

Description

The ZoneLink®.S Driver Module connects directly to a Microroller® motorized roller, and is linked to a ZoneLink® Controller using standard category 5 patch cables (RJ-45).

The ZoneLink®.S Driver Module uses microcontroller-based commutation of the brushless motor, which provides the following benefits:

- Predictive diagnostics embedded in the Driver Module to flag when a powered roller should be replaced, in advance of the roller failing.
- Closed-loop speed control to hold roller speed at a constant value, improving the ability to tune a conveyor system.

The zone sensor connects to the Driver Module, keeping all wiring local to a zone, reducing wiring cost and complexity.



Specifications

| | | | | |
|-------------------------|-------------------------------------|--------------------------------------|-------------------------------------|-----------|
| Part Numbers | ZoneLink®.S Driver, 22 Watt Motor | ZL.S-DK101 | | |
| | ZoneLink®.S Driver, 35 Watt Motor | ZL.S-DK101-35 | | |
| | ZoneLink®.S Driver, 22 W w/ Aux I/O | ZL.S-DK102 | | |
| | ZoneLink®.S Driver, 35 W w/ Aux I/O | ZL.S-DK102-35 | | |
| Electrical Power | Termination | Plug-In, Spring Clamp Terminal | | |
| | Voltage Range | 24 VDC (+/- 10%) | | |
| | Current Consumption, Max | 100mA plus Powered Roller and Sensor | | |
| Motor Connection | Type | Microroller® | | |
| | Number | One (1) | | |
| | Termination | 9-pin Connector | | |
| | Voltage Range | 24 VDC | | |
| | Max Average Current (22W) | 2.0 Amps | | |
| | Max Average Current (35W) | 2.8 Amps | | |
| Sensor Input | Type | NPN or PNP | | |
| | Number | One (1) | | |
| | Termination | Plug-in, Spring Clamp Terminal | | |
| | Sensor Power Voltage | 24 VDC | | |
| | Sensor Input Voltage Range | 0 to 30VDC | | |
| | Maximum Sensor Power Current | 50 mA | | |
| | Sourcing Sensor Current | 11 mA Max (Input pulled to 24V) | | |
| | Sinking Sensor Current | 4.3mA Max (Input pulled to 0V) | | |
| ZoneLink®.S Port | Type | Current Sinking Inputs/Outputs | | |
| | Number | One (1) | | |
| | Termination | RJ-45 | | |
| | Voltage Range | 24 VDC | | |
| | Maximum Current | 250mA per output | | |
| Environmental | Temperature | Storage | -30° to 85° C (-22° to 185° F) | |
| | | Operating* | -15° to 45° C (5° to 113° F) | |
| | Humidity | | 5-95% RH, non-condensing | |
| | Vibration | | 2G at 10 to 500 Hz | |
| | Shock | | 10G | |
| | | | *35W loaded 100% at 100% duty cycle | |
| Physical | Dimensions | | 4.61" H x 2.81" W x 1.13" D | |
| | Weight | | 2.2 oz | |
| | Mounting | | Mounting base | |
| | Indication | Power | | Green |
| | | Status | | Red/Green |
| Sensor | | | Green | |

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.

Complementary Products

Holjeron manufactures a complete line of smart conveyor control equipment. To complete your system, have you considered:

- Stack Light Controllers for DeviceNet
- Light Stacks for DeviceNet
- Operator Panels for DeviceNet, Multiple function
- Push Button Controllers for DeviceNet, Multiple I/O
- Low Profile I/O for DeviceNet, Multiple I/O
- Motor Starter Controllers for DeviceNet
- ZoneLink®.S ZPA Module for 22W and 35W Microrollers w/ Auxiliary I/O
- ZoneLink® 4 Zone Controllers with DeviceNet™

To request pricing and availability, or to place an order:

Contact us

Holjeron

25599 SW 95th Ave. Suite E

Wilsonville, Oregon 97070

Phone 503.582.0820

Fax 503.582.9166

www.holjeron.com

email

General info: info@holjeron.com

Sales: sales@holjeron.com

Support issues: support@holjeron.com

About Holjeron

Our products are all designed and produced by us

If you need this modified or that to be changed, it can be done. We give you the technology that best suits your needs. We understand Common Industrial Protocols (CIP) such as DeviceNet and Ethernet/IP, as well as CANOpen and Smart Distributed System (SDS.) Our engineers can supply the distributed I/O solutions that meet your specific needs.

We push intelligence to the process

Holjeron's smart quick-connect products can reduce wiring and give you diagnostics designed for your material handling system. Our products are designed with your system in mind. Using industry standards, we explore new ways to make things work in industrial automation. We apply the requisite technology to deliver the solution your system needs.

Want to kick around options?

Call us. Where else are you going to find people who love talking about this stuff? And who know enough to be helpful? The number to connect you to someone who understands your business – **503.582.0820**

Membership

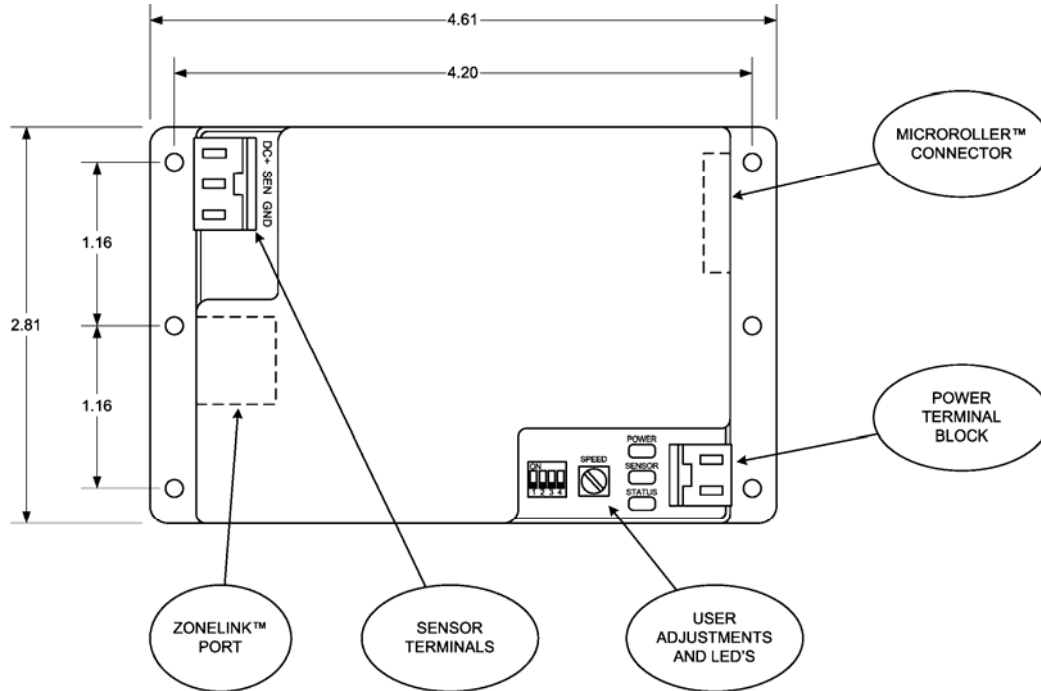
Holjeron is an active participant in key industry organizations and standards bodies.



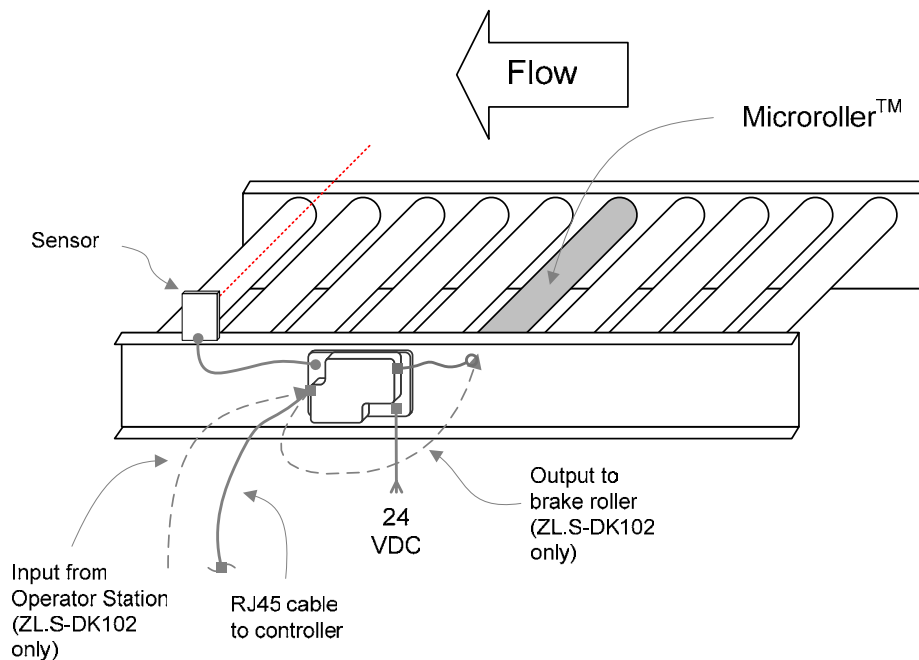
www.mhia.org

Holjeron is a wholly-owned subsidiary of Matthews International Corporation

Dimensions and Layout

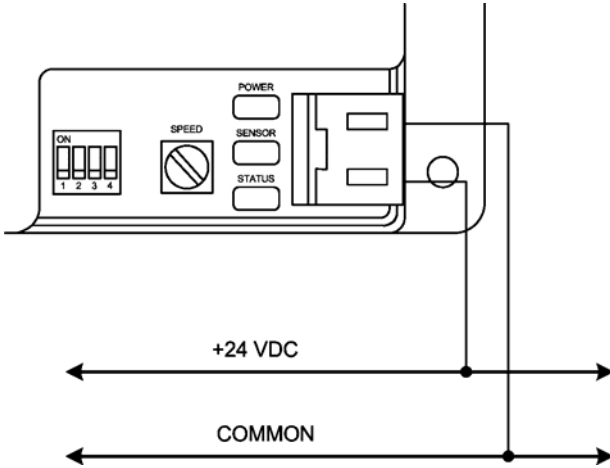


Typical Installation



Wiring

24 VDC Power

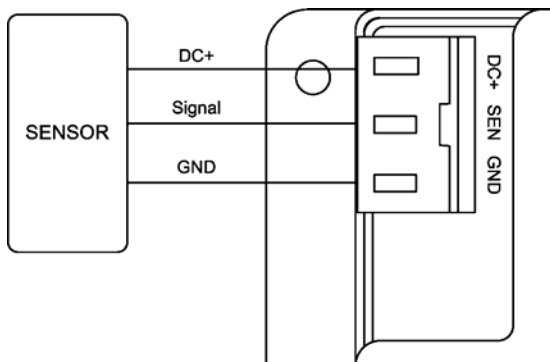


The Power Connector is a 2-pin pluggable terminal block with locking header that accepts up to 14 gauge wire. Use leverage from a small screwdriver to release the terminal block. Power to the ZoneLink®.S Driver Module must be 24 VDC. Power supplies for the 22W Driver Module should be sized to allow each powered roller zone to draw 2.2 amps continuously; and at least 3 amps for the 35W Driver Module.

NOTES

1. Systems that have multiple power supplies should have the commons of each power supply tied together.
2. There is no limit to the number of Zone-Link® Driver Modules in a system.

Sensor Wiring

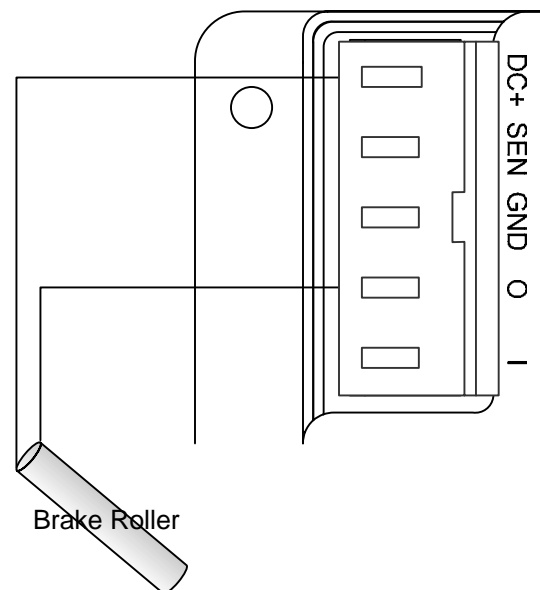
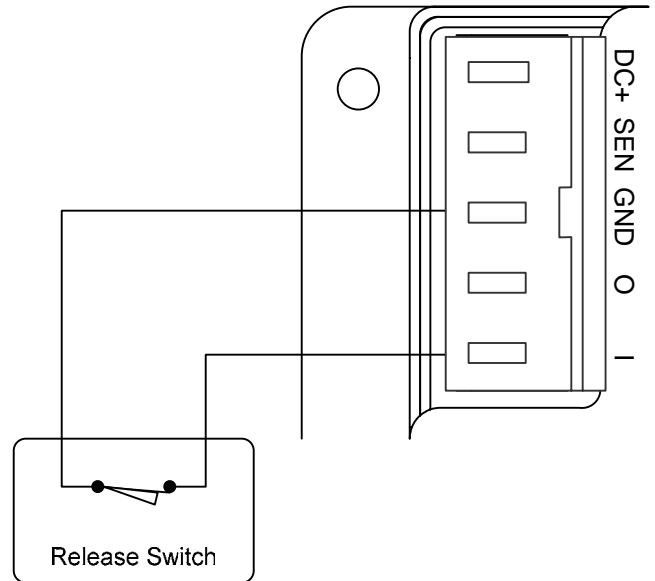


Terminal block for the sensor is a 3-pin plug-in style with locking header that accepts up to 14 gauge wire. Use leverage from a small screwdriver to release the terminal block. The

ZoneLink® Driver Modules are compatible with both PNP and NPN sensors.

I/O Wiring

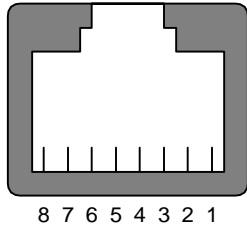
The ZL.S-DK102 can accommodate a 5-pin terminal block to connect to a sensor and an external input signal, to enable work station hold mode, or to an output signal, which could be used to operate an external device such as a brake roller. The terminal block has a locking header that accepts up to 14 gauge wire. The 5-pin terminal operates similarly to the 3-pin terminal.



ZoneLink®

The ZoneLink® connections are RJ-45 jacks with pin assignments as defined in the diagram below. ZoneLink® is designed to use standard Ethernet patch cables (Category 5, 5e or 6).

ZoneLink® RJ-45 Connector



ZoneLink® Pin Assignments

| Pin | Function |
|-----|---------------------|
| 1 | SENSOR STATE OUTPUT |
| 2 | RESERVED |
| 3 | DIRECTION INPUT |
| 4 | RUN INPUT |
| 5 | FAULT OUTPUT |
| 6 | BYPASS INPUT (1) |
| 7 | .S COMMUNICATIONS |
| 8 | COMMON |

- (1) The BYPASS INPUT, when enabled in conjunction with a RUN INPUT, causes the motor to run at the BYPASS SPEED. The default BYPASS SPEED is 2400 RPM (full rated speed).

Microroller® Selection

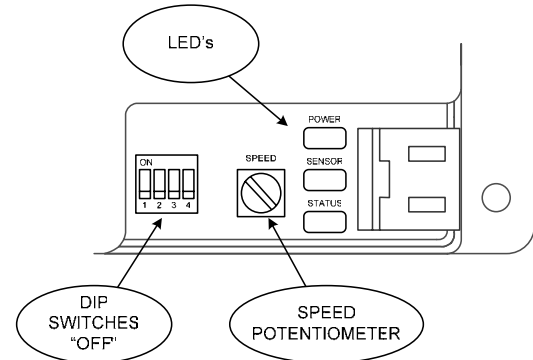
The following information regarding the sizing of a 22W Microroller® is for reference only. Each application should be reviewed regarding the suitability of a Microroller® for that application.

| Roller P/N | Rated Speed (FPM) | | Tangential Force (Lbs) |
|-----------------|-------------------|----------|------------------------|
| | 1000 RPM | 2400 RPM | |
| MR-AD-1.9-xxx-4 | 4 | 16 | 67.0 |
| MR-D-1.9-xxx-5 | 5 | 22 | 49.0 |
| MR-D-1.9-xxx-7 | 8 | 33 | 32.8 |
| MR-D-1.9-xxx-10 | 14 | 60 | 17.8 |
| MR-D-1.9-xxx-15 | 17 | 73 | 15.1 |
| MR-D-1.9-xxx-20 | 24 | 100 | 11.0 |
| MR-D-1.9-xxx-30 | 29 | 122 | 9.0 |
| MR-D-1.9-xxx-40 | 55 | 238 | 4.9 |

All Data Based on 1.9 Inch Diameter Roller

Configuration

DIP switches to configure the functionality of the ZoneLink® Driver Module 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 nearest edge of the Driver Module.



DIP Switches -- Manual Configuration Options

Manual configuration of a ZoneLink® Driver Module requires setting a single DIP switch to set the direction of rotation, setting the second DIP switch OFF, and then setting the desired speed using the speed potentiometer.

Driver DIP Switch Assignment

| Switch | Function | OFF | ON |
|--------|--------------------------|-----------|--------|
| 1 | Direction of Rotation | CCW | CW |
| 2 | Run Speed Reference | Pot | Serial |
| 3* | Aux Output functionality | Pulse Out | Brake |
| 4 | Sensor Type | NO | NC |

*Note: Switch #3 is operable on DK102 drivers only. It is not used on DK101 drivers.

The **Direction of Rotation** is used to set the default rotation of the Microroller® in normal use. This allows for the ZoneLink® Driver Module to be installed in various locations on a conveyor system.

The **Run Speed Reference** for the Microroller® can be generated using one of two different methods: the potentiometer on the ZoneLink®.S Driver or over .S serial communications. When DIP Switch 2 is set to OFF then the speed potentiometer controls the RUN Speed. When set ON, the RUN speed is set through .S communications. Using the potentiometer, motor RPM can be set within 4 RPM over the range of 250 to 4000 RPM. Using .S control, any integer RPM value within the ability of the motor may be set.

The brushless motors in the Microroller® deliver the maximum torque from 1000 to 2400 RPM in the 22W Microroller®; and from 1000 to 3300 RPM in the 35W Microroller®. The Zone-

Link® .S Driver Module can set the motor speed outside of these ranges, up to their maximum speed (3200 RPM for the 22W version and over 4000 RPM for the 35W version). However, it is recommended to size the application--and set the speed-- to have the maximum torque.

The **OUTPUT functionality** is applicable only to the ZL.S-DK102 with auxiliary I/O family of drivers. In the ON position, the output signal can be used to operate a brake roller. Normally, the signal is weakly pulled up to 24v. When the brake is to be activated, the "active low" signal is sunk to ground allowing the brake solenoid to swing, engaging the brake. In the OFF position the output provides a 24 volt square wave at a frequency one tenth that of the motor RPM.

The **SENSOR type** selection is used to configure the sensor output to activate when sensor itself activates. This setting allows the use of both sensors that activate when blocked (Normally Open, Sw #4 OFF) and sensors that activate when not blocked (Normally Closed, Sw #4 ON).

Serial Configuration

Serial configuration of a ZoneLink® Driver Module requires connection to a ZoneLink®.S Controller capable of configuring ZoneLink®.S products, or using one of the ZoneLink®.S configuration tools available from Holjeron. Consult the documentation for the specific tool being used.

Product Information (Required in all products)

| ID | Description | R/W | Default/Notes |
|-----|-------------------------------------|-----|--|
| 0 | Product ID | R | 4 = 22 Watt 5 = 35 Watt 6-7 = Reserved |
| 1 | Hardware Version | R | |
| 2 | Software Version | R | |
| 3-5 | Reserved | | |
| 7 | Diagnostic Register (Instantaneous) | R | See Diagnostic Register |
| 8 | Diagnostic Register (Locked) | R | See Diagnostic Register |

Motor Properties

| ID | Description | R/W | Default/Notes |
|----|-------------|-----|---------------|
| 16 | Motor RPS | R | |

| | | | |
|-------|--------------------------------|---|--|
| 17 | Normal Speed Setpoint | W | 1800 |
| 18 | Bypass (w/Run) Speed Setpoint | W | 2400 |
| 19 | Bypass (wo/Run) Speed Setpoint | W | 0??? |
| 20 | Current Setpoint | W | 22W: 2000 = 2 amp 35W: 2800 = 2.8 amp |
| 21 | Reserved | | |
| 22 | No-Load Current Enable | W | 0 = No-load current not enabled |
| 23 | Motor Current | R | |
| 24 | Motor Temperature | R | |
| 25-28 | Reserved | | |
| 29 | Operating Time | R | |
| 30 | Reserved | | |

Diagnostic Register

| Faults | | Warnings | |
|---------------------------|-----|----------------------------|-----|
| Description | Bit | Description | Bit |
| Commutation Fault | 0 | Excessive Current Limit | 8 |
| Low Current | 1 | High No Load Current | 9 |
| Reserved | 2 | Excessive Motor Stalls | 10 |
| Work Station Hold Engaged | 3 | Motor Design Life Exceeded | 11 |
| Motor Stall Fault | 4 | Reserved | 12 |
| Motor Thermistor Fault | 5 | Reserved | 13 |
| Reserved | 6 | Reserved | 14 |
| Driver Thermistor Fault | 7 | Reserved | 15 |

Indication

There are three LED's on a ZoneLink® Driver Module next to the power terminal block. They are labeled POWER, ACTIVE and STATUS.

The POWER LED is green, and will illuminate whenever 24 VDC is applied to the controller and the controller is healthy. If 24 VDC is present and the POWER LED is not on then the unit needs to be replaced.

The ACTIVE LED is illuminates green when the connected sensor has is actuated.

The STATUS LED is dual color (red/green). Warnings and Faults are indicated through a series of red and green flashes. Consecutive green flashes indicate a Warning. Red flashes indicate Faults. The number of red flashes denotes the severity of the condition, while subsequent green flashes defined the specific condition.

STATUS LED States

| Status LED | Indication |
|--|--|
| Solid Green | The unit is operating properly. |
| Solid Red | On for 0.5 seconds on startup. After startup, a solid red STATUS may mean the unit has failed and needs to be replaced. |
| Flashing Green | WARNINGS The unit is still functioning but has a condition that should be checked. |
| 1 Red flash, followed by 1 or more Green flashes | APPLICATION FAULT The motor has stopped and a condition must be cleared before the motor can run again. |
| 2 Red flashes, followed by 1 or more Green flashes | CRITICAL FAULT The motor has stopped. Depending on the fault, the motor and/or controller may need to be replaced. |

Warnings

There are two (2) types of warnings: Application and Predictive. Warnings do not stop the motor from running. Instead, they are an indicator that some form of corrective action is needed.

Warnings also cause the ZoneLink® Fault Output to toggle state every 0.5 seconds.

Warnings (All Green Flashes)

| Indication |
|---|
| Excessive Current Limit – when the motor is running, every 10 milliseconds the current being consumed by the powered roller is measured and a moving average is updated. If more than 30% of the measurements are at the current limit level then a warning is activated. |
| High No Load Current – when a roller is instructed to stop and its sensor is not blocked then, prior to stopping, a current reading is taken. If the average No Load Current increases 20% over the life of the roller then a High No Load Current warning is issued. Note: No Load Current Enabled must be set to 1 for this diagnostic to be active. See Serial Configuration Section for more detail. |
| Excessive Motor Stalls – each time the motor is stopped, the Motor Stall Fault is checked and a moving average is updated. If the motor stops due to a stall more than 10% of the time then a warning is activated. |
| Design Life – a Microroller® has a design life of 25,000 hours. When the motor has run for more than the design life a warning is indicated. |

Faults

Two (2) types of faults occur in ZoneLink® Driver Modules: Application and Critical. Faults cause the motor to stop running, and require intervention to get a system back operational.

Application Faults can be reset or cleared to get a system running.

Critical Faults typically can not be cleared, and usually require changing either the motor or Driver Module.

Faults also cause the ZoneLink® Fault Output to be ON.

Application Faults (1 Red Flash, followed by Green Flashes)

| Green Flashes | Indication |
|---------------|--|
| 1 | Motor Stall – the Driver Module is trying to run the motor, yet it hasn't moved for a full second. The motor will attempt to start after a ten second delay. |
| 2 | Motor Thermistor Fault – the temperature inside the motor is too high. The motor will restart when the motor cools down. |
| 3 | Not used |
| 4 | Driver Thermistor Fault - the temperature inside the driver electronics is too high. The motor will restart when the motor cools down. |

Critical Faults (2 Red Flashes, followed by Green Flashes)

| Green Flashes | Indication |
|---------------|---|
| 1 | Commutation Fault – the circuit that controls the motor commutation has failed. |
| 2 | Low Current – the Driver Module is reading a current that is below the normal No Load value. This is typically due to the mechanical link internal to the powered roller has broken. The remedy is to replace the roller. |
| 3 | Not used |
| 4 | Work station hold activated – Not a true "fault." Indicates that an external signal has stopped the roller. Normally used to force accumulation. |