Keep it all in check.

COPILOT®

HARDWARE INSTALLATION AND SETUP GUIDE

RJG.
MOLD SMART

Training and Technology for Injection Molding

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CONTENTS

Read, understand, and comply with all following instructions.

Disclaimer

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Compliance

The CoPilot® system has been designed and tested in accordance with the following standards:

- EN 61326-1:2020
  EMC Requirements for electrical equipment for measurement, control, and laboratory use. Intended for use in industrial locations.

- IEC 61010-1:2010
  Safety requirements for electrical equipment for measurement, control, and laboratory use.

The CoPilot system conforms to European Conformity (CE) requirements and is eligible for sale in the European Union (EU).

Privacy

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Alerts

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

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

NOTE *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 CoPilot software is pre-installed on the Application Processor AP4.0. The AP4.0 receives data from the Lynx™ sensor interface ports which are connected to Lynx hardware on the injection molding machine. The following details the AP4.0 and Lynx hardware required for the CoPilot software.

Application Processor AP4.0

The Application Processor AP4.0 is a quad-core, low-power, industrial computer designed for processor-intensive tasks with integrated RJG Lynx technology. The AP4.0 case is constructed of cast metal. A single 24 V DC power supply/cable provides the AP4.0 and integrated Lynx sensor interface with 24 V DC power.

Technical Specifications

The Lynx sensor interface ports are insulated and sealed to withstand temperature, shock, and moisture commonly found in injection molding environments. The AP4.0 processor supplies the Lynx sensor interface ports with power.

Environmental

The AP4.0 is intended for indoor use only.

Humidity	90% RH non-condensing	
Temp. Range	32–122 °F	0–50 °C
Altitude Limit	9,842′	3,000 m

Notice

Protection provided by the equipment may be impaired if the equipment is used with accessories not provided or recommended by the manufacturer, or is used in a manner not specified by the manufacturer. The AP4.0 contains no operator-serviceable parts.

Product Dimensions
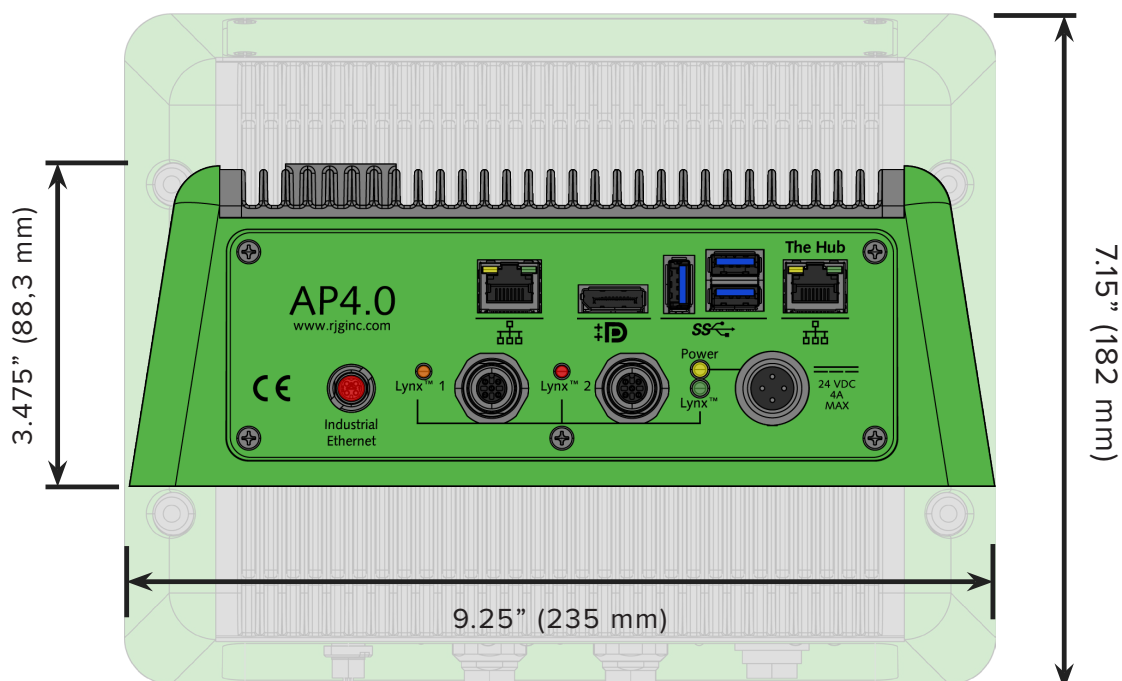
Connections
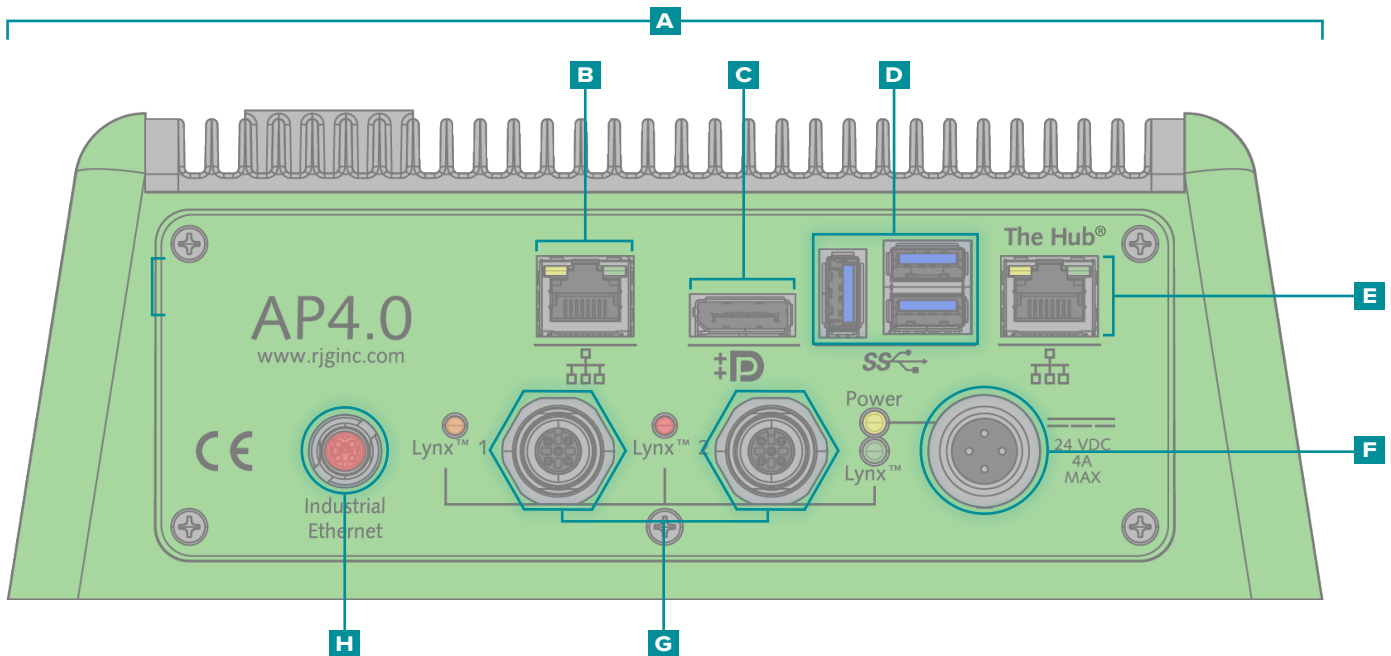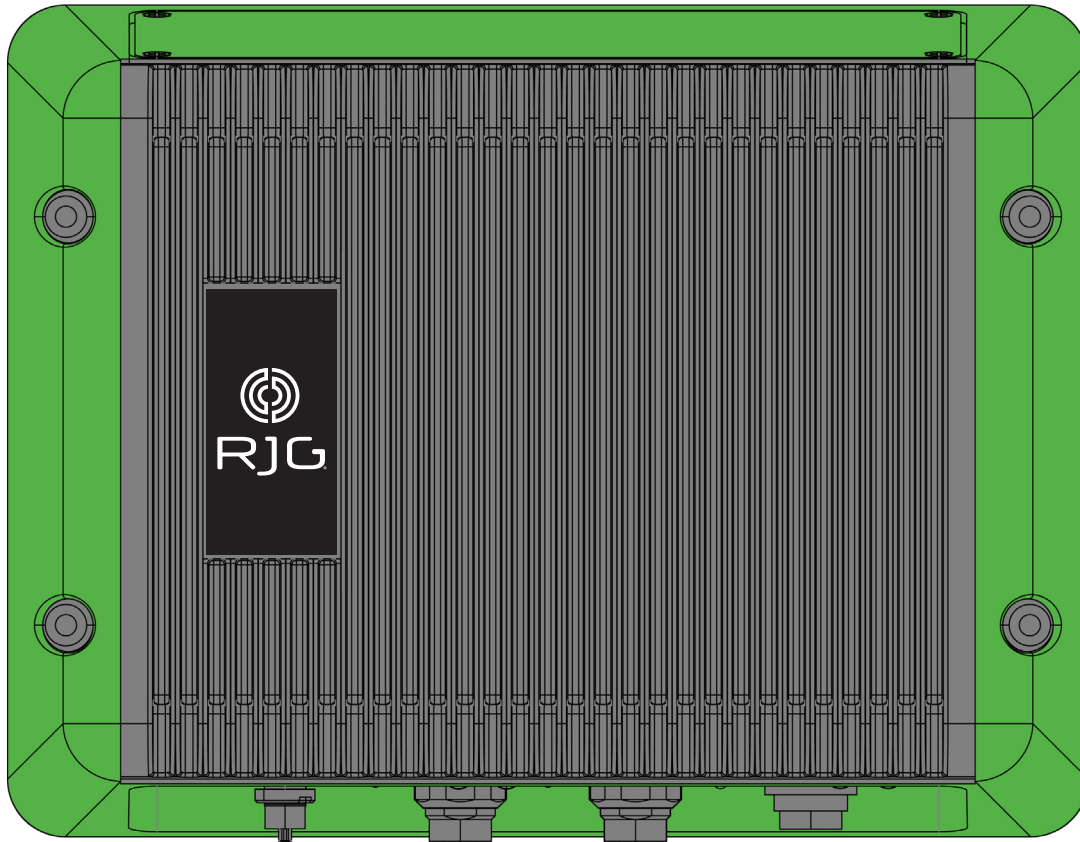
A	Cast Metal Case	**E**	The Hub® Networking Port
B	Auxiliary Port	**F**	24 V DC Power Port
C	DP++ Port (with passive adapter cable)	**G**	Lynx Ports 1 & 2
D	USB 3.0 Ports (x3)	**H**	Industrial Ethernet Port

Lynx Hardware

Lynx devices gather raw data about the machine's sequences, pressures, injection unit position, and other parameters during the injection molding process. Lynx devices are digital and contain electronics that enable automatic identification when connected to the CoPilot system.

Modules

Modules are shielded, DIN-rail-mounted, and wired directly to the machine.

Sequence Module

The Sequence Input Module **A** ID7-M-SEQ is a DIN-rail-mounted module which is wired directly to the molding machine in order to collect 24 V DC timing signals for use with the CoPilot software.

Input Module

The **B** IA1-M-V is an analog input module that accepts 0–5 or 0–10 V DC signals from electric molding machines to obtain injection pressure and screw position for CoPilot software integration.

Relay Module

The **C** OR2-M module provides a normally-open or normally-closed contact for part sorting or control outputs. The OR2-M has two channels that can be assigned for sorting and/or control output.

Output Module

The **D** OA1-M-V is an analog output module wired to the molding machine in order to output a 0–10 V DC signal as an external machine transfer (V→P) for CoPilot software when an OR2-M cannot be used.

Flowmeter Interface Module (Optional)

The **E** IA2-M-DFT is an analog, dual-output module that provides all the inputs and outputs needed to interface the CoPilot system to Smartflow®'s TracerVM™ line of flowmeters.
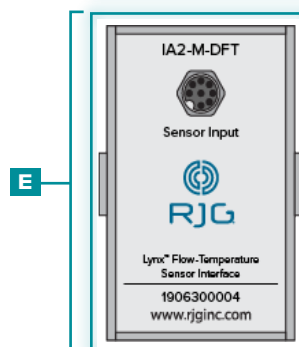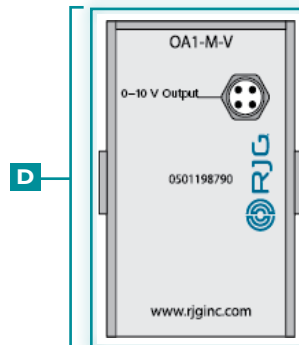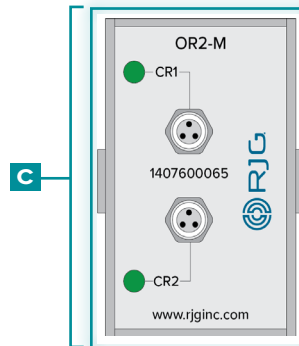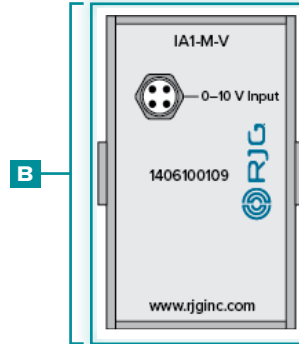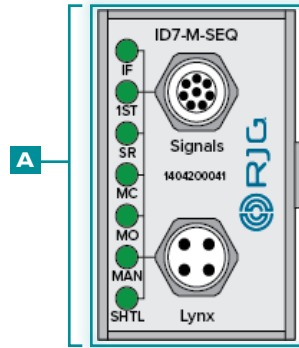
Junctions

Single Feed-Through Junction

The **F** J-LX1 is a single Lynx feed-through junction which connects the shielded, DIN-rail-mounted modules inside the machine panel to the AP4.0.

F
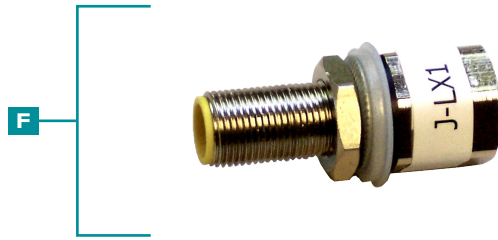
Two-Port Junction

The **G** J-LX2-CE is a Lynx two-port junction which connects modules, machine interface sensors, and junctions to the AP4.0 (used for hydraulic installations).

G
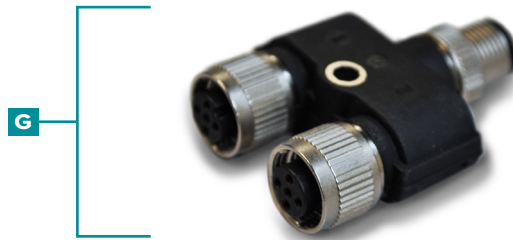
Five-Port Junction

The **H** J-LX5-CE is a Lynx five-port junction which connects modules, machine interface sensors, and junctions to the AP4.0 (for installations which use an optional proximity or limit switch for mold closed signals).

H

Nine-Port Junction

The **I** J-LX9-CE is a Lynx nince-port junction which connects modules, machine interface sensors, and junctions to the AP4.0.

I

Machine Interface Sensors

Stroke/Velocity Sensor

The **J** LE-R-50-REVB is a Lynx 50" stroke/velocity sensor that monitors screw position and speed, and interfaces machines to the AP4.0 in order for the CoPilot software to calculate injection velocity, shot volume, cushion, and plasticizing rates.
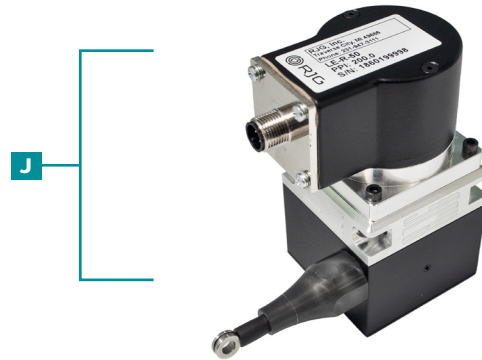
Hydraulic Sensor

The **K** LS-H-1/4NPT-3K/5K is a Lynx hydraulic sensor which interfaces hydraulic machines to the AP4.0 in order to calculate injection pressure.

Proximity Sensor

The **L** L-PX is a Lynx proximity switch used to derive the mold closed signal when one is not available from the machine sequence module.
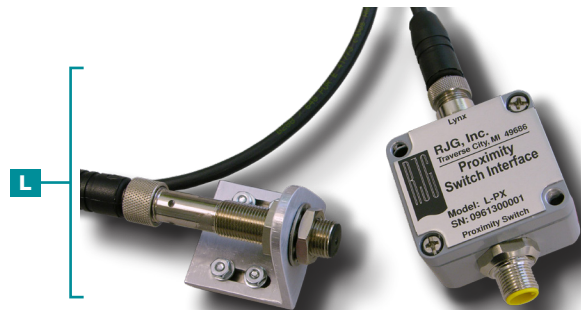
In-Mold Cavity Pressure Sensors

Cavity pressure sensors are placed inside the mold behind ejector pins, behind transfer pins, or are flush-mounted, and detect the plastic pressure conditions inside the related cavity/cavities. Cavity pressure sensors may be single- or multi-channel, strain gage or piezoelectric, and button or flush-mount type.

RJG, Inc. offers a wide array of digital single- and multi-channel strain gage and piezoelectric cavity pressure sensors for each application. In order to choose the correct sensor for each application, a sensor location strategy is vital—visit www.rjginc. com/technology/sensors/choosing for information on choosing a sensor.
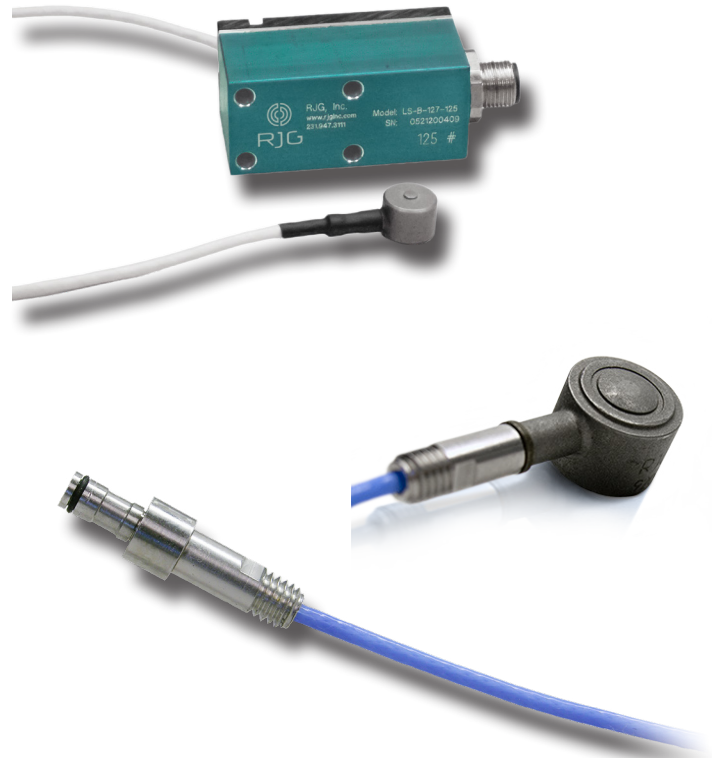
Single- and Multi-Channel Sensors

Single-channel sensors either have or require an adapter for each sensor that is connected to the AP4.0. Multi-channel sensors can connect multiple sensors to a single plate or adapter plate, which then connects to a sensor adapter, which connects to the AP4.0.

Strain Gage and Piezoelectric Sensors

Strain gage sensors use a wheatstone bridge to determine the amount of plastic force exerted while piezoelectric sensors use a quartz crystal to determine plastic pressure forces.

Button or Flush-Mount Sensors

Button-type sensors are placed under ejector or transfer pins, while flush-mount sensors contact the plastic in the cavity, and can be contoured/textured to match the cavity surface.

In-Mold Cavity Pressure Sensor Adapters

Each sensor requires an adapter to connect to the AP4.0. Some sensor adapters can connect a single sensor to the AP4.0, while others can connect multiple sensors to the AP4.0; some sensor adapters are mold-mountable, while some sensor adapters are surface-mountable (away from the mold).

In-Mold Temperature Sensors

Temperature sensors are placed inside the mold or are flush-mounted, and detect the temperature conditions inside the mold or cavity/cavities. Temperature sensors may be Type J or Type K, single- or multi-channel, and are flush-mount type.

Type J and K Type K Sensors

Temperature sensors may be Type J or Type K, though all temperature sensors purchased from RJG, Inc. are Type K.

Single- and Multi-Channel Sensors

Temperature sensors may be single- or multi-channel. RJG, Inc. offers only multi-channel temperature sensor adapters, which can connect up to four temperature sensors to the AP4.0 via a single connection.

Temperature Sensor Adapters

Each sensor must be connected to an adapter, which is then connected to the AP4.0. The temperature sensor adapters offered by RJG, Inc. are four-channel, Type J or Type K, and mold-mountable.
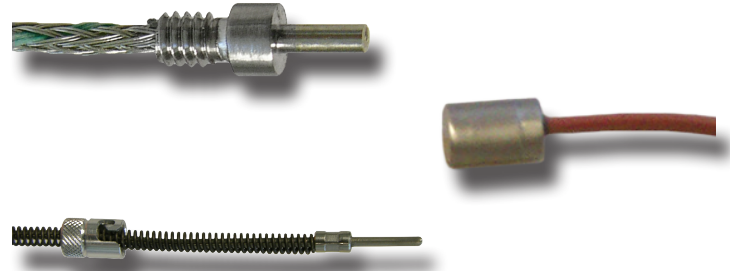
Optional Equipment

Optional equipment can be purchased in order to connect auxiliary molding equipment to the CoPilot system.

Temperature Control Unit (TCU) Interface Assembly

The CoPilot System/TCU Interface Cable Assembly C-TCU-USB includes the serial-to-USB interface and all cabling required to connect a temperature control unit (TCU) to the CoPilot System application processor AP4.0.
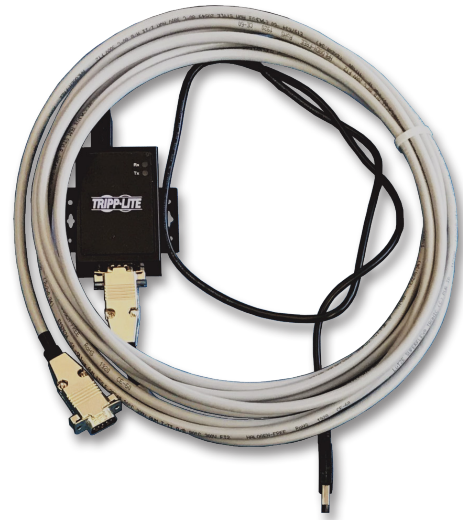
Flowmeter

The Smartflow's TracerVM line of flowmeters can be used with the Lynx digital flow-temperature interface module IA2-M-DFT, which provides all the inputs and outputs needed to interface the flowmeter and CoPilot system.

Installation Overview

Read all instructions before installing hardware components. Contact RJG, Inc. Customer Support for any questions regarding installation. Follow all installation instructions, notes, and cautions.

⚠️ **CAUTION**   *Always disconnect, lock out, and tag out all power sources before making electrical connections. Failure to comply will result in injury or death to personnel and damage or destruction of equipment.*

Component Installation Order

01   Install Application Processor AP4.0

02   Install Touch Screen

03   Install Lynx Modules

04   Install Lynx Junctions

05   Install Lynx Machine Interface Sensors

06   Install Mold Sensors
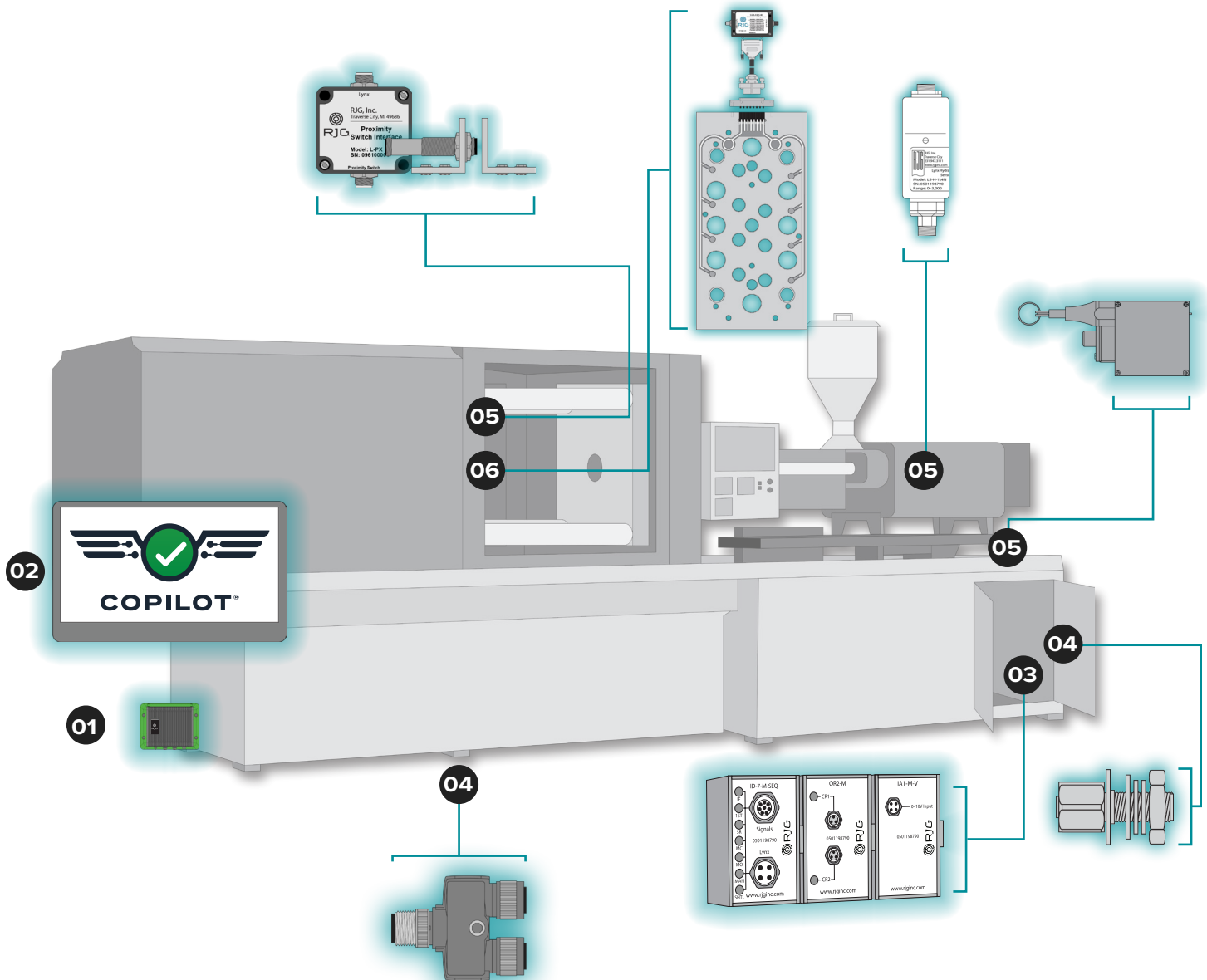
Lynx Hardware Layout—Hydraulic Machines

STANDARD EQUIPMENT	QTY
A AP4.0—*Application Processor*	1
B PS-AP40-24V—*AP4.0 Power Supply/ Cable*	1
C Touch Screen Display	1
D Touch Screen Cables—*One CV-1 DP++ cable, One USB cable (BOTH REQUIRED)*	2
E LE-R-50—*Lynx 50" Stroke/Velocity Encoder*	1
F CE-LX5-4M-F90—*Lynx Four-Meter 90°Cable*	1[3]
G CE-LX5-2M—*Lynx Two-Meter Cable*	1[2]
H CE-LX5-4M—*Lynx Four-Meter Cable*	1[3]
I J-LX1—*Lynx Single Feed-Through*	1
J ID7-M-SEQ—*Lynx Sequence Module*	1
K C-ID7-M-3M—*Shielded Cable for ID7-M-SEQ*	1[1]
L OR2-M—*Lynx Relay Module* **OR** OA1-M-V—*Lynx Analog Output Module*	1[5]
M C-OR2-M-3M—*Shielded Cables for OR2-M*	2[1,5]
N LS-H-1/4NPT-3K/5K—*Lynx 3,000/5,000 psi Hydraulic Pressure Sensor*	1
O CE-LX5-2M—*Lynx Two-Meter Cable*	1
P J-LX5—*Lynx Five-Port Junction Box*	1

OPTIONAL EQUIPMENT	QTY
U L-PX—*Lynx Proximity Switch*	1[1,4]

Cavity Pressure and Temperature Sensors

[1] Item not shown.

[2] For standard installation; use of L-PX requires a quantity of 3.

[3] For standard installation; use of L-PX requires a quantity of 2.

[4] Only used if mold closed signal is not available from the ID7-M-SEQ sequence module.

[5] OA1-M-V used for control (V→P) if OR2-M cannot be utilized.

N E O F P C

ID7-M-SEQ
IF
1ST
SP
MC
MO
MAIN
SHTL
Signals
1404200041

OR2-M
CR1
1407600065
CR2
www.rjginc.com

COPILOT®

THE HUB®

AP4.0
www.rjginc.com
Industrial Ethernet
CE
The Hub
24 VDC

L J G I H D A B

Lynx Hardware Layout—Electric Machines

STANDARD EQUIPMENT	QTY
A AP4.0—*Application Processor*	1
B PS-AP40-24V—*AP4.0 Power Supply/ Cable*	1
C Touch Screen Display	1
D Touch Screen Cables—*One CV-1 DP++ cable, One USB cable (BOTH REQUIRED)*	2
E LE-R-50—*Lynx 50" Stroke/Velocity Encoder*	1
F CE-LX5-4M-F90—*Lynx Four-Meter 90°Cable*	1[3]
G CE-LX5-2M—*Lynx Two-Meter Cable*	1[2]
H CE-LX5-4M—*Lynx Four-Meter Cable*	1[3]
I J-LX1—*Lynx Single Feed-Through*	1
J ID7-M-SEQ—*Lynx Sequence Module*	1
K C-ID7-M-3M—*Shielded Cable for ID7-M-SEQ*	1[1]
L OR2-M—*Lynx Relay Module* **OR** OA1-M-V—*Lynx Analog Output Module*	1 [5]
M C-OR2-M-3M—*Shielded Cables for OR2-M*	2[1,5]
N IA1-M-V—*Lynx Analog Input Module*	1
O C-IA1-M-3M—*Shielded Cable for IA1-M-V*	1[1]
P J-LX5—*Lynx Five-Port Junction Box*	1

OPTIONAL EQUIPMENT	QTY
U L-PX—*Lynx Proximity Switch*	1[1,4]

Cavity Pressure and Temperature Sensors

[1] Item not shown.

[2] For standard installation; use of L-PX requires a quantity of 3.

[3] For standard installation; use of L-PX requires a quantity of 2.

[4] Only used if mold closed signal is not available from the ID7-M-SEQ sequence module.

[5] OA1-M-V used for control (V→P) if OR2-M cannot be utilized.

Application Processor AP4.0

Mounting Requirements

1. Location

Determine a mounting location that will be convenient for installation, use, and maintenance.

Mount to a solid surface.

Mount away from sources of

- static such as hopper, dryer, or material feed lines.
- vibration.
- humidity, contamination, or corrosion (such as water and hydraulic lines).

2.Clearances

Do not mount in an enclosed location.

- Top—6" (150 mm)
- Sides—6" (150 mm)
- Front—6" (150 mm)
- Bottom—12" (300 mm)

⚠ **CAUTION** *Connectors must face down to prevent contamination. Failure to comply will result in damage to or destruction of equipment.*

3.Securing

Mount only using the supplied 0.181" (4,6 mm) mounting holes and recommended 8-32 x 3/4" (x4) machine screws with nuts.

ℹ **NOTE** *DO NOT drill holes in the AP4.0 case.*

3.50" (88,9 mm)

8.25" (209,6 mm)
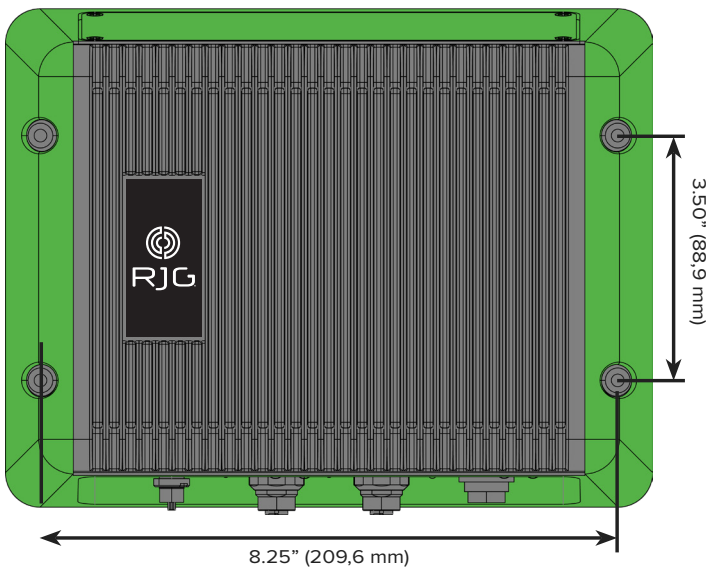
Power Requirements

Wire power to the AP4.0. Power is supplied by a 24 V DC power supply and cable included with the AP4.0. A licensed electrician must check all wiring to ensure that all power and grounds are wired correctly.

⚠ **CAUTION** *Always disconnect, lock out, and tag out all power sources before making electrical connections. Failure to comply will result in injury or death to personnel and damage or destruction of equipment.*
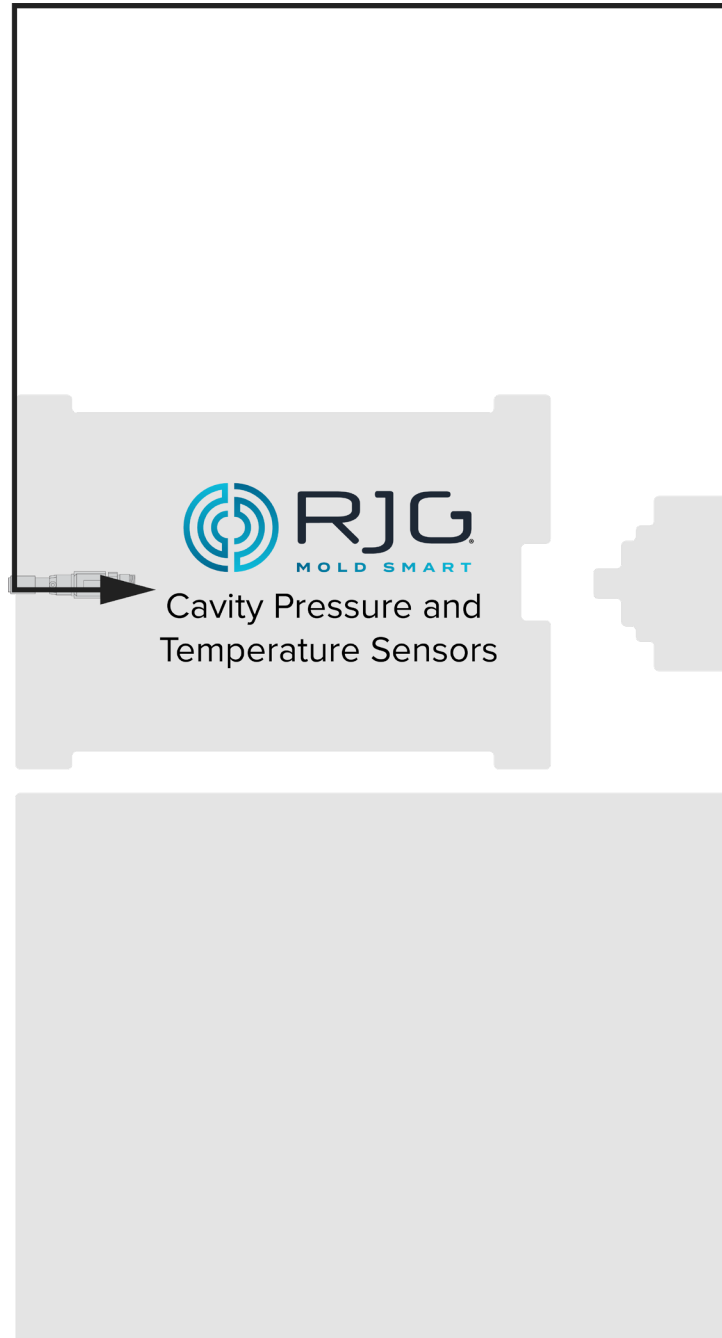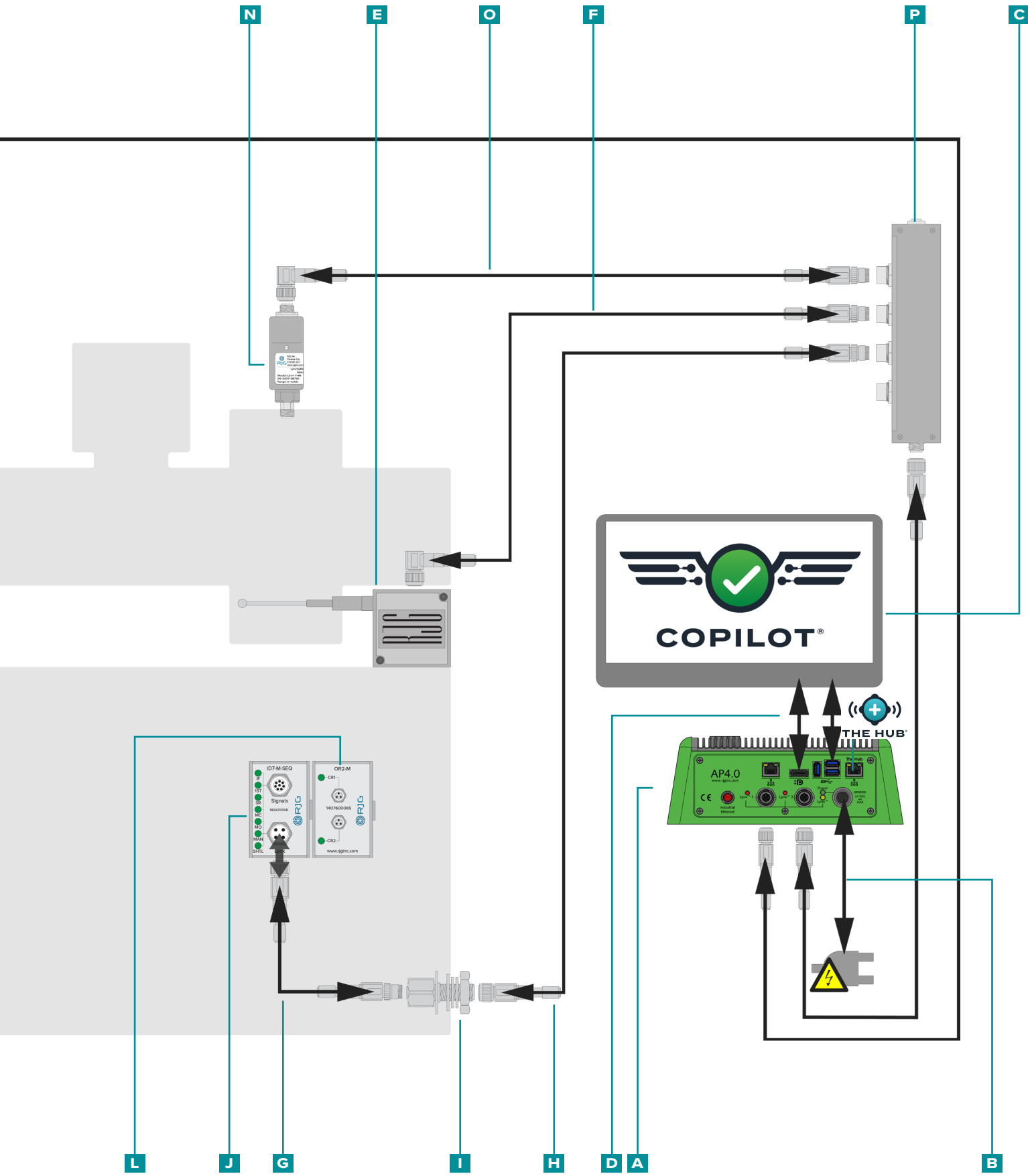
Insert the power supply's cable connector into the AP4.0 power port.

⚠ **CAUTION** *Use only the supplied power supply; failure to comply will result in personal injury or death and damage or destruction of equipment.*

⚠ **CAUTION** *The ground connection of the power receptacle must be made to an adequate earth ground to eliminate possible radio frequency noise and interference, and to ensure a safe operation. Failure to comply will result in personal injury or death and damage or destruction of equipment.*

ℹ **NOTE** *Power must be from supplied from a source separate from the injection molding machine.*

Networking

The AP4.0 provides two ethernet ports. Port 1 is for auxiliary networking; Port 2 is for networking the CoPilot with The Hub.

ℹ **NOTE** *DO NOT run the ethernet cable near any sources of static such as the hopper, dryer, or material feed lines.*

ℹ **NOTE** *Always use an RJ45S shielded ethernet cable.*

TouchScreen Installation

Mounting

The CoPilot system touchscreen monitor for the has a standard Video Electronics Standards Association (VESA) MIS-D four-hole 100 x 100 mm mounting pattern. A mount is not included with CoPilot system touchscreen monitor and must be purchased separately.
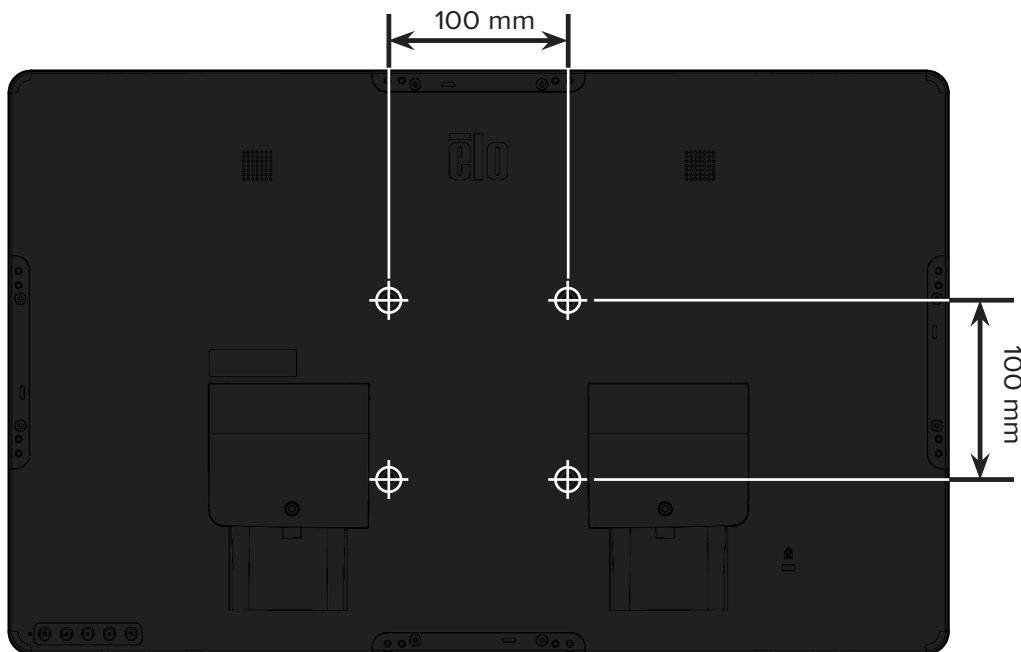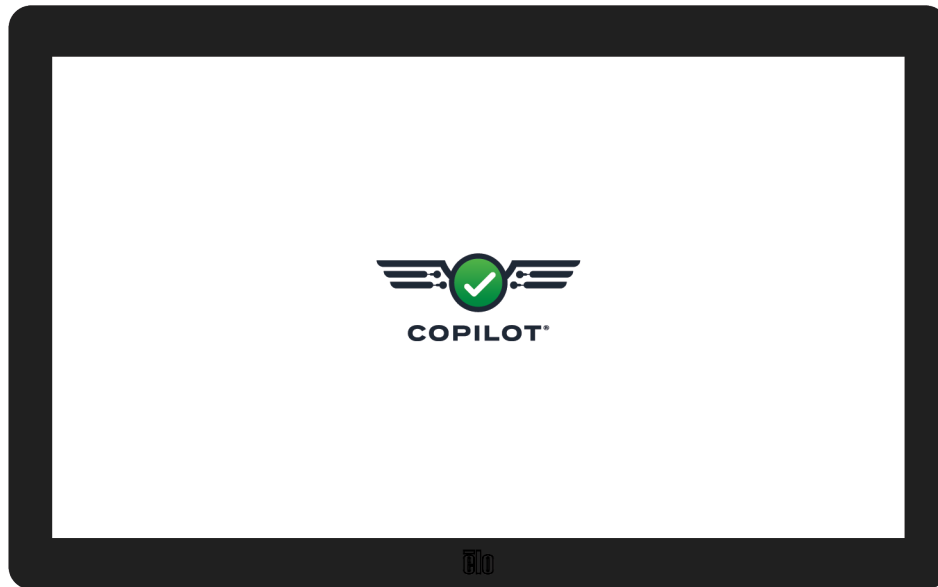
Lynx Hardware Installation

Module Installation

⚠️ **CAUTION** *Before beginning ID7-M-SEQ installation, disconnect and lockout/tag-out any and all power to the molding machine. Failure to comply will result in personal injury or death, and damage or destruction of equipment.*

ID7-M-SEQ Sequence Module

1. Mount the module.

Mount the ID7-M-SEQ module to a solid surface—such as the molding machine frame—using the supplied 1.38" (35 mm) DIN rail. A clearance height of 6" (152,4 mm) from the face of the module is recommended.

ⓘ **NOTE** *Modules and connecting cables must be located away from any static sources, such as feeder tubes and material hoppers.*

2.Wire the module.

ⓘ **NOTE** *The following required signals may be obtained from a machine output card.*

Confirm the machine's sequence output card can supply a reliable 24 V signal.

The CoPilot software requires injection, screw run, and mold clamped signals. Injection signals may be supplied by injection forward, injection forward and first stage, first stage, or first and second stage. Screw run signal may be supplied by screw recovery or analog screw RPM. Mold clamped signal may be supplied by mold clamped, or by a proximity or limit switch (refer to "L-PX Lynx Proximity Switch" on page 33).

Input for all signals 24 V ON; 0 V OFF. Maximum Input Voltage 36 V; Minimum Trigger-On Voltage 18 V.

Wire the machine sequence signals to the module cable C-ID7-M-3M using one of the following acceptable combination of signals (A, B, C, D, E OR F):

ⓘ **NOTE** *Signal combination A is recommended, followed by B, with the remaining being acceptable, but not optimal.*

ⓘ **NOTE** *Note the signals which are wired to the machine for future software setup and use.*

FOR ALL WIRING SIGNAL COMBINATIONS

Using the C-ID7-M-3M cable, attach the common wire (grey) from the ID7-M-SEQ to the common terminal on the machine output card. Attach the appropriate input wires from the ID7-M-SEQ to the output terminals on the machine output card.

CHANNEL	SIGNAL		COLOR
Channel 1	First Stage	🔵	Blue
Channel 2	Second Stage	🔴	Pink
Channel 3	Screw Run	🔴	Red
Channel 4	Mold Clamped	🟤	Brown

A

1st Stage
2nd Stage
Screw Run
Mold Clamped
Not Used
Common

CHANNEL	SIGNAL		COLOR
Channel 1	Injection Forward	🔵	Blue
Channel 2	First Stage	🔴	Pink
Channel 3	Screw Run	🔴	Red
Channel 4	Mold Clamped	🟤	Brown

B

Injection Forward
1st Stage
Screw Run
Mold Clamped
Not Used
Common

ID7-M-SEQ Sequence Module Installation (continued)

C

CHANNEL	SIGNAL	COLOR	
Channel 1	Injection Forward	🔵	Blue
Channel 2	Second Stage	🔴	Pink
Channel 3	Screw Run	🔴	Red
Channel 4	Mold Clamped	🟤	Brown

Injection Forward ←
2nd Stage ←
Screw Run ←
Mold Clamped ←
Not Used ←
Common ←

D

CHANNEL	SIGNAL	COLOR	
Channel 1	Injection Forward	🔵	Blue
Channel 3	Screw Run	🔴	Red
Channel 4	Mold Clamped	🟤	Brown

Injection Forward ←
Not Used ←
Screw Run ←
Mold Clamped ←
Not Used ←
Common ←

E & F

CHANNEL	SIGNAL	COLOR	
Channel 1 or 2	First Stage	🔵	Blue
Channel 3	Screw Run	🔴	Red
Channel 4	Mold Clamped	🟤	Brown

1st Stage ←
Not Used ←
Screw Run ←
Mold Clamped ←
Not Used ←
Common ←

Not Used ←
1st Stage ←
Screw Run ←
Mold Clamped ←
Not Used ←
Common ←

3. Connect the module to the CoPilot system.

Connect the C-ID7-M-3M cable to the ID7-M-SEQ module. Using the CE-LX5-2M Lynx cable, connect the ID7-M-SEQ to the JLX-1 junction.

C-ID7-M-3M Cable to Machine

Lynx Cable to J-LX1
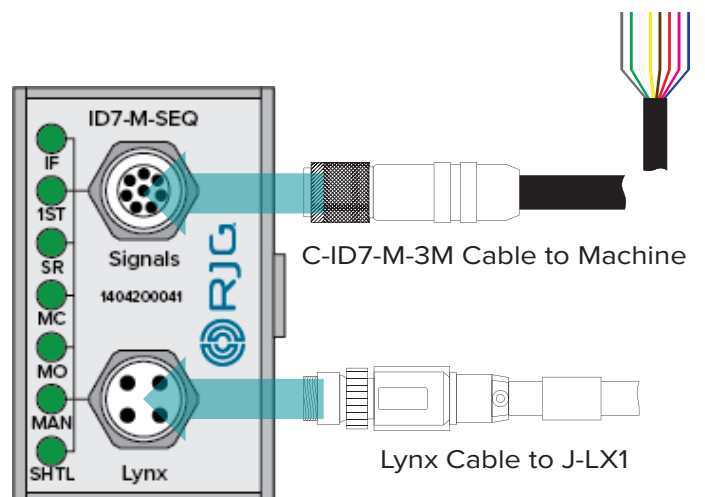
IA1-M-V Analog Input Module

The IA1-M-V module is used to obtain injection pressure and/or screw position from electric molding machines.

⚠️ **CAUTION** *Before beginning IA1-M-V installation, disconnect and lockout/tag-out any and all power to the molding machine. Failure to comply will result in personal injury or death, and damage or destruction of equipment.*

1. Mount the modules.

Mount the IA1-M-V module using the supplied DIN rail next to the installed OR2-M module (connect a IA1-M-V module to the OR2-M module using the integrated side connectors).

A clearance height of 6" (152,4 mm) from the face of the module is recommended.

ℹ️ **NOTE** *Modules and connecting cables must be located away from any static sources, such as feeder tubes and material hoppers.*

2. Wire the module.

ℹ️ **NOTE** *The following required signals may be obtained from a machine output card.*

Wire the following machine sequence signals to the module cable C-IA1-M-3M:

INPUT	FUNCTION	COLOR	
0–10V	+ Signal	🔵	Blue
0 V DC Common	- Signal	⚪	White

Attach 0 V DC (white) wire to the Common terminal of the injection molding machine 0–10 V I/O card.

Attach 0–10 V (blue) wire to the output terminal of the injection molding machine 0–10 V I/O card.

ℹ️ **NOTE** *Note the signals which are wired to the machine for future software setup and use.*

3. Connect the module to the machine.

Connect the C-IA1-M-3M cable to the IA1-M-V module.

0 V DC

0–10 V
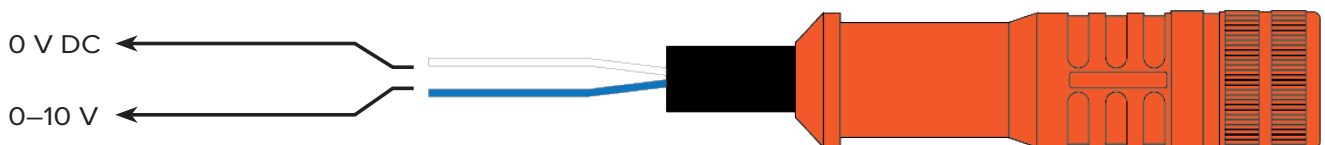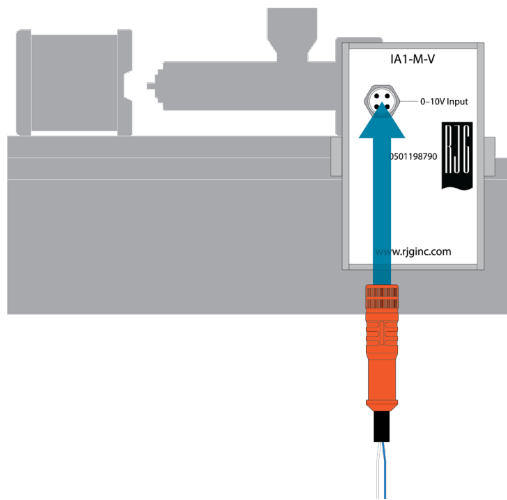
OR2-M Dual Relay Output Module

⚠️ **CAUTION** *Before beginning OR2-M installation, disconnect and lockout/tag-out any and all power to the molding machine. Failure to comply will result in personal injury or death, and damage or destruction of equipment.*

1. Mount the module.

Mount the OR2-M module using the supplied DIN rail next to the installed ID7-M-SEQ module (connect the OR2-M and ID7-M-SEQ modules using the integrated side connectors).

A clearance of 6" (152,4 mm) from the face of the module is recommended.

ℹ️ **NOTE** *Modules and connecting cables must be located away from any static sources, such as feeder tubes and material hoppers.*

2. Wire the module.

To utilize the CoPilot software part sorting and control signals, the OR2-M is interfaced to a machine's or robot's input card; the machine can then be configured to stop if excessive reject parts are being made, or the robot can be configured to save only good parts. Determine the input voltage required by the machine/robot to facilitate desired action (most machines/robots require 24 V DC).

⚠️ **CAUTION** *Always apply the appropriate backups provided by the machine or robot manufacturer.*

RJG, Inc. recommends the use of 🔍 quench-arcs with dry contacts, preferably installed across the load. However, they may also be placed across the contacts by attaching to the cable pigtails.
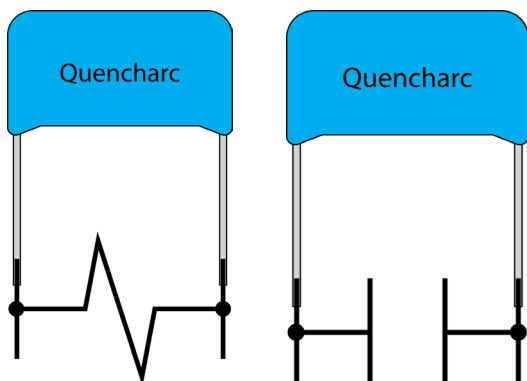
Preferred Method (left) and Alternate Method (right).

🔍 **Quench-arcs**
Quench-arcs increase relay life and reduce electromagnetic interference (EMI) emissions. It is preferred that the quench-arcs (RJG recommends part # 504M02QA100) are attached across the load. However, the quench-arcs may alternately placed across the contacts by attachment to the cable pigtails.

Wire the following machine signals to the module cable C-OR2-3M:

ℹ️ **NOTE** *Refer to "Appendix" on page 43 for inject enable, V→P, and valve gate wiring.*

RELAY	SIGNAL		COLOR
CR1	Normally Open	🟤	Brown
CR1	Common	⚫	Black
CR1	Normally Closed	🔵	Blue
CR2	Normally Open	🟤	Brown
CR2	Common	⚫	Black
CR2	Normally Closed	🔵	Blue

Contact Rating 1A 30 V DC

Attach the Common wire for contact relay 1 (CR1) to the 24 V DC power source of the machine controller/robot; attach the Normally Open wire for CR1 to the 24 V DC machine/robot input/output (I/O) card input terminals.

3. Connect the module to the machine/robot.

Connect the C-OR2-3M cable to the OR2-M module.
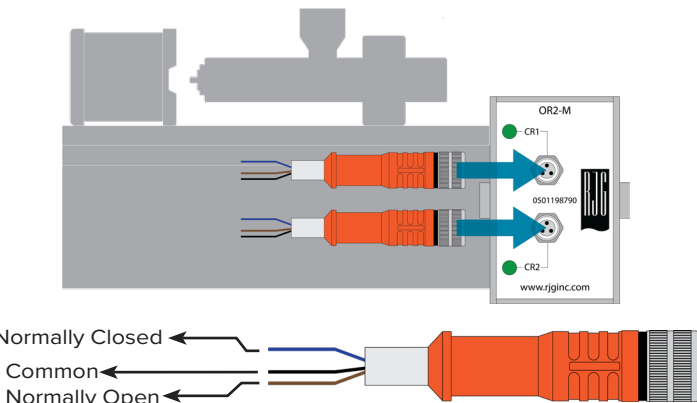
OA1-M-V Analog Output Module

⚠️ **CAUTION** *Before beginning OA1-M-V installation, disconnect and lockout/tag-out any and all power to the molding machine. Failure to comply will result in personal injury or death, and damage or destruction of equipment.*

1. Mount the module.

Mount the OA1-M-V module using the supplied DIN rail next to the installed ID7-M-SEQ module (connect the OA1-M-V and ID7-M-SEQ modules using the integrated side connectors).

A clearance of 6" (152,4 mm) from the face of the module is recommended.

ℹ️ **NOTE** *Modules and connecting cables must be located away from any static sources, such as feeder tubes and material hoppers.*

2. Wire the module.

⚠️ **CAUTION** *Always apply the appropriate backups provided by the machine or robot manufacturer.*

Wire the following machine signals to the module cable C-OA1-M-3M:

OUTPUT TYPE	SIGNAL		COLOR
0–10 V DC	Positive Signal (+)	🟤	Brown
0 V DC	Negative Signal (-)	⚫	Black
No Connection	N/A	🔵	Blue
No Connection	N/A	⚪	White

Using the C-OA1-M-3M cable, attach 0–10 V DC (brown) wire to the output terminal of the injection molding machine 0–10 V I/O card. Using the C-OA1-M-3M cable, attach 0 V DC (black) wire to the Common terminal of the injection molding machine 0–10 V I/O card.

3. Connect the module to the machine.

Connect the C-OA1-3M cable to the OA1-M-V module.
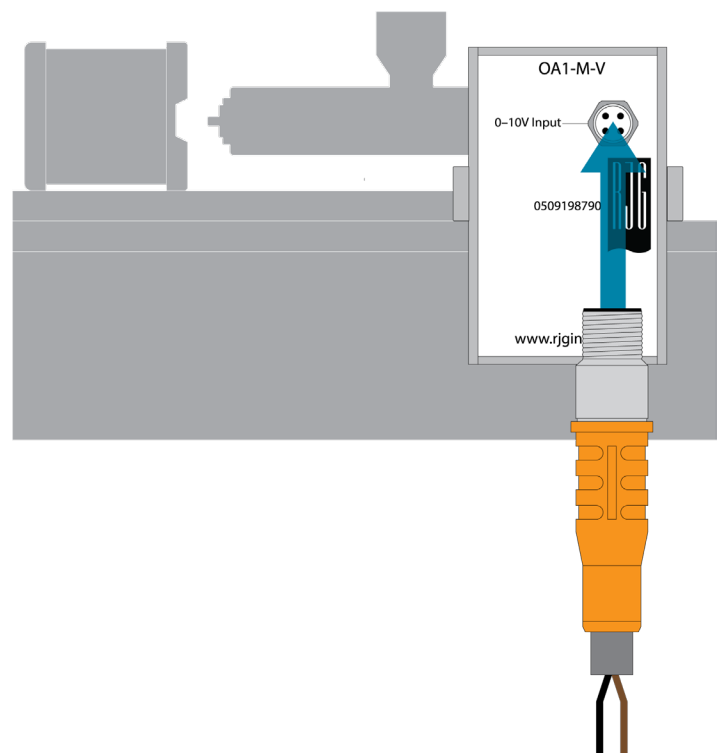
Junction Installation

⚠️ **CAUTION** *Before beginning J-LX1 installation, disconnect and lockout/tag-out any and all power to the molding machine. Failure to comply will result in personal injury or death and damage or destruction of equipment.*

1. Measure and cut junction mounting location.

The J-LX1 is a feed-through junction that connects the DIN rail modules ID7-M-SEQ, OR2-M, and IA1-M-V* to the CoPilot system. A Lynx cable connects the modules and the junction. Note the installation location for the DIN rail modules and measure, mark, and cut a mounting location for the junction in the machine panel.

if installed.

2. Install junction.

Ensure all power is disconnected and perform all lockout/tag-out procedures.

- Remove and retain the **G** nut from the junction.
- Remove and retain **F** steel washer and **E** rubber washer from junction.
- Insert junction from the inside of the machine through the mounting location to the outside of the machine.
- Install **E** rubber washer on junction.
- Install **F** steel washer on junction.
- Install **G** nut on junction; tighten to secure.

Refer to figure at right for installation.
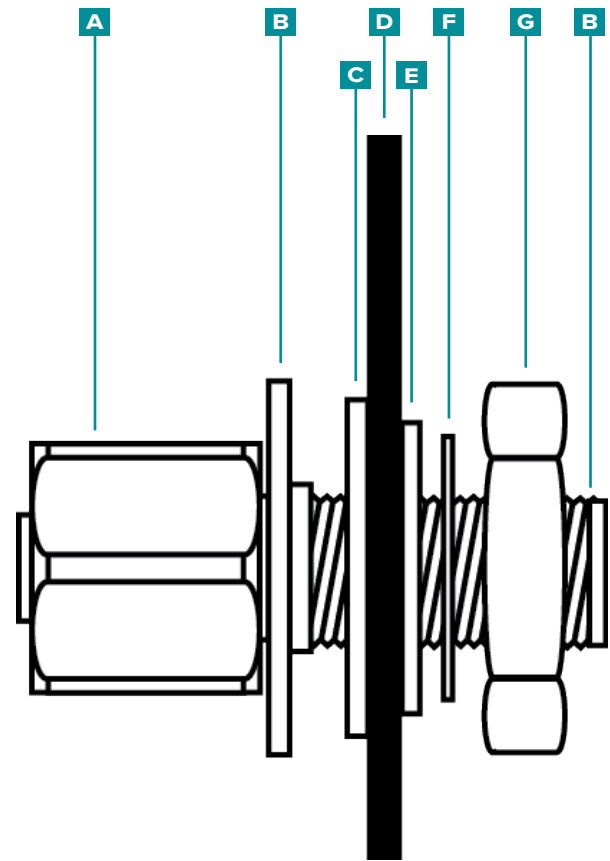
A	Female Socket	**E**	Rubber Washer
B	Thin Shoulder Washer	**F**	Steel Washer
C	Thin Plastic Washer	**G**	Nut
D	Machine Panel	**H**	Male Connector

to ID7-M-SEQ   to J-LX2-CE *or* AP4.0*
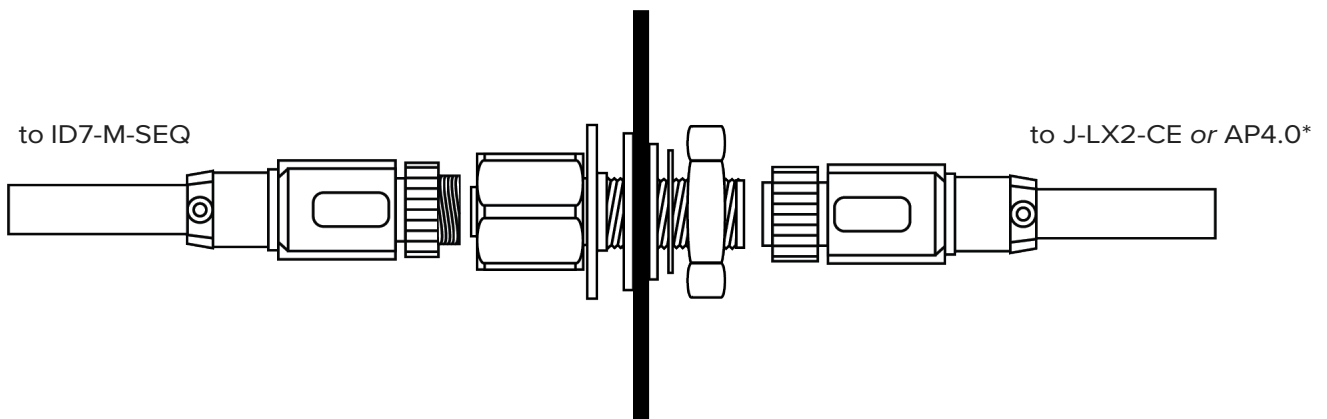
*J-LX2-CE for hydraulic installations, AP4.0 for electric installations

J-LX2-CE Lynx Two-Port Junction (Hydraulic Installations)

⚠️ **CAUTION** *Before beginning J-LX2-CE installation, disconnect and lockout/tag-out any and all power to the molding machine. Failure to comply will result in personal injury or death, and damage or destruction of equipment.*

⚠️ **CAUTION** *Route and secure any cables to prevent abrasion, pinching, or pulling during operation. Junction must be placed in a location that will not cause a trip or snag hazard. Failure to comply will result in personal injury or damage to equipment.*

Mount the junction.

⚠️ **CAUTION** *Mount the junction to prevent damage from excessive heat. Failure to comply will result in damage to equipment.*

to L-SH-1/4NPT-3K   to LE-R-50
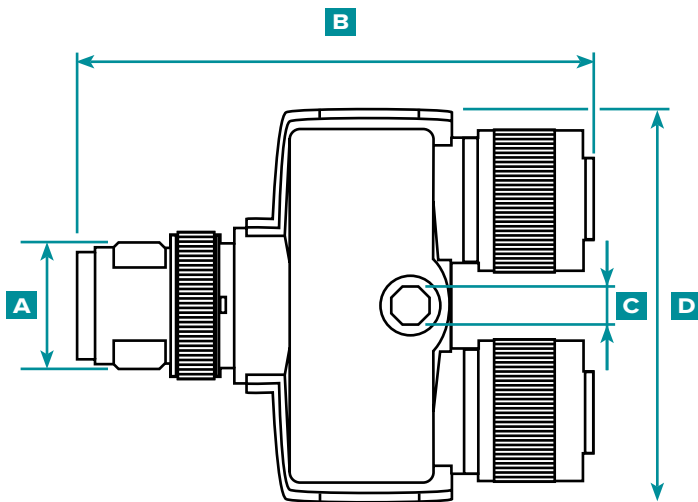
to AP4.0

A	M12	
B	2.035"	51,7 mm
C	0.165"	4,2 mm
D	1.535"	39 mm
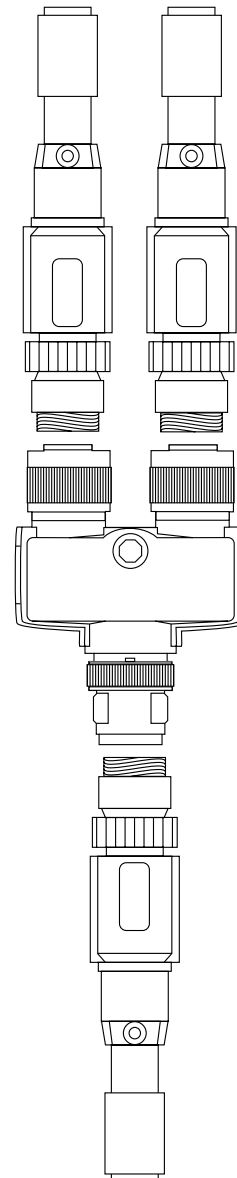
Machine Interface Sensor Installation

LE-R-50-REVB Lynx Stroke/Velocity

The LE-R-50-REVB monitors standard screw position and speed on injection molding machines where the functions are not available from the machine.

⚠️ **CAUTION** *Before beginning LE-R-50-REVB sensor installation, disconnect and lockout/tag-out any and all power to the molding machine. Failure to comply will result in personal injury or death, or damage to equipment.*

1. Mount the sensor.

ℹ️ **NOTE** *The stroke sensor cable must enter the cable bushing straight to eliminate wear on the cable and prevent erroneous readings.*

Mount the LE-R-50-REVB on the molding machine injection unit sled using the two included 10-24 x 2" cap screws.

⚠️ **CAUTION** *Screw travel must not exceed 50" (1270 mm). Failure to comply will result in inaccurate readings, personal injury, and damage to equipment.*
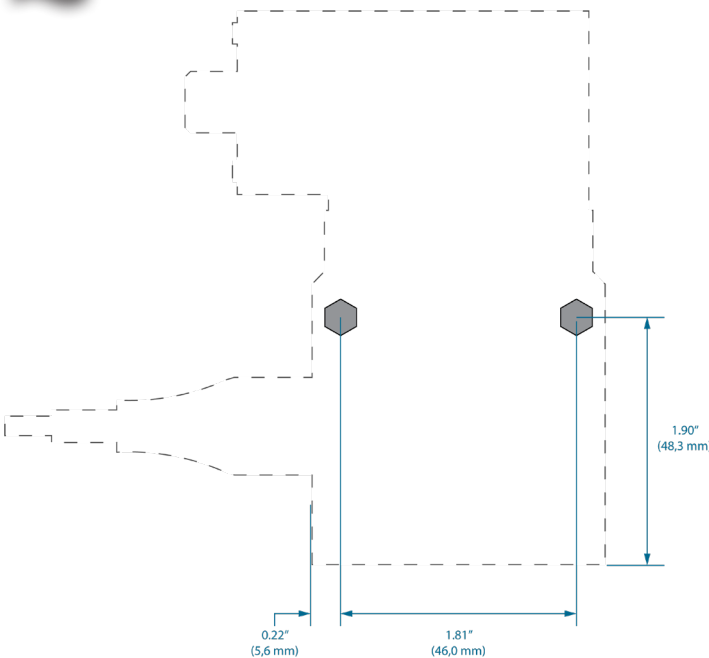
A Preferred Mounting Installation:

Mount the stroke sensor on the injection unit sled near the back of the unit so that the sensor will detect the movement of the screw but not the sled. Refer to figure on page 30.

B Alternate 1 Mounting Installation:

Mount the stroke sensor on the molding machine near the back of the injection unit sled. The sensor will detect the movement of the screw, but also the movement of the sled; this will also cause loss of some usable length. Refer to figure on page 30.

C Alternate 2 Mounting Installation:

Mount the stroke sensor on the injection unit sled near the front of the unit. The sensor will detect the movement of the screw, but not the sled; however, the sensor must remain 6–8" (152,4–203,2 mm) away from barrel heaters. Refer to figure on page 30.

2. Install Lynx cable on sensor.

Connect CE-LX5-4M-F90 Lynx cable to sensor.

ℹ️ **NOTE** *Strain-relieve cable so movement of sled does not place strain on connector.*

3. Install Lynx cable on AP4.0 or J-LX2-CE

Connect CE-LX5-4M-F90 Lynx cable to AP4.0 (electric machines). Connect CE-LX5-4M-F90 Lynx cable to J-LX2-CE Lynx Two-Port Junction Box (hydraulic machines).

1.90"
(48,3 mm)

0.22"
(5,6 mm)

1.81"
(46,0 mm)

Min. Radius = 5 * DIA

LS-H1/4NPT-xK

LE-R-50

A

LS-H1/4NPT-xK

LE-R-50

B

LS-H1/4NPT-xK

LE-R-50
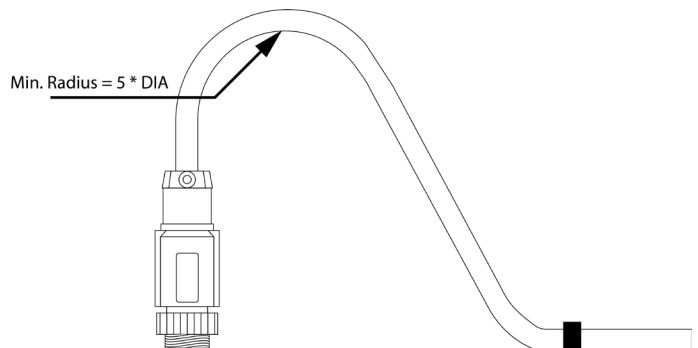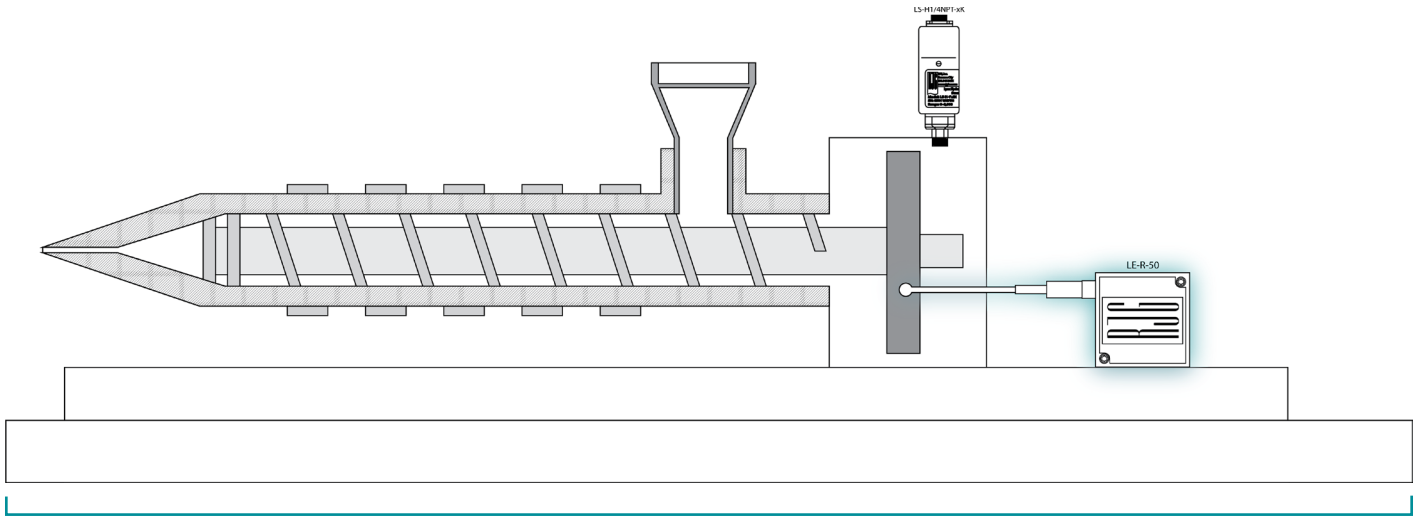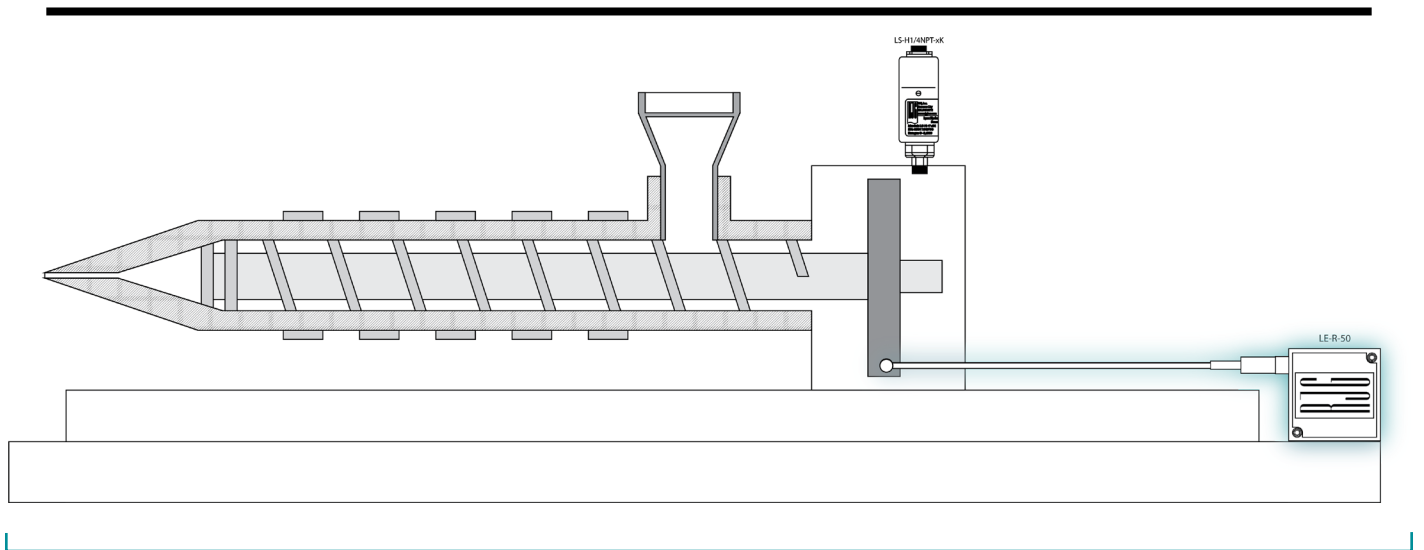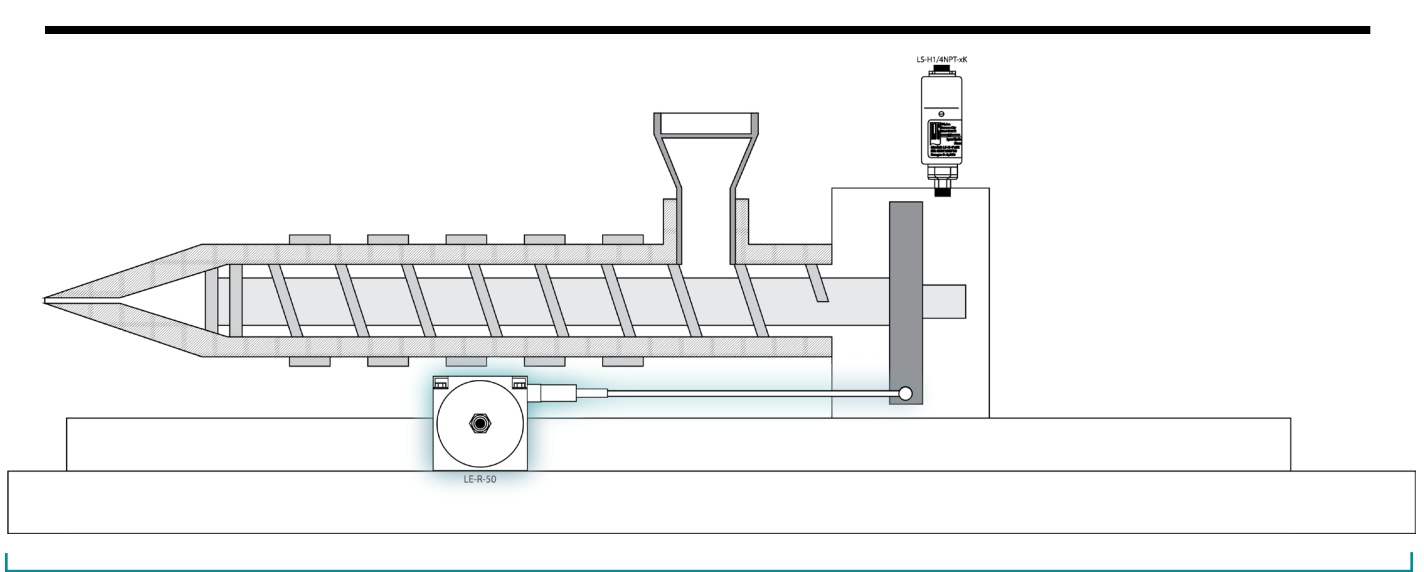
C

LS-H-1/4NPT-3K/5K Lynx Hydraulic Sensor

The LS-H-1/4NPT-3K/5K Lynx hydraulic sensor measures injection and back pressure, which build at the cylinder ram. The sensor has a 1/4" BSPT male adapter to a 1/4" NPT female fitting which attaches to the molding machine's hydraulic system.

> ⚠️ **CAUTION** *Before beginning LS-H-1/4NPT-3K/5K Lynx hydraulic sensor installation, disconnect, lock out, and tag out any and all power to the molding machine. Failure to comply will result in personal injury or death and damage or destruction of equipment.*

> ⚠️ **CAUTION** *Before beginning LS-H-1/4NPT-3K/5K Lynx hydraulic sensor installation, relieve hydraulic pressure from the molding machine. Failure to comply will result in personal injury or death and damage or destruction of equipment.*

1. Install sensor on machine.

The LS-H-1/4NPT-3K/5K 1/4"NPT female adapter may be installed directly to the molding machine; in some cases, an adapter may be required to install the sensor.

Male BSPT/Female NPTF Adapter:

SPECIFICATIONS	
Tube Fitting Part No.	1/4X1/4F3HG
PT Female NPT	1/4
T3 Male BSPT	1/4
C6 Hex (in.)	3/4
L (mm)	3/4
Standard Material	Steel

Male Metric/Female PT Adapter:

SPECIFICATIONS	
Tube Fitting Part No.	M12-1/4F8OHG
	M14-1/4F8OHG
PT Female NPTF	1/4-18
	1/4-18
T8 Port THD Metric STR	M12X1.5
	M14X1.5
C1 Hex (in.)	3/4
	3/4
D Drill (in.)	0.196
	0.281
L (in.)	1.24
	1.24
LL (in.)	0.85
	0.85
Standard Material	Steel
	Steel

2. Install Lynx cable on sensor.

Connect CE-LX5-4M-F90 Lynx cable to sensor.

3. Install Lynx cable on J-LX2-CE.

Connect CE-LX5-4M-F90 Lynx cable to Lynx port on the J-LX2-CE Lynx Two-Port Junction Box.

A	Lynx Connection
B	Hydraulic Connection
C	LS-H-1/4NPT-3K/5K Hydraulic Pressure Sensor
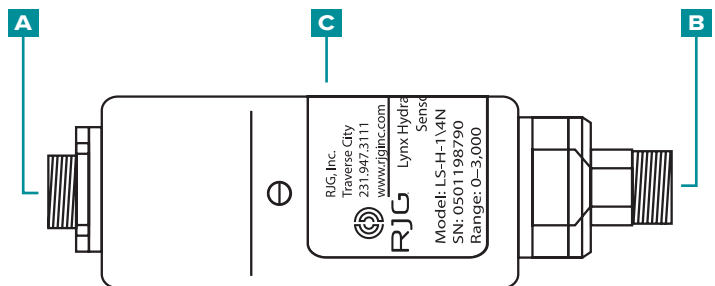
Optional Equipment Installation

J-LX5-CE Lynx Five-Port Junction (Optional)

The Lynx five-port junction is used only if a proximity or limit switch is used to derive a mold closed signal.

⚠ **CAUTION** *Before beginning J-LX5-CE installation, disconnect and lockout/tag-out any and all power to the molding machine. Failure to comply will result in personal injury or death, and damage or destruction of equipment.*

Mount the junction.

The J-LX5-CE may be mounted on the moving or stationary platen or mold half, or other convenient location on the machine using #6 -32 X 1.75" socket head cap screws.

⚠ **CAUTION** *The J-LX5-CE has a maximum operating temperature 185 °F (85 °C); mount junction to prevent damage from excessive heat. Failure to comply will result in damage to equipment.*

⚠ **CAUTION** *Route and secure any cables to prevent abrasion, pinching, or pulling during operation. Junction must be placed in a location that will not cause a trip or snag hazard. Failure to comply will result in personal injury or damage to equipment.*

TOP

6.75" (171,45 mm)

1.0" (25,4 mm)

0.25" (6,35 mm)

1.5" (38,1 mm)

Mounting Holes

0.19" (4,83 mm)

SIDE

7.19" (182,63 mm)

2.05" (52,07 mm)

0.19" (4,83 mm)

Mounting Holes

1.0" (25,4 mm)

0.25" (6,35 mm)
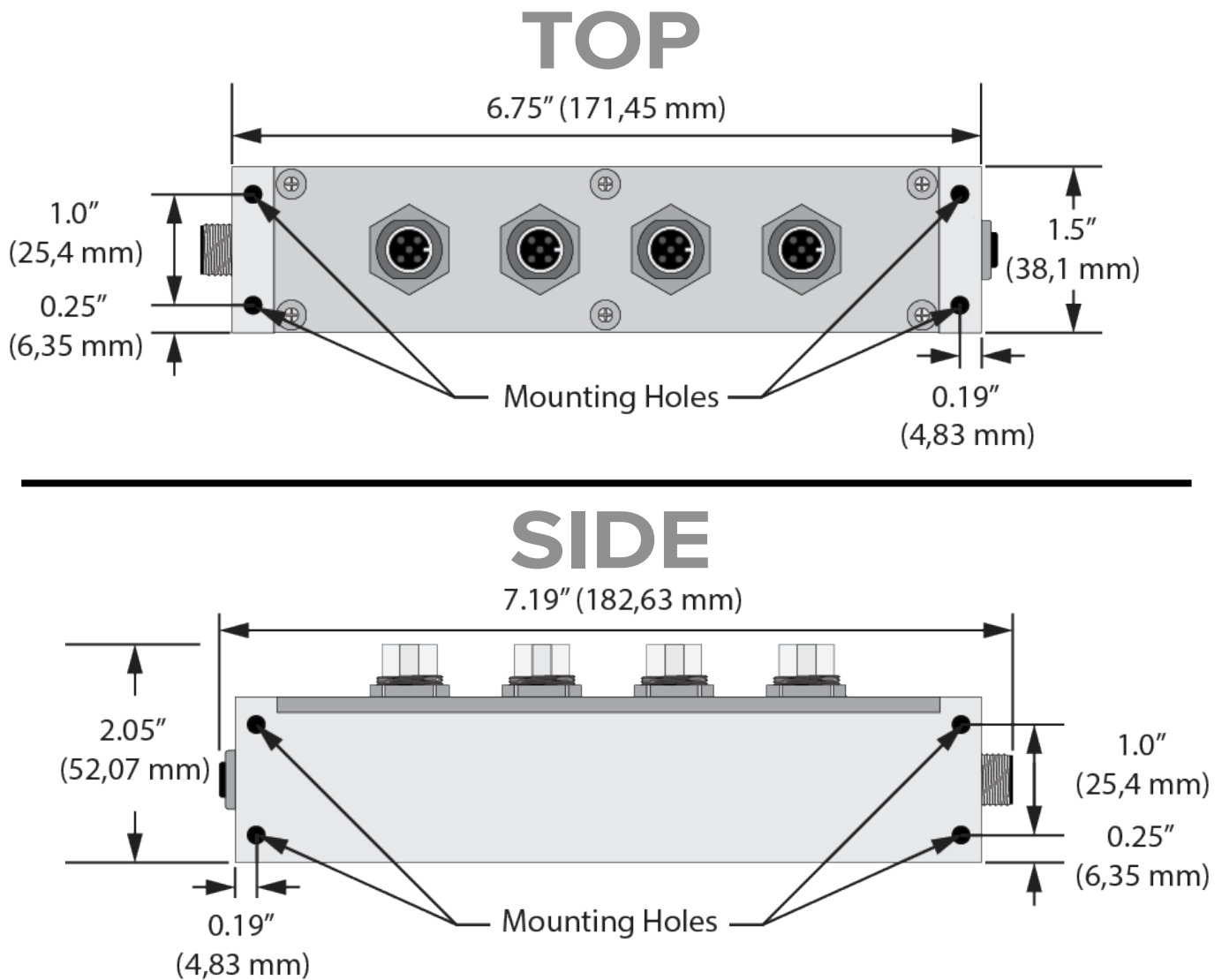
L-PX Lynx Proximity Switch

The L-PX Lynx proximity switch is used to derive a mold closed signal only when one is not available from the ID7-M-SEQ machine sequence module.

> **i**   **NOTE**   *The injection molding machine must be in Manual mode, with the mold closed to perform installation.*

> ⚠   **CAUTION**   *Before beginning L-PX Lynx proximity switch installation, disconnect, lock out, and tag out any and all power to the molding machine. Failure to comply will result in personal injury or death and damage or destruction of equipment.*

1. Install proximity switch on machine.

Use the included magnets to determine correct installation position; remove magnets prior to permanent installation.

Position the proximity sensor/bracket and interface on the non-moving half.
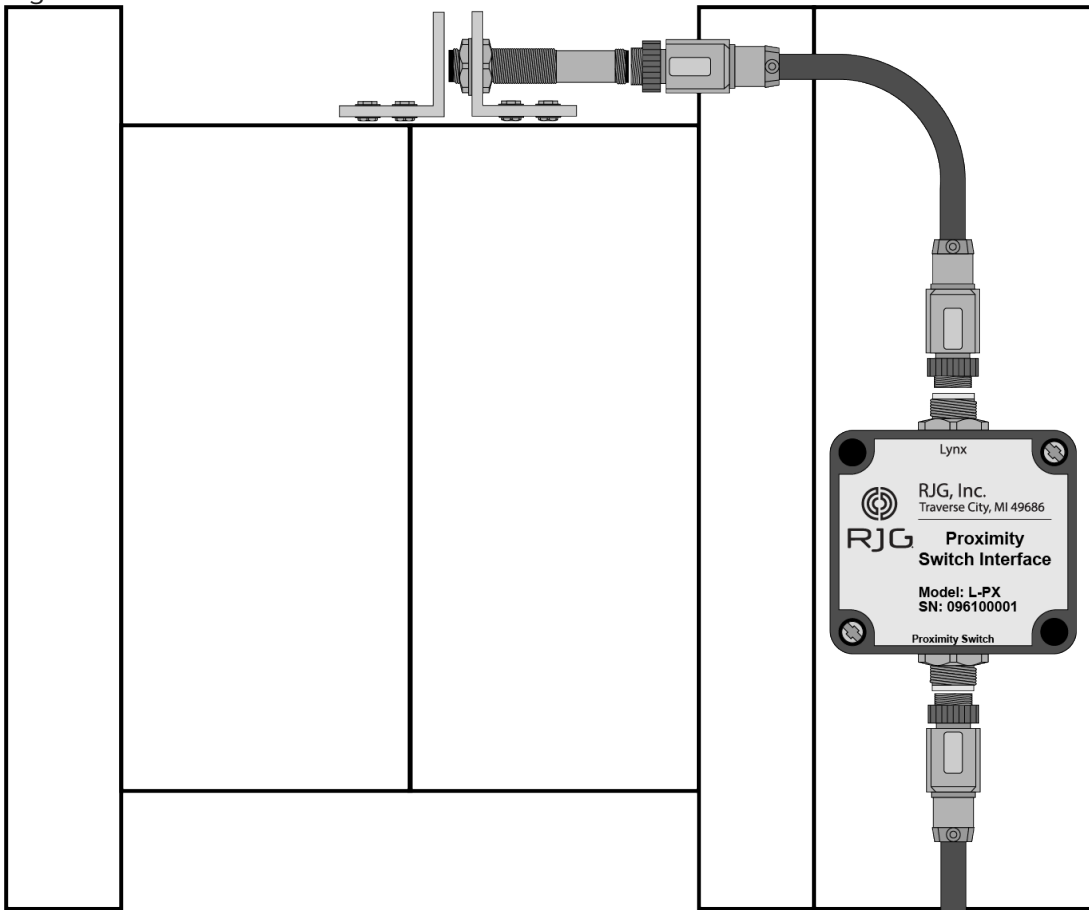
> ⚠   **CAUTION**   *Install the proximity switch so that the switch and/or cable does not become damaged by the ejector plate or mold during operation.*

Position the target bracket on the moving half; adjust the target bracket as close as possible to the proximity sensor (less than 0.1" (25,4 mm) distance).

2. Install Lynx cable on switch.

Connect CE-LX5-4M Lynx cable to switch.

3. Install Lynx cables on switch interface.

Connect CE-LX5-4M Lynx cables to each sides of switch interface.

4. Install Lynx cable on JLX-5-CE.

Connect CE-LX5-4M Lynx cable to Lynx port on the J-LX5-CE Lynx Five-Port Junction Box.

Serial/USB Interface Installation for TCU

1. Determine Serial/USB TCU Interface mounting location.

   Keep the interface away from excessive heat, vibration, and moisture.

2. Mount Serial/USB TCU Interface.

   Mount the interface using the integrated mounting locations.

3. Attach cables to the TCU, Serial/USB TCU Interface, and AP4.0.

   Attach Serial Cable to TCU and Serial/USB TCU Interface; attach USB cable to Serial/USB TCU Interface and AP4.0.

SERIAL/USB INTERFACE		
Operating Temperature	32–104° F	0–40° C
Storage Temperature	14–131° F	-10–55° C
BTUs		15.4 BTU/Hr
Power Source (4.5W)		AP4.0 USB Port

SERIAL CABLE (TCU to USB INTERFACE)

20.0' (6,10 m)
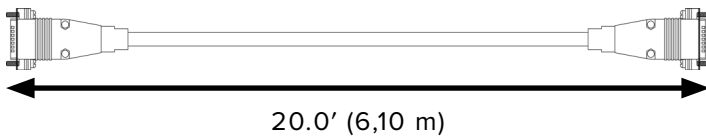
USB CABLE (USB INTERFACE TO AP4.0)

6.0' (1,83 m)

A	CoPilot System Application Processor AP4.0
B	USB Cable
C	Serial/USB TCU Interface
D	Serial Cable
E	TCU

Refer to CoPilot Software User Guide—available for download online at www.rjginc.com—for software setup and use information.

SERIAL/USB INTERFACE

CAUTION *DO NOT change dip switch positions. Failure to comply will result in TCU communication interruptions.*

2.8" (71,1 mm)

2.375" (60,33 mm)

3.0" (76,2 mm)

1.0" (25,4 mm)

0.9" (22,9 mm)

Flowmeter Installation

Refer to the product manual to install flowmeters—
available for download online at www.rjginc.com.

Mold Sensor Installation

Refer to the product manual and installation drawings to install mold sensors—available for download online at www.rjginc.com.

Warranty and Disclaimer

RJG, Inc. Standard 1-Year Warranty

RJG, Inc. is confident in the quality and robustness of the AP4.0 and associated power supply, and so are offering a one year warranty on the named equipment. RJG's AP4.0 and associated power supply 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 AP4.0 and/or associated power supply was subjected to abuse or neglect beyond the normal wear and tear of field use, or in the event the AP4.0 and/or associated power supply has been opened by the customer.

Product Disclaimer

RJG, Inc. is not responsible for the improper installation of this, or 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.

Preventative Maintenance

Periodically inspect the AP4.0, power cable, and all connected cables to detect possible damages. If damage is found, cease equipment use and contact a qualified servicer or RJG, Inc. at (231) 947-3111

Service

The AP4.0 and related components contain no user-serviceable parts. Only qualified personnel may service the AP4.0 and related components.

Disposal

Contact RJG or an RJG representative to discard the AP4.0 or supporting components.
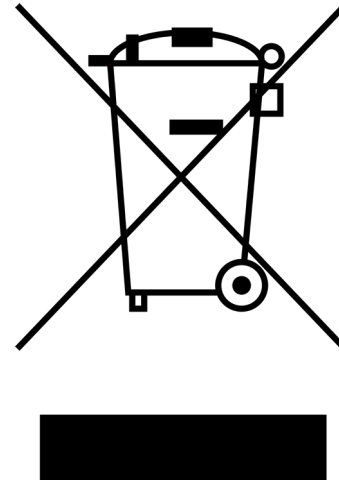
AP4.0 Troubleshooting

The AP4.0 has four LEDs that indicate power supply to:

A the AP4.0 as a whole (one ⬤ yellow);

B the Lynx sensor interface board (one ⬤ green);

C Lynx port 2 (individually (one ⬤ red)); and

D Lynx port 1 (individually (one ⬤ orange)).
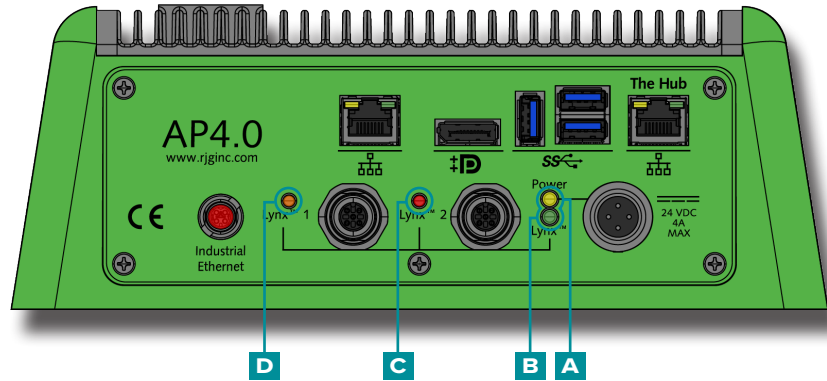
Use the following table to troubleshoot the AP4.0 and attached Lynx devices.

CONDITION	Lynx Port 1	Lynx Port 2	Lynx Board	AP4.0	TROUBLESHOOTING
AP4.0, Lynx, and Lynx Ports 1/2 Power On	⬤ (orange)	⬤ (red)	⬤ (green)	⬤ (yellow)	System is operating as expected.
No Power to AP4.0	◯	◯	◯	◯	Check AC power, power supply connections
Power to AP4.0 Only	◯	◯	◯	⬤ (yellow)	Contact RJG Customer Support for assistance; refer to "Customer Support" on page 41.
AP4.0, Lynx, and Lynx Port 2 Power On, Lynx Port 1 Over Current	◯	⬤ (red)	⬤ (green)	⬤ (yellow)	Unplug Lynx cable from Lynx Port 1; power should return after 15 seconds. Troubleshoot cable/sensor short.
AP4.0, Lynx, and Lynx Port 1 Power On, Lynx Port 2 Over Current	⬤ (orange)	◯	⬤ (green)	⬤ (yellow)	Unplug Lynx cable from Lynx Port 2; power should return after 15 seconds. Troubleshoot cable/sensor short.
AP4.0 and Lynx, Power On, Lynx Ports 1 & 2 Over Current	◯	◯	⬤ (green)	⬤ (yellow)	Unplug Lynx cables from Lynx Port 1 & 2; power should return after 15 seconds. Troubleshoot cables/sensors shorts.

Common Errors

Standard Troubleshooting for Missing or Incorrect Inputs

Expected inputs do not appear on the sequence module, analog input module, or analog output modules (or in the CoPilot software).

1. Verify:

- module wiring is correct

- the inputs are connected to modules through Lynx cables

- Lynx cables are connected to junction(s)

- Lynx cables from junction(s) are connected to Lynx sensor interface ports

2. Disconnect then re-connect inputs.

3. Disconnect, re-connect, and restart AP4.0.

Helpful Hints

Cable Installation

When running wires along the machine, make sure cables will not be near a pinch point.

Avoid running cables near motors, servos, and load cells or along power conduits.

Secure cables well without crimping the cable itself.

Allow for enough slack (without crushing) of the cable if there is a need for range of motion.

Do not exceed 65′ (20 m) total cable length between a sensor, module, or junction and the AP4.0.

Sequence Signal-Machine Manufacturer Terminology Cross Reference

RJG TERM	MANUFACTURER	TERM 1	TERM 2	TERM 3
Injection Forward (IF)	Arburg	Inject		
	Demag			
	Engel	Injection Drain	Injection Unit Forward	
	Fanuc	Injection		
	Mitsubishi			
	Nissei	Filling	1st Stage	
	Sumitomo	Screw Injects	Inject Start	
	Van Dorn	Fill		
	Other			
Screw Run (SR)	Arburg	Dose	Dosage	Screw Rotate
	Demag			
	Engel	Screw Rotation		
	Fanuc	Screw Rotation		
	Mitsubishi	Coloring		
	Nissei	Screw Rotation		
	Sumitomo	Screw Rotate	Start Screw Rotate	
	Van Dorn			
	Other	Charge	Plasticize	Plastication
Mold Clamped (MC)	Arburg	Mold Clamped		
	Demag	Mold Closed		
	Engel	Mold Closed		
	Fanuc	Clamp Press Build Up		
	Mitsubishi			
	Nissei	Clamp Completion		
	Sumitomo	Mold Close End		
	Van Dorn	Clamp Close		
	Other	Die Closed		

Knowledge Base

For further information, visit

https://www.rjginc.com/know-how/knowledge-base

RJG's searchable virtual help library.

Topics include Machine Interface, eDART Data Manager, Networking, Sensor Communication, Extracting eDART Data, Advanced System Overview, Microsoft Windows, Valve Gate, System Utilities Software, Hardware, and other product-related issues.

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: globalcustomersupport@rjginc.com

www.rjginc.com/support

NOTES

Valve Gate Installation

Introduction

The CoPilot system valve gate tool controls valve gates directly while monitoring and controlling other functions. Valve gate control increases process capability by more precisely regulating pressures, flow lines, or knit lines, or by allowing reduced clamp tonnage through alternate filling and packing.

Relay output modules (OR2-M) must be installed to operate (open/close) the gates. Outputs must then be set up within the CoPilot software to open and close each gate independently using pressure, position, time, temperature, or the operation of other valve gates.

> ⚠️ **CAUTION** *Always set the appropriate backups on machine and/or external valve gate controller; RJG is not responsible for any damage caused by the lack of user-set backups. The CoPilot software valve gate control tool closes valve gates on the end of injection.*

Valve Gate Installation (continued)

Requirements

The CoPilot system requires the following inputs and outputs for successful valve gate control operation:

Lynx Device	Input	Function	Required
Sequence Input Module (ID7-M-SEQ)	Injection Forward	Master sequence for start at cycle and opening and closing gates.	Yes
	Screw Run	Stroke direction, zero and material variation information.	Yes
	Mold Clamped	Gate close backup. Accurate cycle time and integration limit.	Yes
	Machine in Manual	User configuration determines whether valve gates are prevented from opening, or forced to open during purges.	No*
	Valve Pressure Supply	When ON this signals the CoPilot system that the hydraulic or air pressure to operate the gates is working. When OFF the CoPilot system cannot operate the valves and displays a user notification.	No*
Stroke Velocity Encoder (LE-R-30)	Screw position and speed	Used to sequence valves open or closed on volume.	Yes
Injection Pressure	Hydraulic, nozzle pressure, or analog input	Measures injection pressure, sets backups, and detects viscosity variations.	No*
Cavity Pressure Sensor(s)	Cavity Pressure	Controls valve gates by cavity pressure; results can be monitored.	

Lynx Device	Output	Function	Required
Dual Relay Output Module (OR2-M)	Velocity to Pressure (V2P Transfer) Contact Closure	External transfer to the machine to switch from velocity control to pressure control once all of the valves have closed.	Yes
	Inject Enable Contact Closure	The CoPilot system will open the contact if a failure occurs fails, which should stop the machine from injecting before mold damage can occur.	No*
Open Valve Relay Output	Contact closure to valve solenoid**	Each contact closure operates one valve solenoid.	Yes

* While listed as not required, these are recommended for successful valve gate implementation.

** RJG does not currently supply the solenoid, or the air or hydraulic supply.

Valve Gate Installation (continued)

Wiring

Two (2) valve gates often can be controlled with one (1) OR2-M module; refer to the included diagrams for the best wiring practices for these systems. A maximum of 14 output devices (currently OR2-M modules or analog output modules OA1-M-V) can be connected to each Lynx port on the AP4.0.

> **i** **NOTE** *As each set of contacts is wired, record the valve gate to which it belongs by serial number and "signal" number (side 1 or side 2 of the module).*

> ⚠ **CAUTION** *The Valve Gate power source must be interrupted by the machine's emergency stop; this is the responsibility of the installer and failure comply may result in serious injury, death, and damage or destruction of equipment.*

The function that is performed when the relay in the OR2-M module becomes energized can be set in the CoPilot software for each valve gate—the system can be set up to open or close the valve gate when energized. This output is assigned in the CoPilot software process setup.

When Contact Closes, Gate Will	On Failure, Gate Will	Wire to Relay Contacts	"Location" Selection
Open	Close	Normally Open	OPEN GATE
Open	Open	Normally Closed	CLOSE GATE

Valve Gate Installation (continued)
Single-Action Solenoid Valve Gate Wiring for Four (4) Gates

⚠️ **CAUTION** *The Valve Gate power source must be interrupted by the machine's emergency stop; this is the responsibility of the installer and failure comply may result in serious injury, death, and damage or destruction of equipment.*
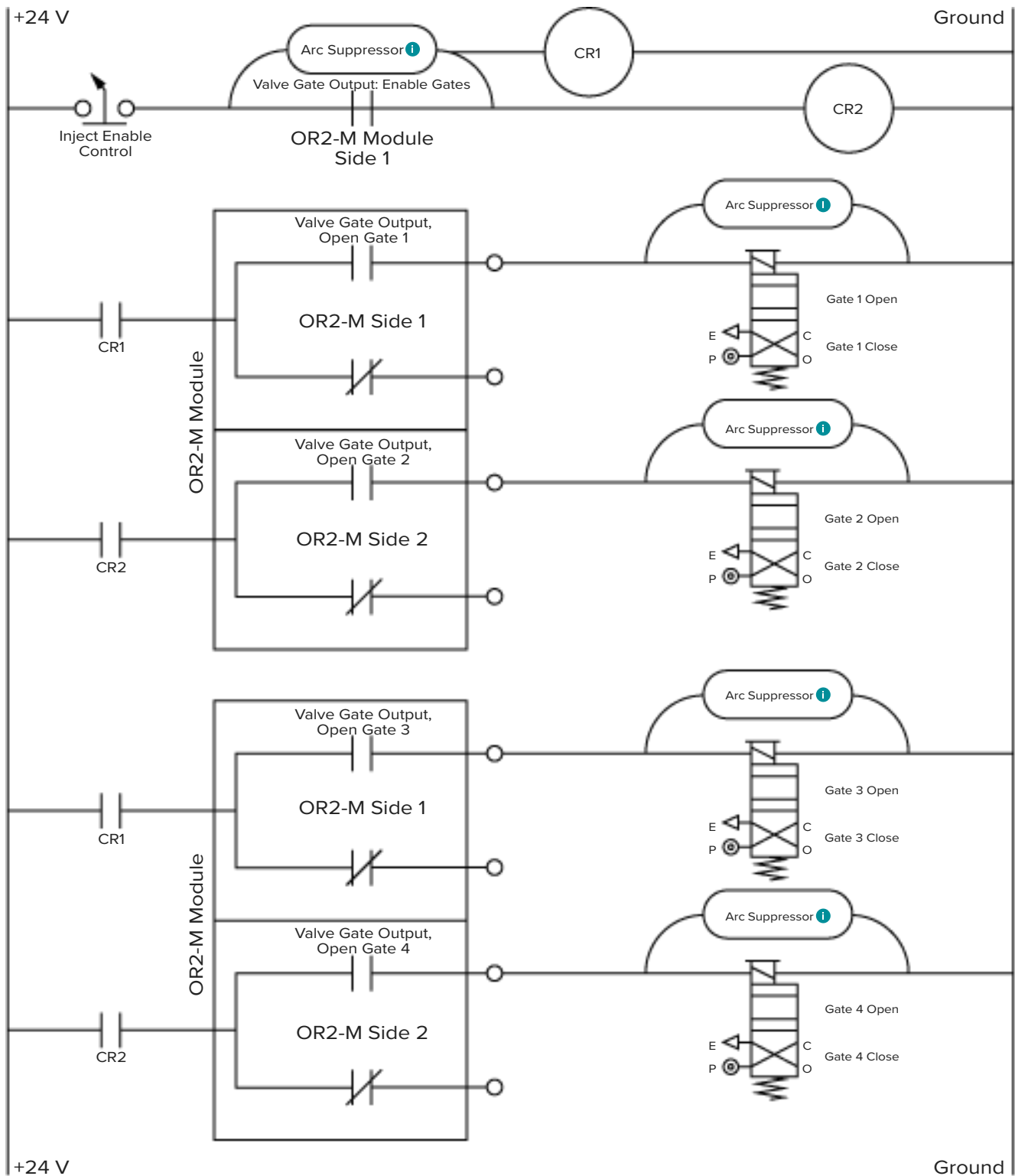
Valve Gate Installation (continued)

Dual Solenoid Systems

Some valve gate actuation systems have two solenoids per gate: one to open the gate and one to close it. Refer to the included diagrams for the best wiring practices of dual solenoid systems.

Dual Solenoid Valve Gate Wiring for Four (4) Gates

⚠️ **CAUTION** *The Valve Gate power source must be interrupted by the machine's emergency stop; this is the responsibility of the installer and failure comply may result in serious injury, death, and damage or destruction of equipment.*
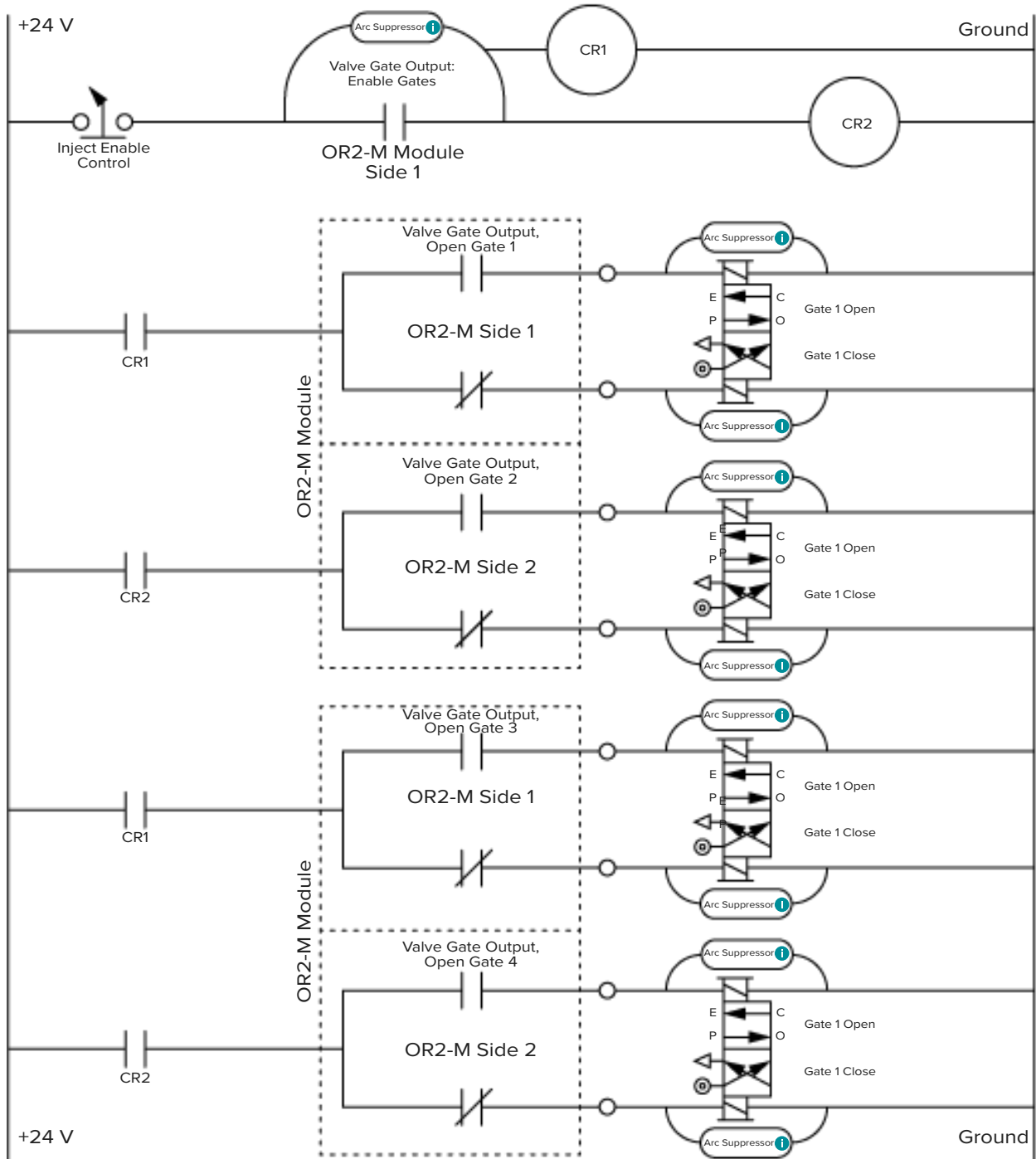
Valve Gate Installation (continued)

Dual Solenoid Valve Gate Wiring for Eight (8) Gates

⚠️ **CAUTION** *The Valve Gate power source must be interrupted by the machine's emergency stop; this is the responsibility of the installer and failure comply may result in serious injury, death, and damage or destruction of equipment.*
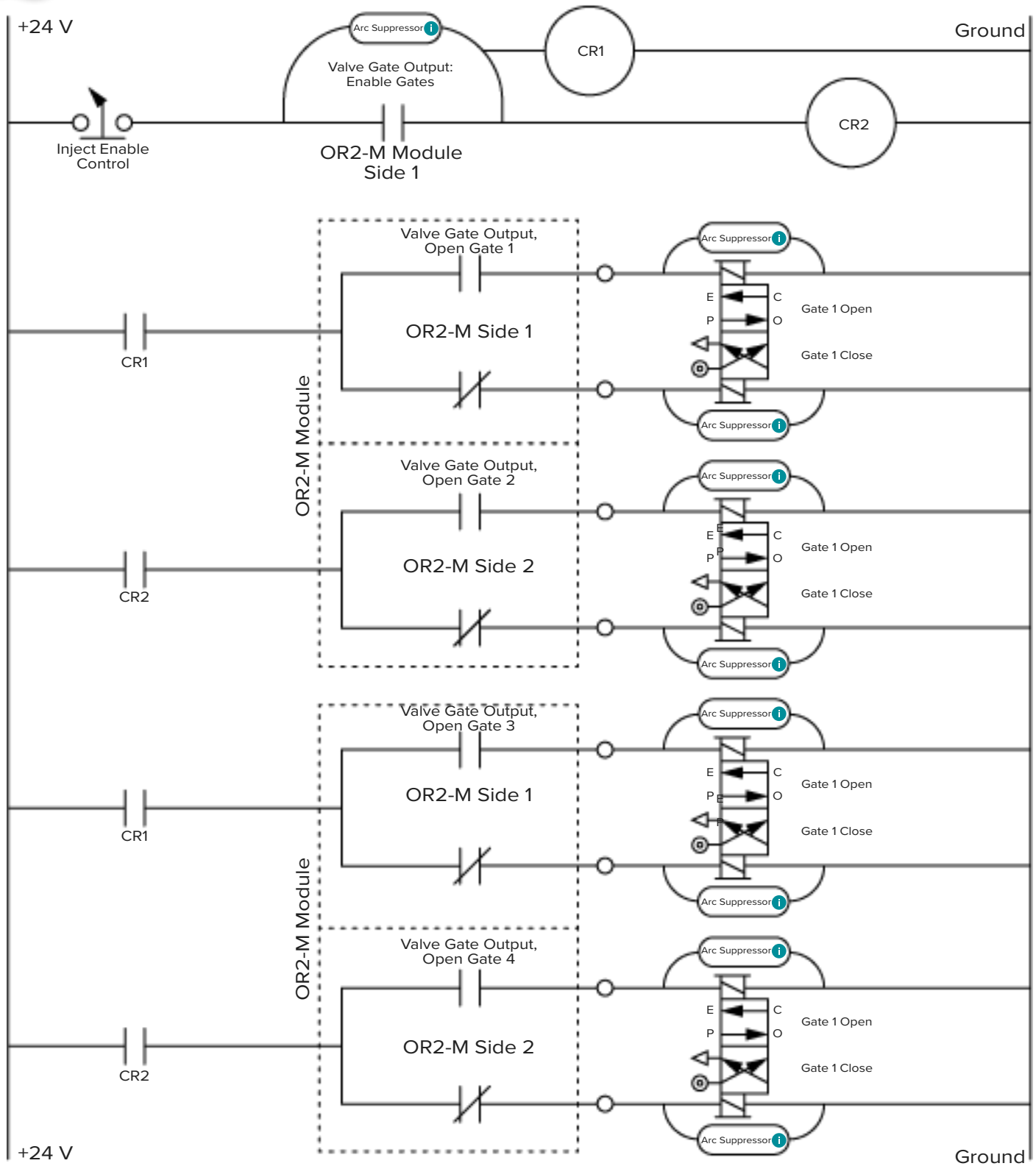
Valve Gate Installation (continued)
Dual Solenoid Valve Gate Wiring for Eight (8) Gates (continued)

⚠️ **CAUTION** *The Valve Gate power source must be interrupted by the machine's emergency stop; this is the responsibility of the installer and failure comply may result in serious injury, death, and damage or destruction of equipment.*
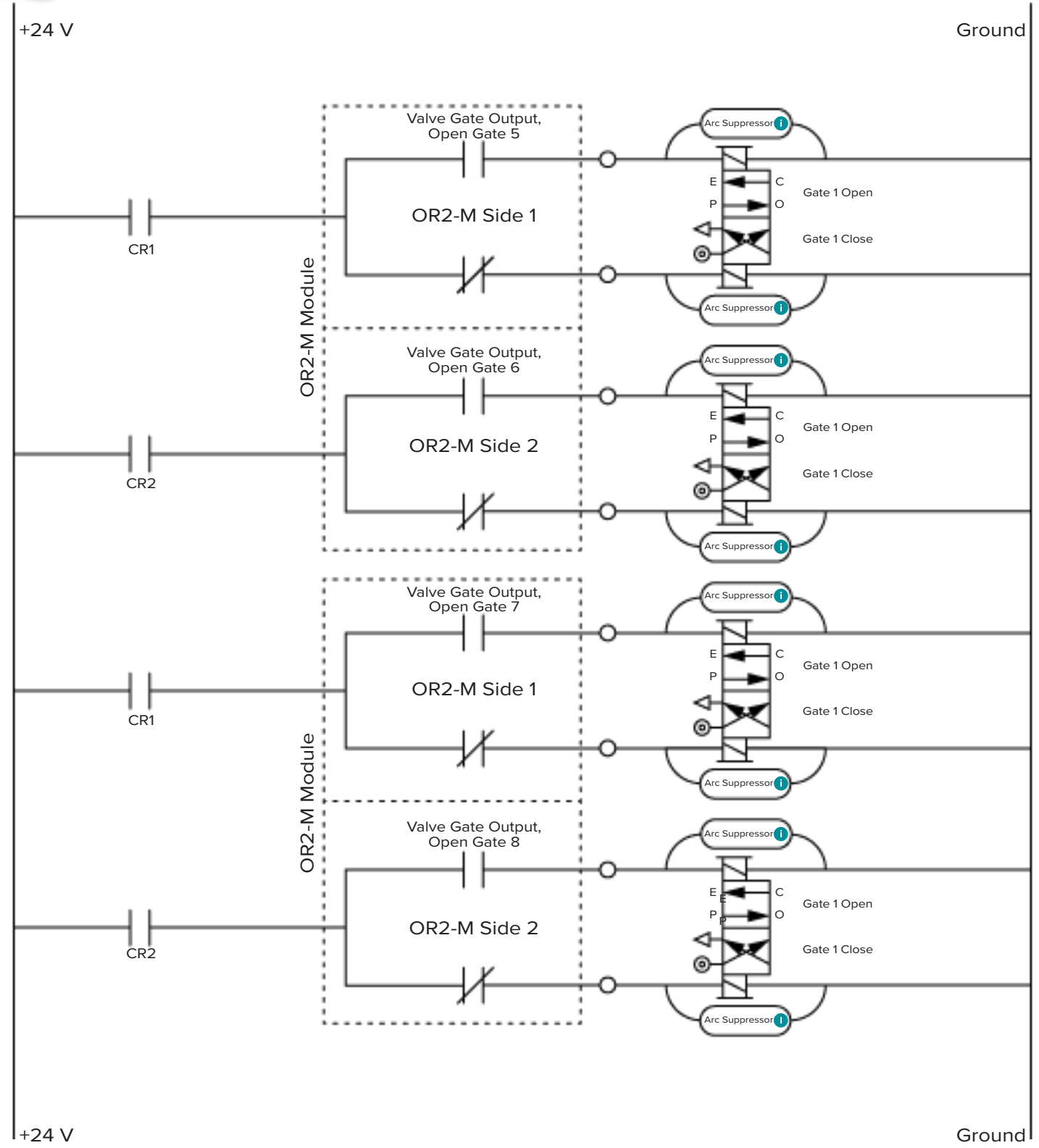
Valve Gate Installation (continued)

Valve Gate Pre-Fill Control Wiring with Parallel OR2-M Modules

> ⚠️ **CAUTION** *The Valve Gate power source must be interrupted by the machine's emergency stop; this is the responsibility of the installer and failure comply may result in serious injury, death, and damage or destruction of equipment.*
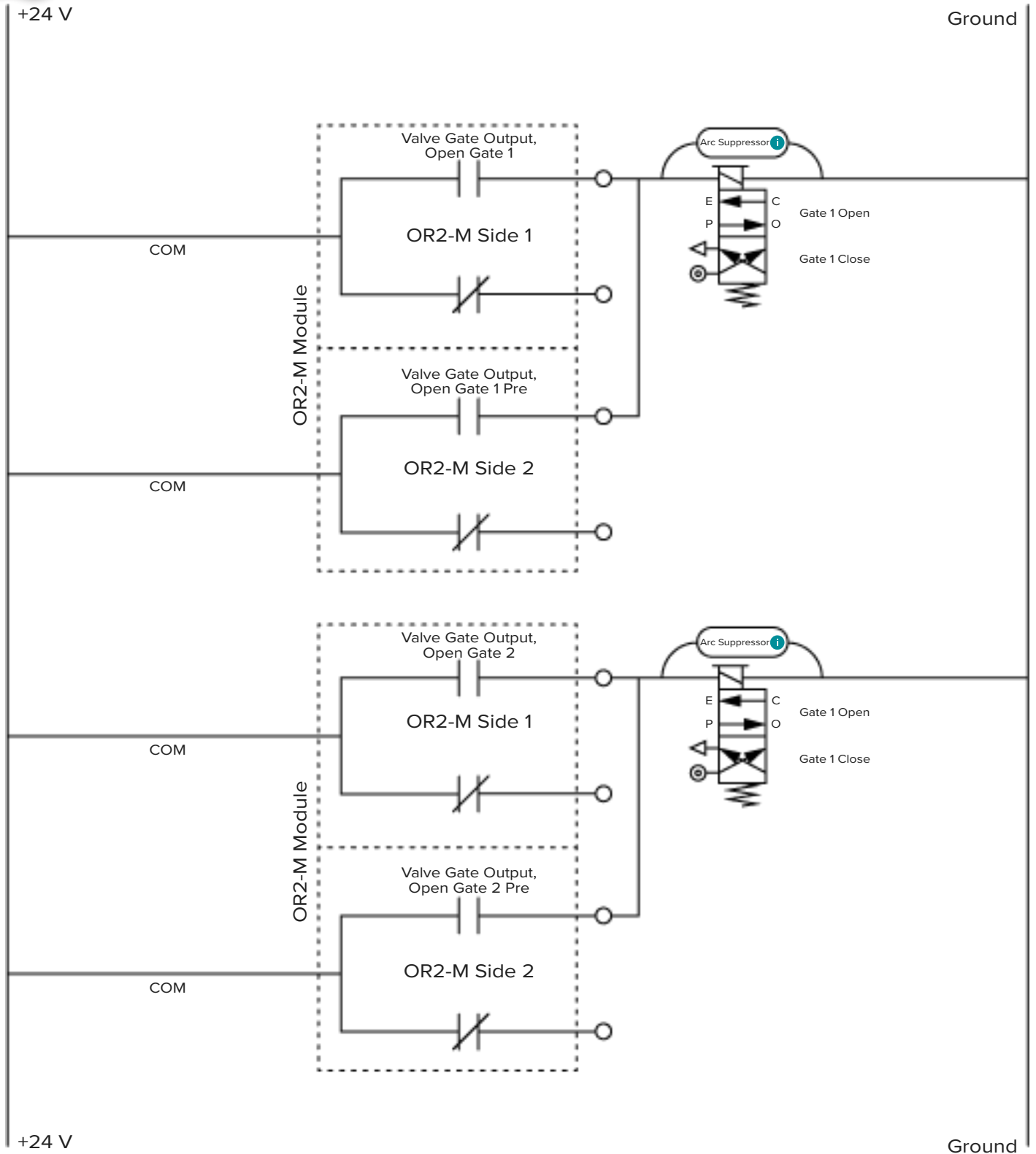
Inject Enable and V→P Wiring

Inject Enable

The inject enable feature deactivates injection when a control sensor is not present, or is in error, or when the CoPilot system is down or a job is not started. *A control sensor is any sensor used for valve gate, V→P transfer, or basic three-stage control.*

When inject enable deactivates injection, a notification is provided to the user indicating that the inject enable feature has been activated. To enable injection after the inject enable deactivates injection,

Users can manually enable injection in order to purge the machine, or perform other machine maintenance tasks.

In order to use the inject enable feature, an OR2-M

module must be wired to the machine and set up in the CoPilot software. The connection must be made on the logic side of the inject enable contacts, and the inject enable normally-open contact relay must be wired in series with the first stage (1st) solenoid (assuming that the ID7-M-SEQ module is wired in the preferred method shown on page 22).

V→P

The VP feature provides a control to velocity-to-pressure (V→P) transfer the machine based on cavity pressure or time after fill begins. In order to use the VP feature, an OR2-M module must be wired to the machine and set up in the CoPilot software.

24 V AC
Machine in Manual
Common
Common
Inject Enable Relay
V→P Relay
First Stage (1st)
Second Stage (2nd)
Screw Run
Mold Closed

First Stage Timer
Remove Wire CR V→P
CR V→P
Remove Wire CR Inject Enable
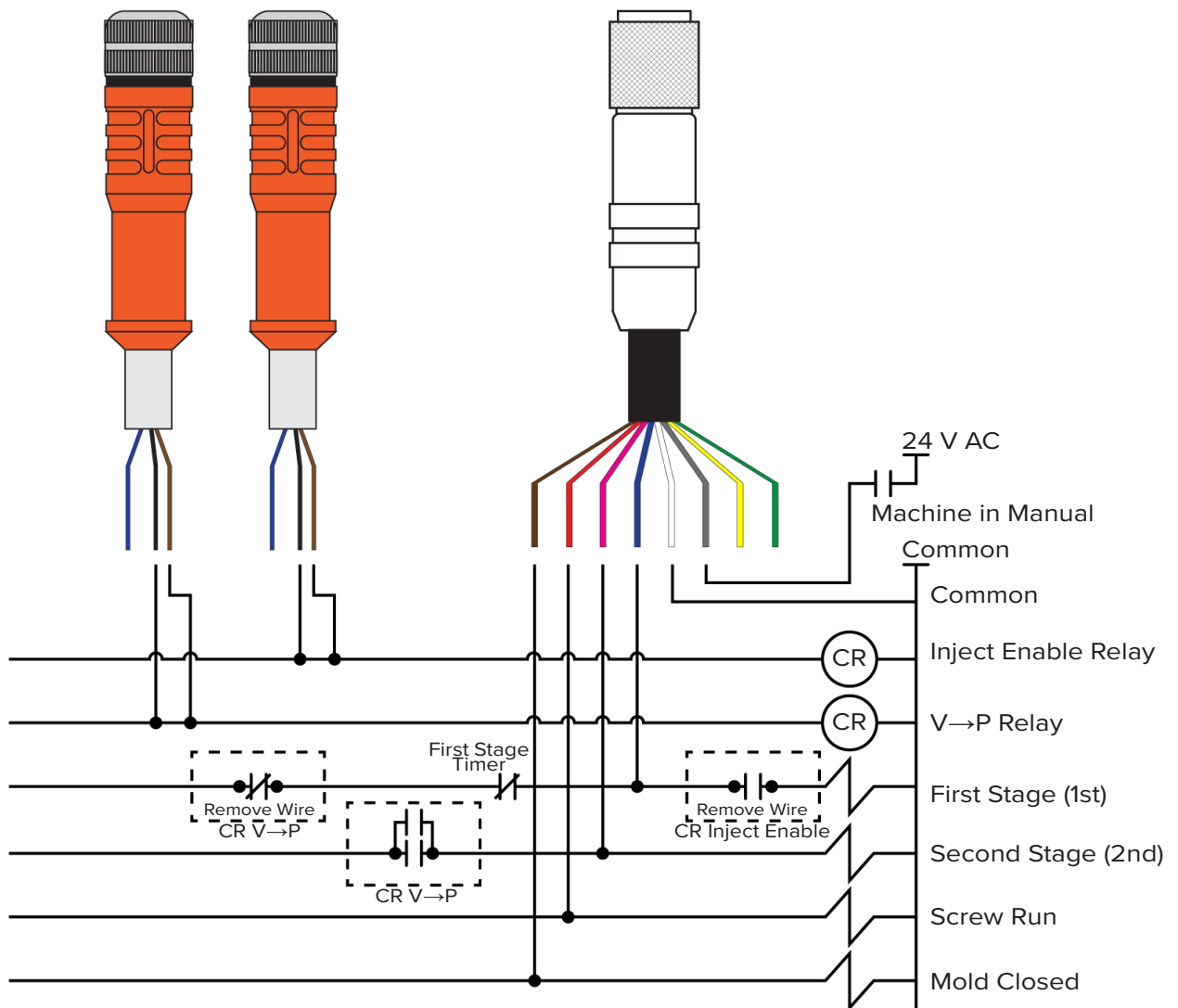
NOTES

CoPilot® System Hardware Installation Checklist

Use the following checklist to complete the CoPilot System application processor AP4.0 and Lynx™ hardware installation. Refer to the "**CoPilot System Hardware Installation and Setup Guide**" for complete, detailed instructions, warnings, and notes for installation and setup of the AP4.0 and Lynx hardware—available for download online at www.rjginc.com.

Machine Name _____

CoPilot System Serial Number _____

Machine Serial Number _____

_____

COPILOT SYSTEM APPLICATION PROCESSOR AP4.0 MOUNTING, POWER, AND NETWORKING

Refer to pages 20 & 21 in the "**CoPilot System Hardware Installation and Setup Guide**."

Mounting

COMPLETED BY	DATE	ACTIVITY
		Mount the AP4.0 to a solid surface with the Lynx sensor interface ports facing down to prevent fluids from entering a port or connection, with faceplate visible for easy location of Lynx port connectors located on the bottom of the AP4.0, using supplied mounting holes. Secure bolts tightly.

Power

COMPLETED BY	DATE	ACTIVITY
		Provide power to the AP4.0 24 V DC power supply from a 100–240 V AC (50–60 Hz) source separate from machine. Insert the power supply's cable (PS-AP50W-12V) connector into the AP4.0 power port. RJG recommends that an uninterruptible power supply (UPS) is placed between the input power and AP4.0 power connection.
		Measure the ground potential between the machine chassis and earth ground with a voltmeter, and record the following:
		Record the AC Voltage Difference:(must be < 1 V AC) _____
		Pass or Fail:(circle one) PASS FAIL
		Record the DC Voltage Difference:(must be < 1 V DC) _____
		Pass or Fail:(circle one) PASS FAIL

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CoPilot® System Hardware Installation Checklist

Networking

COMPLETED BY	DATE	ACTIVITY
		The AP4.0 ethernet port 2 is provided for networking the CoPilot System with The Hub® Software; if The Hub software is used, insert a shielded Cat5e or Cat6 ethernet cable into port 2 for networking.
		Attach the touchscreen cable to the DP++ connection on the AP4.0.
		OPTIONAL: A standard USB keyboard can be attached to the AP4.0; the keyboard must not have programmable functions. Ensure connector is firmly installed in the receptacle.
		OPTIONAL: A standard USB mouse can be attached to the AP4.0; ensure connector is firmly installed in the receptacle.

COPILOT SYSTEM TOUCHSCREEN, POWER, AND CONNECTIONS

COMPLETED BY	DATE	ACTIVITY
		Mount touchscreen within 6.0' (1.8 m) of AP4.0 and machine controller, visible from cell entrances, main aisles, or floor overhead for visual screen alerts using the built-in mounting brackets on back of monitor. Secure bolts tightly. Ensure touchscreen to AP4.0 connections are secure and without strain ifthe moveable swing arm is utilized.
		Power touchscreen from 100–240 V AC (50–60 Hz) source separate from machine. RJG recommendsthat an uninterruptible power supply (UPS) is placed between the input power and touchscreen power connection.
		Attach the touchscreen cable to the DP++ connection on the touchscreen.
		Attach the USB connection to the USB touchscreen and the AP4.0.

CoPilot® System Hardware Installation Checklist

DIN RAIL, J-LX1 JUNCTION, AND MACHINE MODULES

The CoPilot System requires four machine sequence signals; Two of the following three: first stage, second stage, and injection forward, and screw run and mold clamped. Refer to pages 22–27 in the "Copilot System Hardware Installation and Setup Guide." Machine module installation must be performed by a qualified maintenance professional.

DIN Rail and J-LX1 Installation

Refer to page 27 in the "CoPilot System Hardware Installation and Setup Guide" for J-LX1 installation.

COMPLETED BY	DATE	ACTIVITY
		Install the JLX-1 feed through into the machine panel, allowing the CE-LX5 Lynx cable to exit the machine panel.
		Securely mount a sufficient length of 0.89" (35 mm) DIN Rail for all the DIN Rail Mount sensors.
		Mount modules on DIN rail and slide together so integrated amphenol connectors are securely inserted.
		Attach a Lynx cable between the JLX-1 and the ID7-M-SEQ inside the machine panel. Ensure the cable connection is fully inserted and secure.

Machine Sequence Module Cable C-ID7-M-3M

Using the C-ID7-M-3M cable, attach the appropriate input wires from the ID7-M-SEQ to the output terminals on the machine input/output card.

COMPLETED BY	DATE	ACTIVITY
		Verify that first stage (blue wire of C-ID7-M-3M) is wired to the machine I/O for first stage, **OR** verify that injection forward (blue wire of C-ID7-M-3M) is wired to the machine I/O for injection forward. **Signal Interfaced:**(circle one) First Stage Injection Forward
		Verify that second stage (pink wire of C-ID7-M-3M) is wired to the machine I/O for second stage, **OR** verify that first stage (pink wire of Amphenol C-ID7-M-3M) is wired to the machine I/O for first stage. **Signal Interfaced:**(circle one) Second Stage First Stage
		Verify that screw run (red wire of C-ID7-M-3M) is wired to the machine I/O for screw run.
		Verify that mold clamped (brown wire of C-ID7-M-3M) is wired to the machine I/O for mold clamped.
		Verify that the common (grey wire of C-ID7-M-3M) is wired to the machine I/O card ground
		OPTIONAL Verify that the mold opening (yellow wire of C-ID7-M-3M) is wired to the machine I/O for mold opening
		OPTIONAL Verify that the mold closing (any unused wire of the C-ID7-M-3M) is wired to the machine I/O for mold closing. Specify Channel:
		OPTIONAL Verify that the machine in manual mode (white wire of C-ID7-M-3M) is wired to the machine I/O for machine in manual mode.

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Machine Sequence Input Module ID7-M-SEQ

ID7-M-SEQ Serial Number _____

COMPLETED BY	DATE	ACTIVITY
		Verify that first stage is wired to channel 1 of the ID7-M-SEQ, **OR** verify that injection forward is wired to channel 1 of the ID7-M-SEQ.
		Signal Interfaced:(circle one) First Stage Injection Forward
		Verify with a voltmeter that channel 1 is receiving 18–36 V DC for the duration of first stage or injection forward.
		Verify that second stage is wired to channel 2 of the ID7-M-SEQ, **OR** verify that first stage is wired to channel 2 of the ID7-M-SEQ.
		Signal Interfaced:(circle one) Second Stage First Stage
		Verify with a voltmeter that channel 2 is receiving 18–36 V DC for the duration of second stage or first stage.
		Verify that screw run is wired to channel 3 of the ID7-M-SEQ.
		Verify with a voltmeter that channel 3 is receiving 18–36 V DC for the duration of mold clamped.
		Verify that mold clamped is wired to channel 4 of the ID7-M-SEQ.
		OPTIONAL Verify that mold opening is wired to channel 5 of the ID7-M-SEQ.
		OPTIONAL Verify that mold closing opening is wired to any open channel of the ID7-M-SEQ.
		Specify Channel: _____
		OPTIONAL Verify that machine in manual mode is wired to channel 6 of the ID7-M-SEQ.
		Verify that the CoPilot System "Cycle Graph" draws a new cycle each time the machine cycles.
		Verify that there are no errors being produced by the CoPilot System while cycling.

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CoPilot® System Hardware Installation Checklist

ANALOG INPUT MODULE IA1-M-V

Analog Input Module for Injection Pressure

IA1-M-V Serial Number _____

COMPLETED BY	DATE	ACTIVITY
		Attach the 0 V (white) wire of the C-IA1-M-3M cable to the common terminal of the injection molding machine 0–10V I/O card.
		Attach the 0–10V (blue) wire of the C-IA1-M-3M cable to the plus voltage terminal of the injection molding machine 0-10V I/O card.
		Attach the C-IA1-M-3M cable to the IA1-M-VI module. Verify that the cable connection is fully inserted and secure.

Analog Input Module for Stroke Data

IA1-M-V Serial Number _____

COMPLETED BY	DATE	ACTIVITY
		Attach the 0 V (white) wire of the C-IA1-M-3M cable to the common terminal of the injection molding machine 0–10V I/O card.
		Attach the 0–10V (blue) wire of the C-IA1-M-3M cable to the plus voltage terminal of the injection molding machine 0-10V I/O card.
		Attach the C-IA1-M-3M cable to the IA1-M-VI module. Verify that the cable connection is fully inserted and secure.

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CoPilot® System Hardware Installation Checklist

DUAL-RELAY OUTPUT MODULE OR2-M

Dual-Relay Output Module for Part Sorting

OR2-M Serial Number _____

COMPLETED BY	DATE	ACTIVITY
		Determine the input voltage required for the specific part removal device.
		Part Removal Device: _____
_____	_____	Required Input Voltage: _____
		Attach a 24 V DC source from the machine I/O or part removal device to the C-OR2-M-3M common (black) wire.
_____	_____	
_____	_____	Attach the C-OR2-M-3M normally open (brown) wire to the machine I/O card for part sorting or the part removal device.
_____	_____	Attach the C-OR2-M-3M cable to the OR2-M module. Verify that the cable connection is fully inserted and secure.

Dual-Relay Output Module for Excessive Rejects

OR2-M Serial Number _____

COMPLETED BY	DATE	ACTIVITY
		Determine the input voltage required for the I/O, light tree, or part removal device to be activated when the specified number of rejects are counted.
		Device: _____
_____	_____	Required Input Voltage: _____
If the device requires 24 V DC:		
_____	_____	Attach a 24 V DC source from the machine I/O or part removal device to the C-OR2-M-3M common (black) wire.
_____	_____	Attach the C-OR2-M-3M normally open (brown) wire to the machine I/O card for part sorting or the part removal device.
_____	_____	Attach the C-OR2-M-3M cable to the OR2-M module. Verify that the cable connection is fully inserted and secure.

NOTE: Some devices do not require 24 V DC source. Some require a dry contact between terminals on the Machine or device I/O card excessive rejects.

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CoPilot® System Hardware Installation Checklist

Dual-Relay Output Module for V→P Transfer

OR2-M Serial Number _____

COMPLETED BY	DATE	ACTIVITY
		Verify that the machine I/O requires a 24 V DC signal to cause transfer. If the machine requires 0-10 V DC to cause transfer, see the Analog Output Module for V→P Transfer section.
		Attach a 24 V DC source from the machine I/O to the C-OR2-M-3M common (black) wire
		Attach the C-OR2-M-3M normally open (brown) wire to the machine I/O card for external transfer.
		Attach the C-OR2-M-3M cable to the OR2-M module. Verify that the cable connection is fully inserted and secure.

NOTE: Some machines do not require 24 V DC source. Some require a dry contact between terminals on the Machine I/O card for external transfer

ANALOG OUTPUT MODULE OA1-M-V

Analog Output Module for V→P Transfer

OA1-M-V Serial Number _____

COMPLETED BY	DATE	ACTIVITY
		Verify that the machine I/O requires a 0–10 V DC signal to cause transfer. If the machine requires 24 V DC to cause transfer, see the Dual-Relay Output Module for V→P Transfer section.
		Attach a 0 V DC from the machine I/O to the C-OR2-M-3M common (black) wire
		Attach the 0–10 V DC from the machine I/O to the C-OR2-M-3M positive (brown) wire.
		Attach the C-OR2-M-3M cable to the OR2-M module. Verify that the cable connection is fully inserted and secure.

NOTE: Some machines do not require 0–10 V DC source. Some require a dry contact between terminals on the Machine I/O card for external transfer

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CoPilot® System Hardware Installation Checklist

MACHINE INTERFACE SENSORS

Lynx 3,000 or 5,000-psi Hydraulic Sensor LS-H-1/4NPT-3/5K

Refer to page 31 in the "CoPilot System Hardware Installation and Setup Guide."

COMPLETED BY	DATE	ACTIVITY
		Verify that machine power is off and that the hydraulic system is depressurized before proceeding.
		Attach male quick disconnect to the machine's hydraulic system in a position that the sensor can read injection pressure from the cylinder. DO NOT attach the male quick disconnect to the machine system pressure.
		Attach the Lynx Hydraulic Sensor to the male quick-disconnect.
		Attach a lynx cable between the Lynx Hydraulic sensor and the AP4.0 and or Lynx junction box.
		Verify that the cable connection is fully inserted and secure.
		Verify that there is enough strain relief to account for the movements of the injection unit.

Lynx 50-Inch Stroke/Velocity Encoder LE-R-50-REVB

Refer to pages 29 & 30 in the "CoPilot System Hardware Installation and Setup Guide."

COMPLETED BY	DATE	ACTIVITY
		Mount the stroke encoder on the injection sled near the back of the injection unit so that it detects movement of the screw and not the movement of the sled.
		Ensue that the stroke encoder will not be impacted by movements of the injection sled or injection unit.
		Ensure that placement does not allow the stroke encoders cable to extend more than 50" (127 cm).
		Verify that the cable enters the cable bushing straight to prevent wear on the cable.
		Attach a Lynx cable between the stroke encoder and the AP4.0 and or Lynx junction box. Verify that the cable connection is fully inserted and secure.
		Verify that there is enough strain relief to account for the movements of the injection unit.

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CoPilot® System Hardware Installation Checklist

JUNCTION BOXES AND LYNX CABLES

J-LX2-CE, J-LX5-CE, & J-LX9-CE

Refer to pages 27, 28, & 32 in the "CoPilot System Hardware Installation and Setup Guide."

COMPLETED BY	DATE	ACTIVITY
		The AP4.0 has two Lynx Ports installed. Install JLX-5 or JLX-9 junction boxes as needed.
		Connect individual Lynx cable(s) to the junction box(es).
		Connect the junction box(es) to the AP4.0.
		Machine sensors typically are attached to one or more junction boxes separate from the machine sensors.

Temperature Control Unit Interface (TCU)

COMPLETED BY	DATE	ACTIVITY
		Attach the C-TCU-USB cable to the TCU serial connection.
		Attach the C-TCU-USB to the CoPilot System USB connection.

NOTE: Not all TCUs support the serial interface. Some TCUs will need an SPI Interface Kit order from the manufacturer.

DOCUMENT THE CONFIGURATION

COMPLETED BY	DATE	ACTIVITY
		Document the sensor serial numbers, assignments, and configurations.

Approved By _____
Title _____
Date _____

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NOTES

CoPilot® System Machine Sensor and Module Configuration Checklist

Use the following checklist to verify the installation and function of machine-mounted sensors and modules for use with the CoPilot® System.

PREREQUISITES

The CoPilot System hardware has been installed per "**CoPilot System Hardware Installation Checklist**".

Machine Name _____   Machine Serial Number _____

MACHINE MODULE CHECKOUT

Machine Sequence Input Module ID7-M-SEQ

The CoPilot System requires four machine sequence signals; two of the following three: first stage, second stage, and injection forward, and screw run and mold clamped.

COMPLETED BY	DATE	ACTIVITY
		Verify that the first stage indicator light on the CoPilot System "Machine Inputs" card turns on with the first stage signal and channel, **OR** verify that the injection forward indicator light on the CoPilot System "Machine Inputs" card with the injection forward signal and channel.
		Signal Interfaced:(circle one) First Stage Injection Forward
		Verify that the second stage indicator light on the CoPilot System "Machine Inputs" card turns on with the second stage signal and channel, **OR** verify that the first stage indicator light on the CoPilot System "Machine Inputs" card turns on with the first stage signal and channel.
		Signal Observed:(circle one) Second Stage First Stage
		Verify that the screw run indicator light on the CoPilot System "Machine Inputs" card turns on with the screw run signal and channel.
		Verify that the mold closed stage indicator light on the CoPilot System "Machine Inputs" card turns on with the mold closed signal and channel.
		OPTIONAL Verify that the mold opening indicator light on the CoPilot System "Machine Inputs" card turns on with the mold opening signal and channel.
		OPTIONAL Verify that the mold closing indicator light on the CoPilot System "Machine Inputs" card turns on with the mold closing signal and channel.
		OPTIONAL Verify that the machine in manual mode indicator light on the CoPilot System "Machine Inputs" card turns on with the machine in manual mode signal and channel.
		Verify that the indicator lights on the CoPilot System "Machine Inputs" card are turning on with the appropriate signal and channel.
		Verify that the CoPilot System "Cycle Graph" Draws a new cycle each time the machine cycles.
		Verify that there are no errors being produced by the CoPilot System while cycling.

CoPilot® System Mold Sensor Configuration Checklist

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CoPilot® System Machine Sensor and Module Configuration Checklist

Analog Input Module IA1-M-V for Injection Pressure

COMPLETED BY	DATE	ACTIVITY	
		Verify that the Analog Input Module IA1-M-V is assigned to "Plastic Pressure: Injection" on the CoPilot System "Machine Inputs" card.	
		Enter and record the Maximum Pressure:	
		Enter and record the Voltage at Maximum Pressure:	
		Enter and record the Voltage at Minimum Pressure:	
		Verify that the CoPilot System injection pressure matches the machine injection pressure.	
		Machine Peak Injection Pressure:	
		CoPilot System Peak Injection Pressure:	
		Percent Difference:	
		Pass or Fail: (circle one)	PASS FAIL
		Measurement Type: (circle one)	Hydraulic Pressure Plastic Pressure

Analog Input Module IA1-M-V for Stroke Data

COMPLETED BY	DATE	ACTIVITY	
		Verify that the Analog Input is assigned as "Screw: Stroke Position" and "Screw: Velocity" on the CoPilot System "Machine Inputs" card.	
		Enter and record the Maximum Position:	
		Enter and record the Voltage at Maximum Position:	
		Enter and record the Voltage at Minimum Position:	
		Verify that the CoPilot System stroke data matches the machine's stroke data.	
		Maximum Machine Shot Size:	
		CoPilot System Shot Size:	
		Machine Cushion:	
		CoPilot System Cushion:	
		Percent Difference:	
		Pass or Fail: (circle one)	PASS FAIL

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CoPilot® System Machine Sensor and Module Configuration Checklist

Dual-Relay Output Module OR2-M for Part Sorting Checkout

COMPLETED BY	DATE	ACTIVITY
		Verify that an OR2-M module is assigned as "Sorting: Good Control" on the Copilot System "Machine Outputs" card.
		Verify that the green indicator light on the OR2-M module is illuminated when output test is selected on the CoPilot System "Machine Outputs" card.
		Verify the desired sorting output rules on the CoPilot System "Sorting Options" card to ensure the parts are sorted properly.
		Verify that the parts are sorted when output test is selected. When the green light on the OR2-M is illuminated, parts go to the "good" location, when the green light is not illuminated (output test is deselected), parts go to the "reject" location.
		Set alarm limits; ensure that the data is within the alarm limits. Verify that parts go to the "good" location.
		Change alarm limits; ensure that the data is outside of the upper and lower alarm limits. Verify the parts go the "reject" location.

Dual-Relay Output Module OR2-M for Excessive Rejects Checkout

COMPLETED BY	DATE	ACTIVITY
		Verify that an OR2-M module is assigned as "Sorting: Excessive Rejects" on the Copilot System "Machine Outputs" card.
		Verify that the green indicator light on the OR2-M module is illuminated when output test is selected on the CoPilot System "Machine Outputs" card.
		Setup the desired excessive reject settings on the CoPilot System "Control Options" card.
		Verify that the excessive rejects output is "on" when the conditions are met. Intentionally force alarms until the excessive rejects conditions are met.
		Verify that the excessive rejects output can be reset.

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Dual-Relay Output Module OR2-M for V→P Transfer

COMPLETED BY	DATE	ACTIVITY
		Verify that an OR2-M module is assigned as "Control: V→P Transfer" on the Copilot System "Machine Outputs" card.
		Verify that the green indicator light on the OR2-M module is illuminated when output test is selected on the CoPilot System "Machine Outputs" card.
		Verify that the machine transfers from first stage to second stage when output test is selected.
		Verify that the machine transfers from first stage to second stage when a V→P transfer rule is set and enabled for a cavity pressure setpoint.
		OPTIONAL: Verify that the machine transfers from first stage to second stage when any of the V→P transfer rules are set.

Analog Output Module OA1-M-V for V→P Transfer

COMPLETED BY	DATE	ACTIVITY
		Verify that the IA1-M-V module is assigned as "Control: V→P Transfer" on the CoPilot System "Machine Outputs" card.
		Verify that the IA1-M-V module reads 10 V DC when the test output is selected on the CoPilot System "Machine Outputs" card.
		Verify that the machine transfers from first stage to second stage when output test is selected.
		Verify that the machine transfers from first stage to second stage when a V→P transfer rule is set and enabled for a cavity pressure setpoint.
		OPTIONAL: Verify that the machine transfers from first stage to second stage when any of the V→P transfer rules are set.

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MACHINE SENSOR CHECKOUT

Lynx 3,000 or 5,000-psi Hydraulic Sensor LS-H-1/4NPT-3/5K

(If using RJG Lynx™ 3,000/5,000 psi Hydraulic Pressure Sensor LS-H-1/4NPT-3/5K, otherwise see Analog Input Module IA1-M-V for Injection Pressure)

COMPLETED BY	DATE	ACTIVITY
		Verify the correct intensification ratio (RI) is set on the CoPilot System "Machine Setup" card.
		RI for this machine is: _____
		Verify that the injection pressure is properly zeroed on the CoPilot System "Machine Setup" card. *The machine should be idle with the controller and pumps on.*
		Ensure that the CoPilot System injection pressure matches the machine injection pressure.
		Machine Peak Injection Pressure: _____
		CoPilot System Peak Injection Pressure: _____
		Percent Difference: (circle one) PASS FAIL
		Measurement Type: (circle one) Hydraulic Pressure Plastic Pressure

Lynx™ 50-Inch Stroke/Velocity Sensor LE-R-50-REVB

(If using RJG Lynx™ 50-Inch Stroke/Velocity Sensor LE-R-50-REVB, otherwise skip to Analog Input Module IA1-M-V for Stroke Data)

COMPLETED BY	DATE	ACTIVITY
		Verify the correct screw diameter is entered on the CoPilot System "Machine Setup" card.
		Screw diameter for this machine is: _____
		Verify that the stroke data is properly zeroed. An accurate screw run input is required for the Lynx™ Machine Sequence Module ID7-M-SEQ and CoPilot System.
		1. Set the machine's decompress setting to 0.
		2. Place the cycle graph cursor at the end of the screw run sequence data.
		3. Verify that the stroke data reads zero at that position.

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CoPilot® System Machine Sensor and Module Configuration Checklist

SENSOR CHECK

COMPLETED BY	DATE	ACTIVITY
		Verify all connections to machine sensors and modules are fully inserted, tightened and connected to the AP4.0.
		Verify all sensors and modules are displayed on the CoPilot System "Machine Inputs" card.

DOCUMENT THE CONFIGURATION

COMPLETED BY	DATE	ACTIVITY
		Document the sensor serial numbers, assignments and configurations.

Approved By _____
Title _____
Date _____

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CoPilot® System Mold Sensor Configuration Checklist

Use the following checklist to verify the installation and function of mold-mounted sensors for use with the CoPilot® System.

PREREQUISITES

The CoPilot System has been installed per the **"CoPilot System Hardware Installation Checklist"**.

Mold Name _____   Mold Serial Number _____

PHYSICAL SENSOR CHECK

All Sensors

COMPLETED BY	DATE	ACTIVITY
		Verify that the maximum number of sensors connected to one AP4.0 Lynx™ port does not exceed 30; this includes both mold *and* machine sensors.
		Verify all connections to mold sensors and modules are fully inserted, tightened, and connected to the AP4.0.

MOLD SENSOR AND MODULE IN-SOFTWARE CHECK

Ejector or Transfer Pin Cavity Pressure Sensors

COMPLETED BY	DATE	ACTIVITY
		All sensors are displayed on the CoPilot System "Mold Inputs" card.
		Verify that each sensor serial number is assigned to a location with a unique ID (if the same location is used multiple times) on the CoPilot System "Mold Inputs" card.
		Verify that a sensor model is assigned to each sensor serial number.
		Verify that the ejector pin size for each sensor is assigned on the CoPilot System "Ejector Pin Details" card.
		Verify that all sensor assignments are visible on the CoPilot System "Cycle Graph".
		Verify that there are no sensor errors (over-range or under-range errors) present on the CoPilot System "Dashboard".

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CoPilot® System Mold Sensor Configuration Checklist

Flush-Mount Cavity Pressure Sensors

COMPLETED BY	DATE	ACTIVITY
		Verify that each sensor serial number is assigned to a location with a unique ID (if the same location is used multiple times) on the CoPilot System "Mold Inputs" card.
		Verify that a sensor model is assigned to each sensor serial number.
		Verify that all sensor assignments are visible on the CoPilot System "Cycle Graph".
		Verify that there are no sensor errors (over-range or under-range errors) present on the CoPilot System "Dashboard".

Mold Temperature Sensors

COMPLETED BY	DATE	ACTIVITY
		Verify that each sensor serial number is assigned to a location with a unique ID (if the same location is used multiple times) on the CoPilot System "Mold Inputs" card.
		Verify that a sensor model is assigned to each sensor serial number.
		Verify that all sensor assignments are visible on the CoPilot System "Cycle Graph".
		Verify that there are no sensor errors (over-range or under-range errors) present on the CoPilot System "Dashboard".

TEMPERATURE CONTROL DATA

COMPLETED BY	DATE	ACTIVITY
		Verify that the Temperature Control Unit (TCU) is connected to the CoPilot System AP4.0 with the RJG, Inc. C-TCU-USB adapter cable.
		Verify that TCU channels are displayed on the CoPilot System "Mold Inputs" card.
		Verify that all TCU sensor assignments are visible on the CoPilot System "Cycle Graph".

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CoPilot® System Mold Sensor Configuration Checklist

COPILOT SYSTEM SOFTWARE CONFIGURATION

COMPLETED BY	DATE	ACTIVITY
		1. Verify that the Fill Time is being recorded using the "Set Fill Volume at Cursor" tool. 2. Display the "Machine Sequence Fill Trace" on the "Cycle Graph." 3. Verify that the start of the "Fill Trace" aligns with the stroke crossing the zero line. 4. Verify that the end of the "Fill Trace" aligns with the selected fill volume.
		Ensure that the CoPilot Injection Pressure matches the Mold Injection Pressure.

Measurement Type (circle one):   Hydraulic Pressure   Plastic Pressure

Mold Peak Injection Pressure: _____

CoPilot System Peak Injection Pressure: _____

Percent Difference: _____

Pass or Fail (circle one):   PASS   FAIL

COPILOT SYSTEM ALARM CONFIGURATION

COMPLETED BY	DATE	ACTIVITY
		Verify that upper and lower limits are set in accordance with the part quality specifications.
		Print the initial "Job Audit Report" for your records from The Hub software.

COPILOT SYSTEM PROCESS TEMPLATES

COMPLETED BY	DATE	ACTIVITY
		Verify that template for the ideal process setup is saved on the CoPilot System "Cycle Graph". Record the template name for your records. Template Name: _____ Date Stamp: _____

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CoPilot® System Mold Sensor Configuration Checklist

V→P TRANSFER CONFIGURATION

COMPLETED BY	DATE	ACTIVITY
		Verify that control setpoints for V→P transfer are entered and enabled.
		Verify that safety backups are set on the machine controller.
		Record the V→P transfer settings for your records.

DOCUMENT SENSOR CONFIGURATION(S)

COMPLETED BY	DATE	ACTIVITY
		Record the "Mold Setup Summary" page for your records.

Approved By _____
Title _____
Date _____

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CoPilot® System and The Hub® Software Networking Checklist

Use the following checklist to complete the installation of hardware and cabling of the RJG, Inc. The Hub® Software network. **This checklist must be completed by a qualified IT professional.**

PREREQUISITES

The CoPilot System hardware has been installed per the "CoPilot System Hardware Installation Checklist."

Machine Name _____   CoPilot System Serial Number _____

NOTE: *The IP address of each Copilot System must be unique.*

THE HUB SOFTWARE SERVER INSTALLATION

Completed By _____   Date _____

ETHERNET CABLE INSTALLATION

COMPLETED BY	DATE	ACTIVITY
_____	_____	Ensure that the Ethernet cable and connectors are shielded throughout.
_____	_____	Install cable(s) between the CoPilot System(s) and the network switch(es).
_____	_____	Verify that a single continuous Ethernet Cable connects each CoPilot System to the network switch.
_____	_____	Ensure that the longest cable between the CoPilot System(s) and The Hub Software is less than 300 ft. (91 m). Verify that Ethernet cables are clear of any sources of EMI including but not limited to high voltage, solenoids, electric/servo motors, and/or static-generating devices.
_____	_____	Verify the integrity of each Ethernet cable with an Ethernet cable tester.

COPILOT SYSTEM(S) TESTING ON THE NETWORK

COMPLETED BY	DATE	ACTIVITY
_____	_____	Document the Hub Network Address _____. _____._____._____
_____	_____	On each CoPilot System "Network Settings Card", select the network configuration DHCP.
_____	_____	On each CoPilot System "Network Settings Card", enter the The Hub Software network address.
_____	_____	Start a job on each CoPilot System. Verify that the CoPilot System is displayed on The Hub Software's "Machines" page.

Approved By _____
Title _____
Date _____

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