm (Figure 26 is the position of swinging arm when working), make the magnet within swinging arm on the right up of the hall sensor, (Figure 27 is the position of swinging arm when stopping), generally, the machine could stop. If not, adjust the position again in clockwise direction.

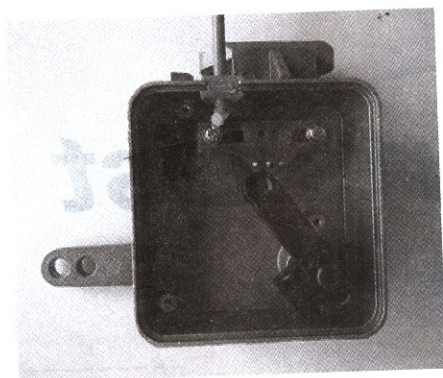


Figure 26

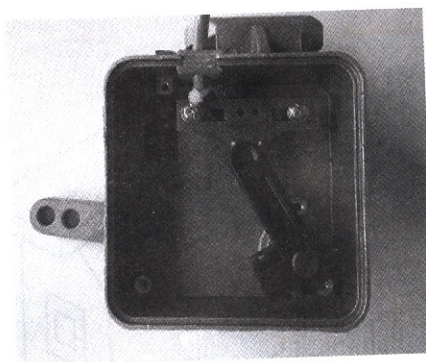


Figure 27

F. "E1" shows in the screen.

The error message shows the motor overloaded, please check if the sewing material is too heavy or the machine needs lubrication.

G. "E2" shows in the screen.

The error message shows the motor has over-current or under-voltage, please check if the power supply voltage is normal, the normal supply voltage should be from 200V to 240V.

H. "E3" shows in the screen.

You need to cut off the power and then turn it on again, or the motor need to be changed.

I. "E4" shows in the screen.

The error message shows the signal of motor hall is wrong. please check if the motor power and signal plug (10 pins Molex) is correctly connected, signal wire of motor hall broken or not, pins inside plug and socket are out of shape or not, or the motor need to be changed.

J. If the fuse has been burnt out (when turn on the power), and the error still existed when change a new and same type fuse, please contact with local distributor.

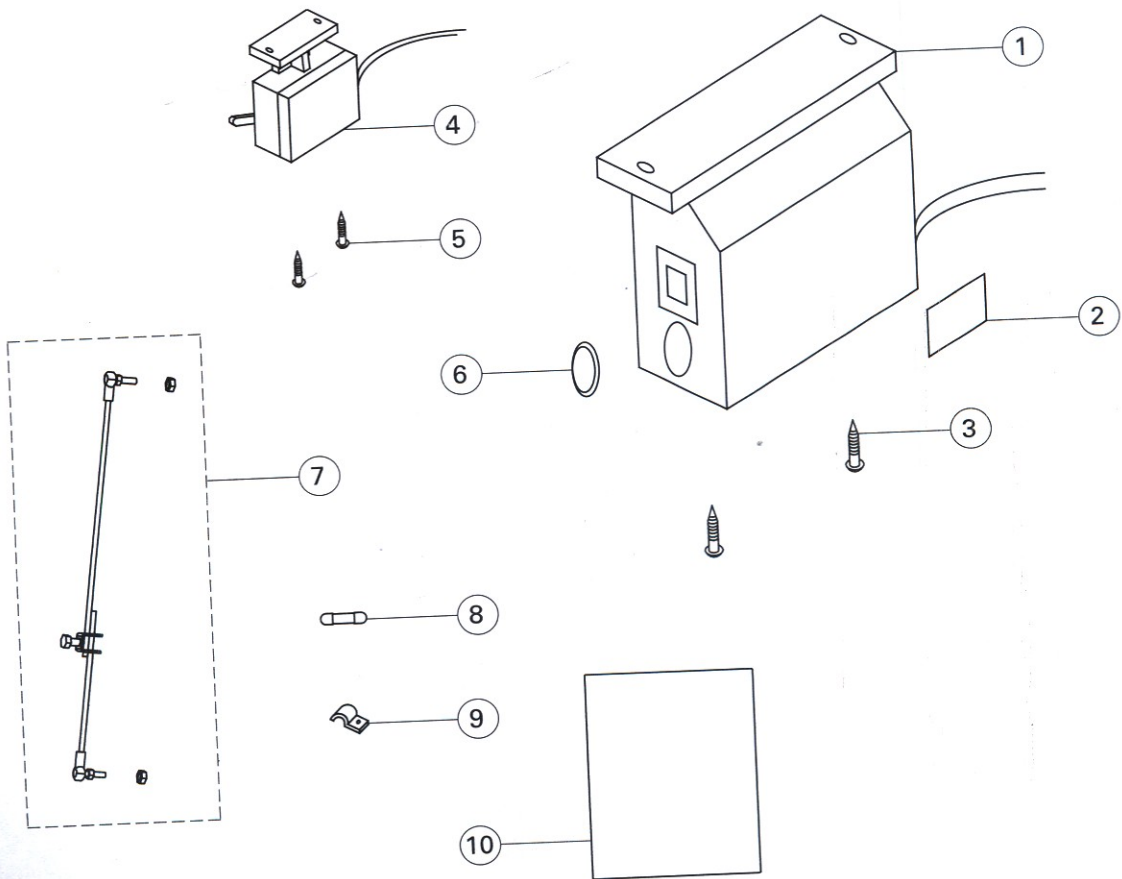
K. If there is any other error message which not included above, please contact with local distributor.



Parts List

7.1

Parts List



7.1

Parts List

No.	Part No.	Descriptions	Qty.
1	3013001200	Control Box (AC 220V)	1
2	8.21.04.020	Rating Plate (AC220V/550W/5500rpm)	1
	8.21.04.021	Rating Plate (AC220V/400W/7000rpm)	1
3	8.20.047	Screw ST6.3x25	2
4	7.03.01.001	Speed Controller	1
5	8.20.038	Screw ST5.5x32	2
6	8.21.03.030	"S" cameo	1
7	8.21.06.001	Pitman Rod	1
8	8.01.11.088	Fuse 8A	1
	8.01.11.038	Fuse 10A	1
9	8.21.06.005	Cable Clips	10
10	364360-001	Instruction Manual	1



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