

***ENGLISH***

**BK-7**  
**INSTRUCTION MANUAL**

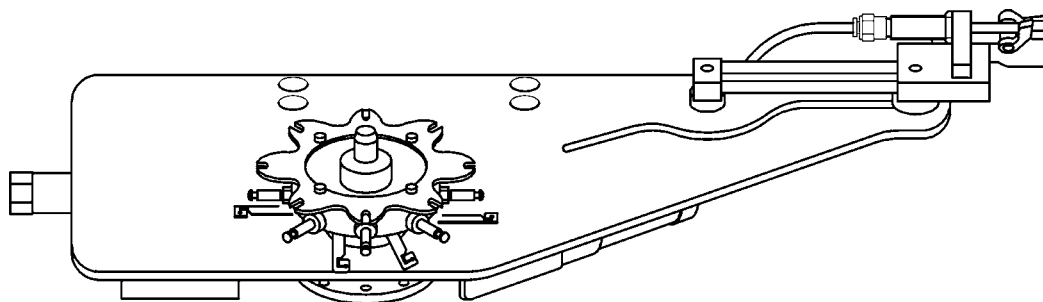
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# Component parts list

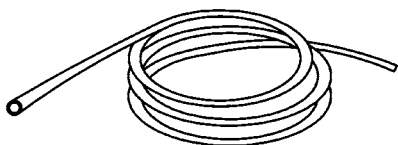
Check the below-stated parts.

**Automatic bobbin changer asm., complete set**

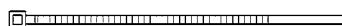


**Setscrew, screw M6 × 20 L, 4 pieces**

**Air hose ø8 × 800 mm**



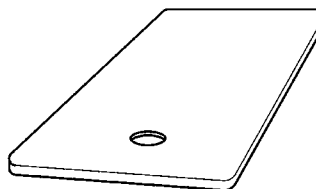
**Cable clip band T-18R, 7 pieces**



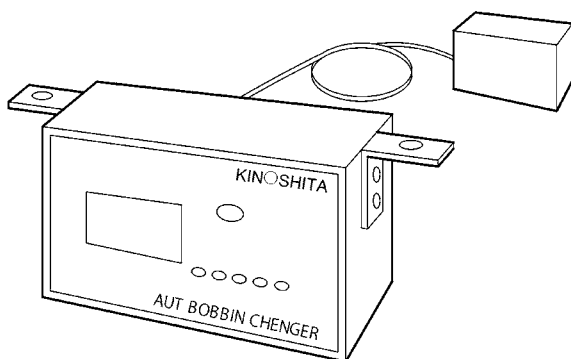
**Cable clip SL-9N, 3 pieces**



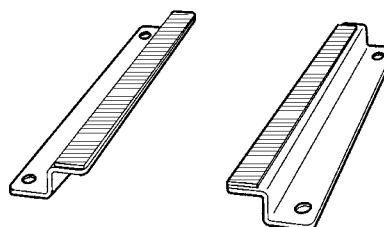
**Opening / closing door set, plate cover**



**Control box, complete set**



**Support plate**



**Setscrew, screw M5 × 20L, nut M5,  
2 pieces each**

**Setscrew, screw M4 × 16L, nut M4,  
4 pieces each**

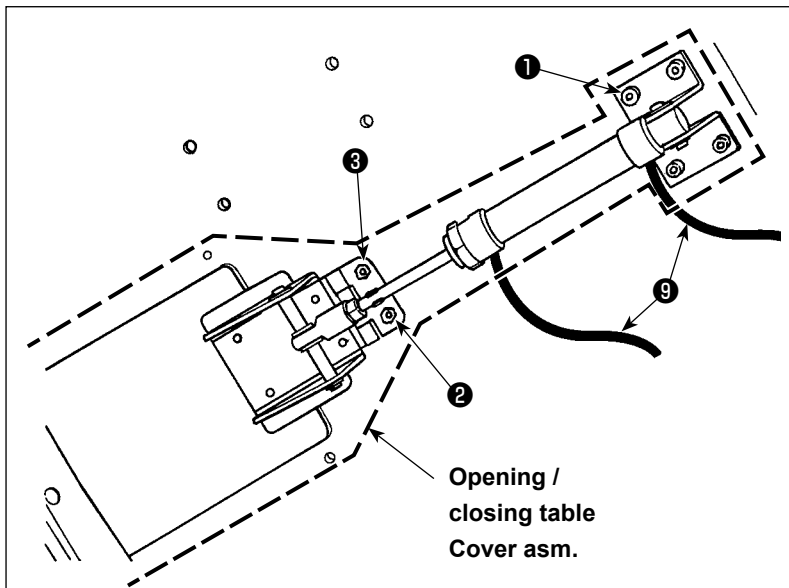
# 1. Installing the main body of automatic bobbin changer

## WARNING :

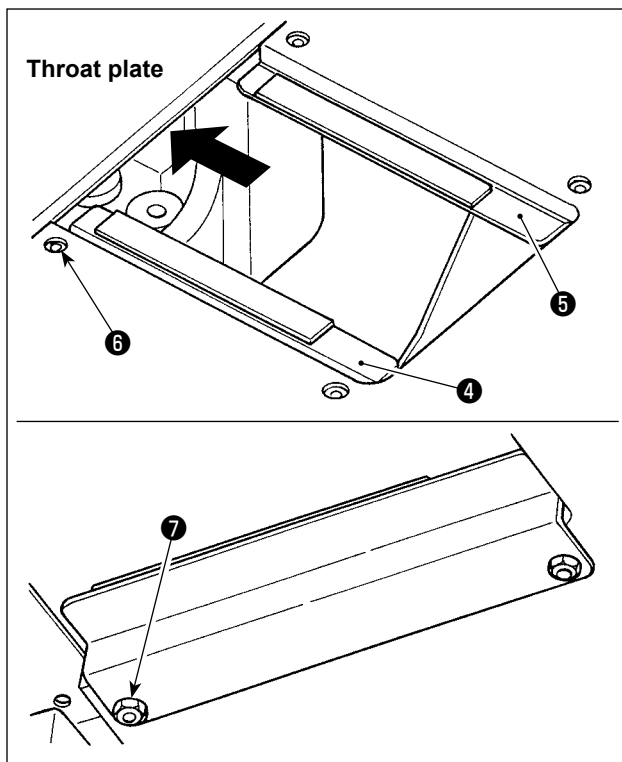
1. Installation procedure of the automatic bobbin changer must be carried out by a trained technical expert.
2. Request your distributor or a specialized electrician to carry out electric wiring.
3. Do not connect the power plug of the sewing machine before completing the installation procedure.  
If the start button is pressed during the work by mistake, the sewing machine will actuate, posing a great risk.
4. Be sure to connect the ground wire.  
If the ground wire connection is not proper, electric shock can be caused.



## 1-1. Attaching the plate cover



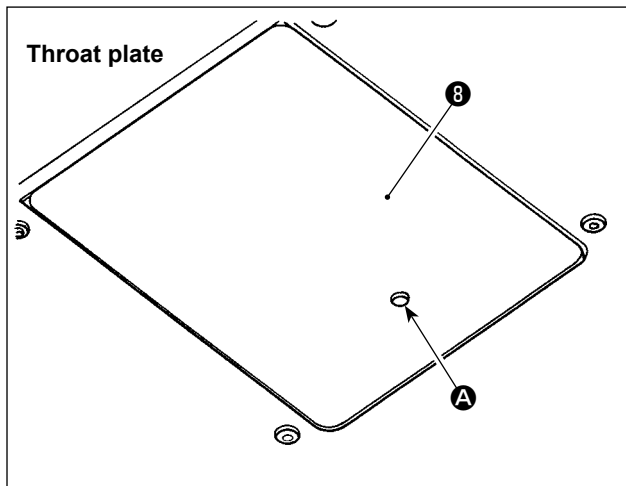
- 1) Pull out two air hoses 9 from the manual valve.  
Remove screws 1 (four pieces) and 2 (two pieces) and nuts 3 (two pieces). Detach the opening / closing table cover asm.



- 2) Attach support plates 4 and 5 with a table. Secure them with screws 6 (four pieces) and nuts 7 (four pieces).



Support plates 4 and 5 are provided with a magnet sheet on their top surfaces. Attach the support plates with their magnet-attached sides up and with their sides with shorter base metal faced toward the throat plate.



3) Fit plate cover 8 on the table.

Place it in such a way that hole portion A of the opening / closing cover is brought to opposite side of the throat plate.

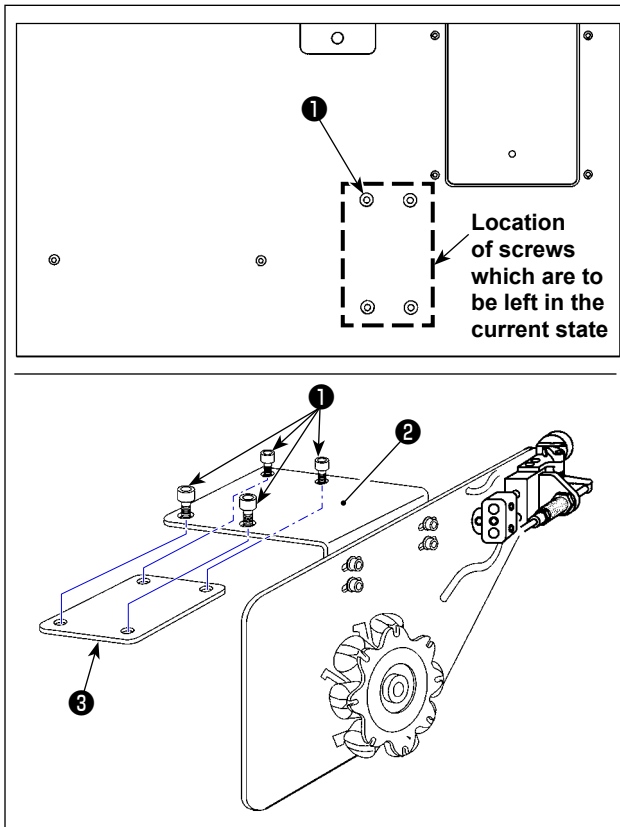
- Caution**

  1. Check to make sure that plate cover 8 does not project the table surface. If it projects the table surface, correct by slightly bending part 4 or 5.
  2. After fitting plate cover 8 on the table, carefully adjust the longitudinal position of the cover so that it does not come in contact with the throat plate of sewing machine.

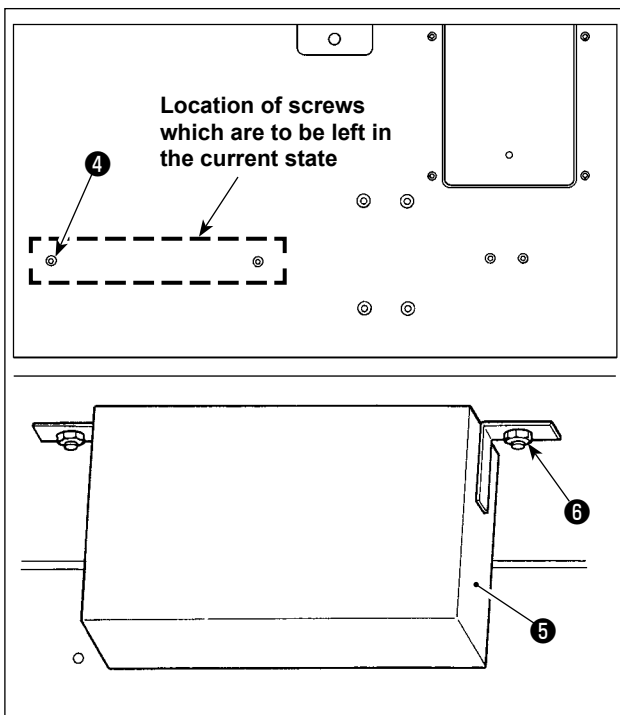
**[How to open the plate cover]**

Inserting a thin screw driver into hole portion A of the opening / closing cover, open plate cover 8.

## 1-2. Installing the main body of automatic bobbin changer



- 1) Put screws **1** (four pieces) into the top surface of table. Fitting bobbin changer mounting plate **2** on those screws, temporarily tighten the screws.
- 2) Adjust the final position of the bobbin changer following the steps of procedure for adjusting the mounting position of bobbin changer. Then, tighten screws **1** (four pieces) and screw plate **3**.

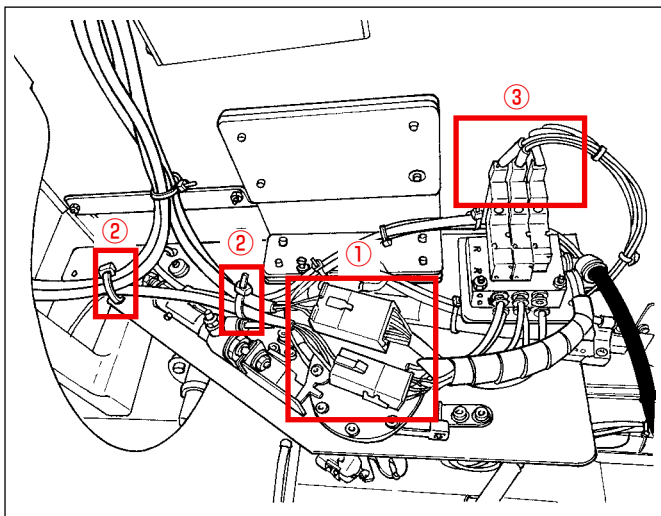


- 3) Put screws **4** (two pieces) into the tapped holes from the top surface of table. Hanging control box **5** of the bobbin changer on the screws, tighten nuts **6** (two pieces).

**Caution** Attach the control box in such a way that its operation button faces to the operator side.

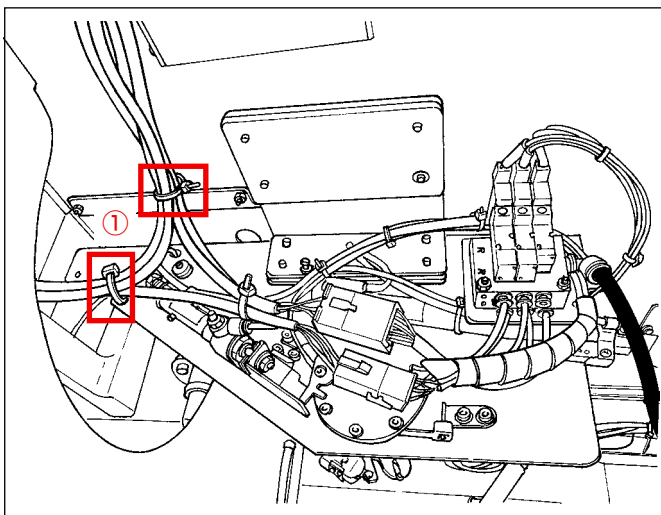
## 2. Wiring procedure

### (1) Wiring to the main body of BK-7

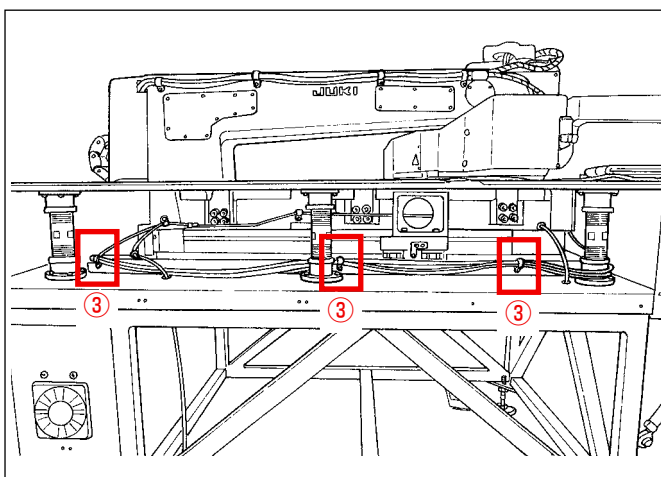


- ① Connect the two wirings coming from the main body of BK-7 and two wirings coming from the controller while matching their connector numbers.
- ② Secure the wirings at two locations with cable clip bands as illustrated in the figure. At this time, take care not to fix the cores.
- ③ Connect the cords to the connectors in the order or white one, red one and blue one from the left as illustrated in the figure.

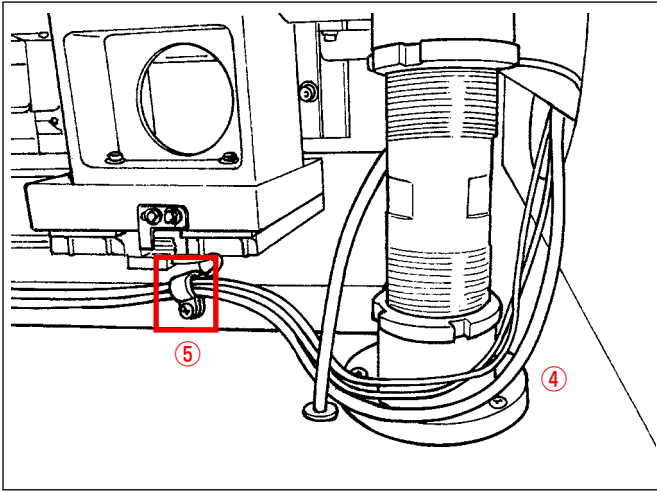
### (2) Wiring to the PS-700



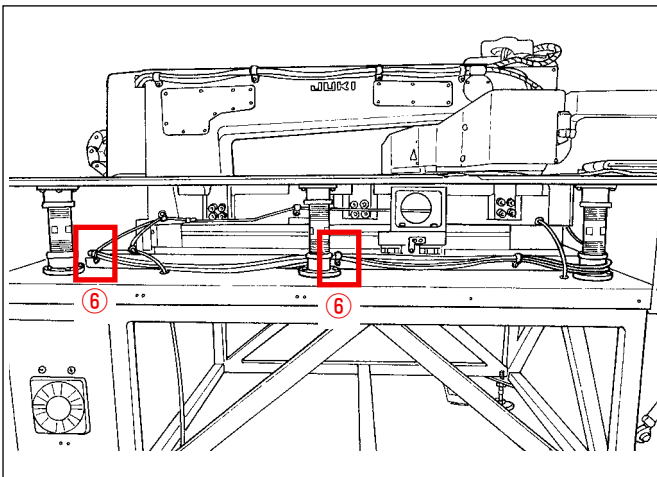
- ① Secure the wirings at two locations as illustrated in the figure. At this time, take care not to fix the cores.



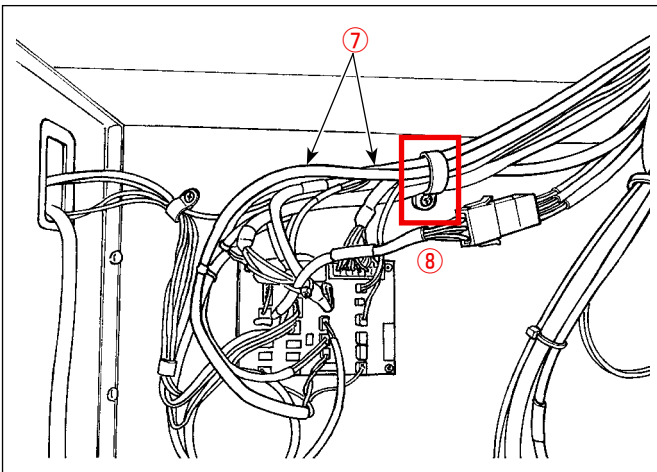
- ② Detach the side cover.
- ③ Remove cable clamps which secure the Y-origin sensor wirings at three locations. They are to be changed with the cable clamps supplied with the unit in the below-stated Step ⑤ .



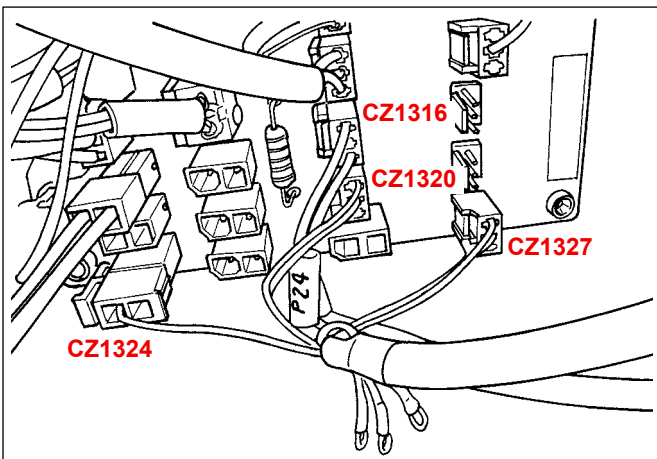
- ④ For wiring of cables, pass the two cables coming from the controller along the outside of strut (this is the wiring route).
- ⑤ Secure the Y origin sensor wirings together with the aforementioned two cables and air tube using the cable clamp supplied with the unit.  
At this time, take care not to bend the wirings located at the root of Y origin sensor.



- ⑥ Secure the aforementioned three cables, air tube and Y origin sensor wirings with cable clamps supplied with the unit at two locations as illustrated in the figure.

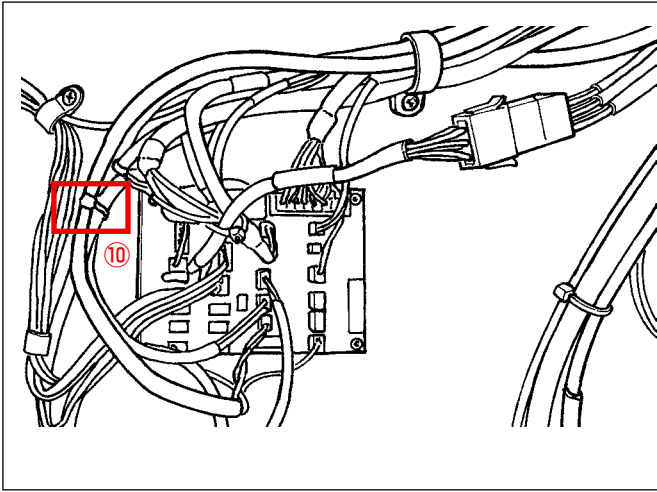


- ⑦ Open the storage door on the rear side of the main body of PS-700. Draw the cables, wirings and air tube through the hole into the sewing machine table.
- ⑧ Pass two wirings through the cable clamps which have already been attached to secure them.



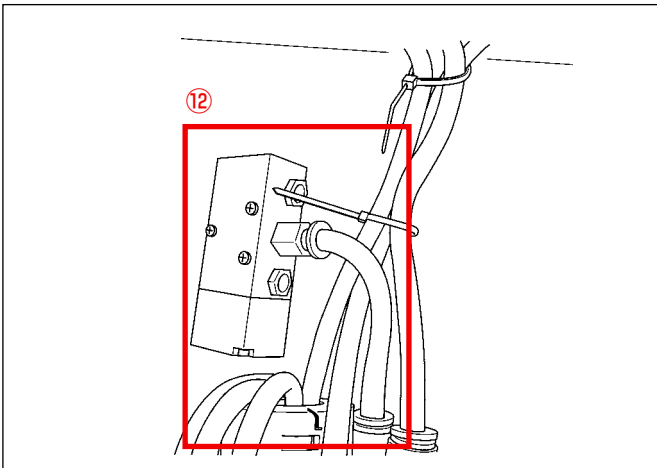
- ⑨ Connect the wirings to the connectors at four locations on the PCB.



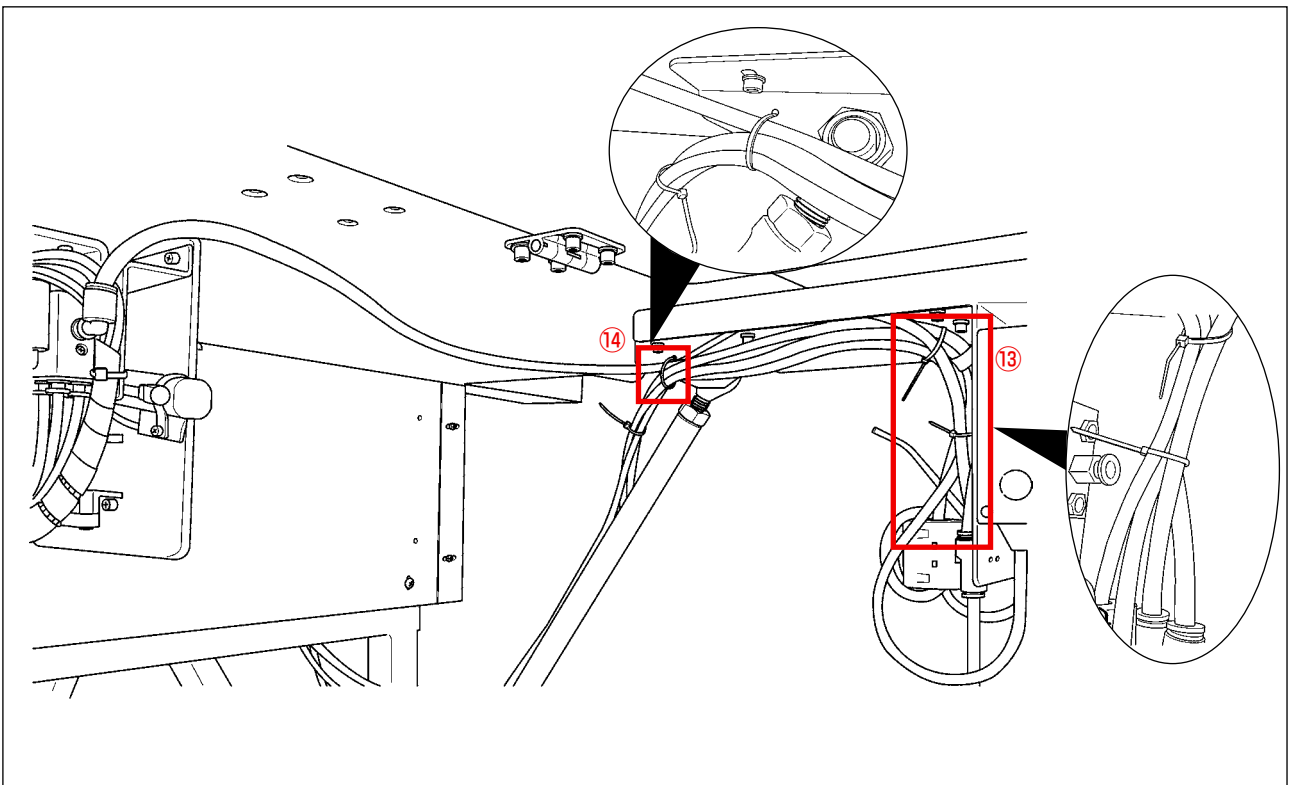


⑩ After the completion of connection of wirings to the PCB, secure the wirings with cable clip bands.

⑪ Close the storage door. Attach the side cover.



⑫ Also detach the air tube which has been connected to the manual valve.



⑬ Connect the air tube that is wired from BK-7, to the Y union as illustrated in the figure.

⑭ After you have connected the air tube, cut off the original cable tie. Secure the piping with a new cable tie.

### 3. Adjusting the installation

#### 3-1. Adjusting the installation of the automatic bobbin changer

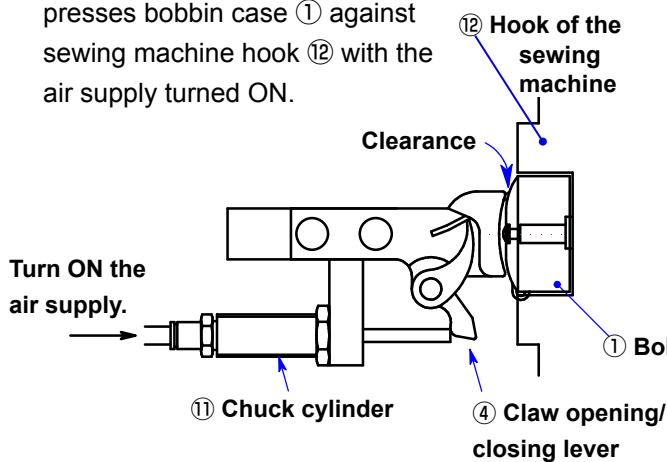


#### WARNING :

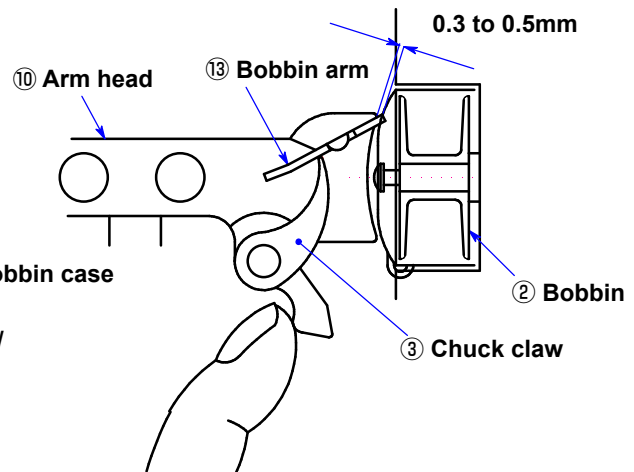
1. Adjustment procedure has to be carried out by a trained technical expert.
2. Be sure to turn OFF the power to the sewing machine and to the automatic bobbin changer, and unplug them. Turn OFF the air supply to decrease the air pressure to "0 (zero)". It is quite dangerous to actuate the sewing machine and / or the bobbin changer during the adjustment work.

#### ■ How to check the installation position of the automatic bobbin changer

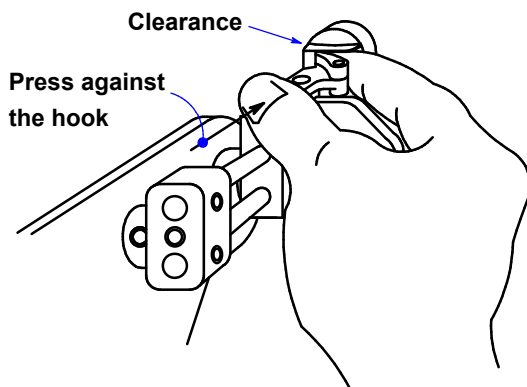
1. The illustration shown below represents the state that the operator grasps the bobbin arm ⑬ and presses bobbin case ① against sewing machine hook ⑫ with the air supply turned ON.



2. Put bobbin ② in the bobbin case. Push claw opening / closing lever ④ until the bobbin case is pressed against the sewing machine hook ⑫. In this state, measure the clearance.



3. Dimension of clearance provided when chuck claw ③ grasps bobbin case ① and presses it against sewing machine hook ⑫.



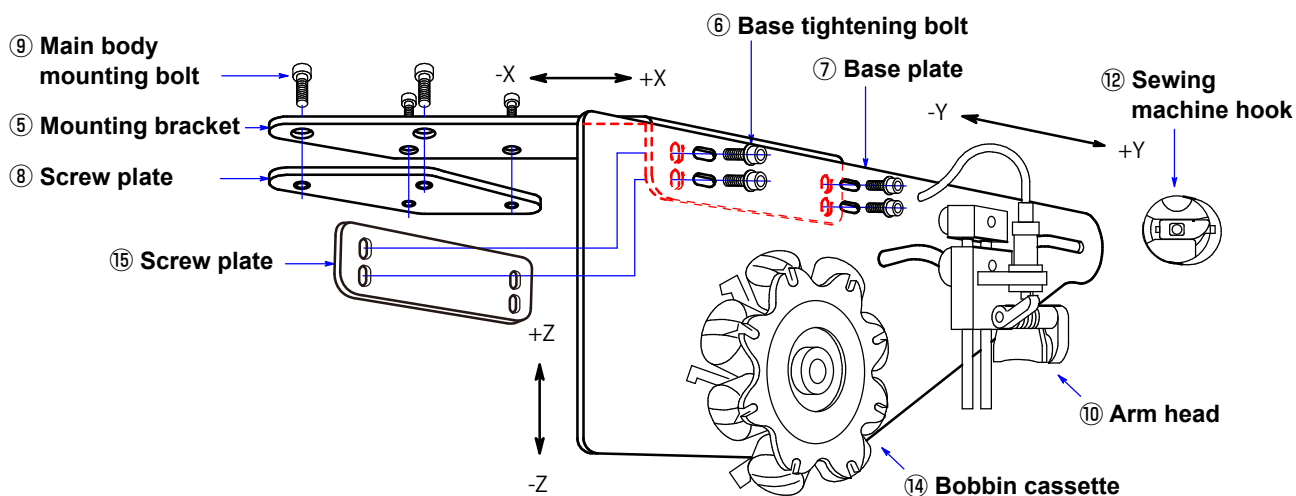
Clearance: 0.3 to 0.5 mm  
(in the state the bobbin case is pressed against the hook)

## ■ How to adjust the installation position

- With respect to the X direction, loosen main body anchor bolts ⑨ (four pieces) of the automatic bobbin changer mounting bracket ⑤ . Move bobbin changer mounting bracket ⑤ to the right and left to adjust the installation position of the bobbin changer.
- With respect to the Y direction, loosen base tightening bolts ⑥ (four pieces) of bobbin changer base plate ⑦ . Move base plate ⑦ back and forth to adjust the installation position of the bobbin changer.
- With respect to the Z direction, loosen base tightening bolts ⑥ (four pieces) of bobbin changer base plate ⑦ . Move base plate ⑦ up and down to adjust the installation position of the bobbin changer.



If the aforementioned clearance is too small, bobbin case ① and sewing machine hook ⑫ can be broken when arm head ⑩ moves toward the hook side. On the other hand, if the aforementioned clearance is too large, chuck claw ③ can fail to grasp the bobbin case, causing a chuck error.



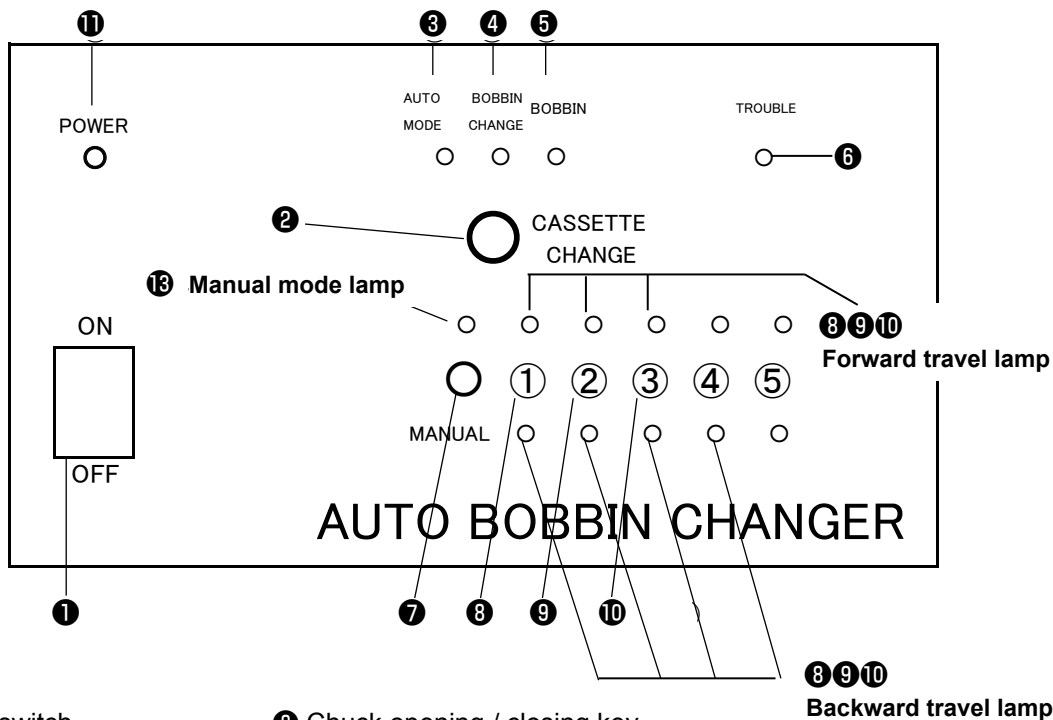
- |                                |                           |
|--------------------------------|---------------------------|
| ① Bobbin case                  | ⑧ Screw plate             |
| ② Bobbin                       | ⑨ Main body mounting bolt |
| ③ Chuck claw                   | ⑩ Arm head                |
| ④ Claw opening / closing lever | ⑪ Chuck cylinder          |
| ⑤ Mounting bracket             | ⑫ Sewing machine hook     |
| ⑥ Base tightening bolt         | ⑬ Bobbin arm              |
| ⑦ Base plate                   | ⑭ Bobbin cassette         |
|                                | ⑮ Screw plate             |

## ■ Detailed procedure of installation and adjustment

- 1) Install the automatic bobbin changer to the sewing machine with M6 cap bolt No. 79 and mounting plate No. 77.
- 2) Install the control box to the predefined location.
- 3) Connect and wire the cables and connect the air hose referring to "**2. Wiring procedure**" p.5.
- 4) Turn ON the power and air supply. Check to make sure that the lamps mounted on the control box light up as described below.

### Lamps to be checked whether they light up

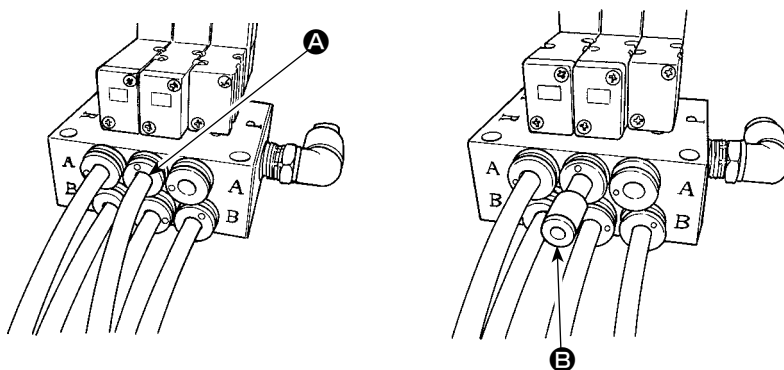
- ① Power lamp; ③ Automatic mode lamp; ④ Bobbin replacement lamp; ⑤ Bobbin presence lamp



- |                            |                               |
|----------------------------|-------------------------------|
| ① Power switch             | ⑧ Chuck opening / closing key |
| ② Cassette replacement key | ⑨ Cassette feed key           |
| ③ Automatic mode lamp      | ⑩ Arm head key                |
| ④ Bobbin replacement lamp  | ⑪ Power lamp                  |
| ⑤ Bobbin presence lamp     | ⑫ Manual mode lamp            |
| ⑥ Fault lamp               |                               |
| ⑦ Manual mode key          |                               |

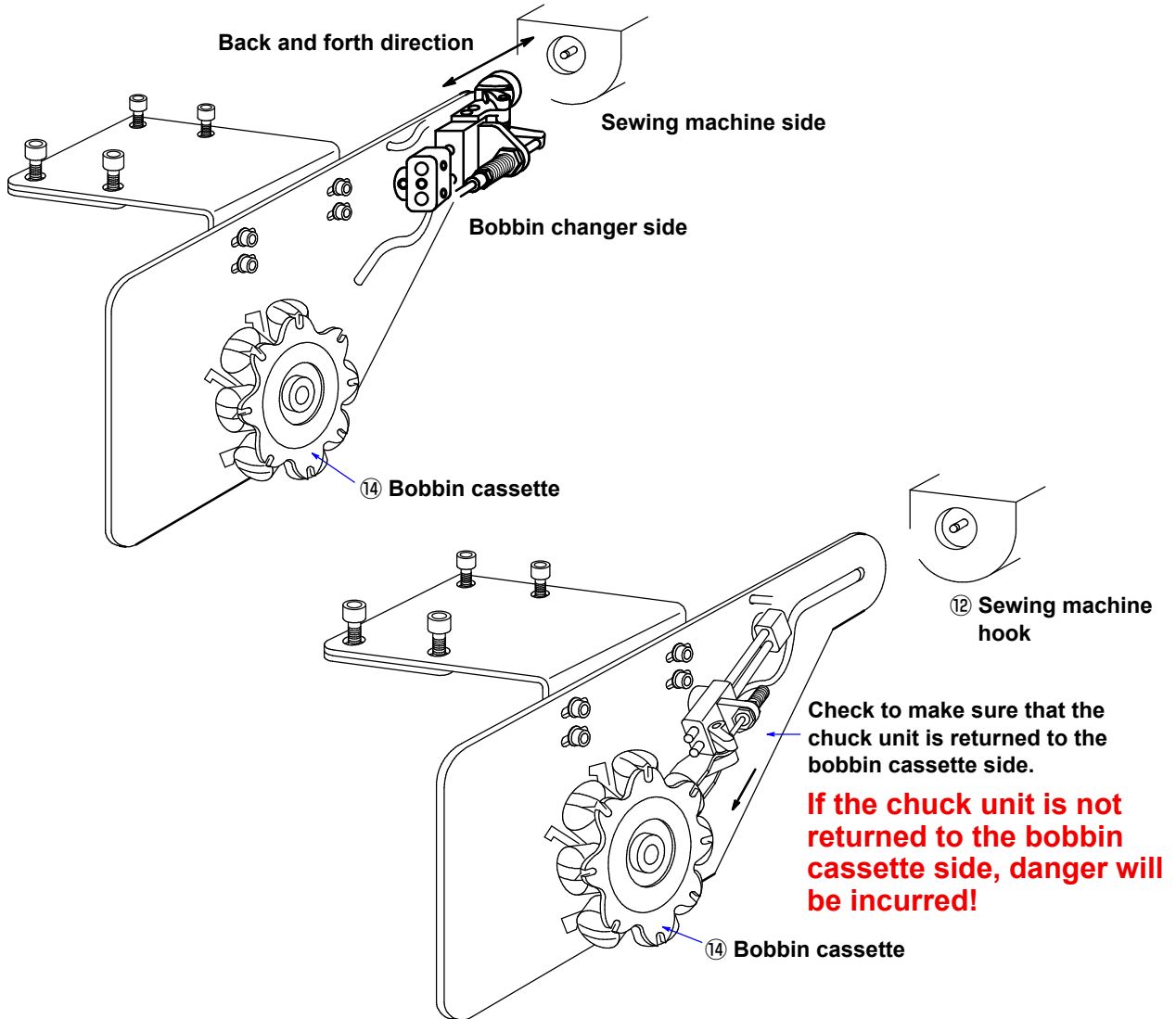
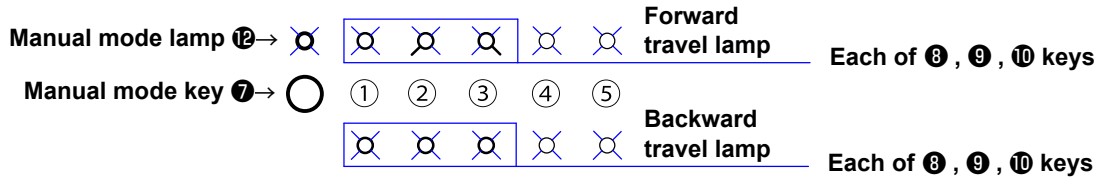
⑧ ⑨ ⑩  
Backward travel lamp

- 5) Pull out white tube, A side, **A** located at the center of 3-way solenoid valve. Then, insert plug cap **B** supplied with the unit.



6) Change over the operation method of the control box to the manual operation.

- When manual mode key ⑦ is pressed, manual mode lamp ⑫ (orange) lights up, automatic mode lamp ③ (green) goes out and the operation mode is changed over to the manual mode.
- When arm head key ⑩ is pressed once, the chuck unit can be moved back and forth (sewing machine side ⇄ bobbin changer side).



**DANGER :**

Since the plug cap is fitted over the solenoid valve, the air is not supplied to the cylinder on the head returning side. If arm head key ⑩ is pressed again, in this state, the chuck head will abruptly return to the cassette side, inviting great danger.

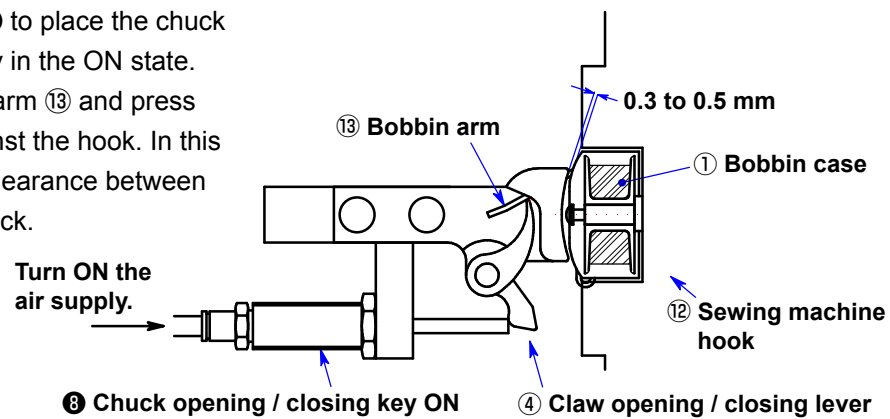
Be sure not to press arm head key ⑩ unless you have confirmed that you have returned the chuck unit to bobbin cassette ⑭ side by hand. If the chuck unit is not returned to the bobbin cassette side, the risk of pinching your fingers in the chuck unit will be invited.



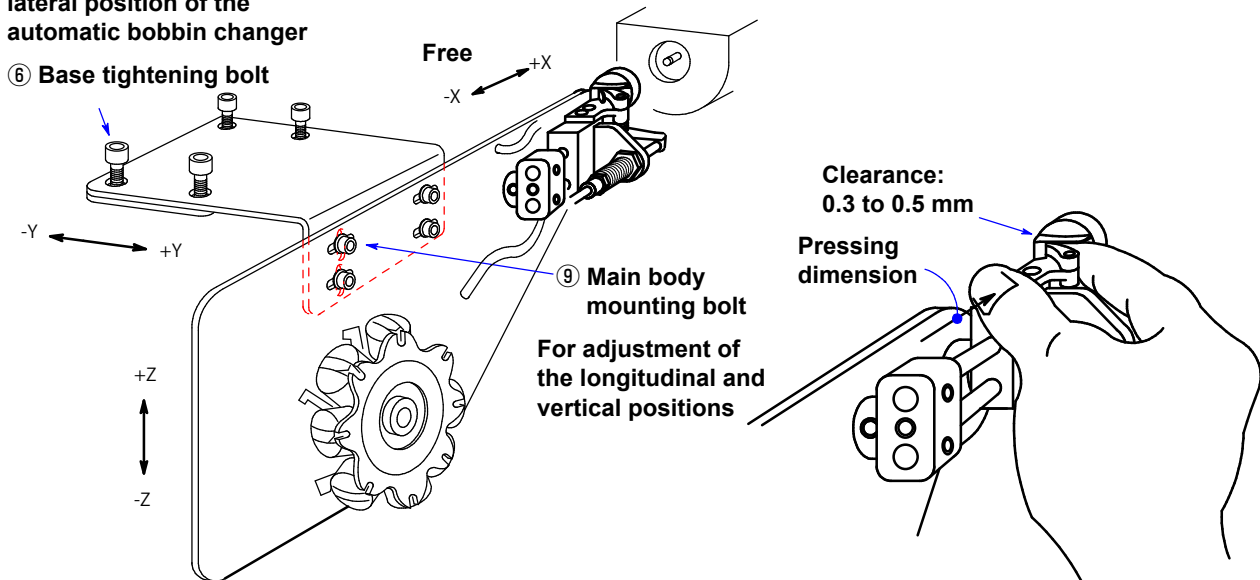
- 7) Chucking the bobbin case, check the installation clearance between the bobbin case and sewing machine hook ⑫. Then, fix the automatic bobbin changer.
- Once the chuck can be moved by hand, put the bobbin case in the bobbin changer cassette. Press chuck opening / closing key ⑧ to let the chuck grasp the bobbin case.
  - Moving the chuck head in the aforementioned state, check the operation of putting the bobbin case in and out of the sewing machine hook.
  - Loosen base tightening bolts ⑥ of the bobbin changer. Finely adjust the position of the automatic bobbin changer to the optimum one with respect to X, Y and Z directions to allow the bobbin case to be put in and out of the sewing machine hook. Once the automatic bobbin changer is correctly positioned, tighten the base tightening bolts to secure it.

### Adjusting the clamp clearance between bobbin case

Press push button ⑧ to place the chuck opening / closing key in the ON state. Then, grasp bobbin arm ⑬ and press bobbin case ① against the hook. In this state, measure the clearance between bobbin case and chuck.



For adjustment of the lateral position of the automatic bobbin changer



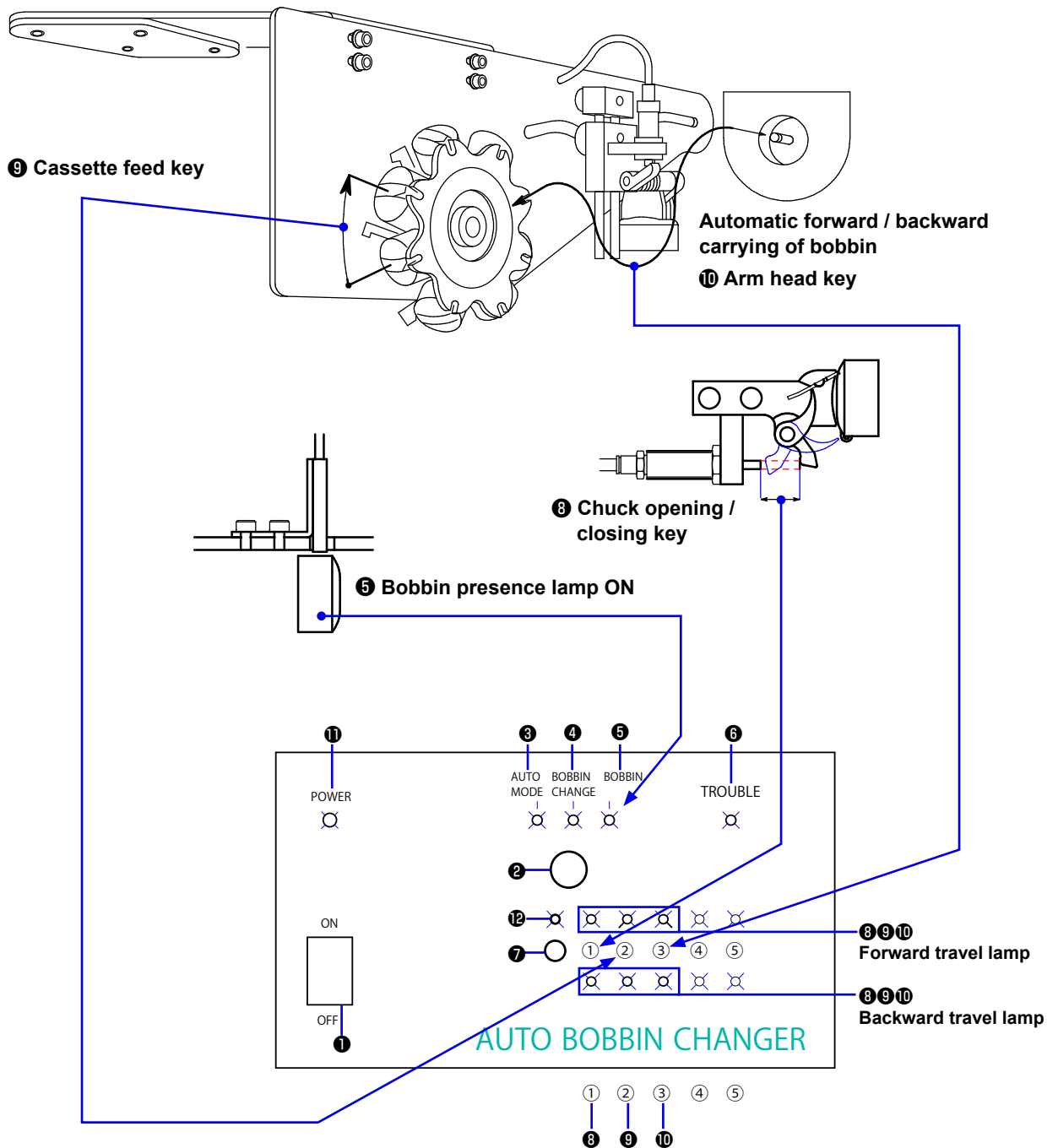
#### Cautions regarding the setting position of the bobbin changer in the longitudinal direction (Y direction)



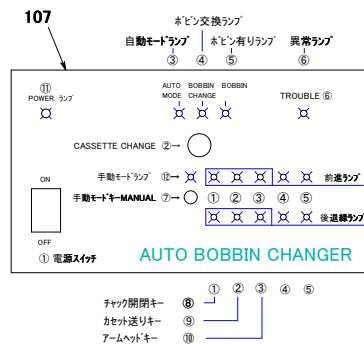
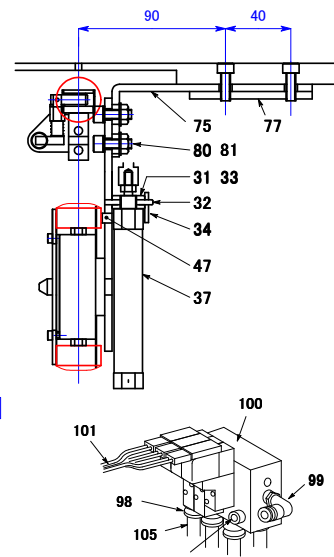
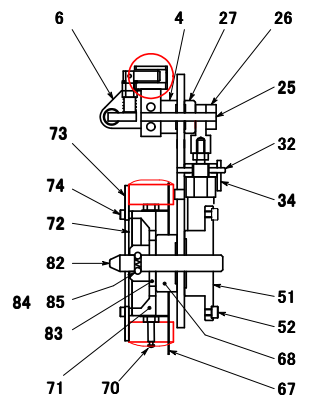
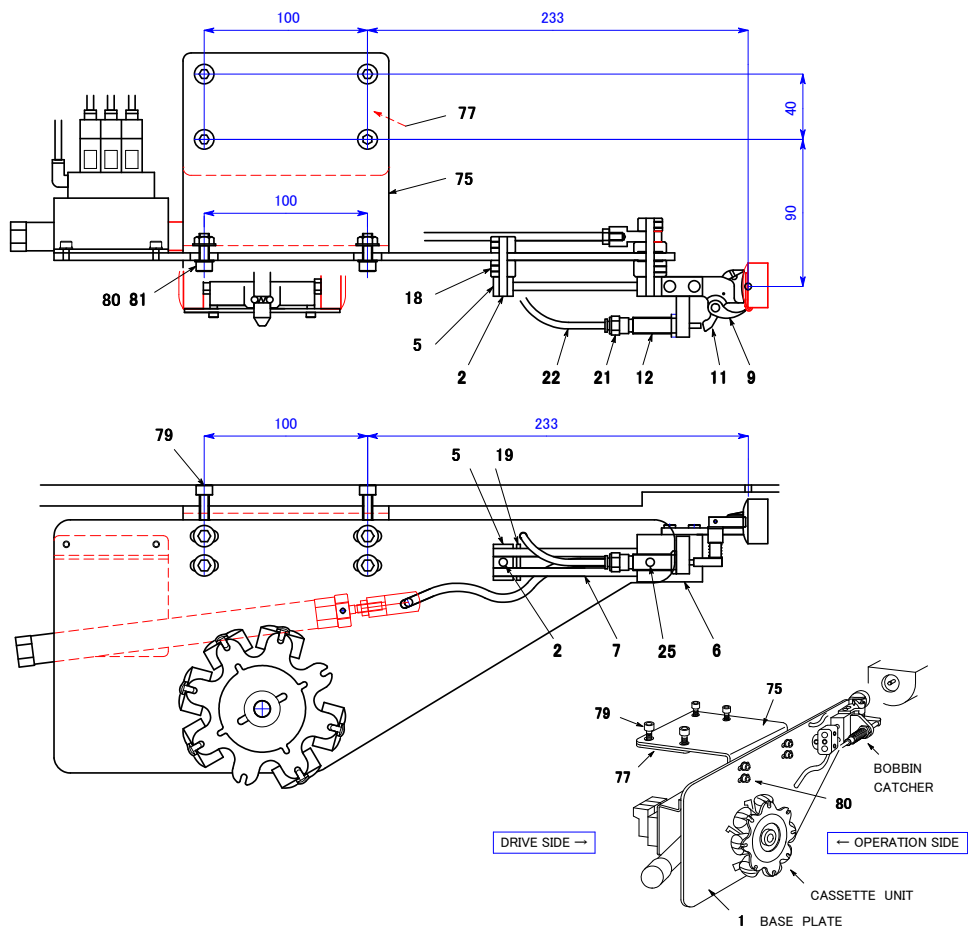
- If the clearance provided between the bobbin case that is placed in the sewing machine hook and the chuck is too small when the chuck rests on the sewing machine side, breakage of the bobbin and hook and mis-chucking can be caused. On the other hand, if the aforementioned clearance is too large, malfunctions such that the chuck fails to grasp the bobbin case arm can occur.
- Finely adjust the setting position of the bobbin changer in longitudinal direction so that a clearance of 0.3 to 0.5 mm is provided between the bin case and the chuck when the chuck grasps the bobbin case arm.

- 8) Return the chuck unit to the cassette side by hand. Press arm head key ⑩ .
- Turn ON the air supply to the chuck unit so that it cannot be moved by hand. Detach the plug cap fitted to the solenoid valve. Then, reconnect the originally-connected white tube to the solenoid valve.
  - <Completion of preparation for piping>
- The installation of the automatic bobbin changer to the sewing machine is completed with the aforementioned steps of procedure. Operating the automatic bobbin changer manually, check whether it performs operations normally referring to **"4. Explanation of operation of the control box of automatic bobbin changer" p.15.**

**<Check the operation buttons>**



- |                            |                               |                    |
|----------------------------|-------------------------------|--------------------|
| ① Power switch             | ⑥ Fault lamp                  | ⑪ Power lamp       |
| ② Cassette replacement key | ⑦ Manual mode key             | ⑫ Manual mode lamp |
| ③ Automatic mode lamp      | ⑧ Chuck opening / closing key |                    |
| ④ Bobbin replacement lamp  | ⑨ Cassette feed key           |                    |
| ⑤ Bobbin presence lamp     | ⑩ Arm head key                |                    |

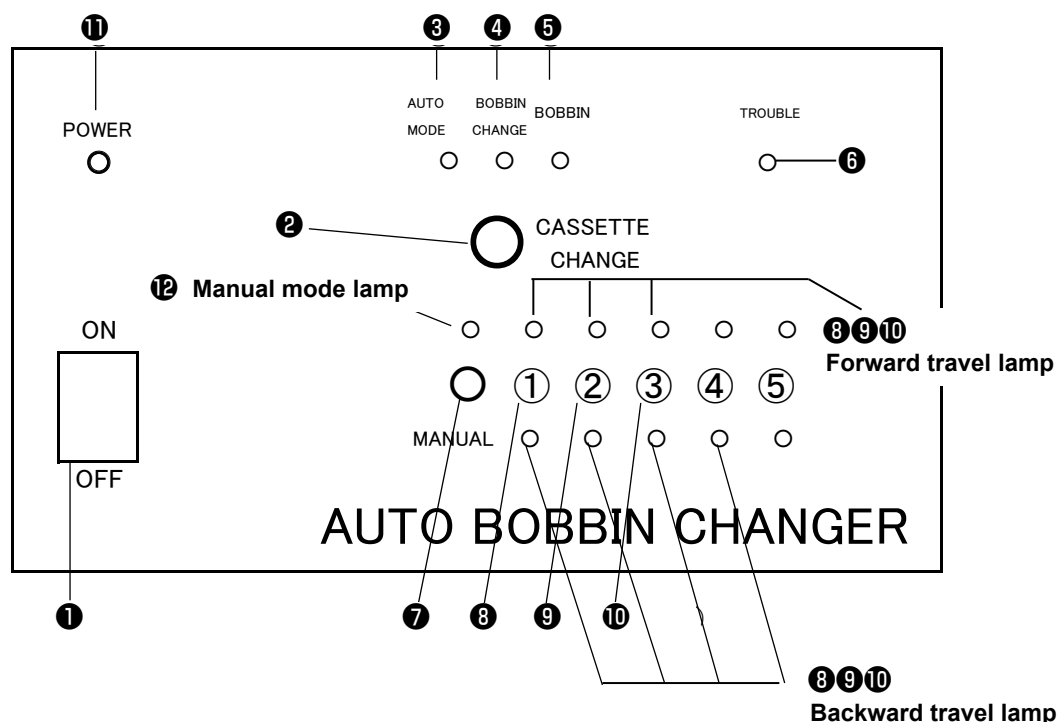


No.	Name of part	Quantity	No.	Name of part	Quantity
1	BASE PLATE	1	61	SCREW M4×8	2
2	CENTER PIN	1	62	SPRING_WASHER M4	2
3	SET_COLLAR	1	63	SCREW M4×8	2
4	SET_COLLAR	1	64	SPRING_WASHER M4	2
5	CENTER BLOCK	1	65	SCREW M4×6	2
6	CHUCK SLIDER	1	66	SPRING_WASHER M4	2
7	SLIDER PIN	2	67	LOWER THREAD HOLDER	1
8	CHUCK HEAD	1	68	BOBBIN CASSET ASSY	1
9	OPEN FOOT	1	69	NUT M4	8
10	OPEN SPRING	1	70	BOBBIN PIN M4	8
11	OPEN LEVER	1	71	BOBBIN CASSET	1
12	AIR CYLINDER	1	72	BOBBIN STOPPER WASHER	1
13	AIR CYLINDER NUT	1	73	BOBBIN STOPPER PLATE	1
14	BOBBIN LINK SCREW	1	74	SCREW M3×5	4
15	SPRING PIN AW12	1	75	BRACKET	1
16	SCREW M4×10	2	76	---	1
17	SCREW M4×5	1	77	PLATE	1
18	SCREW M4×5	3	78	PLATE	1
19	OIL FELT	1	79	SCREW M6×20	4
20	SCREW M4×5	1	80	SCREW M6×20	4
21	ONE TOUCH JOINT	1	81	SPRING_WASHER M6	4
22	AIR TUBEφ4	1	82	SPRING_WASHER M6	1
23	SCREW M4×5	1	83	PIN φ4×30	1
24	SCREW M4×5	2	84	BALL φ4	2
25	CAM SLIDE PIN	1	85	SPRING	1
26	SET_COLLAR	1	86	SCREW M8×12	1
27	CAM THRUST_COLLAR A	1	87	SCREW M8×12	1
28	CAM THRUST_COLLAR B	1	88	WASHER M6	2
29	SCREW M4×5	1	89	NUT M6	4
30	SCREW M4×12	2	90	NUT M6	4
31	AIR CYLINDER NUT	1	91	WASHER M6	4
32	SCREW PIN	2	92	AIR BRACKET	1
33	SCREW M3×3	2	93	SCREW M4×6	2
34	AIR CYLINDER BRACKET	1	94	SPRING_WASHER M4	2
35	SCREW M4×6	2	95	SCREW M4×25	2
36	SPRING_WASHER M4	2	96	SILENCER	2
37	AIR CYLINDER ASSYφ16×150	1	97	JOINT	2
38	BRAKE BAND HOLDER BRACKET	1	98	STRAIGHT UNION	6
39	BRAKE BAND	1	99	ELBOW UNION	1
40	SCREW M4×16	1	100	3-PORT SOLENOID VALVE	1
41	NUT M4	1	101	POWER CABLE	3
42	SPRING_WASHER M4	1	102	CYLINDER SENSOR ASSY	3
43	SPRING	1	103	CYLINDER SENSOR	1
44	SCREW M4×6	2	104	SPIRAL TUBE	1
45	SPRING_WASHER M4	2	105	AIR TUBE	5
46	SENSOR BRACKET	1	106	KNUCKLE	1
47	SENSOR ASSY	1	107	OPERATION BOX	1
48	SCREW	1			
49	SCREW M4×6	2			
50	SPRING_WASHER M4	2			
51	CASSET FEED BOSS	1			
52	SCREW M5×5	8			
53	AIR CYLINDER ASSYφ16×30	1			
54	AIR CYLINDER BRACKET	1			
55	FEED_PLATE	1			
56	FEED_SHAKE STOP STAY	1			
57	FEED_PLATE SHAKE STOP	1			
58	AIR CYLINDER NUT	1			
59	NUT M5	2			
60	SPRING_WASHER M5	2			



## 4. Explanation of operation of the control box of automatic bobbin changer

- ★ Upper and lower lamps of ⑧, ⑨ and ⑩ automatically light up in sequence according to the operations carried out by the relevant sections of automatic bobbin changer (even under the automatic mode).



### ① Power switch

- When power switch ① is placed in <ON>, the power lamp ⑪ lights up. (If the power lamp does not light up, check the voltage of the 24 VDC connection point.)  
Check the voltage of the connection destination.
- When power switch ① is placed in <ON>, automatic mode lamp ③ and cassette feed key ⑨, arm head key ⑩ and chuck opening / closing key ⑧ light up respectively. (Automatic mode)  
**Caution: If the backward travel lamps (green) of keys ⑧, ⑨ and ⑩ fail to light up, it is assumed that some fault has occurred. Request the serviceperson for inspection.**
- When the bobbin case is loaded in the cassette at the bobbin changing position, bobbin presence lamp ⑤ lights up. When no bobbin case is present at the bobbin changing position, the lamp goes out.

### ② Cassette replacement key

- When the manual mode is selected:  
When this switch is pressed under the manual mode, the automatic bobbin changer does not operate. In the case the cassette is manually rotated by four or eight turns, the fault lamp lights up in order to prevent improper operation. In this state, the bobbin changer will no longer operate. This switch is used for resetting the fault lamp which flickers (when the preset final counter value is reached).
- When the automatic mode is selected:
  - Normal operation When replacement of all of the bobbin cases (four or eight pieces) loaded in the automatic bobbin changer is completed, fault lamp ⑥ flickers and the bobbin changer stops.  
When this switch is pressed after the replacement of cassette, the automatic bobbin changer takes out a bobbin case from the newly installed cassette and feeds it to the sewing machine.

## ② Forced replacement of the bobbin cassette

This function is provided to allow the cassette to be changed in the case of changing the thread color, etc. before it is emptied. (Regardless of the number of bobbins already used, the cassette replacement operation is carried out forcibly.)

When this switch is pressed while the sewing machine is at rest and the automatic bobbin changer rests at its origin (in this state, the green lamp of the respective cylinders light up and the bobbin presence (in the sewing machine) lamp and bobbin lamp on the bobbin changer side go out), fault lamp ⑥ flickers, bobbin cases are taken out from the sewing machine to the bobbin changer side, and the chuck section retracts toward the sewing machine side. (At this time, fault lamp ⑥ keeps flickering. Replace the bobbin cassette with a new one. When this switch is pressed again, the automatic bobbin changer takes out a bobbin from the newly installed cassette and feeds it the sewing machine.

## ③ Automatic mode button

- When the automatic mode button ③ lights up, the automatic bobbin changer is placed in the mode under which it automatically replaces the bobbin (automatic mode).

## ④ Bobbin replacement lamp

- This lamp only lights up at the moment when the thread trimming signal and the count-completed signal are received from the sewing machine (bobbin thread remaining amount detector, counter circuit).
- When the thread absence signal and the count complete signal are received, the automatic bobbin changer automatically changes the bobbin.

## ⑤ Bobbin presence lamp

- This lamp lights up when the bobbin case is put in the cassette at its bobbin changing position.

## ⑥ Fault lamp

- Fault lamp ⑥ flickers or lights up in the following cases.

<When the fault lamp lights up>

1. In the case the chuck fails to grasp the bobbin case (mis-grasping of the bobbin case on the sewing machine side and on the automatic bobbin changer side)
2. In the case the automatic bobbin changer stops operation halfway and fails to complete operation within the specified time since the cylinder advancing end sensor fails to detect or has broken.
3. In the case the cylinder sensor has failed.

<The fault lamp flickers>

1. In the case all of the bobbins (four or eight pieces) loaded in the cassette have been used.

When the manual mode is selected

If the cassette is manually rotated by one turn (four or eight bobbin cases) under the manual mode, the fault lamp will light up and the cassette cannot be rotated further in order to prevent improper operation. To re-start the automatic bobbin changer, press cassette replacement key ②. (Cassette replacement key ②, under the manual mode, is only used for resetting the flickering fault lamp. If this key is pressed, the bobbin changer will not move.)

Under the automatic mode (automatic mode is selected)

When the fault lamp flickers, the automatic bobbin changer returns all of the bobbin cases to the cassette and the arm head enters the standby state on the sewing machine side. When cassette replacement key ② is pressed after the replacement of the cassette, the bobbin changer takes out a bobbin case from the newly-installed cassette and feeds it to the sewing machine.

- \* In the case the bobbin cassette is not fully loaded with bobbin cases (i.e., the number of bobbin cases loaded in the bobbin cassette is smaller than the maximum loadable number of bobbin cases), the bobbin changer operates while skipping the empty portions. However, when the cassette rotates four or eight turns to feed four or eight pieces of cassettes to the sewing machine, the fault lamp flickers and the bobbin changer stops. Then, the cassette changer will be placed in the standby state under which the bobbin changer waits for replacement of the cassette.

## Keys used for manual operation

### ⑦ Manual mode key

- When manual mode key ⑦ is pressed, the manual mode lamp ⑫ lights up.
- The automatic bobbin changer can be operated manually with below-stated keys ⑧ , ⑨ and ⑩ .
- When manual mode key ⑦ is pressed again while all of the lower lamps (green) of the ⑧ , ⑨ and ⑩ light up, automatic mode lamp ③ lights up to return the operation mode to the < Automatic mode >.

### ⑧ Chuck opening / closing key

- When chuck opening / closing key ⑧ is pressed once, the chuck grasps the bobbin case arm (i.e., chuck closes) and forward travel lamp (red) lights up. When the chuck opening / closing key is pressed again, the chuck releases the bobbin case arm (i.e., chuck opens) and backward travel lamp (green) lights up.
- \* After the completion of operation, light up the backward travel lamp (green).

### ⑨ Cassette feed key

- The cassette feed key is enabled when the arm head is distantly positioned from the cassette. (The forward travel lamp (yellow) of the arm head key ⑩ lights up.)
- When cassette feed key ⑨ is pressed once, the cassette is fed once and the forward travel lamp (yellow) lights up.  
When the key is pressed again, the cylinder returns to its home position and the backward travel lamp (green) lights up.

### ⑩ Arm head rotating key

- The arm head rotating key is enabled when the arm head is distantly positioned from the cassette.
- When arm head key ⑩ is pressed once, the arm head travels forward from the bobbin changer side to the sewing machine side and the forward travel lamp (red) lights up.  
When the key is pressed again, the arm head travels backward to the bobbin changer side and backward travel lamp (green) lights up.
- \* After the completion of the operation, return the arm head to the bobbin changer side. (The backward travel lamp (green) lights up.)

### ⑪ Arm head forward / backward travel key

- When arm head forward / backward travel key ⑪ is pressed once, the arm head travels forward to the sewing machine side and the cassette side and the forward travel lamp (red) lights up.  
When the key is pressed again, the arm head leaves the sewing machine side and the cassette side and backward travel lamp (green) lights up.
- \* After the completion of the operation, move the arm head away from the sewing machine side and the cassette side. (The backward travel lamp (green) lights up.)

## ■ Automatic operation (normal operation)

### [Precautions]

1. **Be sure to turn OFF the power switch of the sewing machine in any of the following cases. If not, the sewing machine will run when you press the start button by mistake during the work, inviting great danger.**
  - \* **When the bobbin case in the sewing machine hook is replaced**
  - \* **When the sewing machine is disused or the operator leaves the sewing machine side**
2. **Be sure to turn OFF the power switch of the automatic bobbin changer when attaching / detaching the cassette. If the bobbin changer is operated by mistake, great danger will be invited.**

- The automatic bobbin changer carries out the following operations when receiving the "bobbin replacement command" from the sewing machine.
- Conditions to be satisfied to allow the automatic bobbin changer to accept the "bobbin replacement command" are as stated below.

If one of the conditions is not satisfied, the automatic bobbin changer will not start the bobbin replacement operation even if the sewing machine outputs the "bobbin replacement command".

  - ① Automatic mode...The select switch is placed in the "automatic" side.
  - ② Origin position...The green lamps of all the cylinders light up.
  - ③ "Bobbin presence" lamp goes out... No bobbin is present at the position of the bobbin presence / absence check sensor of the automatic bobbin changer.
- In the case all of the four or eight bobbins loaded in the cassette of the bobbin changer are used up (replaced), the bobbin changer stops in the state all of the four or eight empty bobbin are loaded in the cassette, the arm bed retracts to the sewing machine side, and the fault lamp flickers.

When the "cassette replacement" switch is pressed after the replacement of the cassette with empty bobbins with the cassette loaded with the threaded bobbins, the bobbin changer feeds a new bobbin to the sewing machine and the stops (The flickering fault lamp also goes out.)

## ■ Connection

### 1) Connecting the power supply (control box)

The supply voltage is 24 VDC (white → 24 V; black → 0 V).

Never apply the AC voltage to the control box. Application of the AC voltage to the control box will break it.

### 2) Connecting the automatic bobbin changer to the sewing machine

Bobbin changer side		Sewing machine side	
Wiring color	Wiring number & name of signal		
White	INPUT GND	←	0V
Black	Sewing machine is running	←	Output (output for operation, needle cooler, etc.)
Red	Bobbin replacement command	→	Output (output for down counter, etc.)
Yellow	OUTPUT GND	→	0V
Brown	Prohibition of operation	→	Input (protection of thread trimmer, precedence stop at upper position, etc.)
Green	Bobbin replacement completed	→	Input (used for clearing the counter)
Blue	Automatic bobbin changer is faulty	→	Input (used for the case the fault indication, etc. is necessary)

#### Explanation of signals

##### ① From the sewing machine: "Sewing machine is in operation"

This is the signal for prohibiting the automatic bobbin changer from operating while the sewing machine is in operation.

##### ② From the sewing machine: "Bobbin replacement command"

Output this signal at the timing of bobbin replacement such that the counter completes counting. While the "sewing machine is in operation" signal is being output, the automatic bobbin changer will not accept this signal.

##### ③ To the sewing machine: "Prohibition of operation"

This signal is output from the automatic bobbin changer to the sewing machine in order to prevent malfunction while the automatic bobbin changer is automatically replacing the bobbin, or when the manual mode is selected.

##### ④ To the sewing machine: "Bobbin replacement completed"

This signal is output for approximately 0.5 s upon the completion of automatic bobbin replacement. It can be used to clear the counter, etc.

##### ⑤ To the sewing machine: "Automatic bobbin changer is faulty"

This signal is output when the automatic bobbin changer is faulty (the fault lamp lights up).

It is not output when the fault lamp flickers (during the replacement of cassette).

**Signals related to the checking sensors**

 Case AMP 172163-1  
 Pin AMP 170363-1

CN pin number	Name of signal	Wiring color
1 +5V	Arm forward / backward travel; advancing end	Yellow
2 +5V	Arm forward / backward travel; reversing end	Blue
3 GND	Arm forward / backward travel; common (-)	Brown and grey
4 +5V	Index; advancing end	White / black 1
5 +5V	Index; reversing end	Green / black 1
6 GND	Index; common (-)	Red / black 1 Yellow / black 1
7 +5V	Arm rotating; advancing end	Brown / black 1
8 +5V	Arm rotating; reversing end	Grey / black 1
9 GND	Arm rotating; common (-)	Blue / black 1 White / black 2
10 +24V	Bobbin presence / absence sensor (+)	Black and white
11 GND	Bobbin presence / absence sensor (-)	Green
12 +5V	Bobbin presence / absence sensor signal	Red
13 +5V	Reserved; advancing end	Red / black 2
14 +5V	Reserved; reversing end	Yellow / black 2
15 GND	Reserved; common (-)	Green / black 2 Brown / black 2

**Signals related to the valves**

 Case AMP 172171-1  
 Pin AMP 170365-1

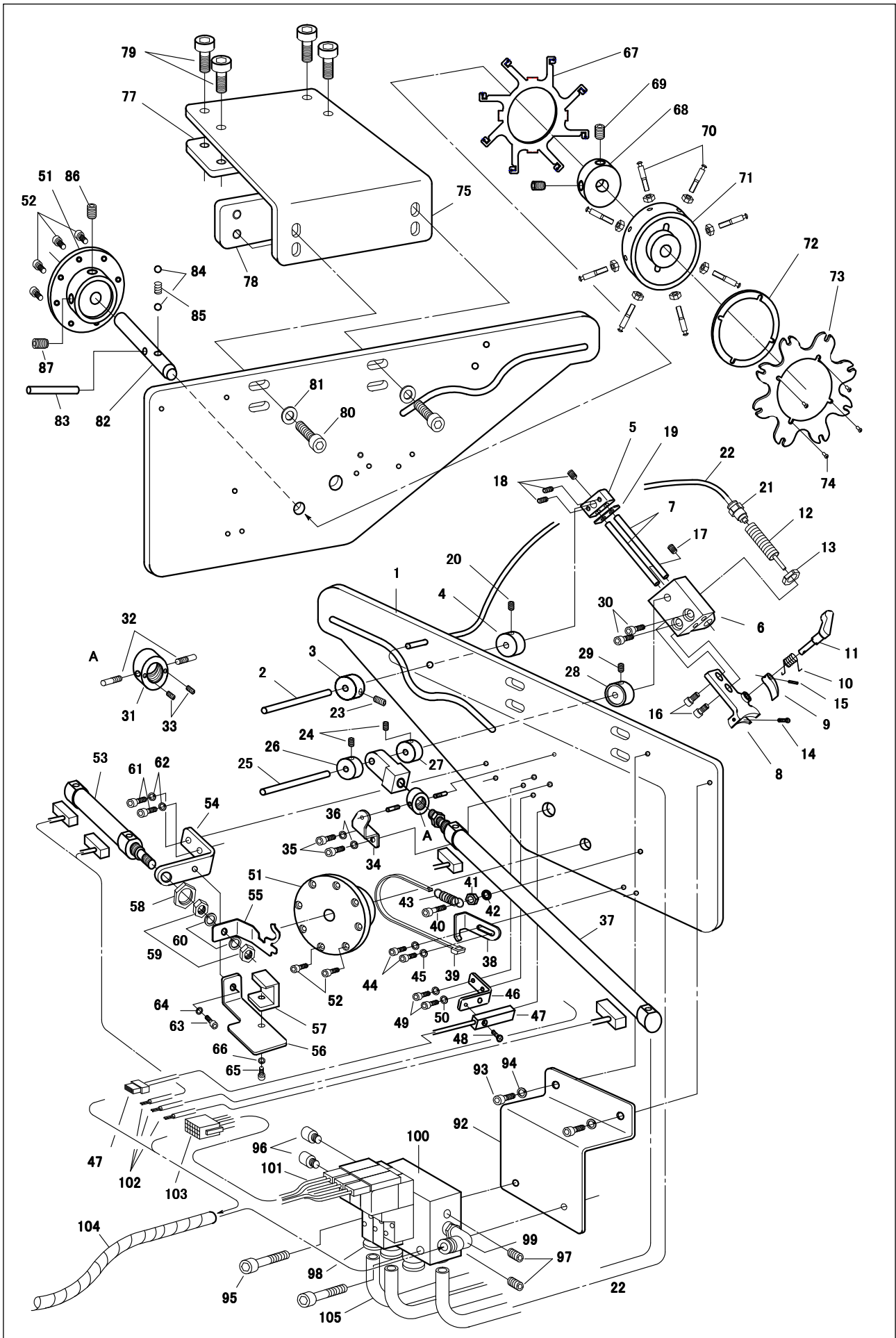
CN pin number	Name of signal	Wiring color
1 GND	Clamp SOL valve (-)	White
2 +24V	Clamp SOL valve (+)	Black
3 GND	Index SOL valve (-)	Green
4 +24V	Index SOL valve (+)	Red
5 GND	Arm rotating SOL valve (-)	Brown
6 +24V	Arm rotating SOL valve (+)	Yellow
7 GND	Arm forward / backward travel SOL valve (-)	Grey
8 +24V	Arm forward / backward travel SOL valve (+)	Blue
9 *GND	Reserved SOL valve (-)	Red / black 1
10 *+24V	Reserved SOL valve (+)	White / black 1
11		
12		
13		
14		
15		

**Signals transmitted / received between the sewing machine and the automatic bobbin changer**

 Case AMP 172170-1  
 Pin AMP 170365-1

CN pin number	Name of signal	Wiring color
1 input	From the sewing machine: Sewing machine is in operation	Black
2 GND	GND for input	White
3 input	From the sewing machine: Bobbin replacement command	Red
4 output	To the sewing machine: Automatic start	Green
5 GND	GND for output	Yellow
6 output	To the sewing machine: Operation prohibition command	Brown
7 output	To the sewing machine: Bobbin changer is faulty	Blue
8 GND	Reserved: GND	Grey
9		
10		
11		
12		

# 5. Parts list for the BK-7



No.	Name of part	Quantity	Remarks	No.	Name of part	Quantity	Remarks
1	BASE PLATE	1		61	SCREW M4×8	2	
2	CENTER PIN	1		62	SPRING_WASHER M4	2	
3	SET_COLLAR	1		63	SCREW M4×8	2	
4	SET_COLLAR	1		64	SPRING_WASHER M4	2	
5	CENTER BLOCK	1		65	SCREW M4×6	2	
6	CHUCK SLIDER	1		66	SPRING_WASHER M4	2	
7	SLIDER PIN	2		67	LOWER THREAD HOLDER	1	
8	CHUCK HEAD	1		68	BOBNIN CASSET ASSY	1	
9	OPEN FOOT	1		69	NUT M4	8	
10	OPEN SPRING	1		70	BOBBIN PIN M4	8	
11	OPEN LEVER	1		71	BOBNIN CASSET	1	
12	AIR CYLINDER	1		72	BOBBIN STOPPER WASHER	1	
13	AIR CYLINDER NUT	1		73	BOBBIN STOPPER PLATE	1	
14	BOBBIN LINK SCREW	1		74	SCREW M3×5	4	
15	SPRING PIN AW12	1		75	BRACKET	1	
16	SCREW M4×10	2		76	---	1	
17	SCREW M4×5	1		77	PLATE	1	
18	SCREW M4×5	3		78	PLATE	1	
19	OIL FELT	1		79	SCREW M6×20	4	
20	SCREW M4×5	1		80	SCREW M6×20	4	
21	ONE TOUCH JOINT	1		81	SPRING_WASHER M6	4	
22	AIR TUBE ø4	1		82	SPRING_WASHER M6	1	
23	SCREW M4×5	1		83	PIN ø4×30	1	
24	SCREW M4×5	2		84	BALL ø4	2	
25	CAM SLIDE PIN	1		85	SPRING	1	
26	SET_COLLAR	1		86	SCREW M8×12	1	
27	CAM THRUST_COLLAR A	1		87	SCREW M8×12	1	
28	CAM THRUST_COLLAR B	1					
29	SCREW M4×5	1					
30	SCREW M4×12	2					
31	AIR CYLINDER NUT	1					
32	SCREW PIN	2		92	AIR BRACKET	1	
33	SCREW M3×3	2		93	SCREW M4×6	2	
34	AIR CYLINDER BRACKET	1		94	SPRING_WASHER M4	2	
35	SCREW M4×6	2		95	SCREW M4×25	2	
36	SPRING_WASHER M4	2		96	SILENCER	2	
37	AIR CYLINDER ASSY ø16×150	1		97	JOINT	2	
38	BRAKE BAND HOLDER BRACKET	1		98	STRAIGHT UNION	6	
39	BRAKE BAND	1		99	ELBOW UNION	1	
40	SCREW M4×16	1		100	3-PORT SOLENOID VALVE	1	
41	NUT M4	1		101	POWER CABLE	3	
42	SPRING_WASHER M4	1		102	CYLINDER SENSOR ASSY	3	
43	SPRING	1		103	CYLINDER SENSOR	1	
44	SCREW M4×6	2		104	SPIRAL TUBE	1	
45	SPRING_WASHER M4	2		105	AIR TUBE	5	
46	SENSOR BRACKET	1		106	KNUCKLE	1	
47	SENSOR ASSY	1		107	OPERATION BOX	1	
48	SCREW	1					
49	SCREW M4×6	2					
50	SPRING_WASHER M4	2					
51	CASSET FEED BOSS	1					
52	SCREW M5×5	8					
53	AIR CYLINDER ASSY ø16×30	1					
54	AIR CYLINDER BRACKET	1					
55	FEED_PLATE	1					
56	FEED_SHAKE STOP STAY	1					
57	FEED_PLATE SHAKE STOP	1					
58	AIR CYLINDER NUT	1					
59	NUT M5	2					
60	SPRING_WASHER M5	2					

**\* Part number of spare parts to be used  
for purchase order  
No.55 40190373  
No.70 40190374**