

PRODUCT MANUAL

LYNX™ MOLD-MOUNT PIEZOELECTRIC SENSOR ADAPTER LP/LX1-M



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LYNX™ MOLD-MOUNT PIEZOELECTRIC SENSOR ADAPTER

LP/LX1-M

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LP/LX1-M

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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 Lynx™ mold-mount piezoelectric sensor adapter LP/LX1-M provides cavity pressure sensor users with a convenient, simple interface between a single piezoelectric sensor and the RJG, Inc. eDART® or CoPilot® system.

APPLICATIONS

CAVITY PRESSURE MONITORING

The LP/LX1-M accepts and automatically scales the input of any single piezoelectric cavity pressure sensor for use with the RJG, Inc. eDART or CoPilot system.

OPERATION

SENSOR ADAPTERS

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

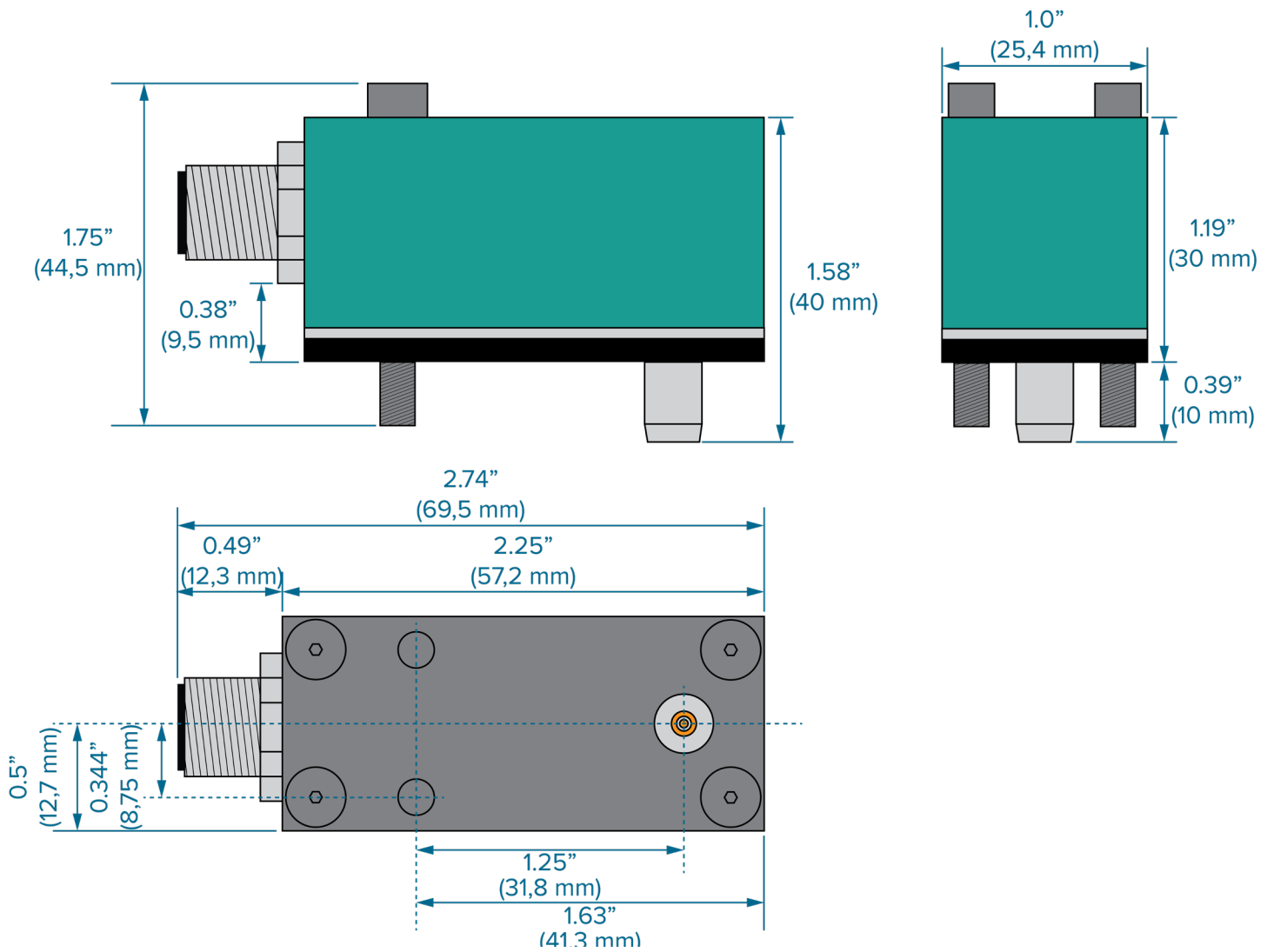


PIEZOELECTRIC SENSORS

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 the sensor adapter mounted outside of the mold.

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

DIMENSIONS

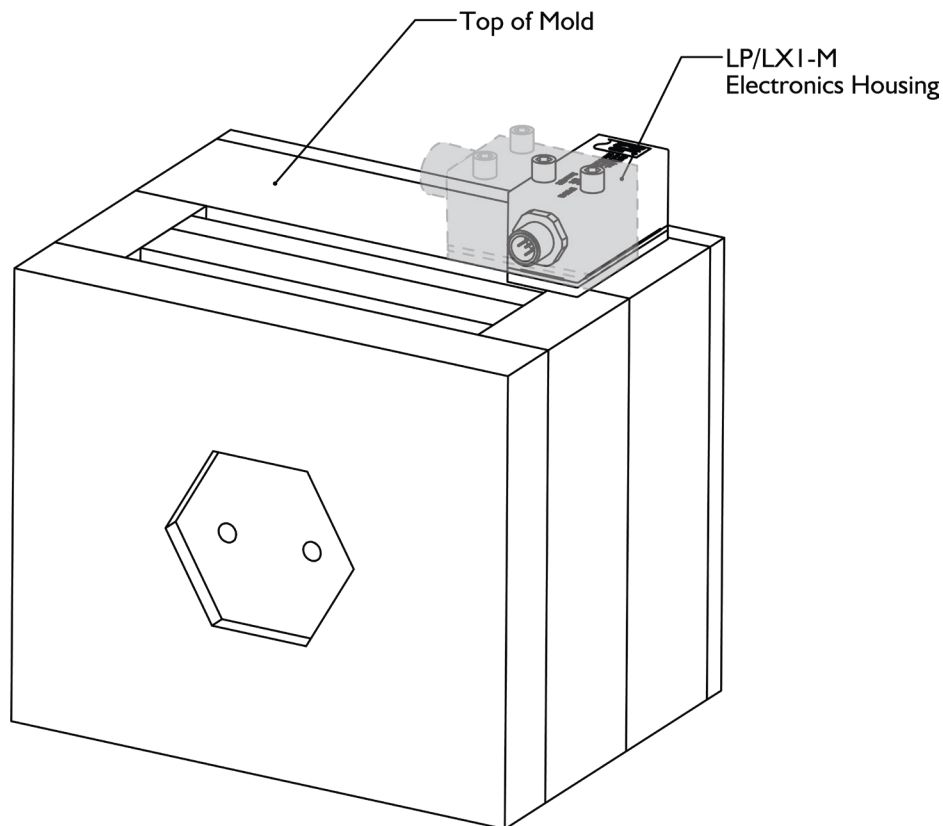


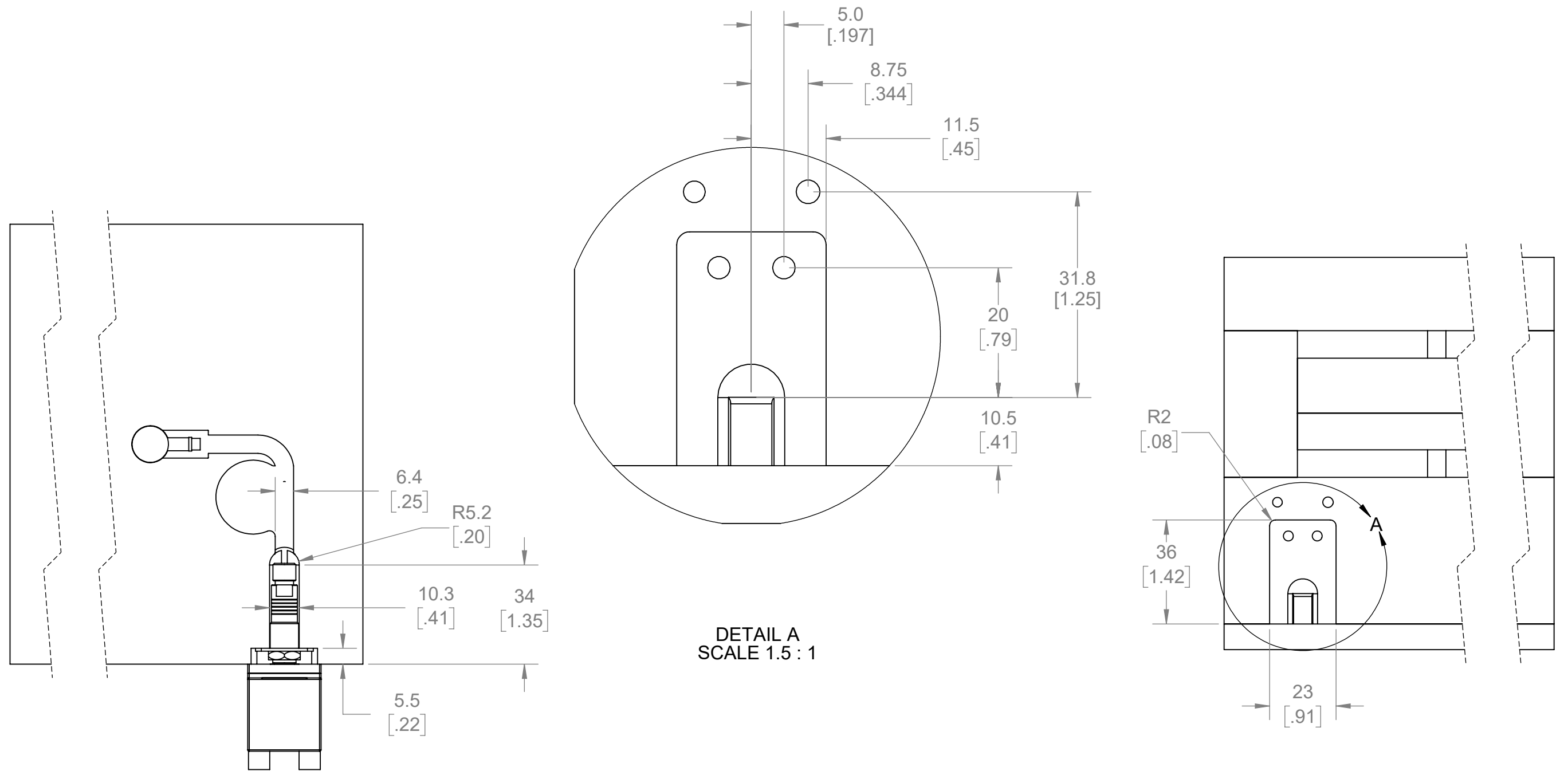
INSTALLATION

INSTALLATION OVERVIEW

The Lynx mold-mount piezoelectric sensor adapter LP/LX1-M is mounted on the mold clamp plate. A piezoelectric cavity pressure sensor in the mold is attached to a single-channel piezoelectric sensor cable 1645, which is then connected to the LP/LX1-M. The LP/LX1-M 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 mold, though RJG recommends that sensors are installed using the transfer pin method; 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 cables. Cable lengths vary based on items purchased.





INSTALLATION SPECIFICATIONS (continued)

MOUNTING

1. Requirements

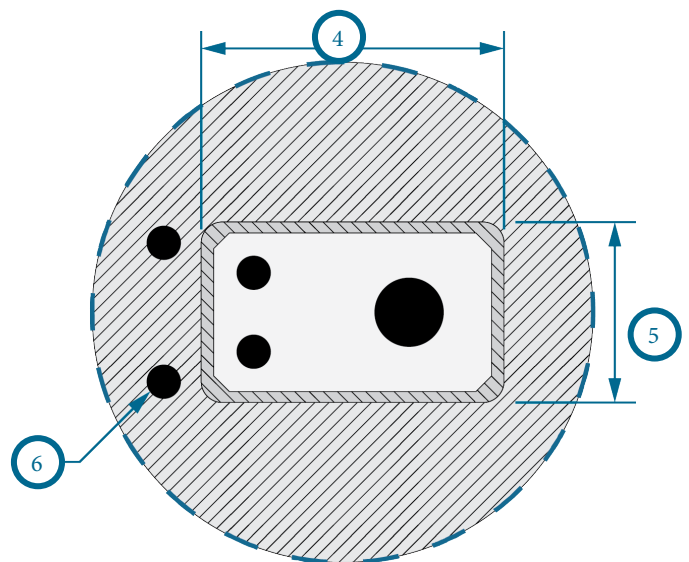
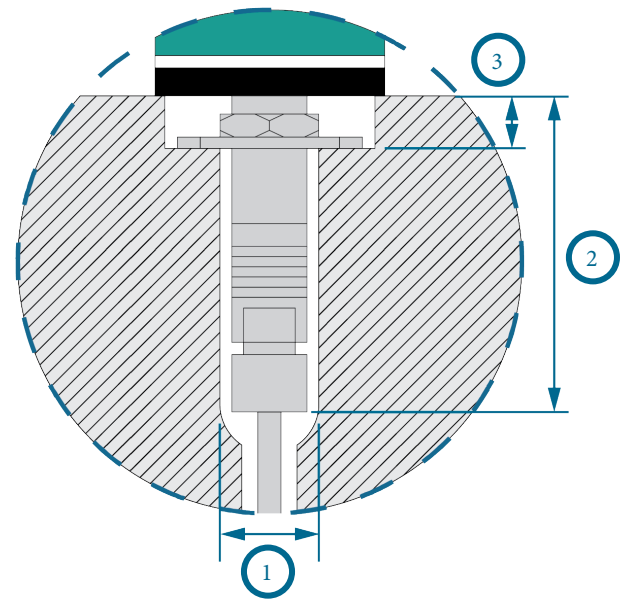
The Lynx piezoelectric sensor adapter must be mounted on a frame-grounded structure to ensure proper operation. The ground potential of the structure must be the same as the ground required for the eDART system.

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. Cable Connector Pocket

The LP/LX1-M connects to the piezoelectric cavity pressure sensor inside the mold via the sensor connector cable 1645. The 1645 cable is fastened in place by a mounting plate placed underneath the LP/LX1-M.

- Machine a 0.41" (10,3 mm) DIA pocket 1.35" (34 mm) deep for the sensor connector 1645 cable into the mold, concentric with the sensor cable channel (1 & 2 at right).
- Machine a pocket in the mold side for the sensor connector cable fastening plate 0.22" (5,5 mm) deep by 1.42" (36 mm) long by 0.91" (23 mm) wide, so that the 1645 cable end can be affixed to the fastening plate's provided opening (3-5 at right).
- Drill and tap in four places for 8-32 x 0.375" socket head cap screws; two screws affix the fastening plate to the mold steel, and two screws affix the LP/LX1-M to the mold steel above the fastening plate (6 at right).



1 Ø 0.41" (10,3 mm)

2 1.35" (34 mm)

3 0.22" (5,5 mm)

4 1.42" (36 mm)

5 0.91" (23 mm)

6 8-32 x 0.375"

INSTALLATION SPECIFICATIONS *(continued)*

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.

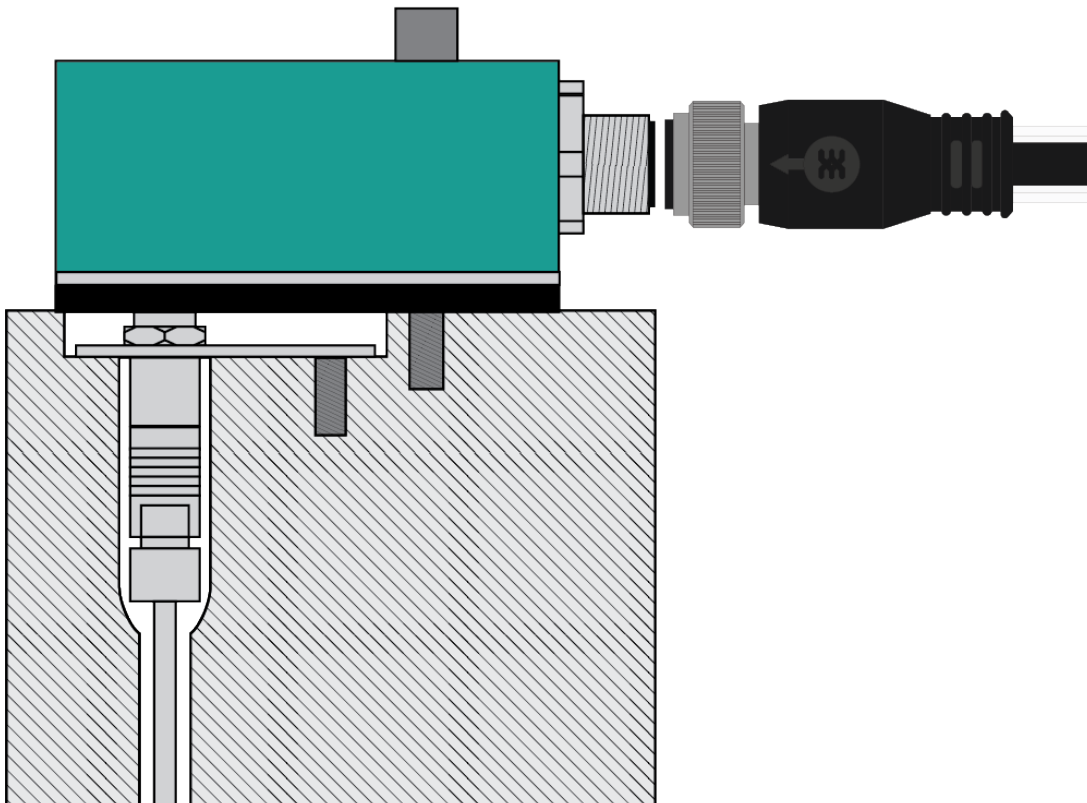
CAUTION *Disconnect and lockout the main power sources before making electrical connections. Electrical connections must only be made by qualified personnel.*

2. Piezoelectric Sensor Cable 1645

Install the 1645 Fischer connector cable end on the LP/LX1-M to join the sensor and the sensor adapter.

3. Lynx Premium Cable CE-LX5-W

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



INSTALLATION SPECIFICATIONS (continued)

SOFTWARE SETUP

1. Software Setup Version 9.xx

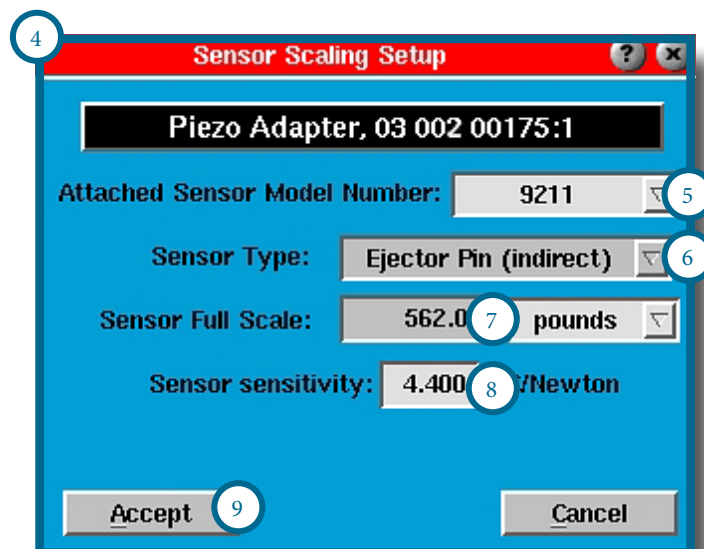
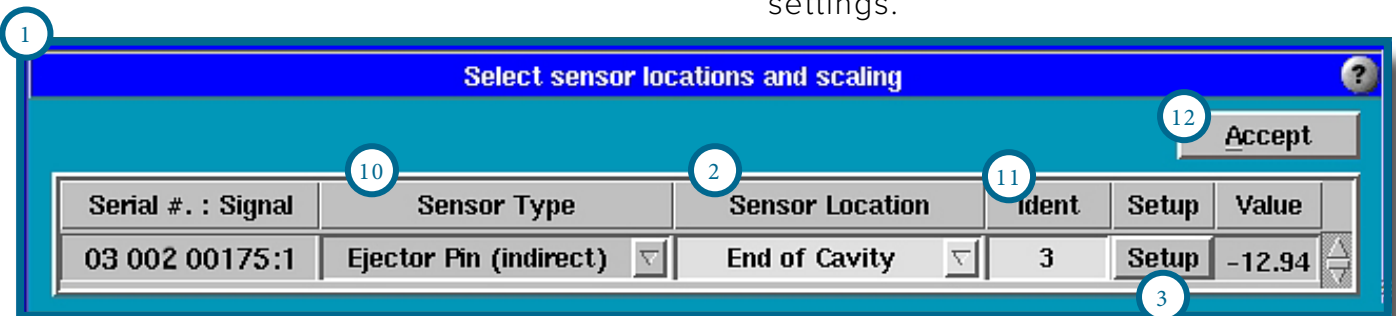
The LP/LX1-M will appear in the in the Sensor Locations **1** tool for initial setup in the eDART version 9.xx software.

- Select the Sensor Location **2** from the drop-down menu next to the Sensor Type drop-down menu, OR Select the Setup button **3** next to the Identification column.

The Sensor Scaling Setup window **4** will appear. Fill in the window to complete the LP/LX1-M setup.

- Select the Sensor Model Number **5** from the drop-down menu.
- The Sensor Type **6** will automatically populate.

- The Sensor Full Scale **7** and the unit of measurement will automatically populate.
- A default sensitivity is automatically populated at setup; If desired, enter the Sensor Sensitivity **8** listed on the sensor's calibration certificate.
- Select the Accept **9** button to save settings.
- The Sensor Type **10** will automatically populate next to the LP/LX1-M serial number.
- Enter the cavity number **11** of associated sensor in the Identification column.
- Select the Accept **12** button to save settings.



INSTALLATION SPECIFICATIONS (continued)

2. Software Setup Version 10.xx

The LP/LX1-M 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 **i** to open the Mold Sensor Configuration window **4**.

The Mold Sensor Configuration window **4** will appear. Fill in the window to complete the LP/LX1-M 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 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'. The 'Available Sensors' list (labeled **2**) includes a sensor with SN: 1300200 060:1 and model 9211. The 'Mold' configuration window (labeled **3**) shows 'End of Cavity' selected for the sensor. The 'Mold Sensor Config' window (labeled **4**) is open, showing the following settings: Model #: 9211 (labeled **5**), Sensor Full Scale: 2000.000 (labeled **6**) bar, and Sensor Sensitivity: 9.4000 (labeled **7**) C/bar. A 'Use this value as default' checkbox is present. The 'DONE' button (labeled **8**) is highlighted in green. The bottom navigation bar includes 'BACK', 'UNDO', 'CANCEL', and 'NEXT' buttons.

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, connectors, and cables must be installed in areas 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 ± 20 pC in sixty seconds indicates abnormal drift. The cause of “drift” is dirty/contaminated connections—this could be any of the connections from the sensor to the eDART.

Properly clean all connections points with a recommended, electronics-grade 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 a recommended, 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 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 LP/LX1-M 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 LP/LX1-M, and so are offering a one-year warranty. RJG's Mold 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.

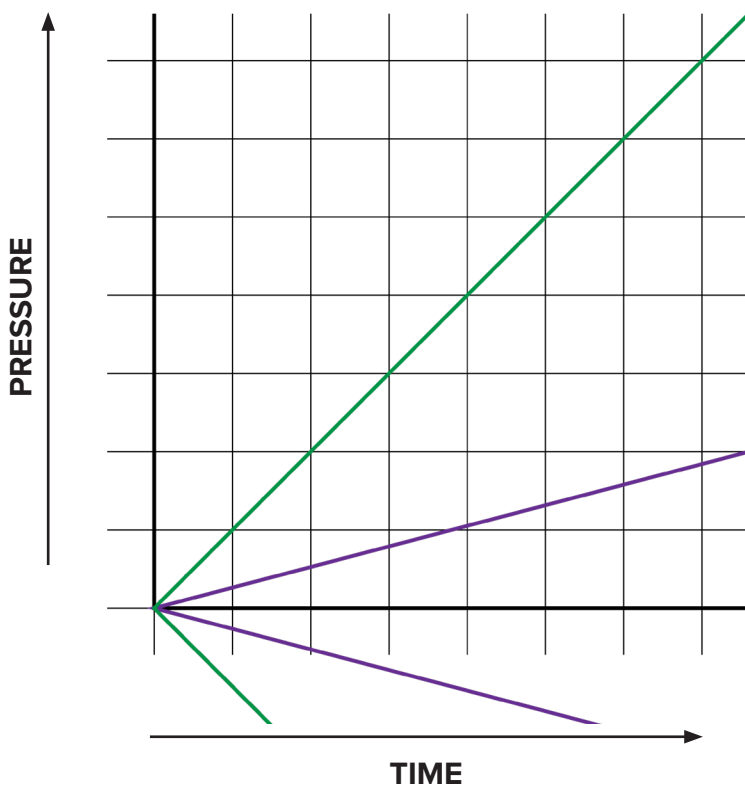
A sensor reading that slowly rises or falls (positive or negative) from the set zero value.

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 eDART/CoPilot system communication.

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



Piezoelectric Sensor Drift Type Graph

	Fast Drift/Invalid
	Slow Drift

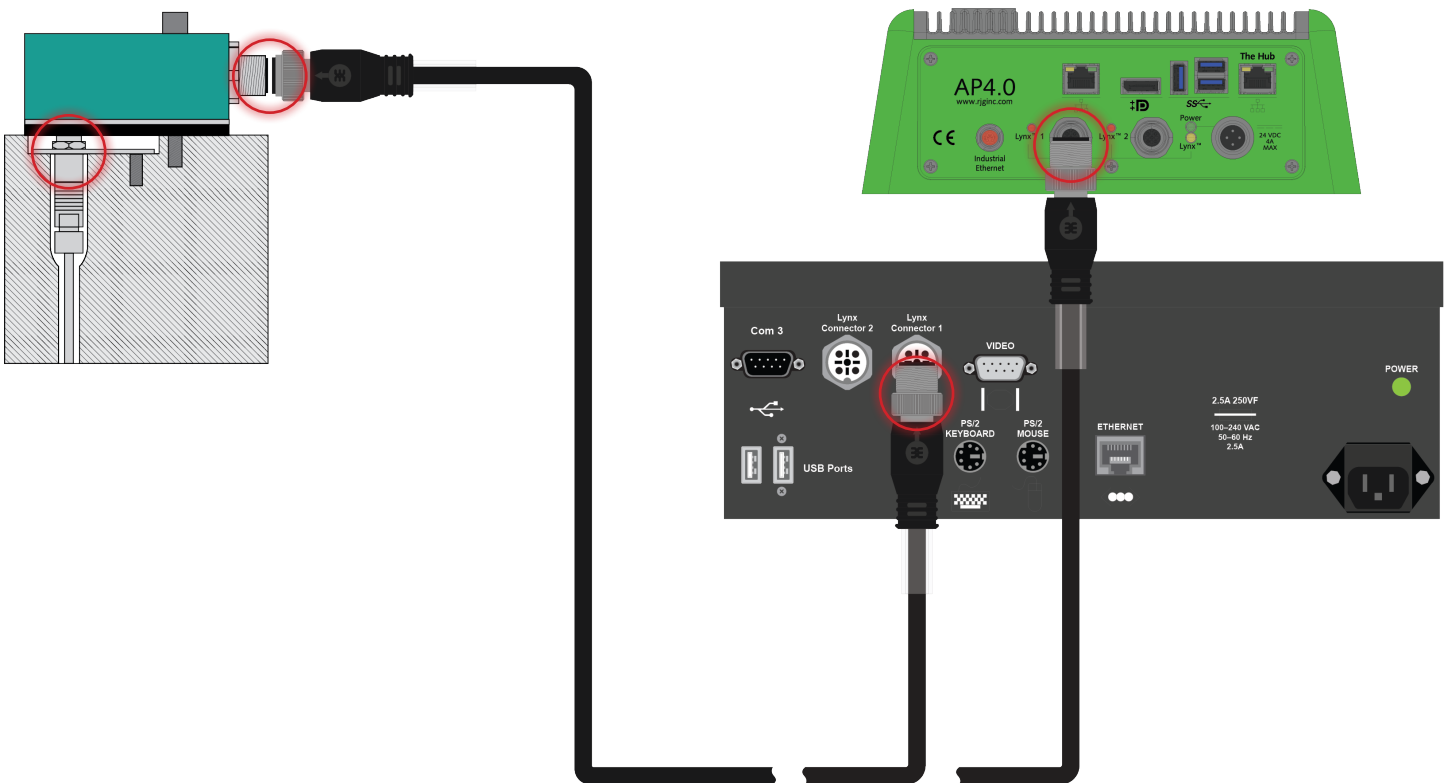
COMMON ERRORS *(continued)*

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 the CE-LX5-W cable from the eDART and clean connector; if reading continues to drift, continue to next step.
2. Disconnect the CE-LX5-W cable from the LP/LX1-M and clean end and connector; if the reading continues to drift, continue to next step.
3. Disconnect the 1645 from the LP/LX1-M and clean ends; if the reading continues to drift, continue to next step.
4. 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.



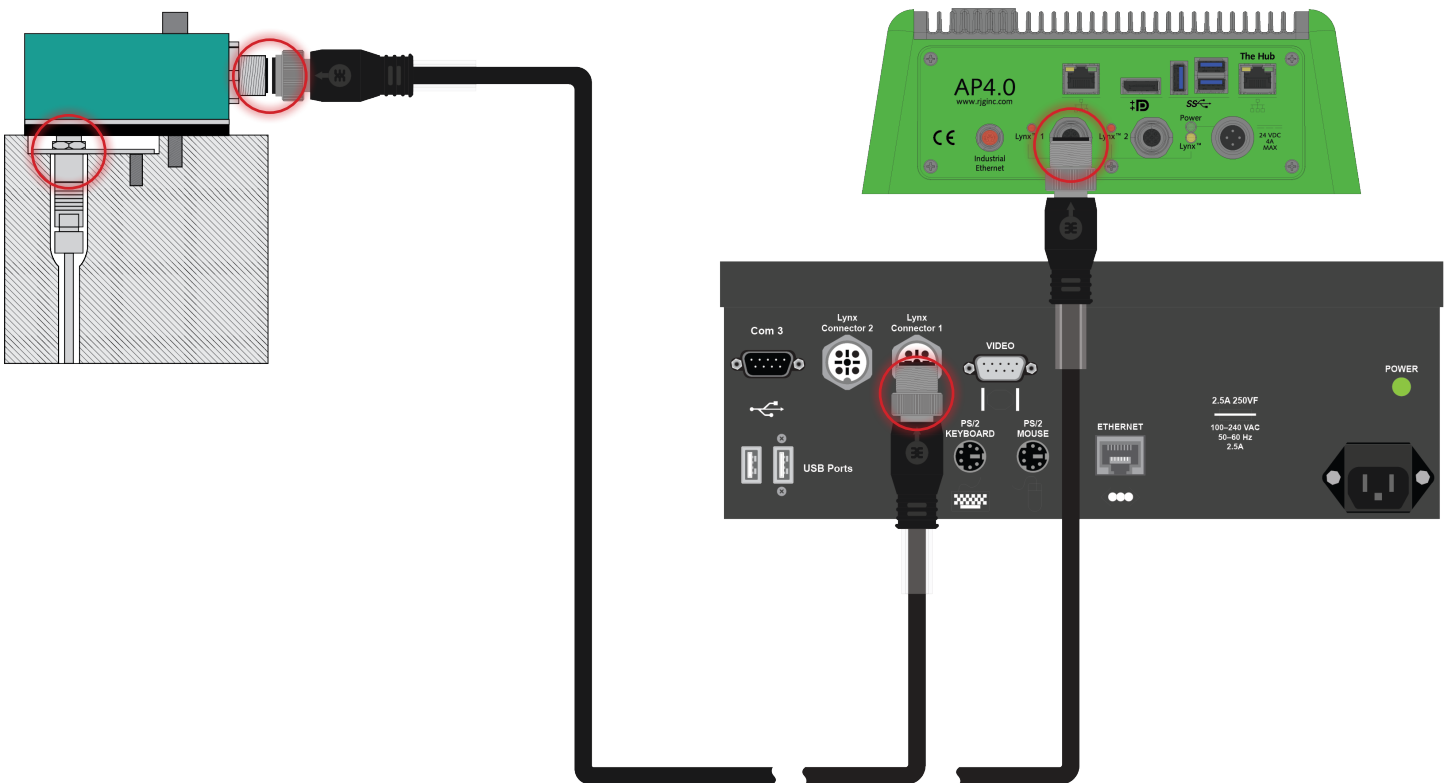
COMMON ERRORS *(continued)*

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 the CE-LX5-W cable from the eDART and clean connector; if reading continues to drift, continue to next step.
2. Disconnect the CE-LX5-W cable from the LP/LX1-M and clean end and connector; if the reading continues to drift, continue to next step.
3. Disconnect the 1645 from the LP/LX1-M and clean ends; if the reading continues to drift, continue to next step.
4. 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.



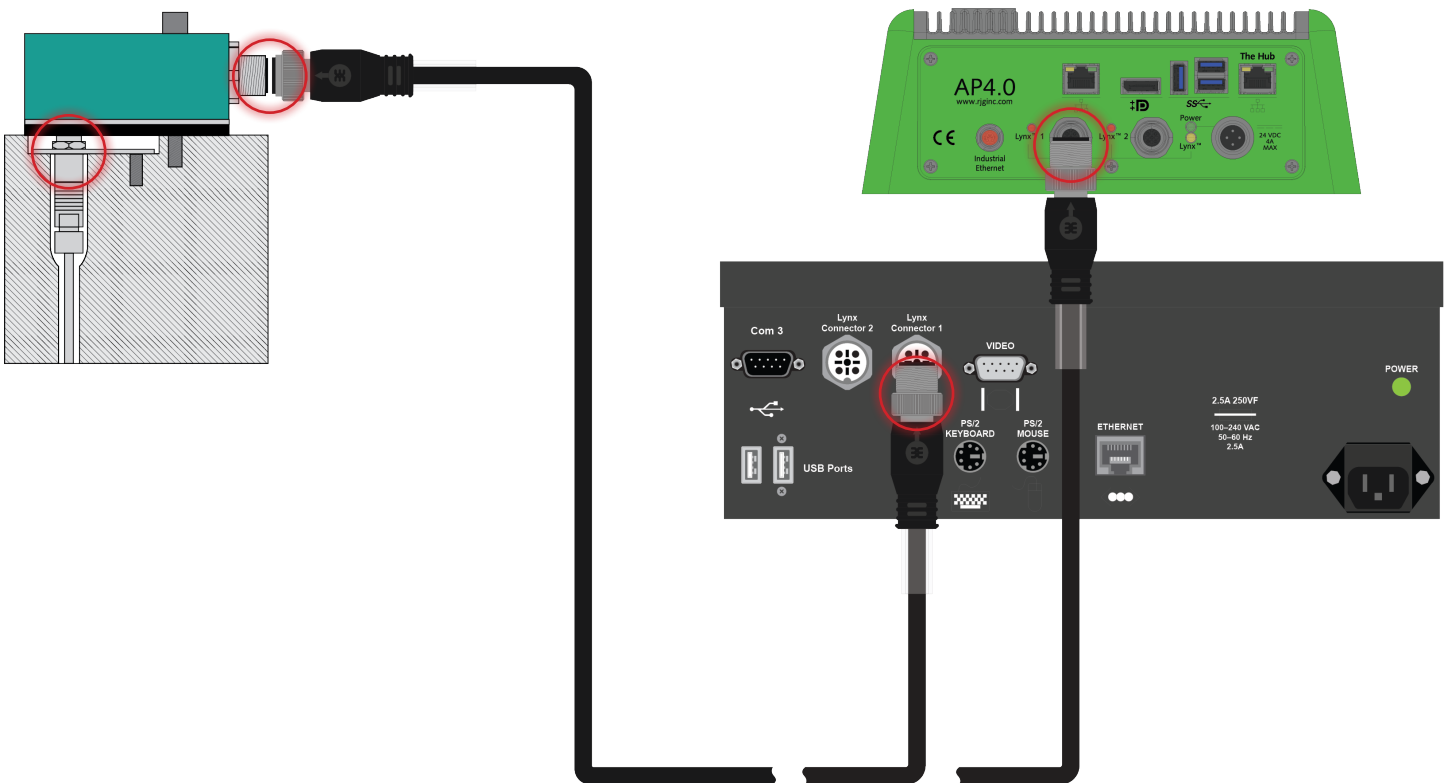
COMMON ERRORS *(continued)*

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 CE-LX5-W Lynx premium cable with working cable; test the sensor operation. If communication remains non-existent, continue to next step.
2. Replace the 1645 sensor cable with working cable; test sensor operation. If communication remains non-existent, continue to next step.

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: CustomerSupportGroup@rjginc.com

www.rjginc.com/support

RELATED PRODUCTS

The LP/LX1-M is compatible with other RJG, Inc. products for use with the eDART process control and monitoring system.

COMPATIBLE PRODUCTS

LYNX PREMIUM CABLES CE-LX5-W

The Lynx premium sensor cable (1 at right) is a polyurethane-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 LP/LX1-M with the eDART system.



SINGLE-CHANNEL PIEZOELECTRIC SENSOR CABLE 1645

The single-channel piezoelectric sensor cable 1645 (2 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 a piezoelectric sensor with the LP/LX1-M.



eDART OR COPILOT SYSTEMS

The eDART and CoPilot systems (3 at right) are process monitoring and control systems for plastic injection molding applications, providing a plethora of process tools from sorting parts to monitoring cavity pressure.



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 SURFACE-MOUNT SENSOR ADAPTER PZ/LX1-S

The Lynx Surface-Mount Piezoelectric Adapter PZ/LX1-S (4 at right) accepts connection from a single piezoelectric sensor, the 1645 cable, and the 1661 sensor cable to interface them with a single CE-LX5-W cable and the eDART 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 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 (6 at right) interface up to eight piezoelectric sensors to the eDART system with a single connection.



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