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PULSEROLLER

ConveyLinx ERSC Family Complete Guide

Version 7.0 – 14 November 2025



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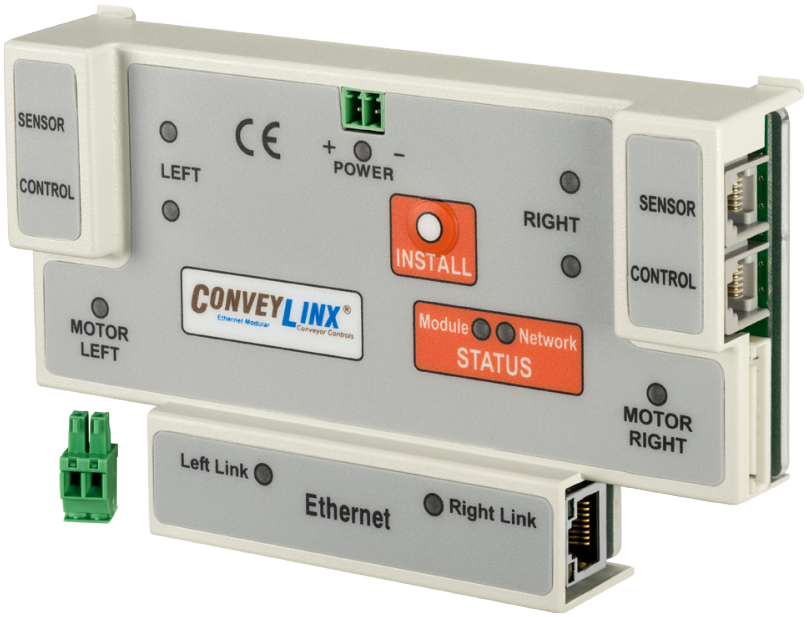
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1. ConveyLinx-ERSC Family of Controllers

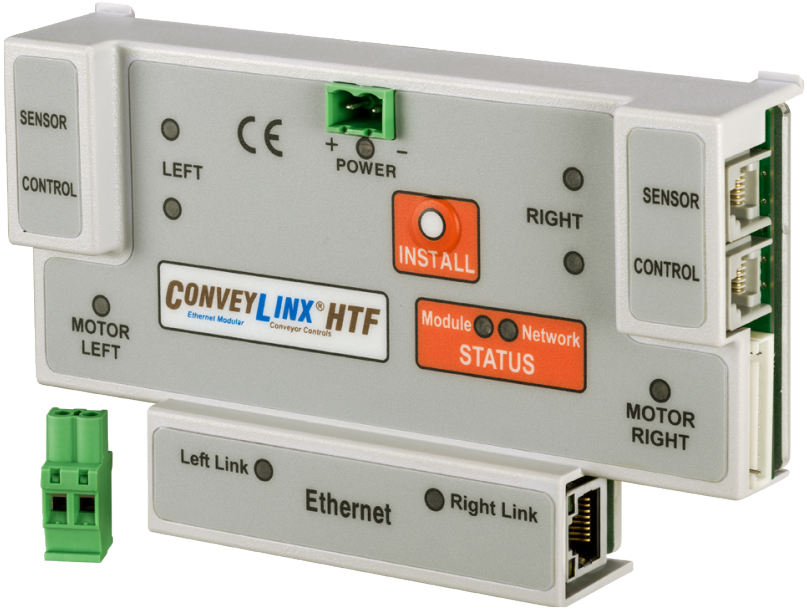
ConveyLinx-ERSC Family of Controllers

Products Covered in this Manual

ConveyLinx-ERSC
Article Number
3010-0000



ConveyLinx-HTF
Article Number
3010-3000



ConveyLinx-ERSC-E Article Number 3110-0000

ConveyLinx-HTF-E Article Number 3110-3000



1.1. About this manual

ConveyLinx-ERSC Family of Controllers /

About this manual

Symbol Conventions

! This symbol indicates that special attention should be paid in order to ensure correct use as well as to avoid danger, incorrect application of product, or potential for unexpected results

✻ This symbol indicates important directions, notes, or other useful information for the proper use of the products and software described herein

Important User Information

! Modules contain ESD (Electrostatic Discharge) sensitive parts and components. Static control precautions are required when installing, testing, servicing or replacing these modules. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference any applicable ESD protection handbook. Basic guidelines are:

- Touch a grounded object to discharge potential static
- Wear an approved grounding wrist strap
- Do not touch connectors or pins on component boards
- Do not touch circuit components inside the equipment
- Use a static-safe workstation, if available
- Store the equipment in appropriate static-safe packaging when not in use

! Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes, and standards

! The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Pulseroller does not assume responsibility or liability (to include intellectual property liability) for actual use based on the examples shown in this publication

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Not Included in this Manual

! Because system applications vary; this manual assumes users and application engineers have properly sized their power distribution capacity per expected motor loading and expected operational duty cycle. Please refer to conveyor equipment and/or motor roller manufacturer's documentation for power supply sizing recommendations

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1.2. Getting Started

Getting Started

Purpose of this Manual

The purpose of this manual is to:

- Identify the components and ports available on a module
- Provide guidelines for proper installation and wiring
- Provide examples on basic inter-module connections for linear conveyor
- Introduce the EasyRoll software tool and provide instructions to configure and modify parameters

Who Should Use this Manual?

This manual is intended for users who need basic product information and simple application procedures to implement Modules to control simple linear conveyor.
You should have a basic understanding of electrical circuitry and familiarity with relay logic, conveyor equipment, photo-sensors, etc. If you do not, obtain the proper training before using this product.

What do you want to do?

Learn about module hardware ports

Learn about power supply sizing

How to Auto-Configure your network of modules

Find out about what all the LED states mean

Learn about the different release modes and how to change them

Learn about Flex Zone

Learn about jam conditions

How to reset a module back to factory default

How to wire up a Hardwired Interlock

How to Auto-Replace a module

Additional Resources

EasyRoll+ Manual

PLC Developers Guide

1.3. Glossary of Terms

ConveyLinx-ERSC Family of Controllers /

Glossary of Terms

Term	Definition
Carton	A separate (usually wrapped or boxed) object to be transported by the conveyor. The terms tray, tote, load, or product may also be used interchangeably in this document.
ConveyLinx	Conveyor controls architecture based upon modular distributed devices connected via Ethernet network.
ConveyLinx-Ai / ConveyLinx-Ai2 / ConveyLInx-Ai3	Conveyor control module that is part of the ConveyLinx family. Each module can accommodate up to 2 MDR conveyor zones. The modules allow connection for Senergy-Ai platform motor rollers and gear drives. The term Module will be used within this document and will refer to the ConveyLinx-Ai2 device
DHCP	Dynamic Host Configuration Protocol A protocol for assigning IP addresses to devices on a network from a pool of available IP’s. A dynamic IP address changes each time the device connects to the network
ERSC	Ethernet Roller Speed Control module – Conveyor control module that is part of the ConveyLinx family. Each ERSC can accommodate up to 2 MDR conveyor zones. In this document the term module will be synonymous with ERSC
ERSC-SE4	Designed to “break-out” the RJ11 connection for easy installation. The module has an amplifier to the output giving it up to 100mA output capabilities. Configurable diodes for the inputs to minimize leakage current to and from the ERSC. Module also allows for external power source connection for auxiliary devices.

Hall Effect Sensor	Special sensor embedded within the brushless DC motor of an MDR used to provide motor rotor position feedback to the motor controller
IP54	The IP Code (International Protection Marking) specifies the device's degree of resistance to intrusions, dust and water. IP54 certified device must be fully protected from splashed water, dust particles and completely protected from contact
JST	This is the name of a particular connector manufacturer that produces a specific plug/socket arrangement for MDR connection to control cards. This name is accepted within the conveyor and MDR industry as a simple description of the particular socket style used on ERSC hardware.
LED	Light Emitting Diode – In the context of this document, LED's are used on the ConveyLinx-Ai2 to provide visual indication of module status
Light / Dark Energized	Term used to describe how the signaling output circuit of a photo-sensor is configured when it detects its reflected light. A photo-sensor that is light energized will activate its output circuit when it detects its reflected light. A dark energized photo-sensor will activate its output circuit when it does not detect its reflected light
M8	This is the type of a connector, which has four connector pins and is used on the ConveyLinx Ai2 modules for both sensor connectors and MDR connectors
MDR	Motorized Drive Roller or Motor Driven Roller – Brushless DC motor and gearbox assembly integrated into a single conveyor roller
Normally Open / Normally Closed	Control logic terminology to define the state of the output of a Boolean "on" or "off" device. The term specifically describes the state of the output circuit when the device's sensing circuit is un-energized. In the context of photo-sensors; a normally open wired sensor would have its output circuit energized when it detected its reflected light and its output circuit would be de-energized when it did

	not detect its reflected light. Conversely a photo-sensor wired normally closed would energize its output circuit when it did not see its reflected light and it would de-energize its output circuit when it did detect its reflected light
NPN / PNP	Electronics term that indicates the type of transistor circuit used for a logical input or output for controllers. NPN devices will provide a common or ground connection when activated and a PNP device will provide a logic voltage connection when activated
Photo-sensor	A device, mounted near the end of the conveyor zone to sense the presence of a carton on the zone
PLC	Programmable Logic Controller – A wide variety of industrial computing devices that control automatic equipment
PWM	Pulse Width Modulation – a control scheme that utilizes high speed switching transistors to efficiently deliver power in a controlled fashion from the ConveyLinx controller to MDR
Retro-reflective / Reflex	Term used to describe the two basic types of photo-sensors. Retro-reflective photo-sensors utilize a reflective target that must be aligned with the photo-sensor such that the light emitted by the photo-sensor is reflected back to it. ‘Reflex (or sometimes known as proximity) type photo-sensors emit light to be reflected back from an object located sufficiently close to the sensor. ‘For both types of photo-sensors, when they detect their reflected light source, their signaling output circuit changes state.
RJ-11 / RJ-12	Registered Jack Style 11 / 12 – Standard connector / receptacle format utilizing 4 or 6 pin connections. The typical standard connection for telephones. RJ-11 utilizes 4 pins and RJ-12 utilizes 6 pins but both styles use the same physical size.
RJ-45	Registered Jack Style 45 – Standard connector / receptacle format utilizing 8 pin connections. The typical standard for

	computer network cable connections
Senergy-Ai	PulseRoller brand proprietary motor control platform that provides electronic intelligence inside the motor that can be read by ConveyLinx-Ai Family and MotionLinx-Ai Family control modules. The connection from the motor to the controller is via 4-Pin M8 style connector
Singulation Release	Conveyor control method for zoned controlled conveyor that dictates that when a zone is discharging its carton, the upstream carton waiting to enter must wait until the discharged carton is completely clear before it is allowed to enter
Slave Rollers	A set of non-motorized conveyor rollers mechanically linked to an MDR. The MDR and slave rollers make up a physical zone. All of the slave rollers in a zone rotate at the same speed and direction as the MDR because of their mechanical linkage
TCP/IP	Transport Control Protocol / Internet Protocol – IP is the protocol which oversees the transmission of information packets from device to device on an Ethernet network. TCP makes sure the packets have arrived and that the message is complete. These two protocols are the basic language of the Internet and are often referred to together as TCP/IP.
Train Release	Conveyor control method for zone configured conveyor that dictates that when a zone is discharging, the upstream zone’s carton can move in unison with the discharging carton.
Zone	A basic (linear or curved) cell of the conveyor consisting of a set of slave rollers driven by one or more MDR’s and a single photo-sensor.
ZPA	Zero Pressure Accumulation – Term that describes the conveyor controls and mechanical scheme that will cause loads to queue on a conveyor in discrete zones such that loads do not touch each other

2. Module Hardware

Module Hardware

Each **ConveyLinx-ERSC Module** is designed to be installed and integrated into the conveyor's mechanical side frame assembly. The **ConveyLinx-ERSC Module** is a controller for up to 2 Motorized Drive Roller (MDR) conveyor zones. Each **ConveyLinx-ERSC Module** provides connection points for 2 MDR units with their corresponding 2 photo-sensors as well as upstream and downstream network and discreet interconnections to form a complete control system for zoned MDR conveyors.

✻ The "left" and "right" naming convention for the module ports is based upon facing the front of the **ConveyLinx-ERSC Module** and is not to be confused with direction of product flow on the conveyor. Product flow will be designated as "upstream" and "downstream"

Learn more:

Identifying ConveyLinx-ERSC Module Components

Mounting Dimensions

Motor Ports

Sensor & Control Ports

Ethernet Ports

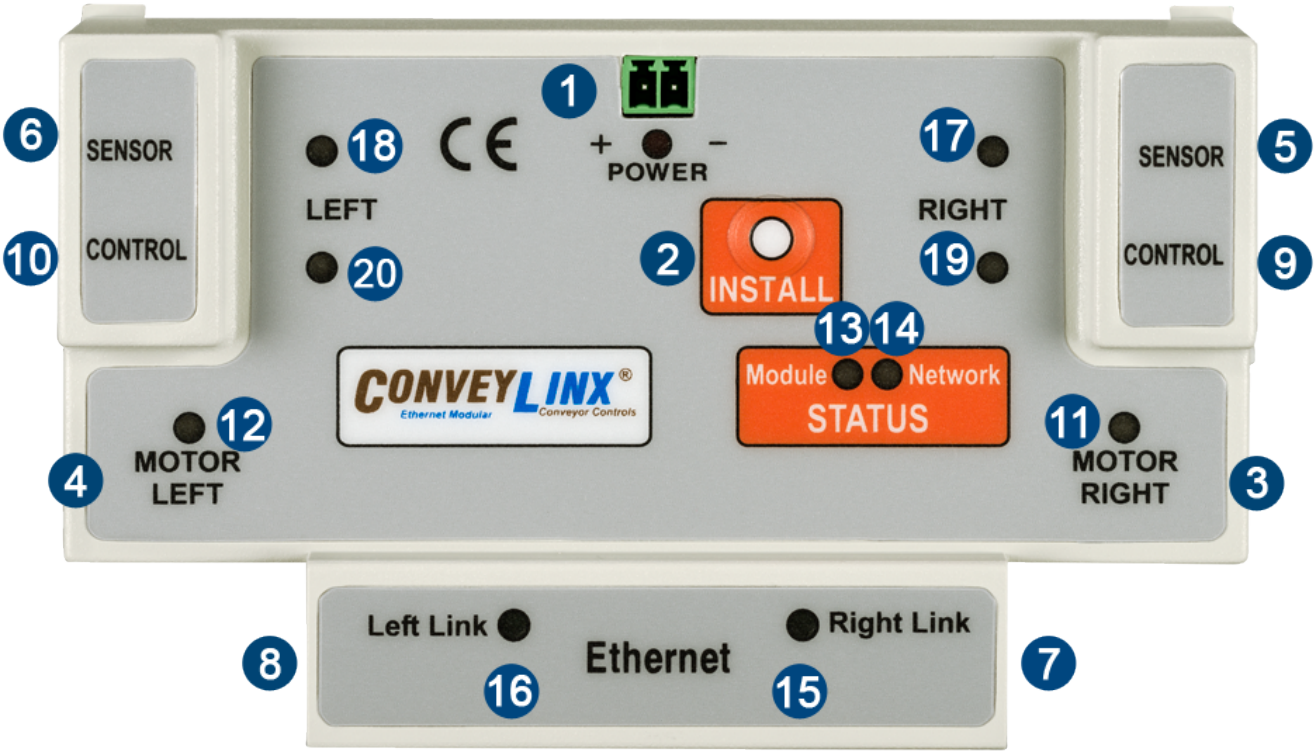
ConveyLinx-ERSC Module Internal Fusing

LED Status Indicators

2.1. Identifying Module Components

Module Hardware /

Identifying Module Components



Item	Description
1	24VDC Power Connector
2	Install Button – Used for Auto-Configuration Procedure and Auto Module Replacement
3 & 4	Motor Left and Motor Right 9-pin JST style header for MDR/ PGD connection
5 & 6	Left Sensor Port and Right Sensor Port RJ-12 style jack for

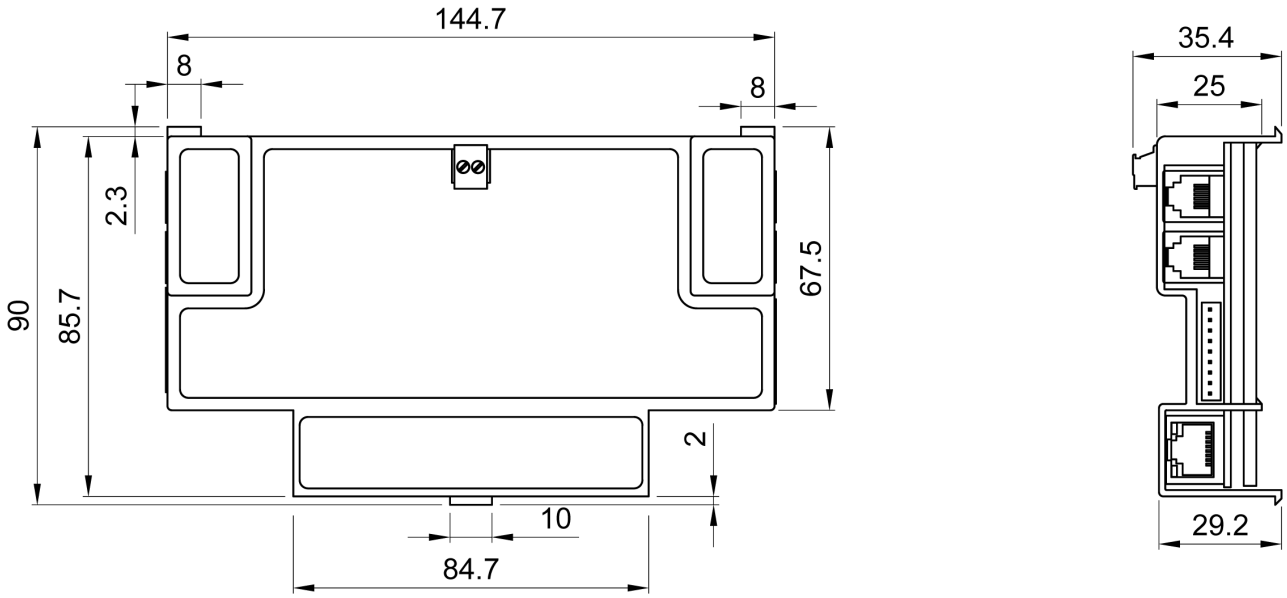
	zone photo-sensor connection
7 & 8	Link Left and Link Right RJ-45 style Ethernet network communication connection between modules
9 & 10	Left Control Port and Right Control Port RJ-12 style ports for discreet hard-wired signal connections for non-networked interface interlocks and zone control
11 & 12	Motor Left LED & Motor Right LED – Motor status indicators
13	Module Status LED Indicator
14	Module Network Status LED Indicator
15 & 16	Left Link & Right Link Status LED Indicators
17 & 18	Left Sensor & Right Sensor Status LED Indicators
19 & 20	Control Port Left & Control Port Right Status LED Indicators

2.2. Mounting Dimensions

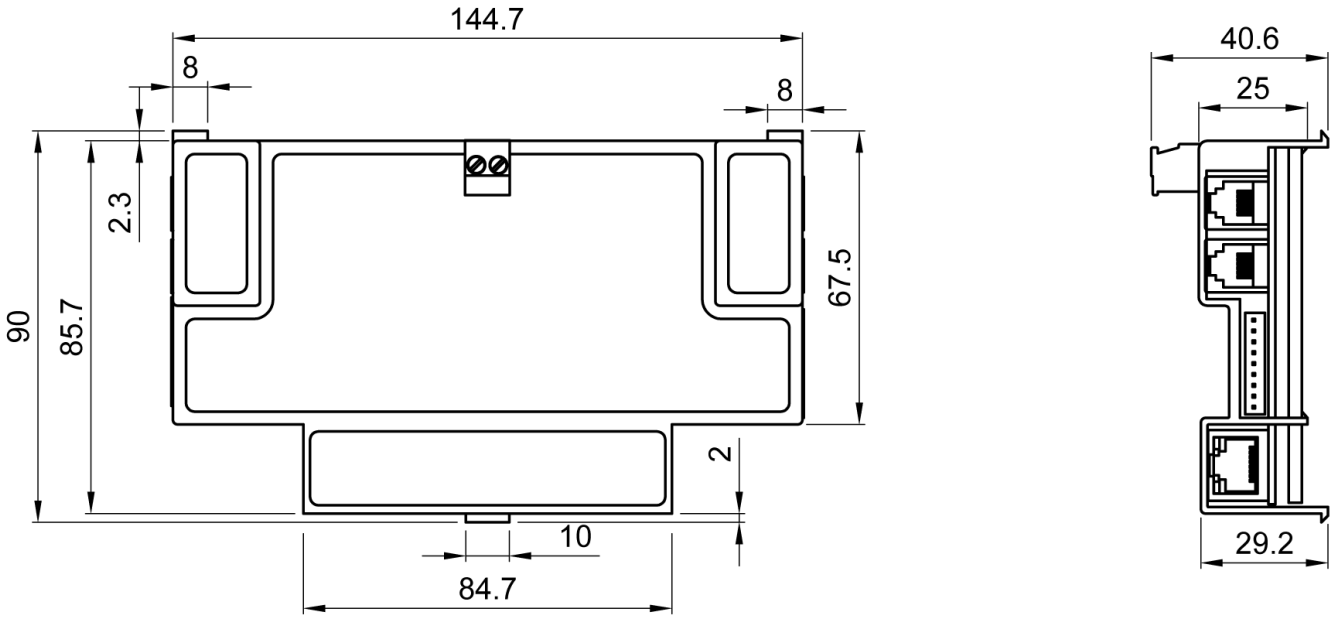
Module Hardware /

Mounting Dimensions

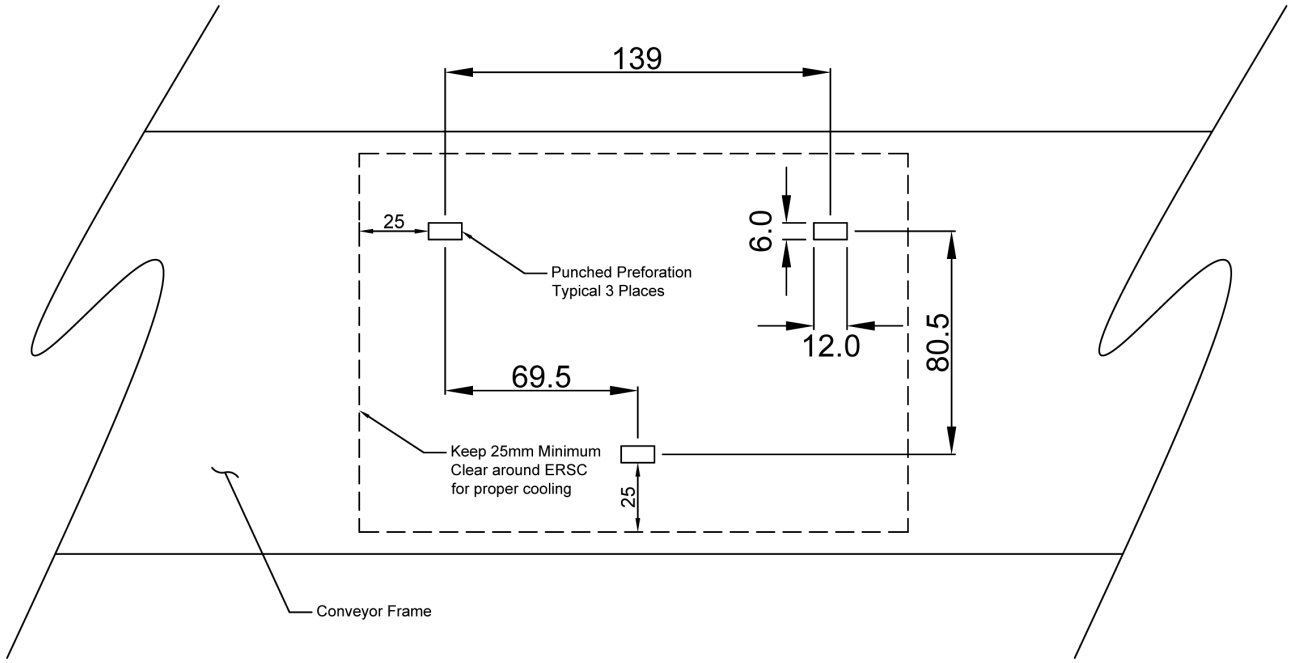
ConveyLinx (3010-0000) and ConveyLinxE (3110-0000)



ConveyLinx-HTF (3010-3000) and ConveyLinxE-HTF (3110-3000)

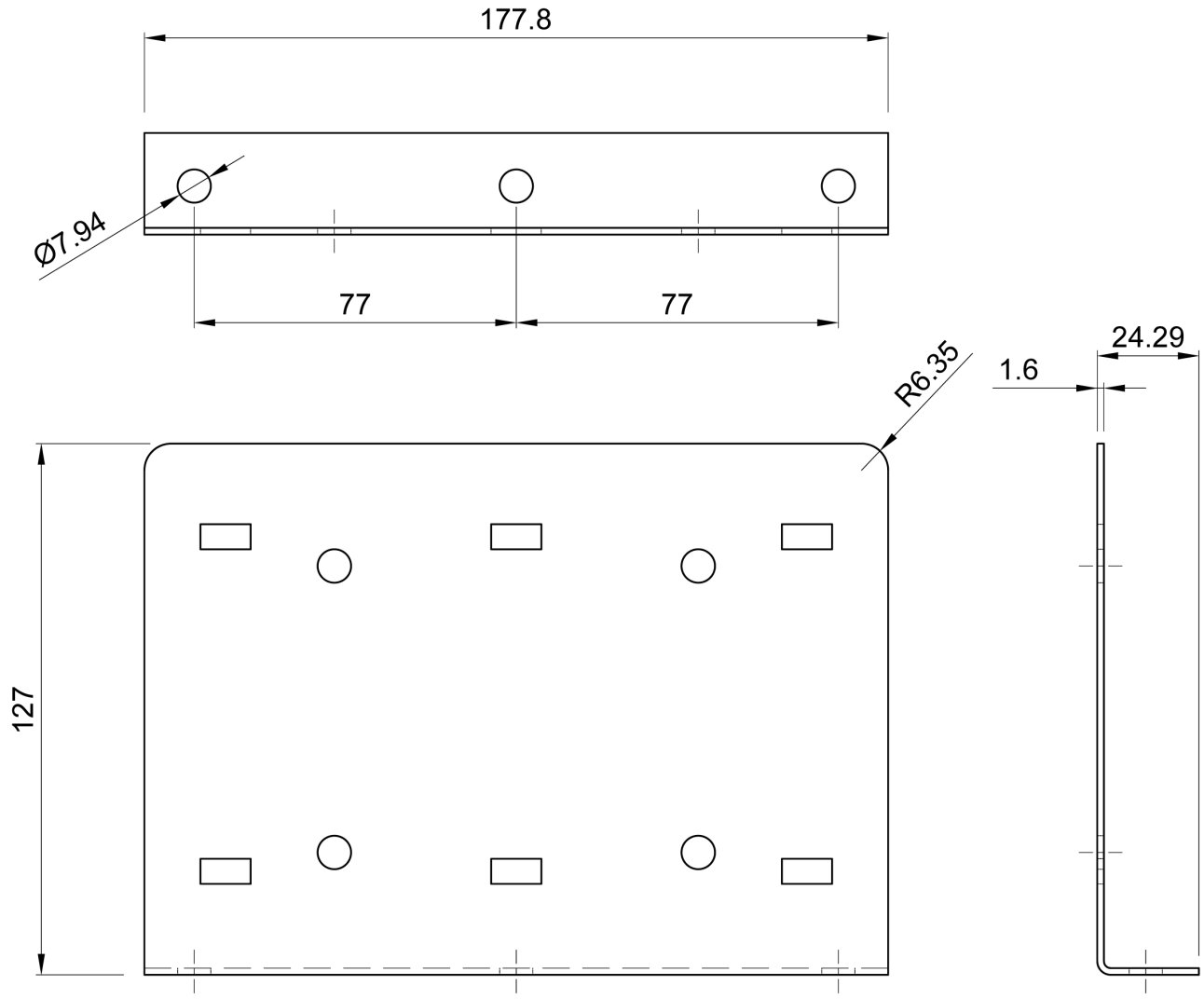


Conveyor Frame Preforations Dimensions



Optional Mounting Bracket

Pulseroller Order Type: **BRKT-UNIV** Order Code: **099-1002**

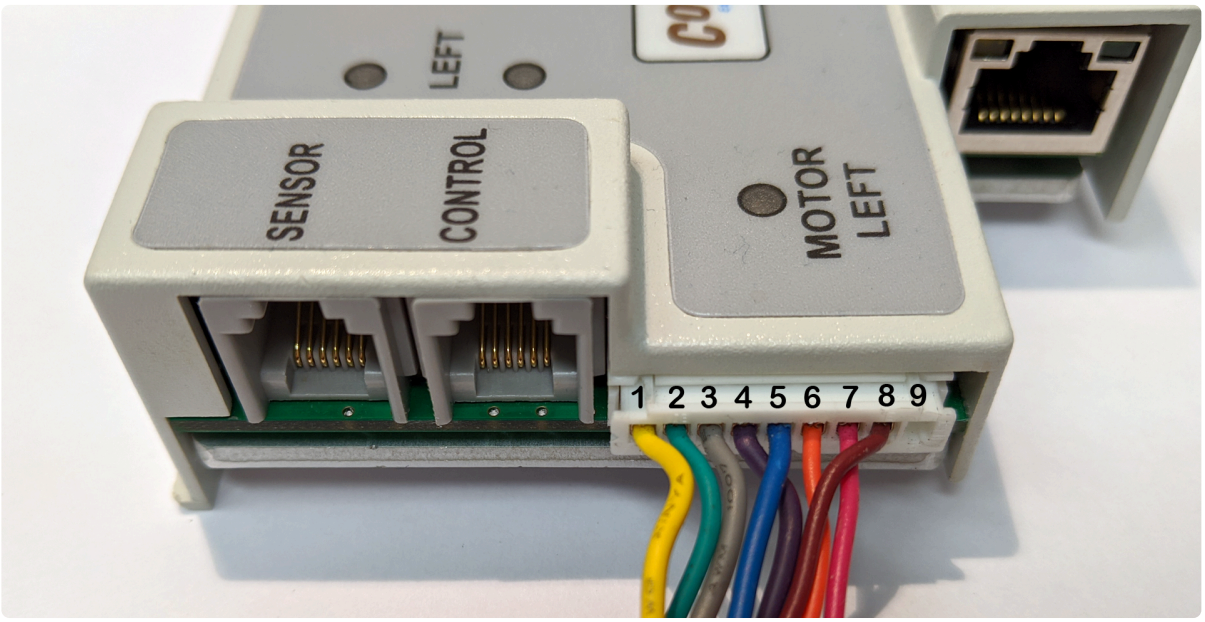


2.3. Motor Ports

Module Hardware /

Motor Ports

Both the Left and the Right Motor Ports utilize a 9-pin JST brand female receptacle. Each receptacle is mechanically keyed to assure proper orientation upon plugging in. The motor connector pin-outs are as shown



Pin	Description
1	GND
2	Vcc – Hall Effect Sensor Power
3	Motor Winding U
4	Motor Winding V
5	Motor Winding W
6	Hall Effect Sensor U
7	Hall Effect Sensor V
8	Hall Effect Sensor W

9 Optional – Mechanical Holding Brake Control

Please note the JST connector is keyed so you cannot plug it in upside down

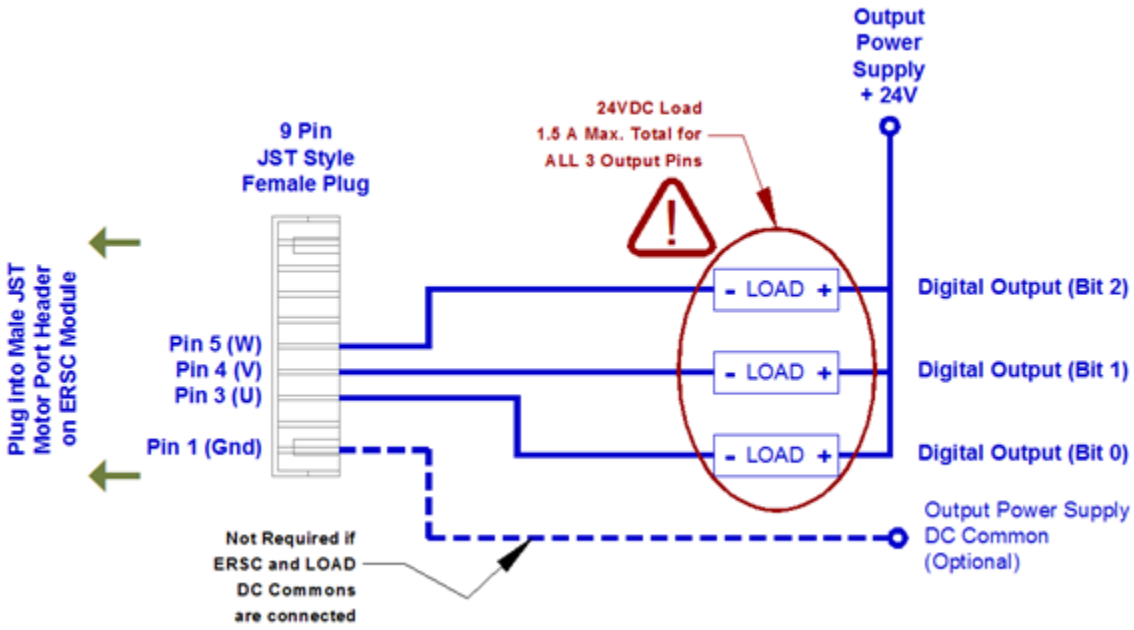
2.3.1. Motor Ports as Digital Outputs

Module Hardware / Motor Ports /

Motor Ports as Digital Outputs

Motor Phases as Digital Outputs

! Motor port as digital I/O is only applicable when **ConveyLinx-ERSC Module** is in **PLC I/O Mode**. Use ***EasyRoll+*** to place module in PLC I/O Mode



Motor Phases as Digital Outputs

✻ Please note that the **ConveyLinx-ERSC Module switches to GND** to complete the circuit

! Pins 3,4, and 5 can each be independently switched on and off. **Any individual pin can sink up to 1A to ground in these modes, but the total for all 3 pins combined cannot exceed 1.5A**.

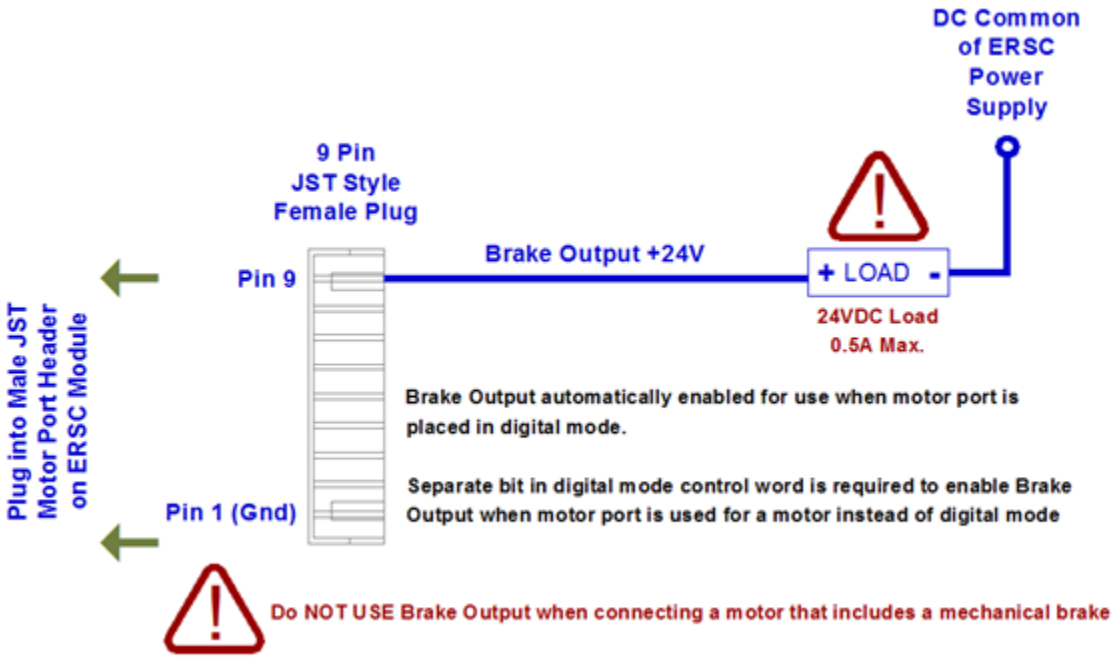
! Short Circuit Error on bit 12 is classified as a “fatal” error that will require either a cycle of power on the ERSC or an explicit Motor Fault Reset command from external controller the same as if the port was being used as a motor port.
External controller must continuously write “1” to the Motor Fault Reset register for at least 500 msec for reset to occur

✻ Please see ConveyLinx PLC Developers Guide for details on controlling Motor Port Digital Outputs

---

Using the Brake Output Pin on the Motor Port

! Brake Output (Pin 9 on the JST connector) as a +24V output signal is only available when **ConveyLinx-ERSC Module** is in **PLC I/O mode**. Use ***EasyRoll+*** to place module in PLC I/O Mode



Brake Output Pin as Digital Output

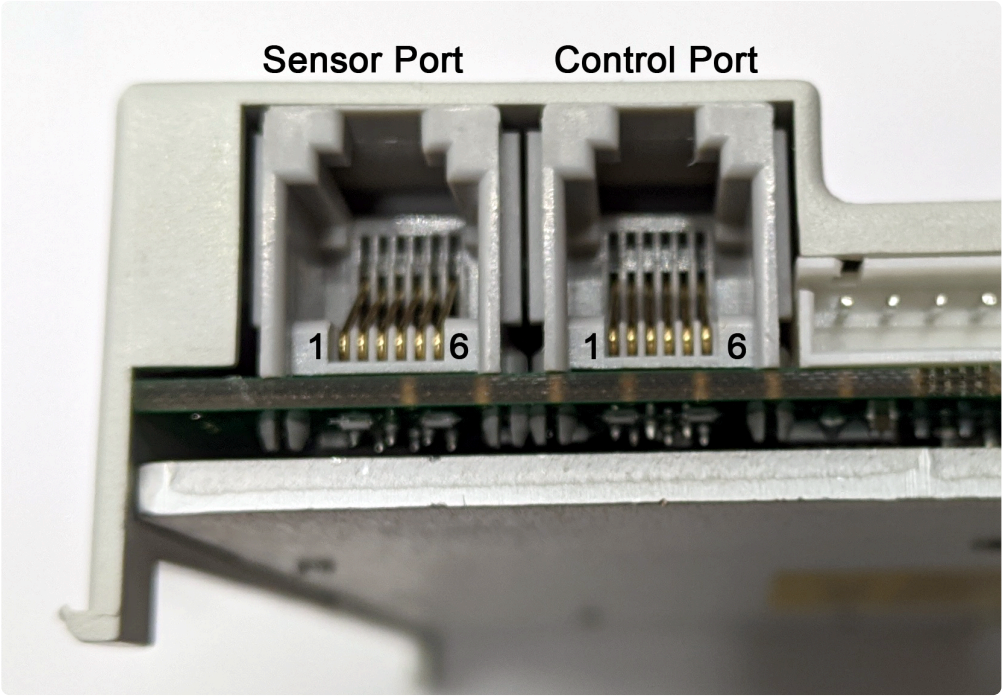
✻ Unlike the motor phases (Pins 3, 4, and 5), the Brake Output is available when the motor port is not in digital mode and is actually running a motor.

Please see ConveyLinx PLC Developers Guide for details on controlling Brake Output Pin

2.4. Sensor & Control Ports

Module Hardware /

Sensor & Control Ports



Each Sensor and Control Port is a standard RJ-12 style jack.

Sensor Port Pin Out

Pin	Signal	Description
1		Not Used
2	GND	Module DC Common
3	Sensor Error	Digital Input for Sensor's error output – Auto detect for NPN or PNP
4	Sensor State	Digital Input for Sensor's state output – Auto detect for NPN or PNP
5	Vcc	Module 24VDC Supply

6		Not Used

! Shorting Pins 2 & 5 (Vcc and Gnd) may damage the port's Sensor Detect circuit. If this circuit is damaged, the module will no longer properly detect a connected sensor and will not properly Auto-Configure.

Control Port Pin Out

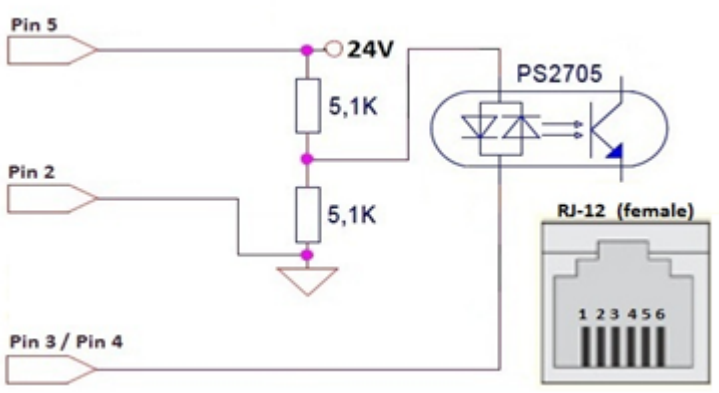
Pin	Signal	Description
1	Output E	Digital Output for Upstream/Downstream Interlock, SE Module recommended
2	GND	Module DC Common
3	P3 Input	Optional Local Accumulate Digital Input – Auto detect for NPN or PNP
4	P4 Input	Optional Interlock Digital Input – Auto detect for NPN or PNP
5	Vcc	Module 24VDC Supply
6	Output C	Digital Output for Upstream/Downstream Interlock, SE Module recommended

! Single output signal flows between *Pin 1* and *Pin 6*. This signal is very low power (@ 2mA). An SE Breakout Module is recommended when using of this signal.

Sensor & Control Port I/O Electrical Details

Inputs

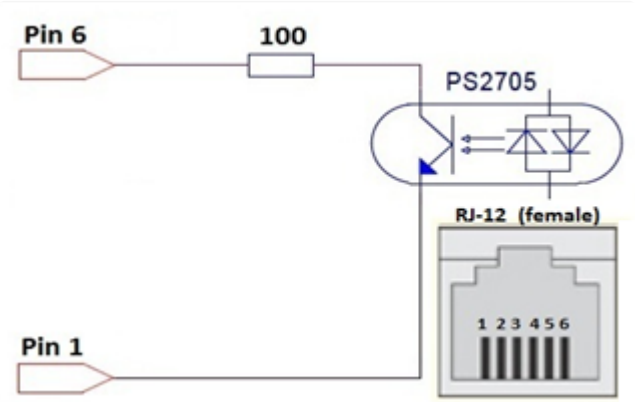
The Sensor and Control port both have 2 inputs each. Sensor and Control port inputs are auto-sensing for the connected circuit type. Input function as either PNP or NPN. Please note that both sourcing and sinking current will activate the input



Minimum ON current	1.5 mA
Maximum OFF current	0.4 mA

Outputs

The Control Port output is an NPN transistor whose Emitter (Pin 1) and Collector (Pin 6) are made available to be connected either as sourcing or sinking device in the user's input circuit



Minimum ON current	2 mA
Maximum ON current	8 mA
OFF current	< 100 nA

Sensor & Control Port Power Pins

Pin 5 of all RJ-12 ports provides 24V for powering up a photo-eye or for biasing the output transistor found on the control port. The current that those pins can supply is limited internally. Each side of the module is fused separately and each side's control port and sensor port share a solid-state fuse rated at 100 mA. For example, If there is one photo-eye plugged into the left sensor port and one photo-eye plugged in the left control port, then the combined consumption of the two photo eyes must not exceed 100mA.

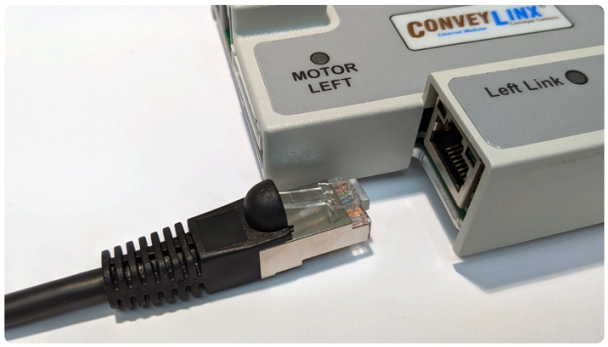
! Current in excess of 100mA drawn from the sensor port's 24V pin may cause permanent damage to the sensor detection circuit. Care should be taken to avoid excess loads, short circuits and miss-wiring of the sensor port

2.5. Ethernet Ports

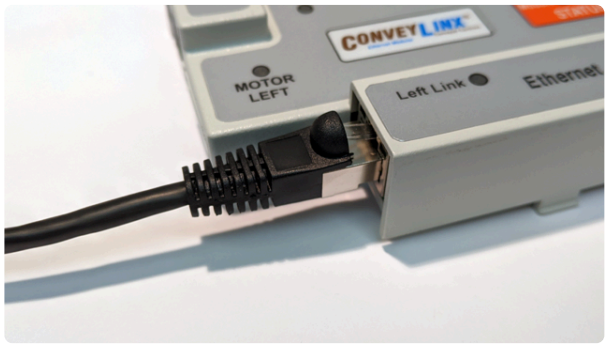
Module Hardware /

Ethernet Ports

Both of these ports are standard RJ-45 jacks conforming to standard Ethernet connection pin-out.



RJ-45 Cable and Ethernet Port



RJ-45 Cable Plugged in



Both Left & Right RJ-45 Cables Plugged In

! All Hardware Revision 1 **ConveyLinx-ERSC Module** must use Ethernet shielded crossover style cables. Hardware Revision 2 and later modules can use straight or crossover shielded Ethernet cables.

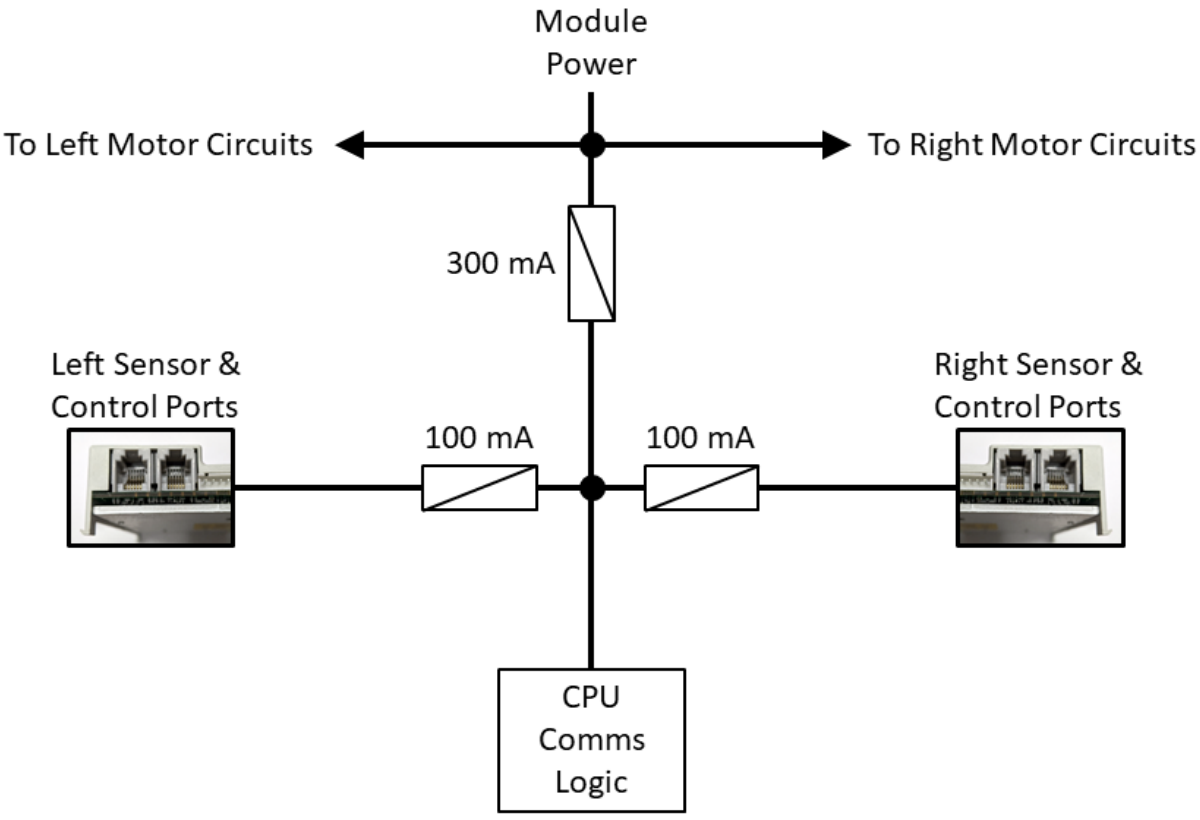
! Failure to use SHIELDED cables may result in data loss and unexpected results

2.6. Module Internal Fusing

Module Hardware /

Module Internal Fusing

Because the **ConveyLinx-ERSC Module** utilizes a single external power connection for both control power and MDR power; the **ConveyLinx-ERSC Module** includes internal re-settable fusing to protect the control power from the MDR power. The overall control power fuse is rated at 300 mA and this is the source for CPU, LED's, sensor ports, control ports, etc. From this circuit, the Sensor and Control port pairs share their own separate 100 mA fuses.



ConveyLinx-ERSC Internal Fusing Diagram

! User's must take care in the types of sensors and devices that need to connect to a given **ConveyLinx-ERSC Module** and assure that the current draw on any Sensor/ Control port pair does not exceed the fuse ratings. If any of the 100 mA fuses trips,

there is no direct indication of this state. An indirect indication could be to see if a connected sensor is powered when plugged into either port.

! If the 300 mA fuse trips, upon the automatic reset of the fuse, the **ConveyLinx-ERSC Module** should reboot on its own. However, the **ConveyLinx-ERSC Module** may require the power to be cycled manually to fully restart

2.7. Over-Voltage Protection

Module Hardware /

Over-Voltage Protection

There are two sources of potential excess voltage:

1. Over-voltage coming from the power supply
2. Over-voltage generated by an over-driven motor

Power Supply

The **ConveyLinx-ERSC Module** utilizes a “clamp down” chip on the power input to detect any voltage coming in that is greater than 33.3V. If this is detected, it shorts the +24V to GND to protect the remaining electronics on the module. This chip serves a dual function as it also helps filter ESD voltage spikes as well.

Over-Driven Motor

The **ConveyLinx-ERSC Module** firmware monitors the motor voltage and if it rises above 30V, it automatically shunts the motor driver transistors together (the same as in normal braking) so that the energy is contained within the motor coils and away from the controller electronics. The inherent nature of motor coil geometry and construction allow for this driven state to be tolerated for several seconds or even minutes before there is any potential damage to the motor coil circuit. When the voltage drops below 29V, the **ConveyLinx-ERSC Module** firmware allows the motor power transistors to switch back to their normal operation.

2.8. LED Status Indicators

Module Hardware /

LED Status Indicators

ConveyLinx-ERSC Module status is indicated by several LED's. All LED's with the exception of the Ethernet Link and Activity LEDs are multi-colored and context sensitive. The following sections indicate the various meanings of all LED indicators.

> ✻ By definition **Blinking** is approximately 1/2 second on/off cycle and **Flashing** is approximately 1/4 second on/off cycle.

If you need help finding where LED Items are located on the **ConveyLinx-ERSC Module**

Communications

Indicator	Item	LED State	Description
Ethernet Left Link	16	OFF	No connection established
		Solid Green	Connection is established
		Blinking Green	When data transmission activity is occurring
Ethernet Right Link	15	OFF	No connection established
		Solid Green	Connection is established
		Blinking Green	When data transmission activity is occurring

Motors

Indicator	Item	LED State	Description

Motor Left & Motor Right	11 & 12	OFF	Motor is not running and no faults detected
		Solid Green	Motor is running
		Flashing Green (intermittent)	Motor is being moved or rotated by external force
		Solid Red	Motor is not connected or motor is stalled
		Blinking Red	Motor is overloaded or over-heated
		Flashing Red	Motor Stopped: Short circuit detected between at least two of the phase windings
			Motor Running: Over-current condition

Network & Module Status

Indicator	Item	LED State	Description
Module Status	13	Solid Red	Module is booting up or during Auto-Replacement procedure, module is attempting to retrieve data from neighbor module(s)
		Blinking Red	Module is starting task processes
		Blinking Green	Module is ready
		Flashing Green & Blinking Red	Auto-replace procedure has been properly triggered
		Flashing Red & Blinking Green	Failsafe Mode

		Flashing Red	Auto Configure Mode is active
		Blinking Amber	Performing firmware upgrade check
		Solid Amber	Firmware upgrade in progress
Network Status	14	Solid Red	Starting Inter-module communications
		Blinking Red	Establishing inter-module connections
		Blinking Green	Inter-module communications established

Sensors

Indicator	Item	LED State	Description
Sensor Left & Right	17 & 18	Solid Green	Sensor is Blocked
		Solid Red	Sensor Error State (Pin 3) is Active
		Blinking Red	Arrival Jam or missing sensor
		Blinking Green/Amber	Sensor Jam
		Flashing Green	When Sensor is blocked, indicates external device (PLC/PC controller or EasyRoll) has accumulated the zone and inhibiting release

Control Ports

Indicator	Item	LED State	Description
Control Port Left & Right	19 & 20	Solid Green	If acting as Upstream Port: Wake-up signal is logically enabled on Pin 4
			If acting as Downstream Port: Lane Full signal is logically enabled
			If Module is in PLC I/O Mode: Signal on Pin 4 is logically enabled
		Solid Red	Local Accumulate signal (Pin 3) is logically enabled
		Flashing Red	Module configuration error

Special Cases

Indicator	Item	LED State	Description
All Sensor, Control Port & Motor	11 12 17 18 19 20	Flashing Red	Module in stopped state
Left Sensor, Left Control Port, & Left Motor	18 20 12	Flashing Green	ZPA zone on left side of module is in Maintenance Mode*
Right Sensor, Right Control Port, & Right Motor	17 19 11	Flashing Green	ZPA zone on right side of module is in Maintenance Mode*

*Maintenance mode only accessible via remote PLC.

2.9. Power and Network Connections

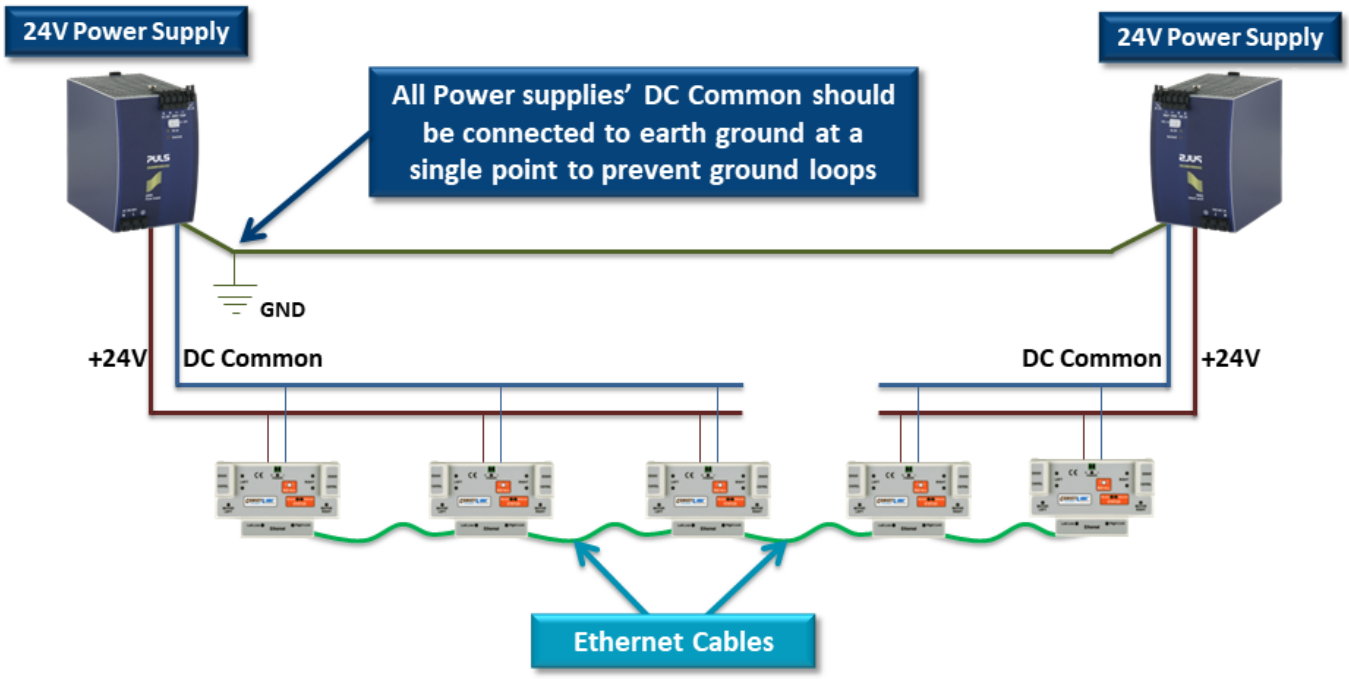
Module Hardware /

Power and Network Connections

Power connector is included with the **ConveyLinx-ERSC Module** when shipped from the factory

ERSC	Phoenix Contact PN: 1827127 MCVR 1,5/2-ST-3,81
ERSC-HTF	Phoenix Contact PN: 1912841 MVSTBW 2,5 HC/ 2-ST-5,08

Once MDR's and photo-sensors have been connected based upon the desired conveyor arrangement (1 zone, 2 zone, dual motor zone, etc.); all **ConveyLinx-ERSC Modules** that make up the linear conveyor arrangement need to be interconnected with shielded Ethernet cables (Hardware Rev.1 modules must use shielded crossover Ethernet cables) and each module needs to receive a 24VDC power connection. The Power Plug connection is the power source for all logic, photo-sensors, and MDR's.
Multiple power supplies should have their DC Common terminals connected together as shown:



! This document assumes the user is aware of MDR power requirements for the application and that the user and/or installer have properly sized 24VDC power supplies and wiring based upon all applicable codes and standards. This document also assumes installation will follow proper equipment grounding practices. "DC common or -"on all power supplies should always be connected to ground. Improper power supply sizing and/or improper grounding practices will produce unexpected results.

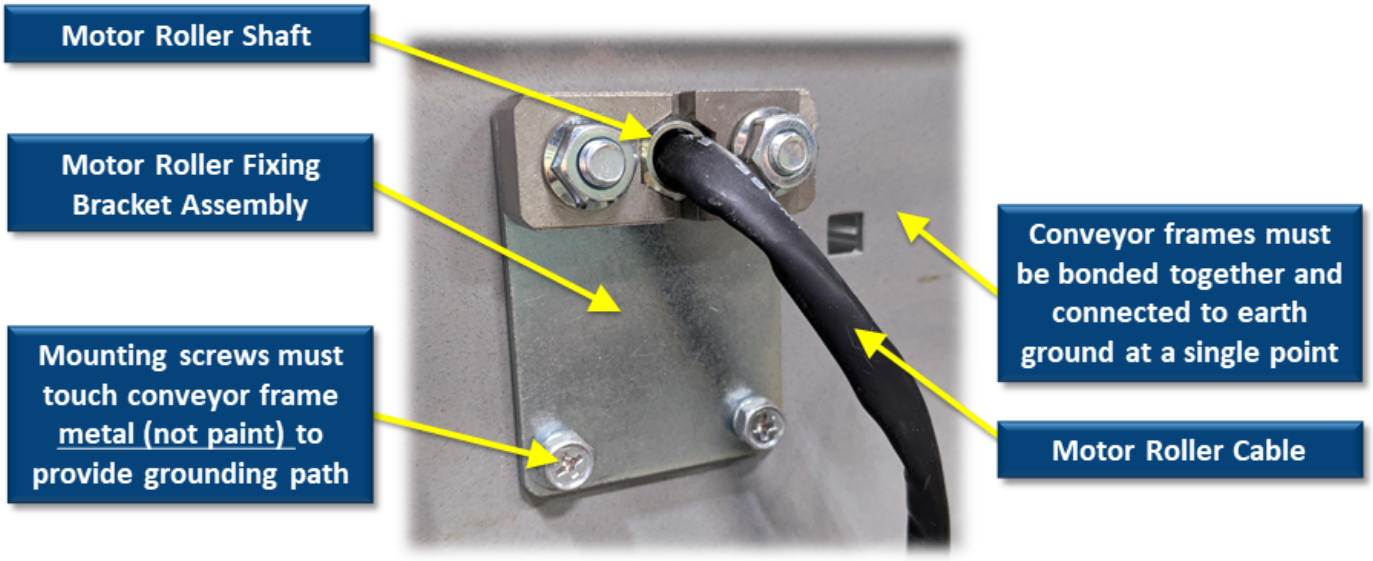
Learn about power supply sizing

2.10. Proper Motor Grounding Practice

Module Hardware /

Proper Motor Grounding Practice

Motor roller drive end shaft and/or fixing bracket must be electrically bonded to the conveyor frame and conveyor frame connected to electrical ground.



! Improper grounding of MDR and/or Power Supply Common may result in premature MDR and/or **ConveyLinx-ERSC Module** module failure. Proper grounding techniques MUST be observed for all applications

2.11. Power Supply Sizing

Module Hardware /

Power Supply Sizing

The current loading on the power supply for a group of **ConveyLinx-ERSC Modules** depends upon the Motor Type selected. Each of the motor types available has an associated rated current that the motor will draw at rated torque and maximum speed. Each motor type also has an associated allowed current draw that is available for a period of time upon the initial starting of the motor. Theses current values and starting times are shown in the following chart:

	ECO	BOOST	BOOST 8
Power supply load **per Motor Port** at rated torque at maximum speed	2.5 A	3.5 A	3.5 A
Power supply load **per Motor Port** during motor starting period	3.0 A	5.0 A	8.0 A
Duration of motor starting period	5.0 sec	1.5 sec	3.0 sec

✻ Please note that BOOST 8 is only available on ConveyLinx-ERSC-HTF module. You can select BOOST 8 in EasyRoll for a ConveyLinx-ERSC module, but it will not deliver the BOOST 8 current

✻ Please note that the current values shown are per Motor Port, so if both Motor Ports are being used on a given **ConveyLinx-ERSC Module**, the current load seen by the power supply for that module will be double the value shown.

✻ The current values are at rated speed and at rated torque. The current will be less if rated torque is not required by the motor.

2.12. Technical Specifications

Module Hardware /

Technical Specifications

These specifications cover **ConveyLinx-ERSC Module** Hardware Revisions 3 and above and Serial numbers 137101 and higher.

Input Power Supply Requirements	24.0VDC + / – 10%
Input Protection Rating	Class III
Standby Current Consumption	< 120 mA without Motor
Minimum Operating Voltage	21 V
Maximum Operating Voltage	30 V
Storage Temperature	-40ºC to 150º C (-40ºF to 300ºF)
Ambient Operating Temperature (ERSC)	0ºC to 40ºC (32°F to 104°F)
Ambient Operating Temperature (HTF)	-30ºC to 40ºC (-22°F to 104°F)
Humidity	5% to 95% non-condensing
Vibration	0.152 mm (0.006 in.) displacement, 1G peak
Mechanical Shock	20G peak for 10ms duration
Enclosure IP Rating	IP20
Weight	Approximately 200g
Environmental Pollution	Class 2
Altitude	up to 2000m

Digital Input Minimum ON Current	1.5 mA	
Digital Input Maximum OFF Current	0.4 mA	
Motor Ports	Supported Motor Types	Senergy (9-Pin JST Connector)
	Motor PWM Frequency	10 kHz +/- 0.1%
	Max. Starting Current (ERSC)	≤ 5.5A per port
	Max. Starting Current (HTF)	≤ 8A per port
	Rated Current (ERSC)	≤ 4A per port
	Rated Current (HTF)	≤ 5A per port
	Motor Protection	● Coil-to-coil short ● coil-to-Vcc short ● overheating ● over-voltage ● under-voltage ● stall sensing and protection
Network	Type	3 port integrated switch
	Speed	10Base-T / 100Base-TX Auto Detect
	Support	● Back pressure flow control ● Auto Duplex ● Auto straight/ crossover detect ● PAUSE frame support

	Supported protocols	● Modbus TCP ● Profinet IO ● Ethernet IP ● CCLink IEF Basic

2.12.1. Certifications & Standards

Module Hardware / Technical Specifications /

Certifications & Standards



EMC Directive (2014/30/EU) EMC Standard – Emission (EN 61000-6-4)	Electromagnetic compatibility (EMC) — Part 6-4: Generic standards – Emission standard for industrial environments
EMC Directive (2014/30/EU) EMC Standard – Emission (EN 61000-6-2)	Electromagnetic compatibility (EMC) — Part 6-2: Generic standards – Immunity for industrial environments
Programmable Controller (IEC 61131-2)	Programmable controllers – Part 2: Equipment requirements and tests
Low Voltage Directive (2014/35/EU) (EN 61010-1)	Safety requirements for electrical equipment for measurement, control, and lab use
UL Standard for safety (UL 61800-5-1)	Recognized Component per UL 61800-5-1 & CSA C22.2 No. 274 (E503071)
ETL	ETL Listed per UL 61010-1 and 61010-2-201 (CSA C22.2#61010-1)
RoHS 3 (Directive 2011/65/EU)	Restriction of Hazardous Substances
REACH (EC 1907/2006)	Registration, Evaluation, Authorization and Restriction of Chemicals

TSCA	Toxic Substances Control Act (TSCA), United States Code Title 15, Sections 2601–2692
POPs	Stockholm Convention on Persistent Organic Pollutants (POPs)
Conflict Minerals	Dodd-Frank Wall Street Reform and Consumer Protection Act – Section 1502: Conflict Minerals
Asbestos	Declaration of Conformity: Product does not contain asbestos in any component or material
Halogen	Declaration of Conformity: Products contain halogenated materials at negligible/ undetectable levels as defined by IEC 61249-2-21
California Proposition 65	California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)

3. Auto-Configuration

Auto-Configuration

The purpose of ***Auto-Configuration*** for networked ConveyLinx controls is to provide a simple and easy procedure for linear conveyor system commissioning that does not require a PC or PC based software to implement. The ***Auto-Configuration*** of Linear Conveyor feature of ConveyLinx requires only the proper interconnection of each module and the press of a button on the most upstream module to complete.

✻ A networked ConveyLinx solution is capable of controlling more complex conveyor paths that include diverting and merging equipment. However, this requires configuration with a PC and software.

Learn about:

Linear Conveyor

Auto-Configuration Examples

Auto-Configuration Procedure

Expected Auto-Configuration Results

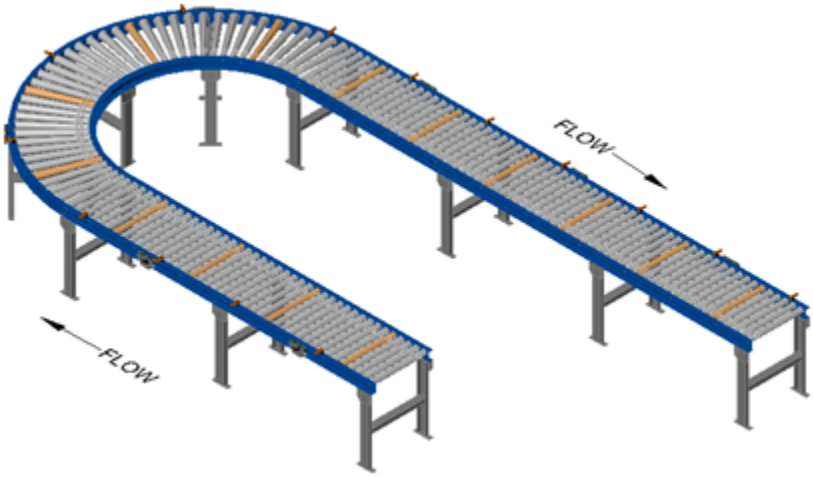
What to do if things go wrong with Auto-Configuration

3.1. Linear Conveyor

Auto-Configuration /

Linear Conveyor

A Linear Conveyor arrangement is defined as a single uninterrupted path of conveyor with no merge or diverts mechanisms. A Linear Conveyor can include curved sections, but the flow of cartons or totes on the conveyor is continuous from in-feed zone to discharge zone.



Example of a Linear Conveyor

Learn about:

Device Connections to Modules

Examples that will generate errors

Motor rotation definition

3.1.1. Device Connections to Modules

Device Connections to Modules

Before the ***Auto-Configuration Procedure*** can be performed; each individual **ConveyLinx-ERSC Module** needs to have its associated MDR's and photo-sensors connected in the proper way for expected operational results.
In general, each **ConveyLinx-ERSC Module** detects which ***Sensor Ports*** have a device connected and will use this to determine its specific configuration once it has been instructed to self-configure by the ***Auto-Configuration Procedure***.
Before starting to configure your system to operate, each MDR and photo-sensor needs to be properly connected to the **ConveyLinx-ERSC Module** mounted on the conveyor.
Modules will determine how to operate based upon how the photo-sensors and MDR's are connected.

✻ The number of ***Sensors*** connected will determine the total number of ***Zones***. Once ***Auto-Configuration*** is complete, this number of ***Zones*** cannot be modified or over-ridden without performing another ***Auto-Configuration Procedure***.

A single ConveyLinx-ERSC Module can operate as a:

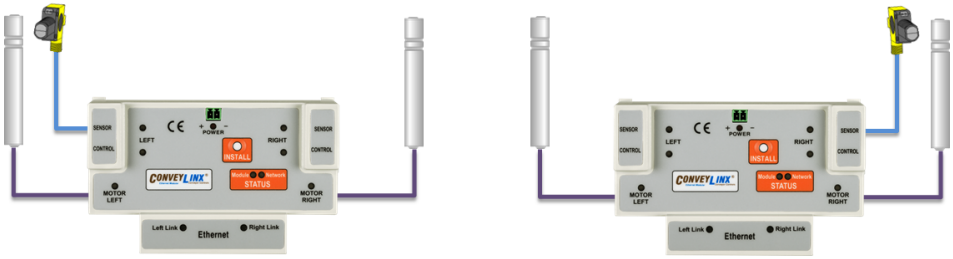
2 zone controller with 2 MDR's and 2 photo-sensors



1 zone controller with 1 MDR and 1 photo-sensor on Left or Right Side



1 zone controller with 2 MDR's and 1 photo-sensor with Sensor on Left or Right Side



3.1.2. Examples that will generate errors

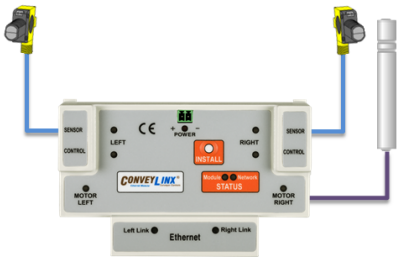
Examples that will generate errors

✻ These examples are not necessarily invalid and will not cause the ***Auto Configuration Procedure*** to fail or abort, but they will result in module errors or cause interruption in the flow of items on the conveyor.

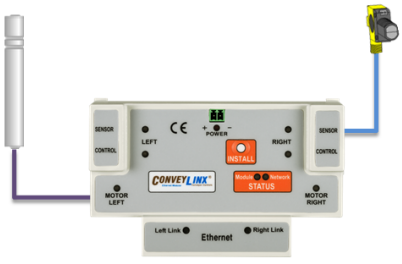
This module will configure as a two zone module but will generate a motor connection error for the missing motor on the Right side



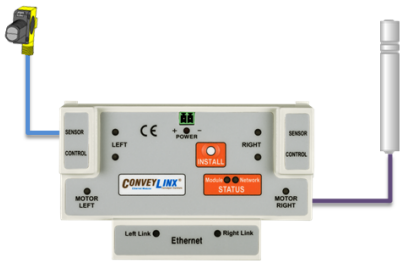
This module will configure as a two zone module but will generate a motor connection error for the missing motor on the Left side



This module will configure as a single zone module on the Right side but will generate a motor connection error for the missing



This module will configure as a single zone module on the Left side but will generate a motor connection error for the missing



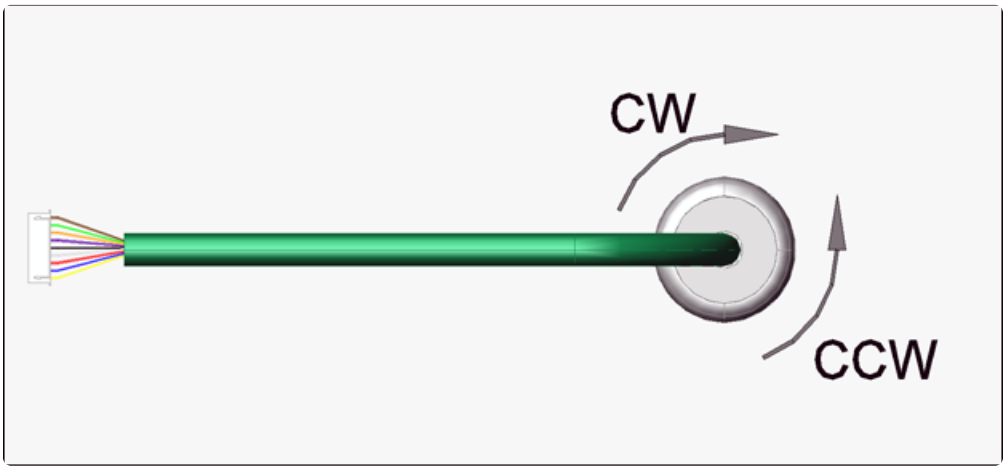
motor on the Right Side

motor on the Left Side

3.1.3. Motor Rotation Definition

Motor Rotation Definition

The **ConveyLinx-ERSC Module** uses a ***Clock-Wise (CW)*** and ***Counter Clock-Wise (CCW)*** motor rotation definition. The reference for this distinction is based upon viewing the MDR from the cable exit end of the roller.



Motor Rotation Definition

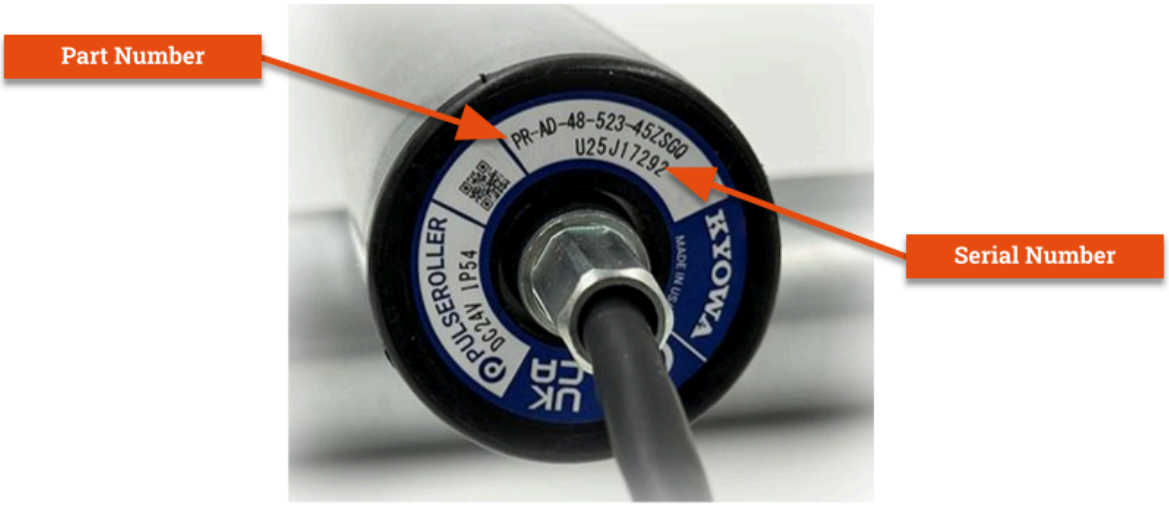
Auto Configuration will automatically adjust the motor rotation direction based upon the flow established by the procedure as long as the cable end of the roller is on the **same side of the conveyor** as the **ConveyLinx-ERSC Module**. If the rotation direction is not correct after the ***Auto-Configuration Procedure*** completes, you can change it. How to change the motor rotation direction using ***EasyRoll+***

3.1.4. Motor Roller Part Number

Auto-Configuration /

Motor Roller Part Number

The motor roller's part number is located on the end cap label on the motor cable end of the roller tube. This label also displays the unit's serial number



3.2. Procedure

Auto-Configuration /

Procedure

The ConveyLinx ***Auto-Configuration Procedure*** routine will detect which photo-sensors are connected in order to configure a given **ConveyLinx-ERSC Module** as a 1 or 2 zone controller. The physical order of module connections; from upstream to downstream, dictate the MDR direction and product flow logic.

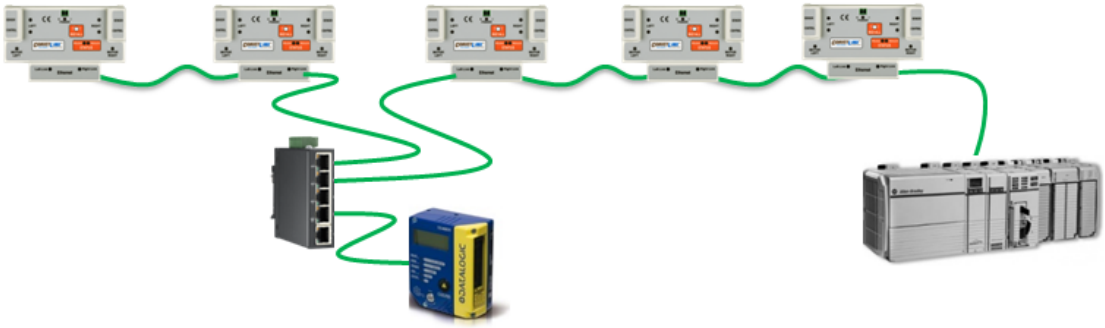
Before You Begin

- All sensors should be clear. ***Auto-Configuration*** assumes **takes for granted** that the state of each sensor is the “zone empty” state so that the module can auto-learn the block/clear states for both retro-reflective and diffuse type sensors
- Make sure you have no more than 221 **ConveyLinx-ERSC Modules** connected. ***Auto-Configuration*** will not configure past 221 **ConveyLinx-ERSC Modules** in one network
- Make sure that there are no other Ethernet devices or switches connected in your string of *ConveyLinx-ERSC Module*s. After ***Auto-Configuration*** is complete and successful, you can interrupt the Ethernet string with other devices and/or switches as needed.

For Auto-Configuration – make sure all modules are connected without any other devices

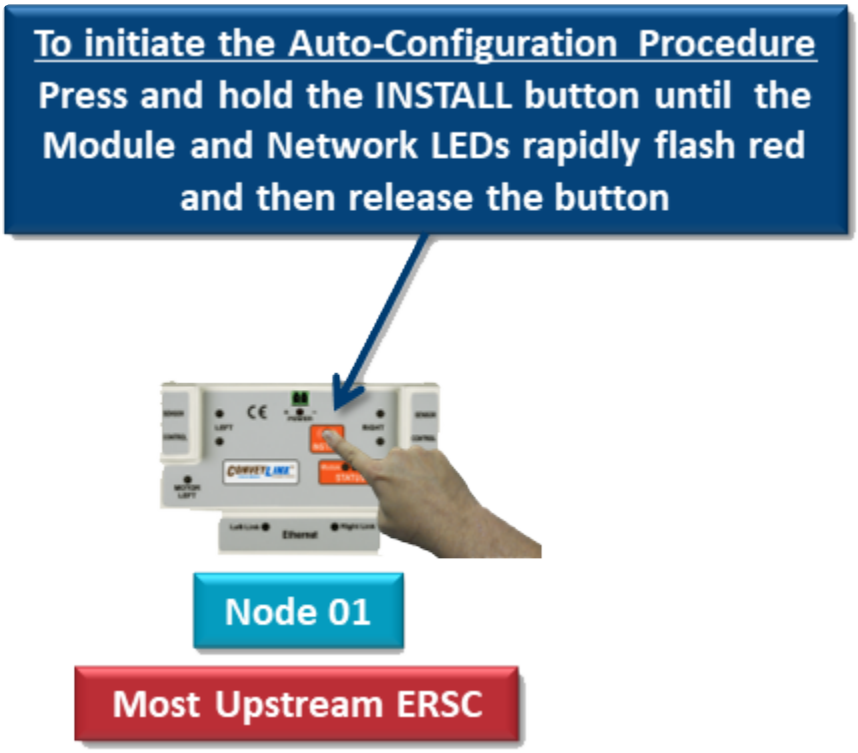


Once Auto-Configuration is complete – you can insert Switches and connect devices as needed



The direction of flow of the conveyor dictates where to begin the ***Auto-Configuration Procedure***. The **ConveyLinx-ERSC Module** located at the most upstream or in-feed end of the conveyor is the module where the procedure must be initiated.. Because of its physical location on the conveyor path and physical location in the Ethernet connection chain; the most upstream **ConveyLinx-ERSC Module** will automatically connect to all downstream **ConveyLinx-ERSC Modules** and set their I.P. address for communication. Then the routine automatically sets the direction of flow.

Auto-Configuration Procedure



1. Press and hold INSTALL button on the most upstream/in-feed end **ConveyLinx-ERSC Module** and keep it held for 5 seconds
2. After 5 seconds the Module Status LED will flash RED
3. Once Module Status LED begins flashing RED, the INSTALL button must be released within 2 seconds. If held for longer than 2 seconds; the procedure is cancelled
4. Once the INSTALL button has been released within the 2 second time window, the **ConveyLinx-ERSC Module** will be initiated as most upstream module and the Auto-Configuration Procedure routine will begin.
5. Observe that all of the LED's (with the exception of the Left Link and Right Link LEDs) will flash on and off RED on all the **ConveyLinx-ERSC Modules** in the network string



https://www.youtube.com/embed/XDJkC8jpZIM?rel=0

! In order for the Auto-Configuration to work properly, all loads, totes, product, containers, cartons, etc. must be removed from the entire conveyor path and all photo-sensors must be aligned and adjusted so that none are detecting that their respective zone is occupied. Failure to meet these conditions will produce unexpected results.

* Please note that once a network has been configured; pressing and holding the Install button on any module that has neighboring **ConveyLinx-ERSC Modules** on both sides of it will not initiate a new Auto-Configuration Procedure. The module will detect that it is not the most upstream unit and abort the procedure. However, the **ConveyLinx-ERSC Module** will perform its local re-booting procedure. This procedure will take a few seconds to complete

! Please note that pressing and holding the Install button on the most **DOWNSTREAM ConveyLinx-ERSC Module WILL** initiate a new Auto-Configuration Procedure and attempt to establish the flow in the opposite direction

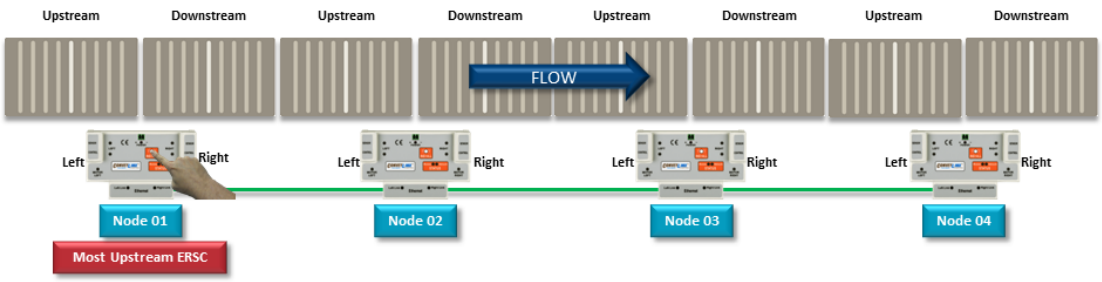
3.3. Auto-Configuration Examples

Auto-Configuration /

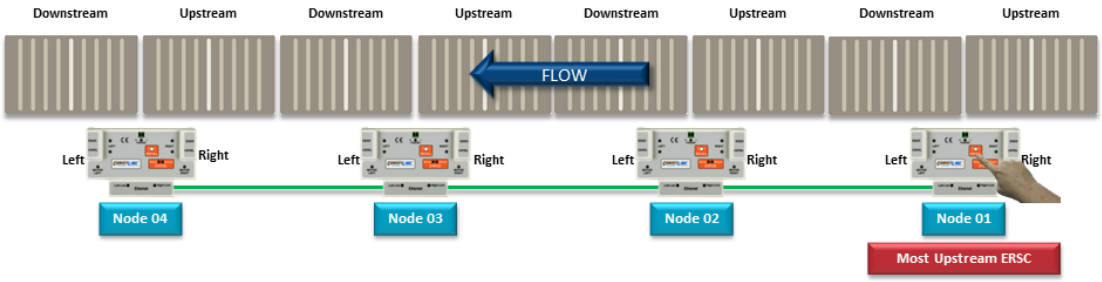
Auto-Configuration Examples

> ✻ Please note that the ***Flow*** is based upon the Ethernet cable routing during the ***Auto-Configure Procedure***. The ***Flow*** direction cannot be changed or over-ridden. The only way to change the ***Flow*** direction is to perform another ***Auto-Configuration Procedure***

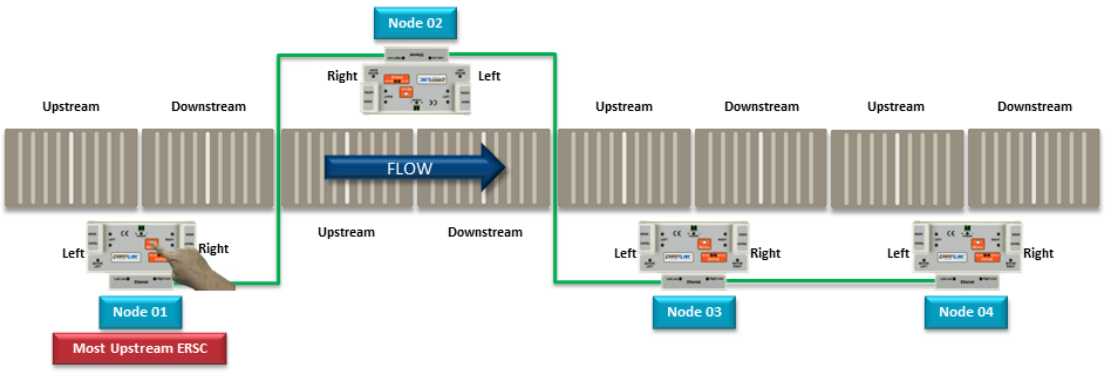
Left to Right Flow Example



Right to Left Flow Example



Left to Right Flow with Opposite Side Module Example



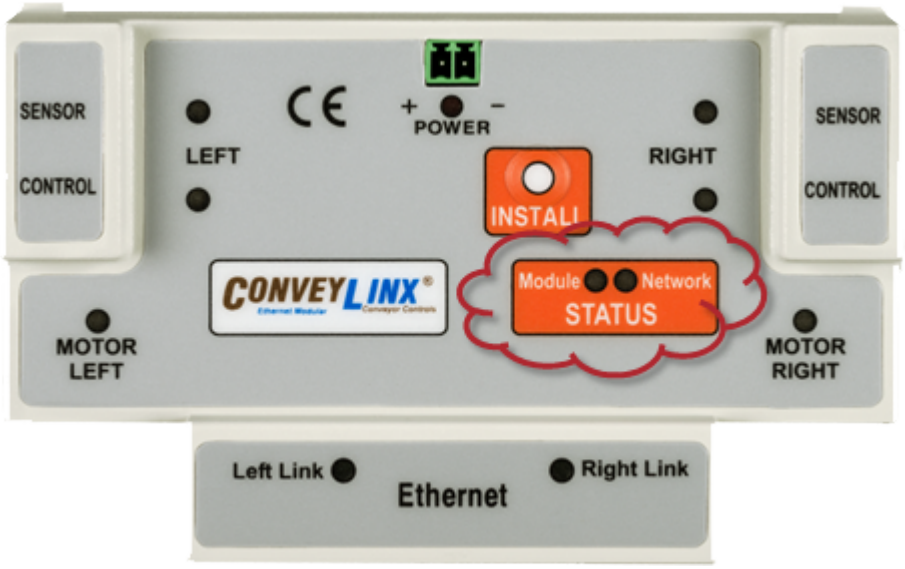
3.4. Expected Results

Auto-Configuration /

Expected Results

When the ***Auto-Configuration Procedure*** routine is complete, each **ConveyLinx-ERSC Module** will automatically reboot. When a **ConveyLinx-ERSC Module** has been successfully configured and rebooted, its ***Module*** and ***Network Status LED's*** will blink on and off green.

When the module has been properly configured and is operational, both its *Module* and *Network* Status LEDs will blink on and off *Green*



> ✻ Please note that the time to complete the ***Auto-Configuration Procedure*** is dependent on the number of **ConveyLinx-ERSC Modules** being configured. Larger networks will take more time than smaller networks

How to verify success

Conveyor Operation

Place a carton on your empty conveyor so that it blocks the most upstream zone's sensor. It should convey all the way to the discharge end and the last most downstream zone should try to convey it off the end of its zone. If this does not happen, then at the point

where the carton stops, check that module's motor connection is sound and that the zone's sensor is properly aligned. If the sensor was not properly plugged in and powered when the ***Auto-Configuration Procedure*** was performed, you will have to perform the procedure again. If the sensor was powered but is misaligned when the ***Auto-Configuration Procedure*** was performed, you can either perform the procedure again or change the logical polarity of that particular sensor using ***EasyRoll+*** .

Examine the Network

While the ***Auto-Configuration Procedure*** is in process, you should see all of your modules' LEDs flashing on and off red. If this is not the case, then check your Ethernet cables and connections and power connections.

To verify that all the modules you expected to be configured are in fact configured, with ***EasyRoll+*** or ***EasyRoll*** you can connect to your newly configured **ConveyLinx-ERSC Module** network and perform a "***Discover*** function":**Future Link Marker**. The ***Discover*** function will display all modules that it finds and from the list your most upstream **ConveyLinx-ERSC Module** should have the 4th octet of its IP Address as .20 and you should see each module you configured in the list.

3.5. What to do if things go wrong

Auto-Configuration /

What to do if things go wrong

Here are some troubleshooting tips:

Unexpected Motor Behavior

- If a **ConveyLinx-ERSC Module** was previously configured and its motor settings were changed in ***EasyRoll+*** including rotation direction, these setting are not changed to default when a new Auto-Configuration procedure is performed.
- Make sure you have the correct motor type settings. How to change Motor Type Setting using ***EasyRoll+***
- Make sure that there are no motor errors. How to jog motor and look for errors using ***EasyRoll+***

Network and Module Status LEDs Blinking Green with unexpected results

- Check that all sensors are operational and that all zones are clear then perform procedure again. How to change block/clear sensor logic without having to perform another Auto-Configuration using ***EasyRoll+***
- Check all network and power connections and make sure there is 24V on each **ConveyLinx-ERSC Module** then try the Auto-Configuration procedure again
- Verify that all of the module sensor/motor combinations are valid. Check here to find out what module set-ups are invalid

Either or both Network and Module Status LEDs are Blinking or Flashing Red

- Make sure there are no other Ethernet devices (PC's, Switches, Scanners, etc.)

connected between any of the module on your network. The Auto-Configuration procedure aborts when it encounters a non ConveyLinx device along the network path before reaching the last module. **ConveyLinx-ERSC Modules** up to that point should be configured properly but the remaining modules will not.

- When removing a **ConveyLinx-ERSC Module** from an existing configured network that is already operational; be sure to wait 1 or 2 minutes to allow the Ethernet Switches on the modules to reset their MAC Address ARP table before attempting a new Auto-Configuration procedure

4. Default Settings and Operation

Default Settings and Operation

After Auto-Configuration, the modules on your newly configured network are in ZPA mode and set to Singluation Release.

If all module and/or Network Status LED's are blinking green; then to fully verify configuration is to place a single carton onto the most upstream zone and see that it conveys to the discharge zone. If it does, then the Auto-Configuration Procedure is successful.

Learn About:

Singulation Release Mode

Flex Zone Recognition

Jam Conditions

Hard-Wired Interlocks

Automatic Module Replacement

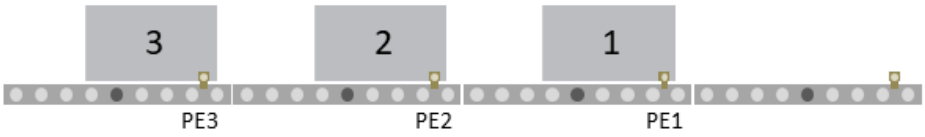
How to Reset to Factory Defaults

4.1. Singulation Release Mode

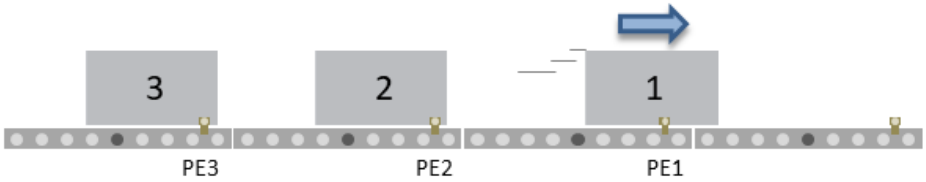
Singulation Release Mode

Singulation Release is the mode where the **ConveyLinx-ERSC Module** requires that its neighboring downstream zone must be clear before it releases an item.

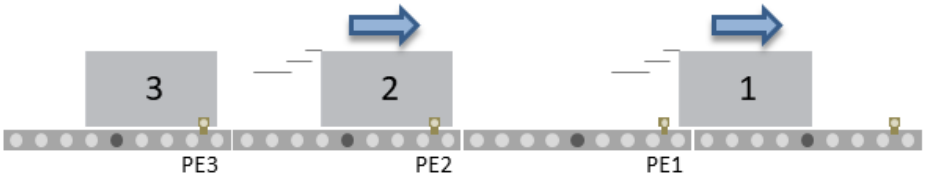
All 3 Cartons are accumulated



Carton 1 releases – Cartons 2 and 3 remain accumulated



When Carton 1 clears PE1 then Carton 2 releases



View other ZPA Release Modes and how to change ZPA modes with ***EasyRoll+***

4.1.1. Other Release Modes

Default Settings and Operation / Singulation Release Mode /

Other Release Modes

Train Release in *EasyRoll+*

GAP Train Release in *EasyRoll+*

T-Zone Release in *EasyRoll+*

4.2. Flex Zone Recognition

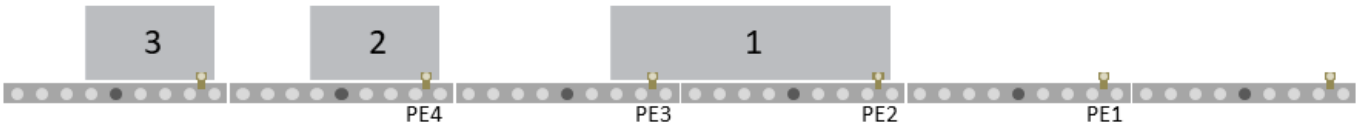
Default Settings and Operation /

Flex Zone Recognition

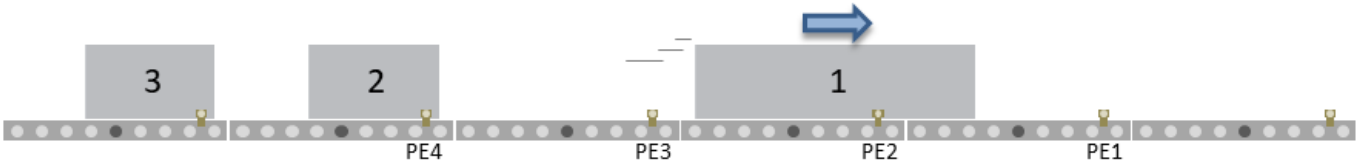
ConveyLinx-ERSC Modules will automatically detect that a given carton is longer than one zone length and automatically adjust accumulation control so that the longer carton occupies two logical zones and will keep the next upstream carton from conveying into the longer carton.

! Flex Zone mode only functions in **singulation release mode**

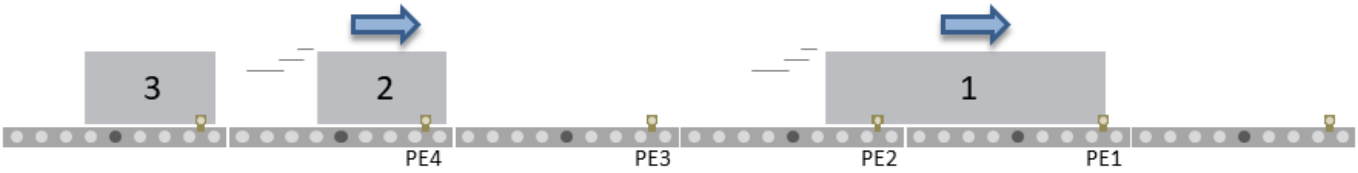
All 3 Cartons are accumulated and the Zone at PE3 has Flex Zone enabled



Carton 1 Releases – Even though PE3 is clear, because it has Flex Zone enabled, Carton 2 remains accumulated



When Carton 1’s leading edge reaches PE1, Flex Zone is cleared from the Zone at PE3 and Carton 2 releases



! Please note that Flex Zone mode operates for carton lengths up to 2 zone lengths only. Operating conveyor system with cartons whose lengths are in excess of 2 zone lengths may produce undesirable results such as excessive detected jam conditions and faults.

How to disable Flex Zone operation with *EasyRoll+*

4.3. Jam Conditions

Default Settings and Operation /

Jam Conditions

There are two (2) types of Jam conditions detected by the **ConveyLinx-ERSC Module**:

Sensor Jam

Arrival Jam

✻ Both of these Jam conditions utilize a single Jam Timer that has to expire in order for the condition to be active. Once either of these jam conditions becomes active; they will automatically clear in the logic after the Auto Clear Time has expired. Both the Jam Time and Auto Clear Time values are 5 seconds each by default. Please see Jam and Auto Clear Timers in ***EasyRoll+***

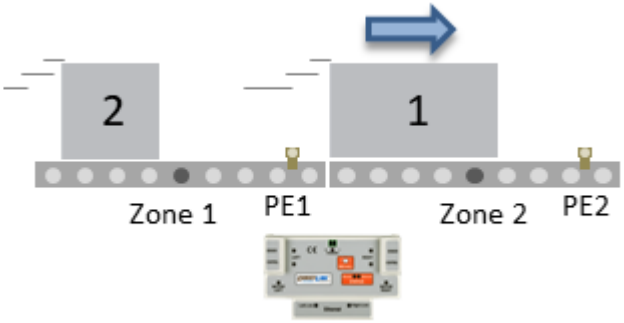
4.3.1. Arrival Jam

Default Settings and Operation / Jam Conditions /

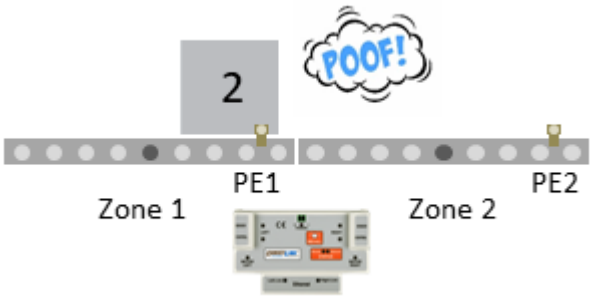
Arrival Jam

When a carton leaves an upstream zone and is conveyed to its next downstream zone, this upstream zone expects positive confirmation of carton arrival from the downstream zone. This communication occurs automatically along the ConveyLinx network. If a new carton arrives at this upstream zone while this upstream zone is waiting for a downstream arrival confirmation, the new carton will accumulate on this upstream zone. If the upstream zone does not receive this confirmation within the ***Jam Timer*** interval, the **ConveyLinx-ERSC Module** will produce an ***Arrival Jam*** fault. Once an Arrival Jam occurs, the **ConveyLinx-ERSC Module** will automatically hold any new carton at the upstream zone for a pre-determined ***Auto Clear Time*** Timer value and then resume normal ZPA function. By default, the ***Jam Timer*** and the ***Auto Clear*** Timer values are set to 5 seconds for each. This condition will be indicated on the corresponding Sensor LED on the module

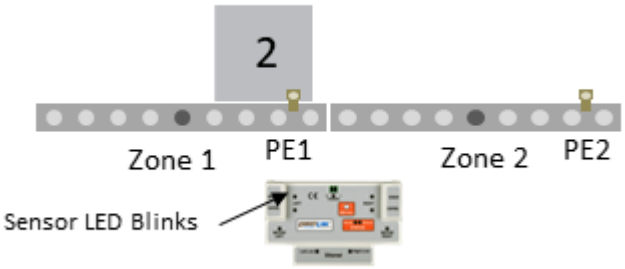
Carton 1 has left PE1 and is on its way to PE2 and because PE1 is clear, Carton 2 is entering Zone 1



Carton 1 disappears but the Zone 2 motor continues to run for the Jam Time period (5 sec. by default). During this time Carton 2 arrives at PE1 but Zone 1 stops because Jam Timer is still timing



When the Jam Timer expires, the Sensor LED blinks to indicate an Arrival Jam and keeps blinking for the Auto Clear Time (5 sec. by default). When Auto Clear Time expires, the Arrival Jam is reset and Carton 2 will release if Zone 2 is empty



✻ How to Disable Arrival Jam with ***EasyRoll+***

✻ How to change the Jam and Auto Clear Timers with ***EasyRoll+***

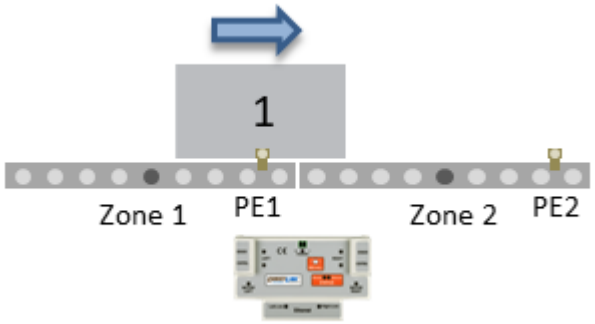
4.3.2. Sensor Jam

Default Settings and Operation / Jam Conditions /

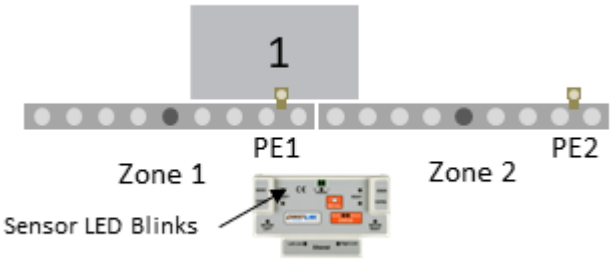
Sensor Jam

While a zone is releasing a carton; if this carton remains blocking the photo-sensor for the ***Jam Timer*** period (default of 5 seconds), the **ConveyLinx-ERSC Module** will detect a ***Sensor Jam***. This will be indicated on the corresponding Sensor LED on the module as shown here.

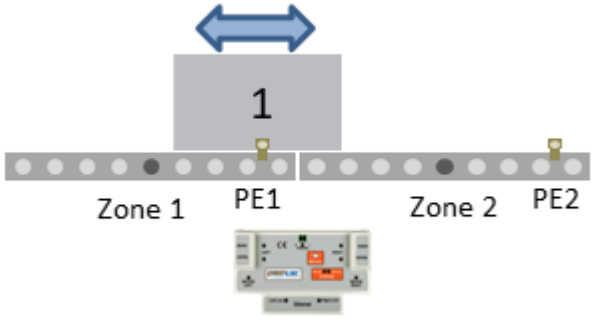
Carton 1 is leaving Zone 1 but has got stuck. Zone 1 and Zone 2 motors are running but PE1 is remaining blocked



When the Jam Timer has expired (5 sec. by default) Zone 1 and Zone 2 motors stop and Zone 1 Sensor LED flashes green/amber for the Auto Clear Time (5 sec. by default)



When the Auto Clear Timer has expired, Zone 1 will start performing the Sensor Jam Auto Clear procedure



Here is what happens when Sensor Jam Auto Clear procedure occurs

1. Run the zone motor in reverse until the sensor is clear or 1 second has elapsed, whichever happens first
2. Wait for the Auto Clear Timer to expire
3. Run the zone motor forward to attempt discharge to the downstream zone (Attempt #1 complete)
4. If sensor is still blocked after discharge attempt, the zone motor runs in reverse until the sensor is clear or 1 second has elapsed, whichever happens first
5. Wait for the Auto Clear Timer to expire
6. Run the zone motor forward to attempt discharge to the downstream zone (Attempt #2 complete)
7. If sensor is still blocked after discharge attempt, the zone motor runs in reverse until the sensor is clear or 1 second has elapsed, whichever happens first
8. Wait for the Auto Clear Timer to expire
9. Run the zone motor forward to attempt discharge to the downstream zone (Attempt #3 complete)
10. If sensor is still blocked after Attempt #3, the sensor must be cleared manually to reset the Sensor Jam condition. Please note that if any of the discharge to downstream attempts (steps 3, 6, or 9) are successful, the Sensor Jam condition is automatically reset.

✻ If item is still blocking the sensor after Sensor Jam Auto Clear procedure is complete you have to physically clear the jam by removing the item or you can attempt another Auto Clear procedure using ***EasyRoll+***

✻ The 5 second Jam Timer and Auto Clear Timer values are default settings. How to change Jam and Auto Clear Timers with ***EasyRoll+***

✻ How to Disable Sensor Auto Clear Function with ***EasyRoll+***

4.4. Hard-Wired Interlocks

Default Settings and Operation /

Hard-Wired Interlocks

Once your linear conveyor has been Auto-Configured and running in ZPA mode; the **ConveyLinx-ERSC Modules** will attempt to convey all items from upstream to downstream in the direction of flow. The next logical step that you will want to do is Interlock with the most upstream and/or downstream zones and perhaps interrupt flow in a zone somewhere in the middle.

Control Ports Provide Interlock Function

By default after configuration, each control port provides:

- An input for an Interlock Signal (***Pin 4***)
- An input for Local Zone Accumulate (***Pin 3***)
- An output that indicates if zone is occupied (Pins 1/6 Circuit)

✻ The Interlock Input (***Pin 4***) will act as either a ***Wake Up*** or a ***Lane Full*** depending on whether the Control Port is configured on the **Upstream** or **Downstream** side of the module. When each **ConveyLinx-ERSC Module** has been Auto-Configured, either its Left or Right side will be configured as the Upstream side and the other will be the Downstream side depending on the flow established during Auto-Configuration.

! ***Wake Up*** interlock should only be used on the **MOST Upstream** zone and the ***Lane Full*** interlock should only be used on then **MOST Downstream** zone of any given subnet.

Learn About:

Upstream Interlock (Wake Up)

Downstream Interlock (Lane Full)

Local Zone Accumulate

Interlocks with a Single Zone Module

Interlock Input versus Local Accumulate Input

Using a Photoeye for Wake Up

Using a Photoeye for Lane Full

SE Breakout Module

4.4.1. Upstream Interlock (Wake Up)

Default Settings and Operation / Hard-Wired Interlocks /

Upstream Interlock (Wake Up)

Whichever ***Control Port*** (Left or Right) is on the ***Upstream Side*** of the module will accept a signal on its ***Interlock Input*** . If the zone is unoccupied, when a digital signal is applied, the zone will run its motor to accept an item.

Upstream Interlock Functionality

Learn more about how the Upstream Interlock works

Learn more about when a module configured as a single zone

Learn the difference between Upstream Interlock and Local Zone Accumulation

---

How to Connect Hardwired Signals

How to connect inputs to Control Port using SE Breakout Module

How to connect Control Port output signal to external control using SE Breakout Module

How to use a Photoeye with Control Port

4.4.2. Downstream Interlock

Default Settings and Operation / Hard-Wired Interlocks /

Downstream Interlock

Whichever ***Control Port*** (Left or Right) is on the ***Downstream Side*** of the module will accept a Downstream Interlock signal on its ***Interlock Input*** . If this signal is energized, the zone will run to accept an item and will stop when it's zone sensor is blocked. When this signal is de-energized, the zone will run to convey the item downstream.

Downstream Interlock Functionality

Learn more about how the Downstream Interlock works

Learn more about when a module configured as a single zone

Learn the difference between Downstream Interlock and Local Zone Accumulation

---

How to Connect Hardwired Signals

How to connect inputs to Control Port using SE Breakout Module

How to connect Control Port output signal to external

control using SE Breakout Module

How to use a Photoeye with Control Port

4.4.2.1. Continuous Discharge

Default Settings and Operation / Hard-Wired Interlocks / Downstream Interlock /

Continuous Discharge

A special case of the ***Downstream Interlock*** is the ***Continuous Discharge*** where the ***Interlock Input*** is actually not used at all and by disabling arrival jam detection in ***EasyRoll+***, any items arriving at the discharge of the most downstream zone will continue to be conveyed. With this functionality, arrival jams and jam reset delays are ignored.

Learn more about how Continuous Discharge works

4.4.2.2. Lane Full Interface

Default Settings and Operation / Hard-Wired Interlocks / Downstream Interlock /

Lane Full Interface

A special case of the ***Downstream Interlock*** is the ***Lane Full Interface*** where the ***Interlock Input*** is provided with an ***EasyRoll+*** configurable on delay and off delay timer to control release from the most downstream zone as well as by-pass the arrival jam detection and delay that is part of the default Downstream Interlock functionality

Lane Full Interface Interlock Functionality

Learn more about how the Lane Full Interface works

Learn more about when a module configured as a single zone

Learn the difference between Downstream Interlock and Local Zone Accumulation

---

How to Connect Hardwired Signals

How to connect inputs to Control Port using SE Breakout Module

How to connect Control Port output signal to external control using SE Breakout Module

How to use a Photoeye with Control Port

4.4.3. Local Zone Accumulate

Default Settings and Operation / Hard-Wired Interlocks /

Local Zone Accumulate

On a newly Auto-Configured linear conveyor without any intervention from external signals, items will not stop on any zones in the middle unless the next downstream zone is occupied. At zones where you may want to have a simple switch or operator button to cause an item to temporarily stop and accumulate at that zone, you can use the ***Local Zone Accumulate*** signal on ***Pin 3*** of the associated ***Control Port*** to signal the **ConveyLinx-ERSC Module** to accumulate the zone.

! If you re-energize the ***Pin 3*** signal while the item is in transit and still blocking the zone sensor, the item will stop and if left like this, the zone will eventually generate an Arrival Jam. You can modify the function of the ***Pin 3*** operation by making it active only upon leading edge of the zone sensor using ***EasyRoll+***

Learn more about how the Local Zone Accumulate function works

How to connect inputs to Control Port using SE Breakout Module

How to connect Control Port output signal to external control using SE Breakout Module

4.4.4. Interlocks with Single Zone Module

Default Settings and Operation / Hard-Wired Interlocks /

Interlocks with Single Zone Module

When you have a ***single zone ConveyLinx-ERSC Module*** (one sensor and one or two motors); whichever side of the **ConveyLinx-ERSC Module** (Left or Right) that has the ***Sensor*** attached will **always be the Upstream Zone** of the **ConveyLinx-ERSC Module** and provide the ***Upstream Interlock*** functionality. The opposite side Control Port will **always be the Downstream Zone** will provide the ***Downstream Interlock*** functionality.

Learn more about Interlocks with Single Zone Module

4.4.5. Interlock Input versus Local Accumulate Input

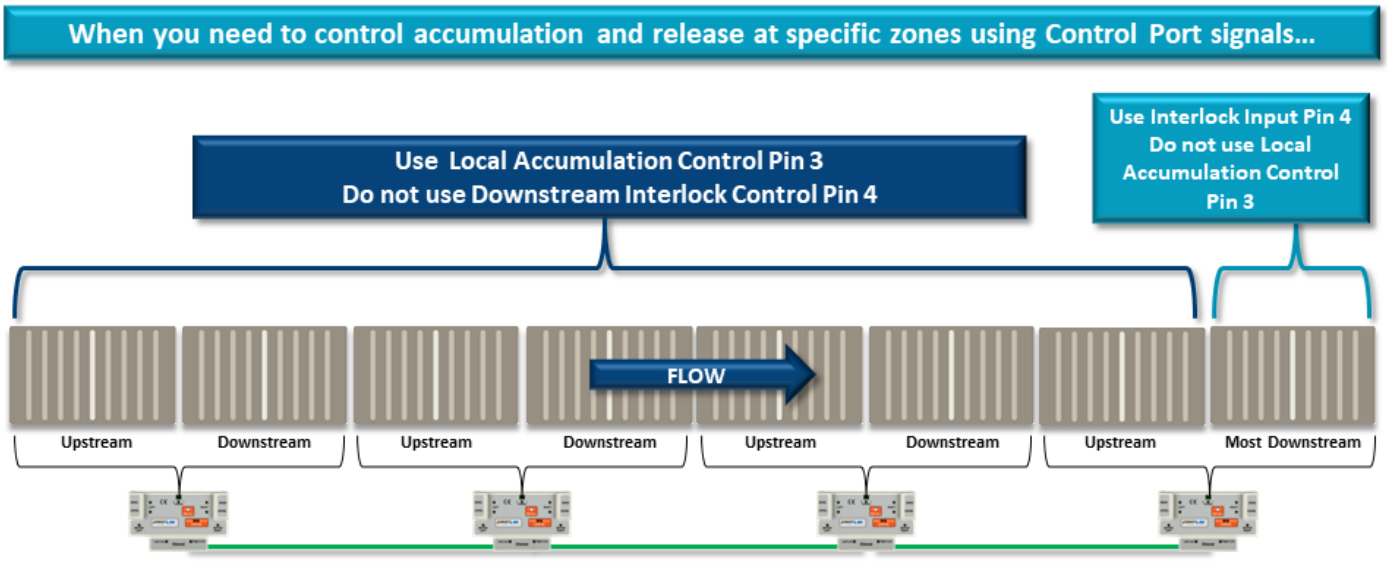
Default Settings and Operation / Hard-Wired Interlocks /

Interlock Input versus Local Accumulate Input

By default, energizing the Interlock Signal ***Pin 4*** on a Control Port on the Downstream side of a **ConveyLinx-ERSC Module** will cause that zone to accumulate an item when it arrives on the zone sensor. You get the same result if you energize the Local Accumulate Signal on ***Pin 3***. So if all you want to do is accumulate a zone, which signal should you use and does it make any difference? **The answer is yes it can make a difference**

- To accumulate the most downstream zone, use the Interlock Input Pin 4

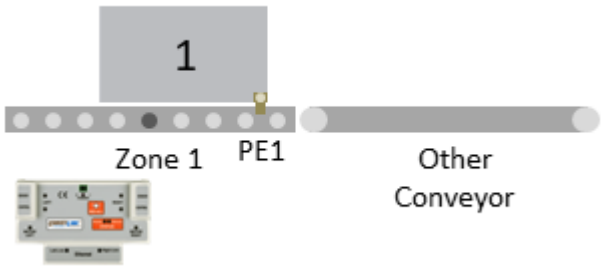
- To accumulate any other zone, use the Local Accumulate Input Pin 3



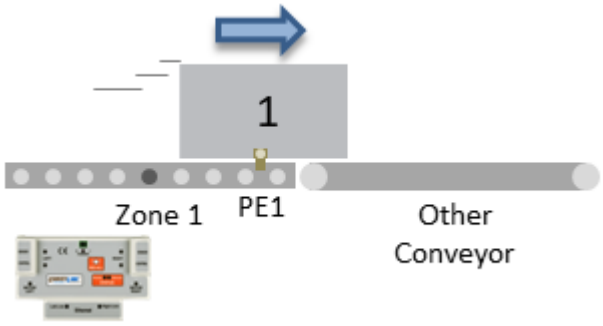
What happens if you use Pin 3 when you should use Pin 4?

Suppose you want to control the release of multiple items by toggling the ***Pin 3*** signal. After you release the first one, you will get an Arrival Jam because the module is looking for the ***Pin 4*** signal to be energized in order to "confirm the downstream arrival" of the item. So, by using ***Pin 3*** in this case, you will have to wait the Jam Time plus the Auto Clear Time between release of each item.

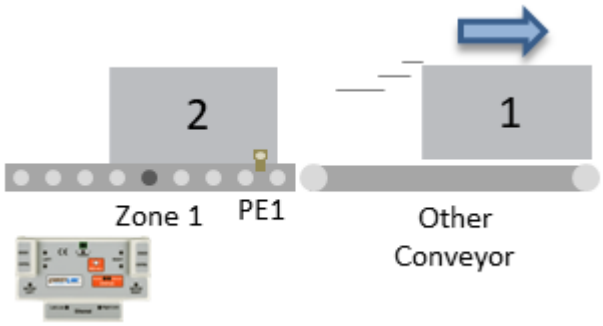
Downstream Control Port *Pin 3* is ON and Carton 1 accumulates when it arrives



When *Pin 3* is turned OFF, Zone 1 will run to convey Carton 1 on downstream



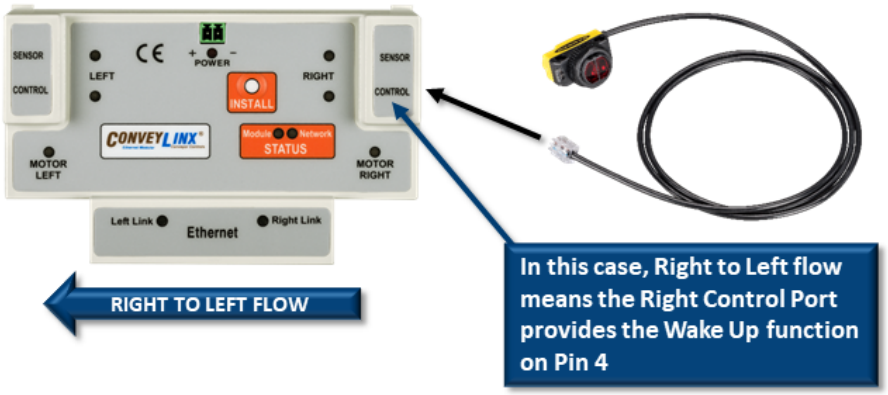
When Carton 1 clears PE1, *Pin 3* signal is turned back ON. Because *Pin 3* is ON, Carton 2 will stop upon arrival at PE1 *however because there is no signal to Pin 4 to indicate arrival downstream, Zone 1 will generate an Arrival Jam !!!*



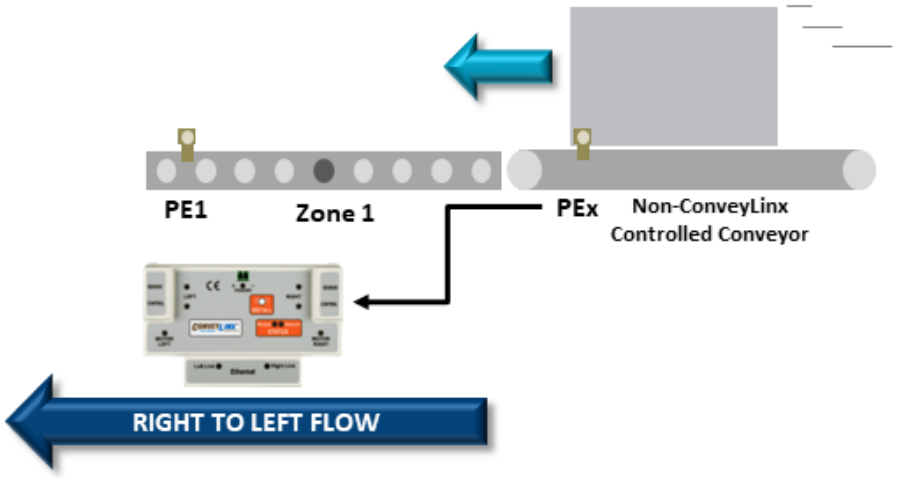
4.4.6. Using a Photoeye for Wake-Up

Using a Photoeye for Wake-Up

Because standard RJ-11/12 Sensors put their blocked/clear output on Pin 4; this type of Sensor can be plugged into the Upstream Control Port and provide the Pin 4 Wake Up signal



When PEx is plugged into the Right Control Port and its output is ON, Zone 1 will Wake Up if it is unoccupied. If Zone 1 is occupied, Zone 1 will not wake up and run



If you do not have a Sensor with RJ-11/12 connector; you can use an SE-4 module to wire you sensor to the Control Port

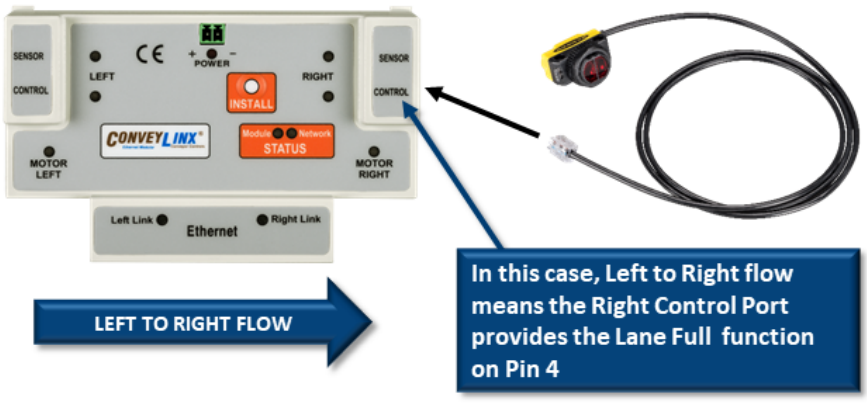
By default, your Sensor has to energize its output when it is blocked. You can change *Pin 4* to accommodate a Sensor that de-energizes its output when it is blocked using *EasyRoll+*

! If your sensor has an Error or Health Output signal, you need to cut the signal wire for this on the RJ-12 connector in order to keep this signal from inadvertently energizing Pin 3

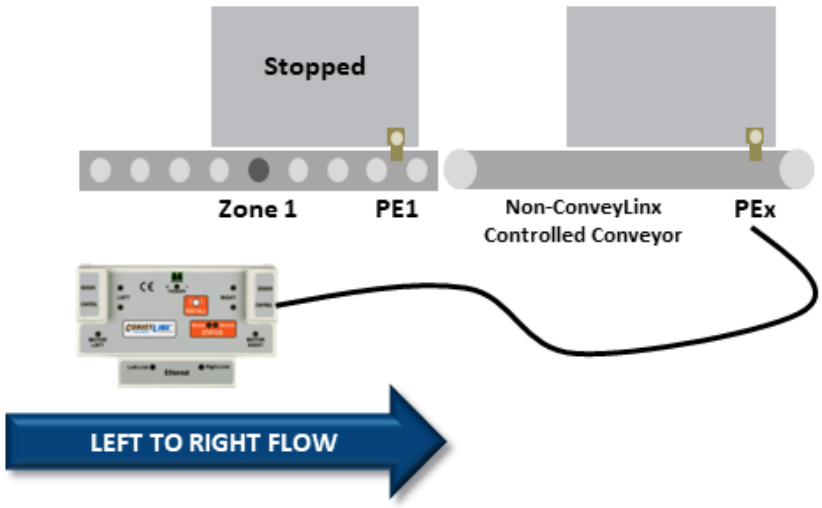
4.4.7. Using a Photoeye for Lane Full

Using a Photoeye for Lane Full

Because standard RJ-11/12 Sensors put their blocked/clear output on Pin 4; this type of Sensor can be plugged into the Downstream Control Port and provide the Pin 4 Lane Full signal.



When PEx is plugged into the Right Control Port and its output is ON, Zone 1 will see a Lane Full condition and stop any item that arrives at PE1. If PEx output is OFF, Zone 1 will continue to run and convey item downstream



✻ If you do not have a Sensor with RJ-11/12 connector; you can use an SE module to wire you sensor to the Control Port

✻ Block and Clear Timer function for the Lane Full Sensor using *EasyRoll+*

✻ By default, your Sensor has to energize its output when it is blocked to make ***Lane Full*** operate. You can change ***Pin 4*** to accommodate a Sensor that de-energizes its output when it is blocked using ***EasyRoll+***

! If your sensor has an Error or Health Output signal, you need to cut the signal wire for this on the RJ-12 connector in order to keep this signal from inadvertently energizing Pin 3

4.5. Automatic Module Replacement

Default Settings and Operation /

Automatic Module Replacement

Once a linear conveyor has been commissioned by ***Auto-Configuration Procedure***, the **ConveyLinx-ERSC Module** store configuration data about its upstream and downstream neighboring modules. This configuration data is automatically updated even if the linear conveyor has had its parameters modified by the EasyRoll software. The **ConveyLinx-ERSC Module** firmware uses this feature to allow for easy module replacement so that the entire linear conveyor does not have to be Auto-Configured again in order to replace a single **ConveyLinx-ERSC Module**.

! For Automatic Module Replacement to work:

- The modules initially must have been properly Auto-Configured
- None of the modules have had their I.P. Addresses changed manually
- None of the Ethernet cables have been re-routed since initial Auto-Configuration

Module Auto Replacement Procedure

1. Disconnect existing module's motor(s), network, photo-sensor(s), hardware, and power connections. The order of disconnection does not matter.
2. Connect new module's motor(s), sensor(s), hardware, and network connections only. DO NOT CONNECT POWER YET.
3. Press and hold INSTALL button. While holding the INSTALL button pressed; connect module power.
4. Observe the Module Status LED. About 1 second after applying power; the Module

Status LED will start blinking red. DO NOT RELEASE THE INSTALL BUTTON YET. After another second, you will see that the Module Status LED will start to blink both RED and GREEN. This is the indication that the Auto Replace Procedure is starting and you MUST release the Install Button NOW. Releasing the Install Button before you see the Module Status LED flashing both red and green will result in cancelling the Auto Replace Procedure.

5. To tell if the ***Auto Replace Procedure*** has been properly initiated, the replaced module will turn its Sensor and Control Port LEDs on solid red. Also, all modules on the network will briefly flash their sensor and control port LEDs. This is normal and they will return to normal operation within a few seconds.

6. Wait for at least 3 minutes before using the system or cycling power or plugging or unplugging any Ethernet connections. The module being replaced will automatically upgrade or downgrade its firmware if needed and restore its configuration settings. This will involve multiple automatic restarts of the module. Do NOT cycle power to the module during this 3-minute period.

7. When both the Module Status and Network LED's are blinking green, then the module replacement has been a success.

! Once the Auto Replacement procedure has started; if power is lost on the replacing module, it may become inoperable. In this case, you may need to reset it back to factory default settings before attempting to use it as a replacement module. If it does not return to factory default settings, you may need to return it to PULSEROLLER to be repaired. How to reset a module back to factory default settings

4.6. Reset to Factory Default Settings

Default Settings and Operation /

Reset to Factory Default Settings

There may be instances when you want to return a **ConveyLinx-ERSC Module** to its "factory default" state. The procedure to do this is the following:

1. Unplug all sensors, devices, motors, and network cables such that the only thing connected is power
2. Press and hold the Install Button until the Module LED begins to flash
3. When the Module Status and Network Status LEDs both blink green, the procedure is complete

! If the module you wish to reset was installed in a subnet that was subsequently Locked from *EasyRoll+* or *EasyRoll*; then this module must first be Unlocked using *EasyRoll+* or *EasyRoll* before you can perform the procedure to reset to factory default setting.

How to unlock a module using *EasyRoll+*

Factory Default Settings

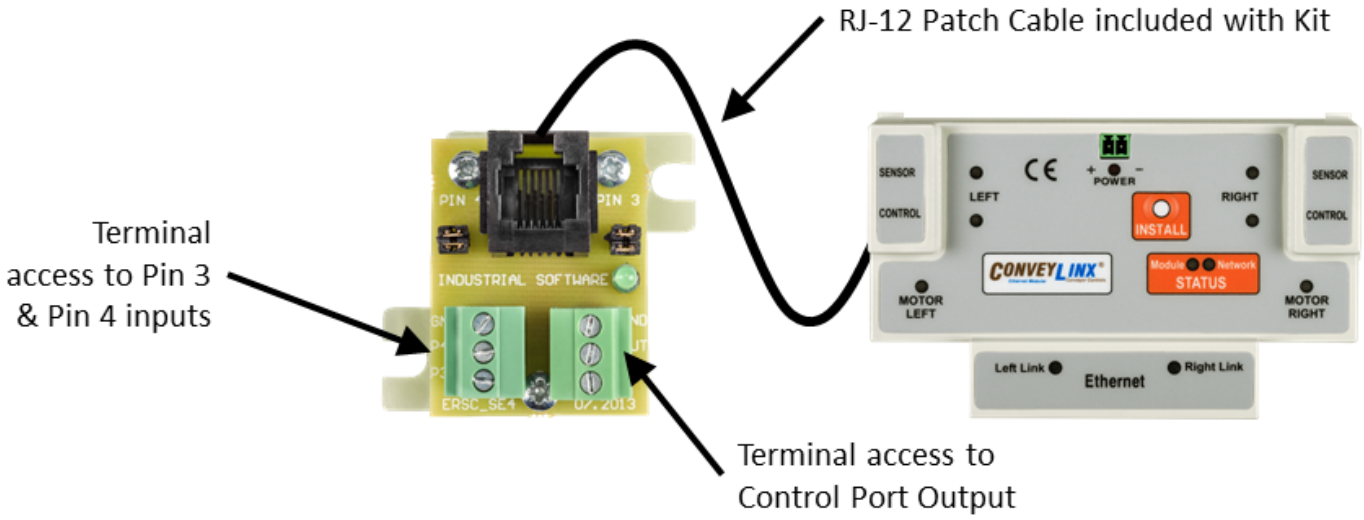
Item	Value or Setting
IP Address Settings	IP: 192.168.202.20
	Subnet Mask: 255.255.128.0
	Default Gateway: 192.168.202.1
Left & Right Motor Settings	Senergy ECO
	Normal Braking
	Closed Loop
	100% Speed

	CW Direction
	100 Pulses Acceleration
	50 Pulses Deceleration
Module Mode	ZPA – 2 Zone – Left to Right Flow
	Singulation Release Mode
	All Settings Options Unchecked
Look Ahead & Timing Settings	JAM Timer = 5.00
	Auto Clear Timer = 5.00
	Run After Timer = 5.00
	Sensor Debounce = 0.10
	All Induct Timers = 0.00
Control Ports	All Options Unchecked
Sensors	Sensors are “ON is Blocked”
	Sensor Health are “ON is Error”
Connections	All are Cleared

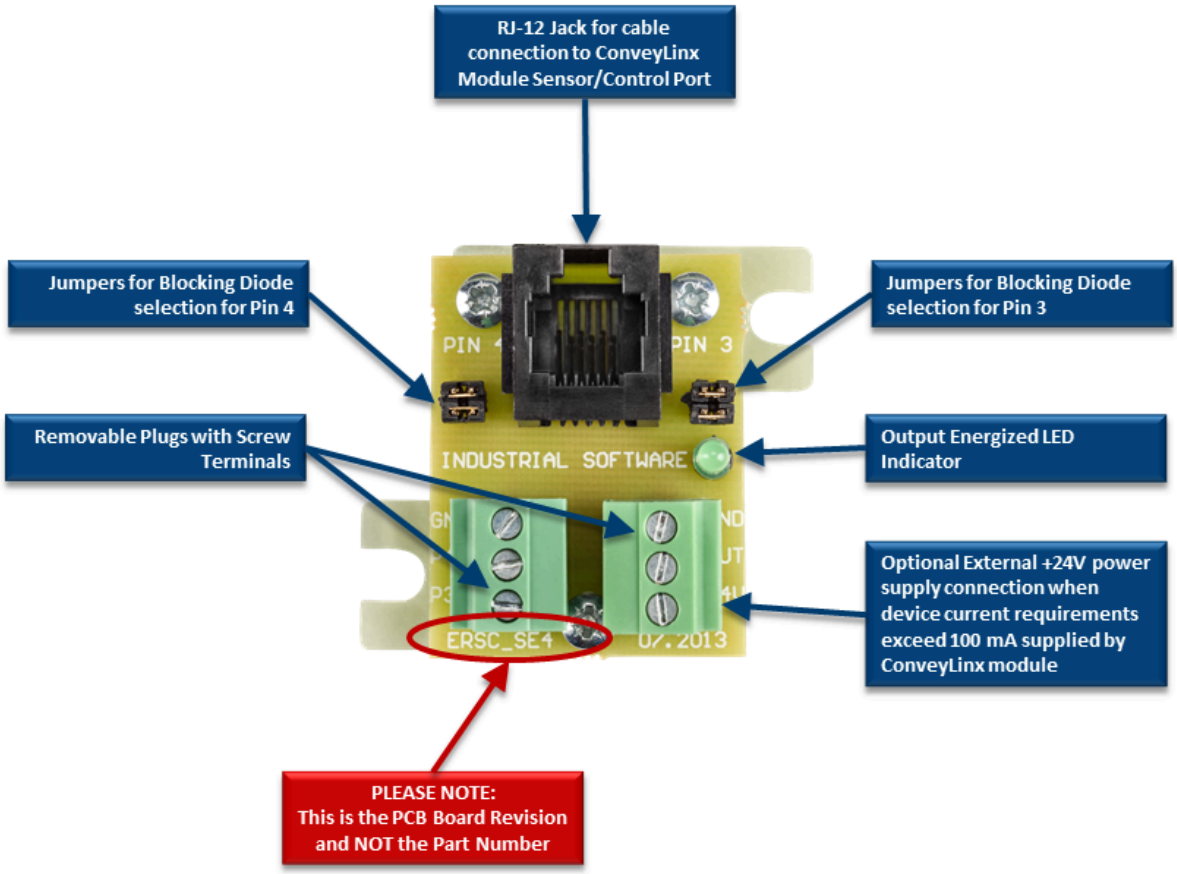
5. SE Breakout Module

SE Breakout Module

The SE breakout module provides convenient wiring terminals for access to ***Pin 3*** and ***Pin 4*** inputs as well as the Control Port's output (Sensor and Control). SE Inputs (Pin 3 and Pin 4) are PNP-NPN auto-sensing so you can use sourcing or sinking PLC output modules. The terminals ***P3*** and ***P4*** on the SE-4 correspond to ***Pin 3*** and ***Pin 4*** respectively



> This module is typically sold as the ***SE Breakout Module Kit*** (Order Code 8087-0017). This kit includes the modules and an 8 inch RJ-12 cable to connect the SE to the **ConveyLinx-ERSC Module**



Additional Functionality

Blocking Diodes

In addition to providing simple wiring connectivity to the **ConveyLinx-ERSC Module** RJ-12 pins, the SE Breakout Module also provides blocking diodes for both the Local Zone Accumulate input signal (Pin 3) and the Interlock input signal (Pin 4). The SE module's diodes are equipped with user settable jumpers to allow configurations for both sourcing and sinking solid state PLC output modules.

Output Amplifier with Optional External Power Source

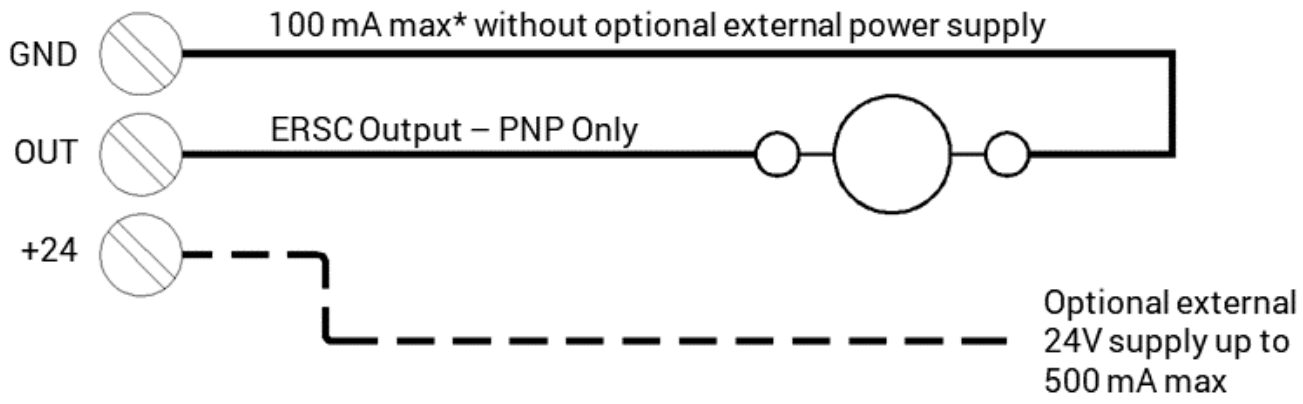
The SE Breakout Module also includes an amplifier for the Control Port's output circuit (Pin 1 and Pin 6) to allow up to 100mA of current load. This feature will allow the Control

Port output to drive a small inductive load such as a relay coil as well as a PLC input. Because of current restrictions on each pair of Sensor and Control Ports, you can optionally connect an external +24V power source to the “+24V” terminal on the SE Breakout Module to provide power to connected devices. The SE Module’s output can accommodate up to 500 mA with this external power. The SE Module also contains circuitry to prevent a connected external power source from back-feeding into the **ConveyLinx-ERSC Module**’s power bus.

5.1. Typical Output Connection

SE Breakout Module /

Typical Output Connection



*100 mA less power required for connected sensors or other input devices

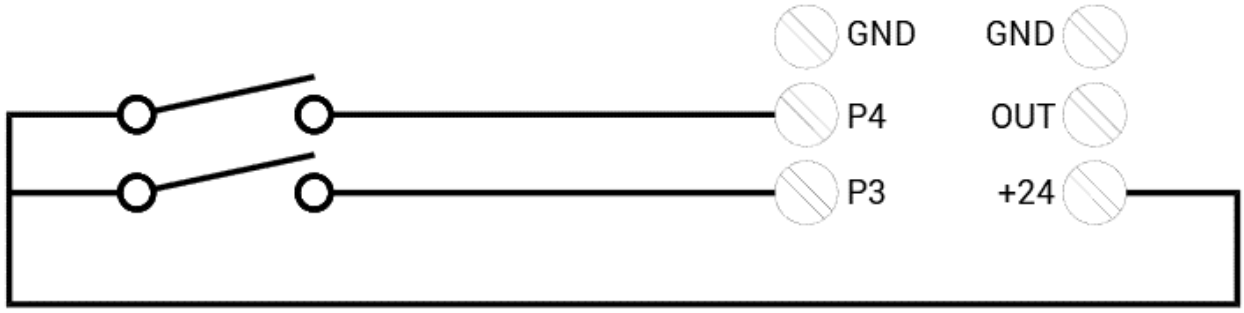
! If using optional external power supply, this external supply's DC common MUST be connected to ERSC power supply DC common

5.2. Typical Input Connections

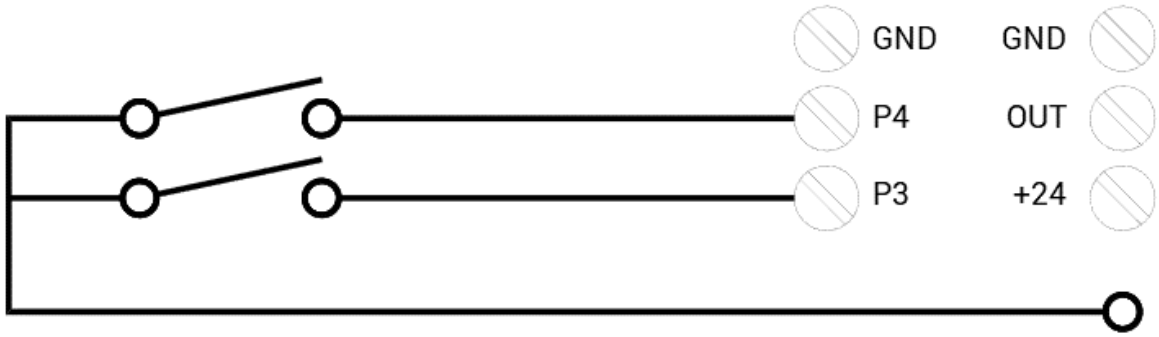
SE Breakout Module /

Typical Input Connections

PNP Inputs – powered from ERSC

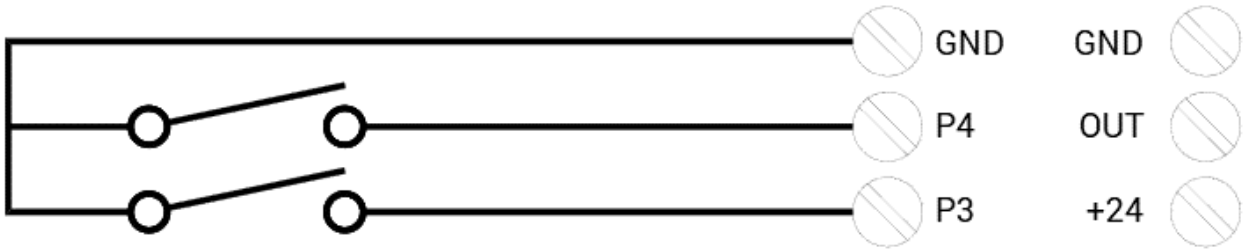


PNP Inputs – powered from external supply



External 24V supply with DC Common connected to ERSC Power Supply DC Common

NPN Inputs



5.3. Input Circuit Blocking Diode Jumpers

SE Breakout Module /

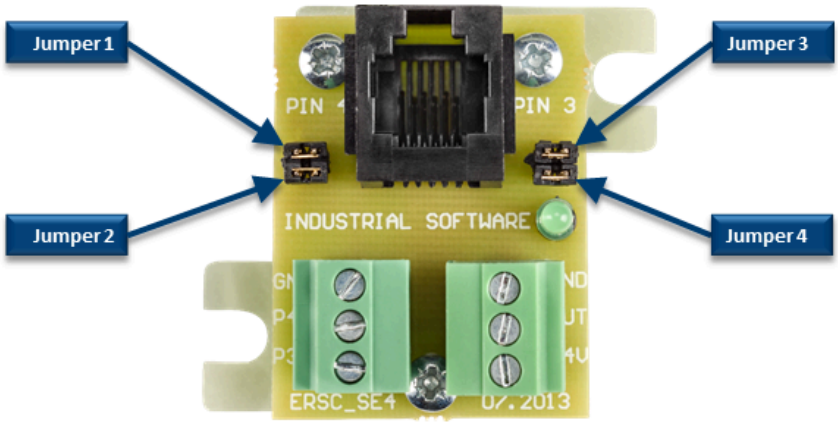
Input Circuit Blocking Diode Jumpers

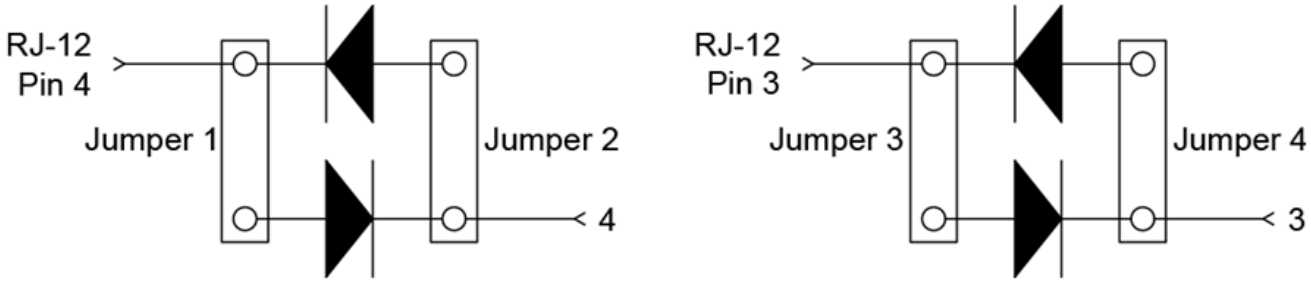
A typical situation for using an SE breakout Module is to connect a PLC's digital output to one of the ERSC's input signals for interlock control. Some solid state digital output circuits for some PLC models can provide false inputs to the ERSC module because of the module's PNP/NPN auto-detection circuitry. Some PLC solid state digital outputs can provide an electrical path to ground when powered off. This can result in the ERSC module's NPN auto-detection circuit to interpret this condition as a positive NPN signal and thus energize its input circuit. The SE Breakout module provides jumper selectable diodes in order to block this opposite flow in order to keep from false triggering an ERSC input.

✻ Please note that NOT ALL PLC SOLID STATE OUTPUTS present this behavior.

! For relay or dry contact signals to the P3/P4 inputs, leave both jumpers installed

Both the P3 and P4 inputs on the SE Breakout Module has a pair of user removable jumpers to allow configuration to block a ground path when connecting a PNP input signal and to block a voltage when connecting an NPN input signal.





✻ Please note that if both jumpers remain installed, the ERSC Module will auto detect PNP/NPN operation and there will be no protection from reverse current path from Solid State devices

! At least one jumper MUST remain installed. If BOTH jumpers are removed then there will be NO SIGNAL (PNP nor NPN) connected to the ERSC

Examples

For a solid state PLC output module SOURCING 24V:

For P4 – remove Jumper 1 and leave Jumper 2 installed
For P3 – remove Jumper 3 and leave Jumper 4 installed

For a solid state PLC Output module SINKING 0V:

For P4 – remove Jumper 2 and leave Jumper 1 installed
For P3 – remove Jumper 4 and leave Jumper 3 installed

5.4. Notes on SE Module Revisions

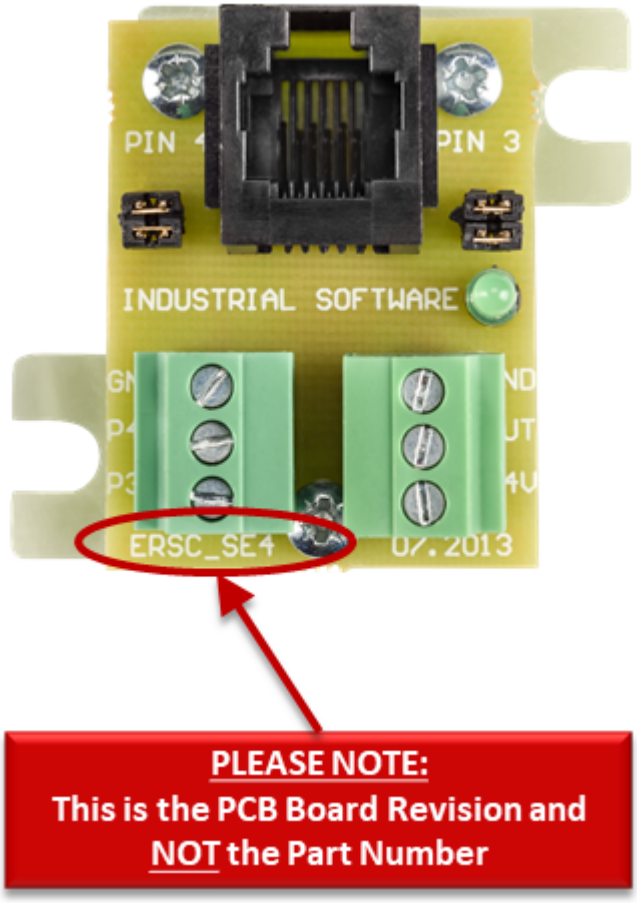
SE Breakout Module /

Notes on SE Module Revisions

Because there have been a handful of revisions to the SE breakout module since its introduction, this section documents the changes and updates made for each revision.

Part Number and Circuit Board Revision

Customers have been confused (and rightly so) because initially Pulseroller changed the Part Number for the SE module upon each revision because these revisions changed the functionality of the module. It was often interpreted by customers that the markings on the Printed Circuit Board (PCB) were the part number. Actually, the markings on the PCB are the PCB's revision level. For part numbers SE-2, SE-3, and SE-4; the PCB revision matched the part number because there were functional changes with each revision. ***However since the SE-4 PCB revision there have been no functional changes to the SE breakout module and no part number change***.



PCB revisions greater than SE-4 are functionally equivalent to the SE-4 part number. As of the date of this publication the current PCB revision is SE-6. This PCB revision is **functionally equivalent to SE-4**.

Revision History

In order to support previous revisions to the SE Breakout Module, the following items describe the functionality and possible limitations of each revision.

Part Number ERSC-SE2

Original design providing bias diodes for the Pin 3 and Pin 4 inputs to allow solid state PLC output modules to operate without inadvertently triggering the PNP/NPN auto detect feature of the ERSC. This design also provided the Control Port Output amplifier to allow higher current devices to be connected to this output. The OUT signal is PNP only.

! Because the Control Port Output is in an indeterminate state upon ERSC boot up; the OUT signal could possibly momentarily energize upon initial power up or re-boot of the ERSC. Users must take proper care when using the OUT signal in their control system logic.

! The 24V terminal on the ERSC-SE2 is directly connected to the ERSC's Control port power. If users connect an external power source to the 24V terminal on the SE2; this will back-feed power into the ERSC. If this is done, when the main power to the ERSC is disconnected; the ERSC could still power up. User must take care to not connect external power source to the 24V terminal.

Part Number ERSC-SE3

This version contains a modification to block the OUT signal from energizing during the ERSC's initial power-up or re-boot sequence. Thus, users no longer have to worry about an inadvertent OUT signal being energized during initialization or reboot of the ERSC. For convenience; an LED has been added that illuminates when the OUT signal is being energized.

! The 24V terminal on the ERSC-SE3 is directly connected to the ERSC's Control port power. If users connect an external power source to the 24V terminal on the SE3; this will back-feed power into the ERSC. If this is done, when the main power to the ERSC is disconnected; the ERSC could still power up. User must take care to not connect external power source to the 24V terminal.

Part Number ERSC-SE4

This version contains a diode circuit that blocks an external power source from back-feeding into the ERSC's Control Port power. Users can now provide external power for devices connected to the Control Port in cases where these device's power requirements exceed the maximum limits of the port.

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