ZoneLink™ Powered Roller Controller

for use with Sparks Microroller™

PRC-6070-1 0903 TECHNICAL DATA SHEET

Description

ZoneLink™ is Holjeron's method for linking adjacent zones in a conveyor system. This is accomplished using two electrical lines between each Powered Roller Controller: one to signal the neighboring upstream zone it is READY to receive a unit and one to let the downstream zone know it is SENDING a unit.

The ZoneLink™ Powered Roller Controller (PRC), in addition to Upstream and Downstream ZoneLink™ ports, directly drives a Sparks Automation Microroller™ and has input terminals for a sensor. Zero Pressure Accumulation (ZPA) logic is executed in the ZoneLink™ PRC.

Warranty/Remedy

Seller warrants its products to be free from defects in design, material and workmanship under normal use and service. Seller will repair or replace without charge any such products it finds to be so defective on its return to Seller within 18 months after date of shipment by Seller. **The foregoing is in lieu of all other expressed or implied warranties (except title), including those of merchantability and fitness for a particular purpose.** The foregoing is also purchaser's sole remedy and is in lieu of all other guarantees, obligations, or liabilities or any consequences incidental, or punitive damages attributable to negligence or strict liability, all by way of example.

While Holjeron provides application assistance, personally and through our literature, it is up to the customer to determine the suitability of the product in the application.

All information contained herein, including illustrations, specifications and dimensions, is believed to be reliable as of the date of publication, but is subject to change without notice.

Specifications

Part Numbers	ZoneLink™ Powered Roller Controller		PRC-902001
	ZoneLink™ PRC with Brake Control		PRC-902004
	ZoneLink™ Interface Card		PRC-902100
Electrical Power	Termination		2 pin Plug-In Terminal
	Voltage Range		24 VDC
	Current Consumption		80 mA plus Powered Roller
Motor Conection	Type		Sparks Microroller™
	Number		One (1)
	Termination		Sparks 9-pin Connector
	Voltage Range		24 VDC
	Max Current	Starting	4.5 Amps
		Continuous	2.5 Amps
Sensor Input	Type		NPN or PNP Sensor
	Number		One (1)
	Termination		Screw terminal
	Voltage Range		24 VDC
	Maximum Current		20 mA
ZoneLink™ Ports	Type		Current Sinking
	Number		Two (2)
	Termination		RJ-45
	Voltage Range		24 VDC
	Maximum Current		2 amps
Environmental	Temperature	Storage	-30° to 70° C (-22° to 158° F)
		Operating	0° to 60° C (32° to 140° F)
	Humidity		5-95% RH, non-condensing
	Vibration		2G at 10 to 500 Hz
	Shock		10G
Physical	Dimensions		4.41" H x 2.81" W x 1.13" D
	Weight		12 oz
	Mounting		Mounting base
	Indication	Power	Green
		Error	Red

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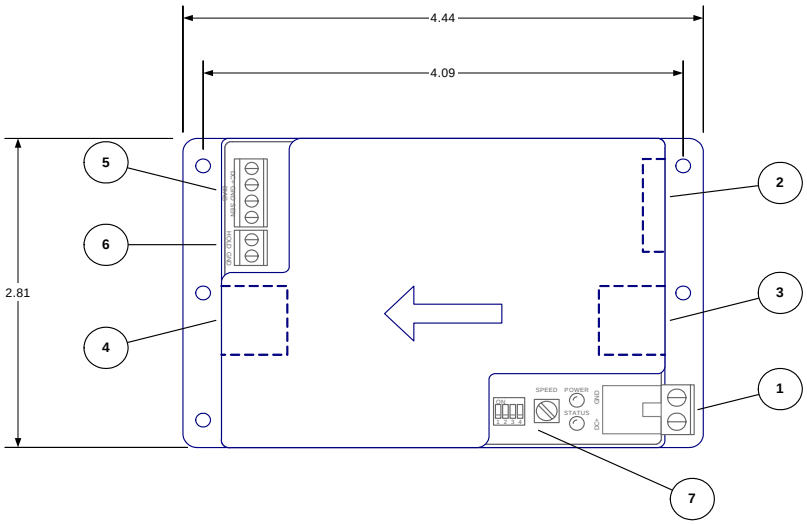
Dimensions and Layout



ZoneLink™ PRC Connections and Switches

1. Power Connector
2. Sparks Microroller™ Connector
3. Upstream ZoneLink™ Port
4. Downstream ZoneLink™ Port
5. Sensor Terminals
6. Hold Function Terminals (Brake connector on PRC-902004)
7. Adjustments and LED's

Connections

Power

The Power Connector is a 2-pin pluggable terminal block that accepts up to a 12 gauge wire. Power to the PRC must be 24 VDC. Power supplies should be sized to allow each powered roller zone to draw 2.5 amps continuously.

Microroller™

The Microroller™ is supplied by Sparks with a 9-pin connector that mates with the connector on the PRC.

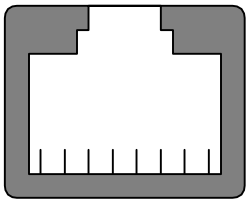
Sensor and Hold

Screw terminal blocks for the sensor and hold function accept up to 16 gauge wire.

ZoneLink™ Connectors

The ZoneLink™ connections are RJ-45 jacks with pin assignments as defined in the diagram below. ZoneLink™ is designed to use standard Category 5 patch cables.

ZoneLink™ RJ-45 Connector

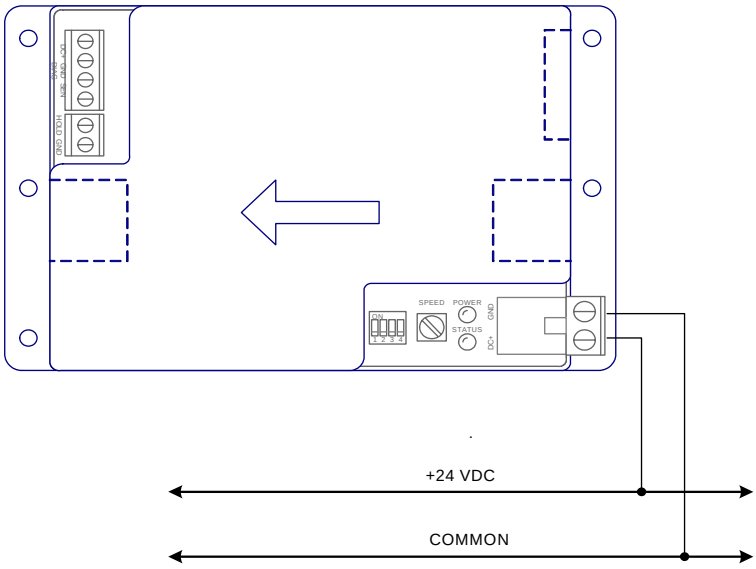


ZoneLink™ Pin Assignments

Pin	Function	Upstream	Downstream
1	SENDING	Input	Output
2	READY	Output	Input
3	DIRECTION	Global Input	
4	RUN	Global Input/Output	
5	FAULT	Global Output	
6	MANUAL BYPASS	Global Input	
7	Reserved	Reserved	
8	COMMON		

Wiring

24 VDC Power

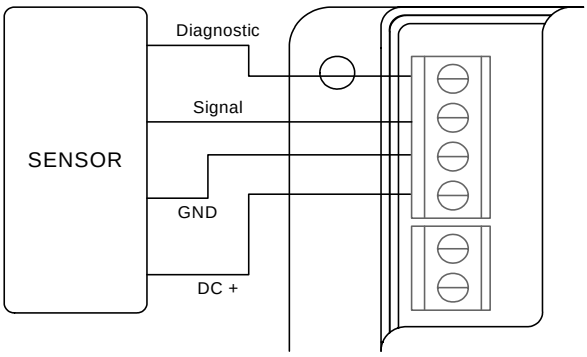


Note: ***Systems that have multiple power supplies must have the commons of each power supply tied together.***

Allow 2.5 amps continuous per zone, with a 4.5 amp inrush for up to 300 milliseconds.

No more than 150 ZoneLink™ PRC's should reside on a single continuous, non-isolated system, regardless of the number of power supplies in the system.

Sensor Wiring



Sensors can be NPN or PNP output. Sensor signal line must be on when a unit is blocking the sensor. Consult the sensor manufacturers' documentation for details.

Sensors with diagnostic lines to indicate marginal sensor functionality can also be used. The diagnostic line is evaluated by the PRC.

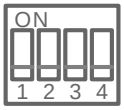
Configuration and Indication

Configuring a ZoneLink™ PRC requires setting four (4) DIP switches to positions to match the application requirements, and then setting the desired speed. There are also two LED's to provide indication regarding the status of the PRC.

DIP Switches

DIP switches to configure the functionality of the ZoneLink™ PRC are located near the power terminal block. The switches are numbered 1 through 4, beginning with the switch furthest from the speed adjustment. The ON position for each switch is away from the edge of the PRC.

PRC DIP Switch Layout



PRC DIP Switch Assignment

Switch	Function	OFF	ON
1	Direction of Rotation	CCW	CW
2	Operating Mode	See table below	
3			
4	Photo Type (For diagnostics only)	Dark Operate	Light Operate

Mode Selection

Mode	SW 2	SW 3
Automatic Singulation	OFF	OFF
Automatic Train	ON	OFF
Slave	OFF	ON
Manual	ON	ON

The **Direction of Rotation** is used to set the default rotation of the Sparks Microroller™ in normal use.

The **Photo Type** is used when a sensor has a diagnostic signal to indicate marginal light being returned to the sensor. The PRC compares this signal to the sensor state to determine if the sensor needs to be cleaned, re-aligned or replaced.

Speed Adjustment

Between the DIP Switches and the power terminals is a potentiometer for adjusting the speed of the attached Sparks Microroller™.

The brushless motors in the Microroller™ are rated for a maximum of 2400 RPM, and the minimum recommended motor RPM is 1000. Below 1000 RPM the torque capability of the motor drops off dramatically. Consequently, the ZoneLink™ PRC is set to limit the RPM of the motor from between 1000 and 2400 RPM.

Indication

There are two LED's on the PRC to indicate status. One is labeled POWER and the other STATUS. The POWER LED is green, and will be on whenever 24 VDC is applied to the PRC and the PRC is healthy. If 24 VDC is present and the POWER LED is not on then the unit needs to be replaced.

The STATUS LED is red. On power up. The STATUS LED is on solid for 0.5 seconds. After startup, the STATUS LED functions as follows:

Okay…The STATUS LED will be OFF.

Motor Fault…The control of the motor has experienced a major fault condition and the LED will be ON solid.

Motor Stalled…The motor rotation is being inhibited by some external force (jammed, lock bearing, etc). The motor is stopped, then a restart is attempted 10 seconds later. When stalled the LED is ON solid.

High Temperature…Sparks Microrollers™ are equipped with a temperature sensor in the motor. A high temperature condition will cause a motor to stop running until the temperature drops below the acceptable level. This condition will cause the LED to be ON solid.

Sensor Marginal Light…If a sensor is functioning marginally then the LED will FLASH. The operation of the PRC, however, will continue.

Jam Protection…When a unit is being transferred downstream the sensor in that zone is blocked for more than eight (8) seconds then the PRC considers the zone as jammed. The LED FLASHES and the zone remains inactive until the sensor is cleared.

Operating Modes

Automatic Singulation Mode

Singulation mode only allows one unit in a zone at any given time. In other words, a zone is not ready to receive another unit until the zone is completely empty.

ZoneLink™ PRC's are equipped with a transfer timer. When a unit clears the upstream sensor the PRC begins timing. If the unit doesn't reach the downstream sensor in 16 seconds then the unit is presumed to be missing and the zone will stop running or will accept another unit.

Automatic Train Mode

When in train mode, the ZoneLink™ PRC will accept another unit as long as downstream is available. The PRC does not wait to clear the zone.

The ZoneLink™ PRC tries to maintain a 250 millisecond gap while running. When accumulated, however, the downstream zone becomes READY immediately, allowing the upstream zone to begin running a few milliseconds after the downstream zone.

Slave Mode

When the load being transported is heavier than a single Microroller™ is rated to move then additional powered rollers can be added in the zone. A PRC that is in slave mode can be placed between the main zone controller and the upstream zone controller. The slave PRC will run only when the main PRC for that zone is running, and will pass all control signals through to the upstream controller.

Manual Mode

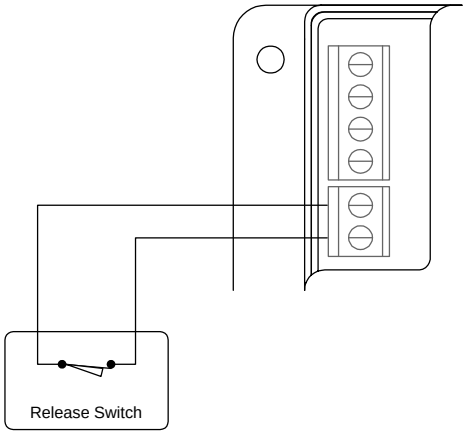
A ZoneLink™ PRC can have it's internal logic disabled by setting the DIP switches to manual mode. The Microroller™ can be controlled directly through the RUN and DIRECTION signals on the downstream ZoneLink™ port.

Workstation Hold

The ZoneLink™ PRC is equipped with a feature that allows product to be stopped at a zone, regardless of whether the downstream zone is able to accept a unit. This is done by connecting the HOLD input terminals to each other.

A practical method for the connecting the HOLD terminals is through a normally closed contact on a foot switch or push button.

HOLD Switch Example



Timers

ZoneLink™ PRC's are equipped with a set of timers that function differently, depending on whether in singulation or train mode. The table below describes each timer, and how it functions in each mode.

Timer	Description	Timer Values	
		Singulation	Train
Release Delay Timer	When a product is accumulated, the release timer delays how long a product is held before it is released downstream. This is used to ensure gaps in the product.	N/A	N/A
Gap Timer	When running, attempts to maintain a gap between units.	N/A	250 milliseconds
Transfer Timer	Once a product is released and cleared the upstream sensor, the transfer timer is used to ensure a product reaches the downstream sensor. If the Transfer Timer expires, the accumulation logic is reset.	16 seconds	N/A
Sleep Timer	Once a product clears the downstream sensor, and there are no other packages being released into the zone, the zone will run for the length of the sleep timer before turning off.	N/A	4 seconds
Jam Timer	If a zone is running to transfer product, and the downstream sensor remains blocked for the length of the Jam Timer, then the PRC will stop the zone and indicate a fault. The zone can not run again until the sensor that is jammed has been cleared.	8 seconds	8 seconds
Stall Timer	If the motor RPM drops below 300 RPM for the period of the Stall Timer, the PRC will stop the roller and indicate a fault condition. After 10 seconds, the PRC will attempt to re-start the roller. This cycle will continue until the fault condition causing the stall is cleared.	1 second stall 10 second re-start	1 second stall 10 second re-start