Section 8.9
Air Tuck-in Device

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8.9 Air Tuck-in Device

8.9.1 General

The air tuck-in device forms the tuck-in selvedge by means of the mechanism shown below. See the figure below (refer to tuck-in mechanism).

1. The cutter cuts the inserted weft yarn to a length of 16 mm or more.
2. The air blown from the valve at the nozzle support portion supplies the cut weft yarn.
3. Then the air jet from the hole beside the nozzle support returns (tucks in) the weft yarn.

Device outline (LH & RH tuck-in devices)

<table>
<thead>
<tr>
<th></th>
<th>LH tuck-in device</th>
<th>RH tuck-in device</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nozzle support</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>RH cutter</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Valve (supply)</td>
<td>Valve (supply)</td>
</tr>
<tr>
<td>4</td>
<td>Valve (tuck in)</td>
<td>Valve (tuck in)</td>
</tr>
<tr>
<td>5</td>
<td>Valve (cutter)</td>
<td>Valve (cutter)</td>
</tr>
<tr>
<td>6</td>
<td>Valve (store)</td>
<td>Valve (store)</td>
</tr>
<tr>
<td>7</td>
<td>Cylinder</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Throttle valve (supply)</td>
<td>Throttle valve (supply)</td>
</tr>
<tr>
<td>9</td>
<td>Throttle valve (tuck in)</td>
<td>Throttle valve (tuck in)</td>
</tr>
<tr>
<td>10</td>
<td>Throttle valve (cutter)</td>
<td>Throttle valve (cutter)</td>
</tr>
<tr>
<td>11</td>
<td>Throttle valve (store)</td>
<td>Throttle valve (store)</td>
</tr>
</tbody>
</table>

Nozzle support portion (tuck-in mechanism)

Weft yarn Air (supply)

Weft yarn Air (tuck-in)
8.9 Air Tuck-in Device

8.9.2 Preparation

[1] Dummy Reed

Use the dummy reed in a special shape as shown at left for the air-tuck-in device.

Use of this reed will reduce weft misses.

Use the ordinary cut reeds within the woven fabric.


Ends of the turned-back wefts should be drawn into the ground construction by at least 3 to 4 mm, except for selvage warps which are crossed with wefts every pitch.

Such a construction is capable of catching weft ends even if selvage warps are not crossed with wefts.

If the yarn density in the above 3 to 4 mm range is too high, thin out the warps.

A: Selvage
B: Ground

The standard setting for the tuck-in length is 16 mm. The weft density in the tuck-in selvages is double in the ground, so that troubles due to thick selvages may occur in the subsequent processes.

To prevent such problems, use any of the following solutions:

(1) Lower the warp density of the selvage to less than that of the ground.

(2) Make the selvage construction coarser than that of the ground.

(3) Use finer yarns for the selvages than those for the ground.

Use your experience to make a selection from the solutions above according to the construction, yarn type, and yarn count.

One of the most important keys is to make a test weaving up to the final process when a new style construction is applied and to check the tuck-in selvages for no involved problems before proceeding to the practical production.
What follows are basic rules for drawing warps through reeds and the standard selvage constructions.

1. Apply at least one pattern that crosses a warp with a weft every pitch, in the edges of tuck-in selvages. Generally, the ground construction is used as the pattern.

2. Make the number of warps per reed's dent in the edges of tuck-in selvages greater than the number of warps drawn inside the selvages. Generally, the same number of warps per dent for the ground is applied.

### [3 ] Selvage Construction Samples

1. Poplin  
   Ground B : 1/1  
   Selvage A : 1/1

2. Sheeting  
   Ground B : 1/1  
   Selvage A : 2/2

3. Thin fabric  
   Ground B : 1/1  
   Selvage A : 2/1 + 1/2
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(4) Cotton and cotton-combined twill fabric
Ground B : 3/1
Selvage A : 2/2

(5) Cotton and cotton-combined twill fabric
Ground B : 3/1
Selvage A : 3/1 + 1/3

(6) Cotton fabric
Ground B : 3/1
Selvage A : 3/1 + 1/3

(7) Cotton twill fabric
Ground B : 2/2
Selvage A : 2/2
8. SELVAGE FORMING DEVICE

(8) Cotton fabric
Ground B : 3/1
Selvage A : 3/1

(9) Cotton fabric, 2/1 twill
Ground B : 2/1
Selvage A : 3/3

(1) Setting the forward-backward position
Adjust the temple position for a clearance between the reed and temple cover of 1.5 to 2 mm when the loom angle is 0°. Use an oblong hole in the tucker rail for adjustment.

(2) Lateral position adjustment (See the figure below.)
Determine the temple position by providing a clearance of 1 mm between the fabric width edge and the nozzle support.

NOTE: Minimize the clearance (1 to 2 mm) between the fell plate and the temple ring front edge.
8.9.3 Air Tuck-in Device Installation


(1) Positions of the LH and RH tucker nozzle supports and the cutter
Adjust the clearance between the reed and LH tucker nozzle support to 1 mm when the reed has the master tooth. When the reed has no master tooth, adjust the clearance to 2 mm (to prevent interference caused by reed tooth deformation). Adjust the clearance between the left side of the LH tucker nozzle support and the LH cutter to 3.5 to 4.0 mm. Adjust the clearance between the right side of the RH tucker nozzle support and the RH cutter to 0.5 to 1.0 mm.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tucker nozzle support</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Reed</td>
<td></td>
</tr>
</tbody>
</table>


Adjust the initial installation as shown at left.

Adjust the RH suction 1 mounting position for a clearance of 1 mm from the RH cutter 2, and for a clearance of 5 mm from feeler 3.

**NOTE:** Install the suction and feeler as illustrated, and manually rotate the loom to confirm no interference with the reed or any other part.

---


Adjust to make the positions relative to the reed are as shown in the figure at left when the loom angle is 0° (reed forward end).

The forward-backward position can easily be measured by inserting a steel tape measure from behind the reed.

**NOTE:** Install the suction and feeler as illustrated, and manually rotate the loom to confirm no interference with the reed or any other part.

---

[5] Cutter Opening

Adjust the mounting position of each cutter for an opening of 10 mm between the tip end of the upper blade and the lower blade (see the figure at left.)

The upper blade can be adjusted when the bolt A in the figure is loosened. Before loosening bolt A, be sure that hoop 2 is in contact with cutter arm 1.

If bolt A is loosened when there is any clearance, the cutter contact pressure is varied.
[6]  **Cutter Overlap in Closed State**

Adjust the cutter overlap in the closed state by adjusting the movement of the upper blade. By operating each cutter on the screen displayed by [OPERATOR] – [MANUAL] – [TUCKER] on the function panel, adjust clearance $E$ in the photo at left so that 1 to 3 mm of the upper blade is visible from the overlapped portion of the upper and lower blades. If clearance $E$ is increased, the cutter motion decreases.

[7]  **Cutter Contact Pressure Adjustment**

Adjust the contact pressure of each cutter for dimension $C$ in the figure at left of 10 mm.

For adjustment, push the cutter shaft in the direction of the arrow at left. Then loosen bolts $A$ and $B$ to adjust dimension $C$ to 10 mm. After the adjustment tighten bolts $B$ and $A$. When tightening bolt $A$, be sure that [5] “Cutter Opening” is maintained.

If dimension $C$ is adjusted to 10 mm, clearance $D$ between the hoop and shaft bracket 4 mm.
### 8.9.4 Air Tuck-in Device Piping

The figure below shows the valve hose layout and connection.

![Diagram of Air Tuck-in Device Piping]

1. Supply valve
2. Tuck-in valve
3. Storage valve
4. RH cutter valve
5. Tucker suction valve

### 8.9.5 Catch Cord Length

The length of the weft yarn cut off at the RH suction portion should be 75 mm or more. If the length is short, the tuck selvedge on the RH side may become instable.

![Diagram of Catch Cord Length]
8.9.6 Tuck-in Air Adjustment

[1] Air Pressure

Use the sub-end (SE) for the air supply to the air tuck-in device.

The SE pressure should be kept at 500 kPa (5 kg/cm²) or above during loom operation. If it is lower than 500 kPa (5 kg/cm²), the tuck condition may become poor.

The higher the air pressure, the better the tuck selvedge condition.

The rough guideline is 500 kPa (5 kg/cm²) for C20s weft, and 550 kPa or above for C10s weft.

[2] Throttle Valve Adjustment

Adjust the throttle valve opening for smooth tuck-in as follows:

Throttle valve adjustment is expressed by the number of turns from the fully opened position.

- **LH side**

<table>
<thead>
<tr>
<th>No</th>
<th>Valve</th>
<th>Number of turns</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Supply valve</td>
<td>5 turns</td>
</tr>
<tr>
<td>2</td>
<td>Tuck-in valve</td>
<td>6 turns</td>
</tr>
<tr>
<td>3</td>
<td>Storage valve</td>
<td>4 turns</td>
</tr>
</tbody>
</table>

- **RH side**

<table>
<thead>
<tr>
<th>No</th>
<th>Valve</th>
<th>Number of turns</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Supply valve</td>
<td>3 turns</td>
</tr>
<tr>
<td>5</td>
<td>Tuck-in valve</td>
<td>4 turns</td>
</tr>
<tr>
<td>6</td>
<td>RH cutter valve</td>
<td>Full opening</td>
</tr>
</tbody>
</table>
8.9 Air Tuck-in Device

8.9.7 Function Panel Setting


Set the air jet timing after selecting [Map] – [TUCKER] – [Setting] on the function panel. The standard setting levels are as follows:

- Tucker suction: 300-100
- LH storage: 10-60
- LH Tuck-in: 155-230
- LH Supply: 160-190
- RH Tuck-in: 140-230
- RH Supply: 155-190
- RH Cutter: 115-230

NOTE:
- Select ON for each pick as the standard for LH storage.
- Set the injection opening width for each of tuck and supply at the standard shown above. (Otherwise, tucking errors may occur.)

For thick yarn weaving, increase the PSE pressure first, and change the timing the tuck will be stabilized.


Air jetting and cutter operation of the air tuck-in device can be checked manually. The screen at left appears upon touching [Map] – [TUCKER] – [Manual].

Touch the desired switch for manual operation.

⚠️ CAUTION

Refrain from manual operation while looking into the nozzle support. Otherwise, foreign matter entrance into your eye may arise.
8. SELVAGE FORMING DEVICE

8.9.8 Tucking Technique
(Tuck Condition Improvement)

Make the following adjustment to reduce tucking errors or loose selvedge texture at the standard setting.

Adjust temple drawing to ensure that the edge of the fabric is at the ring edge before making tuck-in adjustment. (Stabilized fabric edge position is the fundamental in the air tucker.)


Changing the vertical position of the tucker nozzle support varies tucking error frequency and selvedge tightness.

Adjust the height based on overall judgment of the tuck yarn turn back state and tucking errors.

REFERENCE: Generally speaking, the selvedge gets tighter as the tucker nozzle support position rises, but the tucking error (tuck yarn departure from the selvedge texture) frequency will increase.


The cut timing is 120° in standard setting.

Forwarding the tucker nozzle support 1 will cause loose tucking but improves the tuck arrangement in the fabric texture. If it is forwarded excessively, loops are likely to be generated at the cloth edge.

If tucker nozzle support 1 is brought back, tight selvedge tucking results but imperfect tucking with the tuck yarn floating from the fabric texture may result.

The cloth fell position of the woven fabric should desirable be aligned with the selvedge and ground-weave texture portions. The forward-backward position of the support then should be about 2 mm from the depth of the slit. Adjust to the best position since the support forward-backward and vertical adjustments are the key points in final adjustment.

NOTE: Before changing the nozzle support position, stop the loom. After the position adjustment, check the operation.

[4] Selvedge Texture Change

Changing the selvedge texture, etc. explained in the preparation section will vary the tuck selvedge condition. Basically, the tuck-in condition is stabilized when the selvedge upper and lower shedding balance is kept constant.

EXAMPLE: If the selvedge edge is not stable, increase the selvedge texture from one repetition to two repetitions.

In case of twill weaving, inserting 1/1 plain texture at the selvedge end will stabilize the selvedge if use of a shedding frame is possible.
8.9.9  Maintenance

Add grease to two grease nipples (indicated by arrows) with a grease gun every ten days.

Use type D grease (see M.3 “Lubrication”).