

2 Safety

2.1 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 HR system and must be followed.



Warning

- A warning notifies of a hazard that could result in material damage, injuries or death.



Advice

- Advice includes supplementary instructions for the correct and faultless operation of the HR system.

2.2 General safety instructions

All safety instructions shall be carefully studied before the operation of the Synventive HR system is initiated. When working with the HR system, all safety instructions contained herein must be followed.

- 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.
- Before machine operation, properly set all safety devices and use them at all times.
- 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 HR systems shall be approved and properly dimensioned taking into account the weight and size of the manifold.
- When unpacking the HR system, there is a risk of injury due to falling parts and sharp edges. Maintain a minimum distance of 1m from the HR system.
- Never work with hydraulic hoses without shutting down the hydraulic pump first.
- Make sure the hoses of the hydraulic, pneumatic and cooling systems as well as all electric cables do not obstruct movable parts of the machine, do not interfere with the machine's area of movement and the area of automatic handling, if applicable.
- When working on electric parts of the machine, switch off temperature control of the HR system and the injection molding machine as well as the machine control and disconnect all electric connections to the HR system or machine.
- Before cable mounting and dismantling, disconnect power. Cables to the HR system and the injection mold are energized.
- Electrical terminals for attaching cables to the HR system shall never be allowed to come into contact with the coolant or hydraulic fluid. They could be short-circuited or a fire could occur, leading also to damage to the HR system.
- If the cavity plate is not guided on pillars or pins when moving, there is a risk of damage to the nozzle tips.
- The cooling compound for nozzles with a cooling insert should always have the correct mixing ratio to prevent corrosion and obstructed circulation.
- System shutoff without aftercooling could result in damage to the sealing at actuator seals. To avoid this, the cooling of hydraulic actuators should continue for at least 15 minutes after the system power is disconnected. The liquid flowing from leaking hoses or connections could result in short circuit or fire in case of contact with electric parts. Maintain good condition of the hoses and their connections through regular maintenance. The coolant and the hydraulic fluid should not be located near the

- To provide to the mold function, to determine operating data and to verify the eligibility and functional reliability of the Synventive HR system as specified and approved by the customer, it is necessary to carry out a rheologic calculation from the customer's point of view based on our knowledge. Upon request at the time of the purchase order, we can submit free of charge the dimensions of the melt flow channels, necessary for the calculation, converted into the form of three-dimensional data.
- Contact between the skin and the hot injection mold could result in burns. Use personal protective equipment, such as gloves, apron, sleeves and face protection, to guard against burns.
- electric connections and devices on the machine.
- The hoses in the injection molding machine or the injection mold are under high pressure and reach high temperatures. Before you start any hose-related work, shut down the injection molding machine, disconnect power and depressurize the hoses.

2.2.1 Safety instructions for heaters

- Take care of the production and color identification of temperature sensor cables (5.1.3.1).
- All Synventive HR 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.
- To maximize the life of temperature sensors, maintain the operating temperature as specified in the respective material data sheets during processing.
- Always used J type temperature sensors.
- Check that the aluminum surfaces of heaters do not contact the nozzle cut-outs. If they do, enlarge the nozzle cut-outs as needed. Any contact between the heaters and the nozzle cut-outs will lead to the risk of improper temperature control, which could result in damage to the aluminum casting.
- Immediately renew 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. On the other hand, power supply cables are not suitable for use as temperature sensor cables for data transfer to the temperature controller.
- 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.