PRODUCT MANUAL

Lynx™ Quad Temperature Modules

LS-QTTB-J & LS-QTTB-K

Training and Technology for Injection Molding

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INTRODUCTION

Read, understand, and comply with all following instructions. This guide must be kept available for reference at all times.

DISCLAIMER

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ALERTS

The following three alert types are used as needed to further clarify or highlight information presented in the manual:

📖 **DEFINITION** *A definition or clarification of a term or terms used in the text.*

ⓘ **NOTES** *A note provides additional information about a discussion topic.*

✎ **CAUTION** *A caution is used to make the operator aware of conditions that can cause damage to equipment and/or injury to personnel.*

NOTES

The Lynx™ Quad Temperature Modules LS-QTTB-J and LS-QTTB-K accept input from up to four thermocouples (type J or type K) for use with the RJG, Inc. eDART® or CoPilot® systems.

APPLICATIONS

Temperature data can help identify cooling circuit variation, imbalance or blockage—including warp due to semi-crystalline shrinkage behavior—and improper melt temperatures.

Mold temperatures including in-cavity,effective melt, mold, parting line, and coolant temperatures, can be monitored using the LS-QTTB-J/K in conjunction with temperature sensors and the eDART or CoPilot system, as well as barrel and dryer temperatures.

1. Mold Temperatures

- In-Cavity Temperature Monitoring*

If the plastic contacts the sensor or the sensor is just behind the cavity wall, the sensor is considered "in-cavity" and can be post gate, mid-cavity or end-of-cavity.

In-cavity temperature monitoring can be used to identify melt flow front arrival, which is useful in identifying balance and warp issues.

- Effective Melt Temperature, Surface (Mold) Temperature*, Parting Line, Sprue, or Runner

If the sensors are located in the mold steel the sensor can be utilized for effective melt temperature, mold (surface) temperature, parting line temperature, sprue, or runner.

Effective melt temperature is a summary value that the eDART generates from a cavity temperature sensor installed in the wall of the cavity where the flow front contacts the sensor as it passes by.

A calibration factor is used to compute a number close to the actual melt temperature; the effective melt temperature will never read out the actual temperature of the melt. If the value changes over time or when transferring a mold between machines, a change in melt temperature can be suspected.

Changes in cycle time or breaks in cycle dramatically affect thermodynamic stability in injection molding; monitoring temperature enables troubleshooting of processing problems. Effective melt, mold, and parting line temperatures can help identify cooling variations.

- Coolant Temperature Monitoring*

If the coolant contacts the sensor or the sensor is just behind the coolant channel, the sensor is considered a coolant temperature monitor; the sensor can be assigned in the Sensor Locations tool as mold output temperature.

Coolant temperature is NOT the same as the mold surface temperature. After the process has stabilized a flow of heat out of the mold occurs on every cycle which creates a temperature gradient from the cavity surface to the coolant.

Coolant temperature monitoring can be used to identify cooling circuit variation, which is useful in identifying warp issues.

*Available on the CoPilot system.

APPLICATIONS (*continued*)

2. Barrel Temperature Monitoring

A sensor or sensors can be placed in the barrel and connected to the LS-QTTB-J/K and the eDART system for barrel temperature monitoring; available barrel locations include nozzle, front, center, feed throat, and rear.

3. Dryer Temperature Monitoring

A sensor or sensors can be placed in the dryer and connected to the LS-QTTB-J/K and the eDART system for dryer temperature monitor; a dryer temperature sensor is assigned as an auxiliary sensor (eDART software version 9.xx) or a barrel temperature/description not available (eDART software version 10.xx).

OPERATION

The LS-QTTB-J/K collects temperature readings from up to four connected thermocouples for use with the eDART or CoPilot systems. The LS-QTTB-J is compatible with type J thermocouples, while the LS-QTTB-K is compatible with type K thermocouples; RJG, Inc. offers a line of type K thermocouples. The LS-QTTB-J/K modules feature terminal block connectors and accepts input from a broad range of thermocouples.

The LS-QTTB-J/K requires eDART software version 8.0 or later and CoPilot software version 6.0 or later. The eDART computes a range of values from the thermocouple temperature measurements for display and use. In-cavity sensors will provide calculations such as Process Time/Temperature, Minimum/Temperature, Effective Melt Temperature, Rise/Temperature, and Average Value at end-of-cavity, mid-cavity, and/or post-gate; mold temperatures are also generated for parting line, mold surface, end-of-cavity, mid-cavity, and post-gate locations.

INSTALLATION OVERVIEW

The LS-QTTB-J/K is grounded and mounted over the area where the thermocouple wires exit the mold, but away from extensive heat or vibration/shock, using the provided EMI gasket. The thermocouple wires are inserted into the module and installed using the terminal block. A Lynx cable is attached to the LS-QTTB-J/K Lynx port and the eDART or CoPilot system.

LS-QTTB-J/K

EMI GASKET

THERMOCOUPLE WIRE
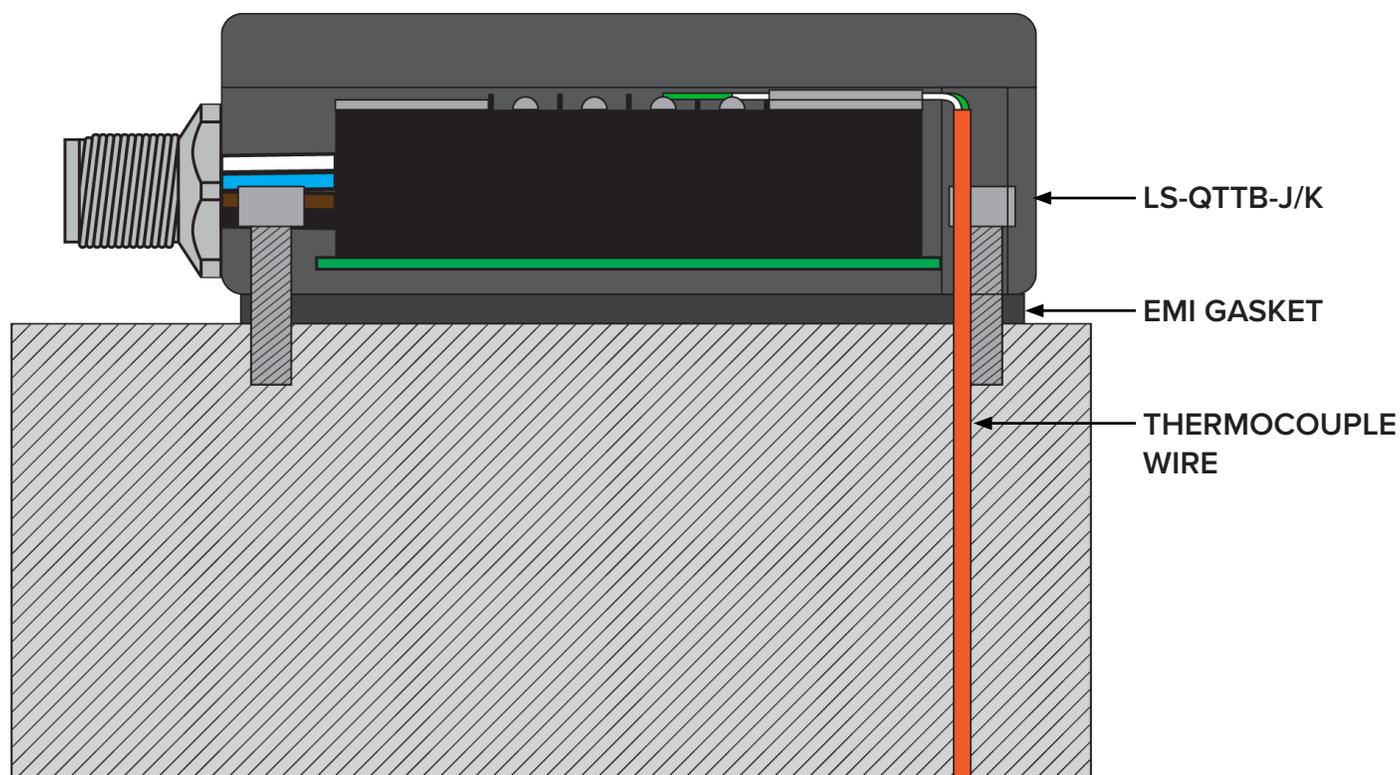
INSTALLATION SPECIFICATIONS

MOUNTING

1. Requirements

The Lynx quad temperature module must be mounted on a frame-grounded structure to ensure proper operation. The ground potential of the structure must be same as the ground required for the eDART or CoPilot system.

↗ **CAUTION** *The ground connection of the frame-grounded structure must be made to an adequate earth ground to eliminate the possibility of radio frequency noise and interference, and to ensure a safe operation. Always have a licensed electrician check all wiring to ensure that all grounds are wired correctly.*

2. Mounting

The module must be mounted using the provided EMI gasket, with the slot of the module and gasket over the channel where the cables exit the mold; refer to the dimensions to determine the correct mounting location.

3. Remove cover.

- Remove screws (**1**) from LS-QTTB-K, then remove cover plate.

4. Insert thermocouple wire.

Feed thermocouple wire (**2**) through the mounting gasket and wire slot (**3**) in bottom of module.

5. Install the module.

Mount the Lynx quad temperature module using the two provided mounting screws (**4**) (10-24 x 0.75").

↗ **CAUTION** *Do not mount in locations subject to high shock or vibration (such as ejector plates or actuating mold components).*

↗ **CAUTION** *The module must be mounted to surfaces with temperatures between 32–140 °F (0–60 °C).*

CONNECTIONS

1. Requirements

The thermocouple wires must be shielded, however, wires that remain within the mold may not be shielded. The shielded wires must run through the slot in the bottom of the module then be secured using the shield plate to ensure good contact and reduce radio frequency (RF) noise susceptibility.

✓ **CAUTION** *Disconnect and lockout the main power sources before making electrical connections. Electrical connections must only be made by qualified personnel.*

Keep the protective cap in place on the Lynx connector when not in use to prevent contamination.

2. Remove shield plate.

Remove screws (**1**) from shield plate(**2**), then remove shield plate(**2**).

3. Connect negative (-) lead.

• Connect white wire (**3**) to the negative terminal.

4. Connect positive lead (+).

• Connect green wire (**4**) to positive terminal.

5. Install shield plate.

• Install shield plate (**2**) over the thermocouple wire with screws (**1**)— ensure the plate contacts the shield.

✓ **CAUTION** *Do not over-tighten the plate; failure to comply will result in damage to equipment.*

6. Install cover plate.

• Install LS-QTTB-K cover plate with screws.

7. Lynx Cable CE-LX5

Remove the protective cap from the Lynx connector on the module. Install the female Lynx-connector-end of the CE-LX5 cable onto the LS-QTTB-J/K Lynx connector.
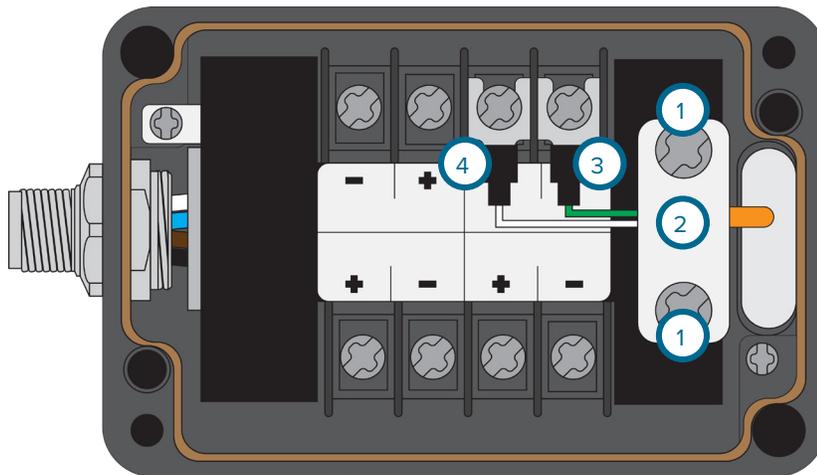
THERMOCOUPLE TYPE	THERMOCOUPLE WIRE COLORS IEC 584-3	
Type K	Positive (+)	Green
	Negative (-)	White

SOFTWARE SETUP

1. Requirements

The LS-QTTB-J/K requires eDART software version 8.0 or eDART software version 10.xx or later; contact RJG Customer Support if a software upgrade is required.

The LS-QTTB-J/K requires CoPilot software version 6.0 or higher; refer to the CoPilot Software User Guide for setup information.

2. Software Setup Version 8/9.xx

The LS-QTTB-J/K will appear in the Sensor Locations ❶ tool for initial setup in the eDART version 9.xx software.

- Select the Sensor Type ❷ from the drop-down menu; if the module has not previously been configured, all four channels will be assigned as "Mold temperature" with no Sensor Location assigned.

- Select the Sensor Location ❸ from the drop-down menu.

- Enter the associated sensor's cavity number ❹ in the Identification column (if two or more sensors are set to the same Sensor Location).

- Select the Accept ❺ button to save settings.

Serial #. : Signal	Sensor Type		Sensor Location		Ident	Setup	Value
07 127 99999:1	Mold Temperature	▽	Post Gate	▽	1		Open
07 127 99999:2	Mold Temperature	▽	Mold Surface	▽	2		Open
07 127 99999:3	Mold Temperature	▽	Not Used	▽			Open
07 127 99999:4	Mold Temperature	▽	End of Cavity	▽			Open

3. Software Setup Version 10.xx

The LS-QTTB-J/K and associated sensor may be set up during the Machine Setup/ Inputs or Mold Setup/Inputs **1** in the eDART version 10.xx software.

There are multiple sensor types and corresponding sensor location options depending upon the desired application; ensure that the desired sensor type and location match the assigned sensor type and location.

MACHINE INPUT SETUP

• Click, drag, and drop the associated sensor from the Available Sensors **2**

list into the Other Sensors **3** machine location listed on the left to designate the sensor type; a window to specify the sensor location will appear when selected; select Barrel Temperature **4**.

• The configuration window **5** will open; select the desired sensor location from the drop-down box **6**; locations include barrel nozzle, front, center, feed throat, rear, and description not available (used for dryer temperature).
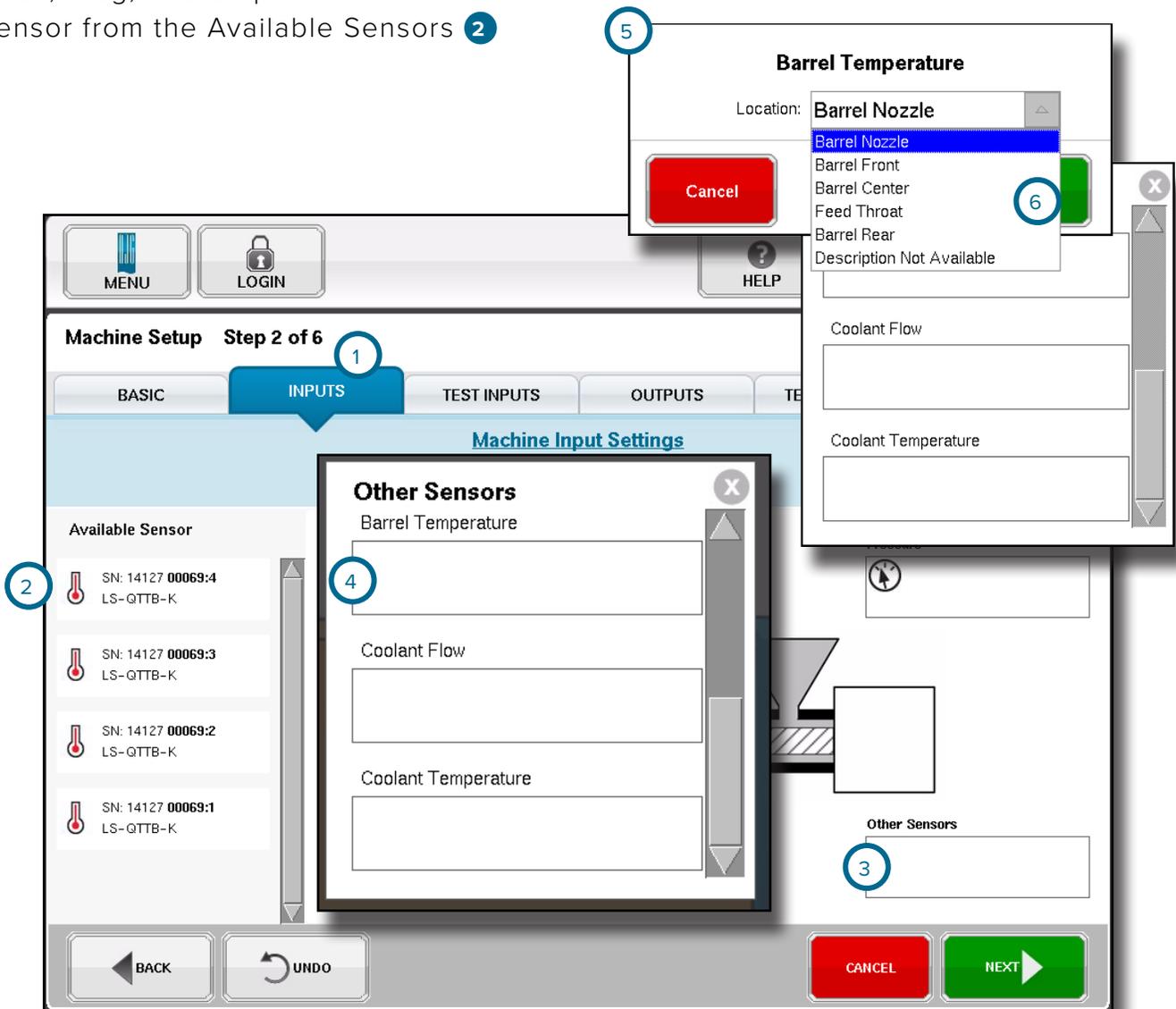
MOLD INPUT SETUP

- Click, drag, and drop the associated sensor from the Available Sensors **7** list into the Mold Sensors **8** machine location or the desired cavity **9** listed on the left to designate the sensor type; a window to specify the sensor location will appear when selected.

- For mold sensors **10**, runner, surface, parting line, sprue, or coolant temperature can be selected; for cavity types **11**, end-of-cavity, mid-cavity, or post-gate locations can be selected.

NOTES

CLEANING

Keep sensor pocket, cable channel, and sensor components free from oil, dirt, grime, and grease.

TESTING & CALIBRATION

Thermocouples are known to have drift in calibration dependent upon time and temperature. To test calibration, check the thermocouple output against the thermocouple rating and electromagnetic field (EMF) tables in a known temperature source.

WARRANTY

RJG, INC. STANDARD WARRANTY

RJG, Inc. is confident in the quality and robustness of the LS-QTTB-J and LS-QTTB-K, and so are offering a one-year warranty. RJG's Lynx quad temperature modules are guaranteed against defects in material and workmanship for one year from the original date of purchase. The warranty is void if it is determined that the adapter was subjected to abuse or neglect beyond the normal wear and tear of field use, or in the event the adapter box has been opened by the customer.

PRODUCT DISCLAIMER

RJG, Inc. is not responsible for the improper installation of this equipment, or any other equipment RJG manufactures.

Proper RJG equipment installation does not interfere with original equipment safety features of the machine. Safety mechanisms on all machines should never be removed.

NOTES

RJG

MEASUREMENT ERRORS

Errors in measurement can result from connection problems, lead resistance issues, or electrical noise.

CONNECTION PROBLEMS

Connections must be clean and free from oil, dirt, grime, and grease.

If shielded wire is used, the wire must run under the LS-QTTB-J/K shield plate (**1** & **2** at right). The shield plate should be tightened and have good contact with the shielded thermocouple wire to reduce RF noise susceptibility.
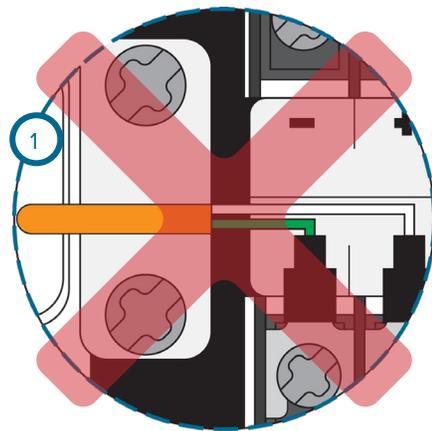
WIRE EXTENSIONS

Thermocouple wires are typically thin, and have a high resistance, making them sensitive to noise. If extra wire is needed, use thermocouple extension wire between the thermocouple and measurement instrument. Thermocouple wire is much thicker and thus has a lower resistance.
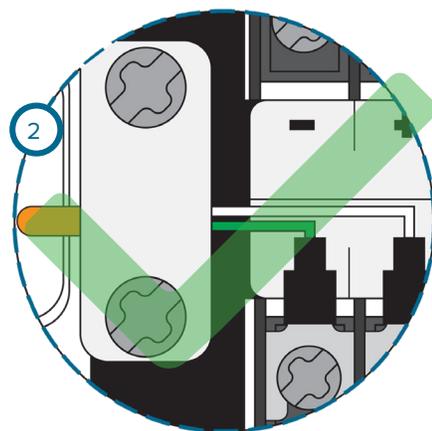
NOISE

Electromagnetic interference (EMI), or RF, is caused by electric devices such as motors, and can result in measurement reading errors. If noise is suspected, turn off all equipment that is suspect while monitoring the reading to determine the source.

Thermocouples and wiring can short or open circuit, causing error in signals. Check the thermocouple with a standard volt meter across the positive and negative leads to determine if the circuit is functioning correctly.

INSTALLATION ERRORS

REVERSED CONNECTIONS

Connections must not be reversed (**1** & **2** at right). Reversed leads will provide a reading which will vary in the opposite direction relative to ambient temperature.

LOOSE CONNECTIONS

Ensure connections are firmly in place, but are no over-tightened. Over tightening may crush the wires.
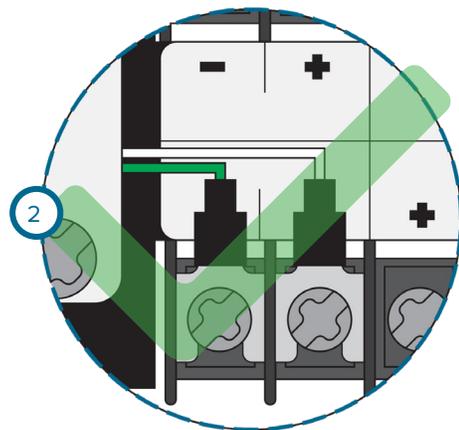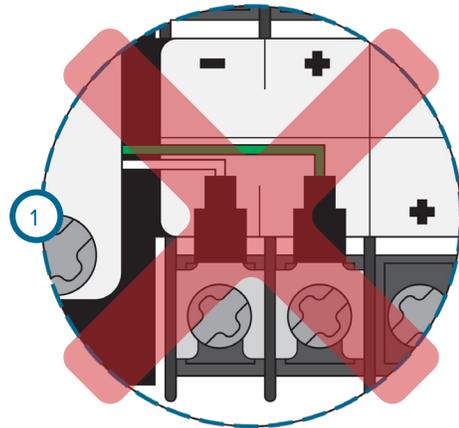
CUSTOMER SUPPORT

Contact RJG's Customer Support team by phone or email.

RJG, Inc. Customer Support

P: 800.472.0566 (Toll Free)

P: +1.231.933.8170

www.rjginc.com/support

NOTES

COMPATIBLE PRODUCTS

The LS-QTTB-J/K temperature sensor is compatible with other RJG, Inc. products for use with the eDART or CoPilot process control and monitoring systems. The LS-QTTB-K is compatible with the following RJG, Inc. temperature sensors.

SPRING-LOADED 1.5 MM TEMPERATURE SENSOR TS-SL01.5-K

The TS-SL01.5-K 1.5 mm spring-loaded temperature sensor (**1** at right) analyzes temperature variations inside the mold cavity when used with the Lynx quad temperature terminal LS-QTTB-K and the eDART or Copilot system.

PRESS-FIT 3 MM CAVITY TEMPERATURE SENSOR TS-PF03-K

The TS-PF03-K 3 mm press-fit cavity temperature sensor (**2** at right) analyzes temperature variation inside the mold cavity when used with the Lynx quad temperature terminal LS-QTTB-K and the eDART or CoPilot system.

1 MM FLUSH MOUNT CAVITY TEMPERATURE SENSOR TS-FM01-K

The TS-FM01-K 1 mm flush mount cavity temperature sensor (**3** at right) analyzes temperature variation inside the mold cavity when used with the Lynx quad temperature terminal LS-QTTB-K and the eDART or CoPilot system.

NOTES

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