

## Description

The ZoneLink® Driver Module connects directly to a Microroller® motor driven roller.

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

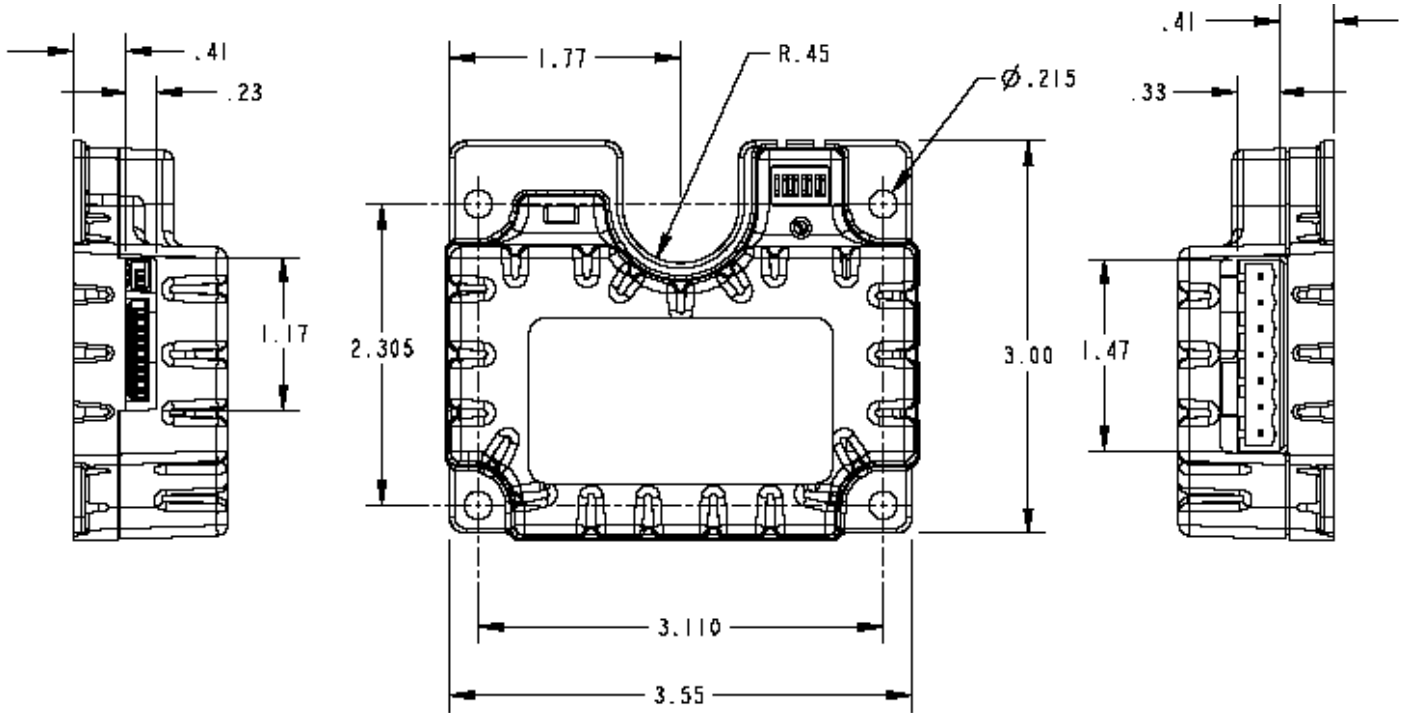
- \* Closed-loop speed control to hold roller speed at a constant value, improving the ability to tune a conveyor system.
- \* A single Driver Module for control of both 22W and 35W Microroller® motor driven rollers.
- \* A single Driver Module for control of standard, electronic brake, and mechanical brake rollers.
- \* Discreet speed selection for accurate zone-to-zone speed control.
- \* Multiple fault indications for easy and thorough troubleshooting.



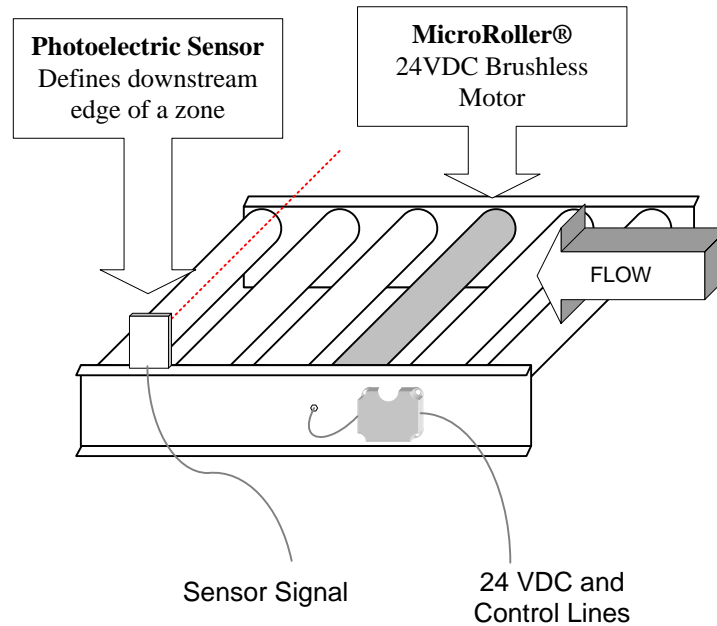
## Specifications

<b>Part Numbers</b>	ZL-DH100	ZoneLink® Driver for 22W and 35W Motors w/ Mechanical or Electronic Brake Output (Configured via DIP Switches)
<b>Electrical Power</b>	Termination Voltage Range Current Consumption	Plug-In Cage Clamp Terminal 24 VDC (+/- 10%) 100 mA plus Microroller®
<b>Motor Connection</b>	Type Number Termination Voltage Range Max Average Current	Microroller® Compatible One (1) 10-pin Connector 24 VDC 3.6 A
<b>Control Port</b>	Type Number Termination Voltage Range Max Continuous Avg Current Boost (Starting) Avg Current Self-Resetting Fuse	Current Sinking Inputs/Outputs Single 7-Pin Connector Plug-in Cage Clamp Terminal 24 VDC 2.6 A (22W) / 3.6 A (35W) 3.4A (22W) / 4.0A (35W) 5A
<b>Potentiometer</b>	Internal External	600-3600 rpm (22W) 1000-4000 rpm (35 W) 0% - 100% of internal range
<b>Environmental</b>	Temperature Humidity Vibration Shock	Storage Operating -30° to 70° C (-22° to 158° F) 0° to 60° C (32° to 140° F) 5-95% RH, non-condensing 2G at 10 to 500 Hz 10G
<b>Physical</b>	Dimensions Weight Mounting Indication	Status 3.70" L x 3.15" W x 1.10" D 4 oz Mounting base identical to V12/21 Solid Green – Normal Flashing Green/Red – Fault

**Dimensions and Layout**



**Typical Installation**



## Wiring

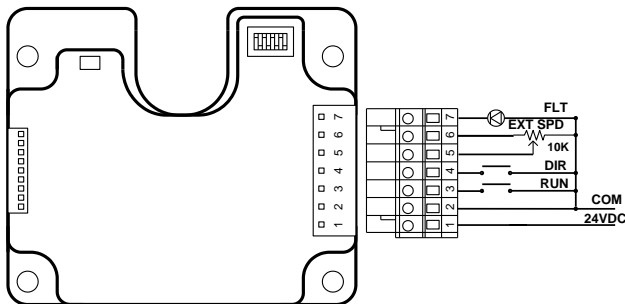
### Power and Control Wiring

The Power Connector is pin 1 on the driver control port. Power to the ZoneLink® Driver Module must be 24 VDC. Power supplies for systems driving 22W rollers should be sized to allow each motor-driven roller zone to draw 3.6 amps continuously. For installations utilizing 35W rollers should allow at least 4.2 amps per driver module.

A Microroller® can be signaled to run by sinking Control pin 3 to common. The run direction of the Microroller® can be changed by sinking Control pin 4 to common. When the ZoneLink® Driver Module or Microroller® experiences a FAULT Control pin 7 will be pulled to ground. The wiring diagram is shown in Error! Reference source not found..

**NOTE: The ZoneLink® Driver MUST share common with the Control I/O.**

### External Speed Control and Control Port Wiring



**Figure 1 Control Port Wiring**

Pin	Function
7	Fault
6	3.3V Reference
5	Analog Speed Input
4	Direction
3	Run
2	Common
1	24VDC

**Table 1 Control Port Wiring**

Control pin 5 can be used for speed control using an external potentiometer or the output of an analog output module of a PLC. The external speed control signal can be used to set motor run speed to approximately 0-100% of the motor speed range. If using a potentiometer, a higher turn version will provide more precise speed control. The external pot range will be the same as on-board input range, using a 10K pot. If using an external potentiometer, control pin 6 must be connected to the other side of the potentiometer. This pin is the 3.3VDC reference.

When connecting the output of an analog output module, you must configure the module to output 0-3.3VDC. Voltages over 3.3VDC WILL damage the driver. For proper operation, you must tie the DC common wires from the driver and analog output module together.

## Configuration

DIP switches to configure the functionality of the ZoneLink® Driver Module are located on the upper right of the module, above the control port receptacle. The switches are numbered 1-8, beginning with the switch on the left. The ON position for each switch is toward the top of the Driver Module.

**Please Note:** The ZL-DH100 can be used to drive both 22 Watt and 35 Watt Microroller® motor driven rollers using DIP switches 1-3 to set the power level appropriately. Previously, separate products were available from Holjeron to drive the different roller types. The ZL-DH100 replaces both all ZL-DK100 variants ZL-DK100, ZL-DK100B, ZL-Dk100EB, and ZL-DK100-35.

- DIP switches 1, 2, and 3 are used to set Power and Braking Modes as shown in Table 3.
- DIP switch 4 is used to set the default rotation of the ZoneLink® in normal use as shown in Table 2. This allows for the ZoneLink® Driver Module to be installed in various locations on a conveyor system.
- DIP switches 5 through 8 can be used to set the speed, as shown in tables 3 and 4.

DIP Switch	Function
1	<b>Power/Braking Mode Table</b>
2	
3	
4	<b>Direction: OFF=CCW, ON=CW</b>
5	<b>Power Specific Speed Table</b>
6	
7	
8	

**Table 2 General Driver DIP Switch Assignment**

DIP Switches			MDR	Braking Mode
1	2	3		
OFF	OFF	OFF	22W	Dynamic
ON	OFF	OFF	22W	Electronic Hold
OFF	ON	OFF	22W	Mechanical Hold (requires "Brake Roller")
ON	ON	OFF	35W	Dynamic
OFF	OFF	ON	35W	Electronic Hold
ON	OFF	ON	Reserved - Motor will not run	
OFF	ON	ON		
ON	ON	ON		

**Table 3 Power and Braking Mode DIP Switch Assignments**

### Braking Mode Application Notes

The ZL-DH100 also enables three different braking modes in one driver module. Previously, separate SKU's were available from Holjeron to achieve different braking modes. The ZL-DH100 Driver Module can be used in Electronic Braking, Mechanical Braking, and standard Dynamic Braking mode, replacing the legacy ZL-DK100EB, ZL-DK100B, and ZL-DK100 models.

**Dynamic Braking** is the default mode of operation for the driver module and is designed to work with standard Microroller® motor driven rollers. When the run power is removed from the MDR, it stops without electrical input from the controller due to the mechanical properties of the motor, gearbox, and other components of the MDR system. Power from the motor is fed back into the driver module while the system slows down and dissipated as heat.

**Electronic Hold Braking** mode is designed to work with both standard and mechanical brake Microrollers®. This is a 'brake and hold' function and is not designed to be a 'positioning' controller.

When used with a standard Microroller®, this feature gives the user the capability to apply braking functionality for less cost than mechanical brake solutions and allows for standardization on a single part number for both driver card and Microroller®. However, on power loss, braking capability is lost.

When used with a mechanical brake Microroller®, the Electronic braking feature saves wear on the brake mechanism while providing mechanical braking in case of power loss. When used with a mechanical brake, and with DIP switch 1 OFF and DIP switch 2 ON, the ZL-DH100 will function exactly like the legacy ZL-DK100B product.

**Mechanical Braking** mode is designed to be used in conjunction with a mechanical brake Microroller® which is equipped with a mechanically actuated brake that is intended to be used as a safety feature to hold loads on inclines or in other situations where holding a load stationary is critical in the case of loss of power.

**Speed Settings:** The ZL-DH100 offers three methods to set the speed: internal pot, external pot and DIP switches 5-8. The following table lists the possible motor rpm settings and their corresponding linear speeds by Microroller® motor-gearbox assembly.

Linear speeds are listed for 1.9 inch rollers. For 2.24 inch rollers, multiply by 1.16. For 2.38 inch rollers, multiply by 1.23. The ON position for each switch is toward the top of the Driver Module.

DIP Switch				22 Watt Motor-Gearbox
5	6	7	8	Motor RPM
OFF	OFF	OFF	OFF	<b>Internal Pot, range 300 to 3600 RPM</b>
ON	OFF	OFF	OFF	1100
OFF	ON	OFF	OFF	1200
ON	ON	OFF	OFF	1300
OFF	OFF	ON	OFF	1400
ON	OFF	ON	OFF	1500
OFF	ON	ON	OFF	1600
ON	ON	ON	OFF	1700
OFF	OFF	OFF	ON	1800
ON	OFF	OFF	ON	1900
OFF	ON	OFF	ON	2000
ON	ON	OFF	ON	2100
OFF	OFF	ON	ON	2200
ON	OFF	ON	ON	2300
OFF	ON	ON	ON	2400
ON	ON	ON	ON	<b>External Pot, range 300 to 3600 RPM</b>

**Table 4 DIP Switch 5-8 Settings for 22 Watt Driver**

DIP Switch				35 Watt Motor-Gearbox
5	6	7	8	Motor RPM
OFF	OFF	OFF	OFF	<b>Internal Pot, range 300 to 4200 RPM</b>
ON	OFF	OFF	OFF	1150
OFF	ON	OFF	OFF	1300
ON	ON	OFF	OFF	1450
OFF	OFF	ON	OFF	1600
ON	OFF	ON	OFF	1750
OFF	ON	ON	OFF	1900
ON	ON	ON	OFF	2050
OFF	OFF	OFF	ON	2200
ON	OFF	OFF	ON	2350
OFF	ON	OFF	ON	2500
ON	ON	OFF	ON	2650
OFF	OFF	ON	ON	2800
ON	OFF	ON	ON	2950
OFF	ON	ON	ON	3100
ON	ON	ON	ON	<b>External Pot, range 300 to 4200 RPM</b>

**Table 5 DIP Switch 5-8 Settings for 35 Watt Driver**

## Faults and Indicators

If the motor thermistor or the driver card thermistor senses that the motor is overheating, the ZoneLink® driver will restrict power to the motor. The driver will automatically reset the motor after the motor cools to below acceptable temperature for about 10 seconds.

### Indication

There is one dual color (red/green) LED on a ZoneLink® Driver Module upper left corner of the module.

Whenever 24 VDC power is applied and the driver is functioning normally, the LED will show solid green. If 24 VDC is present and the LED is not on, the unit needs to be replaced.

Flashing green followed by flashing red indicates a FAULT.

### Status LED States

Two types of faults occur in ZoneLink® Driver Modules: Application and Critical. Faults cause the motor to stop running and require intervention to return to proper operation.

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

*Application Faults (1 Red Flash, followed 1-4 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 re-start after 10 seconds.
2	Motor Thermistor Fault – The motor has reached its temperature limit and has stopped. The motor will be ready to start again about 10 seconds after it cools below its overtemp limit.
4	Driver Thermistor Fault – The driver circuitry has reached its temperature limit and has cut off power to the motor. The driver will be ready supply power again about 10 seconds after it cools below its overtemp limit.

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

*Critical Faults (2 Red Flashes, followed by 1-4 Green Flashes)*

Green Flashes	Indication
1	Commutation Fault – the circuit that controls the motor commutation has failed, or that the motor connector is not fully inserted
2	Low Current – the Driver Module is reading a current that is below the normal No Load value. This is typically occurs when the mechanical link internal to the powered roller has broken. The remedy is to replace the roller.
3	Low Supply Voltage Fault – the fault activates if the supply voltage to the controller falls below 16VDC.



## EMERGENCY STOPS AND SAFETY RELAYS

It is generally considered good safety practice to have E-stop and/or safety relays/controllers installed in any conveyor system, especially one with multiple control system voltages. Many state and local regulations/codes require them. Please consult qualified personnel who plan and design safety equipment for machines and systems and are familiar with the regulations governing safety in the workplace and accident prevention.

### 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:

**ZoneLink®.S Driver Modules** for 22W and 35W Microroller® w/ Auxiliary I/O

**ZoneLink<sup>3</sup> ZPA Controllers** for Microroller®s and SmartRollers

**ZoneLinkTC™** EtherNet/IP controls for control of up to 64 zones or nodes, reducing cost and complexity while providing expansive I/O control.

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

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### About Holjeron

#### Our products are all designed and produced by us

If you need customized solutions, we can do it. 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.



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