RJG
MOLD SMART

PRODUCT MANUAL

Lynx™ Eight-Channel Strain Gage Sensor Adapter with Mold ID

SG/LX8-S-ID

Training and Technology for Injection Molding

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TROUBLESHOOTING

RELATED PRODUCTS

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.*

NOTES

PRODUCT DESCRIPTION

The eight-channel strain gage sensor adapter with mold ID is an adapter that interfaces the RJG, Inc. eight-channel strain gage sensor connector SG-8 and up to eight multi-channel strain gage (MCSG) sensors to the eDART® or CoPilot® system.

APPLICATIONS

MULTI-CHANNEL STRAIN GAGE (MCSG) SENSOR SYSTEM

The Lynx™ MCSG 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.

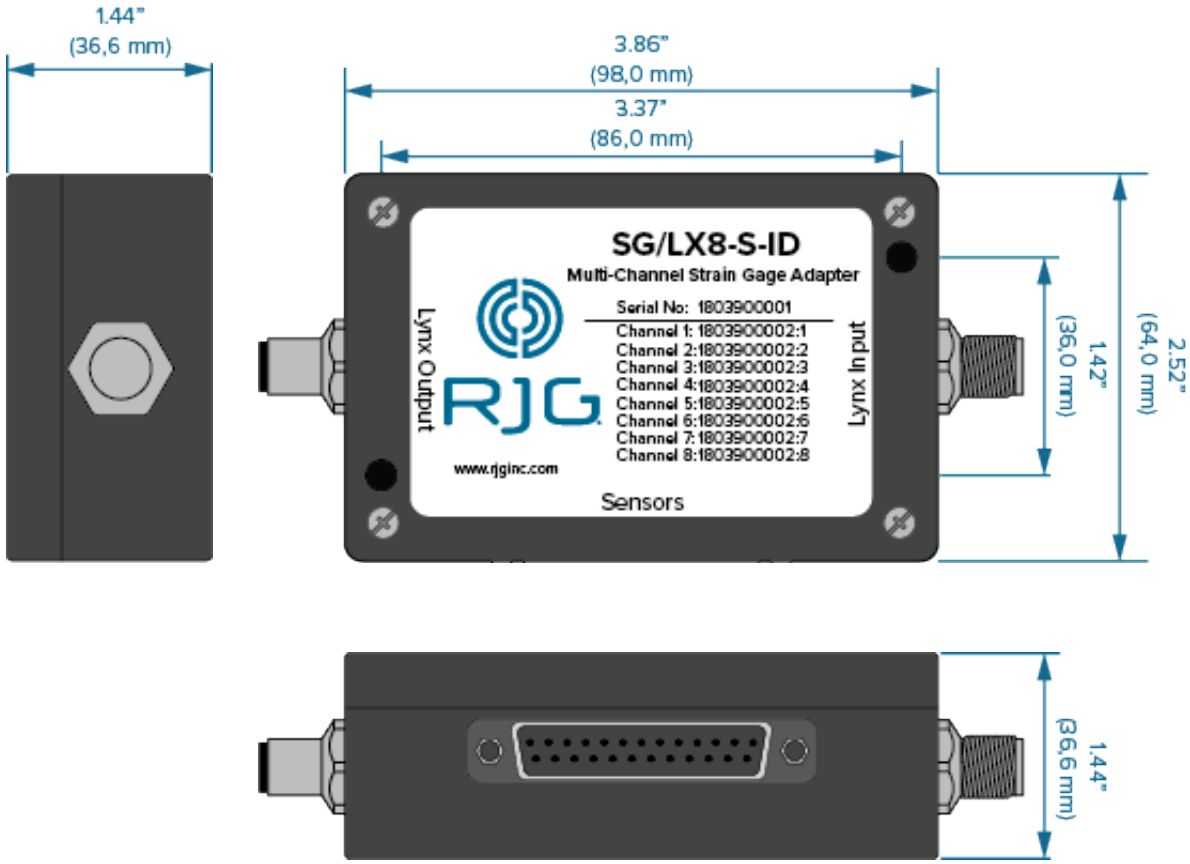
OPERATION

STRAIN GAGE SENSORS

The strain gage uses a Wheatstone Bridge to measure deformation, or the change in resistance of the force over the sensor. The measurement is carried through the sensor cable to the sensor electronics.

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

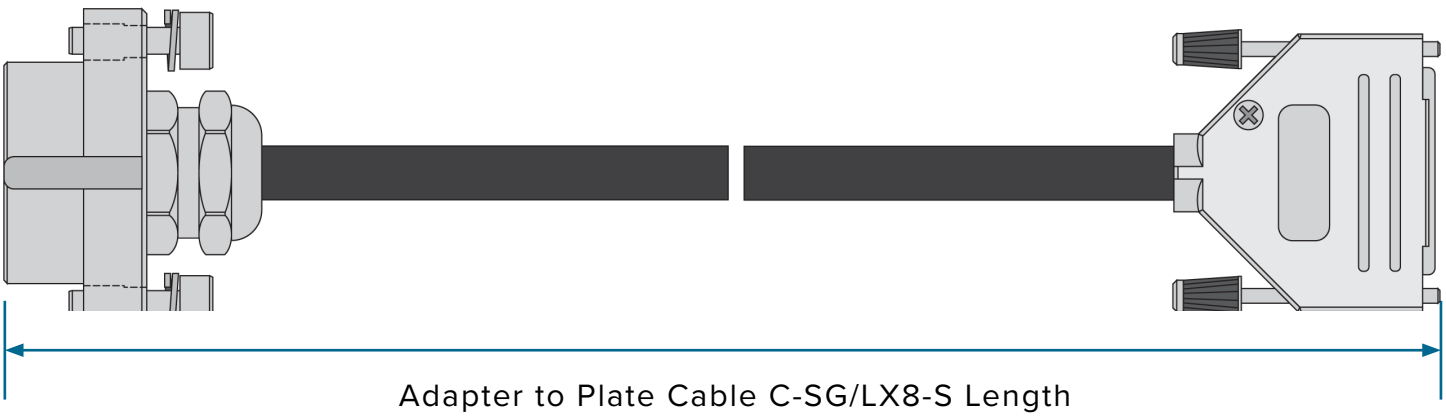
DIMENSIONS



CABLE LENGTHS

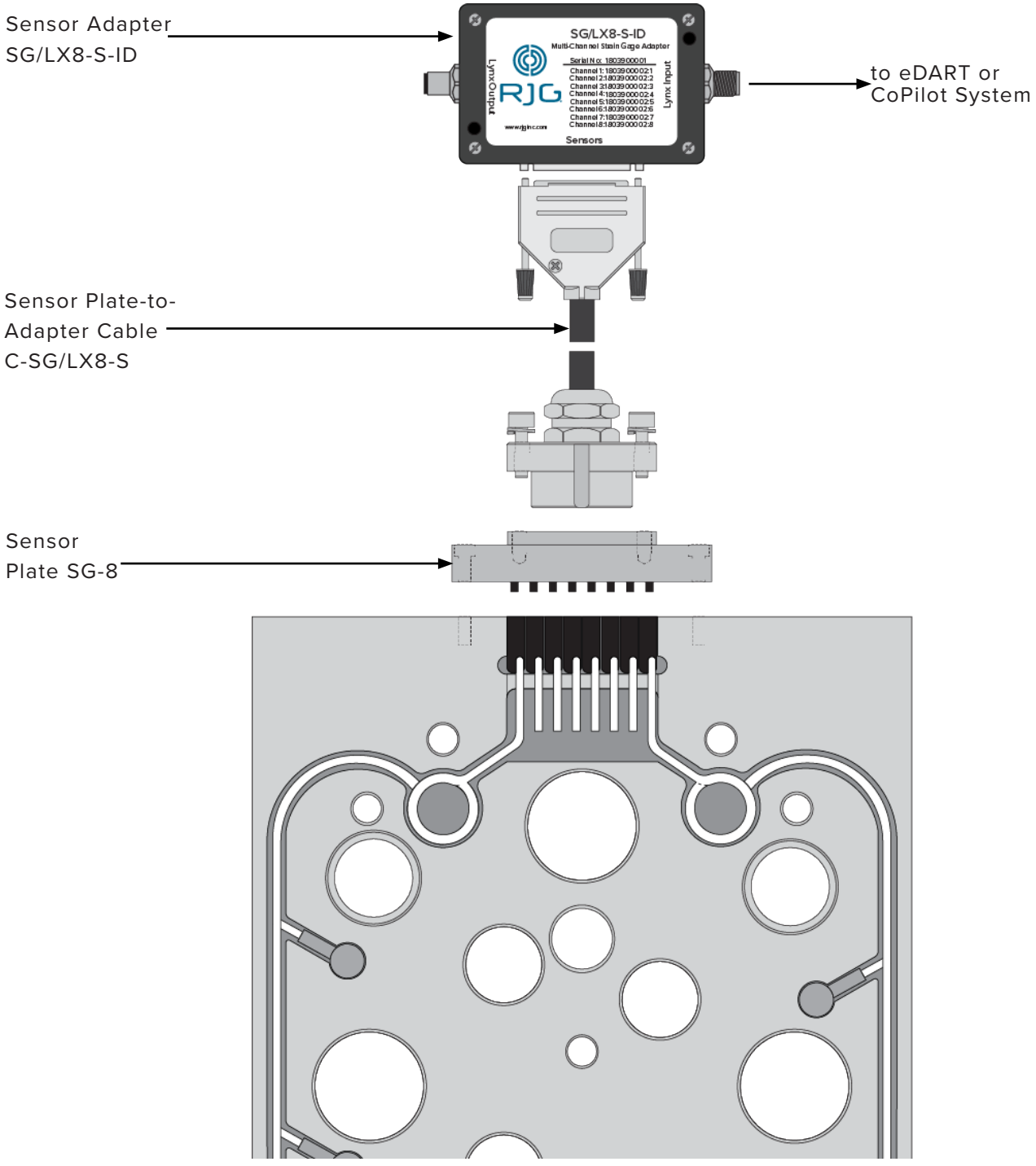
Lengths must be longer than needed to facilitate safe installation and removal of connector from tool to prevent tension on the lead wire; generally, 2–3" (50–75 mm) of slack is sufficient. Use good sense to determine the appropriate cable length required for each application.

CABLE LENGTH		PART NO.
20"	0,5 m	C-SG/LX8-S-.5M
39"	1,0 m	C-SG/LX8-S-1M
79"	2,0 m	C-SG/LX8-S-2M



INSTALLATION

The SG/LX8-S-ID is mounted on a frame-grounded structure or control panel using the supplied 10-24 x 1.75” socket head cap screws (SHCS). The eight-channel strain gage sensor adapter-to-plate cable C-SG/LX8-S is installed on the SG/LX8-S-ID adapter and the eight-channel strain gage sensor plate SG-8, which is mounted on the mold. Inside the mold, up to eight MCSG sensors are connected to the SG-8. The SG/LX8-S-ID is connected to the eDART system by a Lynx cable CE-LX5.



INSTALLATION SPECIFICATIONS

MOUNTING

1. Requirements

The lynx strain gage 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 or CoPilot system.

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

2. Mounting

Mount the SG/LX8-S-ID to a frame-grounded structure or control panel using the supplied 10-24 x 1.75” SHCS.

CONNECTIONS

3. Plate-to-Adapter Cable C-SG/LX8-S

Attach the C-SG/LX8-S cable to the connector of the SG/LX8-S-ID; attach the other end of the C-SG/LX8-S to the SG-8.

4. 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 CoPilot system or desired Lynx junction.

SOFTWARE SETUP

1. Requirements

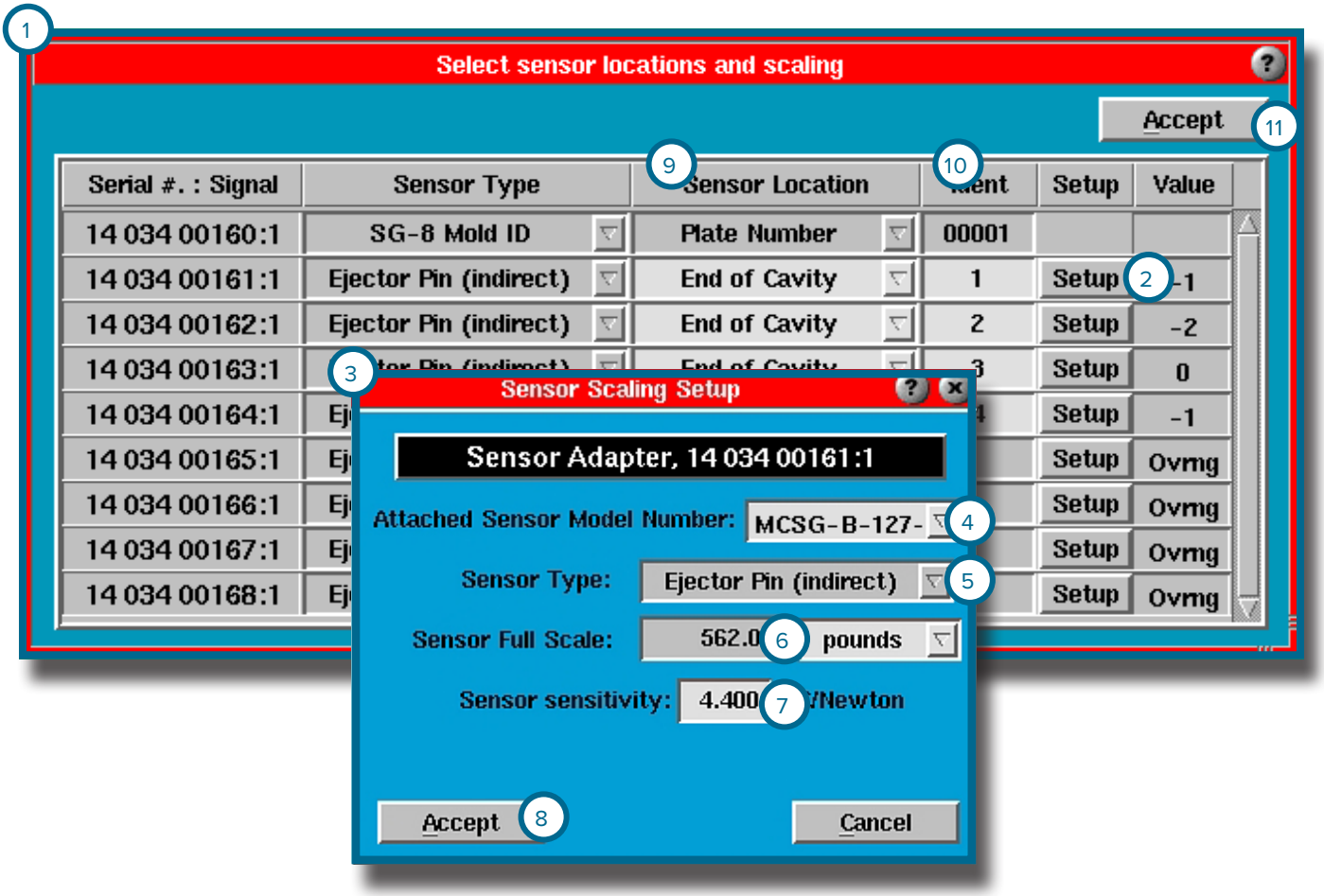
The SG/LX8-S-ID requires eDART system software versions 9.4.2 /10.7.3 or higher, and CoPilot system version 3.0 or higher (refer to the CoPilot System User Guide for setup information).

2. eDART Software Setup Version 9.4 or Higher

The sensor(s) attached to the SG-8 plate and SG/LX8-S-ID adapter will appear in the Sensor Locations 1 tool for initial setup in the eDART version 9.4.2 software.

Select the Setup 2 button; the Sensor Scaling Setup window 3 will appear. Fill in the window for each sensor to complete the SG/LX8-S-ID, SG-8, and connected MCSG senors setup.

- Select the Sensor Model Number 4 from the drop-down menu.
- The Sensor Type 5 and Sensor Full Scale 6 will automatically display.
- A default sensitivity is automatically populated at setup; enter the Sensor Sensitivity 7 listed on the sensor's calibration certificate.
- Select the Accept 8 button to save settings.
- Select the Sensor Location 9 from the drop-down menu.
- Enter the associated sensor's cavity number 10 in the Identification column (if two or more sensors are set to the same Sensor Location).
- Select the Accept 11 button to save settings.



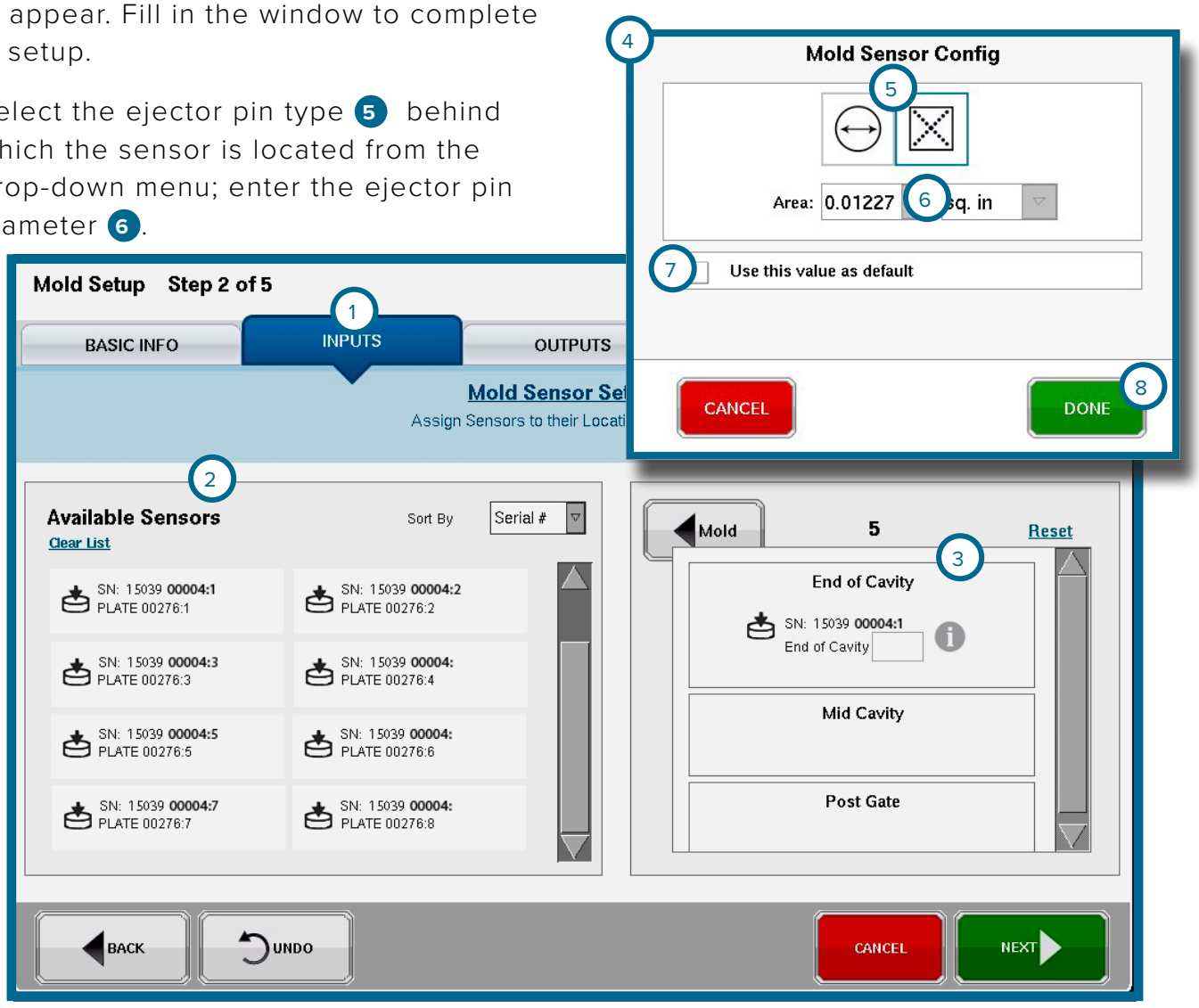
3. eDART Software Setup Version 10.6 or higher

The SG/LX8-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 ⓘ 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 ejector pin type 5 behind which the sensor is located from the drop-down menu; enter the ejector pin diameter 6.
- If the selected/entered ejector pin information is the same for all sensor/pin combinations in the mold, select the check box "Use this as default" 7; the software will automatically assign each placed sensor the specified ejector pin type and diameter for scaling.
- Select Done 8 to save settings.



MAINTENANCE

CLEANING

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.

TESTING & CALIBRATION

The Lynx Eight-Channel Strain Gage Sensor Adapter SG/LX8-S-ID requires no calibration. Follow all instructions and recommendations for individual sensor testing and calibration for optimal operation.

SENSOR TESTING

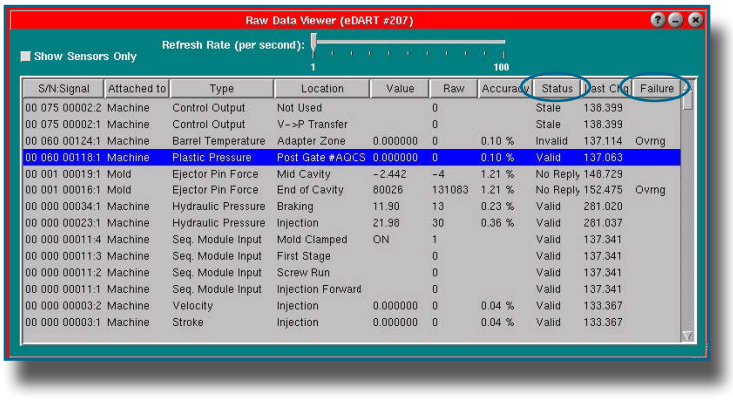
1. Sensor PreCheck

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.



S/N:Signal	Attached to	Type	Location	Value	Raw	Accuracy	Status	Last Chg	Failure
00 075 00002:2	Machine	Control Output	Not Used		0		Stale	138.399	
00 075 00002:1	Machine	Control Output	V->P Transfer		0		Stale	138.399	
00 060 00124:1	Machine	Barrel Temperature	Adapter Zone	0.000000	0	0.10 %	Invalid	137.114	Ovrng
00 060 00118:1	Machine	Plastic Pressure	Post Gate #AQCS	0.000000	0	0.10 %	Valid	137.063	
00 001 00019:1	Mold	Ejector Pin Force	Mid Cavity	-2.442	-4	1.21 %	No Reply	148.729	
00 001 00016:1	Mold	Ejector Pin Force	End of Cavity	80026	131083	1.21 %	No Reply	152.475	Ovrng
00 000 00034:1	Machine	Hydraulic Pressure	Braking	11.90	13	0.23 %	Valid	281.020	
00 000 00023:1	Machine	Hydraulic Pressure	Injection	21.98	30	0.36 %	Valid	281.037	
00 000 00011:4	Machine	Seq. Module Input	Mold Clamped	ON	1		Valid	137.341	
00 000 00011:3	Machine	Seq. Module Input	First Stage		0		Valid	137.341	
00 000 00011:2	Machine	Seq. Module Input	Screw Run		0		Valid	137.341	
00 000 00011:1	Machine	Seq. Module Input	Injection Forward		0		Valid	137.341	
00 000 00003:2	Machine	Velocity	Injection	0.000000	0	0.04 %	Valid	133.367	
00 000 00003:1	Machine	Stroke	Injection	0.000000	0	0.04 %	Valid	133.367	

WARRANTY

RJG, INC. STANDARD WARRANTY

RJG, Inc. is confident in the quality and robustness of the SG/LX8-S-ID, and so are offering a one-year warranty. RJG's eight-channel strain gage 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

INTERMITTENT CONNECTIONS

Intermittent connections or drop outs can be from causes such as damaged or contaminated Lynx connections, improperly seated Lynx connections, damaged transducer cables, or failed sensors (over-pressured, preload, incorrect pocket sensor installation, modules, or grounding issues). All these factors can cause the eDART system to lock up, freeze, shut down, or in rare cases, damage the eDART system unit itself.

When troubleshooting Lynx connections, please make sure that the machine, mold, parts will not be affected while troubleshooting (Example, eDART is controlling Valve Gates or Part Sorting).

Wear proper PPE when needed to reduce the risks of any potential shocks or ungrounded equipment. Please follow all safety guidelines.

TROUBLESHOOTING SOFTWARE FOR INTERMITTENT CONNECTIONS

Use the Sensor Locations menu and/or the eDART Raw Data Viewer to identify intermittent connections or “dropouts”.

SENSOR LOCATIONS MENU

The Sensor Locations menu shows all sensors and modules connected to an eDART system. Intermittent connections/ dropouts can be identified by serial numbers that disappear/reappear on the Sensor locations menu; the sensor or module with the associated serial number(s) is/are experiencing intermittent connection(s)/dropouts.

In addition, if OVRNG or UNDRG readings occur during machine cycling, the sensor could be over-pressured, the sensor is improperly seated in the sensor pocket inside of the mold plate, the sensor is preloaded, or the sensor cable wires are damaged exposed and making contact with the mold steel.

RAW DATA VIEWER EDART TOOL

The Raw Data Viewer shows more detailed information than the Sensor Locations page, and can be used for detecting intermittent connections or dropouts that may not be visible on the Sensor Locations page. For troubleshooting dropouts or intermittent connections ensure that “Only Show Sensors” is selected.

Next, select and highlight “Port 1” under the “Locations” tab in the Raw Data Viewer and right click on the highlighted section. This will open up the “Lynx Port 1 Diagnostics” window, where sensors and/or modules connected to the port will display current data of different existing issues.

The Lynx Port Diagnostics window can display “short streams”. Short Streams happen when the eDART system does not receive a full packet(s) of data from sensors or modules connected to the port. A short stream packet will display as a count in the short stream “count box”, and will indicate a dropout or miscommunication error.

NOTE: Short Streams can show up when connecting or reconnecting sensors. Short streams can also appear in a low numeric value (1–100) on a job if the eDART system has been running for a period of time (typically a week or longer)—this is normal.

If Short Streams are in the 100–1000 range in longer periods of time without connecting or reconnecting sensors, this is an indicator of a dropout or intermittent connection issue(s).

It may be difficult to see which sensor is having the dropout issue. The “Sensor Order Box” to the right-hand side of the Lynx Port Diagnostics window will display the list of serial numbers that are connected to the selected port. If a sensor is dropping out consistently, and for a short period of time, question marks will display where a serial number would be give you the faulty sensor.

If issues persist without being able to identify which sensor is having issue with the Lynx Port Diagnostics, unplug sensors one-by-one from the eDART system to see if the issue will stop occurring.

TROUBLESHOOTING HARDWARE FOR INTERMITTENT CONNECTIONS

If an intermittent connection cannot be identified during troubleshooting within the software, check the hardware using the following information to locate connection issues.

CHECKING eDART SYSTEM LYNX PORTS AND FUSES FOR CONNECTION ISSUES

1. eDART System Lynx Ports

Intermittent connection issues may occur within the eDART system Lynx ports. If short streams are observed on the eDART system Raw Data Viewer "Lynx Port Diagnostics" tool (refer to X), perform the following to troubleshoot connection issues with the eDART system Lynx ports.

Remove both Lynx cables (CE/LX-5) from eDART system Lynx ports one and two; install the Lynx cable from eDART system Lynx port one onto Lynx port two, and the Lynx cable from eDART system Lynx port two onto Lyn port one.

If short stream counts persist in a port after swapping the Lynx cables, one of the eDART system Lynx ports may be damaged.

NOTES *Swapping or reconnecting cables while the eDART system is powered on will cause short streams. Always reset the short streams and other information on the Raw Data Viewer "Lynx Port Diagnostics" window after swapping, reconnecting, or replacing cables. The "reset" option is located at the bottom of the Lynx Port Diagnostics window.*

2. eDART System Fuses

The eDART system Lynx ports one and two have fuses and constant voltage sources chips to help protect from power surges. To check the fuses for Lynx ports one and two, complete the following steps.

- Stop the machine and disconnect the eDART system Lynx ports one and two connections.
- Stop the job and shut down the eDART system.
- Remove the four screws and lid from the of the eDART system and retain.
- On the inside of the eDART system, two fuses for Port 1 & 2 will be present. If the fuses have been blown, replace the fuses with the provided fuses attached to the eDART system lid. Remove the fuses and test with a multimeter to ensure that the fuses are still functioning even if they do not look blown.
- When installing the fuses, use a pair of small tipped pliers to gently squeeze the two tabs on each end of the fuse to ensure proper connectivity.
- Reinstall the lid of the eDART system using the four screws, and reconnect both eDART system Lynx port cables on port one and two.

If issues persist after verifying functionality of the Lynx ports and fuses, check Lynx cables, Lynx cables connectors, and Lynx modules.

CHECKING LYNX CABLES AND CONNECTIONS FOR CONNECTION ISSUES

Intermittent connection issues may occur within the eDART system Lynx cables. If short streams are observed on the eDART system Raw Data Viewer “Lynx Port Diagnostics” tool (refer to X), perform the following to troubleshoot connection issues with the eDART system Lynx cables.

NOTES *Swapping or reconnecting cables while the eDART system is powered on will cause short streams. Always reset the short streams and other information on the Raw Data Viewer “Lynx Port Diagnostics” window after swapping, reconnecting, or replacing cables. The “reset” option is located at the bottom of the Lynx Port Diagnostics window.*

To check Lynx cables and connectors for connection issues, complete the following steps.

- Remove one cable from either Lynx port one or two, and follow the cable path from the eDART system, to the machine, to the mold, to discover any potential damage.
- Verify Lynx cable connections are seated with each module or sensor properly.
- Look for possible corrosion, damage, or debris inside of both male and female connections.
- Replace any components that are unsatisfactory.

If the Lynx cables, connectors, or connections do not show any signs of the possible issues, continue troubleshooting as described in this chapter.

INTERFERENCE

INTERFERENCE WITH MACHINE INTERFACE MODULES AND SENSORS

If Lynx cable connections from the eDART system to the machine, as well as to the mold or tool, have been checked, but interference continues, check module cabling that interfaces with the machine. Check each module's voltage for input or output and take note of the maximum temperature tolerances. The machine interfacing module tolerances are as follows:

1. Machine Interface Modules

Modules, such as the OR2-M or ID7-M-SEQ, have wires that connect to the inside of a machine, conveyor belt, or robot. These cables are not normally shielded and can be susceptible to electrical noise, interference, and loose connections with the electrical buses in the machine, conveyor belt, or robot, Verifying these connections and having the module wires away from any electrical interference will help improve eDART system performance and any possible dropouts.

LYNX™ SHIELDED MACHINE SEQUENCE MODULE ID7-M-SEQ	LYNX™ SHIELDED DUAL-RELAY OUTPUT MODULE OR2-M	LYNX™ SHIELDED ANALOG OUTPUT MODULE OA1-M-V	LYNX™ SHIELDED ANALOG INPUT MODULE IA1-M-V
Maximum Input Voltage 36 V DC Minimum Trigger-On Voltage 18 V DC	Contact Rating 1 A 30 V DC	Maximum Output Voltage 0–10 V DC	Maximum Input Voltage 0–10 V DC
Maximum Operating Temperature 140° F for all machine interface modules.			

2. Mold/Tool Interfacing Lynx Modules

LYNX™ EIGHT-CHANNEL STRAIN GAGE SENSOR ADAPTER WITH ID SG/LX8-S-ID
Is powered from the eDART system, and provides power to the sensors for information feedback.
Can be prone to power surges if machine or mold is not grounded properly.

INTERFERENCE FROM MOLD SENSORS

Cables can move out of the sensor cable channels inside of a mold or tool during assembly before the retainer plate is installed. This can lead to damaged cables where cable wires get damage and are exposed to the steel of the mold, resulting in electrical shortages or possible interference.

Often, Lynx sensor adapters and electrical cases/boxes (LSB127/159-XXXX models) are installed on a mold and are exposed to excessive heat causing the electronics communications to fail and result in dropouts or damage. When troubleshooting, check the temperature of the mold or tool surface—this also includes the transducer buttons. RJG provides both a normal heat range and a high temperature range of button style transducers.

To detect if dropouts or interference is occurring with a specific transducer, disconnect the Lynx cable to see if short streams still occur. Continue to disconnect Lynx cables from sensors until short streams have stopped occurring. “Reset” the Lynx Port Diagnostics after each disconnection and reconnection.

If all troubleshooting steps fail to identify the cause for intermittent connection or interference issues, please contact RJG Customer Support.

CUSTOMER SUPPORT

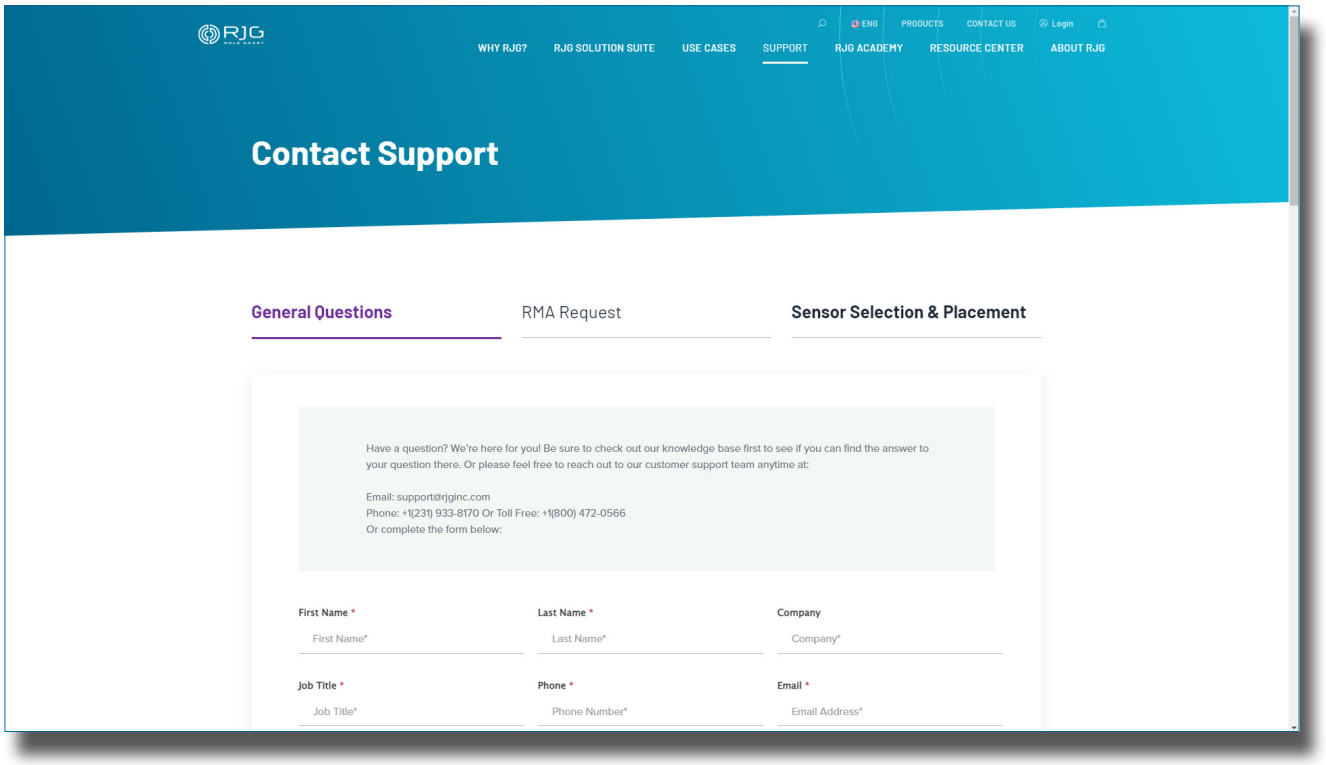
Contact RJG's Customer Support team by phone or email.

RJG, Inc. Customer Support

P: 800.472.0566 (Toll Free)

P: +1.231.933.8170

www.rjginc.com/support



NOTES

RELATED PRODUCTS

The SG/LX8-S-ID is compatible with other RJG, Inc. products for use with the eDART or CoPilot process control and monitoring systems.

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 SG/LX8-S-ID with the eDART or CoPilot system.

LYNX EIGHT-CHANNEL STRAIN GAGE SENSOR PLATE-TO-ADAPTER CABLE C-SG/LX8-S

The Lynx Eight-Channel Strain Gage Sensor Plate-to-Adapter Cable (2 at right) interfaces the SG-8 eight-channel strain gage sensor plate (and up to eight connected multi-channel strain gage (MCSG) sensors) and the SG/LX8-S-ID eight-channel strain gage sensor adapter.

EIGHT-CHANNEL STRAIN GAGE SENSOR PLATE WITH ID SG-8

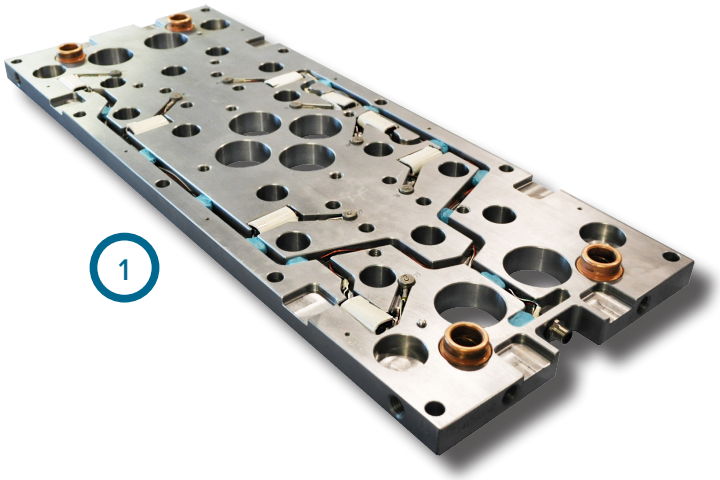
The Eight-Channel Strain Gage Sensor Plate with Mold ID (3 at right) is a connector that interfaces up to eight strain gage sensors with the SG/LX8-S-ID with a single connection outside of the mold.

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 EMBEDDED SENSORS

The Lynx embedded sensors (1 at right) LES-B-127-50/125/500/2000 electronics and heads are embedded into the clamp plate, eliminating outside cabling. Each plate includes a single connector that accommodates up to twenty-four sensors. All sensors are fully functional and properly named with a single cable connection from the mold to 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 (2 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/LX8F-S (3 at right) interface up to eight piezoelectric sensors to the eDART or CoPilot system with a single connection.

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