

# 1-Needle, Lockstitch, Automatic buttonholing Machine ACF-172-1790

# **INSTRUCTION MANUAL (MACHINE OPERATION)**



NOTE :

Read safety instructions carefully and understand them before using. Retain this Instruction Manual for future reference.

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# 1. GENERAL

Mainly consisting of a sewing machine, preset board, carriage, stacker, the ACF-172-1791RS indexer is designed to automatically carry out a series of operations starting sewing button on the front top-center strips of men's shirts, etc. and ending with stacking of workpieces.

# 1-1 Features

- 1) The material feed mechanism allows the material to be fed quickly at accuratintervals.
- 2) The number of buttonholes or the feed to the sewing amount can be easily set or changed with the keys on the control panel. Twenty different patterns can be stored in memory, which enables the operator to quickly respond to the frequent setup changes.
- 3) The material is automatically fed to sewing position after it has been placed on the setting position. The machine automatically performs a series of operations, including sewing, thread trimming and staking.
- 4) The operator can set the next material to be sewn while the machine is still sewing, allowing the operator to have enough to attend on several machines.
- 5) Thanks to the presetting mechanism, it is possible for the operator to attend on four machines without causing one of them to stand idle or for the operator himself/herself to become idle when tow pieces of garment are set on.
- 6) The clamping mechanism clamps the material securely without allowing any slippage during the sewing operation from inserting to stacking.
- 7) Buttonholes can be sewn also the front to-center strips of ladies1 wear.9)The machine has various modes while enable self-diagnosis when an error occurs.
- 10) It is also equipped with a workpiece detector mechanism which eliminates a sewing start error.
- 11) The amount of finished products stacked on the stacker can be detected.

# 1-2. Configuration of the main parts



- 1 Sewing machine head
- 2 Preset board
- 3 Carriage
- 4 Stacker
- **5** Control panel
- 6 Power switch

- Knee switch
- Pause switch
- I Hand switch
- Workpiece detector switch
- Air gun
- Preset adjusting knob (supplied with the machine in the accessory box)
- B Cloth palate
- Handle of the cloth plate
- Tool box
- Thread stand
- Filter box
- Machine head pause switch

# 1-3. Operating precautions

CAUTION:

To avoid malfunction and damage of the machine, confirm the following.

- 1. Before you put the machine into operation for the first time after the set-up, clean it thoroughly.
- 2. This machine corresponds to the power supply voltage 200 to 240V.
- 3. Never use the machine in the state where the voltage type is different from the designated one.
- 4. Operate the machine with the air pressure set to 0.5Mpa.

# 2. SPECIFICATIONS

| (1) main unit  | (5)  |
|--|--|
| 1) Feed interval   | : 0 to 610 (0. to 24")   |
| <ol> <li>Overall feed amount</li> </ol>  | : 610 mm (24")   |
| ③ Number of buttonholes which<br>can be sewn                                   | : 1 to 20 ps. (the machine is set to<br>the independent sewing mode<br>when sewing only one buttonhole<br>on the material. ) |
| <ul> <li>④ Distance from the top end of<br/>the garment body to the</li> </ul> | : 0 to 140 mm (2) (6)<br>(0 to 5.5")   |
| 1st buttonhole   |  |
| (5) distance from the side end of<br>the garment body to the<br>buttonhole     | : 7 to 21 mm<br>(0.3 to 0.8")  |
| <ul> <li>6 Applicable garment size that<br/>cat be sewn</li> </ul>             | : Width 220 to 420 mm<br>(8.7 to 16.5")<br>Length 400to 880 mm<br>(15.7 to 34.6")  |
| Number of patterns that can<br>be stored in memory                             | : 20   |
| Power supply   | : 200 to 240V(3-phase/single phase) (Rated voltage ± 10% or less) (Without voltage changeover)                               |
| Power source frequency   | : 50/60 Hz   |
| Power consumption  | : 1000 VA (supply voltage ± 10% or less)   |
| Operating air pressure   | : 0.5 MPa  |
| Air consumption  | : 240 NI/ min . or less  |
| Machine dimensions   | : Width 1,910mm<br>Depth 850mm<br>Table Height 920 mm  |
| Weight   | : 300 kg   |
| (2) Sewing machine components  |  |
| Machine head   | : LBH-79RS-1ACH  |
| 2 Sewing speed   | : Max. 4,000 rpm   |
| Stitch length  | : Max. 25 mm X sewing width 4 mm   |
| Size (knife size)  | : 6.4 to 19.1 mm (1/4 to 3/4")   |
| 5 Needle   | : DPx5 #11J to #14J  |
| Lubricating oil  | : JUKI New Defrix Oil No.1   |
| Number of stitches   | : 0.2 to 2.5   |

# 3. INSTALLTION

# 3-1. Installing the device



# 3-2. Installing the thread stand



# 3-3. Connecting the power supply



- Securely fix the device in place moving brakes 1 of the four outsize casters provided with a brakes
   1 of the four out side casters provided with a break in the direction of the arrow.
- If the floor on which the device is to be installed is not flat and smooth, loosen nuts ② adjust the height of the device properly and firmly tighten the nuts.
- Finally, lower adjusters 3 until the caster do not rise above the floor surface, and fix the adjusters using nuts 4.
- 1) Assemble the thread stand unit, and fix the assembly in the hole in the table as shown in the figure.
- 2) Tighten locknuts 1 so that they securely hold the thread stand assembly.
- In the case of ceiling wiring, pass the power cable through spool rest rod 2.

- 1) First confirm that power switch in "OFF", then connect the power cord to the power supply.
- 2) If the driving pulley rotates in the reverse direction, change the connection of two terminals of the three cables.
- Turn ON the power, and then check the direction of the fan of the blower motor against the seal showing the direction of rotation attached on the fan cover of the blower motor.
- 4) If the fan rotates in the reverse direction, change the connection of the power cord to the reverse position on the plug side of the power cord. Then re-check the direction of rotation of the fan of the blower motor to make sure of the normal rotation.

1. Running the pulley in the reverse direction might case the sewing machine to malfunction.

2. Be sure to check the direction of rotation of the sewing machine motor and that of the blower motor

### 3-4. Installing the air hose



- Insert air hose ① into one-touch joint ② supplied with this unit, and fix it using metal fittings or the like.
- 2) Insert one-touch joint 2 into joint 3 until it clicks.
- 3) Set the air pressure gauge to 0.5 MPa. To adjust, raise knob is of regulator in direction is, and turn knob is clockwise (direction is) to increase the air pressure, or turn the knob counter-clockwise (direction is) to increase the air pressure, or turn the knob counter-clockwise (direction is) to increase the air pressure, or turn the knob counter-clockwise (direction is) to decrease the air pressure. When the air pressure gauge has been set to 0.5 MPa press knob is in direction is until it clicks. The sound indicates that the gauge has locked.



operation.

When bottle () is filled with waiter, be sure to drain off the water by removing one-touch joint () from regulator (), and by pressing drain button (). Drain off the water every time the machine is used, either before or after

# 3-5. How to operate the air gun



- The amount of air to be blown from the air gun is changed by turning nozzle 
   mounted at the top end of air gun.
- Turning the nozzle in the direction of the solid arrow will decrease the amount of air to air to be blown from the gun.

## 3-6. Installing the cloth plate



  Loosen handle ① of the cloth pate. Then bring cloth prate ② to the desired position, and tighten handle ①.

2) The cloth plate can be installed either the right-or left-hand side of the unit. Loosen handle ①, and draw out cloth plate ②.Remove two screw ③, move cloth plate support bar ④ to the position shown in the figure and tighten screws ③. Fit the cloth plate on the support bar, and fix the table at the desired position. (If you wish to place a material setting table on cloth side of the unit, the cloth plate (asm.) G50281720B0 is separately available.)



Be sure to use the cloth plate only to place the material on it. Do not lean against the or sit on it.

# 3-7. Installing the machine head

#### (1) Lubrioation



# WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



#### 1) Lubricating oil to oiling tank

 $\circ$  Fill the oiling tank with New Defrix Oil No.1 up to the level indicated by "MAX" ①.

#### 2) Adjusting the lubrication for the sewing hook

- Adjust the amount of oil supplied to the sewing hook by loosening lock nut Úñ and turning oil amount adjusting screw 3.
- Amount of supplied oil is reduced when turning the screws ③ clockwise.
- Fix the screw with lock nut **2** after adjusting the lubrication for the sewing hook.
- When you first operate your sewing machine after set-up or after an extended period of disuse, remove the bobbin case and apply a few drops of oil to the hook race. In addition, apply a few drops oil from oiling hole in hook driving shaft front metal 4 to soak the inside felt in oil.

# 4. OPERATION AND ADJUSTMENT

WARNING:

Turn OFF the power before staring the work so as to prevent accidents caused by abrupt start of the

#### 4-1. Operating switches and adjusting pneumatic components



#### (1) Power switch

Use this switch to turn ON / OFF the power to the unit.

(2) Pause switch, Machine head pause switch Use this switch to stop the machine from running.

#### (3) Knee switch



The height of the switch can be adjusted in the three stages. (It has been factory-adjusted to the middle stage at the time of delivery.) Loosen two screws **1** in the reverse side of the knee switch, and fix the switch at a height where you can operate it with ease. The switch is used as the start switch under the A mode, and is used as the preset cancel switch under the B mode.

Whether the knee switch or the hand switch is used as the start switch can be selected with the memory switch dara <u>U51</u>.

(For the setting procedure of the selection of the start switch under A mode/B mode, refer to "2-17. Changing the memory switch data " in the section of PANEL OPERATION.)



#### (4) Hand switch

This switch is used as the start switch or the preset cancel switch. (Refer to the aforementioned "Knee switch".)



If the electricity is cut off when material is being brought to the sewing position and preset board **1** and carriage **1** come in contact with each other, discharge air from the machine, slightly press preset board **1** back ward, raise carriage **2** by hand, and move preset board **1** toward you to return it to its home position. Then, connect the air to the machine.



To discharge air from the unit, press one-touch joint **3** in the direction of the arrow, and remove hose **4**. For the connecting procedure, refer to "3-4. Connecting the air hose".

#### (5) Workpiece detector switch



#### (6) Preset adjusting knob



This switch prevents a malfunction when there is no workpiece set on the machine.

If either one of two detector switches **1** detects a workpiece, the machine is actuated.

Take care not to place anything other than the sewing products or hands on detector switches **①**.

If using a piece of light absorbing black material, the detector sensor may be inoperative. In this case, the detecting function can be inoperative by selecting the memory switch No. US2.

(Refer to "2-17. Changing the memory switch data" in the section of PANEL OPERATION.)

Use this knob to adjust the seam allowance.

Insert preset adjusting knob **①** which is supplied in the accessory box into the hole, and turn the knob to set the seam allowance to the value indicated by scale marker **②**. (Refer to "4-3. Adjusting the seam allowance".)

After the adjustment, return knob **1** to the tool box to prevent it from being lost.

#### (7) Adjusting the air blower





- The air blower is provided with four blow pipes as illustrated in the figure on the left. The soled arrows show the air blowing direction of the respective pipes. The name and function of each components is as follows:
  - Blower for the carriage
  - Blower for lifting the workpiece
  - Blower sucking the workpiece
  - Blower peeling off the workpiece
  - 6 Machine head
  - 6 Preset table
  - Stacking board

- To be used for bellowing down the workpiece
- To be used for staking the workpiece
- 2) The speed controllers used to adjust the air blow of air blow pipes 1 to 4 are those shown in the figure on the left.
  - 1 Speed controller of the blower for the carriage
  - ② Speed controller of the blower for the lifting the workpiece
  - ③ Speed controller of the blower for the sucking the workpiece
  - ④ Speed controller of the blower for the peeling off the workpiece
- Table of relationship between the adjustment values of the speed controllers at the time of delivery and the thickness of the material







 Turn knob ① of the speed controller in the direction of the arrow to increase the amount of air to be blown. After the adjustment, fix the knob at the adjusted position using locknut ②.



Adjusting the amount of air to be blow while the machine is in operation is very dangerous. Be to turn OFF the power to the machine starting the adjustment.

5) Adjusting the air blower for blowing down the workpiece

If sewing a heavy-weight material or a large-size material, fully open speed controller ① first. If the workpiece cannot be easily blown down, gradually loosen speed controller ② to increase the amount of air to be blown properly.

If sewing a light-weight material or floppy material, set speed controller (2) to the value adjusted of air to be blown.

6) Adjust the air blower for stacking the workpiece If sewing a heavy-weight material or a large-size material, loosen speed controller ③ and ④ to in increase the amount of air to be blown properly. If sewing a light-weight material, set speed controller ③ to be the value adjusted at the time of delivery and tighten speed controller ④ to increase the amount of air to be blown.



7) Adjusting the air blower for the needle bar When dust collected on the needle bar area falls and is caught in the seams, adjust the direction and strength of the air blower. The air blower blows dust away and prevents dust from falling under needle. For the direction of the air blower, correct the installation of the pipe. Adjust the air blower so that air blows as near as the machine arm jaw area.





Press and turn the manual switch of solenoid valve No. 7 to check the motion.Strength of the air blow is adjusted with the speed controller.When the manual switch of solenoid valve No. 7 is pressed and turned, the pusher is actuated and simultaneously the needle bar air blower is actuated. Return the manual switch after the adjustment since the manual switch is locked with it pressed and turned.Adjust the speed controller located on the black pipe branched from the yellow pipe connected from solenoid valve No. 7.

Air blow is actuated during machine operation when continuously performing sewing. Take care not to excessively increase the amount of air to be blown so that the sewing is not affected. Standard adjustment value :  $9.5 \pm 0.5$  mm

# (8) Vacuum adjusting metal fittings



They are used to adjust the vacuum suction force of the preset board for sucking the workpiece. Adjustment is carried out by turning metal fitting **①**. For the normal operation, **②** in the metal fitting should not be closed. If sewing a large-size material should not be closed. If sewing a large-size material or a coarse texture, close the hole **②**.



## (9) Sensor to detect the number of garment bodies stacked



- Sensor 2 mounted on cylinder 1 which driver pusher 4 detects the thickness of garment bodied stacked on stacking board 3 when actuating the stacker.
- 2) You can let the alarm occur at the time when the thickness of garment bodies stacked on the board reaches any desired value specified by change the position of sensor ② with a Phillips type screwdriver. (Distance ⑤ has been factory-adjusted to 40 mm at the time of delivery. The value is equivalent to the height reached when stacking approximately 120 to 140 garment bodies made of T/C broadcloth. Moving sensor ② to the right will make the alarm occur earlier.)



Note that the sewing machine does not | stop operation when this alarm occurs.

## 4-2. Operation of the sewing machine

#### (1) Inserting the needle



# WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



Hold needle with its recessed part facing toward the operator side A, insert the needle fully into the needle clamping hole, and tighten needle setscrew ①. Use a DPx5-(#11J, #14J).



When attaching the needle, turn OFF the power to the motor.

#### (2) Threading the needle-thread



#### WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



Pass the needle thread in the order ① to ② as shown in the figures.

The threading can be done easily by using the needle threader supplied with the machine. Change the thread guide threading method according to the thread to be used.

#### (3) Threading the bobbin case



#### Rotating direction of bobbin and threading

- 1) Fit the bobbin so that it rotates in the direction of the arrow.
- 2) Pass the thread through thread slit ①, then through under the tension spring ②, again through thread slit ③, and pull the thread from ④.
- 3) Threading at **4** for purl stitching is different from that for whip stitching. So, be careful.

#### (4) Adjusting the bobbin thread tension



Adjust the bobbin thread tension as given below when the bobbin thread is pulled up at the position where thread slit **①** of bobbin case comes up.

| Purl stitch |               | To such an extent that bobbin case quietly comes down when |
|-------------|---------------|--|
|             | 0.05 to 0.15N | holding thread end coming from bobbin case and shaking it  |
|             |               | quietly up and down.                                       |
| Whip stitch | 0.15 to 0.3N  | To such an extent that bobbin case barely comes down when  |
|             |               | holding thread end coming from bobbin case and shaking it  |
|             |               | somewhat strongly.   |

Turning tension adjust screw **2** clockwise will increase bobbin thread tension, and turning it counterclockwise will decrease the tension.

Adjust the bobbin thread tension to lower for synthetic filament thread, and to higher for spun thread. The thread tension is higher by approximately 0.05N when the bobbin case is set to the hook since idle-prevention spring is provided.



When bobbin thread tension is adjusted, make sure of the needle thread tension setting of the memory switch.(Refer to "2-9. Changing the needle thread tension" in the section of PANEL OPERATION.)

#### (5) Installation of bobbin case



#### WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



- 1) Lift up and hold bobbin case latch lever between two fingers.
- Push the bobbin case into the hook so that it is supported by the hook shaft 1 and then snap in the latch lever.

Press the bobbin case until the predetermined position is reached, and it will click.

- If the bobbin case is out of the predetermined position, it can jump out from the hook to cause the needle thread to tangle on the hook shaft. Check to be sure that the bobbin case is properly installed in the correct position.
  - 2. There is a difference in the shape of bobbin case between the standard hook and the dry one. They have nothing in common with each other.

#### (6) Installing the knife

#### WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



#### Inch $\rightarrow$ mm CONVERSION TABLE

| Knife size | Indication of mm |
|------------|------------------|
| 1/4        | 6.4              |
| 3/8        | 9.5              |
| 7/16       | 11.1             |
| 1/2        | 12.7             |
| 9/16       | 14.3             |
| 5/8        | 15.9             |
| 11/16      | 17.5             |
| 3/4        | 19.1             |
| 13/16      | 20.6             |
| 7/8        | 22.2             |
| 1          | 25.4             |
| 1 1/8      | 28.6             |
| 1 1/4      | 31.8             |
| 1 3/8      | 34.9             |
| 1 1/2      | 38.1             |

When replacing the knife with a new one, perform as follows.

- Knife ① can be easily removed together with the washer when removing knife retaining screw ②.
- 2) Adjust so that the knife, when lowered the knife bar by hand, is spaced 1 to 2 mm away from the top surface of the throat plate as illustrated in the sketch. Then, be sure to place the washer and tighten the knife retaining screw.

In case the cloth cutting knife on hand is indicated in inch, set the length of cloth cutting (knife size) in mm using the inch  $\rightarrow$  mm conversion table on the left side. Sewing data <u>S02</u> is the length of cloth cutting. Refer to "2-7. Changing the sewing data" in the section of PANEL OPERATION.

#### (7) Remove and installing the bobbin case



- 2) When carriage table ① is in the position of the origin (left end position), press (carriage tilt/ lift button) on the panel to set the state of ③, and it is simply performed to replace the bobbin.
- 3) Holding knob 2 open shuttle cover 3.
- Raise and hold latch lever S of bobbin case 4 to take it out. (The bobbin in the bobbin case will not come off provided that the latch lever is raised and held.)
- 5) To load the bobbin case in the shuttle, put in onto the shuttle shaft until it will go no further, and snap on the latch lever of the bobbin case.
- 6) Close shuttle cover **3**.

# 4-3. Adjusting the seam allowance



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



#### (1) Adjusting distance (A)



#### (2) Adjusting distance **B**



 Adjust the seam allowance from the side end of the garment to the buttonhole (distance a in the figure), and from the top end the garment to the 1<sup>st</sup> buttonhole (distance a), a in the figure). The number of buttonholes and the intervals between the buttonhole can be adjusted using the panel switches.(Refer to "Inputting the sewing data" on page 23.)



Be sure to make adjustment of the seam allowance after you have turned OFF the power switch.

- 1) Turning preset adjusting knob ① clockwise will decrease distance ④, or counter clockwise will increase it.
- 2) Read the required distance on scale 2 and marker 3. Then turn the knob until it reaches the specified value.
- Distance (a) can be adjusted with the range from 7 to 21 mm.
- 4) When A cannot be adjusted be set to the value indicated on the scale, loosen screw 5. which fixes scale plate 4 (the plate has both sides a screw), and re-adjust the position of the scale plate properly. (See the figure given in (2).)
- 5) After the adjustment, return the knob in the tool box to prevent it from being lost.
- Loosen thumb screw 3 of gauge 2 on preset board 1, and move the board to the value set onscale 4.
- 2) Setting the material so that top end of the material comes inside of the marker will complete the positioning of the material.(When sewing ladies' wear, determine the position of the material using the scale marker on the left side of the preset board while following the same procedure as the above.)
  - The line on the leftmost of the right-side scale is aligned with the center of the needle which corresponds to the sewing start position of the first buttonhole (the bottom end of the buttonhole) of garment body of men's wear.
  - 2. The line on the rightmost side of the left-side scale corresponds to the sewing start position of the first buttonhole (the top end of the buttonhole) of garment body of ladies' wear.
  - 3. For the changeover of men's wear / ladies' wear, refer to "1-10. Changeover of men's and ladies' wear" in the section of PANEL OPERATION.
  - 4. For the setting procedure of the material, refer to "OPERATION".

## 4-4. Adjusting the carriage lamp



#### WARING:

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

## (1) Adjusting the position of the clamps



### (2) Adjusting the clamping force



Adjust the position of the clamp only when you wish to eliminate a clearance between the clamps or you wish change the arrangement of the clamp.

- If you wish to eliminate a clearance between the clamps, loosen screws 3 either in clamps (small)
   or in clamp (large) 2, and move the relevant one. Then tighten screws 3.
- 2) If you wish to change the arrangement of clamp (small) ① and clamp (large) ②, remove screws
  ③, and re-position the clamps as you wish. Then fix the clamps wish the screws. (The clamps can be attached to any of the installation holes in mounting base ④.)



Whenever you perform this adjust the clamping force of the clamps referring to "(2) Adjusting the clamping force".

When adjusting the position of the clamps or replacing the clamp cushion, perform the adjustment below.

- Place workpiece ① on the carriage as illustrated in the figure, press and turn the manual switch on solenid valve ③ to actuate the clamp cylinder.
- 2) Loosen locknut ④ and turn adjustment screw ⑤in the direction of the arrow.Then clamp cushion⑥ will be raised.
- 4) Finally, tighten the locknut and check that the clamping force of the clamps do not change.
- 5) Return the manual switch to its home position.



# 4-5. Adjusting the stacking board of the stacker



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



If sewing garment bodies with pockets, adjust the stacking board following the steps, adjust the stacking board following the steps described below. This adjustment allows the stacker to stack approximately 140 pieces of garment bodies with pockets (material : T/C board cloth ). (When sewing garment bodies without pockets, no adjustment is required.)

- When sewing men's wear, loosen locknuts 2 in the reverse side of staking board 1 on the right side, and raise the stacking board until the reverse side of the stacking board is flush with the reverse side of the locknut.
- When sewing ladies' wear, loosen locknuts (2) in the staking board on the left side as in the case of men's wear.

(When sewing garment bodies without pockets, lower locknuts 2 until they reach staking board base 3 and tighten them to the extent where stacking board 1 is secured.)

# **5. OPERATION**



- 1 Power switch
- Control panel
- 3 Knee switch
- 4 Hand switch
- **5** Workpiece suction lamp
- 6 Temporary stop switch
- Machine head pause switch

#### WARNING:

1. The machine can be started in two different methods ; A and B modes, by changing over the memory

switch data U51.

- (Refer to "2-17. Changing the memory switch data")
- 2. The knee-switch is used as start switch under the A model and the hand-switch is used under the B mode.
- 3. Under both A and B models, the machine will start when releasing the start switch. Be sure to avoid placing your hand(s) under the work clamp check and the needle with the start switch held pressed.

When the switch is pressed, the following series of operation will be performed automatically [Series of the operation for men's wear]

| Start  |           | The preset board moves forward and  | >Buttonho    | le Index in the | right direction |
|--------|-----------|-------------------------------------|--------------|-----------------|-----------------|
|        |           | feeds the material on the carriage. | sewing       | (the carriage   | e moves)        |
| 1      |           |                                     |              |                 |                 |
| Stack  | ing 🚛     | The conveyer returns to its         | Buttonhole - | Index in the    | — — Buttonhole  |
|        |           | home position                       | sewing       | right direction | sewing          |
| [Serie | es of ope | eration for ladies' wear]           | ·            |                 |                 |

| Start →  | The preset board moves forward and | → The carr | riage travels to its |    | ndex in the left directior | ר∣י |
|----------|------------------------------------|------------|----------------------|----|----------------------------|-----|
| f        | eeds the material on the carriage. | rightmos   | st position          | (1 | the carriage move)         |     |
|          |                                    | -          |                      |    |                            | _   |
| Stacking | The conveyer returns to its        | Buttonhole | Index in the         |    | - Buttonhole               |     |
|          | home position                      | sewing     | right direction      |    | sewing                     |     |

For the operating procedure of start and workpiece suction, operate in accordance with the type selected in "Start switch selection" of the memory switch data <u>U51</u>.

[Operating the A-mode (the knee switch is used to start sewing)]

- 1) Press READY key 🕐 on the operation panel to make the ready ON state.(State that the screen is green)
- 2) Properly se the material on the preset board. (See the figure below.)
- 3) When knee switch ③ is pressed, the material will be sucked (workpiece suction lamp ⑤ lights up). When it released, the machine will start running.
- \* When the material is sucked (workpiece suction lamp **5** lights up), press hand switch **4** and the workpiece suction mechanism is released (workpiece suction lamp **6** goes off). Then the start is released.
- \* If you repeat steps 2) and 3) during sewing the 1st workpiece, continuous operation can be performed.

[Operating the B-mode (the hands switch used to start sewing)]

- 1) Press READY key O on the operation panel to make the ready ON state.(State that the screen is green)
- 2) Properly set the material on the preset board. (See the figure below.)
- 3) When hand switch ④ is pressed, the material will be sucked (workpiece suction lamp ⑤ lights up). When it released, the machine will start running (workpiece suction lamp ⑤ goes off).
- \* When the material is sucked (workpiece suction lamp <sup>(3)</sup>) lights up), press knee switch \$3\$ and the workpiece suction mechanism is released (workpiece suction lamp <sup>(3)</sup>) goes off). Then the start is released.
- \* If you repeat steps 2) and 3) during sewing the 1st workpiece, continuous operation can be performed.



1) Men's shirts

Place the material so that there is no clearance between the side end of the material and presetting board (A), and align the top end of the material witch marker (B).

2) Ladies' shirts

Place the material so that there is no clearance between the side end of the material and presetting board (A), and align the top end of the material with maker (G).



# 6. MAINTENACE

# 6-1. Adjusting the needle-to-hook relation



**WARNING :** To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.







0.05 mm -



Perform adjusting the needle-to-hook relation when the needle enters the center of the needle hole in the throat plate.

#### (1) Needle bar height

- 1) Bring down the needle bar to the lowest point.
- Insert the part [1] of timing gauge into the gap between the bottom end of needle bar and throat plate, where the bottom end of the needle bar touches the top of the part[1] of the timing gauge.
- Loosen needle bar connection screw ①, and adjust the height of the needle bar.
- (2) Set the needle to hook relation in the following way
- Rotate the hand pulley in the correct direction until the needle starts to go up from its lowest point.
- 2) Insert the part [2] <sup>(2)</sup> of the timing gauge into the gap between the bottom end of the needle bar and the throat plate, where the bottom end of the needle bar touches the top of the part [2] <sup>(2)</sup> of the timing gauge.
- 3) Loosen setscrew of the hook sleeve, and align blade point of the sewing hook with the center of needle hole. Make adjustment so that a clearance of approx. 0.05 mm is provided between the needle and the blade point of the hook.

(3) Adjusting the bobbin case positioning stopperAdjust with setscrew ③ so that the contact of the top end of bobbin case positioning stopper ① and the end of inner hook ② is 0 to 0.2 mm.

# 6-2. Adjusting the needle thread trimmer



#### WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



(1) Adjusting the thread grasping force of the needle thread trimmer

If the needle thread trimmer fails to provide consistent thread grasping force, the needle thread can slip off at the beginning of sewing.

- If the thread grasping force of the needle thread trimmer has reduced, loosen setscrews 1 and detach needle thread trimmer 2.
- Slightly bend the top end of thread presser spring
   so that it comes in contact with thread trimming blade of upper knife
   over the length with no clearance and so that the needle thread trimmer securely holds the thread regardless of the position of the thread trimming blade at which the thread is trimmed.

# (2) Adjusting the height of the needle thread trimmer

To adjust the height of the needle thread trimmer, loosen setscrew **①**. Set the height of trimmer as low as possible, provided that it does not touch work clamp check, in order to minimize the length of remaining thread on the needle after trimming. Note that the work clamp check tilts when sewing a multi-layered portion of the material, attach the needle thread trimmer to slightly raise the installing position of the trimmer.



When replacing the needle thread trimmer, make sure that the trimmer normally works under the needle thread trimmer adjusting mode.

Refer to "5-3-2. Performing the adjustment of the origin of the needle thread trimmer" in the section of PANEL OPERATION.

## 6-3. Adjusting the presser bar pressure



#### WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



To adjust the pressure applied by the presser bar to fabric, turn presser spring regulator ①. When the pressure is not enough to prevent fabric from puckering, turn regulator ① clockwise.

#### 6-4. Adjustment of the bobbin presser unit



# WARNING :

To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



Loosen nut **2** and adjust the position with stopper spring **3** so that the distance from the front end of machine bed to bobbin presser **1** is 8 to 15 mm when the sewing machine stops. Then tighten nut **2**.

# 6-5. Thread tension





#### (1) Thread take-up spring (purl stitch)

- The thread take-up amount of thread take-up spring
   is 8 to 10 mm, and the appropriate pressure at the start is approximately 0.06 to 0.1N.
- To change the stroke of the thread take-up spring, loosen screw 2, insert a thin screwdriver into the slot of thread tension post 3, and turn it.

Turning it counterclockwise will decrease the pressure.

(2) Adjusting the thread take-up amount of the thread take-up lever

The thread take-up amount of the thread take-up lever should be adjusted in accordance with the thickness of the sewing products so as to obtain well-tightened stitches.

- a. For heavy-weight materials, loosen setscrew 2 in thread guide ①, and move the thread guide to the left. The thread take-up amount of the thread take-up lever will be increased.
- b. For light-weight materials, move thread guide 1 to the right. The thread take-up amount of the thread take-up lever will be reduced.

## 6-6. Removing dust near the bobbin case



Hold knob **2** and open hook cover **1**. Then remove dust (thread waste and cloth waste) near bobbin case **3**.



# 6-7. Cleaning the cooling filter



# **WARNING :** To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



Clean filter ② of the fan located on the bottom surface of the machine table (bed base) once every week.

- 1) Pull the screen kit **1** in the direction of the arrow to remove it.
- 2) Wash the filter 2 under running water.
- 3) Reinstall the filter **2** and the screen kit **1**.

## 6-8. Cleaning the vacuum filter



Clean the filter element inside the filter box once every 4 months.



## 6-9. Draining of the air regulator



When bottle **1** is filled with water, draw out one-touch joint **3** from regulator **2**, and press drain button **4** to perform draining.

It is recommended to perform draining each time before operating the machine or after operating.

## 6-10. Replacing the clamp cushion



If the clamp cushion of the carriage has worn out or deformed, replace it with anew one in the following steps of procedure.

- 1) Remove worn out cushion from clamp 1 ,and wipe the clamp surface cleanly.
- Attach chshion 2 supplied with the machine on clamp 1 so that the cushion is positioned illustrated in the figureon the left.

C C





# 6-11. Cleaning the carriage and lubricating to the drive section

 Apply grease to the feed rack and pinion gear of the carriage, and apply grease to the carriage unit once every 6 months.

For the grease, use ESSO LITHTAN 2 or lithium system grease (equipment to penetration No.2 and base oil viscosity  $95 \text{mm}^2$  /s (40 )).

 Apply grease to the geed rack, pinion gear and grease up to the shaft of the carriage once every 6 months.



#### WARNING :

- 1. To avoid electrical shock hazards, turn OFF the power and open the control box cover after about five minutes have passed.
- 2. Open the control box cover after turning OFF the power without fail. Then, replace with a new fuse with the specified capacity.



The machine uses the following four fuses.

#### SDC circuit board

• For stepping motor and knife solenoid power supply protection

5A (time-lag fuse)

- Por thread tension solenoid and stepping motor power supply protection
  - 3.15A (time-lag fuse)
- For control power supply protection2A (fast-blow type fuse)



#### I/O circuit board

For carriage pulse motor power supply protection
 4A (time-lag fuse)

# 7. GAUGE COMPONENTS

# (1) Cloth cutting knife



|                     |                   | 7      |              |
|---------------------|-------------------|--------|--------------|
| A Knife size (inch) | B Knife size (mm) | C Mark | D Part No.   |
| 1/4                 | 6.4               | F      | B2702047F00  |
| 3/8                 | 9.5               | К      | B2702047K00A |
| 7/16                | 11.1              | I      | B2702047100  |
| 1/2                 | 12.7              | L      | B2702047L00A |
| 9/16                | 14.3              | V      | B2702047V00  |
| 5/8                 | 15.9              | М      | B2702047M00A |
| 11/16               | 17.5              | A      | B2702047A00  |
| 3/4                 | 19.1              | N      | B2702047N00  |
| 7/8                 | 22.2              | Р      | B2702047P00  |
| 1                   | 25.4              | Q      | B2702047Q00A |
| 1-1/4               | 31.8              | S      | B2702047S00A |

# (2) Throat plate



| Stitch width<br>Type | 5mm (Marking • AxB)     | 6mm (Marking • AxB)     |
|----------------------|-------------------------|-------------------------|
| Standard (S)         | 40004350 (S5 • 1.4x6.2) | 40004351 (S6 • 1.4x7.4) |
| For knits (K)        | 40004352 (K5 • 1.2x6.2) | 40004353 (K6 • 1.2x7.4) |

# (3) Presser

#### Stitch width 5 mm

| Size (AxB)<br>Type | 1 (4x25)     | 2 (5x35)    | 3 (5x41)    |
|--------------------|--------------|-------------|-------------|
| Standard (S)       | B1552781000A | B1552782000 | B1552783000 |
| For knits (K)      | D1508771K00A | D1508772K00 | D1508773K00 |

#### Stitch width 6 mm

| Size (AxB)<br>Type | 3 (6x41) |
|--------------------|----------|
| Standard (S)       | 14524409 |



# (4) 120 mm work clamp (5 X 120 mm)



| No. | Part No.    | Name of part                          | Q'ty |
|-----|-------------|---------------------------------------|------|
| 0   | 40006335    | Work clamp arm 120                    | 1    |
| 2   | 40008645    | Work clamp foot (asm.) 120            | 1    |
| 8   | 40008658    | Work clamp 120                        | 1    |
| 4   | SS6060210SP | Work clamp setscrew 120               | 2    |
| 6   | SD0790203SP | Work clamp foot hinge screw 120       | 1    |
| 6   | 40006341    | UTT close cam 120                     | 1    |
| 0   | 40006342    | Work clamp lifting plate 120          | 1    |
| 8   | SM6050800SP | Work clamp lifting plate setscrew 120 | 2    |
| 9   | 40014871    | Feed plate ACF 120                    | 1    |

Setting when 120 mm work clamp (presser) is used

- 1) The max. sewing length from the origin of the carriage is 25 mm. When performing sewing beyond 25 mm, input the jump feed at the start of sewing. For the input of the jump feed, refer to "1-3-1. ACF data input screen" of "1-3. LCD display section under ACF mode" of PANEL OPERATION.
- 2) When performing the continuous stitching, if the total length of the continuous stitching pattern exceeds 25 mm, input the jump feed at the start of sewing. For the input of the jump feed, refer to "1-3-1. ACF data input screen" of "1-3. LCD display section under ACF mode" of PANEL OPERATION. It is effective to set the jump feed on the 1st button side (right side of the work clamp) in case of men's wear, and on the 1st button side (left side of the work clamp) in case of ladies' wear.

#### 3) Example of setting

- ① When, in case of men's wear, buttonhole interval is 100 mm and number of buttonholes is 6
  - SETTING OF LBH PATTERN (For the details, refer to "2-14-1. LBH continuous stitching data input screen" of "2-14. LCD display section at the time of continuous stitching of PANEL OPERATION".)
  - $\cdot$  Jump feed at the start of sewing : 100 mm
  - · Feed amount up to the 2nd buttonhole : -100 mm
  - SETTING OF ACF PATTERN (For the details, refer to "1-3-1. ACF data input screen" of "1-3. LCD display section" of under ACF mode of PANEL OPERATION").
  - $\cdot$  Number of buttonholes to be sewn : 3
  - · Buttonhole interval : 200 mm
- 2 When, in case of ladies's wear, buttonhole interval is 100 mm and number of buttonholes is 6
  - SETTING OF LBH PATTERN (For the details, refer to "2-14-1. LBH continuous stitching data input screen" of "2-14. LCD display section at the time of continuous stitching of PANEL OPERATION".
  - $\cdot$  Jump feed at the start of sewing : without
  - $\cdot$  Feed amount up to the 2nd buttonhole : 100 mm
  - SETTING OF ACF PATTERN (For the details, refer to "1-3-1. ACF data input screen" of "1-3. LCD display section under ACF mode of PANEL OPERATION".)
  - $\cdot$  Number of buttonholes to be sewn : 3
  - · Buttonhole interval : 200 mm

# 8. TROUBLES AND CORRECTIVE MEASURES

| Troubles   | Causes  | Corrective measures   | Page                                 |  |  |  |  |  |  |
|--|---|---|--------------------------------------|--|--|--|--|--|--|
| 1. Needle thread breakage                        | 1. Thread tension at parallel section is too high.  | <ul> <li>Decrease the thread tension at parallel section.</li> </ul>  | PANEL<br>OPERATION                   |  |  |  |  |  |  |
|  | 2. Pressure or stroke of thread take-up spring is too large.  | <ul> <li>Decrease the tension of thread take-<br/>up spring or decrease its stroke.</li> </ul>                                    | MACHINE<br>OPERATION<br>6-5          |  |  |  |  |  |  |
|  | 3. There is a burr or scratch on the blade point of book  | <ul> <li>Buff the blade point of hook. Or,<br/>replace the book</li> </ul>  | -                                    |  |  |  |  |  |  |
|  | <ol> <li>Hook timing is not proper.</li> </ol>  | <ul> <li>Adjust again the hook timing with<br/>timing gauge.</li> </ul>   | MACHINE<br>OPERATION<br>6-1          |  |  |  |  |  |  |
|  | 5. There is a scratch on the thread path.   | <ul> <li>Polish the thread path with sand paper<br/>and buff it.</li> </ul>   | -<br>MACHINE                         |  |  |  |  |  |  |
|  | 6. Attaching needle is wrong.   | • Adjust again the direction, height, etc.  | OPERATION<br>4-2(1)                  |  |  |  |  |  |  |
|  | <ol> <li>Needle is too thin.</li> <li>Needle tip is damaged.</li> </ol>   | <ul> <li>Replace the needle with a thicker one.</li> <li>Replace the needle.</li> </ul>   | -                                    |  |  |  |  |  |  |
| 2. Needle thread slips off.                      | 1. Needle thread trimmer opens too early.   | <ul> <li>Delay the opening timing of the needle<br/>thread trimmer.</li> </ul>  | MACHINE<br>OPERATION                 |  |  |  |  |  |  |
|  | <ol> <li>Whip stitching is not formed at the start of<br/>sewing.(Tension at the start of sewing is too<br/>high.)</li> </ol> | <ul> <li>Decrease tension at the start of sewing.(Sewing data 857))</li> </ul>  | 0-2<br>PANEL<br>OPERATION<br>2-7     |  |  |  |  |  |  |
|  | 3. Threading needle thread is wrong.  | • Thread properly again.  | MACHINE<br>OPERATION                 |  |  |  |  |  |  |
|  | 4. Speed at the start of sewing is too fast.  | <ul> <li>Set the soft-start function.(Memory switch data U09 to U13)</li> </ul>   | 4-2(2)<br>PANEL<br>OPERATION<br>2-17 |  |  |  |  |  |  |
| 3. Wobbling at parallel section                  | 1. Thread tension at parallel section is too low.   | <ul> <li>Increase the thread tension at parallel section.</li> </ul>  | PANEL<br>OPERATION                   |  |  |  |  |  |  |
|  | 2. Bobbin thread tension is too high.   | <ul> <li>Decresase bobbin thread tension.<br/>(Purl stitching : 0.05 to 0.1N)</li> </ul>  | MACHINE<br>OPERATION<br>4-2(4)       |  |  |  |  |  |  |
|  | 3. Pre-tension is too low.  | <ul> <li>Increase pre-tension.</li> </ul>   | -                                    |  |  |  |  |  |  |
| 4. Wobbling at the start of sewing               | 1. Thread tension at parallel section is too low.   | <ul> <li>Increase the thread tension at parallel section.</li> </ul>  | PANEL<br>OPERATION<br>2-9            |  |  |  |  |  |  |
|  | 2. Position of needle thread trimmer is too high.   | <ul> <li>Lower the needle thread trimmer to<br/>such an extent that it does not come<br/>is content with the preserve.</li> </ul> | MACHINE<br>OPERATION                 |  |  |  |  |  |  |
|  | 3. Stroke of thread take-up spring is too large.  | <ul> <li>Decrease the stroke of thread take-up spring.</li> </ul>   | MACHINE<br>OPERATION<br>6-5          |  |  |  |  |  |  |
| 5. Needle thread appears<br>on the wrong side of | 1. Bar-tacking thread tension is too low.   | <ul> <li>Increase the bar-tacking thread tension.</li> </ul>  | PANEL<br>OPERATION                   |  |  |  |  |  |  |
| section in dumpling condition.                   | 2. Bobbin thread tension is too high.   | <ul> <li>Decresase the bobbin thread tension.<br/>(0.05 to 0.1N)</li> </ul>   | 2-9<br>MACHINE<br>OPERATION          |  |  |  |  |  |  |
|  | 3. Number of stitches of radial shape is too many.  | <ul> <li>Decrease the number of stitches.<br/>(Sewing data 519)</li> </ul>  | PANEL<br>OPERATION<br>2-7            |  |  |  |  |  |  |
|  | 4. Tension at the end of sewing is too low.   | <ul> <li>Increase tension at the end of sewing.<br/>(Memory switch data U06))</li> </ul>  | PANEL<br>OPERATION<br>2-17           |  |  |  |  |  |  |
| 6. Stitches float.                               | 1. Bobbin thread tension is too low.  | <ul> <li>Increase the bobbin thread tension.</li> </ul>   | MACHINE<br>OPERATION                 |  |  |  |  |  |  |
|  | 2. Bobbin thread comes off bobbin case.   | <ul> <li>Perform proper threading the bobbin case.</li> </ul>   | 4-2(2)<br>MACHINE<br>OPERATION       |  |  |  |  |  |  |
|  |   | <ul> <li>Take care that the winding amount of<br/>bobbin thread is not excessive.</li> </ul>                                      | 4-2(3)<br>PANEL<br>OPERATION<br>1-6  |  |  |  |  |  |  |

| Troubles                   | Causes   | Corrective measures  | Page      |
|----------------------------|--|--|-----------|
| 7 Stitch skipping          | 1 Button hole is small in terms of the size of   | • Beplace the presser with a smaller                       | -         |
|                            | presser.   | one.   |           |
|                            |  |  | MACHINE   |
|                            | 2. Material flops because of light-weight.       | • Delay the hook-to-needle timing.                         | OPERATION |
|                            |  | (Lower the needle bar by 0.5 mm.)                          | 6-1       |
|                            | 3 Attaching needle is wrong                      | <ul> <li>Adjust again the direction height etc.</li> </ul> | MACHINE   |
|                            |  |  | OPERATION |
|                            |  |  | 4-2(1)    |
|                            | 4. Needle is bent.                               | • Replace the needle.                                      | -         |
|                            | 5. There is a burr or scratch on the blade point | • Built the blade top of hook. Or, replace                 | -         |
|                            |  | the nook.  |           |
| 8. Thread frays.           | 1. Number of stitches of tie stitching is too    | <ul> <li>Increase the number of stitches of tie</li> </ul> | PANEL     |
|                            | small.   | stitching at the end of sewing (Sewing                     | OPERATION |
|                            | 2 Width of the stitching is too wide             | data $568$ )   | 2-7       |
|                            | 2. Width of the stitching is too wide.           | end of sewing.(Sewing data S67)                            | OPERATION |
|                            |  | ,                    | 2-7       |
|                            |  |  |           |
| 9. Length of needle        | 1. Width of the stitching is too narrow.         | • Widen the width of the stitching at the                  |           |
| end of sewing is too       |  | end of sewing.(Sewing data _ 307 )                         | 2-7       |
| long.                      | 2. Tension of tie stitching is too low.          | <ul> <li>Increase tension at the end of</li> </ul>         | PANEL     |
|                            |  | sewing (Memory switch data U06                             | OPERATION |
|                            |  | )  | 2-17      |
| 10 Needle thread breaks    | 1 Tension at the start of sewing is too low      | ○ Increase tension at the start of                         | PANFI     |
| at the start of sewing,    |  | sewing.(Memory switch data \$57                            | OPERATION |
| or the wrong side of       |  | )  | 2-17      |
| seam is dirty.             |  |  |           |
| 11 Knife drons even        | 1 Thread breakage detection plate is             | <ul> <li>Adjust the detector plate</li> </ul>              |           |
| when needle thread is      | improperly adjusted.                             | (Refer to the Engineer's Manual.)                          |           |
| cut.                       |  |  |           |
|                            |  | a Daulass the use alls                                     |           |
| 12. Needle breaks.         | 1. Needle is dent.                               | • Replace the needle.                                      |           |
|                            |  |  | 4-2(1)    |
|                            | 2. Needle comes in contact with the blade point  | <ul> <li>Adjust the needle-to-hook timing.</li> </ul>      | MACHINE   |
|                            | of hook.   |  | OPERATION |
|                            | 3 Needle thread trimmer comes in contact with    | • Adjust the installing position of needle                 |           |
|                            | needle when it opens.                            | thread trimmer.  | OPERATION |
|                            |  |  | 6-2       |
|                            | 4. Needle does not come to the center of the     | • Re-adjust the installing position of                     | -         |
|                            | needle note of throat plate.                     | throat plate base.   |           |
|                            | 5. Needle stop position is low and the needle    |  |           |
|                            | comes in contact with the needle thread          |  |           |
|                            | trimmer when it closes.                          |  |           |
| 13 Knife drons plural      | 1. Cloth cutting knife is not set to the plural  | <ul> <li>Belease the plural time setting</li> </ul>        | MACHINE   |
| times.                     | times motion setting.                            |  | OPERATION |
|                            |  |  | 2-16      |
| 14 Air blown from propot   | 1. Plawer mater is relating in the reverse       | • Change the direction of rotation of the                  |           |
| 14. Air blows from preset. | direction  | motor  | OPERATION |
|                            |  |  | 3-3       |
|                            |  |  | -         |
| 15. Preset does not move   | 1. Cloth is not detected since it is coarse.     | • Release the cloth detection.(Memory                      | -         |
| is pressed.                |  | Switch data U02 )  |           |
|                            |  |  |           |
| 16. Cloth is folded when   | 1. Air blow is excessively high or low.          | • Adjust the air blow.                                     | MACHINE   |
| cloth is delivered from    |  | ○ Clean the air filter.                                    | OPERATION |
| preset to carriage.        |  |  |           |
| 17. Cloth slips when cloth | 1. Vacuum force is excessively low.              | • Adjust the cloth suction force of the                    | MACHINE   |
| is delivered from preset   |  | vacuum.  | OPERATION |
| to carriage.               | 2. Clamp force is excessively low                |  | 4-1(8)    |
|                            |  |  | OPERATION |
|                            |  |  | 4-4       |
|                            |  |  | 1         |

# 9. INITIAL VALUE DATA FOR EACH SHAPE TABLE

| No.        | Item  | Unit   |               | Shape selection Level 1 (12 shapes) Shape selection Level 2 (20 shapes) |                             |               |               |               |                   |               |               |               |                        | Shape selection Level 3 (30 shapes) |               |               |               |               |                 |                    |                        |                 |                |               |                 |                        |               |                        |      |          |                        |             |
|------------|---|--------|---------------|---|-----------------------------|---------------|---------------|---------------|-------------------|---------------|---------------|---------------|------------------------|-------------------------------------|---------------|---------------|---------------|---------------|-----------------|--------------------|------------------------|-----------------|----------------|---------------|-----------------|------------------------|---------------|------------------------|------|----------|------------------------|-------------|
| S01        | Sewing shape  |        |               |   | <b>ук</b><br>Ш <sub>3</sub> | ₩<br>₩4       | <u>.</u><br>  | ۳             | <del>ال</del> ارم |               |               |               | <b>U</b> <sub>11</sub> | <b>D</b> <sub>12</sub>              | <b>D</b> 13   | <b>1</b> 4    | 1 <b>D</b> 15 | <b>Ü</b> 16   | Ű <sub>17</sub> | <b>)</b><br>7(* 18 | <b>U</b> <sub>19</sub> | U <sub>20</sub> | <b>1</b><br>21 | Ū22           | Ű <sub>23</sub> | <b>W</b> <sub>24</sub> | <b>R</b> 25   | <b>D</b> <sub>26</sub> | 27   | 28       | <b>1</b> <sub>29</sub> | <b>.</b> 30 |
| S02        | Cloth cutting length  | mm     | 12.7          | 12.7  | 12.7                        | 12.7          | 12.7          | 12.7          | 12.7              | 12.7          | 12.7          | 12.7          | 12.7                   | 12.7                                | 12.7          | 12.7          | 12.7          | 12.7          | 12.7            | 12.7               | 12.7                   | 12.7            | 12.7           | 12.7          | 12.7            | 12.7                   | 12.7          | 12.7                   | 13.0 | 19.1     | 19.1                   | 19.1        |
| S03        | Knife groove width, right                                       | mm     | 0.10          | 0.10  | 0.10                        | 0.10          | 0.10          | 0.10          | 0.10              | 0.10          | 0.10          | 0.10          | 0.10                   | 0.10                                | 0.10          | 0.10          | 0.10          | 0.10          | 0.10            | 0.10               | 0.10                   | 0.10            | 0.10           | 0.10          | 0.10            | 0.10                   | 0.10          | 0.10                   | -    | -        | 0.10                   | 0.10        |
| S04        | Knife groove width, left  | mm     | 0.10          | 0.10  | 0.10                        | 0.10          | 0.10          | 0.10          | 0.10              | 0.10          | 0.10          | 0.10          | 0.10                   | 0.10                                | 0.10          | 0.10          | 0.10          | 0.10          | 0.10            | 0.10               | 0.10                   | 0.10            | 0.10           | 0.10          | 0.10            | 0.10                   | 0.10          | 0.10                   | -    | 0.10     | -                      | 0.10        |
| S06        | Left/right shape ratio (right side in terms of left side)       | %      | 1.70          | 1.70  | 1.70                        | 1.70          | 1.70          | 1.70          | 1.4               | 1.4           | 1.4           | 1.4           | 100                    | 1.70                                | 1.70          | 1.70          | 1.70          | 1.4           | 1.4             | 100                | 1.70                   | 1.70            | 1.70           | 1.70          | 1.70            | 1.70                   | 1.70          | 1.70                   | -    | <u> </u> | _                      | +           |
| S07        | Pitch at parallel section                                       | mm     | 0.35          | 0.35  | 0.35                        | 0.35          | 0.35          | 0.35          | 0.35              | 0.35          | 0.35          | 0.35          | 0.35                   | 0.35                                | 0.35          | 0.35          | 0.35          | 0.35          | 0.35            | 0.35               | 0.35                   | 0.35            | 0.35           | 0.35          | 0.35            | 0.35                   | 0.35          | 0.35                   | -    | -        | -                      | -           |
| S08        | 2nd bar-tacking length  | mm     | 1.0           | -   | 1.0                         | -             | 1.5           | 3.0           | 1.0               | -             | 1.5           | 3.0           | -                      | 1.0                                 | 1.0           | 1.5           | 3.0           | -             | -               | -                  | -                      | -               | 1.5            | 3.0           | -               | -                      | -             | -                      | -    | -        | -                      | -           |
| S09        | 1st bar-tacking length  | mm     | 1.0           | -   | -                           | -             | -             | -             | -                 | -             | -             | -             | -                      | -                                   | -             | -             | -             | -             | -               | 1.0                | 1.0                    | 1.0             | 1.0            | 1.0           | -               | -                      | -             | -                      | -    | -        | -                      | -           |
| S10        | Bar-tacking width, right compensation                           | mm     | 0.0           | -   | 0.0                         | -             | 0.0           | -             | 0.0               | -             | 0.0           | -             | -                      | 0.0                                 | 0.0           | 0.0           | -             | -             | -               | 0.0                | 0.0                    | 0.0             | 0.0            | 0.0           | -               | -                      | -             | -                      | -    |          | -                      | -           |
| S11        | Bar-tacking width, left compensation                            | mm     | 0.0           | -   | 0.0                         | -             | 0.0           | -             | 0.0               | -             | 0.0           | -             | -                      | 0.0                                 | 0.0           | 0.0           | -             | -             | -               | 0.0                | 0.0                    | 0.0             | 0.0            | 0.0           | -               | -                      | -             | -                      | -    |          | -                      |             |
| S12        | Taper bar-tacking offset, left                                  | mm     | -             | -   | -                           | -             | -             | 0.85          | -                 | -             | -             | 0.85          | -                      | -                                   | -             | -             | 0.85          | -             | -               | -                  | -                      | -               | -              | 0.85          | -               | -                      | -             | -                      | -    | <u> </u> | -                      | -           |
| S13        | Laper bar-tacking offset, right                                 | mm     | -             | -   | -                           | -             | -             | 0.85          | -                 | -             | -             | 0.85          | -                      | -                                   | -             | -             | 0.85          | -             | -               | -                  | -                      | -               | -              | 0.85          | -               | -                      | -             | -                      | -    | <u> </u> | -                      | -           |
| S14<br>S15 | Number of stitches of evelet shape                              | Stitch | -             | -   | -                           | -             | -             | -             | 2.0               | 2.0           | 2.0           | 2.0           | _                      |                                     |               | -             | -             | 2.0           | 2.0             | _                  | -                      |                 | _              | -             |                 | -                      | -             | -                      | -    | <u> </u> | _                      | <u> </u>    |
| S16        | Evelet width  | mm     | -             | -   | -                           | -             | -             | -             | 1.0               | 1.0           | 1.0           | 1.0           | _                      | _                                   | _             | -             | -             | 1.0           | 1.0             | _                  | -                      | _               | _              | -             | _               | -                      | -             | -                      | -    | <u> </u> | _                      | -           |
| S17        | Eyelet length   | mm     | -             | -   | -                           | -             | -             | -             | 3.0               | 3.0           | 3.0           | 3.0           | _                      | -                                   | -             | -             | -             | 3.0           | 3.0             | -                  | -                      | -               | -              | -             | -               | -                      | -             | -                      | -    | -        | _                      | -           |
| S18        | Round type shape length   | mm     | -             | 2.0   | 2.0                         | 2.0           | 2.0           | 2.0           | -                 | 2.0           | -             | -             | 2.0                    | 2.0                                 | 2.0           | 2.0           | 2.0           | 2.0           | 2.0             | 2.0                | 2.0                    | 2.0             | -              | -             | 2.0             | 2.0                    | 2.0           | 2.0                    | -    | -        | -                      | -           |
| S19        | Number of stitches of radial shape                              | Stitch | -             | -   | 3                           | 3             | 3             | 3             | -                 | 3             | -             | -             | -                      | -                                   | -             | -             | -             | -             | -               | 3                  | -                      | -               | -              | -             | 3               | 3                      | 3             | -                      | -    | -        | -                      | -           |
| S20        | Radial shape reinforcement (with/without)                       |        | -             | -   | Without                     | Without       | Without       | Without       | -                 | Without       | -             | -             | -                      | -                                   | -             | -             | -             | -             | -               | Without            | -                      | -               | -              | -             | Without         | Without                | Without       | -                      | -    |          | -                      |             |
| S21        | Pitch at bar-tacking section                                    | mm     | 0.30          | 0.30  | 0.30                        | Ă[            | 0.30          | 0.30          | 0.30              | -             | 0.30          | 0.30          | 0.25                   | 0.30                                | 0.25          | 0.25          | 0.25          | 0.25          | 0.30            | 0.30               | 0.25                   | 0.30            | 0.30           | 0.30          | 0.25            | 0.30                   | 0.25          | 0.25                   | -    |          | -                      | -           |
| S22        | 1st clearance   | mm     | 1.5           | 1.5   | 1.5                         | 1.5           | 1.5           | 1.5           | 1.5               | 1.5           | 1.5           | 1.5           | 1.5                    | 1.5                                 | 1.5           | 1.5           | 1.5           | 1.5           | 1.5.            | 1.5                | 1.5                    | 1.5             | 1.5            | 1.5           | 1.5             | 1.5                    | 1.5           | 1.5                    | -    | 2.0      | 2.0                    | 2.0         |
| S23        | 2nd clearance   | mm     | 1.3<br>Singlo | 1.3<br>Singlo   | 1.3<br>Singlo               | 1.3<br>Singlo | 1.3<br>Singlo | 1.3<br>Singlo | 1.3<br>Singlo     | 1.3<br>Singlo | 1.3<br>Singlo | 1.3<br>Singlo | 1.3<br>Singlo          | 1.3<br>Singlo                       | 1.3<br>Singlo | 1.3<br>Singlo | 1.3<br>Singlo | 1.3<br>Singlo | 1.3<br>Singlo   | 1.3<br>Singlo      | 1.3<br>Singlo          | 1.3<br>Singlo   | 1.3<br>Singlo  | 1.3<br>Singlo | 1.3<br>Singlo   | 1.3<br>Singlo          | 1.3<br>Singlo | 1.3<br>Singlo          | -    | 2.0      | 2.0                    | 2.0         |
| S32        | Double stitching cross selection                                |        | <             | <   | <                           | <             | <             | single<br><   | single<br><       | <             | single<br><   | < Single      | single<br><            | <                                   | single<br><   | <             | <             | <             | single<br><     | <                  | <                      | <               | <              | single<br><   | <               | <                      | <             | <                      | -    | <u> </u> |                        | <           |
| S33        | Double stitching width compensation                             | mm     | 0.0           | 0.0   | 0.0                         | 0.0           | 0.0           | 0.0           | 0.0               | 0.0           | 0.0           | 0.0           | 0.0                    | 0.0                                 | 0.0           | 0.0           | 0.0           | 0.0           | 0.0             | 0.0                | 0.0                    | 0.0             | 0.0            | 0.0           | 0.0             | 0.0                    | 0.0           | 0.0                    | -    | -        | _                      | -           |
| S34        | Number of times of basting                                      | Time   | 0             | 0   | 0                           | 0             | 0             | 0             | 0                 | 0             | 0             | 0             | 0                      | 0                                   | 0             | 0             | 0             | 0             | 0               | 0                  | 0                      | 0               | 0              | 0             | 0               | 0                      | 0             | 0                      | 3    | 2        | 2                      | -           |
| S35        | Pitch of basting  | mm     | 4.0           | 4.0   | 4.0                         | 4.0           | 4.0           | 4.0           | 4.0               | 4.0           | 4.0           | 4.0           | 4.0                    | 4.0                                 | 4.0           | 4.0           | 4.0           | 4.0           | 4.0             | 4.0                | 4.0                    | 4.0             | 4.0            | 4.0           | 4.0             | 4.0                    | 4.0           | 4.0                    | 4.0  | 4.0      | 4.0                    | -           |
| S36        | Rolling length of basting                                       | mm     | 8.0           | 8.0   | 8.0                         | 8.0           | 8.0           | 8.0           | 8.0               | 8.0           | 8.0           | 8.0           | 8.0                    | 8.0                                 | 8.0           | 8.0           | 8.0           | 8.0           | 8.0             | 8.0                | 8.0                    | 8.0             | 8.0            | 8.0           | 8.0             | 8.0                    | 8.0           | 8.0                    | 8.0  | 8.0      | 8.0                    | -           |
| S37        | Rolling pitch of basting  | mm     | 0.8           | 0.8   | 0.8                         | 0.8           | 0.8           | 0.8           | 0.8               | 0.8           | 0.8           | 0.8           | 0.8                    | 0.8                                 | 0.8           | 0.8           | 0.8           | 0.8           | 0.8             | 0.8                | 0.8                    | 0.8             | 0.8            | 0.8           | 0.8             | 0.8                    | 0.8           | 0.8                    | 0.8  | 0.8      | 0.8                    |             |
| S38        | Rolling width of basting  | mm     | 1.5           | 1.5   | 1.5                         | 1.5           | 1.5           | 1.5           | 1.5               | 1.5           | 1.5           | 1.5           | 1.5                    | 1.5                                 | 1.5           | 1.5           | 1.5           | 1.5           | 1.5             | 1.5                | 1.5                    | 1.5             | 1.5            | 1.5           | 1.5             | 1.5                    | 1.5           | 1.5                    | 1.5  | 1.5      | 1.5                    |             |
| S39        | Compensation before/after needle entry of basting               | mm     | 1.5           | 1.5   | 1.5                         | 1.5           | 1.5           | 1.5           | 1.5               | 1.5           | 1.5           | 1.5           | 1.5                    | 1.5                                 | 1.5           | 1.5           | 1.5           | 1.5           | 1.5             | 1.5                | 1.5                    | 1.5             | 1.5            | 1.5           | 1.5             | 1.5                    | 1.5           | 1.5                    | 1.5  | 1.5      | 1.5                    | -           |
| S40<br>S41 | Compensation of left side position of basting                   | mm     | 0.0           | 0.0   | 0.0                         | 0.0           | 0.0           | 0.0           | 0.0               | 0.0           | 0.0           | 0.0           | 0.0                    | 0.0                                 | 0.0           | 0.0           | 0.0           | 0.0           | 0.0             | 0.0                | 0.0                    | 0.0             | 0.0            | 0.0           | 0.0             | 0.0                    | 0.0           | 0.0                    | 0.0  | 0.0      | 0.0                    | -           |
| S42        | Compensation of right side position of basting                  | mm     | 0.0           | 0.0   | 0.0                         | 0.0           | 0.0           | 0.0           | 0.0               | 0.0           | 0.0           | 0.0           | 0.0                    | 0.0                                 | 0.0           | 0.0           | 0.0           | 0.0           | 0.0             | 0.0                | 0.0                    | 0.0             | 0.0            | 0.0           | 0.0             | 0.0                    | 0.0           | 0.0                    | 0.0  | 0.0      | 0.0                    | -           |
| S44        | Speed setting of basting  | rpm    | 2000          | 2000  | 2000                        | 2000          | 2000          | 2000          | 2000              | 2000          | 2000          | 2000          | 2000                   | 2000                                | 2000          | 2000          | 2000          | 2000          | 2000            | 2000               | 2000                   | 2000            | 2000           | 2000          | 2000            | 2000                   | 2000          | 2000                   | 2000 | 2000     | 2000                   | -           |
| S45        | Sewing together function (without/with)                         |        | Without       | Without   | Without                     | Without       | Without       | Without       | Without           | Without       | Without       | Without       | Without                | Without                             | Without       | Without       | Without       | Without       | Without         | Without            | Without                | Without         | Without        | Without       | Without         | Without                | Without       | Without                | -    | -        | -                      | -           |
| S46        | Width of sewing together  | mm     | 2.0           | 2.0   | 2.0                         | 2.0           | 2.0           | 2.0           | 2.0               | 2.0           | 2.0           | 2.0           | 2.0                    | 2.0                                 | 2.0           | 2.0           | 2.0           | 2.0           | 2.0             | 2.0                | 2.0                    | 2.0             | 2.0            | 2.0           | 2.0             | 2.0                    | 2.0           | 2.0                    | -    | -        | -                      | -           |
| S47        | Pitch of sewing together  | mm     | 2.0           | 2.0   | 2.0                         | 2.0           | 2.0           | 2.0           | 2.0               | 2.0           | 2.0           | 2.0           | 2.0                    | 2.0                                 | 2.0           | 2.0           | 2.0           | 2.0           | 2.0             | 2.0                | 2.0                    | 2.0             | 2.0            | 2.0           | 2.0             | 2.0                    | 2.0           | 2.0                    | -    |          | -                      |             |
| S51        | Left parallel section tension                                   |        | 120           | 60  | 120                         | 120           | 120           | 120           | 60                | 60            | 60            | 60            | 60                     | 60                                  | 60            | 60            | 60            | 60            | 60              | 120                | 60                     | 60              | 60             | 60            | 60              | 60                     | 60            | 60                     | 60   | 60       | 60                     | 60          |
| \$52       | Right parallel section tension                                  |        | 120           | 60  | 120                         | 120           | 120           | 120           | 60                | 60            | 60            | 60            | 60                     | 60                                  | 60            | 60            | 60            | 60            | 60              | 120                | 60                     | 60              | 60             | 60            | 60              | 60                     | 60            | 60                     | 60   | 60       | 60                     | 60          |
| S54        | Bight parallel section tension (1st cycle of double stitching)  |        | 60            | 60  | 60                          | 60            | 60            | 60            | 60                | 60            | 60            | 60            | 60                     | 60                                  | 60            | 60            | 60            | 60            | 60              | 60                 | 60                     | 60              | 60             | 60            | 60              | 60                     | 60            | 60                     | -    | <u> </u> |                        | +           |
| S55        | 1st bar-tacking section tension                                 |        | 35            | 60  | 120                         | 35            | 35            | 35            | 60                | 60            | 60            | 60            | 60                     | 60                                  | 60            | 60            | 60            | 60            | 60              | 30                 | 60                     | 60              | 60             | 60            | 60              | 60                     | 60            | 60                     | -    | -        | _                      | -           |
| S56        | 2nd bar-tacking section tension                                 |        | 35            | 60  | 35                          | 35            | 35            | 35            | 60                | 60            | 60            | 60            | 60                     | 60                                  | 60            | 60            | 60            | 60            | 60              | 120                | 60                     | 60              | 60             | 60            | 60              | 60                     | 60            | 60                     | -    | -        | -                      | -           |
| S57        | Setting of needle thread tension at sewing start                |        | 25            | 25  | 25                          | 25            | 25            | 25            | 25                | 25            | 25            | 25            | 25                     | 25                                  | 25            | 25            | 25            | 25            | 25              | 25                 | 25                     | 25              | 25             | 25            | 25              | 25                     | 25            | 25                     | 25   | 25       | 25                     | 25          |
| S58        | Setting of needle thread tension of basting                     |        | 80            | 80  | 80                          | 80            | 80            | 80            | 80                | 80            | 80            | 80            | 80                     | 80                                  | 80            | 80            | 80            | 80            | 80              | 80                 | 80                     | 80              | 80             | 80            | 80              | 80                     | 80            | 80                     | 80   | 80       | 80                     |             |
| S59        | ACT timing adjustment at 1st bar-tacking start                  | Stitch | 0             | 0   | 0                           | 0             | 0             | 0             | 0                 | 0             | 0             | 0             | 0                      | 0                                   | 0             | 0             | 0             | 0             | 0               | 0                  | 0                      | 0               | 0              | 0             | 0               | 0                      | 0             | 0                      | -    | -        | -                      | -           |
| S60        | ACT timing adjustment at the start of right overedging          | Stitch | 0             | 0   | 0                           | 0             | 0             | 0             | 0                 | 0             | 0             | 0             | 0                      | 0                                   | 0             | 0             | 0             | 0             | 0               | 0                  | 0                      | 0               | 0              | 0             | 0               | 0                      | 0             | 0                      | 0    |          | 0                      | 0           |
| S62        | Number of stitches of tie stitching at the start of sewing      | Stitch | 3             | 3   | 3                           | 3             | 3             | 3             | 3                 | 3             | 3             | 3             | 3                      | 3                                   | 3             | 3             | 3             | 3             | 3               | 3                  | 3                      | 3               | 3              | 3             | 3               | 3                      | 3             | 3                      | - 3  | 3        | 3                      | - 3         |
| S63        | Sewing pitch of tie stitching at the start of sewing            | Cutori | 0.00          | 0.00  | 0.00                        | 0.00          | 0.00          | 0.00          | 0.00              | 0.00          | 0.00          | 0.00          | 0.00                   | 0.00                                | 0.00          | 0.00          | 0.00          | 0.00          | 0.00            | 0.00               | 0.00                   | 0.00            | 0.00           | 0.00          | 0.00            | 0.00                   | 0.00          | 0.00                   | 0.00 | 0.00     | 0.00                   | 0.00        |
| S64        | Tie stitching width at sewing start                             | mm     | 0.6           | 0.6   | 0.6                         | 0.6           | 0.6           | 0.6           | 0.6               | 0.6           | 0.6           | 0.6           | 0.6                    | 0.6                                 | 0.6           | 0.6           | 0.6           | 0.6           | 0.6             | 0.6                | 0.6                    | 0.6             | 0.6            | 0.6           | 0.6             | 0.6                    | 0.6           | 0.6                    | 0.6  | 0.6      | 0.6                    | 0.6         |
| S65        | Lengthwise compensation of tie stitching at the start of sewing | mm     | 0.0           | 1.5   | 0.0                         | 1.5           | 0.0           | 0.0           | 0.0               | 1.5           | 0.0           | 0.0           | 1.5                    | 0.0                                 | 0.0           | 0.0           | 0.0           | 1.5           | 1.5             | 1.5                | 1.5                    | 1.5             | 0.0            | 0.0           | 1.5             | 1.5                    | 1.5           | 1.5                    | 0.0  | 0.0      | 0.0                    | 0.0         |
| S66        | Crosswise compensation of tie stitching at the start of sewing  | mm     | 0.0           | 0.0   | 0.0                         | 0.0           | 0.0           | 0.7           | 0.0               | 0.0           | 0.0           | 0.7           | 0.0                    | 0.0                                 | 0.0           | 0.0           | 0.7           | 0.0           | 0.0             | 0.0                | 0.0                    | 0.0             | 0.0            | 0.7           | 0.0             | 0.0                    | 0.0           | 0.0                    | 0.0  | 0.0      | 0.0                    | 0.0         |
| S67        | Tie stitching width at sewing end                               | mm     | 0.6           | 0.6   | 0.6                         | 0.6           | 0.6           | 0.6           | 0.6               | 0.6           | 0.6           | 0.6           | 0.6                    | 0.6                                 | 0.6           | 0.6           | 0.6           | 0.6           | 0.6             | 0.6                | 0.6                    | 0.6             | 0.6            | 0.6           | 0.6             | 0.6                    | 0.6           | 0.6                    | 0.6  | 0.6      | 0.6                    | 0.6         |
| S68        | Number of stitches of tie stitching at sewing end               | Stitch | 3             | 3   | 3                           | 3             | 3             | 3             | 3                 | 3             | 3             | 3             | 3                      | 3                                   | 3             | 3             | 3             | 3             | 3               | 3                  | 3                      | 3               | 3              | 3             | 3               | 3                      | 3             | 3                      | 3    | 3        | 3                      | 3           |
| S69        | Lenginwise compensation of the stitching at the end of sewing   | mm     | 0.0           | 0.0   | 0.0                         | 0.0           | 0.0           | 0.0           | 0.0               | 0.0           | 0.0           | 0.0           | 0.0                    | 0.0                                 | 0.0           | 0.0           | 0.0           | 0.0           | 0.0             | 0.0                | 0.0                    | 0.0             | 0.0            | 0.0           | 0.0             | 0.0                    | 0.0           | 0.0                    | 0.0  | 0.0      | 0.0                    | 0.0         |
| S81        | Knife motion (With/without)                                     |        | 0.9<br>With   | 0.9<br>With   | 0.9<br>With                 | 0.9<br>With   | With          | 0.7<br>With   | 0.9<br>With       | 0.9<br>With   | 0.0<br>With   | 0.7<br>With   | 0.9<br>With            | 0.9<br>With                         | 0.9<br>With   | With          | 0.7<br>With   | 0.9<br>With   | 0.9<br>With     | 0.9<br>With        | 0.9<br>With            | 0.9<br>With     | With           | With          | 0.9<br>With     | 0.9<br>With            | 0.9<br>With   | 0.9<br>With            | 0.0  | With     | With                   | With        |
| S83        | Knife at 1st cycle of double stitching (Without/with)           |        | Without       | Without   | Without                     | Without       | Without       | Without       | Without           | Without       | Without       | Without       | Without                | Without                             | Without       | Without       | Without       | Without       | Without         | Without            | Without                | Without         | Without        | Without       | Without         | Without                | Without       | Without                | - 1  | -        | -                      | -           |
| S84        | Max. speed limitation   | rpm    | 3600          | 3600  | 3600                        | 3600          | 3600          | 3600          | 3600              | 3600          | 3600          | 3600          | 3600                   | 3600                                | 3600          | 3600          | 3600          | 3600          | 3600            | 3600               | 3600                   | 3600            | 3600           | 3600          | 3600            | 3600                   | 3600          | 3600                   | 3600 | 3600     | 3600                   | 3600        |
| S86        | Pitch of going  | mm     | -             | -   | -                           | -             | -             | -             | -                 | -             | -             | -             | -                      | -                                   | -             | -             | -             | -             | -               | -                  | -                      | -               | -              | -             | -               | -                      | -             | -                      | 0.80 | 0.80     | 0.80                   | 0.80        |
| S87        | Width of going  | mm     | -             | -   | -                           | -             | -             | -             | -                 | -             | -             | -             | -                      | -                                   | -             | -             | -             | -             | -               | -                  | -                      | -               | -              | -             | -               | -                      | -             | -                      | 1.7  | 1.7      | 1.7                    | 1.7         |
| S88        | Pitch of returning  | mm     | -             | -   | -                           | -             | -             | -             | -                 | -             | -             | -             | -                      | -                                   | -             | -             | -             | -             | -               | -                  | -                      | -               | -              | -             | -               | -                      | -             | -                      | 0.80 | 0.80     | 0.80                   | 0.80        |
| S89        | wiath of returning  | mm     | -             | -   | -                           | -             | -             | -             | -                 | -             | -             | -             | -                      | -                                   | -             | -             | -             | -             | -               | -                  | -                      | -               | -              | -             | -               | -                      | -             | -                      | 1.7  | 1.7      | 1.7                    | 1.7         |

