

***ENGLISH***

**AMS-224EN4530R / AW-3  
AMS-224EN6030R / AW-3  
INSTRUCTION MANUAL**

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# 1. GENERAL

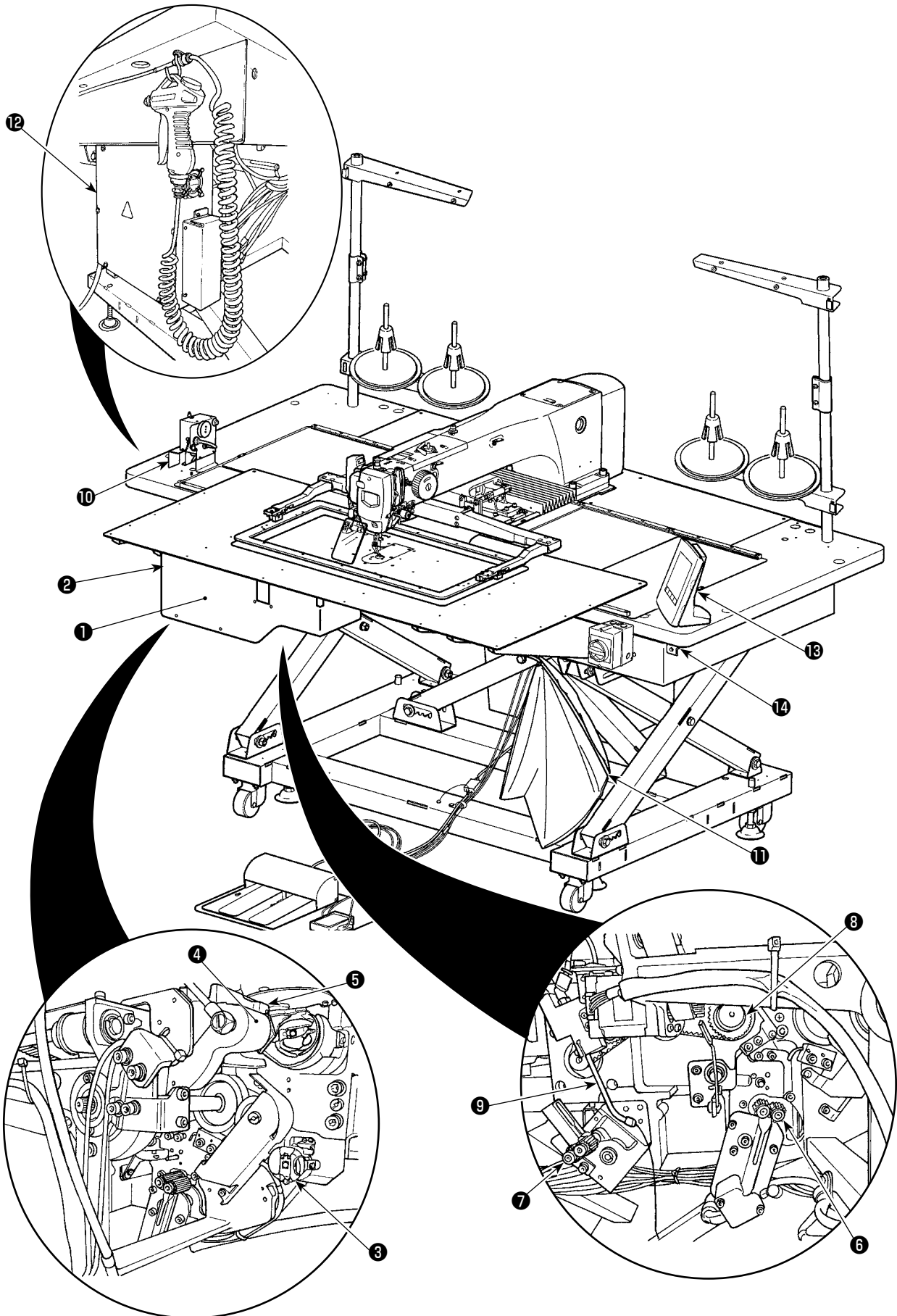
Conventionally, a series of operations including the replacement of bobbin in the sewing machine hook, removal of thread remaining on a bobbin, winding of a bobbin, threading of bobbin case tension spring, and trimming of thread have been carried out manually. Now, this device has been developed to carry out the series of operations full-automatically. This device not only helps increase efficiency of sewing work but also achieves stable product-making in the process that requires high-quality seams.

Refer to the Instruction Manual for the AMS-224EN4530R/IP-420 for the main body of sewing machine.

## 1-1. Specifications of AW-3

1	Applicable bobbin, bobbin case	Exclusive double-capacity bobbin and bobbin case.
2	Applicable thread count	#5 to #30 (Japan), 150 to 50 (TEX), 18 to 60 (TKT)
3	Applicable type of thread	Synthetic thread
4	Remaining-thread removal and bobbin winding operation	Possible while the sewing machine is in operation.
5	Condition setting according to the thread type	Conditions to be met to unravel the thread at the beginning of winding a bobbin can be set.
6	Line voltage	100,120/200,220,240 Vac $\pm$ 10 %, Single phase 50/60 Hz
7	Power consumption	100 VA
8	Air pressure used	0.5 MPa
9	Air consumption	156 N $\ell$ / min (max. value)
10	Dimensions	350 mm (W) $\times$ 290 mm (L) $\times$ 270 mm (H)
11	Mass of the device	10 kg or less (The main body only. The thread draw-out unit and control box are excluded.)
12	Operating temperature range	5 °C to 35 °C
13	Operating humidity range	35 % to 85 % (No dew condensation)
14	Noise	- Equivalent continuous emission sound pressure level ( $L_{pA}$ ) at the workstation : A-weighted value $\leq$ 75 dB ; (Includes $K_{pA}$ = 2.5 dB) ; according to ISO 10821- C.6.2 -ISO 11204 GR2 at remaining-thread removal length = 2 m; Bobbin-thread winding length (22 m).

## 1-2. Configuration



	<b>Name</b>	<b>Function</b>
①	Device main unit	It is mounted under the sewing machine bed and is the mechanical section of the device which carries out changing of bobbin, removal of thread remaining on the bobbin, bobbin winding, threading and thread trimming automatically.
②	Cover	It is used for preventing the worker from coming in contact with the moving section of device.
③	Bobbin setting section	It is the transit place used in the case of putting/removing a bobbin on/from the device.
④	Carrier arm	It is the mechanism for carrying a bobbin case to the hook, bobbin setting section, remaining thread removal section and bobbin winding section.
⑤	Bobbin case chuck unit	It is the mechanism for grasping the bobbin case and loading/removing it in/from the hook. It is mounted at the top end of the carrier arm.
⑥	Remaining thread removal section	It is the mechanism for removing the thread remaining on the bobbin taken out from the hook. It consists of the remaining thread removal roller, suction vacuum, etc.
⑦	Thread unraveling section	This mechanism unravels thread which is wound at the beginning. It consists of a thread unraveling roller, etc.
⑧	Bobbin-thread winding section	It is the mechanism for newly winding thread on a bobbin, threading the bobbin case and trimming the thread. It consists of the clutch plate, threader, thread trimming knife, etc.
⑨	Nozzle	Thread from the bobbin thread cone comes out from the tip of nozzle by way of thread path. The thread coming out of the nozzle is wound on a bobbin.
⑩	Bobbin thread feeding unit	This is the unit for feeding the thread bit by bit from the tip of nozzle and for accurately measuring the length of thread wound on a bobbin.
⑪	Dust bag	It is the bag in which the remaining-thread removed from the bobbin is stored.
⑫	Control box of the device	It is the box which contains the PCB that controls the device operation. This control box is different from the one for the sewing machine.
⑬	Operation panel	This panel is used for setting bobbin-winding/-changing conditions and carrying out bobbin-insertion/-removal operation. Its function is common to that of the operation panel for the sewing machine.
⑭	Device operation lamp	It indicates that the device is in operation.

## 2. INSTALLATION

### 2-1. Installation procedure

Read the Instruction Manual for the main body of sewing machine when installing the device.

#### 2-1-1. Remove packing material from the sewing machine.

#### 2-1-2. Table position adjustment: Only for 6030

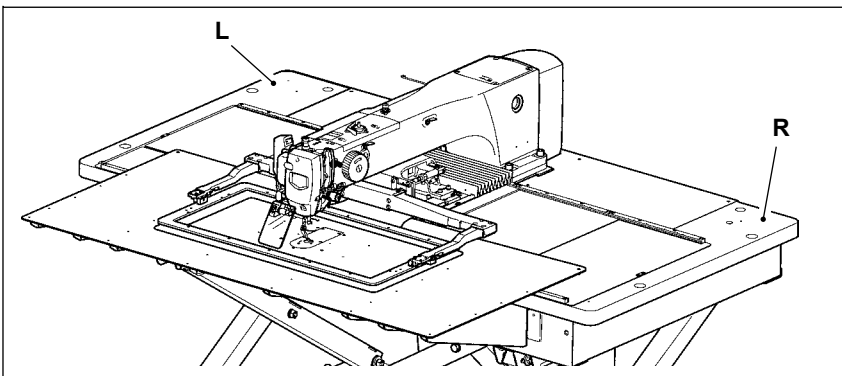
For the 6030, the table has been retracted from the normal position in the factory in prior to shipment.

After unpacking, be sure to carry out the following steps 1) through 9).

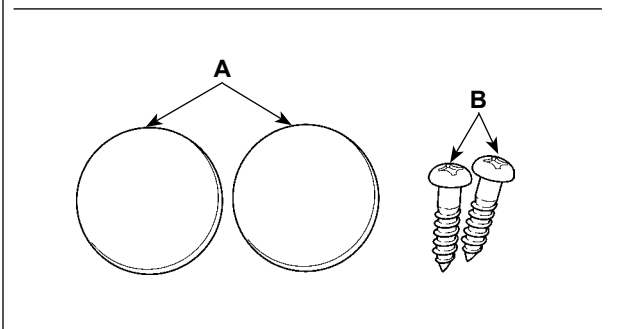


**DANGER :**

The power cable passes through inside the cover. The terminal block is also installed inside the cover. Be sure to turn the power OFF before starting the installation work in order to protect against accident caused by electric shock.



Position adjustment for the left table **L** is described as an example. Adjust the position of the right table **R** in the similar manner.

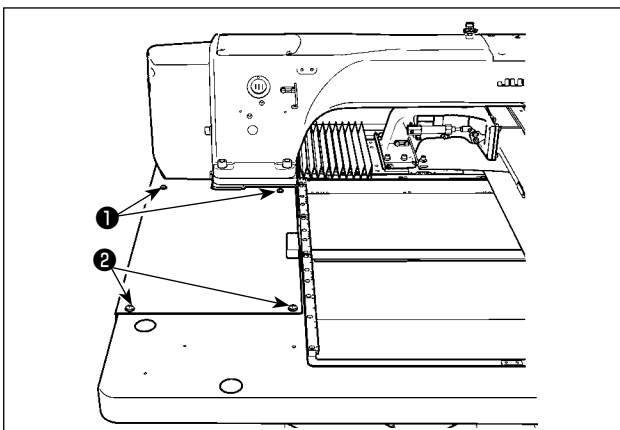


**[Accessories to be used]**

**A:** Table fixing bolt cover  
HX00326000B x 2

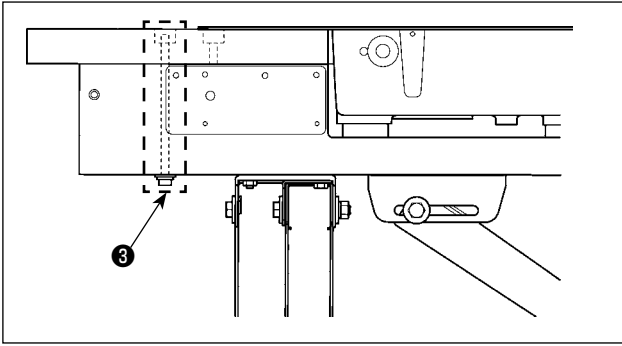
**B:** Power switch setscrew  
SK3512001SE x 2

(Four setscrews are used for the table of the machine for JE.)

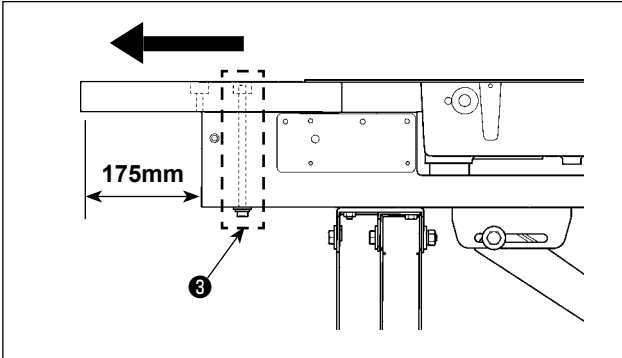


1) Remove screws ① and ② to remove the cover.

\* When removing screw ②, take care not to lose the nut secured on the underside of the table.



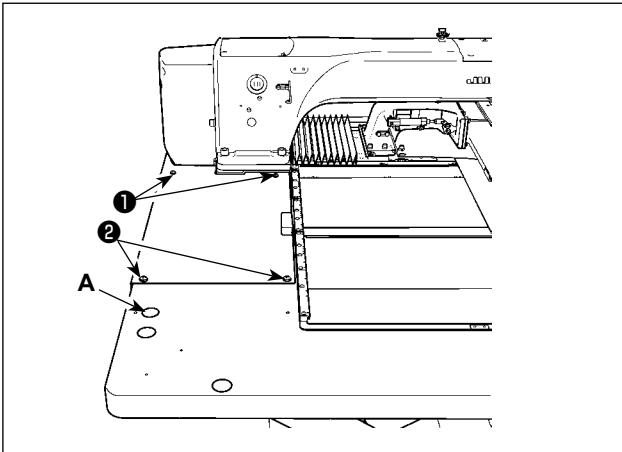
2) Remove table fixing bolts **3** which are mounted at two locations of the table stand.



\* The following steps 3) through 7) are the re-assembly procedure of the table.

3) Shift the table to adjust so that it laterally protrudes from the end of the table stand by 175 mm. For the longitudinal direction, also adjust so that the table protrudes equally (approximately 3 mm on each side) from the end of table stand.

\* If the table is not correctly positioned in the longitudinal direction, the throat plate auxiliary cover may not be removed.



4) Temporarily fix table fixing bolts **3** at two locations from the table stand side.

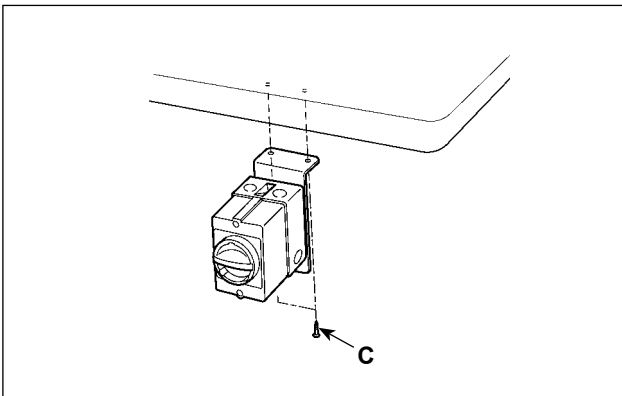
5) Tighten screws **1** and **2** to mount the cover.

\* If the cover and tapped hole do not align, align them by moving the table.

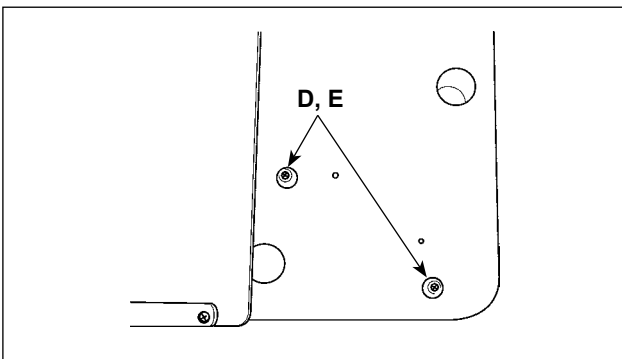
\* Tighten screw **2** after mounting the nut from the underside of the table.

6) Securely tighten the table fixing bolts at two locations from the table stand side. (For reference: Tightening torque: 6 N•m)

7) After mounting the cover, attach the table fixing bolt cover (accessory **A**) in position.

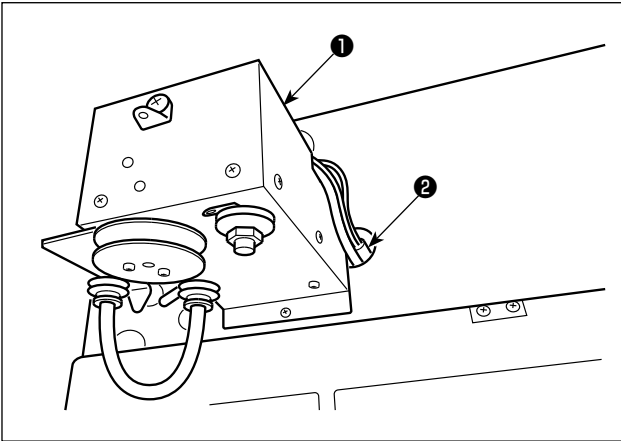


8) Secure the power switch at the punched location on the lower right part of the table using wood screw (accessory **C**).

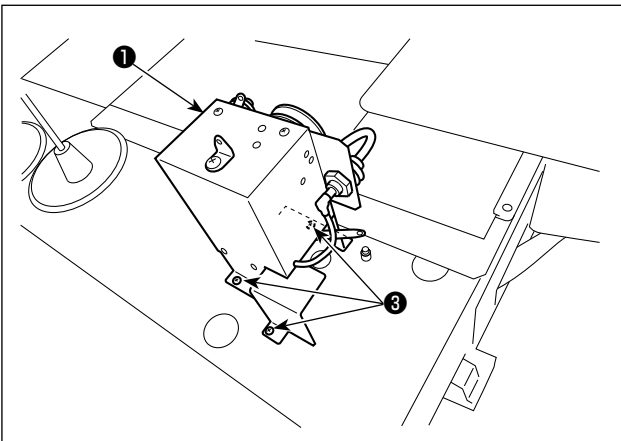


9) Secure the operation panel stoppers (accessory **D**) in the punched locations at near side of the right table using wood screws (accessory **E**).

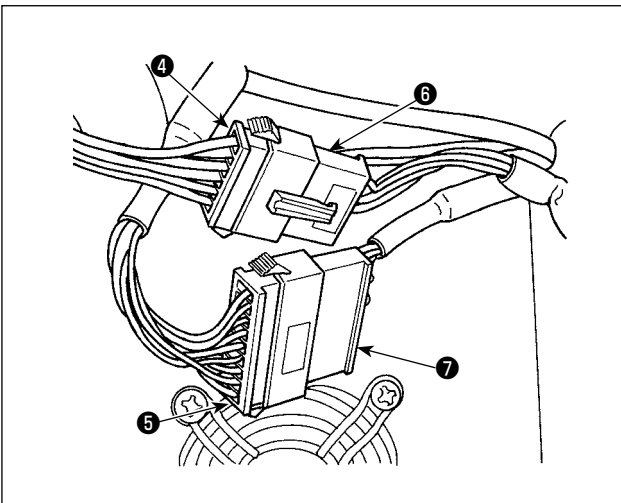
### 2-1-3. Attaching the feed unit



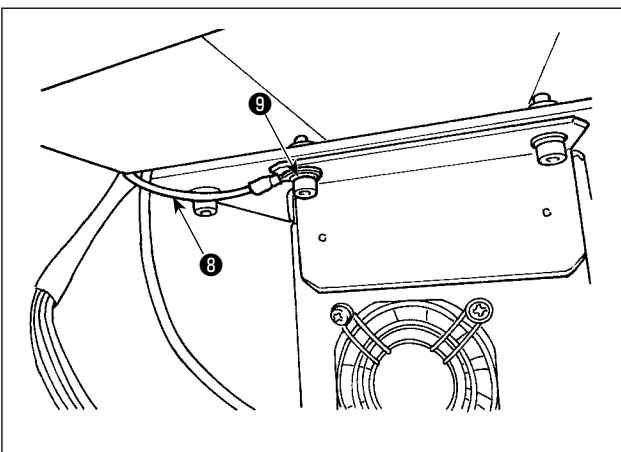
- 1) Connect the tube **2** to the joint of feed unit **1**.



- 2) Attach feed unit **1** to the table with three wood screws **3**. Threaded sections in the table have prepared holes.

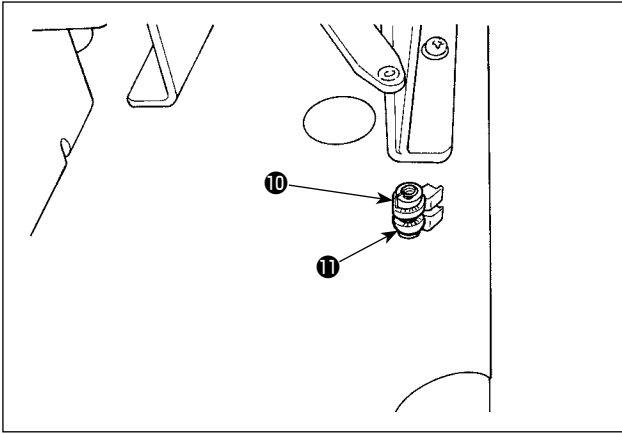


- 3) Connect cable connectors **4** and **5** of feed unit **1** to connectors **6** and **7** on the table stand side.

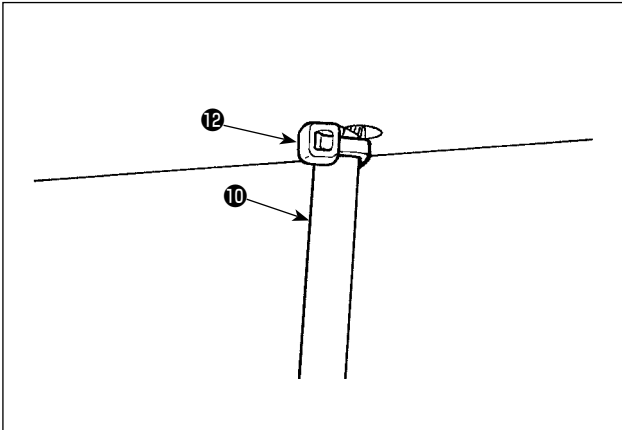


- 4) Connect FG cable **8** of feed unit 1 to control-box mounting screw section **9**.

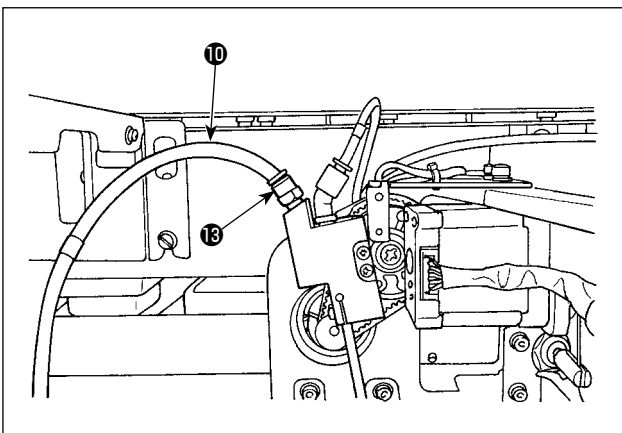




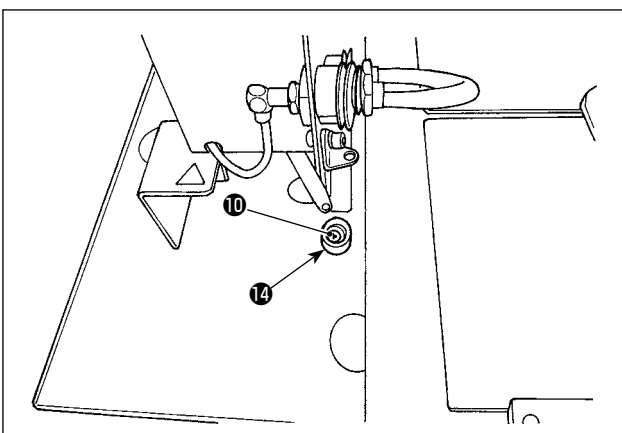
- 5) Pass nozzle thread guide tube **10** through table hole **11**.



- 6) Fix nozzle thread guide tube **10** on the underside of the table hole with cable clip band **12**. Drawing nozzle thread guide tube **10** downward, fix cable clip band **12** with pressed against the table so as to prevent nozzle thread guide tube **10** from fluctuating. Cut out the excess of cable clip band **12**.

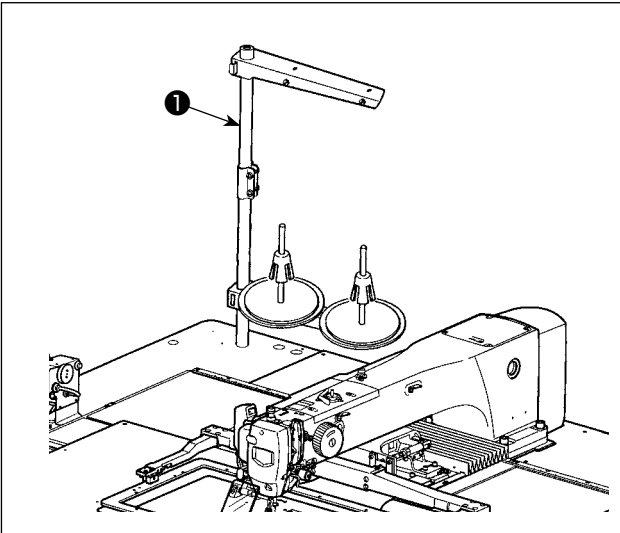


- 7) Connect the other end of nozzle thread guide tube **10** to nozzle joint **13**.

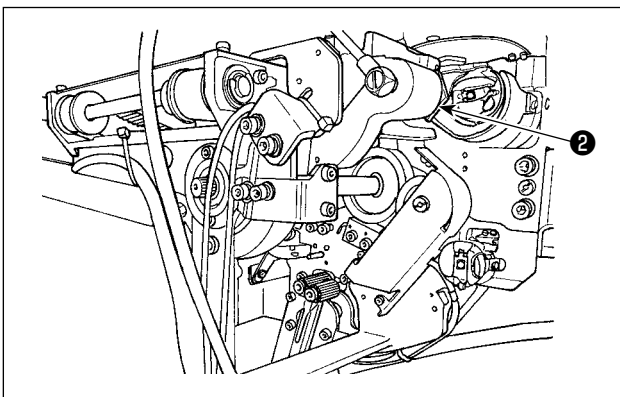


- 8) Fit cable clip band cover **14** over the cable clip band section of nozzle thread guide tube **10**.

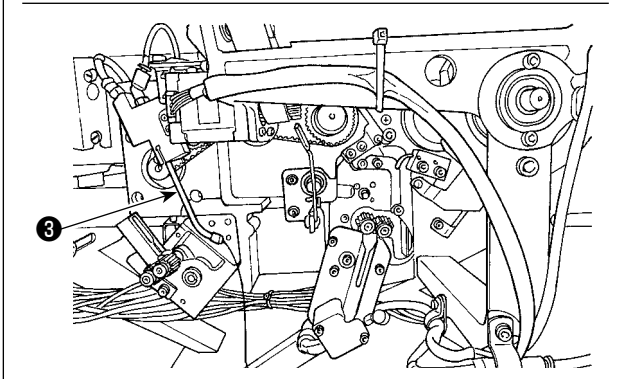
## 2-1-4. Preparing the AW-3



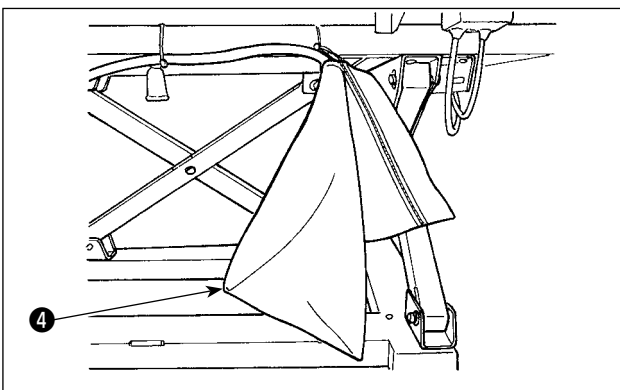
- 1) Install thread stand ❶ on the sewing-machine table.



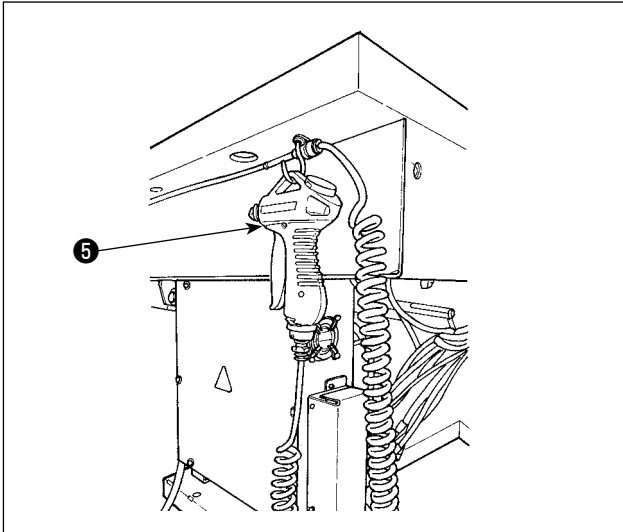
- 2) Cut vinyl string which is used for securing the carrier arm ❷.



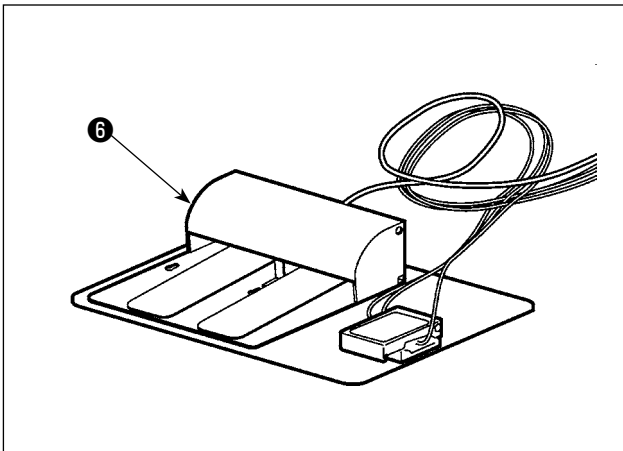
- 3) Cut plastic string which secures the nozzle ❸.



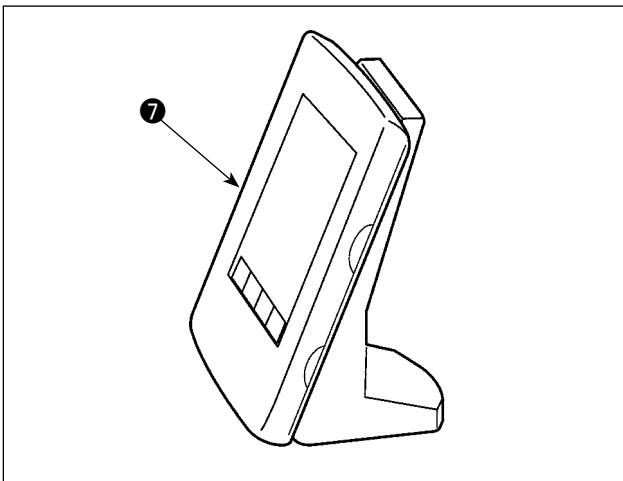
- 4) Take out dust bag ❹ from the accessory box. Attach it to the table stand.



- 5) Remove the adhesive tape which is used for fixing air gun ⑤.



- 6) Take out pedal ⑥.



- 7) Take out panel ⑦.

## 2-2. Installation location

Carefully check the following with respect to the installation location.

- (1) This device uses an optical sensor. In order to protect the optical sensor from malfunctioning, do not install the device at a place such as the place near the window that is exposed to the direct sunlight. In addition, determine the orientation of the device to avoid the direct sunlight.
- (2) Do not use the device at a place near equipment that generates large electrical noise in order to prevent a malfunction. In addition, it is preferable to install the power supply line away from the aforementioned equipment.

### 3. OPERATION PROCEDURE

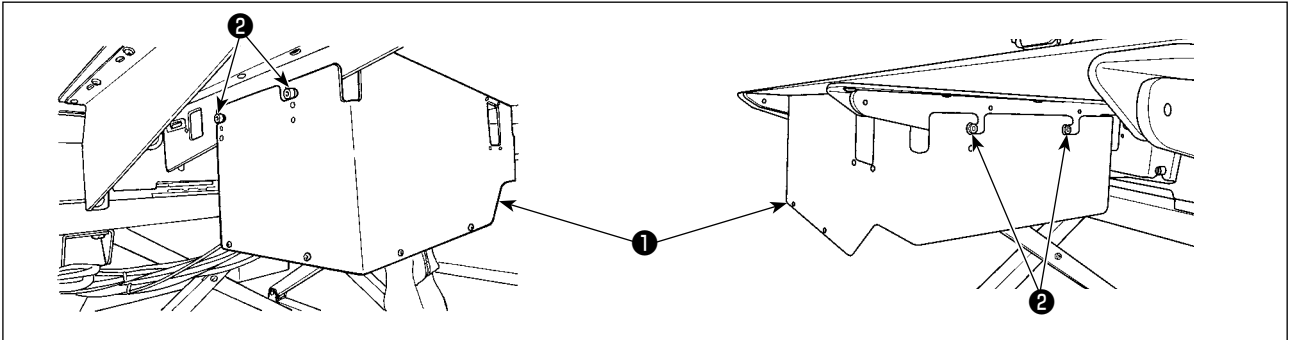


**CAUTION :**

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

#### 3-1. Attaching / removing the cover

It is necessary to remove the front cover ❶ in order to set up the bobbin thread or carry out maintenance. Remove the cover ❶ as described below.



- 1) Loosen four setscrews ❷ on the right and left side faces of the device.
- 2) Slightly shift the cover ❶ upward, then carefully draw it toward you.  
Install the cover ❶ reversing the removal procedure.

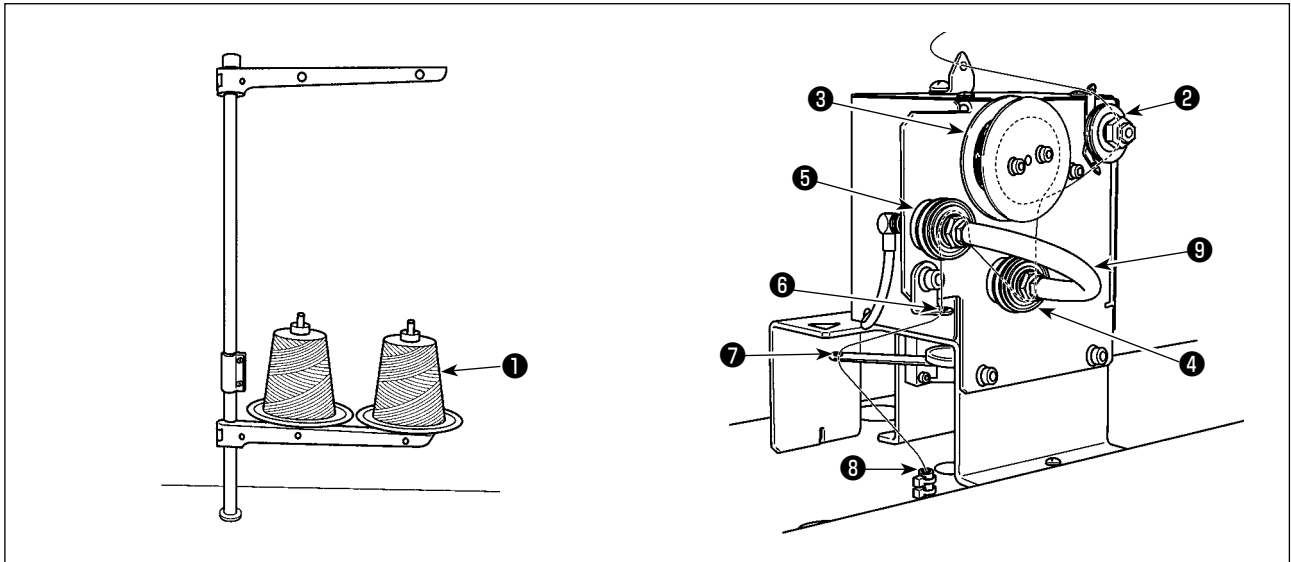



Be sure to attach cover ❶ for the sake of safety when performing sewing.

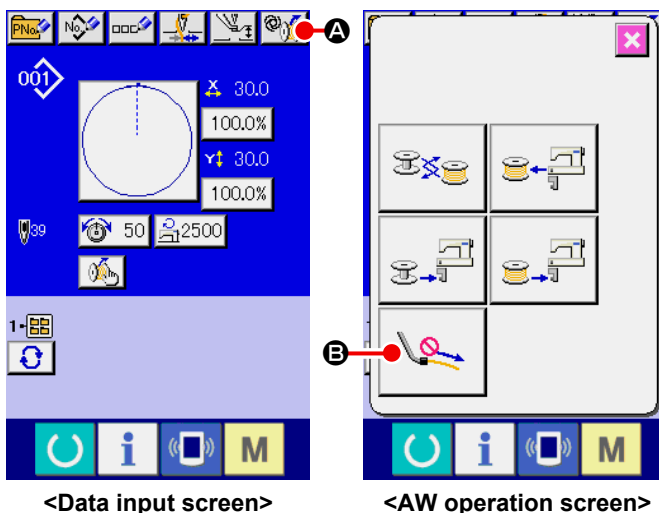
### 3-2. How to thread the device with the bobbin thread



In order to accurately measure the length of thread from the bobbin thread cone ❶ to be wound on a bobbin, guide the thread from the bobbin thread cone ❶ through the bobbin thread feeding unit and draw the thread out from the nozzle as illustrated in the figure.


Install the spool holder disk to the lowest possible position. If it is installed at a high position, an excessive tension will be applied to the thread drawn from the bobbin thread cone ❶, causing a trouble.

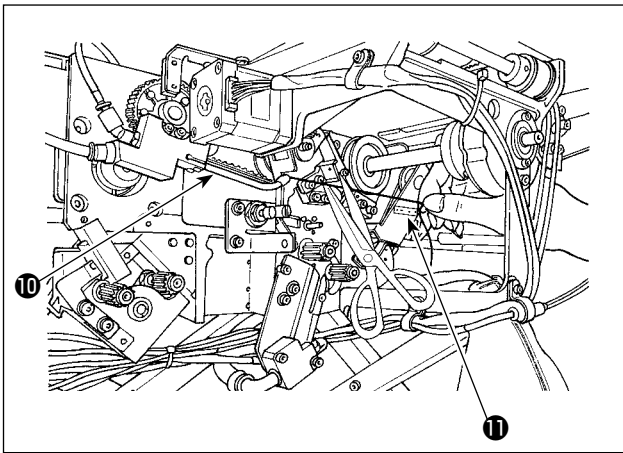


- 1) Insert the power plug to a receptacle and turn ON the power to the device. Press . Wait until initialization operation of the device is completed. (Approx. 10 seconds)
- 2) Pass the thread drawn from bobbin thread cone ❶ through thread tension controller ❷.
- 3) Wind the thread on thread length measuring roller ❸ by one layer.
- 4) Pass the thread through thread guide ❹ by way of tension controllers ❹ and ❺.  
It should be noted that the tube extending between thread tension controllers ❹ and ❺ is intended to prevent thread from tangling on the shaft of the respective thread tension controllers. Pass the thread through the space inside the curved part of tube ❹.
- 5) Pass the thread through the hole in the tip of thread feed arm ❽.




- 6) When the data input screen is displayed on the operation panel, press  A. When the AW operation screen is displayed, press  B.

**Caution** Be aware that the thread feed arm ❽ may operate when  B is pressed.



When the thread is put in thread path tube ⑧, it is sucked. Put the thread in the tube, while pulling the thread from the bobbin thread cone, until the length of thread coming out of the tip of nozzle ⑩ becomes approximately 13 cm. If the thread stops halfway, pull it back slightly several times.

At this time, the bobbin winder nozzle is at its advanced position. In this state, adjust the length of thread while observing the scale on label ⑪ as a guide.

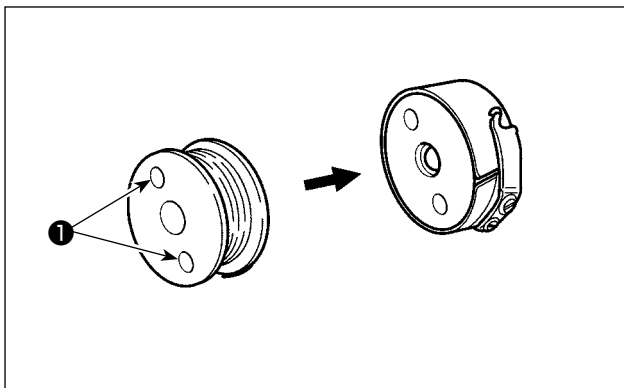
7) Suction is stopped by pressing  ⑨ again.

Basically, adjustment of the thread tension controlled by the thread tension controller is not required.

### 3-3. How to set a bobbin

This device uses two bobbin cases each of which is fitted with a bobbin.

#### (1) How to fit a bobbin in the bobbin case

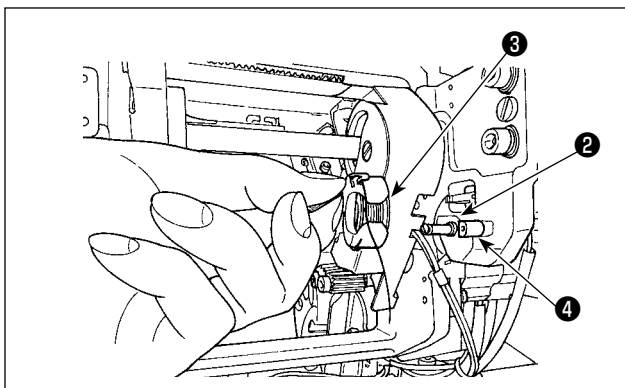


Fit a bobbin in the bobbin case so that clutch holes ① (at two locations) of bobbin are brought to the open side.



**Before fitting a bobbin in the bobbin case, wipe the bobbin case to remove oil and dust. In particular, wipe the shaft section of bobbin case to remove oil and dust. In addition, blow out, with an air gun, oil and dust gathering under the bobbin idling prevention spring in the bobbin case.**

## (2) How to load a bobbin in the device



Load the bobbin case fitted with a bobbin, as described in (1), in bobbin setting section ② of the device.

Load the bobbin case fitted with a bobbin while putting your hand from under the right side of the cover located this side of the device.

Set the bobbin case in such a way that its opening section ③ aligns with lock member ④.

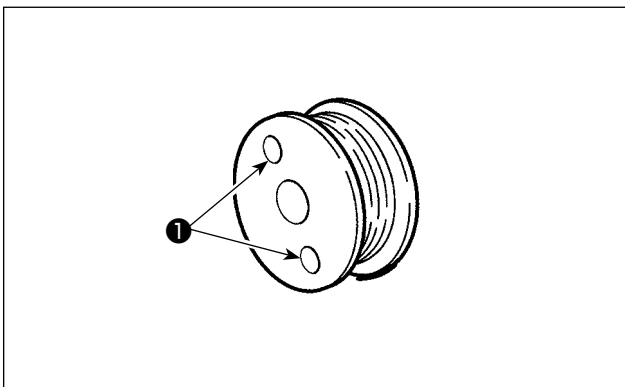
Place the bobbin case in the device with the claw of bobbin case raised. Push the bobbin case in the device fully until it will go no further.



If the bobbin case is not correctly placed in the bobbin setting section ② of the device, an error such that the gripper fails to catch the bobbin case can occur.

If the bobbin case is not correctly placed in the device, the bobbin case can drop from the device without raising its claw. After you have set the bobbin case in the device, make sure that the bobbin case has not dropped from the device.

## 3-4. Length of remaining thread to be removed

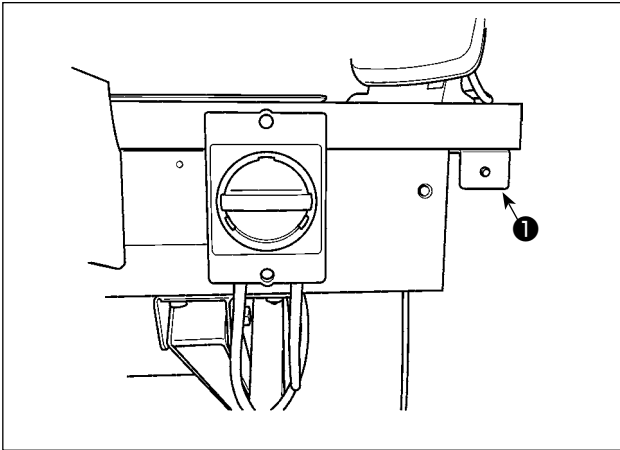


During the remaining-thread removal operation, bobbin clutch holes ① turn as the bobbin rotates. The device recognizes that the remaining thread is being removed by detecting turning of the bobbin clutch holes ①.



The maximum length of remaining thread that can be removed is 8 m. Be aware that a remaining-thread removal error may occur if the bobbin is wound with thread to such an extent that the bobbin clutch holes ① are hidden by the thread. If the length of thread remaining on the bobbin exceeds 8 m, it is necessary to remove the thread from the bobbin by hand.

### 3-5. Device operation lamp



Lamp ❶ mounted next to the power switch indicates that the device is in operation.

Lamp status	Meaning
Light up (ON state)	Indicates that the device is in operation. While the lamp lights up, the device is engaged in removal of remaining thread from the bobbin or winding of a bobbin. Do not turn the power OFF unless there is an emergency.
Light off (OFF state)	Indicates that the device is in the standby state. Make sure that the lamp has gone out before turning the power OFF.



1. In the case the power is turned OFF while the lamp is in the ON state intentionally or unintentionally due to power failure or the like, it is necessary to remove the cover to check whether or not the device is tangled with thread. (Refer to ["3-1. Attaching / removing the cover" p.10.](#))
2. If the device is tangled with thread, remove the thread and draw out thread from the bobbin winder nozzle by approximately 13 cm. Then, attach the cover back. (Refer to ["3-2. How to thread the device with the bobbin thread" p.11.](#))



### 3-6. To use the AW-3

When using the AW-3, the memory switch (level 2) " **K200** " (AW-3 enable/disable setting) must be set to "enable".

No.	Description		Initial value
<b>K200</b>	Enabled		Disabled
	Disabled (AW-3 is not installed)		
	Disabled (AW-3 is installed/with communication) *		
	Disabled (AW-3 is installed/no communication) *		

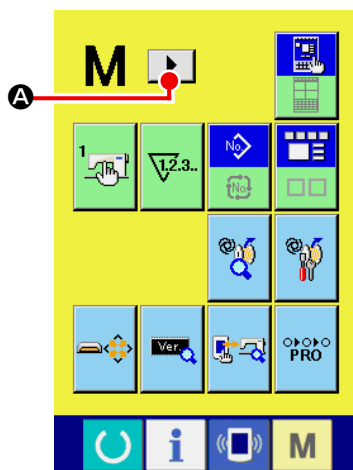
\* Select when the AW-3 is installed but not operated.

If the memory switch is set to "With communication", the version of AW-3 software can be confirmed and rewritten.

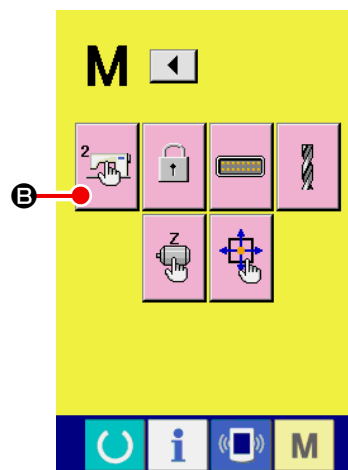


**When the memory switch is initialized, the AW-3 is disabled. Re-set the memory switch " **K200** " to "enable".**

#### [ How to change the memory switch (level 2) ]



<Mode changeover screen>

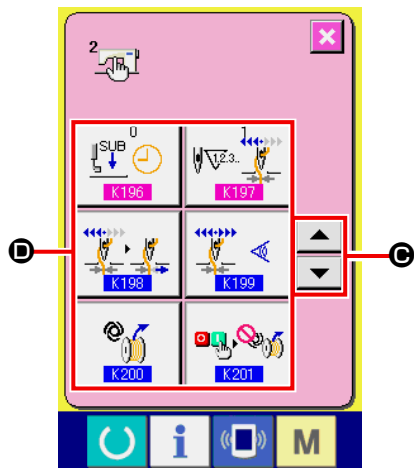


<Mode changeover screen>

#### (1) Displaying the memory switch data (level 2) list screen



When **M** switch is held pressed by approximately six seconds, **A** is displayed on the upper section of screen.

When **A** is pressed to display next page on the screen, memory switch (level 2) **B** is displayed. When the button of **B** is pressed, the memory switch (level 2) list screen is displayed.





<Memory switch data  
(level 2) list screen>

## (2) Selecting the button of memory switch to be changed

Press   **C** to select data item **D** you want to change.

For the memory switch data (level 2) other than " **K200** ", refer to the Engineer's Manual.

## 3-7. Behavior of the AW-3 device when the power is turned ON

When  or  is pressed after the power is turned ON, the AW-3 carries out its initialization operation if it is operated for the first time.



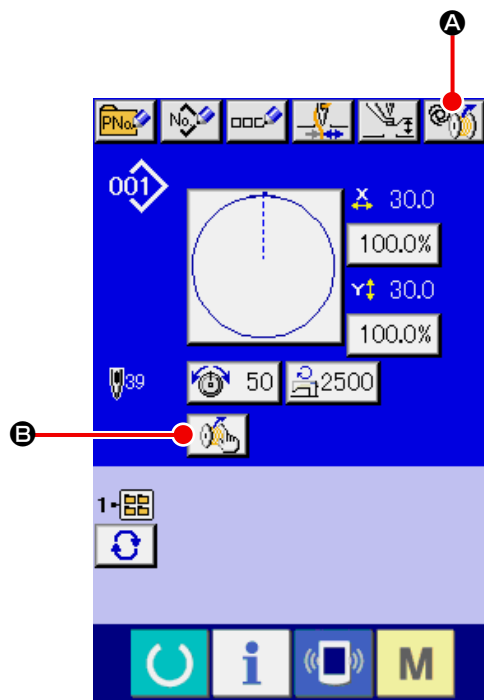
The AW-3 device operates when the power is turned ON, on the assumption that bobbins wound with thread are loaded in the hook and in the bobbin setting section. If the power to the device is turned ON in other situation, it is necessary to operate the AW-3 to load the bobbins. (Refer to "3-8. Basic operation and setting" p.17 for details.)

### 3-8. Basic operation and setting

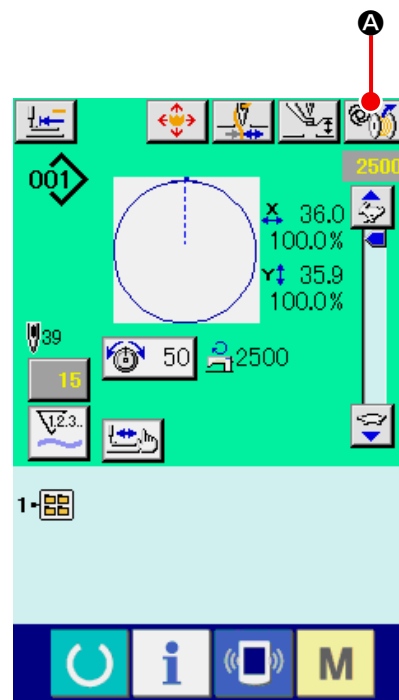
The AMS-224EN is provided with the independent operation function for carrying out setup of the AW-3 and the setting function related to automatic bobbin changing.

Open up the AW operation screen for carrying out the independent operation, or the AW setting screen for carrying out setting.



- \* **The AW operation screen can be opened up from the data input screen or sewing screen.**  
**The AW setting screen can be opened up from the data input screen.**



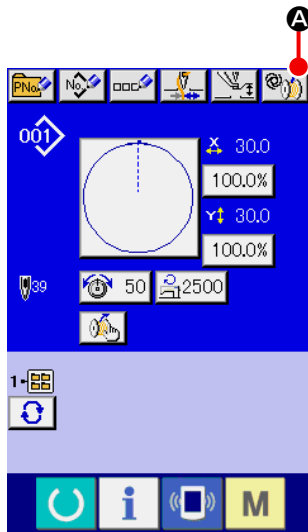
<Data input screen>




<Sewing screen>

	Button and display	Description
A		The AW operation screen is opened up. On the AW operation screen, setup of the AW such as loading/changing of bobbins can be carried out.
B		The AW setting screen is opened up. On the AW setting screen, setting of data related to the automatic bobbin changing such as the bobbin-thread winding quantity can be carried out.

### 3-9. Operating the AW

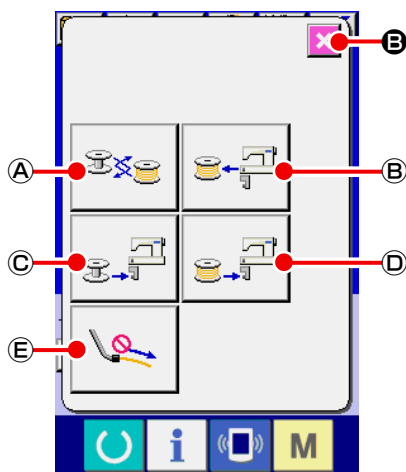


<Data input screen>

When  **A** is pressed on the data input screen, the AW operation screen is displayed.


At this time, the bobbin check screen is displayed when no bobbin is loaded in the device, or the error screen is displayed when an AW error has occurred. On these screens, the error will be reset by completing loading of a bobbin.

The AW operation screen is displayed after resetting the error.



<AW operation screen>

When one of the following buttons is pressed on the AW operation screen, the corresponding independent operation of AW can be carried out.

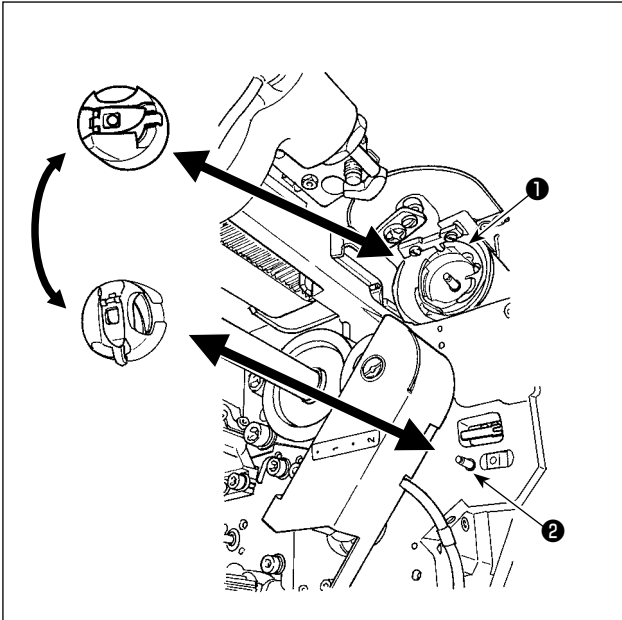
Press  **E** to close the screen.

- A** : Bobbin change button
- B** : Bobbin take-out button
- C** : Empty bobbin loading button
- D** : Threaded bobbin loading button
- E** : Nozzle air button

Detailed explanation will be given from the next page.




**Be aware that an error can be caused if the bobbin in hook ① is directly changed, etc. by hand without operating the AW operation screen after turning the power ON.**





Ⓐ : Bobbin change button

This button is used for winding a bobbin with new thread in the case of changing the thread, etc.

When  Ⓐ is pressed, the bobbin fitted in hook ① is replaced by another bobbin which is present at bobbin case standby position ②. Then, the thread remaining on the bobbin in hook ① is removed and new thread is wound on the empty bobbin.


Ⓑ : Bobbin take-out button


This button is used for taking out the bobbin loaded in hook ①. Take out the bobbin that is present at bobbin case standby position ② by hand before pressing  Ⓑ. Then, when  Ⓑ is pressed, the bobbin loaded in hook ① is brought to bobbin case standby position ②.



Ⓒ : Empty bobbin loading button

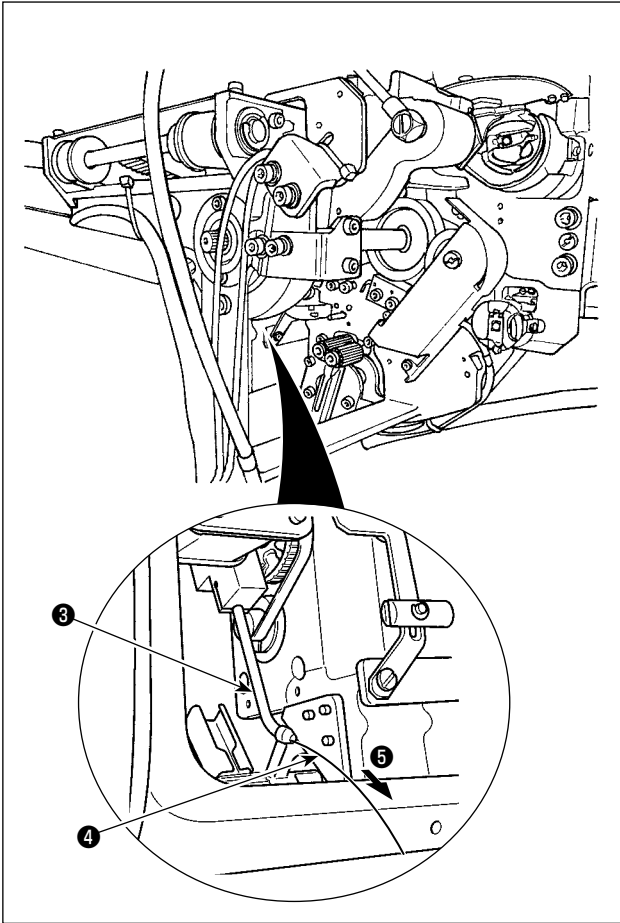
This button is used for loading an empty bobbin in the hook ①.



**Be sure to check that the bobbin to be loaded in the hook ① is empty before pressing  Ⓒ. If a threaded bobbin is loaded in the hook ①, a malfunction can occur when winding the bobbin or removing the thread remaining on the bobbin.**

Place an empty bobbin at bobbin case standby position ② and press  Ⓒ.


- If no bobbin is present in hook ①, the empty bobbin placed as described above will be brought to hook ①. Then, the device waits until the display is restored to the previous one and the next bobbin is placed. The device starts winding a bobbin when  Ⓒ or  Ⓓ is pressed after placing the next bobbin in the hook ①.
- If a bobbin is already present in hook ①, the device will start winding of the bobbin.




ⓓ : Threaded bobbin loading button

This button is used for loading a threaded bobbin in the hook ①.




Be sure to check the bobbin to be loaded in the hook ① is wound with thread before pressing  ⓓ. If an empty bobbin is loaded in the hook ①, a malfunction can occur during sewing.

Place the threaded bobbin at bobbin case standby position ②. Press  ⓓ.

- If no bobbin is present in hook ①, the threaded bobbin placed as described above will be brought to hook ①. Then, the device waits until next bobbin is placed at the bobbin case standby position.
- If a threaded bobbin is present in hook ①, the device will stand ready as it is.

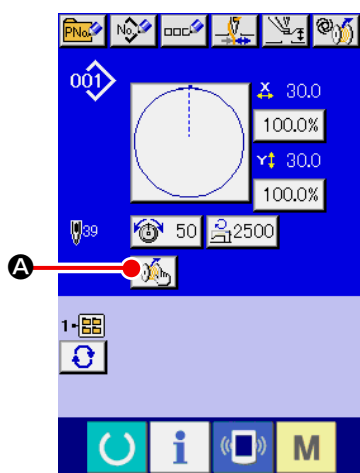
ⓔ : Nozzle air button

This button is used for operating nozzle air ⑤ to feed thread ④ from nozzle ③. Every time  ⓔ is pressed, nozzle air ⑤ status will be changed over between "ON" and "OFF".




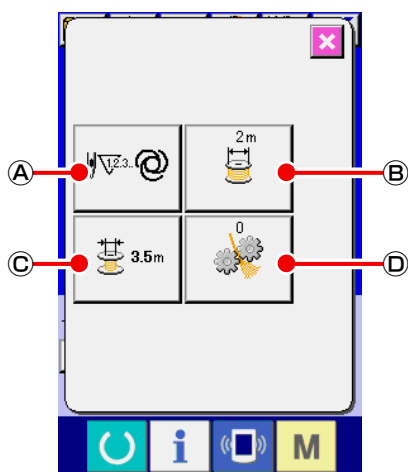
Be aware that the thread feed arm may operate when  ⓔ is pressed.

### 3-10. Setting the AW number-of-stitches input mode, AW operation mode and remaining-thread allowance length



<Data input screen>

When  (A) is pressed on the data input screen, the AW setting screen is displayed.




<AW setting screen>

When one of the following buttons is pressed on the AW setting screen, the corresponding setting of the AW can be carried out.

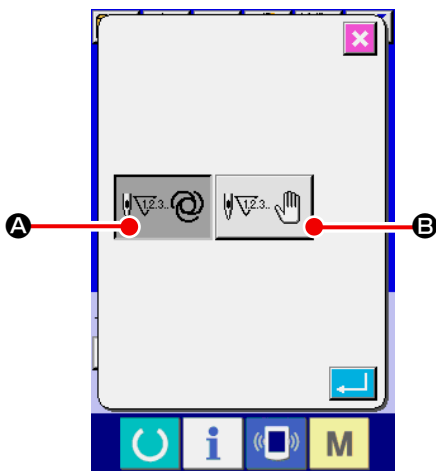
- (A) : AW number-of-stitches input mode setting button
- (B) : Bobbin-thread winding length setting button
- (C) : Remaining-thread allowance length selection button
- (D) : Thread unraveling strength setting button

Detailed explanation will be given from the next page.

### 3-10-1. Setting the AW number-of-stitches input mode

When  (A) is pressed, the AW number-of-stitches input mode setting screen is displayed.

AW bobbin changing method can be set to the "auto" or "manual".



**A** : Auto

The number of stitches to be sewn before changing the bobbin is automatically selected from read-in patterns and the preset bobbin-thread winding lengths. In addition, the number of stitches to be sewn before changing the bobbin is automatically updated according to the remaining-thread allowance length at the time of changing the bobbin. In the case the "auto" is selected, the updated number of stitches will be returned to the initial value by carrying out one of the following operations.

<AW number-of-stitches input mode setting screen>

- In the case of reading in a pattern on the AW operation screen
- In the case the bobbin change is carried out on the AW operation screen
- In the case the bobbin is taken out on the AW operation screen
- In the case the bobbin thread winding length is changed on the AW setting screen
- In the case of changing the AW number-of-stitches input mode from "manual" to "auto"



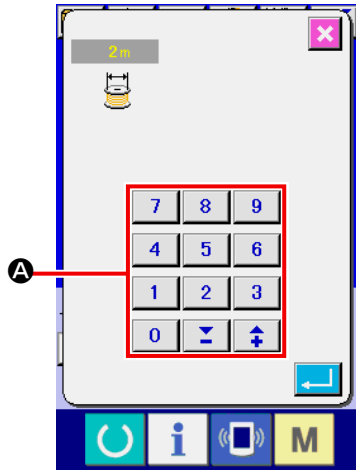
1. If the remaining-thread allowance length setting does not match the sewing conditions, the bobbin thread may run out during sewing.
2. If the remaining-thread allowance length is set to a small value, the bobbin thread may run out due to changes in bobbin-thread consumption. It is therefore necessary to check the actual remaining-thread length before changing the set value.
3. If the remaining-thread allowance length is 3.5 m, some waiting time can occur according to the swing conditions such as the thread count, bobbin-thread winding length and sewing pattern. In such a case, check the actual remaining thread length and re-set it.
4. If the bobbin thread tension of two bobbins differs, the remaining-thread length will also differ. It is necessary, therefore, to adjust so that the bobbin thread tensions of two bobbins are equal.
5. Automatic update of the preset number of stitches is carried out from the fourth automatic change of bobbin.
6. Under the trial stitching mode, the preset number of stitches is not automatically updated. In addition, note that the preset number of stitches is initialized after the completion of trial stitching.

**B** : Manual


Bobbin is changed according to the number of stitches to be sewn before changing the bobbin. Under the manual mode, the number of stitches to be sewn before changing the bobbin is counted using the bobbin thread counter on the counter setting screen.



### 3-10-2. Bobbin-thread winding length



<Bobbin-thread winding length setting screen>

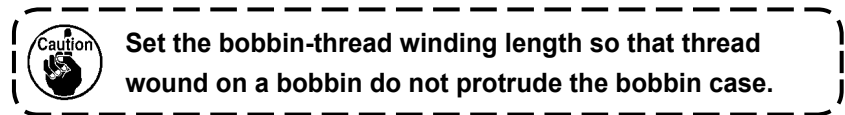
When  (B) is pressed, the bobbin-thread winding length setting screen is displayed.

(A) : Numeric keypad

Bobbin-thread winding length can be entered with the numeric keypad.

Bobbin-thread winding length : Min. 2 m

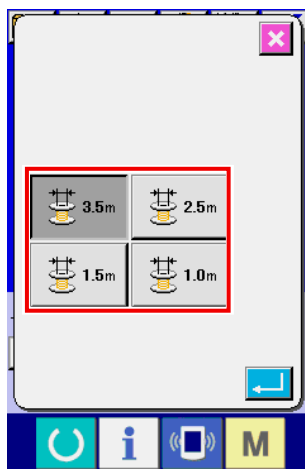
Max. 200 m




Refer to the table shown below for a guide for the bobbin-thread winding length.

# 5	TEX 150	TKT 18	13 m
# 8	TEX 90	TKT 30	27 m
# 20	TEX 60	TKT 40	34 m
# 30	TEX 50	TKT 60	56 m

### 3-10-3. Selecting the remaining-thread allowance length



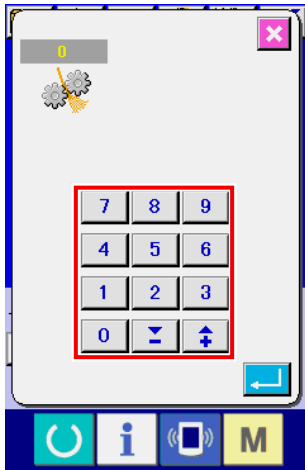
<Remaining-thread allowance length selection screen>

When  (C) is pressed on the AW setting screen, the remaining-thread allowance length selection screen is displayed.


One of the four different remaining-thread allowance lengths (3.5 m/ 2.5 m/ 1.5 m/ 1.0 m) can be selected on the remaining-thread allowance length selection screen.

The remaining-thread allowance length is used when the bobbin change method is set to "auto".

### 3-10-4. Setting the thread unraveling strength



<Thread unraveling strength setting screen>

When  is pressed on the AW setting screen, the thread unraveling strength setting screen is displayed.

Thread unraveling strength can be set in five different stages as 1 to 5 on the thread unraveling strength setting screen. If "0" is entered for the thread unraveling strength, thread unraveling will not be carried out.

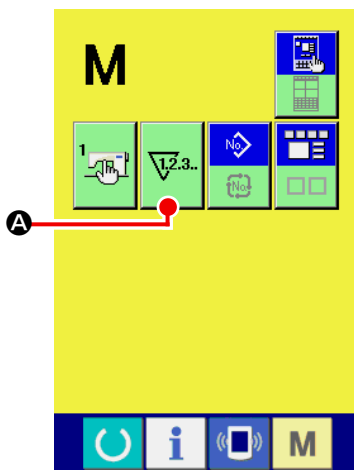
In the case the thread is stiffened with resin such as the bond thread (coating thread), it is not possible to wind the thread on a bobbin. In such a case, enable the thread loosener to allow it to loosen the thread end.

The thread loosener operates to loosen the thread end. Its reference set value is "1". The larger the set value becomes, the more times the thread loosener operates in repetition according to the set value.



1. Thread loosening operation takes time. It is recommended to minimize the set value as long as the thread can be wound on a bobbin. The larger the set value becomes, the longer time is required for bobbin winding. In such a case, sewing cannot be started until the bobbin replacement is completed.
2. Do not enable the thread loosener when using any thread other than the bond thread (coating thread). If the thread loosener is enabled when using any other thread, the thread will be fluffed and will be caught in the bobbin. In such a case, the thread remaining in the bobbin cannot be completely removed.

### 3-10-5. Setting the number of stitches to be sewn before changing the bobbin




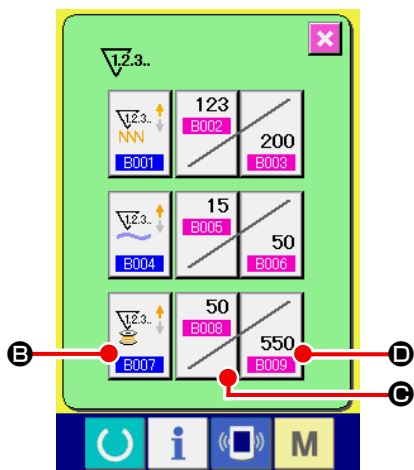
<Mode changeover screen>



The number of stitches to be sewn before changing the bobbin has to be set only under the manual mode. In the case of the auto mode, preset number of stitches will be automatically updated.

The number of stitches to be sewn before changing the bobbin is set on the counter setting screen. The bobbin thread counter indicates the number of stitches to be sewn before changing the

bobbin. Press  **A** on the mode changeover screen to display the counter setting screen.



<Counter setting screen>

**B** : Number-of-stitches counter type button  
 When this button is pressed, the counter-type screen is displayed. Counting method can be selected between the UP counter and DOWN counter. Do not select "disable the counter".

**C** : Counter current-value button  
 When this button is pressed, the counter current-value screen is displayed. On this screen, the current count value can be set and cleared. The unit of the counter set value is "×10" stitches.

**D** : Counter set value button  
 When this button is pressed, the counter set value screen is displayed. On this screen, the counter set value can be set and cleared. The unit of the counter set value is "×10" stitches.

Number of stitches : Min. 10 stitches (Display: 1)  
 Max. 99990 stitches (Display: 9999)

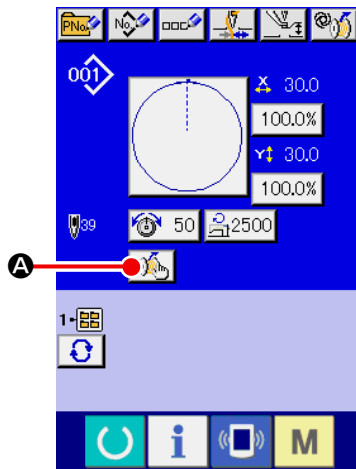


1. Under the automatic mode, the set value of counter is automatically updated. So, do not change it.
2. The remaining-thread length is 8 m at the maximum.  
 Be aware that a remaining-thread removal error may occur if the length of thread to be removed exceeds 8 m. It is recommended to set the number of stitches to be sewn before changing the bobbin so that the remaining thread length is 8 m or less.

### 3-11. Example of operation


This clause gives an example of how to actually operate the device.

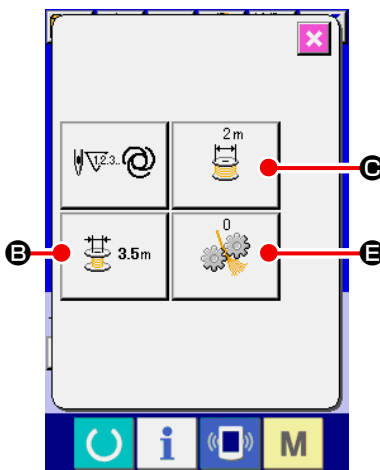
- (1) In the case both of the two bobbins have been taken out of the device or both of the two bobbins are empty



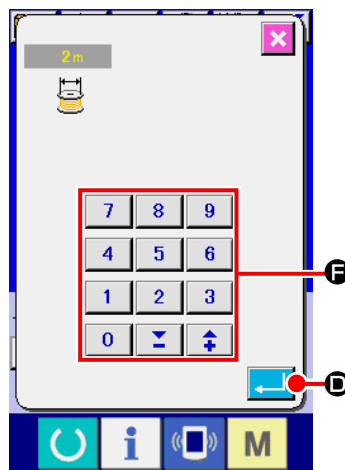
<Data input screen>

- 1) Turn the power to the device.
- 2) Set the bobbin-thread winding length to be wound on a bobbin.


Press  **A** on the data input screen.




<AW setting screen>

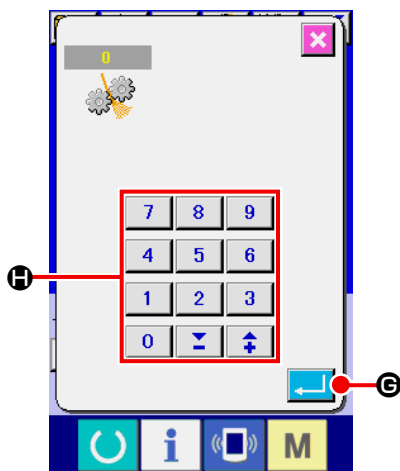


<Bobbin-thread winding length setting screen>

Press  **C** on the AW setting screen.


Set the bobbin-thread winding length using the +/- button or the numeric keypad **F** on the bobbin-thread winding length setting screen.

After the entry of bobbin-thread winding length, press  **D**.




<Thread unraveling strength setting screen>

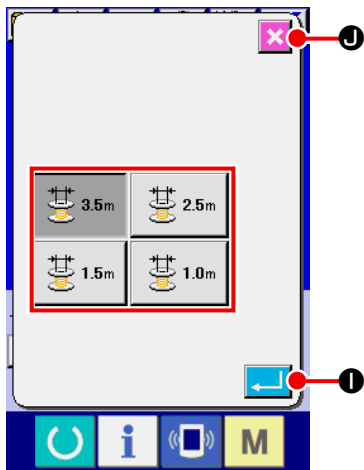
- 3) Setting the thread unraveling conditions

Press  **E** on the AW setting screen.

( 0: Without thread unraveling function )  
( 1: Min. to 5: Max. )

Then, specify the thread unraveling conditions using the +/- button or the numeric keypad **H**.


After the entry of bobbin-thread winding length, press  **G**.



<Remaining-thread allowance length selection screen>

4) Set the number of stitches where necessary. It is necessary to set the number of stitches without exceptions in the case the "manual" is selected.


\* In the case the "manual" is selected, set the counter set value on the counter setting screen.

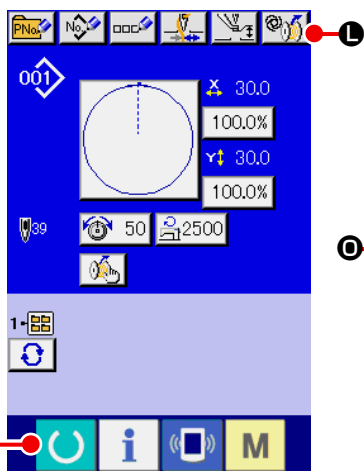
\* In the case the "auto" is selected, press  **B** on the AW setting screen.

Select the remaining-thread allowance length from among 3.5 m/ 2.5 m/ 1.5 m/ 1.0 m.

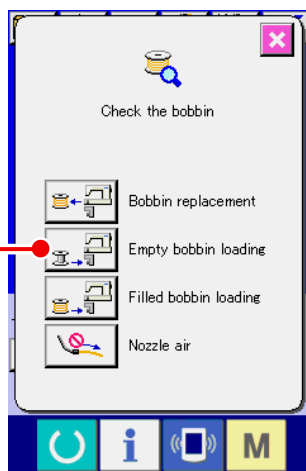
After the entry of bobbin-thread winding length, press 

**I**.


Press  **I** to return to the data input screen.




<Data input screen>

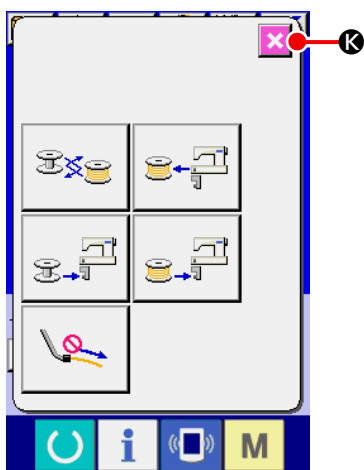


<Bobbin check screen>

5) Press  **L**. Wait until the initialization operation of the device is completed.

6) Place the first bobbin in the bobbin setting section. Then, press 

**O**. The bobbin is taken in the device. (Refer to "[3-3. How to set a bobbin](#)" p.12 for the bobbin setting procedure.)





<AW operation screen>

7) Subsequently, place the second bobbin in the bobbin setting section.

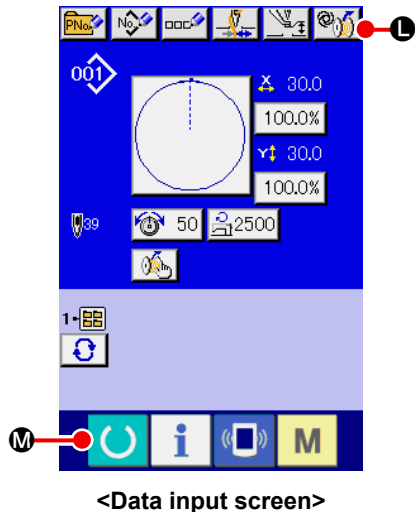
8) Press  **O** in the similar manner.

9) Now, the device starts winding bobbin. Wait a moment until the device completes winding of bobbin.

10) Press  **K** to return to the data input screen. Press 

**M** to display the sewing screen. Once the sewing screen is displayed, sewing can be started.

(2) In the case both of the two bobbins have been taken out of the device or one (or both) of the two bobbins is wound with thread



In this case, the steps of procedure to be taken up to step 5) are same with those in the case of (1). From step 6), take the following steps of procedure.

- Place the first bobbin in the bobbin setting section. (Refer to "3-3. How to set a bobbin" p.12 for the bobbin setting procedure.)

In the case the bobbin placed is:

- empty bobbin, press (L), then press (O).
- already wound with thread, press (L), then press (P).

The bobbin is placed in the hook.

- Subsequently, place the second bobbin in the bobbin setting section.

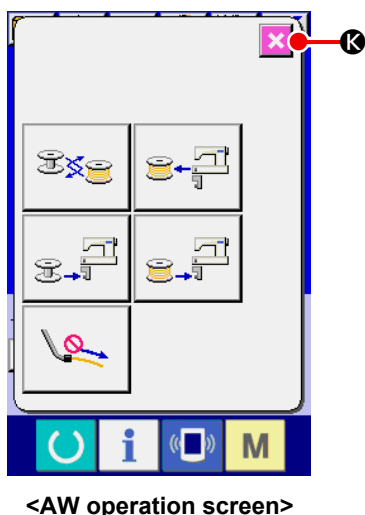
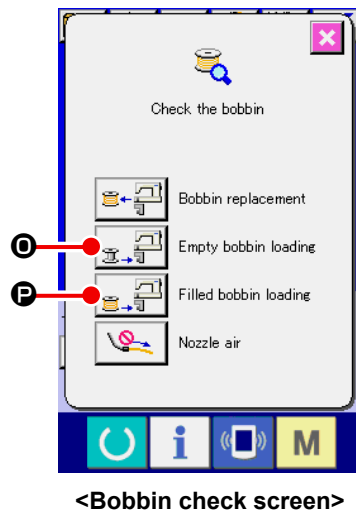
- As with step 6), in the case the bobbin placed in the bobbin setting section is:

- empty bobbin, press (L), then press (O).
- already wound with thread, press (L), then press (P).

The bobbin is placed in the hook.

- Press (K) to return the screen to the data input screen.

Press (M) to display the sewing screen. Once the sewing screen is displayed, sewing can be started.

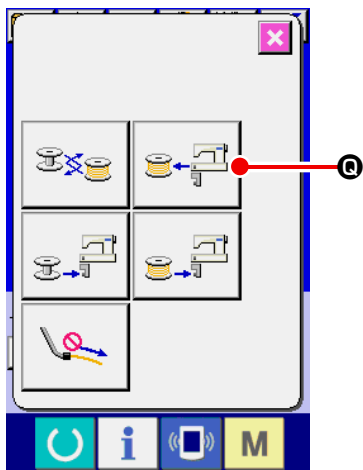


If one of the bobbins is empty, the device winds thread on the bobbin. After the device completes winding of the bobbin, it enters the standby state waiting for the moment to change the bobbin.

**Special care should be taken when using a bobbin that has been already wound with thread, since the preset number of stitches may not be sewn in its entirety (i.e, bobbin thread may run out during sewing) if the quantity of thread wound on the bobbin is not sufficient.**


It is recommended to avoid the use of bobbin which has been used halfway or the bobbin wound with unknown quantity of thread (or to use such a bobbin after removing the thread wound on it by hand until it becomes empty) in order to totally prevent the aforementioned problem. If it is necessary to use the bobbin which has been used halfway, it is necessary to set the number of stitches to a smaller value. The quantity of thread to be removed from a bobbin is large initially, but it will become more and more adequate if the "auto" is selected.

### (3) In other case





<AW operation screen>

(In the case one or two bobbins are loaded in the device (including the hook) other than the case (2).)

- 1) Turn the power to the device.
- 2) If a bobbin is loaded in the bobbin setting section, take it out.
- 3) If any other bobbin still remains in the device (or in the hook), press  **A** to make the bobbin setting section to feed the bobbin to a position at which the bobbin can be taken out.

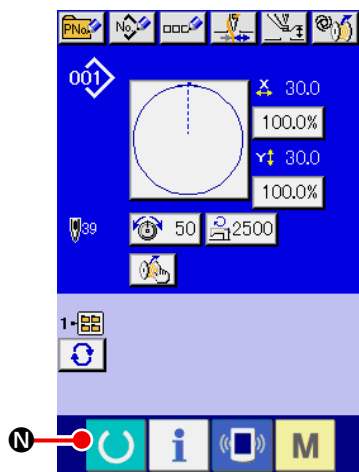
Then, carry out the operation procedure (1) or (2).

**Be sure to carry the bobbin to the bobbin setting section with  **A** before removing the bobbin which is placed in the hook where necessary. If you attempt to remove the bobbin directly from the hook, the sewing machine may operate while no bobbin is placed in the hook.**




**Caution**

### (4) In the case the device remains in the finished state of previous sewing



<Data input screen>

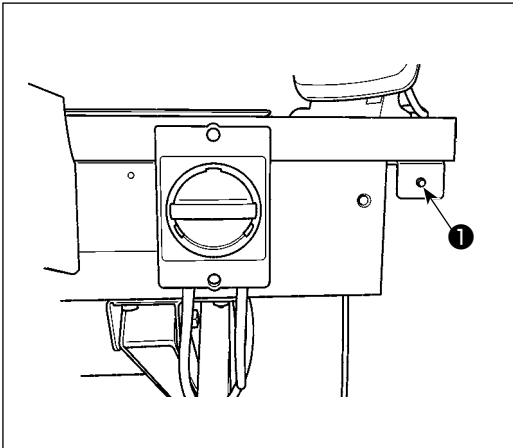
(In the case the previous sewing has been normally finished, and one bobbin is placed in the hook and the other bobbin is placed in the bobbin setting section.)

- 1) Turn the power to the device.
- 2) Press  **N** to display the sewing screen. Once the sewing screen is displayed, sewing can be started.

In other words, the operation required in the aforementioned state is only to turn ON the power to the device. Note that the number of stitches is set at the value that is effective at the end of previous sewing. So, sewing can be started continuously from the previous sewing.

### 3-12. Turning OFF of the power

Do not turn OFF the power to the device in the following cases unless there is an emergency.



Device movement:

- ① While the device is engaged in the removal of thread remaining on the bobbin
- ② While the device is engaged in bobbin winding, threading or thread trimming


If the power is turned OFF while the device is performing one of the aforementioned procedures, the bobbin case will move while the thread is still engaged with the bobbin, causing troubles such that the mechanism is entangled with thread.

In the case of aforementioned ① or ②, device operation lamp ❶ is on. Do not turn OFF the power to the device while device operation lamp ❶ is lighted.



### 3-13. Error display and error handling procedure

If any of the following errors occurs while the device is in operation, the relevant error is displayed on the operation panel. Handle the errors according to the table shown below. Errors which are not included in the table below must be handled after turning OFF the power to the device once.

Refer also to "5. TROUBLESHOOTING" p.40.

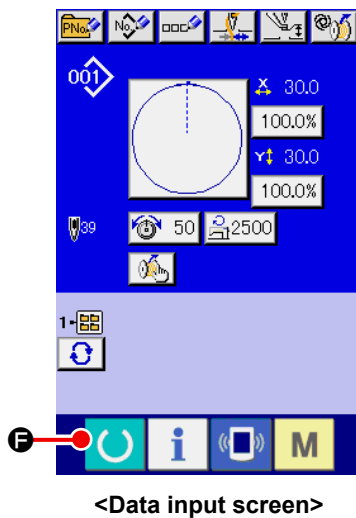
Error code	Description	Error handling procedure
E074	Thread remaining on the used-up bobbin cannot be removed after changing the bobbin.	<ol style="list-style-type: none"> <li>① Take out the relevant bobbin from the bobbin setting section. If any thread remaining on the bobbin, remove it by hand.</li> <li>② Load the bobbin again in the bobbin setting section. Press  displayed on the error screen. The device takes the bobbin in it and starts winding the bobbin.</li> <li>③ When the bobbin winding is completed, the error screen is closed.</li> </ol>



Error code	Description	Error handling procedure
E075	When winding a bobbin, the device has failed to tangle the thread in the hook.	<ol style="list-style-type: none"> <li>① Take out the relevant bobbin from the bobbin setting section. If any thread remaining on the bobbin, remove it by hand.</li> <li>② Check to be sure that the thread appears properly from the nozzle.</li> <li>③ Load the bobbin again in the bobbin setting section. Press  displayed on the error screen. The device takes the bobbin in it and starts winding the bobbin.</li> <li>④ When the bobbin winding is completed, the error screen is closed.</li> </ol>
E076	A fault has occurred during bobbin winding.	<ol style="list-style-type: none"> <li>① Take out the relevant bobbin from the bobbin setting section. If the thread is engaged with the bobbin, cut off the thread. If any thread remaining on the bobbin, remove it by hand.</li> <li>② Check to be sure that the thread appears properly from the nozzle.</li> <li>③ Load the bobbin again in the bobbin setting section. Press  displayed on the error screen. The device takes the bobbin in it and starts winding the bobbin.</li> <li>④ When the bobbin winding is completed, the error screen is closed.</li> </ol>
E077	After bobbin winding, an fault has occurred during the threading of tension regulating spring of bobbin case or during thread trimming after threading the spring.	Same as E076.

### 3-14. Detection of errors related to the AW

#### 3-14-1. Error detection under the normal conditions

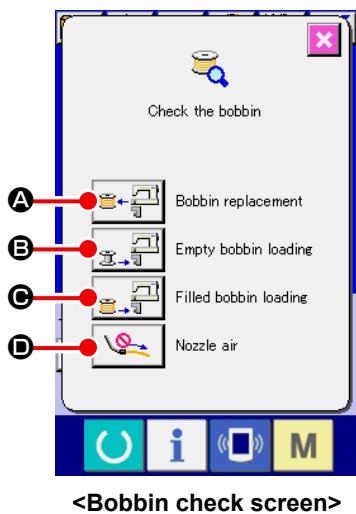


If **E** is pressed or use of any function of the AW device is attempted in the state no bobbin is loaded in the AW (in the state two bobbins are not loaded) or in the state an error has been detected on the data input screen, the AW error screen will be displayed.

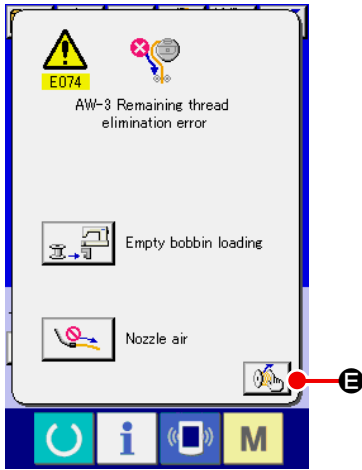
If no bobbin is loaded in the AW device, the bobbin check screen will be displayed. On the bobbin check screen, carry out the bobbin loading operation to load two bobbins in the AW device to reset the error. After the error is reset, the panel display returns to the normal screen.

The following switches can be operated on the bobbin check screen. Refer to "3-9. Operating the AW" p.18 for detailed functions.

The button to be displayed differs according to the bobbin condition.




- A** : Bobbin take-out button
- B** : Empty bobbin loading button
- C** : Threaded bobbin loading button
- D** : Nozzle air button



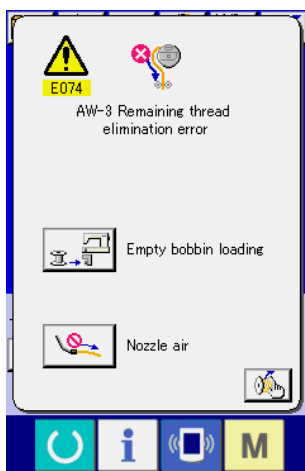
<AW error screen>

In the case "E074 Remaining-thread removal error", "E075 Tangling error", "E076 Bobbin winding error", "E077 Threading error, or thread trimming" has been detected, the AW error screen will be displayed.

On this screen, the error is reset by loading an empty bobbin or a thread bobbin in the AW device. The item to be operated differs with the error number.

When  **E** is pressed, the AW setting screen is displayed. On this screen, settings of the AW can be changed.

### 3-14-2. Detection of errors during sewing



<AW error screen>

In the case an error related to the AW device is detection during sewing, the AW error screen will be displayed after the sewing machine has finished sewing and stopped.

The error resetting procedure is same with the error detected under the normal state.

Refer to **"3-14-1. Error detection under the normal conditions"** p.32 for detailed functions.

### 3-15. List of errors

AW-related errors are listed in the table below.

Error No.	Display	Description of error	How to recover
E074		<b>Remaining-thread removal error</b>	Refer to <b>"3-13. Error display and error handling procedure" p.30</b> for the error resetting method.
E075		<b>Thread twining fault</b>	Refer to <b>"3-13. Error display and error handling procedure" p.31</b> for the error resetting method.
E076		<b>Bobbin winding fault</b>	Refer to <b>"3-13. Error display and error handling procedure" p.31</b> for the error resetting method.
E077		<b>Threading/thread trimming fault</b>	Refer to <b>"3-13. Error display and error handling procedure" p.31</b> for the error resetting method.
E715		<b>Device fault due to direct-drive failure</b>	Turn OFF the power
E716		<b>Device fault due to rotation failure</b>	Turn OFF the power
E717		<b>Device fault due to nozzle failure</b>	Turn OFF the power
E718		<b>Device fault due to moving knife failure</b>	Turn OFF the power
E719		<b>Device failure due to thread-feeding failure</b>	Turn OFF the power
E720		<b>AW device fault (origin error)</b>	Turn OFF the power

Error No.	Display	Description of error	How to recover
E721		<b>AW device fault (Remaining-thread removal position bobbin-sensor error)</b>	Turn OFF the power
E722		<b>AW device fault (Standby position bobbin-sensor error)</b>	Turn OFF the power
E723		<b>AW data fault (EEPROM)</b>	Turn OFF the power
E724		<b>AW data fault (Adjustment value)</b>	Turn OFF the power
E725		<b>AW CPU fault</b>	Turn OFF the power
E951		<b>AW-disconnection error</b>	Turn OFF the power
E952		<b>AW temperature-rise error</b>	Turn OFF the power
E953		<b>AW communication error</b>	Turn OFF the power
E954		<b>Bobbin carrier fault</b>	Turn OFF the power

## 4. MAINTENANCE

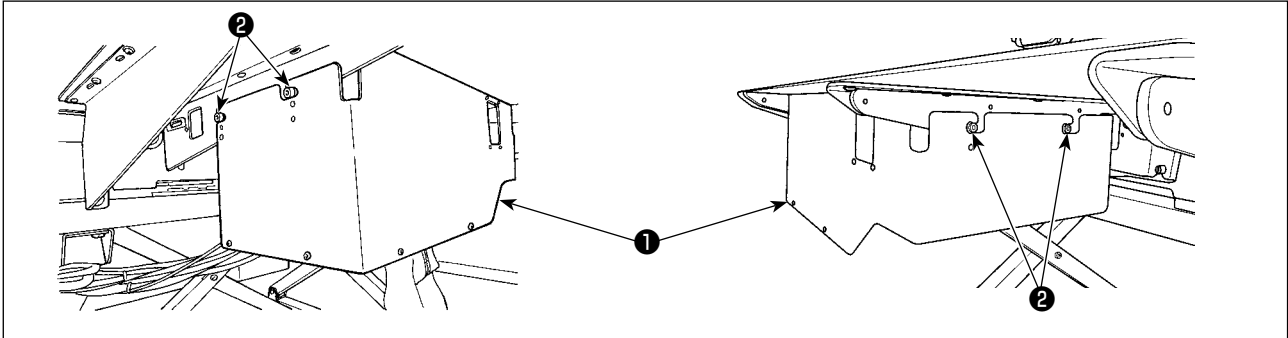
### 4-1. Attaching / removing the cover



**CAUTION :**

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

Remove front cover ❶ from the device before carrying out cleaning, etc.



- 1) Loosen four setscrews ❷ on the right and left side faces of the device.
- 2) Slightly shift the cover ❶ upward, then carefully draw it toward you.  
Install the cover ❶ reversing the removal procedure.

### 4-2. Cleaning

Periodically carry out cleaning of each section of the device with an air gun supplied with the unit as an accessory.

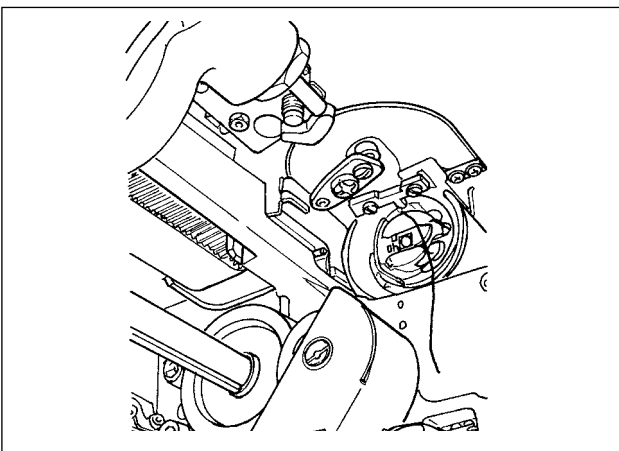


**CAUTION :**

In order to prevent the device from malfunctioning or being damaged, be sure to check the following items before using it.

- ❶ Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.
- ❷ If a large quantity of sewing-machine hook oil gathers on the mechanical section of the device, wipe off the oil before carrying out cleaning with an air gun.

#### (1) Cleaning the periphery of hook

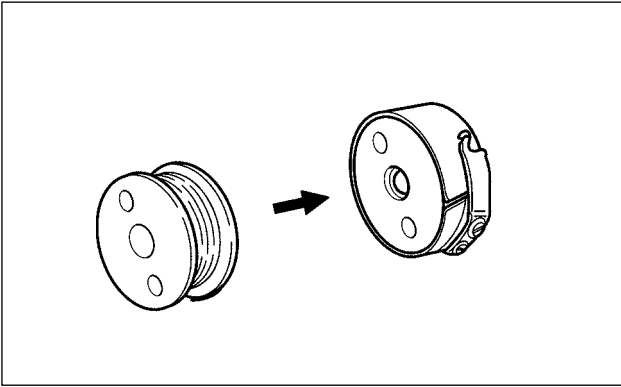


**\* Be sure to carry out cleaning of the periphery of hook every working day.**

When sewing some types of materials, a great deal of dust can be generated. In such a case, carry out cleaning of the periphery of hook several times a day where necessary.

- 1) Remove the front cover from the device in accordance with **"4-1. Attaching / removing the cover" p.36**.
- 2) Remove large dust balls lint around the hook with a pair of tweezers or the like.
- 3) Carry out cleaning by blowing away dust remaining around the hook with an air gun.

## (2) Cleaning the bobbin and bobbin case

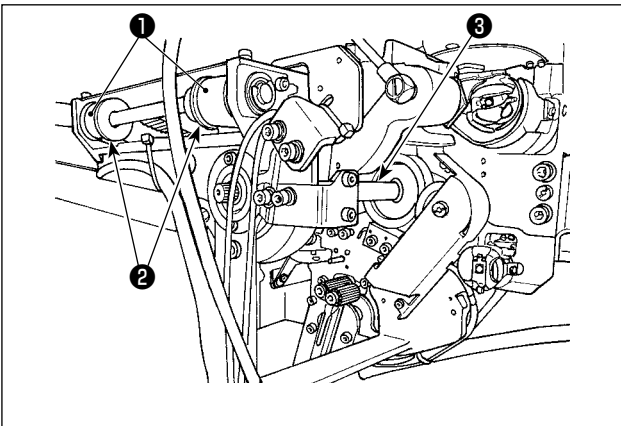


\* **Be sure to carry out cleaning of the periphery of hook every working day.**

When sewing some types of materials, a great deal of dust can be generated. In such a case, carry out cleaning of the periphery of hook several times a day where necessary.

- 1) Wipe off oil and dust gathering on the bobbin case. In particular, carefully wipe off oil and dust from the bobbin case shaft section. In addition, blow away oil and dust gathering under the bobbin idling prevention spring inside the bobbin case with an air gun.
- 2) Clean the side face of bobbin to remove dust and link gathering there.

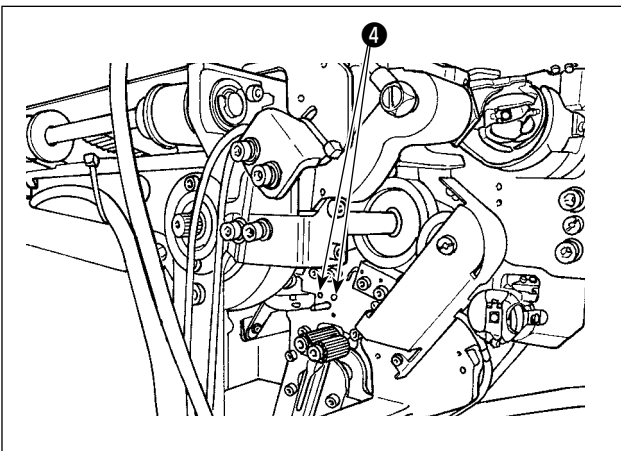
## (3) Cleaning the mechanical section



Carry out cleaning of the mechanical section once a twice a week.

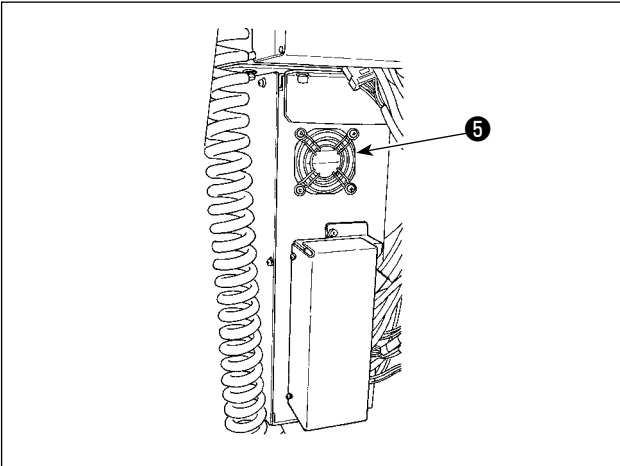
- 1) Carry out cleaning of each belt ① and pulley ② with an air gun. In addition, carry out cleaning of moving sections other than those shown in the figure appropriately.
- 2) Carry out cleaning of each shaft ③ with an air gun.

## (4) Cleaning the sensor



Carry out cleaning of sensor ④ in the remaining-thread removal section with an air gun once or twice a week.

## (5) Cleaning the control box for the device



Carry out cleaning of the control box once a week.

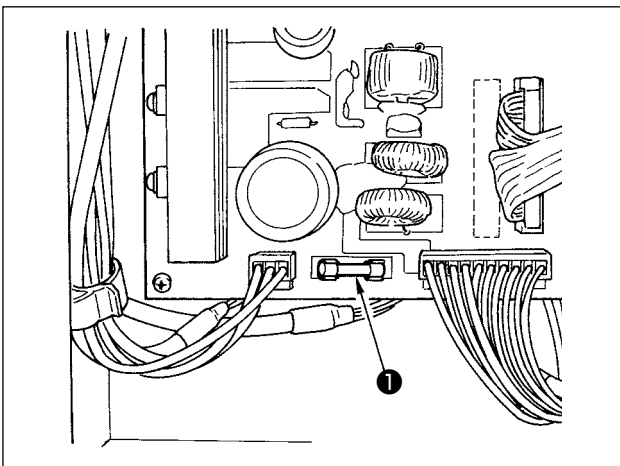
- 1) Carry out cleaning to remove dust from around the ventilation hole on the bottom of control box with an air gun.
- 2) Carry out cleaning to remove dust gathering in exhaust outlet ⑤ of fan motor with an air gun.

## 4-3. Replacing the fuse



### DANGER :

In order to prevent accidents due to an electrical shock, be sure to turn OFF the power switch and remove the power plug from the receptacle before replacing the fuse. In addition, be sure to attach the rated fuse.



Carry out the following steps of procedure to replace fuse ① of the device.

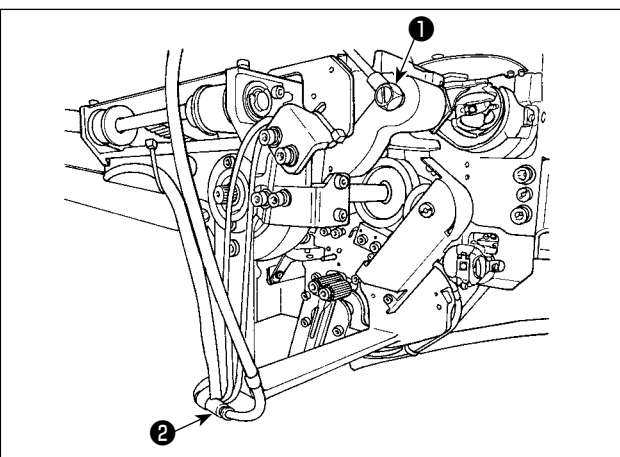
- 1) Turn OFF the power switch and wait for five or more minutes.
- 2) Remove the cover of control box for the device.
- 3) Replace fuse ① attached on the PCB with a new one. Use the fuse with a specified capacity (125 V, T6A).
- 4) Attach the cover removed in step 2) back in place.

## 4-4. Replacing the gripper tube



### CAUTION :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine. In addition, close the air valve before replacing the tube.



If the air tube at the gripper has worn out or is damaged, replace it with a spare tube supplied with the unit as an accessory following the steps of procedure described below.

- 1) Detach hose nipple ① from the rear end of gripper. Then, detach the tube.
- 2) Detach the other end of tube from joint ②.
- 3) Connect a new tube following the aforementioned steps of procedure in the reverse order.

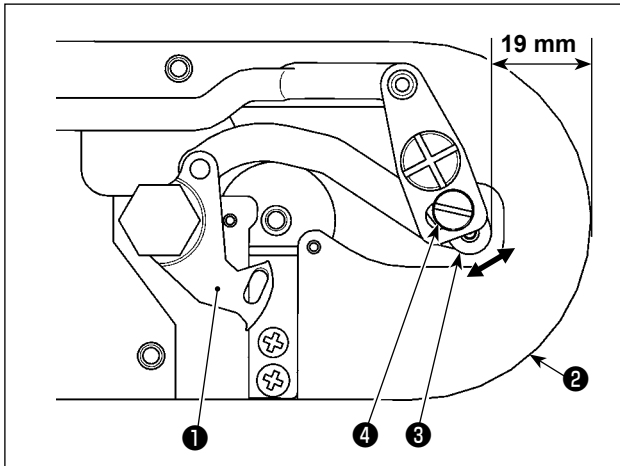


## 4-5. Corrective measure against idling of the bobbin



### CAUTION :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



If a sewing trouble occurs due to frequent idling of bobbin when performing thread trimming, loosen screw ④ and adjust the initial position of moving knife ①.

Loosen screw ④ with a 7-mm spanner.

According to the initial value representing the initial position of moving knife, the distance from the top end of throat plate ② to the top end of moving knife link ③ is 19 mm. Change the initial value to a value between 19.5 and 20mm.



If the distance from the top end of throat plate ② to the top end of moving knife link ③ is increased excessively, the needle thread and bobbin thread sometimes cannot be trimmed at a time.

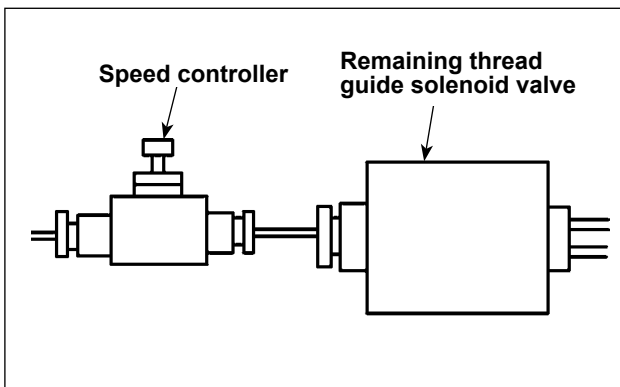
In such a case, decrease the distance from the top end of throat plate ② to the top end of moving knife link ③.

## 4-6. Adjusting the air flow for the remaining thread guide



### CAUTION :

Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



The initial adjustment value of the speed controller has been adjusted to the value which is obtained by turning it in the reverse direction by seven revolutions from the fully-opened position.

If the remaining thread removal is not carried out stably according to the type and count of thread, finely adjust the speed controller.



Thick thread can be guided more smoothly by opening the speed controller since the air flow is increased by opening it. However, thin thread will be likely to flop when the air flow is excessively increased.

Thin thread can be guided more smoothly by closing the speed controller since the air flow is decreased by closing it. However, thick thread will be likely not to be guided smoothly.

## 5. TROUBLESHOOTING

If an error occurs while the device is in operation, the relevant error is displayed on the operation panel. Handle the error referring to **"3-13. Error display and error handling procedure" p.30**.

If the error cannot be reset or the error recurs, it is assumed there is some cause of malfunctions. In such a case, handle the error according to the table given below.

Display and description of error	Cause	Error handling procedure
Power cannot be turned ON.	<ul style="list-style-type: none"> <li>① The power plug is not inserted or contact failure.</li> <li>② Fuse has blown.</li> </ul>	<ul style="list-style-type: none"> <li>○ Check how the power is supplied.</li> <li>○ Replace the fuse according to <b>"4-3. Replacing the fuse" p.38</b>. If the device cannot be powered even after the replacement of the fuse, the device may have failed. In such a case, stop using the device.</li> </ul>
E074 Removal of thread remaining on the bobbin is not carried out normally.	<ul style="list-style-type: none"> <li>① Obstacles such as dust, etc. gather on the moving section.</li> <li>② Thread is entangled with unwinding elimination roller.</li> <li>③ Remaining-thread sucking vacuum force is insufficient.</li> <li>④ Thread end is not properly guided.</li> <li>⑤ Type or count of thread is different from the specification.</li> </ul>	<ul style="list-style-type: none"> <li>○ Carry out maintenance referring to <b>"4-2. Cleaning" p.36</b>.</li> <li>○ Remove the thread.</li> <li>○ Check whether or not the dust bag is full of dust.</li> <li>○ Check whether or not the air pressure has dropped.</li> </ul>
E075 Thread has failed to twine properly on the bobbin.	<ul style="list-style-type: none"> <li>① Obstacles such as dust, etc. gather on the moving section.</li> <li>② Length of thread coming out of the nozzle is not appropriate.</li> <li>③ Thread unraveling is not performed appropriately.</li> <li>④ No thread on bobbin thread cone.</li> <li>⑤ Thread tension is high at thread route.</li> <li>⑥ Thread route is not correct.</li> <li>⑦ Mounting position and direction of the nozzle are not appropriate.</li> <li>⑧ Bobbin fails to rotate.</li> <li>⑨ Bobbin thread feeding unit fails to operate.</li> <li>⑩ Bobbin tape has worn out.</li> </ul>	<ul style="list-style-type: none"> <li>○ Carry out maintenance referring to <b>"4-2. Cleaning" p.36</b>.</li> <li>○ Adjust the length of thread coming out of the nozzle to approximately 13 cm.</li> <li>○ Check the thread unraveling condition setting.</li> <li>○ Check the length of thread coming out of the nozzle.</li> <li>○ Put the bobbin thread cone in place.</li> <li>○ Referring to <b>"3-2. How to thread the device with the bobbin thread" p.11</b>, check the thread tension.</li> <li>○ Check the threading route referring to <b>"3-2. How to thread the device with the bobbin thread" p.11</b>. In particular, the roller and actuating arm, etc. of the bobbin thread feeding unit are threaded correctly.</li> <li>○ Referring to <b>"3-3. How to set a bobbin" p.12</b>, check whether or not the bobbin is fitted in the bobbin case correctly.</li> <li>○ Check whether or not the connector, air tube, etc. coming from the bobbin thread feeding unit are correctly connected.</li> <li>○ Change the bobbin with a new one.</li> </ul>

Display and description of error	Cause	Error handling procedure
<p>E076 Bobbin-thread winding is not carried out normally.</p>	<ul style="list-style-type: none"> <li>① Obstacles such as dust, etc. gather on the moving section.</li> <li>② Thread of the bobbin thread cone has run out during winding of a bobbin.</li> <li>③ Thread has broken during winding of a bobbin.</li> <li>④ Thread wound on the bobbin overflows from the bobbin flange.</li> <li>⑤ Bobbin fails to rotate.</li> <li>⑥ Thread slips out of the roller of bobbin thread feeding unit.</li> <li>⑦ Bobbin thread feeding unit fails to operate.</li> <li>⑧ Thread has tangled on the thread stand, etc. since the thread has vibrated excessively halfway through threading route.</li> </ul>	<ul style="list-style-type: none"> <li>○ Carry out maintenance referring to <b>"4-2. Cleaning" p.36.</b></li> <li>○ Put the bobbin thread cone in place.</li> <li>○ Referring to <b>"3-2. How to thread the device with the bobbin thread" p.11</b>, check the thread tension.</li> <li>○ Check the setting of bobbin-thread winding length.</li> <li>○ Check whether or not the thread used in the previous sewing still remains on the bobbin.</li> <li>○ Referring to <b>"3-3. How to set a bobbin" p.12</b>, check whether or not the bobbin is fitted in the bobbin case correctly.</li> <li>○ If the thread tension is not sufficient, thread may slip off the roller. Check the thread tension.</li> <li>○ Check whether or not the connector, air tube, etc. coming from the bobbin thread feeding unit are correctly connected.</li> <li>○ Check the threading route referring to <b>"3-2. How to thread the device with the bobbin thread" p.11</b>. In particular, the roller and actuating arm, etc. of the bobbin thread feeding unit are threaded correctly.</li> </ul>