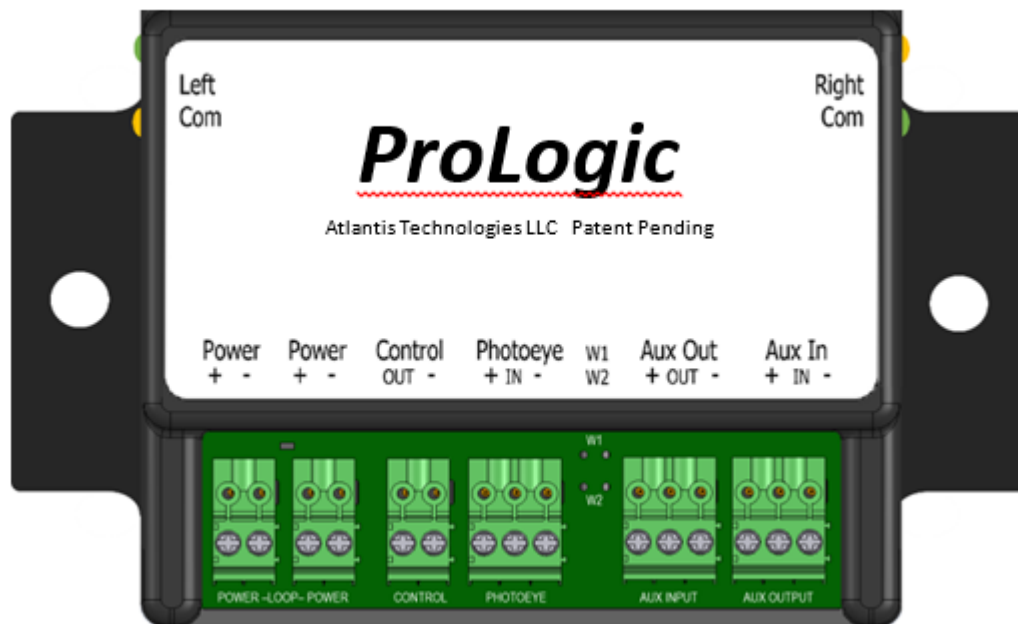


# INSTALLATION AND MAINTENANCE MANUAL

## *ProLogic* System Default System Setup Guide



**DO NOT OPERATE  
EQUIPMENT  
BEFORE READING**

**ATLANTIS**  
TECHNOLOGIES LLC

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**GLOSSARY**

| Term                                       | Definition   |
|--|--|
| <b>BDLR</b>                                | Belt Driven Live Roller. A pneumatic system in which the rollers of a zone are driven by a belt underneath them. The belt will engage the rollers when it is raised up under them. |
| <b>Downstream</b>                          | When facing the <i>ProLogic</i> ZPA controller, the side of the zone in which the package leaves the zone is downstream.   |
| <b>Input &amp; Output Connectors (I/O)</b> | This would include items like limit switches, photo eyes, actuators, machine interfaces, PLCs, etc.  |
| <b>FM</b>                                  | Flat Motor Driven Roller. A system in which a flat motor drives the rollers of a zone.   |
| <b>ProLogic ZPA Controller (PZ)</b>        | Advanced zone controller that uses programmable parameters to characterize each controller in the system. It takes advantage of the Virtual I/O concept.                           |
| <b>ProLogic System Configurator (PSC)</b>  | Off board programming tool used to configure the <i>ProLogic</i> system devices. This is required to configure the system for anything other than default settings.                |
| <b>Slug</b>                                | A large block of products or packages on a conveyor with spacing determined by how they are loaded.  |
| <b>Upstream</b>                            | When a person faces the <i>ProLogic</i> zone controller, the side of the zone in which the package enters the zone is upstream.  |
| <b>Virtual Input/Output (VIO)</b>          | Software configurable input and output options that include physical I/O as well as zone controller states.  |
| <b>Zero Pressure Accumulation (ZPA)</b>    | Mode of conveyor accumulation in which the packages on the conveyor do not touch one another, effectively keeping zero pressure on downstream packages.                            |
| <b>Zone</b>                                | Physical section of a conveyor that is controlled by one zone controller. Zones should fit only one package within them.   |

## INTRODUCTION

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The purpose of this manual is to provide knowledge of operation of a default **ProLogic** system.

### WHAT IS ProLogic?

**ProLogic** is a distributed, programmable zero pressure accumulation (ZPA) zone controller conveyor system. A **ProLogic** conveyor system does not utilize a master controller that executes all of the decision making. Each zone controller is responsible for the package in its zone and determines locally how and when the package is moved. The inputs, outputs, statuses, and modes of other zone controllers within the system are used to determine the action taken for a given zone.

## DEFAULT MODE

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This section of the manual will familiarize users with the default mode that the **ProLogic** system offers. Separate default controllers are available for Flat Motor applications and Belt Driven Live Roller applications.

### CONVEYOR DIRECTION

Conveyor direction, as perceived by default **ProLogic** controllers, is defined as Left-to-Right. The mechanical conveyor direction must also be set to follow the Left-to-Right convention defined below.



Figure 1 Left-to-Right Conveyor Directions

### LEFT-TO-RIGHT

Face the side of the conveyor that the zone controllers are mounted. The package enters on the left hand side of the conveyor zone, travels through and exits the right side of the conveyor zone. If Right-to-Left direction is needed, controllers may simply be mounted on the opposite side of the conveyor. See Figure 2.



Figure 2 Left-to-Right Communication Configuration

## DEFAULT MODE

### RIGHT-TO-LEFT

If the opposite side of the conveyor is inaccessible, Right-to-Left direction can be facilitated by connecting the ProLogic communication cables as seen in Figure 3.

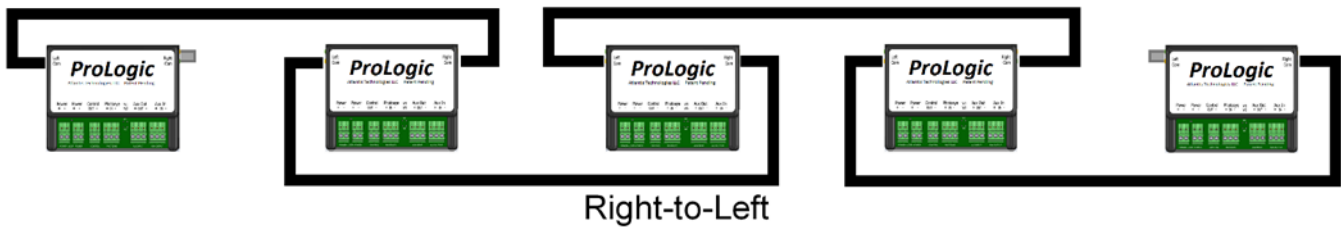


Figure 3 Right-to-Left Communication Configuration

**Note:** In all cases, a LEFT communications port must connect to a RIGHT communications port of an adjacent controller.

### SINGULATION MODE

In default singulation mode, packages are loaded onto the conveyor and spaced evenly as they progress out of the first zone. Package A travels down the conveyor and stops in Zone 5. Package B follows Package A. As Package A clears each zone, Package B loads into the zone, and stops in Zone 4. Package C follows Package B in a similar manner, and stops in Zone 3. See Figure 4.

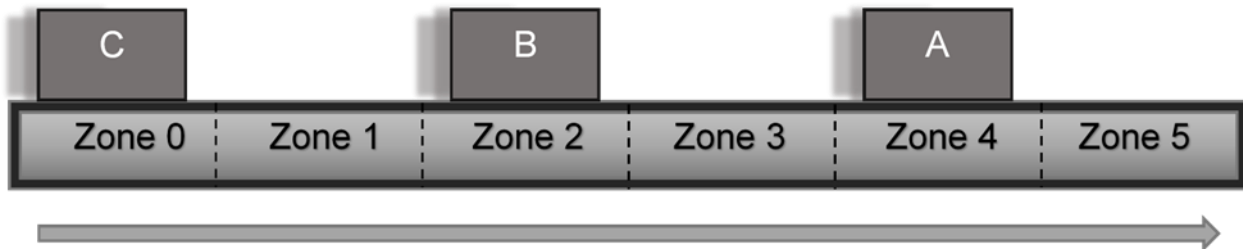


Figure 4 Singulation Mode

When Package A reaches the end of the conveyor and the photo eye senses the leading edge of the package, upstream packages will begin to accumulate. Each package will stop in its individual zone so long as the zone downstream has a package. This keeps the packages from colliding and provides even spacing. See Figure 5.

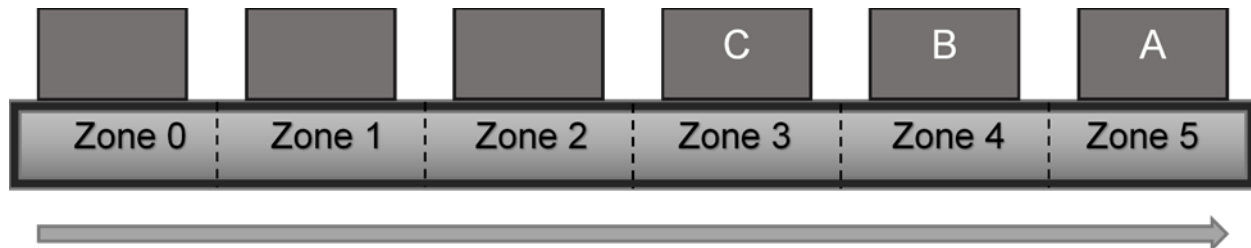


Figure 5 Singulation Mode Spacing

## DEFAULT MODE

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### FACTORY-CONFIGURED INPUTS/OUTPUTS

In a default mode *ProLogic* system, package detection, entry interface, and control I/O are configured to a factory default.

| Item                     | Setting   |
|--------------------------|---|
| Communication            | <i>ProLogic</i> Local Communications Only           |
| Conveyor Direction       | Left-to-Right                                       |
| ZPA Mode                 | Singulation Mode                                    |
| Varying Length Packages  | Disabled  |
| First Zone Wake Up Input | Assigned to Auxiliary Input of the first controller |
| Zone Loading Time        | 5.00 seconds  |
| Zone Discharge Time      | 1.00 seconds  |
| Full State of Controller | Assigned to Photo Eye Input of all controllers      |
| Up Has Package           | <i>ProLogic</i> Local Communication                 |
| Down Ready for Package   | <i>ProLogic</i> Local Communication                 |

Table 1 Factory-Configured I/O

## BASIC SETUP

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This section describes the installation process of a default *ProLogic* system.

**Note: Do NOT attempt to wire the system without making sure all modules are powered off.**

### ProLogic CONTROLLER DRIVE COMPONENTS

*ProLogic* controllers may be mounted onto the conveyor with one controller per zone. The *ProLogic* controller has flanges which allow the user to bolt the controller onto the conveyor. The location of a controller and its drive components in a zone is determined by user preference, conveyor accessibility, and cable lengths.

**Note: See *ProLogic* System Flat Motor Setup Guide or *ProLogic* System BDLR Setup guide for specific components and wiring.**

### COMMBUS COMMUNICATIONS

The RJ45 Commbus Communication Cable (CCC) will be used to link each controller in the *ProLogic* system. CCC lengths are determined by zone length. CCC is available in common zone lengths. Alternatively, standard Cat6 cable may be used if lengths available do not meet the needs of the user.

The right communications port of one controller must connect to the left communications port of the controller adjacent to it. The controller at the most upstream and most downstream zones will have only one CCC plugged into it. The open Commbus communication port on each must have a Commbus Terminator plug in the empty communications ports.

### PACKAGE SENSOR

Photo eyes are most commonly used to sense packages within a zone, however, a variety of sensors may be used. The sensor must be placed near the end of the zone, typically slightly before the end of the zone to allow for package skid. The sensor must be wired into the photo eye terminal block of the *ProLogic* controller. See Appendix A: *ProLogic* Interface Circuits for detail wiring schematic of inputs and outputs.

## **BASIC SETUP**

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### **AUXILIARY INPUT**

There is one 3-pin terminal block for auxiliary input on each controller. The auxiliary input of the entry zone controller must be equipped with a sensor or input that will signal the zone to wake up and accept a package. See Appendix A: *ProLogic* Interface Circuits for detail wiring schematic of inputs and outputs. Only the entry zone auxiliary input can be used.

### **POWER**

Modular 24V<sub>DC</sub> power distribution cables are required to power the *ProLogic* system.

**Note:** See *ProLogic System Flat Motor Setup Guide* or *ProLogic System BDLR Setup Guide* for specific components and wiring.

### **CHECK INDICATORS**

After powering the system on, ensure that the status LED on the front of the controller is a steady green. If status LED is flashing red, please refer to Appendix B: Error Codes and Troubleshooting. Check that the Commbus communication indicators are flashing green and yellow. Note: The green LEDs on the Commbus communications port that has the Commbus terminator plug in it will not flash, but the yellow LEDs on the port will flash. This is normal.

## **ADVANCED OPTIONS**

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The *ProLogic* system comes with the most common settings set as default, and can be mounted and connected with no external configuration required. To use the many advanced features, a PC with a USB port, and the Commbus-USB adapter is required. The patented Commbus communication network is used to easily configure the controllers in a conveyor system.

The *ProLogic* System Configurator (PSC) is the user-friendly Windows application used to configure and tune the system. The PSC gives contextual help with each section of configuration. The program also includes a real time status view, global commands, and more advanced system functions.

## APPENDIX A: ProLogic INTERFACE CIRCUITS

This section details the specification and circuitry on each input and output of a **ProLogic** ZPA Controller.

### POWER INPUT LOOP J3 AND J4

Power input terminals are used to bring 24 V<sub>DC</sub> to the **ProLogic** Controller and optionally bring power to another controller or motor driver card. See Figure 6.

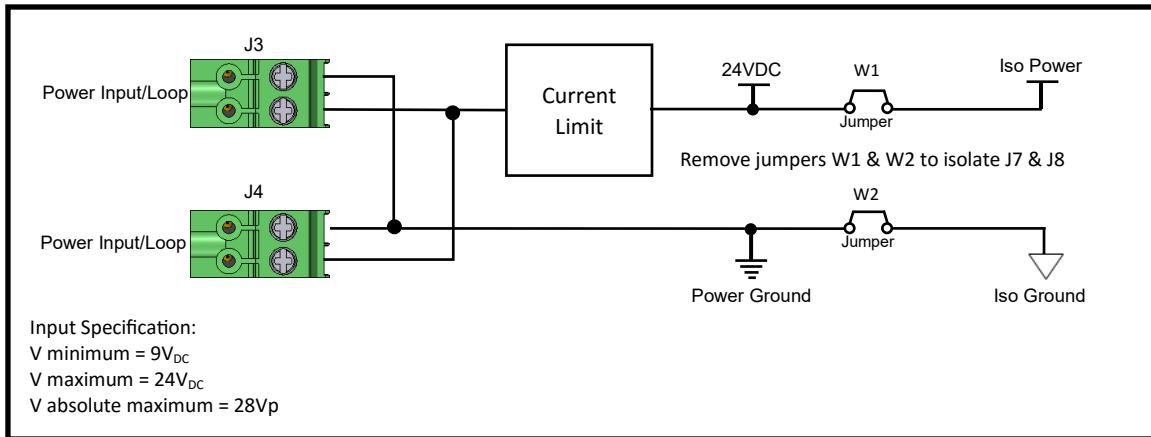


Figure 6 Power Input Loop Circuit

### CONTROL CONNECTOR J5

Control terminal is the standard output used to enable and disable roller movement. This can be a 24 V<sub>DC</sub> signal to control a motor drive, or a similar signal used to open or close a pneumatic valve. See Figure 7.

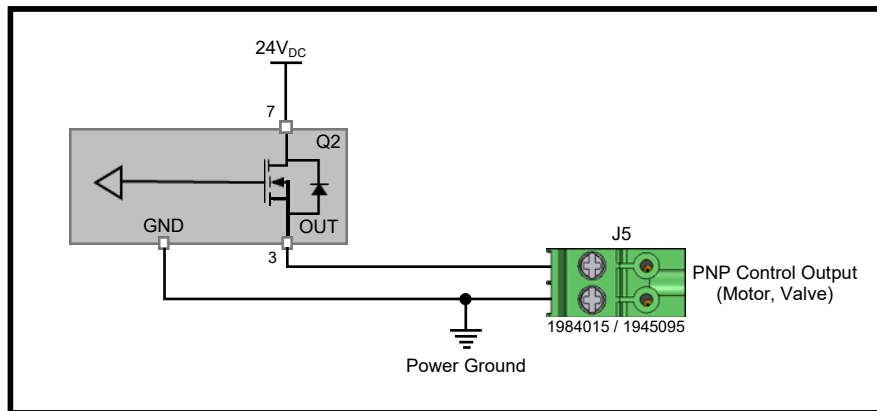


Figure 7 Control Output Circuit - Motor or Valve



## APPENDIX A: ProLogic INTERFACE CIRCUITS

### PHOTO EYE INPUT J6

Photo eye terminal input is used to detect a package on the conveyor. See Figure 8.

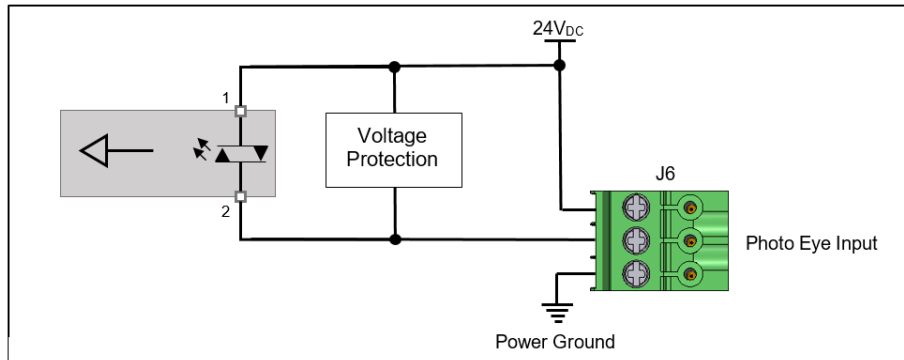


Figure 8 Photo Eye Input

### AUXILIARY OUTPUT J8

Aux In terminal can be used for a variety of inputs including photo eyes, proximity detectors, switches, etc. in most cases, power is sourced from the **ProLogic** 24 V<sub>DC</sub> power. Depending on the device used for input, it may be desirable to use an external power source. To use an external power source, the **ProLogic** power must be isolated by opening jumpers W1 and W2. See Figure 9.

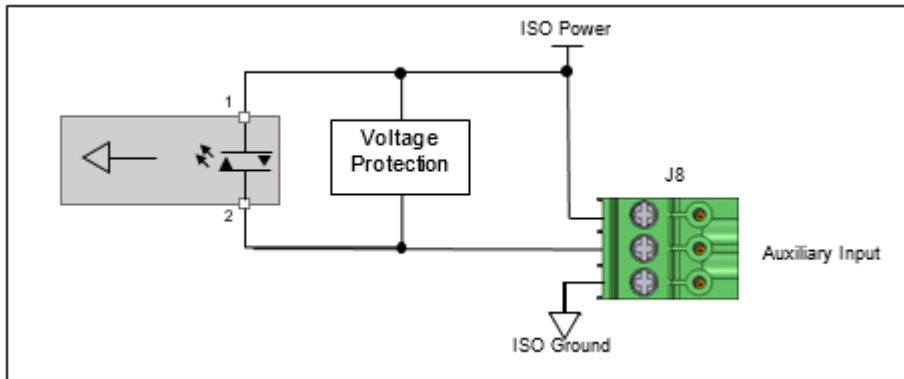


Figure 9 Auxiliary Output Circuit

## APPENDIX B: ERROR CODES AND TROUBLESHOOTING

The **ProLogic** controller is equipped with a status LED on the front of the controller that is green when no error conditions are present or if programming is taking place. The LED will flash long red for the main error number and short for the secondary error number when an error is present. When the all-stop function is active, the LED on all controllers will flash slowly until the all-stop signal is cleared. See Table 2.

| Main Error | Name                        | Secondary Error | Description                             | LED | All Stop | Require Action | Description  |
|------------|-----------------------------|-----------------|---|-----|----------|----------------|--|
| <b>1</b>   | <b>Commbus Local Error</b>  |                 |   |     |          |                |  |
|            |                             | 1               | No upstream or downstream communication |     |          |                | Occurs when communication ceases in both directions.                 |
|            |                             | 2               | No upstream communication               | x   |          |                | Occurs when the communications from the upstream controller cease.   |
|            |                             | 3               | No downstream communication             | x   |          |                | Occurs when the communications from the downstream controller cease. |
| <b>2</b>   | <b>Commbus Global Error</b> |                 |   |     |          |                |  |
|            |                             | 1               | No global communication                 |     |          |                | Occurs at start up and when communication ceases globally.           |
|            |                             | 2               | Commbus Global Lost                     | x   |          |                | Occurs when data packets stop being received by the controller.      |
|            |                             | 3               | Invalid Identifier                      | x   |          | x              | Occurs when invalid data packets are received.                       |
| <b>3</b>   | <b>Power Error</b>          |                 |   |     |          |                |  |
|            |                             | 1               | 24 V <sub>DC</sub> Fault                | x   | x        | x              | There is a fault on the 24 V <sub>DC</sub> input.                    |
|            |                             | 2               | 24 V <sub>DC</sub> Out Low              | x   | x        |                | The input voltage is less than 24 V <sub>DC</sub>                    |
| <b>4</b>   | <b>Memory Error</b>         |                 |   |     |          |                |  |
|            |                             | 1               | Initialization Error                    | x   | x        | x              | Startup initialization error.  |
|            |                             | 2               | Read Error                              | x   |          | x              | Memory read error.   |
|            |                             | 3               | Write Error                             | x   |          | x              | Memory write error.  |

Table 2 **ProLogic** Error Codes

## **APPENDIX B: ERROR CODES AND TROUBLESHOOTING**

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### **COMMBUS LOCAL ERROR**

- Check that all cables are connected properly and the Commbus terminators are on either side of the system in the empty Commbus Communication Ports.
- If a connecting wire shows damaged, replace it.
- Power the system off, then back on.
- If the problem still persists, replace the controller.

### **COMMBUS GLOBAL ERROR**

- Check that all cables are connected properly and the Commbus terminator plugs are on either side of the system in the empty Commbus Communication Ports.
- If a connecting wire shows damage, replace it.
- Power the system off, then back on.
- Check the system configuration with the PSC. Programming error may be possible. Attempt to resend the program to the controller showing an error code.
- If the problem still persists, replace the controller.

### **POWER AND MEMORY ERRORS**

- Replace the *ProLogic* controller.

### **CONTROLLER REPLACEMENT**

In the event of a controller failure, when replacement is necessary, replace the controller with the system powered off.

- Disconnect the power cable after making sure the system is powered off.
- Disconnect Commbus communication cables.
- Disconnect inputs or outputs to the controller. This is easily done with standard terminal blocks, as they push into place. To disconnect the terminal blocks, users face the *ProLogic* controller, and pull the terminal blocks toward themselves.
- Remove the controller to be replaced from the conveyor.
- Mount the new controller.
- Replace inputs and outputs on the new controller with the terminal blocks removed from the previous controller.
- Reconnect Commbus communication cables.
- Reconnect power, and turn the power back on.
- Check that the LED indicators are displaying as expected. See Error Codes and Troubleshooting.
- Resume operation as normal.

# ***ProLogic***

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