



## Safety Instructions

# 1 Safety Instructions

## 1.1 CE approved Equipment

- Only CE approved equipment rated for application should be used with Synventive Hot Runner Systems.

## 1.2 Purpose of use of a Hot Runner System

### 1.2.1 Use compatible with the intended Purpose

- The goal of the Hot Runner System is to carefully transport the melt from the plastification unit to the cavity with an optimum temperature distribution and optimum distribution concept.
- Synventive Hot Runner Systems and single nozzles are not stand alone systems and must be incorporated in the injection mold for use.
- All Synventive Hot Runner Systems are used exclusively for the processing of thermoplastic materials based on the individual requirements of the specified material.
- A max. injection pressure of 30,000 psi (2068 bar) applies to Synventive HR standard components (unless otherwise stated).
- Use in conformity with the specified purpose also includes the study and understanding of and the compliance with all instructions and tasks of the submitted instructions for use.
- Synventive Hot Runner Systems may be incorporated only into specially designed cavities of injection molds.
- To guarantee a reliable operation of the Hot Runner System, it is necessary to comply with the specified periodic inspections and regular maintenance.

### 1.2.2 Use in conflict with the intended Purpose

- Synventive Hot Runner Systems may be only used in the manner described in section 1.2.1 Use compatible with the intended Purpose. Any other use is excluded. If the Hot Runner System is used in any manner that contradicts the intended purpose, the right to any warranty claims shall cease to exist.

## 1.3 Definition of Qualified Persons with Technical Knowledge

**Technical knowledge means that personnel must -**

- Be capable of reading and fully understand electrical/hydraulic circuits
- Fully understand the interrelationship of the built-in safety systems
- Have knowledge regarding the function and build-up of technical components.

**A qualified person is one who, due to his technical training and experience, has sufficient knowledge that he can evaluate the work transferred to him or she -**

- can recognise possible hazards.
- can instigate measures to eliminate hazards.
- has the required repair and assembly knowledge.



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## 1.4 Safety Instructions within the Instruction Manual

- The Hot Runner System is an incomplete machine. When the Hot Runner System is fitted into a machine, the interaction between the entire machine and the Hot Runner System, causes changes to the potential hazards. In particular, the influence of hydraulic and electrical controls on hydraulic drives which cause mechanical movements. This necessitates a hazard analysis and operating instructions for the entire machine.
- These operating instructions are intended to provide information and to prevent hazards when installing the Hot Runner System in the machine as well as information and guidelines for transport, storage and maintenance (inspection, servicing, repair) of the Hot Runner System.
- Only by strictly observing these operating instructions, is it possible to prevent accidents and material damage and ensure fault-free operation of the Hot Runner System.

## 1.5 The HR System Instruction Manual / Part of the Synventive Customer Documentation

- Comply with all safety instructions contained in the customer drawings.
- Use customer drawings for general information only. For detailed information, refer to the supplied Synventive 3D model.

### Parts of the Synventive customer documentation are:

- User instruction (<http://www.synventive.com/servicesupport/----->)
- Customer drawings
- Electrical wiring information
- Product Certificate / Hot Runner Check List
- Manifold mounting check list
- Parts list
- 3D-Model (in digital form)
- General safety instruction for the Synventive HR-system



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## 1.6 Safety Instructions and Symbols used

The following safety instructions and symbols and operating advice are used in this manual. They are highlighted by the respective word. The described measures are used to prevent injuries and avoid damage to the Hot Runner System and must be followed.

## 1.6.1 Danger Symbols Definitions

**Danger**

indicates an imminent hazardous situation which may result in death or serious injury.

**Warning**

indicates a dangerous situation that may lead to irreversible injury.

**Caution**

indicates a dangerous situation that may lead to reversible injury.

**NOTICE****Notice**

indicates a situation that may lead to material damage and provides additional information on proper procedures and trouble-free labor without the possibility of personal injury.

## 1.6.2 Mandatory Safety Signs of the Personal Protective Equipment

	Read the user instruction		Wear safety shoes		Wear close-fitting working cloth
	Wear headgear		Wear protective goggles		Wear face protection
	Wear work gloves or anti oil gloves		Wear apron against high temperature		Wear hearing protection

## 1.6.3 Symbols of Warnings



	General warning		Warning of electrical danger		Warning of hot surface
	Warning of overhead load		Warning of fork lift trucks operating		Warning of falling objects
	Warning of oxidising materials		Warning of explosive atmosphere		

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## 1.6.4 Symbols of Prohibition

	Don't use the cylinder housing as assembly support to get the system into the mold:		Do Not Pinch Signal Wire
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## 1.7 General Safety Instructions

All safety instructions shall be carefully studied before the operation of the Synventive Hot Runner System is initiated. When working with the Hot Runner System, all safety instructions contained here in must be followed.

**Noncompliance with safety notes and instructions could result in serious injuries.**

 <b>DANGER</b>		
	<p><b>Danger to Life by Electric Shock</b></p> <p>Serious personal injury or death can result from electrical contact.</p> <p>Electrical work must be carried out by qualified persons.</p> <p>Verify that all power source connections are properly grounded.</p> <p><b>In Emergency case - Switch all systems off.</b></p> <p><b>For first aid contact your medical / safety representing.</b></p>	
	<p><b>Danger to Life by Hydraulic</b></p> <p>Serious personal injury or death can result from connecting or disconnecting hydraulic hoses under pressure.</p> <p>Hydraulic works must be carried out by qualified persons.</p> <p>Use personal protective equipment, face protection, headgear, anti oil gloves.</p> <p>The hoses in Hot Runner systems and the injection mold are under high pressure and high temperatures</p> <p>Before disconnecting or connecting any hydraulic hoses:</p> <ul style="list-style-type: none"> <li>● The Injection Molding Machine must be shut down.</li> <li>● The electrical disconnect properly locked out.</li> <li>● The hoses have to be depressurized.</li> </ul> <p><b>In Emergency case - Switch all systems off.</b></p> <p><b>For first aid contact your medical / safety representing.</b></p>	



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**! DANGER****Danger to Life by Pneumatics**

Serious personnel injury or death can result from connecting or disconnecting pneumatic hoses under pressure.

Pneumatic works must be carried out by qualified persons.

Use protective goggles or face protection or protective goggles, hearing protection (PPE)  
The hoses in Hot Runner systems and the injection mold are under high pressure.

Before disconnecting or connecting any Pneumatic hoses:

- The injection machine / pneumatic compressor must be shut down.
- The electrical disconnect properly locked out.
- Pressure from the hoses must be removed.

**For first aid contact your medical / safety representing.**

**! WARNING****Heavy Weight Hazard**

Transport and lifting equipment should be operated only by trained personnel.

Operate lifting and transport equipment slowly and carefully to avoid uncontrolled swinging of the manifold.

Lifting and transport equipment for lifting Hot Runner Systems shall be approved and properly rated taking into account the weight and size of the manifold.

When unpacking the Hot Runner System, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1 m from the Hot Runner System.

Use personal protective equipment, such as head gear, safety shoes and work gloves.

**For first aid contact your medical / safety representing.**

**Danger of Unexpected Discharge**

**If production operation stops while Hot Runner heating is on, the melt can overheat easily. Overheated plastic may emit dangerous vapors that could eject explosively if the mold gate is opened.**

Upon each interruption of production operations, retract the machine's injection unit to make sure the pressure in the Hot Runner System can normalize through the inlet bushing.

**Hot Surfaces Hazard**

**Contact between the skin and the hot injection mold could result in burns.**

Use personal protective equipment, such as work 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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**Danger of Material Defects**

Only approved and CE certified temperature controllers rated for application with over current / voltage protection should be used with Hot Runner Systems.

Verify that all cables are damage free and in good condition.

Verify that all electrical connectors are clean and making good contact, and are securely fastened and latched. Dirty or otherwise contaminated connector pins can cause loss of signal and subsequent errors.

Clean all connectors with a spray-type commercial electrical contact cleaner / degreaser and allow them to dry fully before reconnecting.

Verify that all hydraulic hoses and connectors are damage free and in good condition.

All Synventive Hot Runner Systems shall be fitted with a temperature controller to provide separate temperature adjustment for each heating zone; the controller shall have the Soft-Start function for gradual heat-up. In this way you can prevent premature wearing and damage to the hot runner system.

To extend the lifetime of temperature sensors, avoid long-term operation of temperature control in manual mode.

Immediately replace defective temperature sensors.

If you replace heaters or their parts, always use original spare parts from Synventive and carry out the replacement as described in this Manual.

Do not interchange power supply cables with temperature sensor cables. Temperature sensor cables are not suitable for high voltage applications and will melt if exposed to high currents. Power supply cables are not suitable for use as temperature sensor cables for data transfer to the temperature controller.

To maximize the life of temperature sensors, maintain the operating temperature as specified in the respective material safety data sheets during processing.

Take notice of the production and color identification of temperature sensor cables (section 5.2.3.1).

Always use the specified temperature sensor.

Check that the aluminum surfaces of heaters do not come in contact to the nozzle cut-outs. If they do, enlarge the nozzle cutout's as needed. Any contact between the heaters and the nozzle cutouts will lead to the risk of improper temperature control, which could result in damage to the aluminum casting.

If applicable, set the necessary operating temperature to the lowest level possible to avoid plastic degradation and to prevent damage to the temperature sensors.

The highest operating temperature of nozzles with heat pipes (APT nozzles) is 343 °C (650 °F). Operation above this temperature will result in heat pipe failure and loss of thermal performance.

The cooling compound for nozzles with a cooling insert should always have the correct mixing ratio to prevent corrosion and obstructed circulation.