

Description

The Microroller® Driver Module connects directly to a 22W or 35W Microroller® motorized roller.

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

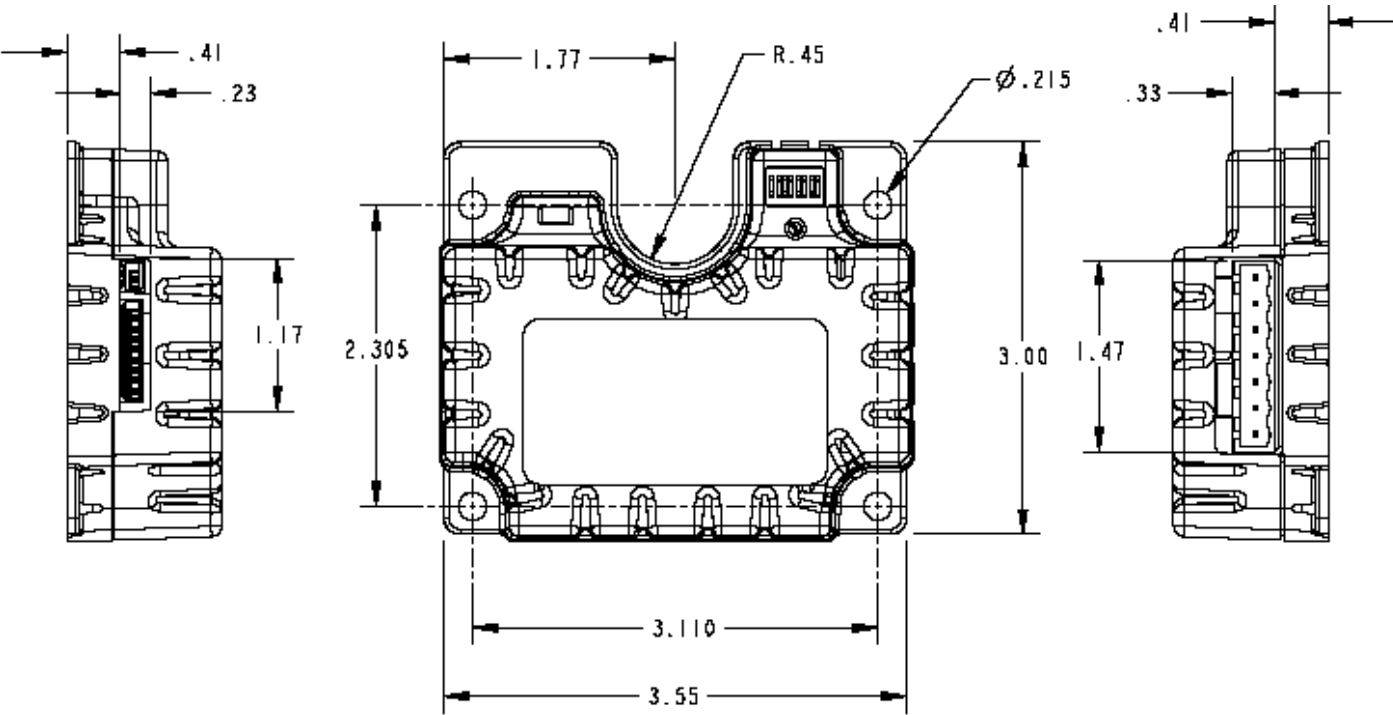
- * Closed-loop speed control to hold roller speed at a constant value, improving the ability to tune a conveyor system.
- * Electronic Brake Module (EB) controls both standard and mechanical brake rollers
- * Discrete speed selection for accurate zone-to-zone speed control
- * Multiple fault indications for more thorough troubleshooting



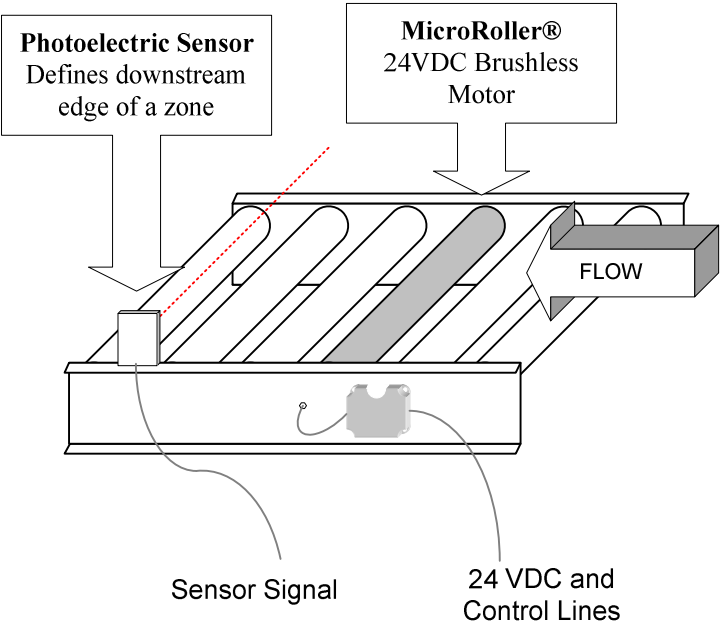
Specifications

Part Numbers	ZL-DK100		Microroller® Driver, 22 Watt Motor	
	ZL-DK100B		Microroller® Driver, 22 Watt w/Brake output	
	ZL-DK100EB		Microroller® Driver, 22W w/ Electronic Brake	
	ZL-DK100-35		Microroller® Driver, 35 Watt Motor	
Electrical Power	Termination		Plug-In Cage Clamp Terminal	
	Voltage Range		24 VDC (+/- 10%)	
	Current Consumption		100 mA plus Microroller®	
Motor Connection	Type		Microroller Distribution Microroller®	
	Number		One (1)	
	Termination		9-pin Connector	
	Voltage Range		24 VDC	
Control Port	Max Average Current		2.0/2.8 Amps (DK100/DK100-35)	
	Type		Current Sinking Inputs/Outputs	
	Number		One (1)	
	Termination		Plug-in Cage Clamp Terminal	
Potentialometer	Voltage Range		24 VDC	
	Maximum Current		2.0/2.8 amps (DK100/DK100-35)	
	Internal		600-3600 rpm (22W)	
	External		1000-4000 rpm (35W)	
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	
Physical	Shock		10G	
	Dimensions		3.70" L x 3.15" W x 1.10" D	
	Weight		4 oz	
	Mounting		See Drawing Below	
Status	Indication		Solid Green – Normal	
			Flashing Green/Red – Fault	

Dimensions and Layout



Typical Installation



Wiring

Power and Control Wiring

Pin	Function
7	Fault
6	Ext. Speed Control
5	Analog Speed Input
4	Direction
3	Run
2	Common
1	24VDC

Table 1 Control Port Wiring

The Power Connector is pin 1 on the motor control receptacle. Power to the Microroller® Driver Module must be 24 VDC. Power supplies for the 22W Driver Module should be sized to allow each motor-driven roller zone to draw 2.2 amps continuously, and at least 3.0 amps for the 35W Driver Module.

A Microroller can be signaled to run by sinking Control pin 3 to common. The Microroller’s direction can be changed by sinking Control pin 4 to common. When the Microroller experiences a FAULT Control pin 7 will be pulled to ground. The wiring diagram is shown in Figure 1.

NOTE

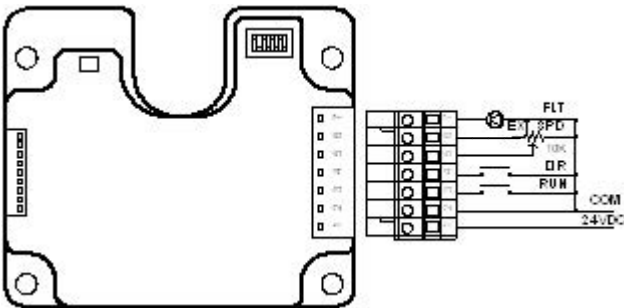


Figure 1 Control Port Wiring

External Speed Control

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 10-90% of the motor speed range. If using a potentiometer, a higher turn version will provide more precise speed control. 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.

Control pin 6 must be connected to the other side of the potentiometer. This pin is the 3.3VDC reference.

DeviceNet™ Network

To connect the ZL-DK100 to a DeviceNet™ network, use the Microroller Distribution PRC-DNT204/224 4-Zone Controller for DeviceNet™. Figure 2 shows the proper wiring. See the PRC-DNT224 documentation for further information.

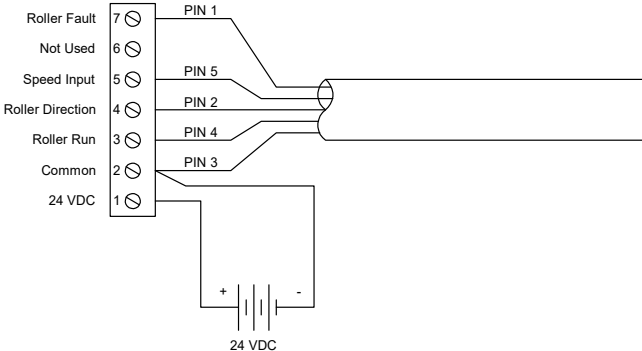


Figure 2 Control Port Wiring from the PRC-DNT204/224

Configuration

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

Manual configuration of a Microroller® Driver Module requires setting DIP Switches 1-4 for correct operation, with switches 5-8 reserved for speed settings.

- Set DIP switch 1 to determine how Application Faults are reset. ON requires a power cycle to clear the faults and OFF allows the driver to reset automatically based on the Application Fault Table below.
- Set Dip Switch 2 to the desired direction of rotation.
- Set DIP Switch 3 to the type of potentiometer being used. If a internal or external potentiometer is being used, DIP Switches 5-8 must all be set OFF (see speed charts, Tables 3 & 4).
- Dip Switch 4 is used to activate the mechanical brake. For electronic braking switch selection, see the Electronic Braking Section on page 5.

Switch	Function	OFF	ON
1	Overtemp Reset	Manual	Auto
2	Direction	CCW	CW
3	Potentiometer	Internal	External
4	Brake*	Off	On
5	Speed settings; see Table 3 and Table 4		
6			
7			
8			

*Note: brake roller only

Table 2 Driver DIP Switch Assignment

Speed Settings

The ZL-DK100 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 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	-7	-10	-15	-20	-30	-35	-40
5	6	7	8	Motor RPM	Approximate Linear Speed (FPM)							
OFF	OFF	OFF	OFF	Internal or external potentiometer (as determined by DIP switch 3)								
ON	OFF	OFF	OFF	1000	10	15	27	33	45	55	77	99
OFF	ON	OFF	OFF	1100	11	17	30	36	50	60	85	109
ON	ON	OFF	OFF	1200	12	18	32	40	54	66	92	119
OFF	OFF	ON	OFF	1300	13	20	35	43	59	71	100	129
ON	OFF	ON	OFF	1400	14	21	38	46	63	77	107	138
OFF	ON	ON	OFF	1500	15	23	41	49	68	82	115	148
ON	ON	ON	OFF	1600	16	24	43	53	72	88	123	158
OFF	OFF	OFF	ON	1700	17	26	46	56	77	93	130	168
ON	OFF	OFF	ON	1800	18	27	49	59	81	99	138	178
OFF	ON	OFF	ON	1900	19	29	51	63	86	104	146	188
ON	ON	OFF	ON	2000	20	30	54	66	90	110	154	198
OFF	OFF	ON	ON	2100	21	32	57	69	95	115	162	208
ON	OFF	ON	ON	2200	22	33	59	73	99	121	170	218
OFF	ON	ON	ON	2300	23	35	62	76	104	126	177	227
ON	ON	ON	ON	2400	24	36	65	79	108	132	185	237

Table 3 DIP Switch 5-8 Settings for 22 Watt Driver

DIP Switch				35 Watt Motor-Gearbox	-10	-14	-20	-30	-40	-60	-70	-80
5	6	7	8	Motor RPM	Approximate Linear Speed (FPM)							
OFF	OFF	OFF	OFF	Internal or external potentiometer (as determined by DIP switch 3)								
ON	OFF	OFF	OFF	1000	10	15	20	33	45	55	71	99
OFF	ON	OFF	OFF	1150	11.5	17	23	38	52	63.5	82	114
ON	ON	OFF	OFF	1300	13	19.5	26	43	59	72	92	129
OFF	OFF	ON	OFF	1450	14.5	22	29	48	65.5	80	103	144
ON	OFF	ON	OFF	1600	16	24	32	53	72	88.5	114	159
OFF	ON	ON	OFF	1750	17.5	26	35	58	79	96.5	124	174
ON	ON	ON	OFF	1900	19	28.5	38	63	86	105	135	189
OFF	OFF	OFF	ON	2050	20.5	31	41	68	92.5	113	145	204
ON	OFF	OFF	ON	2200	22	33	44	73	99.5	121.5	156	219
OFF	ON	OFF	ON	2350	23.5	35.5	47	78	106	130	167	234
ON	ON	OFF	ON	2500	25	37.5	50	83	113	138	177	249
OFF	OFF	ON	ON	2650	26.5	40	53	88	120	146.5	188	264
ON	OFF	ON	ON	2800	28	42	56	93	126.5	154.5	199	279
OFF	ON	ON	ON	2950	29.5	44.5	59	98	133	163	209	294
ON	ON	ON	ON	3100	31	46.5	62	103	140	171	220	309

Table 4 DIP Switch 5-8 Settings for 35 Watt Driver

Electronic Brake Application Notes

The ZL-DK100EB is an electronic brake module designed to work with both standard and mechanical brake Microrollers®. The default setting for DIP switch 4 is OFF and enables the electronic brake function. This is a 'brake and hold' function and is not designed to be a 'positioning' controller. When used with a standard Microroller®, this module 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 4 ON, the ZL-DK100EB functions exactly like the ZL-DK100B. Electronic braking 'Hold' current can be customized in conjunction with Microroller gearbox selection to provide optimized control for specific applications at cost effective levels. Consult our technical specialist for additional information or specification assistance

Indication

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

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

Flashing red followed by flashing green indicates a Fault.

Application Faults

If the motor thermistor or the driver card thermistor senses that the motor is overheating, the driver will restrict power to the motor. If the **Reset Mode** (DIP switch 1) is set to OFF then the power to the motor must be cycled to reset. If the **Reset Mode** is set to ON, then the driver will automatically reset the motor after the motor and/or driver cools to an acceptable temperature. In the event of a stall while the **Reset Mode** is set to ON, the driver will attempt restart every 10 seconds. If the **Reset Mode** (DIP switch 1) is set to OFF, power must be cycled to reset.

Critical Faults

Critical Faults typically cannot be cleared, and usually require changing either the Microroller or Driver Module. In the case of a Low Supply Voltage fault, the fault can be cleared by correcting the low voltage condition and cycling power.

Application Faults

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 with DIP switch 1 in the ON position. With DIP switch 1 in the OFF position, power must be cycled.
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 with DIP switch 1 in the ON position. With DIP switch 1 in the OFF position, power must be cycled.

Critical Faults

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 Microroller Distribution 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

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

- Stack Light Controllers for DeviceNet
- Push Button Controllers for DeviceNet, Multiple I/O
- Low Profile I/O for DeviceNet, Multiple I/O
- ZoneLink® .S Driver Module for 22W and 35W Microrollers w/ Auxiliary I/O
- ZoneLink® 4 Zone Controllers with DeviceNet™
- 4 Zone Controllers for MAC Valves and VFDs
- ZoneLink3 ZPA Controllers for Microrollers and SmartRollers
- ZoneLinkTC EtherNet/IP controls

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

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About Microroller Distribution LLC

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

Microroller Distribution'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 – **800.691.8302**