RJG
MOLD SMART

PRODUCT MANUAL

Lynx™ Surface-Mount Piezoelectric Sensor Adapter

PZ/LX1-S

Training and Technology for Injection Molding

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PRODUCT MANUAL

Lynx™ Surface-Mount Piezoelectric Sensor Adapter

PZ/LX1-S

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PZ/LX1-S

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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

Inasmuch as RJG, Inc. has no control over the use to which others may put this material, it does not guarantee that the same results as those described herein will be obtained. Nor does RJG, Inc. guarantee the effectiveness or safety of any possible or suggested design for articles of manufacture as illustrated herein by any photographs, technical drawings, and the like. Each user of the material or design or both should make his own tests to determine the suitability of the material or any material for the design as well as the suitability of the material, process, and/or design for his own particular use. Statements concerning possible or suggested uses of the material or designs described herein are not to be construed as constituting a license under any RJG, Inc. patent covering such use or as recommendations for use of such material or designs in the infringement of any patent.

PRIVACY

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.*

ABBREVIATIONS

DIA	diameter
MIN	minimum
MAX	maximum
R.	radius

NOTES

PRODUCT DESCRIPTION

The Lynx™ surface-mount piezoelectric adapter PZ/LX1-S provides cavity pressure sensor users with a convenient, simple interface between piezoelectric sensors and the RJG, Inc. eDART® or CoPilot systems.

APPLICATIONS

CAVITY PRESSURE MONITORING

The PZ/LX1-S accepts and automatically scales the input of any piezoelectric cavity pressure sensor for use with the RJG, Inc. eDART process control and monitoring system.

OPERATION

SENSOR ADAPTERS

The PZ/LX1-S contains the necessary hardware to translate the raw data provided by the connected sensor for use with the eDART or CoPilot systems. The adapter is a digital, self-identifying sensor, enabling automatic recognition when connected to the eDART or CoPilot systems.

PIEZOELECTRIC SENSORS

Piezoelectric sensors use quartz crystals to measure the change in resistance, or deformation, of the force over the sensor. The measurement is carried through the sensor cable to the sensor adapter mounted outside of the mold.

The sensor adapter is connected to the RJG, Inc. eDART or CoPilot systems, which display and record the sensor's measurement for operator aid in process monitoring and control.

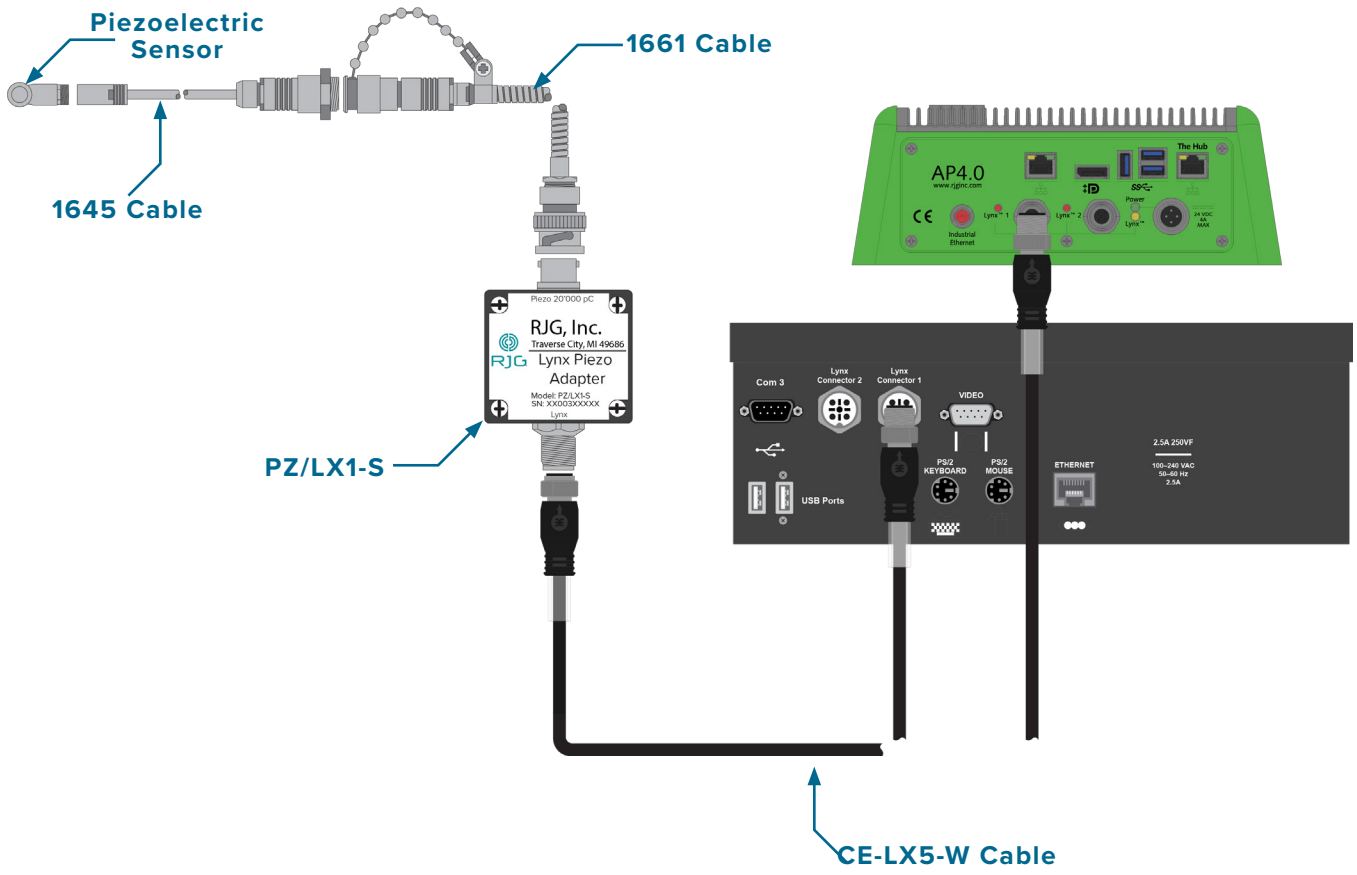
NOTES

INSTALLATION

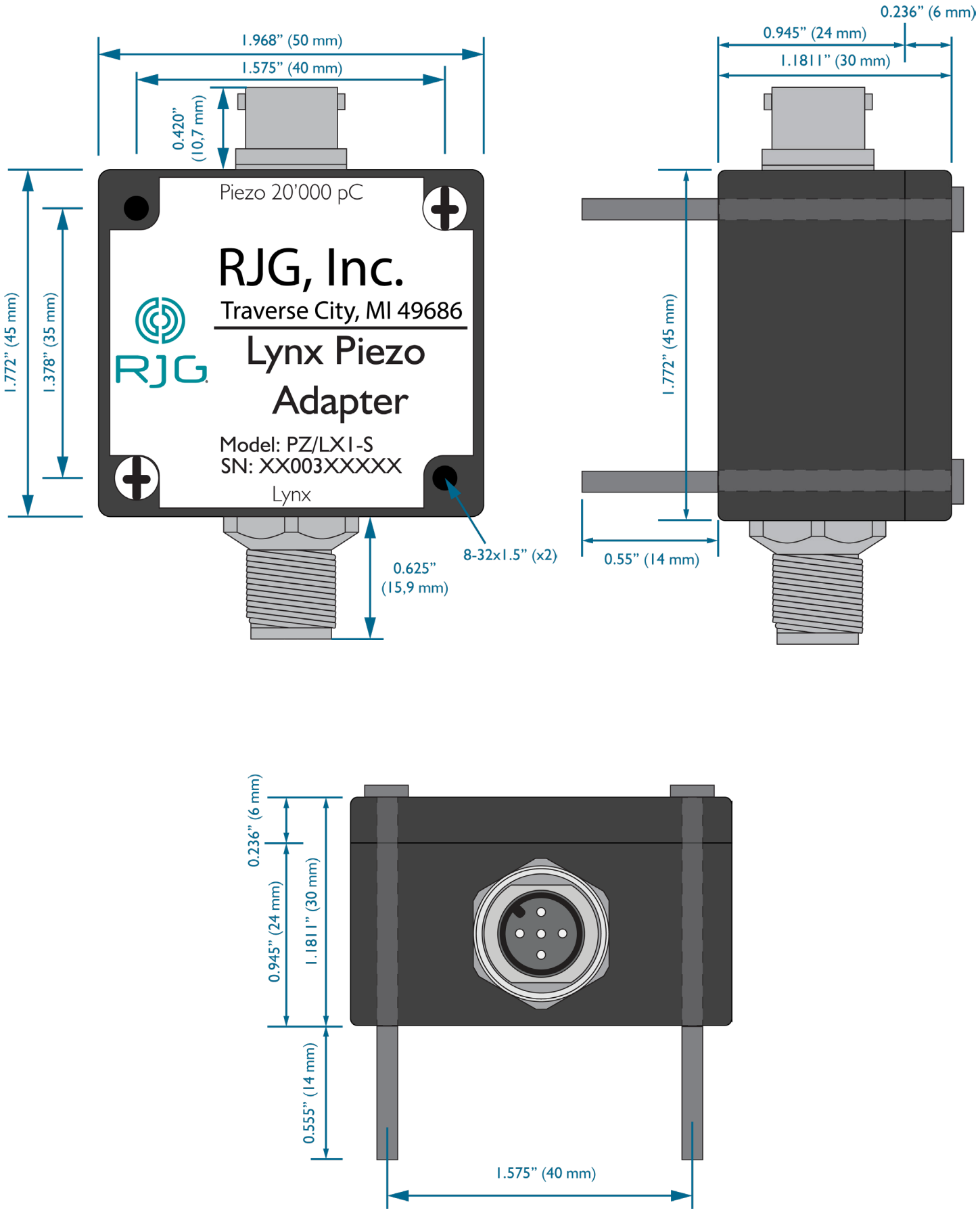
INSTALLATION OVERVIEW

The Lynx surface-mount piezoelectric sensor adapter PZ/LX1-S is mounted on a frame-grounded structure such as a mold in the press, platen, or control panel. A piezoelectric cavity pressure sensor in the mold is attached to the piezoelectric sensor cable 1645, which is then connected to the piezoelectric sensor connector cable 1661. The 1661 is attached to the 20,000 pC-connector-side of the PZ/LX1-S. The PZ/LX1-S is then connected to the eDART or CoPilot system using a Lynx premium cable CE-LX5-W.

The adapter location can be varied to suit the particular machine or mold; ensure that the mounting location is convenient for installation and removal, and facilitates the use of the necessary sensor-to-adapter and adapter-to-eDART/CoPilot (1661 and CE-LX5) cables. Cable lengths vary based on items purchased.



INSTALLATION SPECIFICATIONS



INSTALLATION SPECIFICATIONS (*continued*)

MOUNTING

1. Requirements

The Lynx piezoelectric adapter 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/CoPilot.

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

Mount the Lynx piezoelectric adapter using the two provided mounting screws (8-32 x 1.5”).

CONNECTIONS

1. Requirements

All cables must be away from sources of static such as feeder tubes and material hoppers.

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

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

2. Piezoelectric Sensor Adapter Cable 1661

Install the 1645 Fischer connector cable end on the 1661 Fischer connector cable end to join the sensor cable and the sensor adapter cable.

Remove the protective cap from the 20,000 pC connector on the PZ/LX1-S. Install the BNC-connector–end of the 1661 cable onto the PZ/LX1-S 20,000 pC connector.

3. Lynx Premium Cable CE-LX5-W

Remove the protective cap from the Lynx connector on the PZ/LX1-S. Install the female Lynx-connector-end of the CE-LX5-W cable onto the PZ/LX1-S Lynx connector.

SOFTWARE SETUP

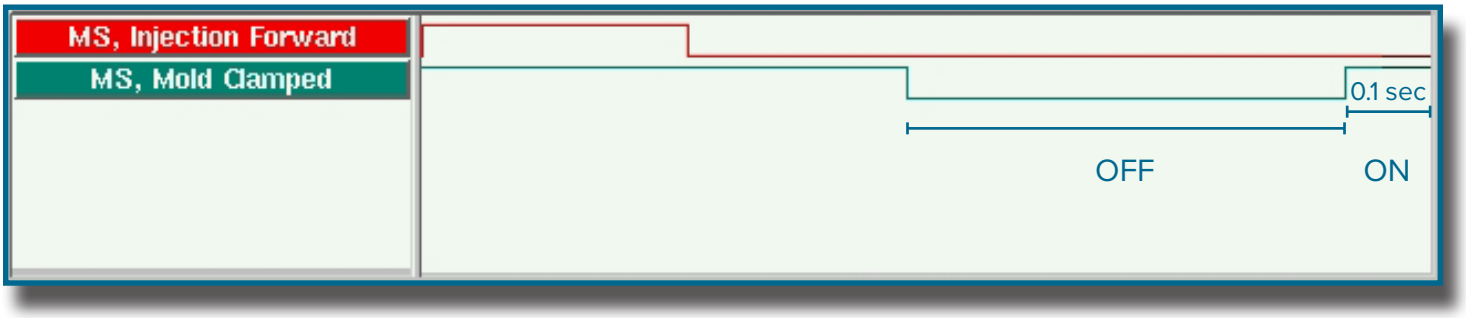
1. Requirements

The PZ/LX1-S requires a mold opening, fully-open, closing, or fully-clamped signal from either the Machine Sequence Module ID7-M-SEQ or Proximity Switch L-PX/Limit Switch L-LS in order to properly zero the connected piezoelectric sensor (an injection forward signal from the ID7-M-SEQ is also acceptable). There must not be any identified cavity pressure within 1/10th of a second of the signal change (either On➔Off or Off➔On).

Refer to the table at right for accepted signals, changes, and the related hardware.

Hardware	Signal	Change
Machine Sequence Module ID7-M-SEQ	Mold Opening	On➔Off
	Mold Closing	On➔Off
	Mold Fully-Open	On➔Off
	Mold Clamped	Off➔On
	Injection Forward	Off➔On
Proximity Switch L-PX or Limit Switch L-LS	Mold Fully-Open	On➔Off
	Mold Clamped	Off➔On

The mold clamped signal on/off change can be viewed on the eDART or CoPilot System cycle graph; the mold-clamped signal trace is high (—) when on, and low (—) when off (refer to the figure below).



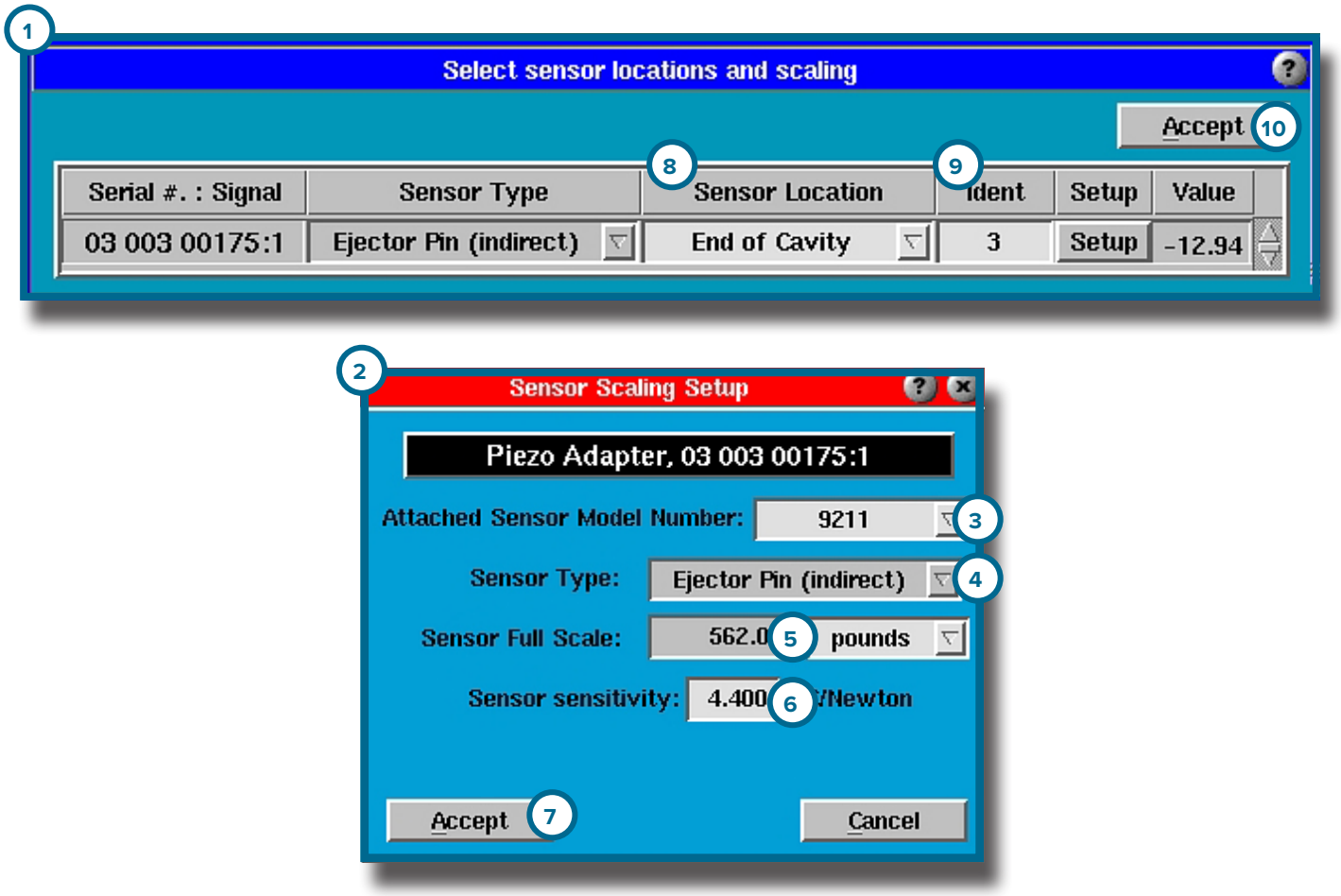
INSTALLATION SPECIFICATIONS (*continued*)

2. eDART Software Setup Version 9.xx

The sensor attached to the PZ/LX1-S will appear in the Sensor Locations 1 tool for initial setup in the eDART version 9.xx software.

The Sensor Scaling Setup window 2 will appear. Fill in the window to complete the PZ/LX1-S setup.

- Select the Sensor Model Number 3 from the drop-down menu.
- The Sensor Type 4 and Sensor Full Scale 5 will automatically display.
- A default sensitivity is automatically populated at setup; enter the Sensor Sensitivity 6 listed on the sensor's calibration certificate.
- Select the Accept 7 button to save settings.
- Select the Sensor Location 8 from the drop-down menu.
- Enter the associated sensor's cavity number 9 in the Identification column (if two or more sensors are set to the same Sensor Location).
- Select the Accept 10 button to save settings.



3. eDART Software Setup Version 10.xx

The PZ/LX1-S and associated sensor is set up during the Mold Setup/Inputs 1 in the eDART version 10.xx software.

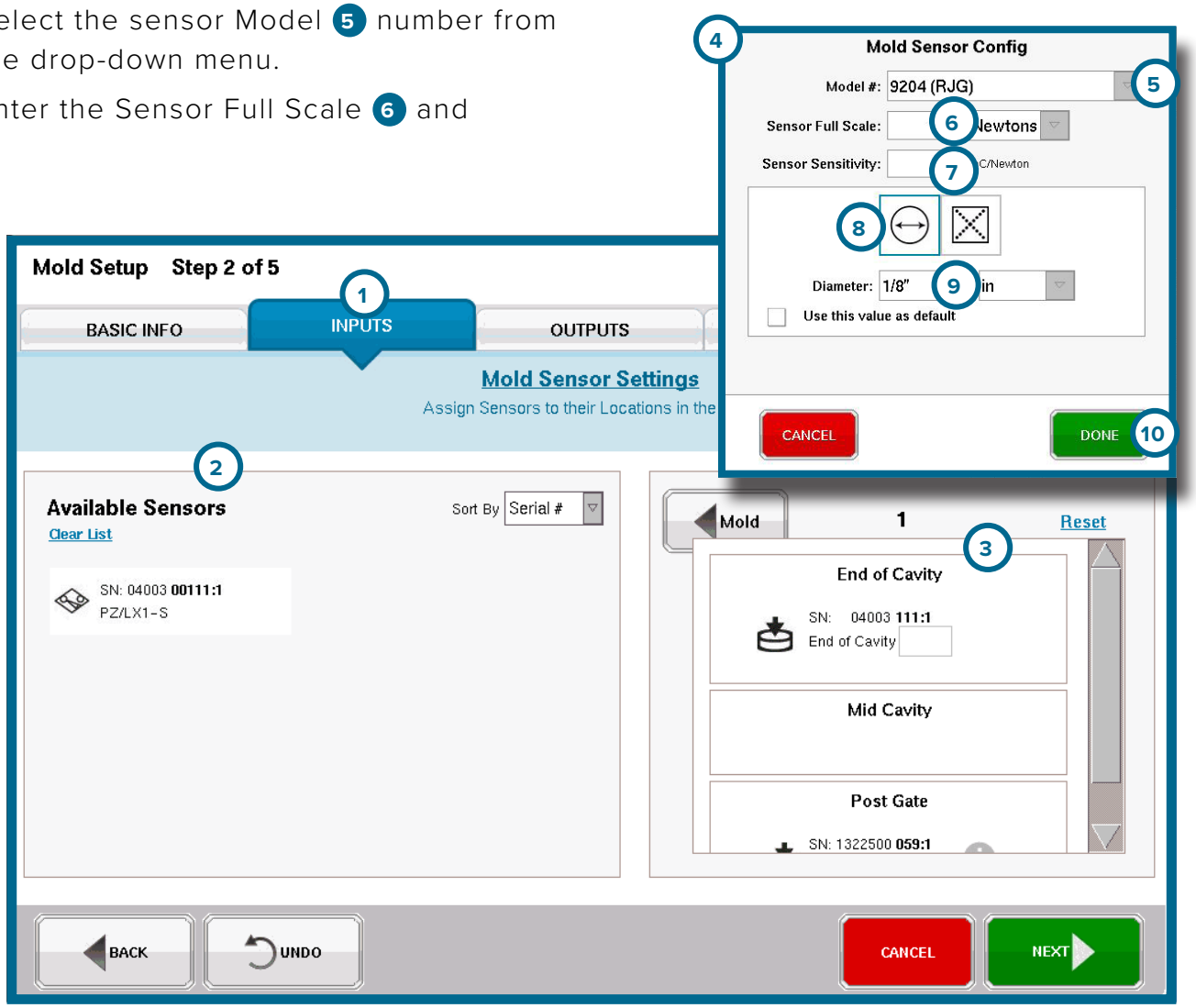
- Click, drag, and drop the associated sensor from the Available Sensors 2 list into the correct cavity and cavity location listed under the mold name on the left (the individual cavity's window 3 will appear when selected).
- Click the ⓘ to open the Mold Sensor Configuration window 4.

The Mold Sensor Configuration window 4 will appear. Fill in the window to complete the PZ/LX1-S setup.

- Select the sensor Model 5 number from the drop-down menu.
- Enter the Sensor Full Scale 6 and select the unit of measurement from the drop-down menu.
- A default sensitivity is automatically populated at setup; Enter the Sensor Sensitivity 7 listed on the sensor's calibration certificate.
- Select the ejector pin type 8.
- Select the ejector pin size and units of measurement 9.
- Select Done 10 to save settings.

4. CoPilot Software Setup

Refer to the **CoPilot System Software User Guide**—available for download online at www.rjginc.com—for setup instructions.



MAINTENANCE

CLEANING & DRIFT

REGULAR CLEANING

Pull sensors from the mold and clean out the pockets and channels when a mold is pulled for preventative maintenance. Sensors must be installed in pockets free from oil, dirt, grime, and grease.

RJG, Inc. recommends the following cleaners:

- MicroCare MCC-CCC Contact Cleaner C
- MicroCare MCC-SPR SuprClean™
- Miller-Stephenson MS-730L Contact Re-Nu®

DRIFT

Piezoelectric sensors can drift negative (-) or positive (+). The acceptable drift specification for RJG piezoelectric sensors is 20 pC/minute. The easiest place to monitor this is the eDART Software Version 9.xx “Sensor Locations” screen. Drift of ±20 pC in sixty seconds indicates abnormal drift. The cause of “drift” is dirty/contaminated connections. This could be the connection at the sensor/1645 cable, 1645-to-1661 cable, or cable-to-adapter case.

Properly clean all connection points with an electronics-grade contact cleaner. Allow the sensors and cables to air-dry before reconnecting them. Do not blow them out with a “shop” air line as this air usually contains oil and other contaminants.

If drift continues to occur, clean the sensors out again with electronics-grade cleaner then bake them in an oven to remove the contaminants (same method used at RJG). It is recommended to bake the sensors/cables at 212 °F (100 °C) for sixty minutes.

If continuing to experience drift after this, please contact RJG Sales for pricing and lead time on replacement items.

TESTING & CALIBRATION

The Lynx Surface Mount Piezoelectric Sensor Adapter PZ/LX1-S features high resolution and low drift ratings and requires no calibration. Follow all instructions and recommendations for individual sensor testing and calibration for optimal operation.

SENSOR TESTING

1. Sensor PreCheck

The Sensor PreCheck provides diagnostics on typical sensor problems such as sensor drift, preload, and zero shift, and can also detect sensor installation errors caused by improper pocket dimensions, damaged wires, and damaged sensor heads. A test report with sensor configuration can be emailed or printed from the device. This device allows testing of up to thirty-two sensors at one time and can verify that a force was applied to the sensor.

2. eDART Software—Raw Data Viewer

The eDART Raw Data Viewer displays the status of the sensor, either Valid, No Reply, Stale, or Invalid.

- A Valid sensor has raw counts that change when force is applied to the sensor; this indicates a properly working sensor.
- A No Reply sensor is not communicating with the eDART; the sensor may be unplugged.
- A Stale sensor indicates a sensor that is unused.
- An Invalid sensor will indicate a Failure of either Over-range (Ovrng) or Under-range (Undrng). The Ovrng indicates the sensor's calibration has changed too far in a positive direction, outside of the upper specification. The Undrng indicates that the sensor's calibration has changed too far in a negative direction, and the sensor may report a number below zero when load is applied.

WARRANTY

RJG, INC. STANDARD WARRANTY

RJG, Inc. is confident in the quality and robustness of the PZ/LX1-S, and so are offering a one-year warranty. RJG's surface mount piezoelectric sensor adapter is 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.

TROUBLESHOOTING

COMMON ERRORS

The following can be observed on the eDART/CoPilot system cycle graph:

1. **Slow sensor drift reading.**

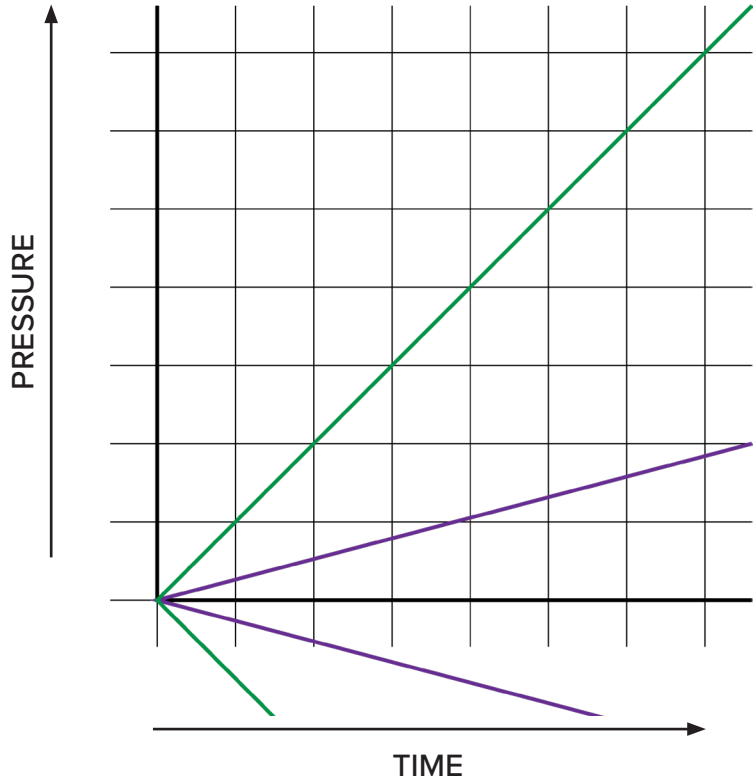
   A sensor reading that slowly rises or falls (positive or negative) from the set zero value.

2. **Fast sensor drift/invalid reading.**

   A sensor reading that quickly rises or falls (positive or negative) from the set zero value, possibly so much that the reading becomes invalid.

3. **No sensor to eDART/CoPilot communication.**

   The sensor reading cannot be obtained by the eDART/CoPilot system.



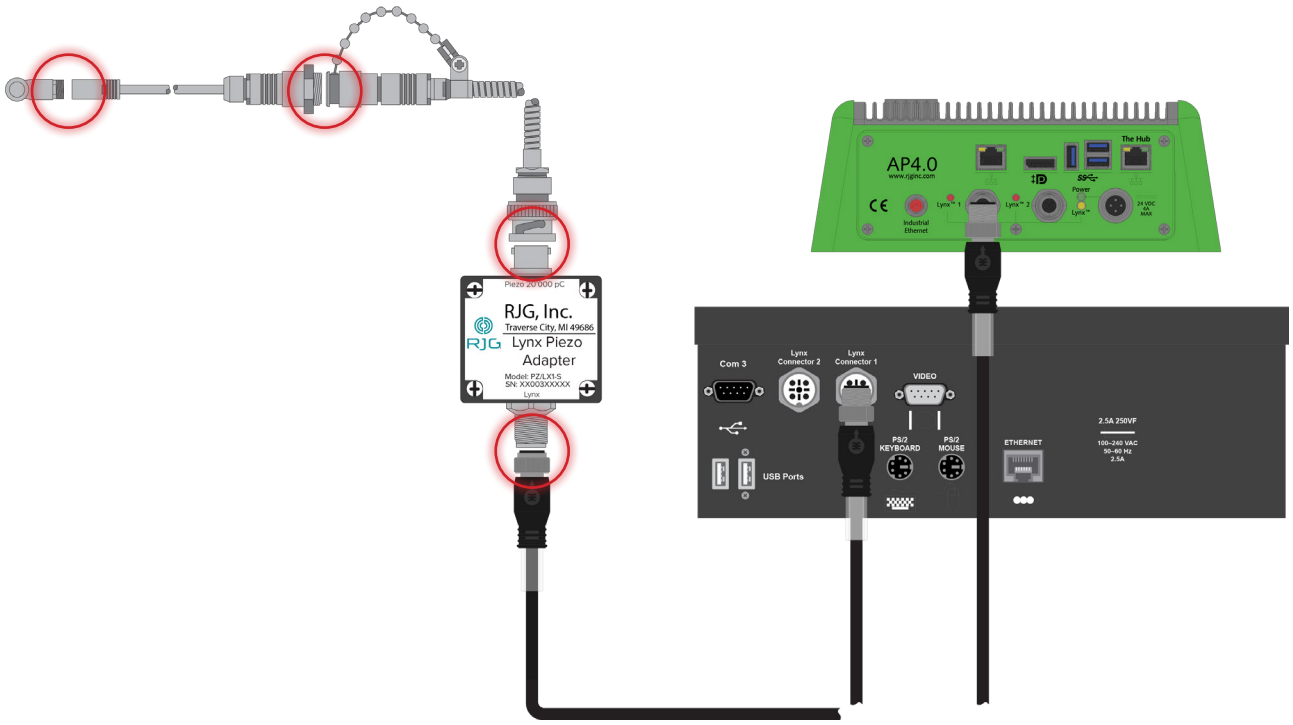
Piezoelectric Sensor Drift Type Graph	
	Fast Drift/Invalid
	Slow Drift

SLOW SENSOR DRIFT READING

If the sensor reading will not remain steady and drifts positive or negative, the sensor, cables, or adapter connectors may be contaminated. To identify the connector(s) with contamination, perform the following:

5. Disconnect the CE-LX5-W cable from the PZ/LX1-S and clean connector; if reading continues to drift, continue to next step.
6. Disconnect the 1661 cable from the PZ/LX1-S and clean end and connector; if the reading continues to drift, continue to next step.
7. Disconnect the 1645 from the 1661 cable and clean ends; if the reading continues to drift, continue to next step.
8. Disconnect sensor from 1645 cable and clean ends.

If the sensor reading continues to drift after the above troubleshooting steps are completed, either the sensor, cables, or adapter must be replaced.

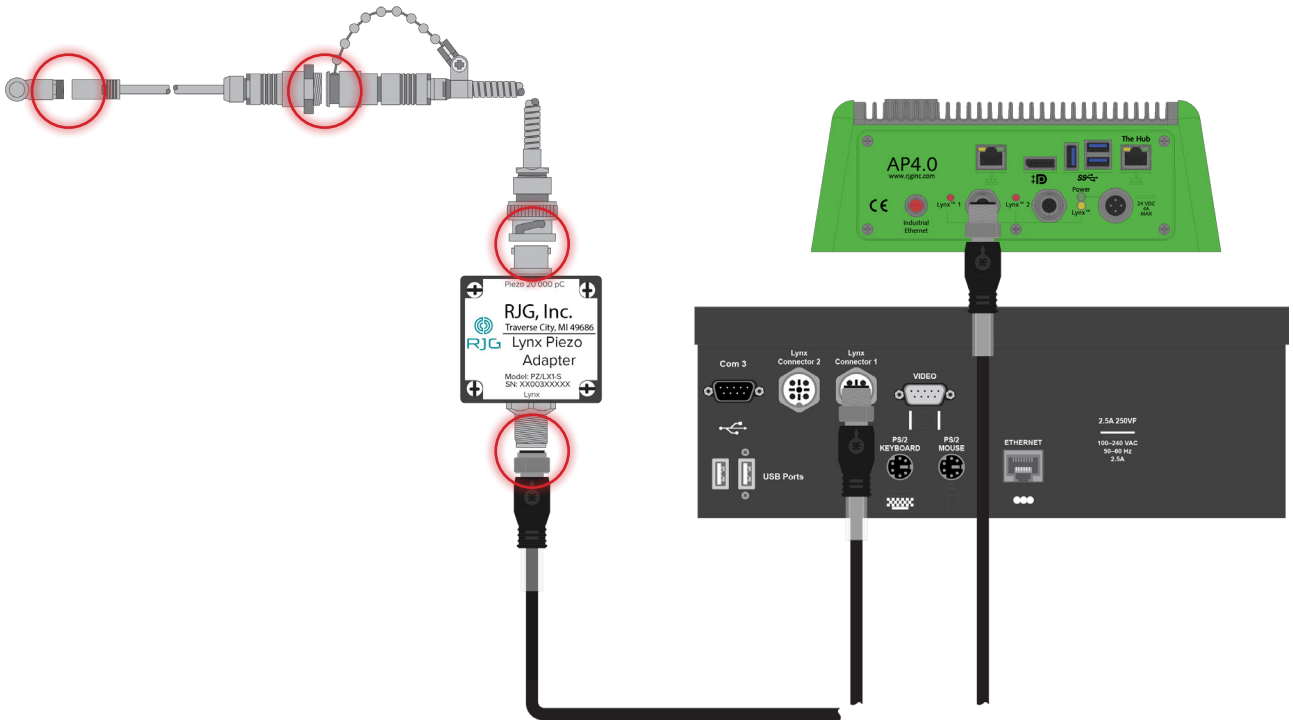


FAST SENSOR DRIFT/INVALID READING

If the sensor reading drifts quickly and becomes invalid, the sensor, cables, or adapter connectors may be heavily contaminated, or the adapter may have failed. To identify the connector(s) with contamination, perform the following:

9. Disconnect the CE-LX5-W cable from the PZ/LX1-S and clean connector; if reading continues to drift, continue to next step.
10. Disconnect the 1661 cable from the PZ/LX1-S and clean end and connector; if the reading continues to drift, continue to next step.
11. Disconnect the 1645 from the 1661 cable and clean ends; if the reading continues to drift, continue to next step.
12. Disconnect sensor from 1645 cable and clean ends.

If the sensor reading continues to drift or remains invalid after the above troubleshooting steps are completed the adapter must be replaced.



SENSOR DOES NOT COMMUNICATE WITH eDART/CoPilot SYSTEM

If the eDART/CoPilot system is unable to establish communication with the sensor, the cables or adapter may have failed. To identify the failed component, perform the following;

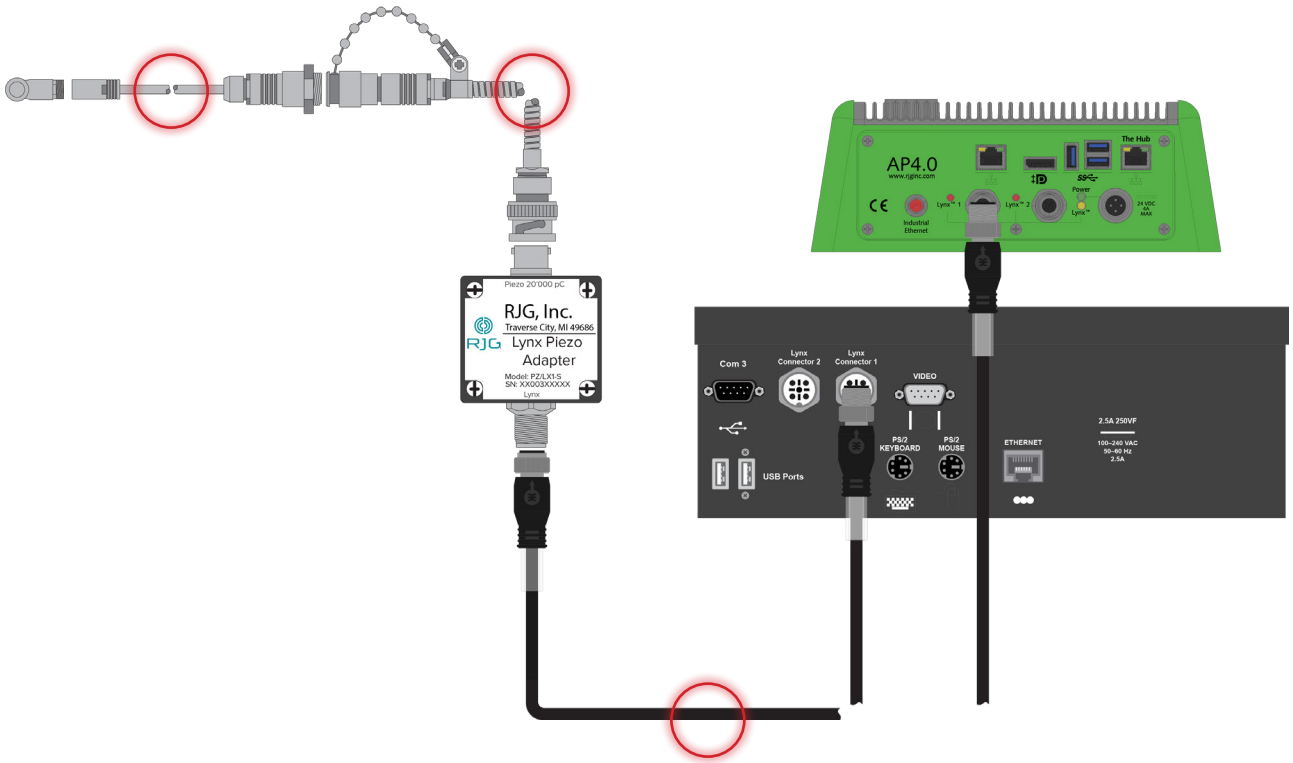
13. Replace the CE-LX5- Lynx cable with working cable; test the sensor communication.

14. Remove 1661 sensor cable from PZ/LX1-S; test the adapter communication. If adapter fails to communicate, the adapter must be replaced; contact RJG Support. If the adapter communicates, but the sensor does not, continue to the next step.

15. Replace the 1661 sensor adapter cable with working cable; test sensor operation. If communication remains non-existent, continue to next step.

16. Replace the 1645 sensor cable with working cable; test sensor operation.

If the eDART/CoPilot system cannot establish communication after these steps, the sensor has failed and must be replaced.



CUSTOMER SUPPORT

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

RJG, Inc. Customer Support

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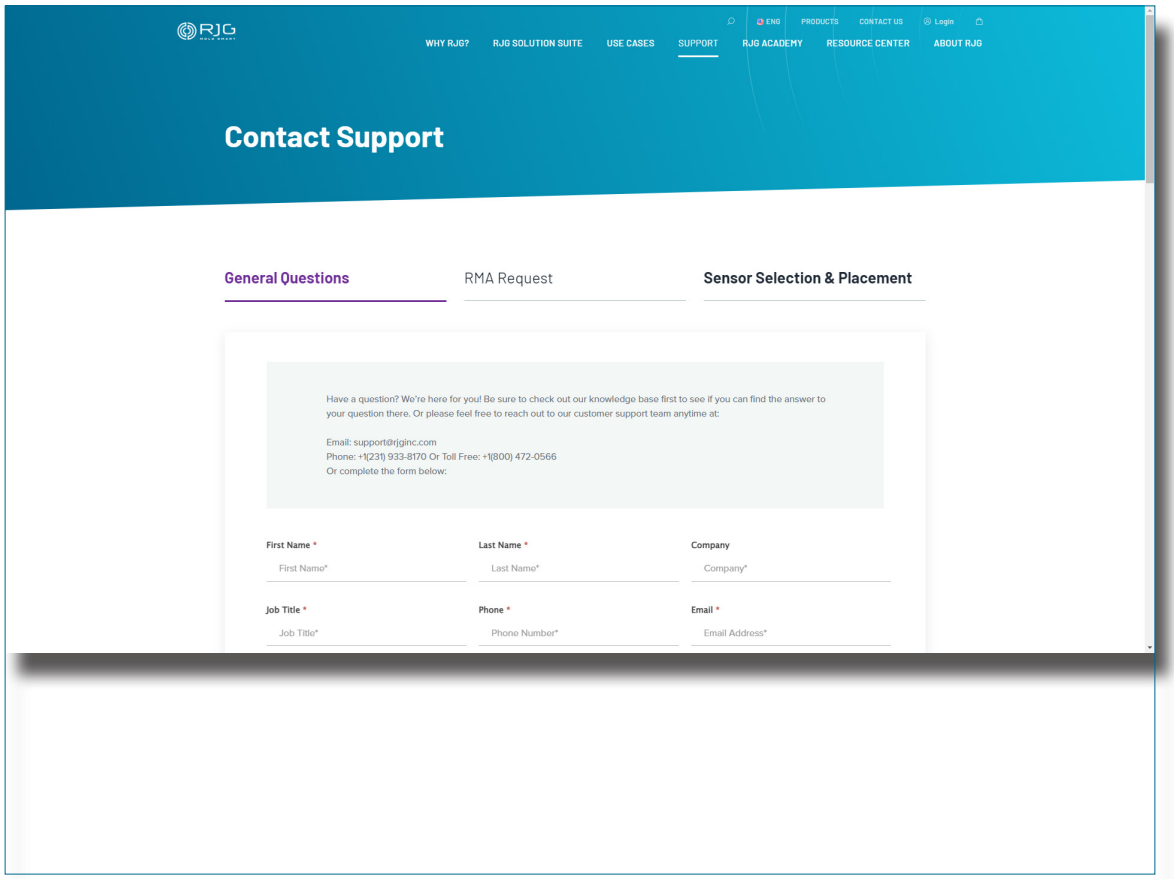
P: +1.231.933.8170

email: CustomerSupportGroup@rjginc.com

www.rjginc.com/support



NOTES

RELATED PRODUCTS

The PZ/LX1-S is compatible with other RJG, Inc. products for use with the eDART or CoPilots process control and monitoring systems.

COMPATIBLE PRODUCTS

LYNX PREMIUM CABLES CE-LX5-W

The Lynx premium sensor cable (1 at right) is a polypropylene-coated cable suited for the heat and stress found in injection molding environments. The cable is available in lengths from 11.8– 472.4” (0,3–12 m), and can be ordered with straight or 90° fittings. One CE-LX5-W is required to interface the PZ/LX1-S with the eDART or CoPilot system.

PIEZOELECTRIC SENSOR ADAPTER CABLE 1661

The piezoelectric sensor adapter cable 1661 (2 at right) is a low noise, Teflon®-coated PTFE/PFA coaxial cable with metal sheathing suited for the heat and stress found in injection molding environments. The cable is available in 0,5, 2,0, and 5,0 m (1.6, 6.5, and 16.4 ft). One 1661 is required to interface the PZ/LX1-S with the single-channel piezoelectric sensor cable1645.

SINGLE-CHANNEL PIEZOELECTRIC SENSOR CABLE 1645

The single-channel piezoelectric sensor cable 1645 (3 at right) is a PTFE/FEP coaxial cable suited for the injection molding environment. The cable is available in several lengths from 0.2–2.0 m (7.9–78.7”). One 1645 is required to interface piezoelectric sensor with the 1661 and PZ/LX1-S.

SIMILAR PRODUCTS

RJG, Inc. offers a wide array of piezoelectric cavity pressure sensors and adapters for each application—mold mount, surface mount, single-channel, and multi-channel.

LYNX SINGLE-CHANNEL PIEZOELECTRIC MOLD MOUNT SENSOR ADAPTER LP/LX1-M

The Lynx Single-Channel Mold Mount Sensor Adapter LP/LX1-M (4 at right) accepts connection from a single piezoelectric sensor and the 1645 cable to interface them with a single CE-LX5-W cable and the eDART or CoPilot system.

PIEZOELECTRIC FOUR-CHANNEL PZ-4 & PZ/LX4F-S

The Four Channel Piezoelectric Connector PZ-4 and Four Channel Piezoelectric Adapter PZ/LX4F-S (5 at right) interface up to four piezoelectric sensors to the eDART or CoPilot system with a single connection.

PIEZOELECTRIC EIGHT-CHANNEL PZ-8 & PZ/LX8F-S

The Eight Channel Piezoelectric Connector PZ-8 and Eight Channel Piezoelectric Adapter PZ/LX4F-S (4 at right) interface up to eight piezoelectric sensors to the eDART system with a single connection.

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