

# PRODUCT MANUAL

## LYNX™ FOUR-CHANNEL PIEZOELECTRIC SENSOR ADAPTER WITH MOLD ID PZ/LX4F-S-ID





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### PZ/LX4F-S-ID

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### PZ/LX4F-S-ID

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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

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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.*

### ABBREVIATIONS

DIA	diameter
MIN	minimum
MAX	maximum
R.	radius



## PRODUCT DESCRIPTION

The four-channel piezoelectric sensor adapter with mold ID is an adapter that interfaces the RJG, Inc. four-channel piezoelectric sensor connector PZ-4 and up to four piezoelectric sensors to the eDART® or CoPilot® systems.

## APPLICATIONS

### MULTI-CHANNEL PIEZOELECTRIC SENSOR SYSTEM

The Lynx™ multi-channel piezoelectric systems provide quick, convenient connection between multiple sensors in a mold to a single sensor adapter and the eDART or CoPilot system outside of the mold, saving real estate and minimizing cabling.

## OPERATION

### PIEZOELECTRIC SENSORS

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

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



## DIMENSIONS



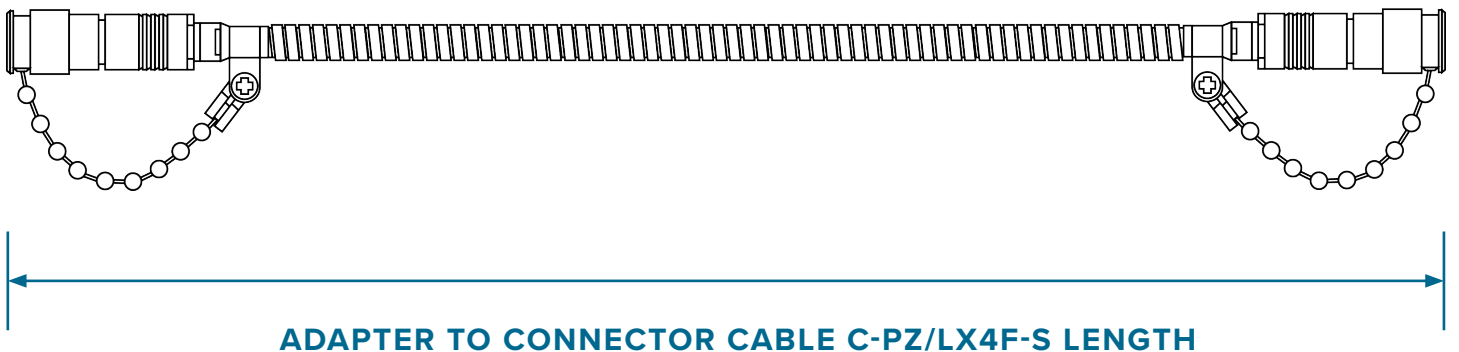
## CABLE LENGTHS

Lengths must be longer than needed to facilitate safe installation and removal of connector from tool to prevent tension on the lead wire; generally, 2–3” (50–75 mm) of slack is sufficient. Use good sense to determine the appropriate cable length required for each application.

### CABLE LENGTH

### PART NO.

CABLE LENGTH		PART NO.
19.7”	0.5 m	C-PZ/LX4F-S-.5M
39.4”	1.0 m	C-PZ/LX4F-S-1M
78.7”	2.0 m	C-PZ/LX4F-S-2M

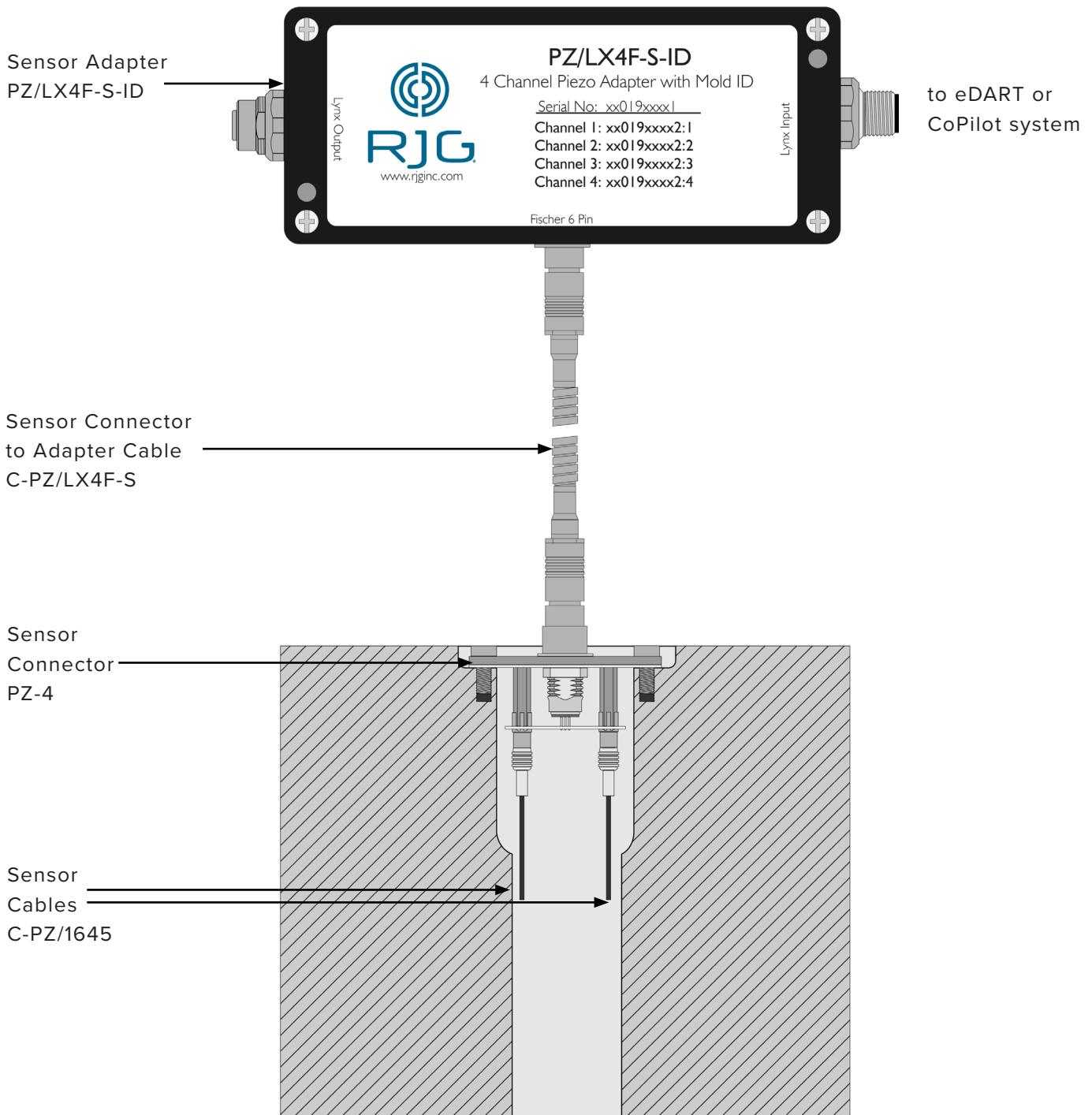




## INSTALLATION

The PZ/LX4F-S-ID is mounted on a frame-grounded structure or control panel using the supplied 8-32 x 2.5" socket head cap screws (SHCS). The four-channel piezoelectric sensor adapter-to-connector cable C-PZ/LX4F-S is installed on the PZ/LX4F-S-ID Fisher six-pin connector and the four-channel piezoelectric sensor

connector PZ-4, which is mounted on the mold. Inside the mold, up to four piezoelectric sensors are connected to the PZ-4 using C-PZ/1645 multi-channel piezoelectric sensor cables. The PZ/LX4F-S-ID is connected to the eDART system by a Lynx cable CE-LX5.



## INSTALLATION SPECIFICATIONS

### 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 the same as the ground required for the eDART.

**⚡ CAUTION** *Must be mounted on a frame-grounded structure or control panel; ground potential is equal to that used by the eDART—adapter and cables are free from contact with static sources such as feeder tubes and material hoppers.*

#### 2. Mounting

Mount the PZ/LX4F-S-ID to a frame-grounded structure or control panel using the supplied 8-32 x 2.5" SHCS.

### CONNECTIONS

#### 1. Piezoelectric Sensor Adapter Cable C-PZ/LX4F-S

Attach the C-PZ/LX4F-S cable to the six-pin connector of the PZ/LX4F-S-ID; attach the other end of the C-PZ/LX4F-S to the PZ-4.

#### 2. Lynx Cable CE-LX5

Attach the female end of a Lynx cable CE-LX5 to the Lynx Output connector; attach the male end of the cable to the eDART or desired Lynx junction.

## INSTALLATION SPECIFICATIONS (continued)

### SOFTWARE SETUP

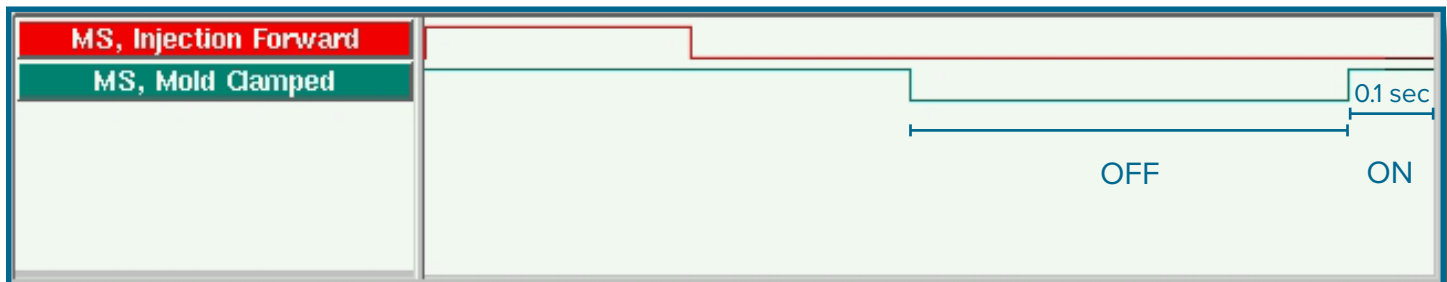
#### 3. Requirements

The PZ/LX4F-S-ID requires a signal from either a Lynx Sequence Input Module (ID7-D-SEQ or ID7-M-SEQ), Lynx Proximity Switch L-PX, or Lynx Limit Switch L-LS in order to properly “zero” the connected piezoelectric sensors.

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

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

Hardware	Signal	Change
ID7-D-SEQ Input	Mold Opening	On→Off
	Mold Closing	On→Off
	Mold Fully-Open	On→Off
	Mold Clamped	Off→On
	Injection Forward	Off→On
L-PX Input	Mold Fully-Open	On→Off
	Mold Clamped	Off→On
L-LS Input	Mold Fully-Open	On→Off
	Mold Clamped	Off→On



## INSTALLATION SPECIFICATIONS (continued)

### 4. Software Setup Version 9.4.3 or Higher

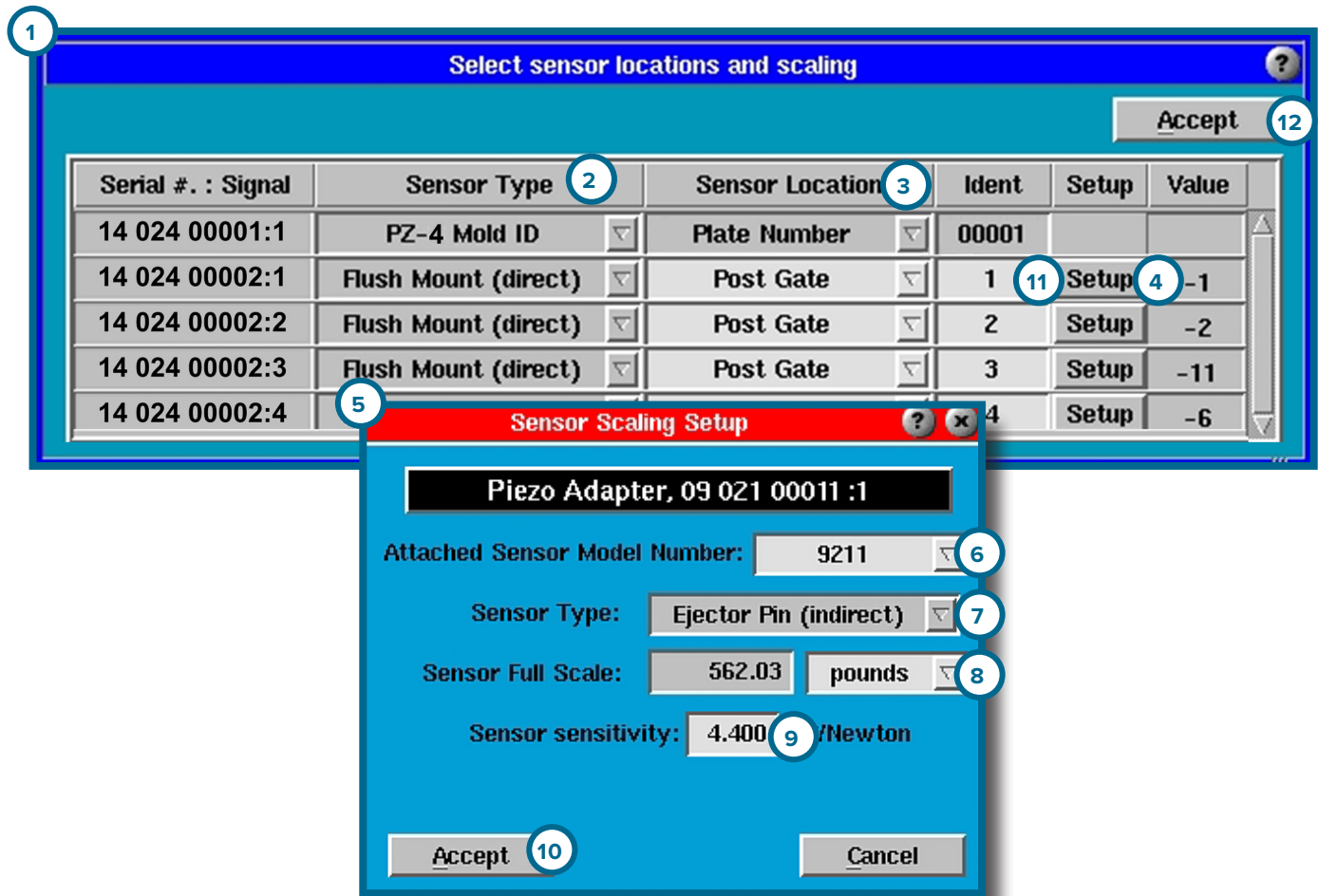
The PZ/LX4F-S-ID will appear in the in the Sensor Locations and Scaling **1** tool for initial setup in the eDART version 9 software.

- The Sensor Type **2** and Location **3** next to the PZ/LX4F-S-ID serial number will automatically populate.
- Select the Setup button **4** next to the Identification column.

The Sensor Scaling Setup window **5** will appear. Fill in the window to complete the setup.

- Select the Sensor Model Number **6** from the drop-down menu.

- The Sensor Type **7** and Sensor Full Scale **8** will automatically populate.
- A default sensitivity is automatically populated at setup; Enter the Sensor Sensitivity **9** listed on the sensor's calibration certificate.
- Select the Accept **10** button to save settings.
- If desired, enter the cavity number of the associated sensor in the Identification **11** column.
- Select the Accept **12** button to save settings.



## INSTALLATION SPECIFICATIONS (continued)

### 5. Software Setup Version 10.8 or higher

The PZ/LX4F-S-ID and associated sensors are set up during the Mold Setup/Inputs **1** in the eDART version 10 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 **i** to open the Mold Sensor Configuration window **4**.

The Mold Sensor Configuration window **4** will appear. Fill in the window to complete the setup.

- Select the sensor Model **5** number from the drop-down menu; the Sensor Full Scale **6** will automatically populate.

- A default sensitivity is automatically populated at setup; enter the Sensor Sensitivity **7** listed on the sensor's calibration certificate.
- Select Done **8** to save settings.

The screenshot displays the 'Mold Setup Step 2 of 5' interface. The 'INPUTS' tab is active, showing 'Mold Sensor Setup' with the instruction 'Assign Sensors to their Location'. On the left, the 'Available Sensors' list contains one sensor: SN: 1402600 706:2, PZ/LX4F-S. On the right, a 'Mold' configuration window for 'Mold 5' is shown, with three cavity locations: 'End of Cavity', 'Mid Cavity', and 'Post Gate'. The 'End of Cavity' location is selected, and an information icon (i) is visible next to it. A 'Mold Sensor Config' dialog box is overlaid on top, containing the following fields: 'Model #' (6157B), 'Sensor Full Scale' (2000.000 bar), and 'Sensor Sensitivity' (9.4000 C/bar). A checkbox for 'Use this value as default' is present. The dialog has 'CANCEL' and 'DONE' buttons. The main interface has 'BACK', 'UNDO', 'CANCEL', and 'NEXT' buttons at the bottom.



### 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 “Sensor Locations” screen. Drift of  $\pm 20$  pC in sixty seconds indicates abnormal drift. The cause of “Drift” is dirty/contaminated connections. This could be the connection at the sensor C-PZ/1645 cable, C-PZ/1645-to-PZ-4 connection, PZ-4-to-C-PZ/LX4F-S cable, or PZ/LX4F-S-ID-to-CE-LX5 connection.

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, 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; bake the plate/adaptor at 140 °F (60 °C).

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

## TESTING & CALIBRATION

The Lynx Four-Channel Piezoelectric Sensor Adapter PZ/LX4F-S-ID 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/LX4F-S-ID, 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

#### 1. Slow sensor drift reading.

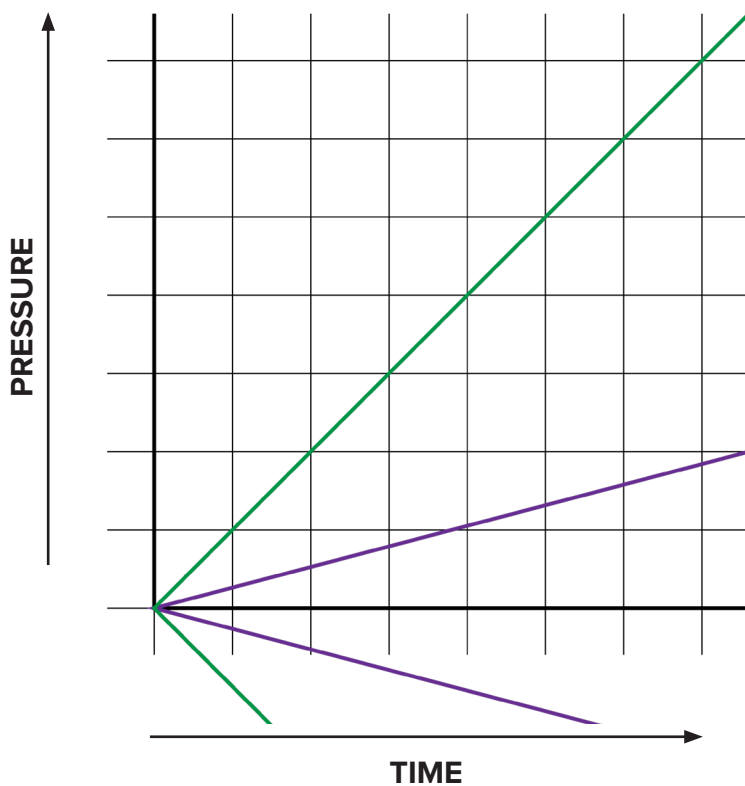
A sensor reading that slowly rises or falls (positive or negative) from the set zero value.

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

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

#### 3. No sensor to CoPilot/eDART system communication.

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



Piezoelectric Sensor Drift Type Graph



Fast Drift/Invalid



Slow Drift

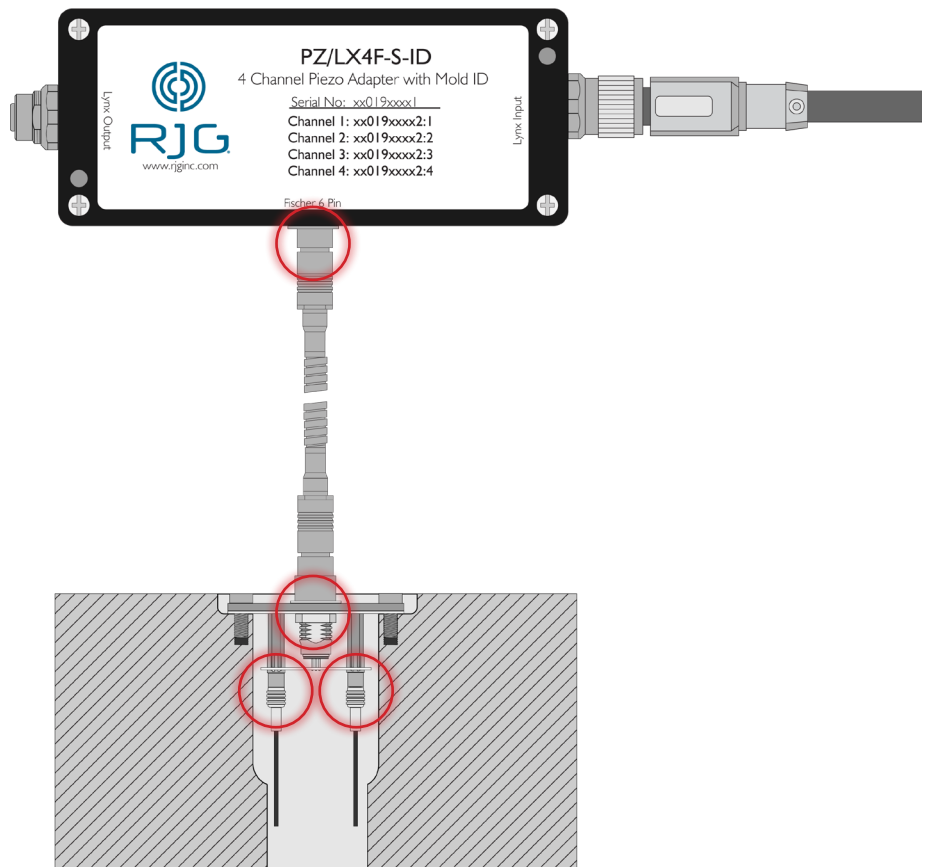
## COMMON ERRORS (continued)

### 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:

1. Disconnect sensor from C-PZ/1645 cable and clean ends; if reading continues to drift, continue to next step.
2. Disconnect the C-PZ/1645 from the PZ-4 and clean ends; if the reading continues to drift, continue to next step.
3. Disconnect the C-PZ/LX4F-S cable from the PZ-4 and clean end and connector; if the reading continues to drift, continue to next step.
4. Disconnect the C-PZ/LX4F-S cable from the PZ/LX4F-S-ID and clean end and connector; if the reading continues to drift, continue to next step.

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



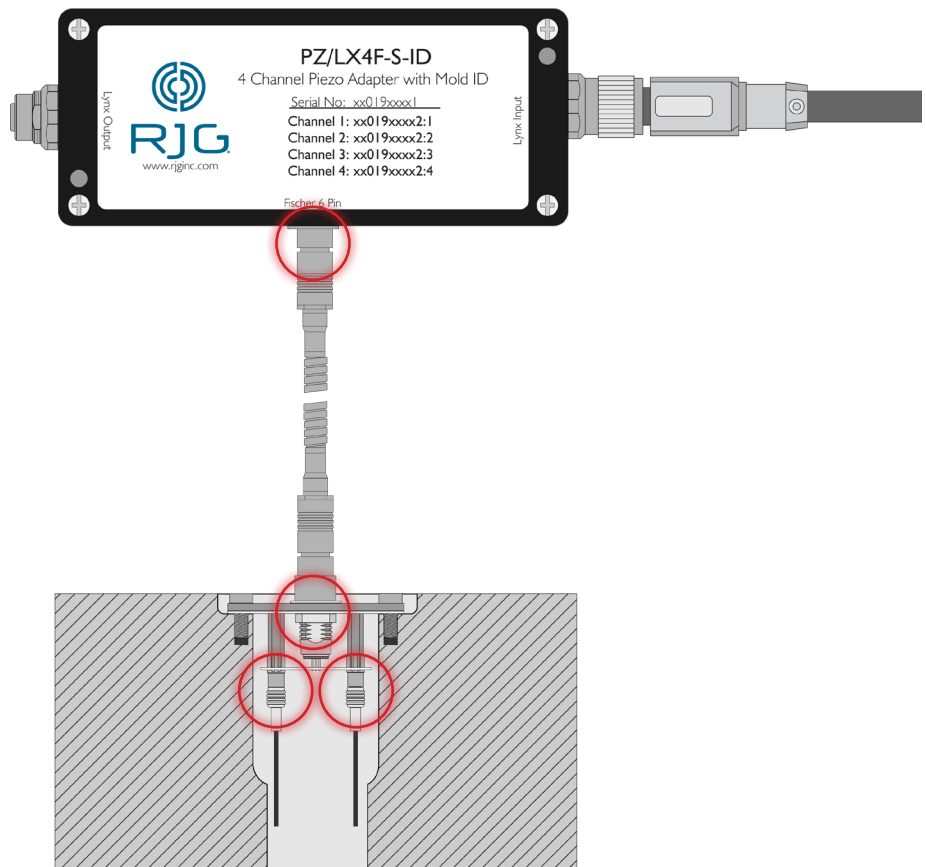
## COMMON ERRORS (continued)

### 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:

1. Disconnect sensor from C-PZ/1645 cable and clean ends; if reading continues to drift, continue to next step.
2. Disconnect the C-PZ/1645 from the PZ-4 and clean ends; if the reading continues to drift, continue to next step.
3. Disconnect the C-PZ/LX4F-S cable from the PZ-4 and clean end and connector; if the reading continues to drift, continue to next step.
4. Disconnect the C-PZ/LX4F-S cable from the PZ/LX4F-S-ID and clean end and connector; if the reading continues to drift, continue to next step.

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



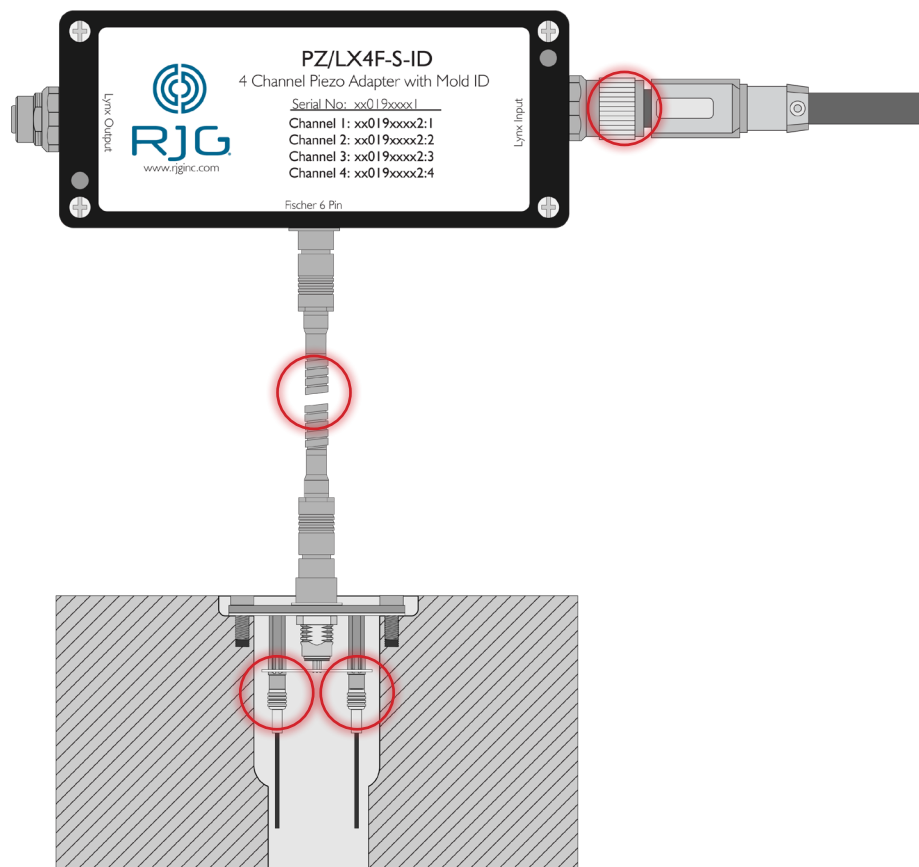
## COMMON ERRORS (continued)

### 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;

1. Replace the C-PZ/1645 sensor cable with working cable; test sensor operation. If communication remains non-existent, continue to next step.
2. Replace the C-PZ/LX4F-S sensor adapter cable with working cable; test sensor operation. If communication remains non-existent, continue to next step.
3. Replace the CE-LX5 Lynx cable with working cable; test the sensor operation.

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



## 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

email: [Support@rjginc.com](mailto:Support@rjginc.com)

[www.rjginc.com/support](http://www.rjginc.com/support)

**Contact Support**

**General Questions** | RMA Request | Sensor Selection & Placement

Have a question? We're here for you! Be sure to check out our knowledge base first to see if you can find the answer to your question there. Or please feel free to reach out to our customer support team anytime at:

Email: [support@rjginc.com](mailto:support@rjginc.com)  
Phone: +1(231) 933-8170 Or Toll Free: +1(800) 472-0566  
Or complete the form below:

<b>First Name *</b> First Name*	<b>Last Name *</b> Last Name*	<b>Company</b> Company*
<b>Job Title *</b> Job Title*	<b>Phone *</b> Phone Number*	<b>Email *</b> Email Address*



## RELATED PRODUCTS

The PZ/LX4F-S-ID is compatible with other RJG, Inc. products for use with the eDART process control and monitoring system.

## COMPATIBLE PRODUCTS

### LYNX CABLES CE-LX5

The Lynx 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 is required to interface the PZ/LX4F-S-ID with the eDART system.

### LYNX FOUR-CHANNEL PIEZOELECTRIC SENSOR ADAPTER CABLE C-PZ/LX4F-S-ID

The Lynx Four-Channel Piezoelectric Sensor Adapter Cable (2 at right) is a PTFE/PFA coaxial cable with metal sheathing suited for the heat and stress found in injection molding environments. A single C-PZ/LX4F-S is required to interface the PZ/LX4F-S-ID to the PZ-4 and up to four sensors.

### FOUR-CHANNEL PIEZOELECTRIC SENSOR CONNECTOR PZ-4

The Four-Channel Piezoelectric Sensor Connector with Mold ID (3 at right) is a connector that interfaces up to four piezoelectric sensors with the PZ/LX4F-S-ID with a single connection outside of the mold.

### FOUR/EIGHT-CHANNEL PIEZOELECTRIC SENSOR CONNECTOR CABLE C-PZ/1645

The Four/Eight-Channel Piezoelectric Sensor Connector Cable (4 at right) is a PTFE/FEP coaxial cable suited for the heat and stress found in injection molding environments that provides a quick, direct connection from the PZ-4/8 to in-mold cavity pressure sensors.



## 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 PIEZOELECTRIC MOLD-MOUNT SENSOR ADAPTER LP/LX1-M

The Lynx Mold-Mount Piezoelectric Sensor Adapter LP/LX1-M (1 at right) accepts input from a single piezoelectric sensor and 1645 cable to interface with a single CE-LX5 cable and the eDART system.



### LYNX SURFACE-MOUNT PIEZOELECTRIC SENSOR ADAPTER PZ/LX1F-S

The Lynx Surface-Mount Piezoelectric Adapter PZ/LX1-S (2 at right) accepts input from a single piezoelectric sensor and 1645 cable to interface with a single CE-LX5 Lynx cable and the eDART system.



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

The Eight-Channel Piezoelectric Connector PZ-8 and Eight-Channel Piezoelectric Adapter PZ/LX8F-S-ID (3 at right) interface up to eight piezoelectric sensors to the eDART system with a single connection.







## LOCATIONS / OFFICES

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