10.4.3 Sprue Bushing 12S Series

**NOTICE**

Always tighten the screws to the torque specified in the respective table in section 13.

---

**WARNING**

**Hot Surfaces Hazard**

Contact between the skin and hot surfaces could result in burns.

- Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.
- When servicing or handling the hot runner system outside the manifold plates or the injection molding machine, care must be taken to heed the hot surface exposure warnings.
- For first aid contact your medical / safety representing.

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**Hazard of Pressurized Air**

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

- Use personal protective equipment: Face protection, hearing protection and gloves.
- For first aid contact your medical / safety representing.

---

**NOTICE**

**Hazard of Material Damage**

Without consulting Synventive it is not permitted to do modifications to the hot runner system e.g. geometrical changes to the nozzle tip, except the part shape adjustment in the area of material allowance.
Technical Data - Sprue Bushing 12S

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Bore (J)</td>
<td>Ø 12 mm</td>
</tr>
<tr>
<td>Nozzle Length (LSB)</td>
<td>50 - 640 mm</td>
</tr>
<tr>
<td>Nozzle Cutout (D)</td>
<td>Ø 35 mm</td>
</tr>
<tr>
<td>Thermocouple</td>
<td>Type J, Type K</td>
</tr>
<tr>
<td>Nozzle Tips</td>
<td>TFP, TTP, TFW</td>
</tr>
</tbody>
</table>

Parts of the Sprue Bushing 12S

In this section the nozzle parts are identified with the numbers indicated in the following figure.

**NOTICE**

Always tighten the screws to the torque specified in the respective table in section 13.

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Nozzle body</td>
</tr>
<tr>
<td>1.2.1</td>
<td>Nozzle heater</td>
</tr>
<tr>
<td>1.3</td>
<td>Nozzle component ring version=1 (Heater locating ring)</td>
</tr>
<tr>
<td>1.4</td>
<td>Nozzle component ring version=2 (Heater locating ring)</td>
</tr>
<tr>
<td>1.5</td>
<td>DIN471</td>
</tr>
<tr>
<td>1.6</td>
<td>Socket set screw</td>
</tr>
<tr>
<td>1.7.1</td>
<td>Nozzle tip (Example TTW)</td>
</tr>
<tr>
<td>1.7.1.1</td>
<td>Tip nut</td>
</tr>
<tr>
<td>1.7.1.2</td>
<td>Full flow insert</td>
</tr>
<tr>
<td>1.7.1.3</td>
<td>Torpedo</td>
</tr>
<tr>
<td>2.1</td>
<td>Nozzle Head</td>
</tr>
<tr>
<td>3</td>
<td>Nozzle Head Heating</td>
</tr>
<tr>
<td>4.1</td>
<td>Thermocouple Type J</td>
</tr>
<tr>
<td>4.1</td>
<td>Thermocouple Type K</td>
</tr>
<tr>
<td>5</td>
<td>Parallel Pin DIN6325 03m6x08</td>
</tr>
</tbody>
</table>
Assembly Tools

In this section the Stripping and Mounting Tool parts are identified with the numbers indicated in the following figure.

### Assembly Tools for TTP, TFP TTW Nozzle Tips

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>AT12E-0104</td>
<td>Nozzle Tip</td>
</tr>
<tr>
<td>T2</td>
<td>AT12E-0103</td>
<td>TTP, TFP TTW Assembly Tool</td>
</tr>
<tr>
<td>T3</td>
<td>AT12E-0105</td>
<td>Seal Cap TTW Assembly Tool</td>
</tr>
</tbody>
</table>

### Heater Disassembly Tool Compl. AT12E-0101

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1.1</td>
<td>AT12E-010101</td>
<td>Heater Disassembly Tool 12E Type 01</td>
</tr>
<tr>
<td>T1.2</td>
<td>AT12E-010102</td>
<td>Heater Disassembly Tool 12E Type 02</td>
</tr>
<tr>
<td>T1.3</td>
<td>AT12E-010103</td>
<td>Heater Disassembly Tool 12E Type 03</td>
</tr>
</tbody>
</table>

### Nozzle Disassembly Tool

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T3</td>
<td>AT12S-01</td>
<td>Nut</td>
</tr>
<tr>
<td>T4</td>
<td>AT06S-02</td>
<td>Holder</td>
</tr>
</tbody>
</table>
10.4.3.1 Nozzle Thermocouple

Dismounting Nozzle Thermocouple

**NOTICE**
For dismounting of the thermocouple the nozzle heater must be dismantled from the nozzle.

1) Lever the clamp of the nozzle heater with a screwdriver and pull the thermocouple (x) from its seat.

2) Pull the top of the thermocouple (x) from the bracket of the nozzle heater (1.2.1).

**NOTICE**
The thermocouple is pressed in.

Mounting Nozzle Thermocouple

**NOTICE**
For assembly of the thermocouple the nozzle heater must be dismantled from the nozzle.

Color Coding of Thermocouples
Take notice of the production and color identification of thermocouple cables.
Synventive uses J and K type thermocouples. Their color coding is given in the following table.

<table>
<thead>
<tr>
<th>Type</th>
<th>International standard IEC 584-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Black + Black - White</td>
</tr>
<tr>
<td>K</td>
<td>Green + Green - White</td>
</tr>
</tbody>
</table>

1) Push the thermocouple (x) under the bracket of the nozzle heater (1.2.1).

**NOTICE**
The fixing is needed to secure the position. A thermocouple (well-fixed in the holder) causes correct measured values.

2) Lever the clamp of the nozzle heater with a screwdriver and fix the thermocouple (x) below the clamp at the nozzle heater.
10.4.3.2 Disassembly the Nozzle 12S

**NOTICE**

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T4). It is not allowed to clamp the nozzle in a vice directly.

**Disassembling Nozzle Head Heater**

1) Loosen the screws Head heater (3) clamp band.

2) Pull the nozzle head heater (3) from the nozzle head (2.1)

3) Pull the thermocouple (4.1) out of the nozzle head (2.1)
Disassembling the Nozzle Heater

1) Dismount the head heater (3) from the nozzle head (2.1), as described in the above page 496.

2) Remove the retaining ring (1.5) from the nozzle tip (1.7.1).
3) Remove the component ring version 1 (1.3) - Heater locating ring.

4) Unscrew and remove the socket set screw (1.6) from the nozzle heater locating ring (1.4).

**NOTICE**
To pull the nozzle heater (1.2.1), the nozzle has to be clamped on the round nozzle head (2.1) surface on a vice by using protective caps. A clamping of the flats would deform the head (2.1).

5) Fix the nozzle head (2.1) in a vice.
6) Mount the heater disassembly tool Type 01 (T1.1).

**NOTICE**
The lower edge of the heater removal tool type 01 (T1.1) must be set below the nozzle heater (1.2.1).
7) Slide disassembly tool Type 02 (T1.2) along the disassembly tool Type 03 (T1.3).

8) Screw disassembly tool Type 03 (T1.3) onto disassembly tool Type 01 (T1.1).

9) To remove the nozzle heater (1.2.1), slide the disassembly tool Type 02 (T1.2) against the disassembly tool Type 03 (T1.3) repeatedly until the nozzle heater (1.2.1) is released.
10.4.3.3 Disassembling the Nozzle and the Nozzle Tip

**WARNING**

**Hazard of Pressurized Air**

Pressurized air blow can result in hot plastic or foreign bodies entering the eyes, causing vision damage.

Following work must be carried out by qualified and experienced persons.

Use personal protective equipment: Face protection, hearing protection and gloves.

1) Dismount the nozzle head heater (3) from the nozzle head (2.1), as described in the above page 496.
2) Dismount the nozzle heater (1.2.1) from the nozzle (1.1), as described in the above page 497.
3) Fix the holder (T4) in a vice.

**NOTICE**

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T4). It is not allowed to clamp the nozzle in a vice directly.

4) Place the nozzle (1.1) with the head side in the holder (T4) to fix the nozzle against rotation.

5) Place the tool nut (T3) over the nozzle body (1.1) at the hexagonal shape.
6) Use a wrench to loosen the nozzle (1.1) from the nozzle head (2.1) via the tool nut (T3) by rotation (counter clockwise).
WARNING
Hot Surfaces Hazard and Pressurized Air
Following work must be carried out by qualified and experienced persons.
Use personal protective equipment: Face protection, hearing protection and gloves.

7) Fix the dismounted nozzle body (1.1) on the hexagonal shape in a vise.

WARNING
Hot Surfaces Hazard
Contact between the skin and the hot nozzle could result in burns.

NOTICE
Never use an acetylene or welding torch, as severe nozzle damage can occur from over-heating.

8) To remove cold plastic in melt consistence, heat the nozzle tip (1.7.1) by using a heat gun, to the maximum temperature of 200 °C (392 °F).

9) Unscrew the nozzle tip (1.7.1) from the nozzle body (1.1) using a wrench.

WARNING
Hazard of Pressurized Air
Pressurized air blow can result in hot plastic parts or foreign bodies entering the eyes, causing vision damage.
Use personal protective equipment: Face protection, hearing protection and gloves.

10) Clean the nozzle body (1.1) and nozzle tip (1.7.1) using pressurized air to remove as much residual plastic as possible.
10.4.3.4 Assembling Nozzle 12S

**NOTICE**

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly.

<table>
<thead>
<tr>
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<tbody>
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</tr>
<tr>
<td>1.5</td>
<td>DIN471</td>
</tr>
<tr>
<td>1.6</td>
<td>Socket set screw DIN914-M3x3-45-H</td>
</tr>
<tr>
<td>1.7.1</td>
<td>Nozzle tip (Example TTW)</td>
</tr>
<tr>
<td>1.7.1.1</td>
<td>Tip nut</td>
</tr>
<tr>
<td>1.7.1.2</td>
<td>Full flow insert</td>
</tr>
<tr>
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</tr>
<tr>
<td>5</td>
<td>Parallel Pin DIN6325 03m6x08</td>
</tr>
</tbody>
</table>
Assembling the Nozzle Tip

**TTW Nozzle Tip Assembly**

1) Place the tip nut (a) into the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).

**TTP Nozzle Tip Assembly**

1) Place the tip nut (a) on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
3) Place the torpedo (c) on the tip insert (b).
4) Using the tool (T1) to push the torpedo (c) and the tip insert (b) into the tip nut (a).

**TFP Nozzle Tip Assembly**

1) Place the tip nut on the tool (T2).
2) Using the tool (T1) to push the tip insert (b) into the tip nut (a).
Shown are the tip nuts, for checking the correct seating of the tip inserts

![Tip Nut Examples](Doc004688.png)

**NOTICE**
See examples of good and incorrect insert installations.
Make sure the insert must not exceed the height of the nozzle tip head.
Incorrect items should not be further processed.

---

### Assemble the Seal Cap on TTW Nozzle Tip

1. Place the tip nut (a) on the tool (T1).
2. Place the seal cap (b) on the tip nut (a).
3. Using the tool (T3) to push the seal cap (b) on the tip nut (a).

![Seal Cap Assembly](Doc007732.png)

**NOTICE**
The assembly tool (T3) has an engraved note on both front sides.
Use the side, signed with TW against the seal cap.

---

### Assembling the Nozzle Tip on the Nozzle

1. Fix the nozzle body on the hexagonal shape in a vice.

![Nozzle Tip Assembly](Doc005520.png)
2) Apply spotting ink on the nozzle tip (1.7.1) bottom surface (SF1).
3) Screw in the nozzle tip (1.7.1) hand-tight into the nozzle body (1.1) until seated.
4) Unscrew the nozzle tip (1.7.1) from the nozzle body (1.1).

5) Check the matching between the nozzle body (1.1) surface (SF2) and the nozzle tip (1.7.1) surface (SF1).
   
   **NOTICE**
   
   The nozzle must bear uniformly on the outer surfaces uniformly and flatly, in particular on the nozzle body contact face.

   **NOTICE**
   
   In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory - please contact Synventive Customer Service or Technical Support.

6) With a positive ink test clean the surfaces and proceed to the next step.

7) Lubricate the thread (not the face) of the nozzle tip body with high-temperature assembly paste (antiseize compound).
   
   **NOTICE**
   
   This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

8) Tighten the nozzle tip (1.7.1) at the nozzle by room temperature.
   
   **NOTICE**
   
   Use torque wrench with wrench insert (HEX21) and a torque of 100 Nm.
Assembling the Nozzle Body

**NOTICE**

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T4). It is not allowed to clamp the nozzle in a vice directly.

1) Fix the holder (T4) in a vice.

2) Place the nozzle head (2.1) in the holder (T4).

3) Apply spotting ink on the nozzle body (1.1) bottom surface (SF1)

4) Screw in the nozzle body (1.1) hand-tight into the nozzle head thread until seated.

5) Unscrew the nozzle body (1.1) from the nozzle head (2.1).
6) Check the matching between the nozzle head (2.1) bottom surfaces (SF2) and the nozzle body (1.1) surface (SF1).

**NOTICE**

The nozzle head must bear on all surfaces uniformly and flatly, in particular on the nozzle head contact face.

In case of any uncertainty, clean the surfaces with a cleaning cloth. If the next ink test is still unsatisfactory, please contact Synventive Customer Service or Technical Support.

7) With a positive ink test, clean the surfaces and proceed to the next step.

8) Lubricate the thread (not the face) of the nozzle body with high-temperature assembly paste (antiseize compound).

**NOTICE**

This is an important measure to prevent thread corrosion due to aggressive gases, which could be released during plastics processing.

9) Tighten the nozzle body (1.1) to the nozzle head.

**NOTICE**

Use torque wrench with wrench insert and the torque specified in the torque table in section 13.
Mounting the Nozzle Head Heater

1) Install the thermocouple, ensuring it is seated correctly in the internal heater groove and nozzle head groove.
2) Place the nozzle head heater (3) on the nozzle head (2.1).

**NOTICE**

The nozzle head heater secures the thermocouple by covering it in the vertical groove.

The heating wire must exit through the central recess of the nozzle head.

3) Attach the head heater (4.1) with the socket set screw (x).

Mounting the Nozzle Heater

**NOTICE**

For work on the nozzle (with assembled nozzle head), the nozzle must be clamped in a vice via using the tool holder (T2). It is not allowed to clamp the nozzle in a vice directly.

1) Slide heater locating, ring (1.4), onto the nozzle body (1.1) up to the surface of the hexagon.

**NOTICE**

The opening of the component ring version 2 (1.4), must be line up with the cable connections (see customer drawing).

2) Bend the leads of the nozzle heater about 90 degrees.

**NOTICE**

Use round-nosed pliers only.
3) Push the nozzle heater (1.2.1) onto the nozzle (1.1).

**NOTICE**

Ensure the orientation of the wire leads (y) matches opening in component ring version 2 (1.4) and nozzle head (2.1).

4) Place the pre centering ring version 1 (1.3) on the nozzle heater (1.2.1).

**NOTICE**

The component ring version 1 (1.3) is for pre centering of the nozzle in the cutout.

5) Mount the retaining ring (1.5) at the nozzle tip (1.7.1).

6) Move the nozzle component ring version 2 (1.4) and nozzle heater (1.2.1) tight to the nozzle component ring version 1 (1.3).

7) Fix the nozzle component ring version 2 (1.4) with the socket set screw (1.6) by a ½ up to ¾ turn.

8) Unit the heater and thermocouple (ex) leads.
10.4.3.5 Grounding of the Sprue Bushing

⚠️ DANGER

**Danger to Life by Electric Shock**

The Sprue Bushing has to be properly grounded to prevent serious personal injury or death.

- Electrical work must be carried out by qualified persons.
- Verify that all power source connections are properly grounded.
- In Emergency case - Switch all systems off.
- For first aid contact your medical / safety representing.

1) Guide the ground wire into the hole of the single head (2.1).
2) Tighten the ground wire with a socket set screw (DIN 913).