Technical Information

ZoneControl™

Zero Pressure Accumulation

SICK

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Zero Pressure Accumulation
Preface

What is an accumulation conveyor?
An accumulation conveyor is a transportation conveyor designed to efficiently stage product when demand is low and deliver product when demand is high. An accumulation conveyor acts as the shock absorber in any distribution warehouse, logistics center or work-in-process operation.

What is ZPA?
Zero Pressure Accumulation (ZPA) is a more specific reference to an accumulation conveyor. A ZPA conveyor is designed to accumulate and release product with zero forward pressure on product. This results in a decreased risk of product damage or derailment.

What is ZoneControl™?
ZoneControl™ is the SICK family of ZPA control solutions. *ZoneControl*™ consist of integrated ZPA systems designed for accumulation conveyors and all the necessary peripherals and accessories to support the system. The *ZoneControl*™ family of products offers multiple ZPA solutions, all of which are similar in their function, but accommodate different types of conveyors by utilizing a variety of mounting configurations.

What is an integrated solution?
A ZPA control system typically consists of four primary components: a ZPA logic circuit, a pneumatic valve or other discrete output for motor control, a sensing device and daisy chain cabling. Integrated ZPA solutions generally integrate three or four of the primary components. Solutions which integrate only three of the components will have connectivity for the fourth component, usually the sensing device or pneumatic valve.

How is ZPA control accomplished?
Accumulation conveyors are designed with integral zones that are independently controlled. The individually controlled zones are activated or deactivated according the control logic circuit and sensor status at the local and neighboring zones. There are two basic types of ZPA control: pneumatic and electric.

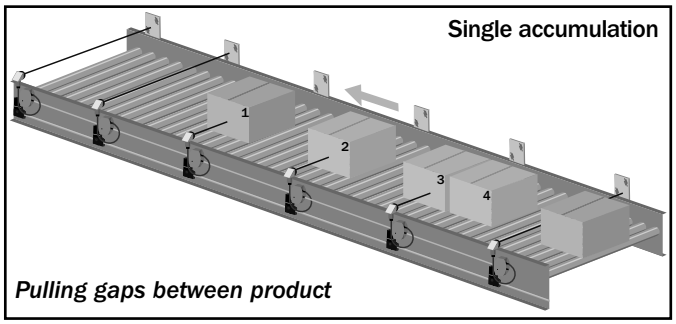
Pneumatic Control – AtoB and AtoD
Accumulation conveyors that pneumatically actuate the drive system utilize small air bladders, often called pucks, to actuate the conveyor drive and/or brake system. When the logic circuit generates an output, a pneumatic solenoid valve is energized causing the valve to open or close. An open valve will allow air to flow and inflate the air bladder, a closed valve will prevent airflow to the bladder causing the bladder to exhaust and deflate. The air bladder, when inflated, will elevate a drive or brake system against the conveyor transportation medium respectively activating or deactivating the zone.

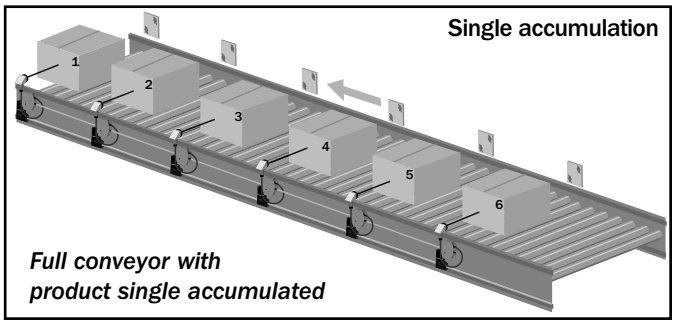
A system that activates or drives the conveyor with airflow to the air bladder is referred to as air-to-drive (AtoD). A pneumatic system that deactivates or brakes the conveyor with airflow to the air bladder is referred to as air-to-brake (AtoB).

Electric Control
An electrically controlled accumulation conveyor utilizes individual electric motors to drive each zone. The logic circuit generates a discrete output to an electric motor drive circuit that activates the electric motor, in turn activating the zone.

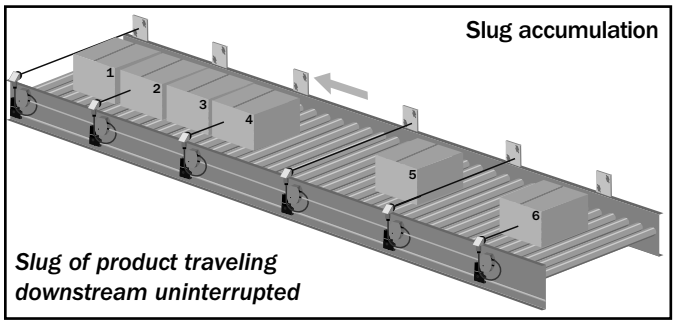
What accumulation modes are available with ZoneControl™?
The most typical accumulation modes are single and slug accumulation; occasionally an accumulation time delay is used to manipulate product accumulation.

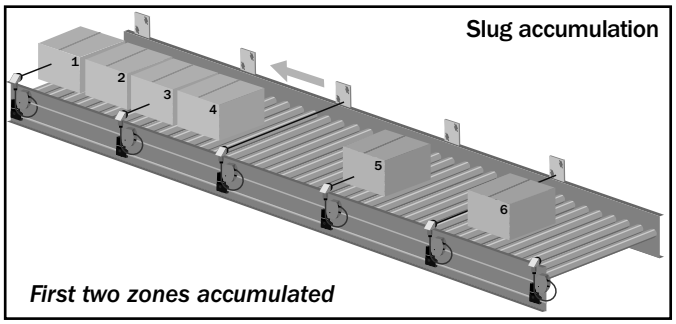
Single accumulation will not allow a large block or slug of product to travel from the in-feed zone of an accumulation conveyor to the discharge zone without inflicting a gap between packages. Single accumulation will accumulate (deactivate) the upstream zone of any two consecutive zones that are detecting product, or in other words, any zone will accumulate when it is detecting product AND the downstream zone is detecting product. The result is a zone length gap between packages. The discharge zone does not have a downstream zone, which is effectively a full downstream zone; therefore, the discharge zone will accumulate when it receives a package.





Slug accumulation will allow a large block or slug of product to travel uninterrupted from the in-feed zone of an accumulation conveyor to the furthest downstream zone, typically the discharge zone. The conveyor will not accumulate (deactivate) any zone until product reaches the furthest downstream zone at which time that zone will accumulate and the immediate upstream zone effectively becomes the furthest downstream zone.





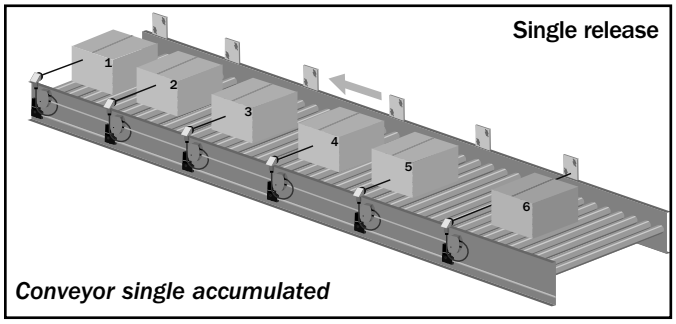
Adjustable accumulation utilizes an adjustable accumulation time delay, that effectively delays package detection, which varies the accumulation function from single to slug. When the accumulation time delay is set to zero seconds, any package detection will be immediately recognized causing the upstream zone to accumulate (deactivate) in the same manner as single accumulation. As the time delay is increased, smaller packages will not be recognized and will advance until stopped by accumulated product downstream. As the stopped packages back up into the sensing device, the accumulation time delay will time out causing the upstream zone to accumulate in a manner similar to slug accumulation.

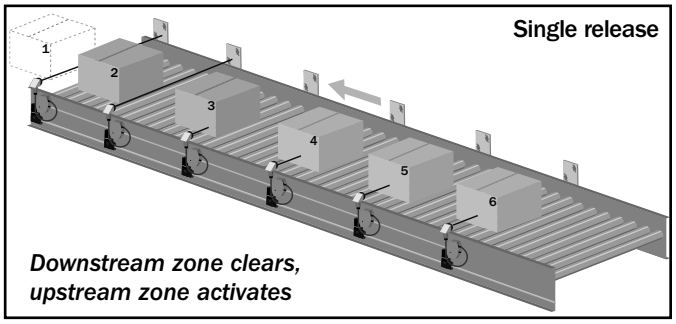
What release modes are available with ZoneControl™?
The most typical release modes are single and slug release; occasionally time delays are used to manipulate product release.

In **single release** mode, a given zone will not release (activate) until the sensing device in the downstream zone has been cleared of packages. Single release can be initiated by applying an electrical release signal at the discharge zone or removing packages in the discharge zone.

Applying an electrical single release signal at the discharge zone will act as an empty downstream zone that will cause the discharge zone to release; the immediate upstream zone will not release until the discharge zone has cleared.

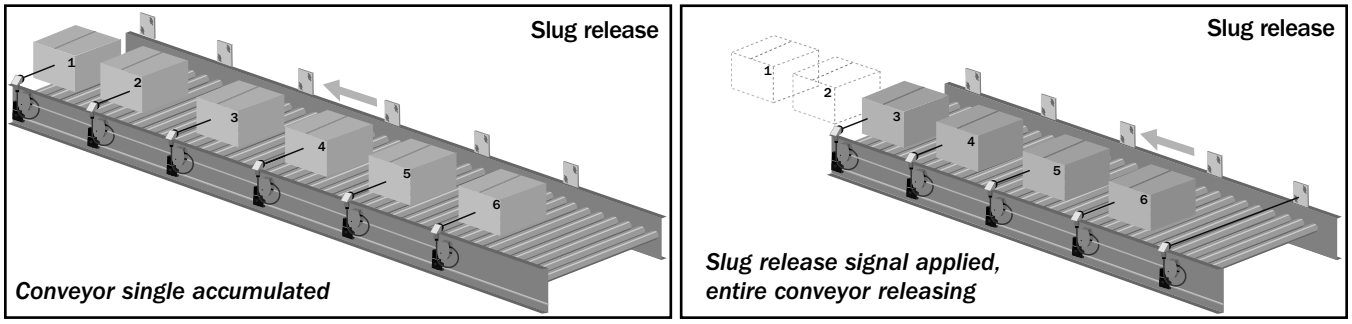
Removal of packages from the discharge zone will cause that zone and the immediate upstream zone to release. Subsequent upstream zones will not release until the immediate downstream zone has cleared.





Single release time delay will add an additional gap between zones as they are released. The additional gap is directly proportional to the time delay selected.

In **slug release** mode, all zones will be activated simultaneously, regardless of sensor status, for as long as the slug release signal is applied. Slug release is initiated by applying an electrical signal at any zone using a *ZoneControl*™ T-cable or Zone Interface Module (ZIM).



Slug release time delay will inflict a small gap between zones as they are released. The small gap is directly proportional to the time delay selected. When applying a *ZoneControl*™ solution with slug release time delay, the release signal must be applied at the discharge zone.

When are single and slug modes most commonly used?
Single accumulation and release is most effective when extremely high throughput is not necessary or the risk of forward pressure is not acceptable. Large or heavy products are frequently accumulated and released in single mode.
Slug accumulation and release is most effective when extremely high throughput is desired and instances of low momentary forward pressure can be tolerated. High speed conveying with small to medium package sizes are often accumulated and released in slug mode.

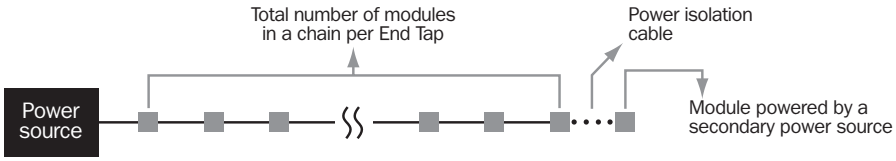
What is slug release termination?
In some applications it is necessary to terminate a slug release signal after a determined number of zones. Slug release termination interrupts the slug release signal by opening the slug release wire. Slug release termination is accomplished with an in-line cable that does not pass the slug signal; all other conductors are passive. Or, slug release termination can be accomplished with a ZPA Interface Module (ZIM) in which the user can remove a jumper to interrupt the slug release signal. The slug termination cable and ZPA Interface Module (ZIM) are offered in the *ZoneControl*™ family of products.

Power Isolation
Power isolation is necessary when more than one power supply is used on a ZPA control system. Power isolation interrupts the positive voltage supply line between two ZPA chains on separate power supplies. Power isolation is accomplished with an in-line cable that does not pass the positive supply voltage; all other conductors are passive. See examples on the following page.

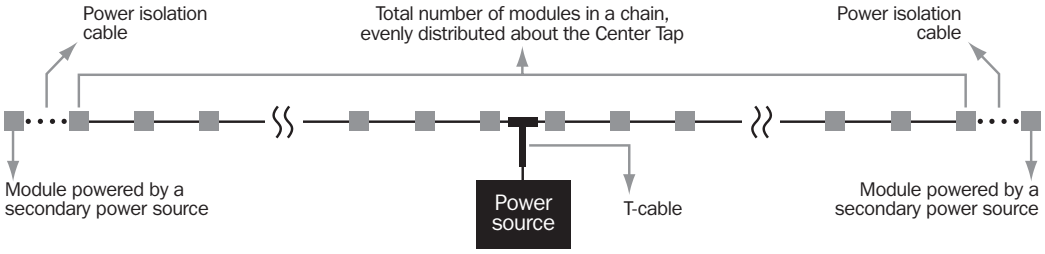
Modules per Tap
There is a limit to the number of *ZoneControl*™ devices that can be connected in series (chain) before an additional power supply and power isolation unit are required. This limit is known as the “Modules per Tap” specification. The number of Modules per Tap will vary from one ZPA solution to another and is affected primarily by the power source, pneumatic valve or output load, and daisy chain cabling. There are three common wiring schemes for ZPA systems: End Tap, Center Tap and Dual Center Tap.

All *ZoneControl*™ “Modules per Tap” specifications are calculated using a 100 W power source, 24 and 28 V DC and 1 m power supply cable for End Tap and Center Tap. Dual Center Tap is calculated using the appropriate power supply cable length for the chain.

The End Tap wiring scheme positions the power source at one end of a ZPA chain, typically the discharge end. A short power cable is used to connect the power source to the first ZPA module. When using End Tap wiring a 28 V DC power source will accommodate the most modules per chain. End Tap wiring is most effective when the ZPA system requires a relatively small number of modules or when a small number of modules remain unpowered on a large ZPA system that uses Center Tap wiring.

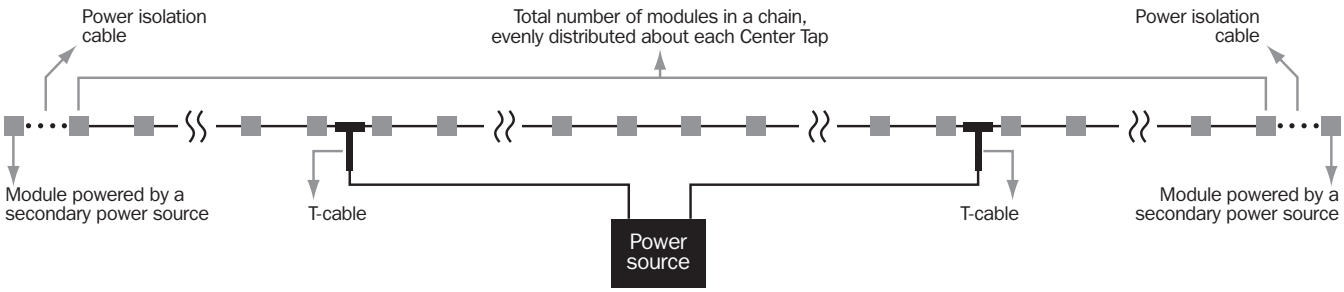


The Center Tap wiring scheme positions the power source at the center point of a ZPA chain. A short cable with an attached T-cable is used to connect the power source to the ZPA chain between two modules. This Center Tap supplies power to the chain in both directions. The Center Tap configuration is the simplest and most common installation for wiring the power source to ZPA systems.



The Dual Center Tap wiring scheme positions the power source at the center point of a ZPA chain. Two long cables with attached T-cables are used to apply a Center Tap at the mid point between the power source and the end of the ZPA chain in both directions, hence, Dual Center Tap. When using Dual Center Tap wiring a 24 V DC power source will accommodate the most modules per chain.

Zone Size

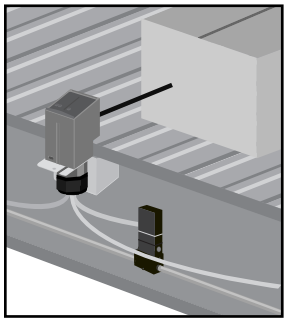


Zone size is the length of an individual zone within an accumulation conveyor. Typically, an accumulation conveyor has two, three or six foot zones.

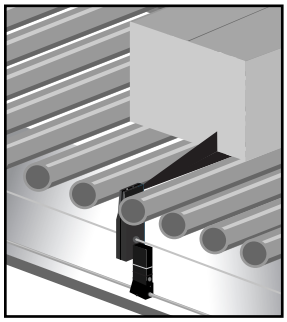
Mounting Location

In general, there are three basic locations where the sensing device of a ZPA system can be located or mounted to the accumulation conveyor: Over-the-Conveyor, Under-the-Conveyor or Side-Frame-Mount. The *ZoneControl*™ family of products offers multiple solutions and each can be easily mounted in one of the three basic locations.

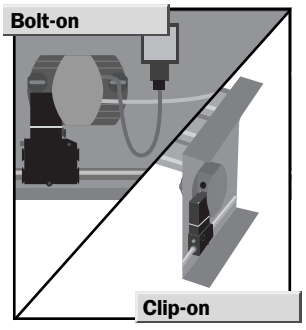
Over-the-Conveyor



Under-the-Conveyor



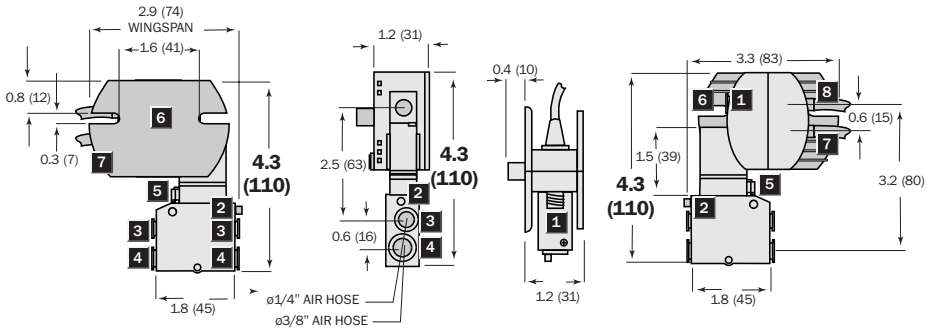
Side-Frame-Mount



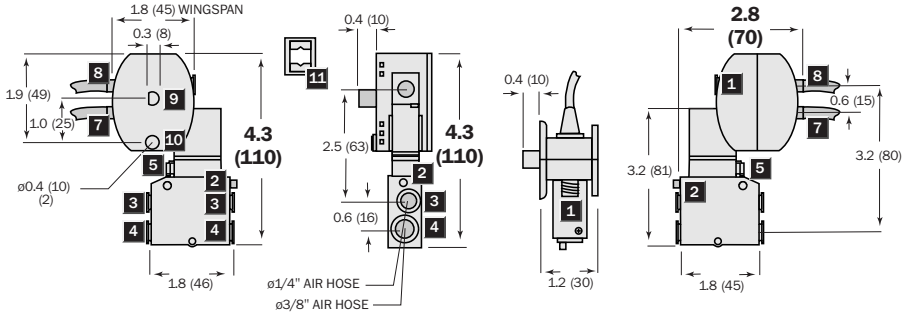
ZLM 1
ZPA Logic Module with Pneumatic Valve Output

Dimensional Drawings

Bolt-on



Clip-on

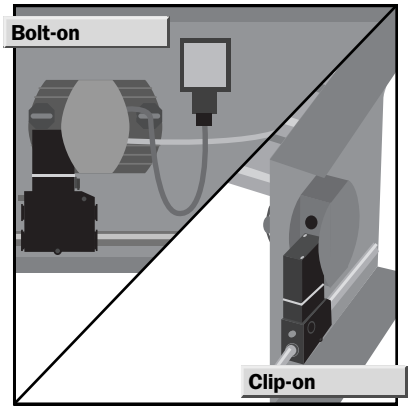


dimensions in inches (mm)

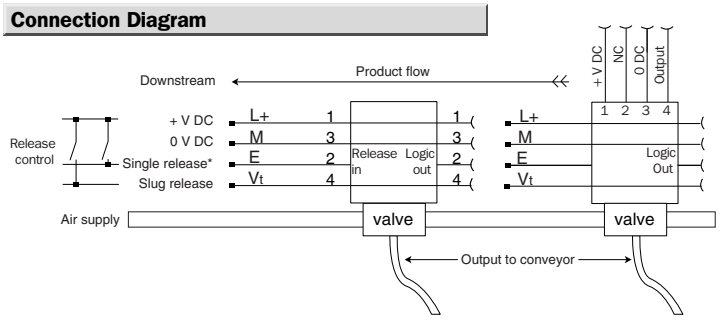
1	Daisy chain connector, male
2	Exhaust
3	Output port (x1)
4	Supply ports (x2)
5	Manual over-ride switch
6	Mounting slots (x2)
7	Daisy chain cable, female
8	Sensor connection cable, female
9	Mounting stud
10	Anti-rotation stud
11	Mounting clip

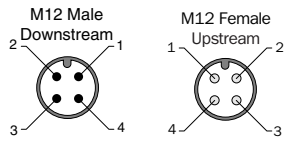
Features

- Side-Frame-Mount
- Integrated ZPA logic, pneumatic valve, daisy chain cables and sensor cable
- American style valve with Imperial size quick connect fittings
- Connection cable for standard sensor, mounted remotely
- Single or slug accumulation logic
- Single or slug release logic
- Industrial grade M12 daisy chain cables



Connection Diagram





*Single accumulation models only

ZLM 1

Technical Data ZLM 1-	C	B
Power		
Supply voltage V_s	24 V DC +20/-10%	
Ripple	$< 5\ V_{ss}$ within V_s	
Current consumption	≤ 47 mA with valve, without sensor	
Sensor		
Photoelectric sensor connection type	Cable: 0.5 m, 4-pin M8 or M12 female, (connects to sensing device - sold separately)	
Photoelectric sensor output requirements	PNP, light operate retroreflective or dark operate diffuse (prox), 20 mA typical	
Interconnection		
Logic output type	PNP	
Logic output voltage	Single accumulation mode: beam blocked = 0 V, beam unblocked = V_s - (≤ 2 V)	
	Slug accumulation mode: D.S. zone activated = V_s - (≤ 2 V), D.S. zone deactive = 0 V	
Logic output current max.	100 mA	
Logic output switching frequency/response time	200 Hz/2.5 ms	
Daisy chain connection type	Connector: 4-pin M12 male (connects to downstream sensor)	
	Cable: 1.1 m or 2.1 m, 4-pin M12 female (connects to upstream sensor)	
Circuit protection	Short circuit protection; interference pulse suppression; V_s reverse polarity protected	
Modules per End Tap (100 W source)	24 V_s: 3 ft zones = 26, 6 ft zones = 20	28 V_s: 3 ft zones = 35, 6 ft zones = 27
Modules per Center Tap (100 W source)	24 V_s: 3 ft zones = 52, 6 ft zones = 40	28 V_s: 3 ft zones = 46, 6 ft zones = 46
Modules per Dual Center Tap (100 W source)	24 V_s: 3 ft zones = 60, 6 ft zones = 52	28 V_s: 3 ft zones = N/A, 6 ft zones = N/A
Logic function		
Accumulation mode	Single; slug	
Release mode	Single (signal applied at discharge zone); slug (signal applied anywhere along chain)	
Valve		
Compressed air	Filtered, lubricated or unlubricated	
Operation mode	AtoD (Air to Drive); AtoB (Air to Brake)	
Pneumatic circuit function	3/2 way	
Port connections	Quick connect: 3/8 in supply; 1/4 in output (connects to local zone)	
Coil ratings	24 V DC, 1 W	
Output flow rate	40 Nl/min; 1.4 SCFM	
Exhaust flow rate	40 Nl/min; 1.4 SCFM	
Orifice size	0.047 in (1.2 mm)	
Operating pressure range	0…4.5 bar (0…65 PSI)	
Response time	Partially open: 10 ms; open: 23 ms; close: 21 ms	
Physical properties		
VDE protection class		
Enclosure rating	IP 40, NEMA 2	
Ambient operating temperature	14…131°F (-10…55°C)	
Storage temperature	-40…167°F (-40…75°C)	
Shock load	IEC 68	
Approximate weight	5.9 oz (168 g) with 1.1 m cable; 7.3 oz (206 g) with 2.1 m cable: 4.1 oz (115 g) no daisy chain cable	
Housing material	ABS	
Fastening method	Clip-on	Bolt-on
Typical mounting location	Side-Frame-Mount	

ZLM 1

ZLM 1 Clip-on Mounting

Zone Length	Sensor Connection		Single Accumulation - Single and Slug Release		Slug Accumulation - Slug Release	
			AtoD ⇩	AtoB ⇩	AtoD ⇩	AtoB ⇩
3 ft	cable M8	⇨	ZLM 1-C1121A10	ZLM 1-C1121A11	ZLM 1-C2121A10	ZLM 1-C2121A11
3 ft	cable M12	⇨	ZLM 1-C1111A10	ZLM 1-C1111A11	ZLM 1-C2111A10	ZLM 1-C2111A11
6 ft	cable M8	⇨	ZLM 1-C1221A10	ZLM 1-C1221A11	ZLM 1-C2221A10	ZLM 1-C2221A11
6 ft	cable M12	⇨	ZLM 1-C1211A10	ZLM 1-C1211A11	ZLM 1-C2211A10	ZLM 1-C2211A11
M12 male connector	connector M8	⇨	ZLM 1-C1021A10	ZLM 1-C1021A11	ZLM 1-C2021A10	ZLM 1-C2021A11
M12 male connector	connector M12	⇨	ZLM 1-C1011A10	ZLM 1-C1011A11	ZLM 1-C2011A10	ZLM 1-C2011A11

ZLM 1 Bolt-on Mounting

Zone Length	Sensor Connection		Single Accumulation - Single and Slug Release		Slug Accumulation - Slug Release	
			AtoD ⇩	AtoB ⇩	AtoD ⇩	AtoB ⇩
3 ft	cable M8	⇨	ZLM 1-B1121A10	ZLM 1-B1121A11	ZLM 1-B2121A10	ZLM 1-B2121A11
3 ft	cable M12	⇨	ZLM 1-B1111A10	ZLM 1-B2111A11	ZLM 1-B2111A10	ZLM 1-B2111A11
6 ft	cable M8	⇨	ZLM 1-B1221A10	ZLM 1-B1221A11	ZLM 1-B2221A10	ZLM 1-B2221A11
6 ft	cable M12	⇨	ZLM 1-B1211A10	ZLM 1-B1211A11	ZLM 1-B2211A10	ZLM 1-B2211A11
M12 male connector	connector M8	⇨	ZLM 1-B1021A10	ZLM 1-B1021A11	ZLM 1-B2021A10	ZLM 1-B2021A11
M12 male connector	connector M12	⇨	ZLM 1-B1011A10	ZLM 1-B1011A11	ZLM 1-B2011A10	ZLM 1-B2011A11

Order Information

Model Number	Part Number	Model Number	Part Number	Model Number	Part Number
ZLM 1-C1121A10	7 027 756	ZLM 1-C1111A10	7 027 764	ZLM 1-C1221A10	7 027 772
ZLM 1-C1121A11	7 027 757	ZLM 1-C1111A11	7 027 765	ZLM 1-C1221A11	7 027 773
ZLM 1-C2121A10	7 027 758	ZLM 1-C2111A10	7 027 766	ZLM 1-C2221A10	7 027 774
ZLM 1-C2121A11	7 027 759	ZLM 1-C2111A11	7 027 767	ZLM 1-C2221A11	7 027 775
ZLM 1-B1121A10	7 027 760	ZLM 1-B1111A10	7 027 768	ZLM 1-B1221A10	7 027 776
ZLM 1-B1121A11	7 027 761	ZLM 1-B1111A11	7 027 769	ZLM 1-B1221A11	7 027 777
ZLM 1-B2121A10	7 027 762	ZLM 1-B2111A10	7 027 770	ZLM 1-B2221A10	7 027 778
ZLM 1-B2121A11	7 027 763	ZLM 1-B2111A11	7 027 771	ZLM 1-B2221A11	7 027 779

Model Number	Part Number	Model Number	Part Number	Model Number	Part Number
ZLM 1-C1211A10	7 027 780	ZLM 1-C1021A10	7 027 788	ZLM 1-C1011A10	7 027 796
ZLM 1-C1211A11	7 027 781	ZLM 1-C1021A11	7 027 789	ZLM 1-C1011A11	7 027 797
ZLM 1-C2211A10	7 027 782	ZLM 1-C2021A10	7 027 790	ZLM 1-C2011A10	7 027 798
ZLM 1-C2211A11	7 027 783	ZLM 1-C2021A11	7 027 791	ZLM 1-C2011A11	7 027 799
ZLM 1-B1211A10	7 027 784	ZLM 1-B1021A10	7 027 792	ZLM 1-B1011A10	7 027 800
ZLM 1-B1211A11	7 027 785	ZLM 1-B1021A11	7 027 793	ZLM 1-B1011A11	7 027 801
ZLM 1-B2211A10	7 027 786	ZLM 1-B2021A10	7 027 794	ZLM 1-B2011A10	7 027 802
ZLM 1-B2211A11	7 027 787	ZLM 1-B2021A11	7 027 795	ZLM 1-B2011A11	7 027 803

Accessories	Page
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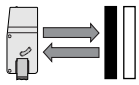
Cables	23
Mounting brackets	25
Interface module	20

WTR 1
ZPA Sensor with Pneumatic Valve Output

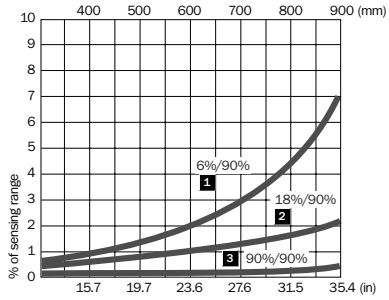
Conveyor Sensors



3.9...35.4 in (100...900 mm)

sensing range

Background Suppression

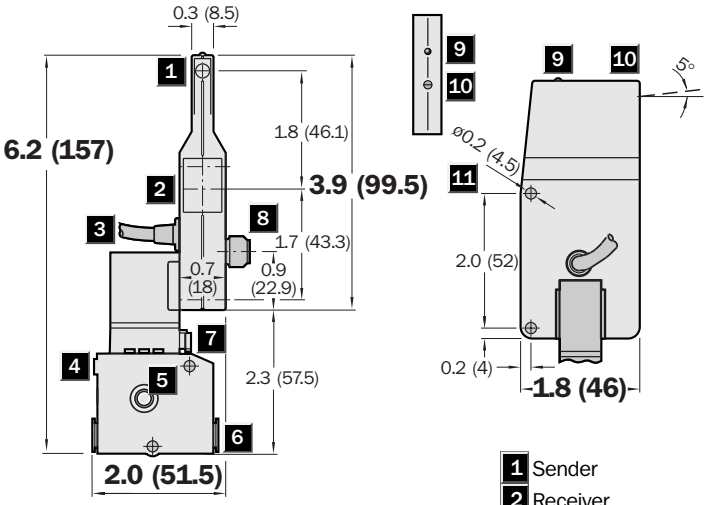


1	Sensing range on black, 6% remission
2	Sensing range on grey, 18% remission
3	Sensing range on white, 90% remission

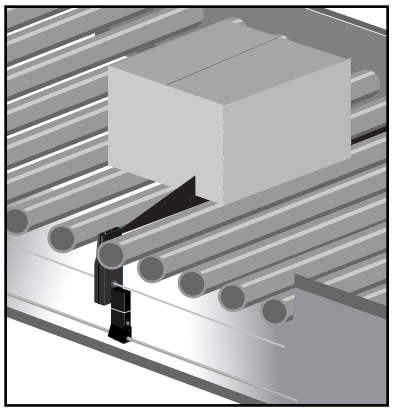
Features

- Under-the-Conveyor Mount
- Integrated ZPA logic, photoelectric sensor, pneumatic valve and daisy chain cables
- American style valve with Imperial size quick connect fittings
- Adjustable Background Suppression (ABS) sensing technology, ignores background targets and no reflector is required
- Single or slug accumulation logic
- Single or slug release logic
- Industrial grade M12 daisy chain cables

Dimensional Drawings



dimensions in inches (mm)



1	Sender
2	Receiver
3	Daisy chain cable, female
4	Exhaust
5	Output port (x1)
6	Supply ports (x2)
7	Manual over-ride switch
8	Daisy chain connection, male
9	Signal strength indicator
10	Sensing distance adjustment
11	Mounting through-holes (x2)

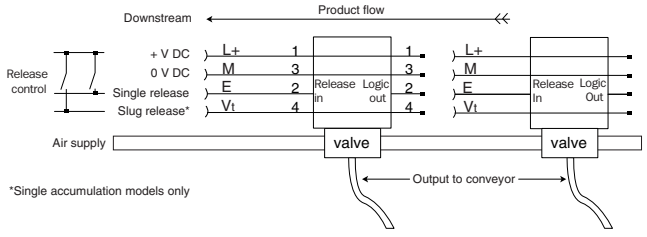
Selection Table

Zone Length	Single Accumulation-Single and Slug Release		Slug Accumulation-Single Release	
	AtoD ⇩	AtoB ⇩	AtoD ⇩	AtoB ⇩
3 ft ⇨	WTR 1-P421A10	WTR 1-P721A11	WTR 1-P921A10	WTR 1-P821A11
6 ft ⇨	WTR 1-P421B10	WTR 1-P721B11	WTR 1-P921B10	WTR 1-P821B11

WTR 1

Technical Data	WTR 1-	P…
Power		
Supply voltage V_s		24 V DC +20/-10%
Ripple		< 5 V_{ss} within V_s
Current consumption		≤ 67 mA with valve
Sensor		
Sensing range		3.9…35.4 in (100…900 mm)
Adjustable background suppression		11.8…35.4 in (300…900 mm)
Light spot diameter		Approx. 1.6 in at 35.4 in (40 mm at 900 mm)
Light source		LED, IR, average life 100,000 hours at 77°F (25°C)
Light beam tilt angle		5° upward from center
Interconnection		
Logic output type		PNP
Logic output voltage		Single accumulation mode: beam blocked = 0 V, beam unblocked = V_s - (≤ 2 V)
		Slug accumulation mode: D.S. zone activated = V_s - (≤ 2 V), D.S. zone deactive = 0 V
Logic output current max.		100 mA
Logic output switching frequency/response time		250 Hz/2.0 ms
Daisy chain connection type		Cable: 1.2 m or 2.0 m, 4-pin M12 female (connects to downstream sensor)
		Connector: 4-pin M12 male (connects to upstream sensor)
Circuit protection		Short circuit protection; interference pulse suppression; V_s reverse polarity protected
Modules per End Tap (100 W source)		24 V_s: 3 ft zones = 23, 6 ft zones = 18 — 28 V_s: 3 ft zones = 32, 6 ft zones = 26
Modules per Center Tap (100 W source)		24 V_s: 3 ft zones = 46, 6 ft zones = 36 — 28 V_s: 3 ft zones = 48, 6 ft zones = 48
Modules per Dual Center Tap (100 W source)		24 V_s: 3 ft zones = 60, 6 ft zones = 48 — 28 V_s: 3 ft zones = N/A, 6 ft zones = N/A
Logic function		
Accumulation mode		Single; slug
Release mode		Single (signal applied at discharge zone); slug (signal applied anywhere along chain)
Valve		
Compressed air		Filtered, lubricated or unlubricated
Operation mode		AtoD (Air to Drive); AtoB (Air to Brake)
Pneumatic circuit function		3/2 way
Port connections		Quick connect: 3/8 in supply; 1/4 in output (connects to local zone)
Coil ratings		24 V DC, 1 W
Output flow rate		40 Nl/min; 1.4 SCFM
Exhaust flow rate		40 Nl/min; 1.4 SCFM
Orifice size		0.047 in (1.2 mm)
Operating pressure range		0…4.5 bar (0…65 PSI)
Response time		Partially open: 10 ms; open: 23 ms; close: 21 ms
Physical properties		
VDE protection class		□
Enclosure rating		IP 54, NEMA 3
Ambient operating temperature		14…131°F (-10…55°C)
Storage temperature		-40…167°F (-40…75°C)
Shock load		IEC 68
Approximate weight		5.9 oz (168 g) with 1.1 m cable; 7.3 oz (206 g) with 2.1 m cable: 4.1 oz (115 g) no daisy chain cable
Housing material		Glass fiber reinforced ABS
Typical mounting location		Under-the-Conveyor

Connection Diagram



Accessories	Page
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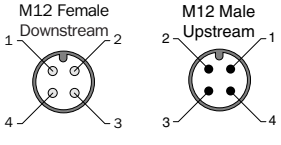
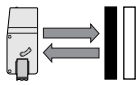


Order Information	
Model Number	**Part Number**
WTR 1-P421A10	1 025 373
WTR 1-P721A11	1 025 374
WTR 1-P921A10	1 025 375
WTR 1-P821A11	1 025 376
WTR 1-P421B10	1 025 390
WTR 1-P721B11	1 025 391
WTR 1-P921B10	1 025 392
WTR 1-P821B11	1 025 393

WTR 2
ZPA Sensor with Electric Motor Control Output

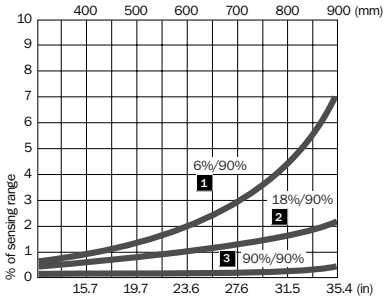
Conveyor Sensors



3.9...35.4 in (100...900 mm)

sensing range

Background Suppression

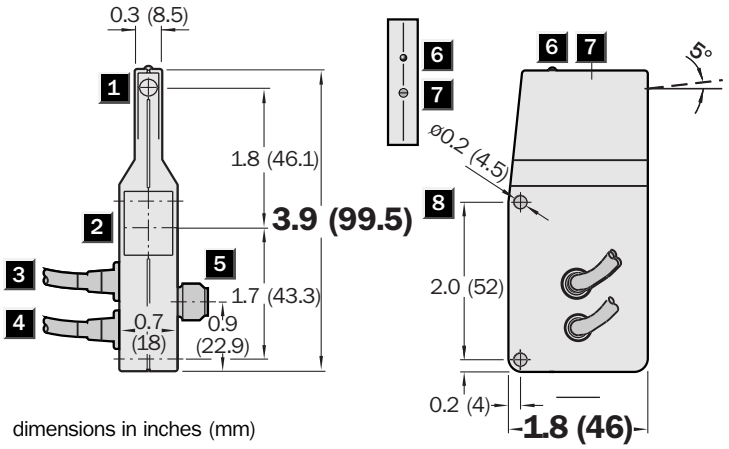


1	Sensing range on black
2	Sensing range on grey
3	Sensing range on white

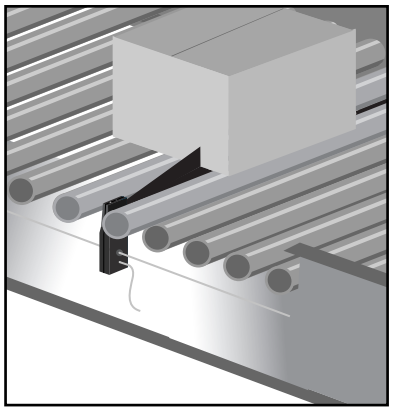
Features

- Under-the-Conveyor Mount
- Integrated ZPA logic, photoelectric sensor, pneumatic valve cable and daisy chain cables
- Output cable for connection to electric motor control or pneumatic valve
- Adjustable Background Suppression (ABS) sensing technology, ignores background targets and no reflector is required
- Single or slug accumulation logic
- Single or slug release logic
- Industrial grade M12 daisy chain cables

Dimensional Drawings



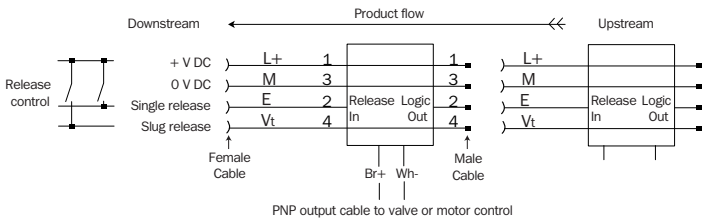
dimensions in inches (mm)

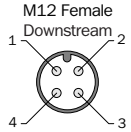


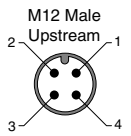
1	Sender
2	Receiver
3	Daisy chain cable, female
4	Output cable, flying leads
5	Daisy chain connection, male
6	Signal strength indicator
7	Sensing distance adjustment
8	Mounting through-holes (x2)

Technical Data	WTR 2-	P621	
Power			
Supply voltage V_s		10…30 V DC	
Ripple		< 5 V_{ss} within V_s	
Current consumption		≤ 25 mA without load, without valve	
Sensor			
Sensing range		3.9…35.4 in (100…900 mm)	
Adjustable background suppression		11.8…35.4 in (300…900 mm)	
Light spot diameter		Approx. 1.6 in at 35.4 in (40 mm at 900 mm)	
Light source		LED, IR, average life 100,000 hours at 77°F (25°C)	
Light beam tilt angle		5° upward from center	
Interconnection			
Logic output type		PNP	
Logic output voltage		Single accumulation mode: beam blocked = 0 V, beam unblocked = V_s - (≤ 2 V)	
Logic output current max.		100 mA	
Logic output switching frequency/response time		250 Hz/2.0 ms	
Daisy chain connection type		Cable: 1.2 m or 2.0 m, 4-pin M12 female (connects to downstream sensor)	
		Connector: 4-pin M12 male (connects to upstream sensor)	
Circuit protection		Short circuit protection; interference pulse suppression; V_s reverse polarity protected	
Modules per End Tap (100 W source, 1 W load)		24 V_s: 3 ft zones = 23, 6 ft zones = 18	28 V_s: 3 ft zones = 32, 6 ft zones = 26
Modules per Center Tap (100 W source, 1 W load)		24 V_s: 3 ft zones = 46, 6 ft zones = 36	28 V_s: 3 ft zones = 48, 6 ft zones = 48
Modules per Dual Center Tap (100 W source, 1 W load)		24 V_s: 3 ft zones = 60, 6 ft zones = 48	28 V_s: 3 ft zones = N/A, 6 ft zones = N/A
Logic function			
Accumulation mode		Single	
Release mode		Single (signal applied at discharge zone); slug (signal applied anywhere along chain)	
Output to motor control or external valve			
Output type		PNP	
Output voltage		HIGH = V_s - (≤ 2 V); LOW = 0 V	
Output current max.		600 mA	
Circuit protection		Short circuit protection	
Connection type		Cable: 1.5 m, 2-wire flying leads (connects to local zone)	
Switching frequency/response time		250 Hz/2.0 ms	
Physical properties		□	
VDE protection class			
Enclosure rating		IP 54, NEMA 3	
Ambient operating temperature		-40…140°F (-40…60°C)	
Storage temperature		-40…167°F (-40…75°C)	
Shock load		IEC 68	
Approximate weight		3.9 oz (110 g) with 1.2 m cable; 5.3 oz (149 g) with 2.1 m cable	
Housing material		Glass fiber reinforced ABS	
Typical mounting location		Under-the-Conveyor	

Connection Diagram







Order Information	
Model Number	**Part Number**
WTR 2-P621	1 015 157

Accessories	Page
Reflectors	22
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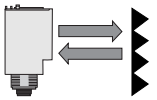
Mounting brackets	25
Interface module	20

WLR 2100-D

DC ZPA Sensor with Electric Output for External Valve or Electric Motor Control

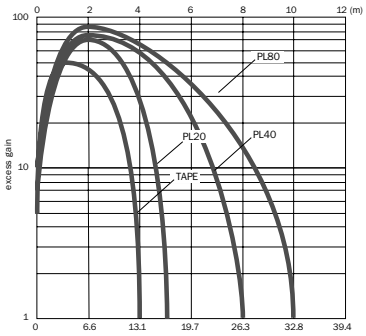
Conveyor Sensors



0…29.5 ft (0...9 m)

sensing range

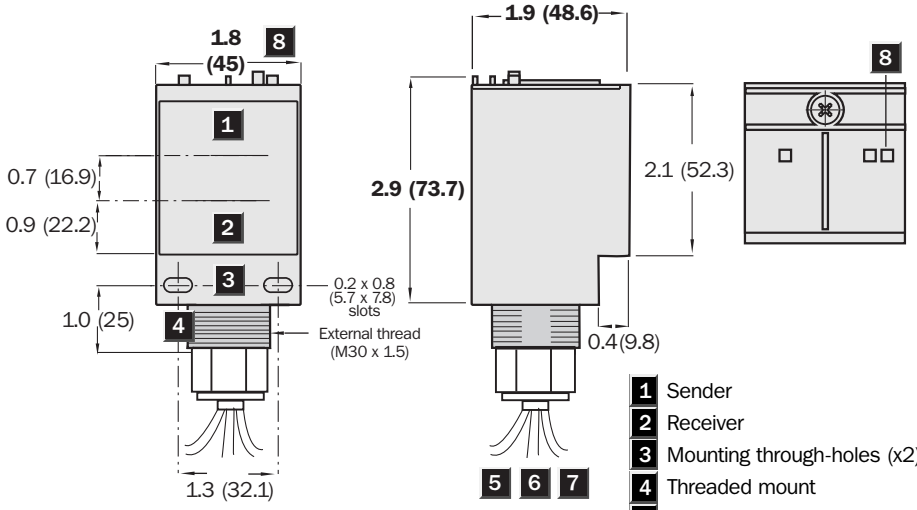
Excess Gain



Features

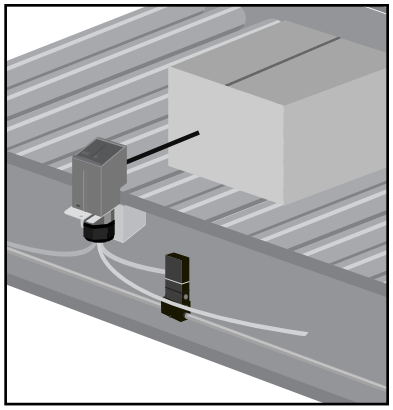
- Over-the-Conveyor Mount
- Integrated ZPA logic, photoelectric sensor, pneumatic valve cable and daisy chain cables
- Output cable for connection to electric motor control or pneumatic valve
- Linear polarized retroreflective sensing technology eliminates false detection of shiny or plastic-wrapped objects
- Single or slug accumulation logic
- Single or slug release logic
- Industrial grade M12 daisy chain cables
- Sealed to withstand harsh environments and washdown

Dimensional Drawings



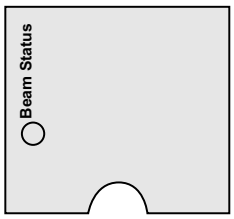
dimensions in inches (mm)

1 Sender
2 Receiver
3 Mounting through-holes (x2)
4 Threaded mount
5 Daisy chain cable, female
6 Output cable, female
7 Daisy chain cable, male
8 Beam status indicator



Inside Cover

All types



1 Beam status indicator

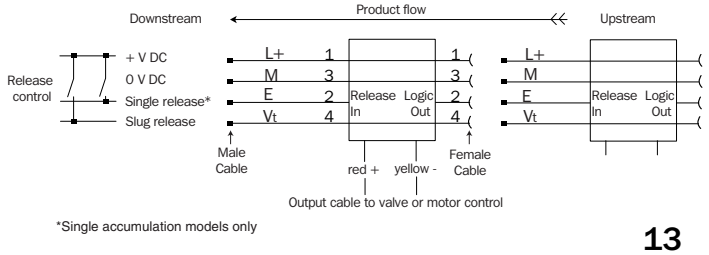
WLR 2100-D

Technical Data	WLR 2100 -D....	
Power		
Supply voltage V_s	10…30 V DC	
Ripple	< 5 V_{ss} within V_s	
Current consumption	≤ 40 mA, without load, without valve	
Sensor		
Sensing range	0…29.5 ft (0…9 m) with PL 80A reflector	
Light spot diameter	Approx. 8.0 in at 29.5 ft (205 mm at 9 m)	
Light source	LED, red, polarized, average life 100,000 hours at 77°F (25°C)	
Interconnection		
Logic output type	PNP	
Logic output voltage	Single accumulation mode: beam blocked = 0 V, beam unblocked = V_s - (≤ 2 V)	
	Slug accumulation mode: D.S. zone activated = V_s - (≤ 2 V), D.S. zone deactivated = 0 V	
Logic output current max.	100 mA	
Logic output switching frequency/response time	500 Hz/1.0 ms	
Daisy chain connection type	Cable: 300 mm, 4-pin M12 male (connects to downstream sensor)	
	Cable: 1.1 m or 2.1 m, 4-pin M12 female (connects to upstream sensor)	
Circuit protection	Short circuit protection; interference pulse suppression; V_s reverse polarity protected	
Modules per End Tap (100 W source, 1 W load)	24 V_s: 3 ft zones = 23, 6 ft zones = 18	28 V_s: 3 ft zones = 31, 6 ft zones = 25
Modules per Center Tap (100 W source, 1 W load)	24 V_s: 3 ft zones = 46, 6 ft zones = 36	28 V_s: 3 ft zones = 46, 6 ft zones = 46
Modules per Dual Center Tap (100 W source, 1 W load)	24 V_s: 3 ft zones = 60, 6 ft zones = 42	28 V_s: 3 ft zones = N/A, 6 ft zones = N/A
Logic function		
Accumulation mode	Single; slug	
Release mode	Single (signal applied at discharge zone); slug (signal applied anywhere along chain)	
Output to motor control or external valve		
Output voltage	HIGH = V_s - (≤ 2 V); LOW = 0 V	
Output current max.	100 mA	
Circuit protection	None	
Connection type	Cable: 300 mm, 2-wire spade or 9.4 mm DIN (43650) type C female (connects to local zone)	
Switching frequency/response time	500 Hz/1.0 ms	
Physical properties		
VDE protection class	⧈	
Enclosure rating	IP 67, NEMA 6	
Ambient operating temperature	-13…131°F (-25…55°C)	
Storage temperature	-40…158°F (-40…70°C)	
Shock load	IEC 68	
Approximate weight	5.3 oz (150 g) with 1.1 m cable; 6.6 oz (188 g) with 2.1 m cable	
Housing material	Glass fiber reinforced ABS	
Typical mounting location	Over-the-Conveyor	

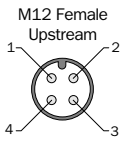
Selection Table

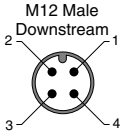
Zone Length	Valve Connection		Single Accumulation - Single and Slug Release ⇩	Slug Accumulation - Slug Release ⇩
3 ft	DIN 9.4 mm	⇨	WLR 2100-D2311	WLR 2100-D2321
3 ft	Spade Conn	⇨	WLR 2100-D1311	WLR 2100-D1321
6 ft	DIN 9.4 mm	⇨	WLR 2100-D2312	WLR 2100-D2322
6 ft	Spade Conn	⇨	WLR 2100-D1312	WLR 2100-D1322

Connection Diagram



*Single accumulation models only





Accessories	Page
Reflectors	22
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Mounting brackets	25
Interface module	20

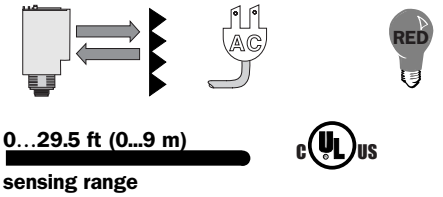
Order Information

Model Number	Part Number
WLR 2100-D1311	7 027 185
WLR 2100-D2311	7 027 808
WLR 2100-D1321	7 027 754
WLR 2100-D2321	7 027 809
WLR 2100-D1312	7 027 753
WLR 2100-D2312	7 027 811
WLR 2100-D1322	7 027 755
WLR 2100-D2322	7 027 810

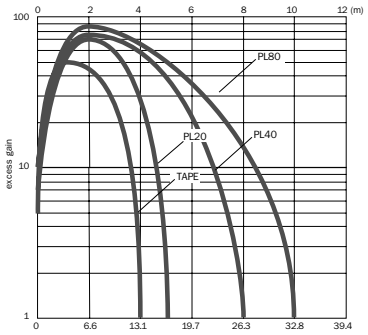
WLR 2100-M

AC ZPA Sensor with Electric Output for External Valve or Electric Motor Control

Conveyor Sensors



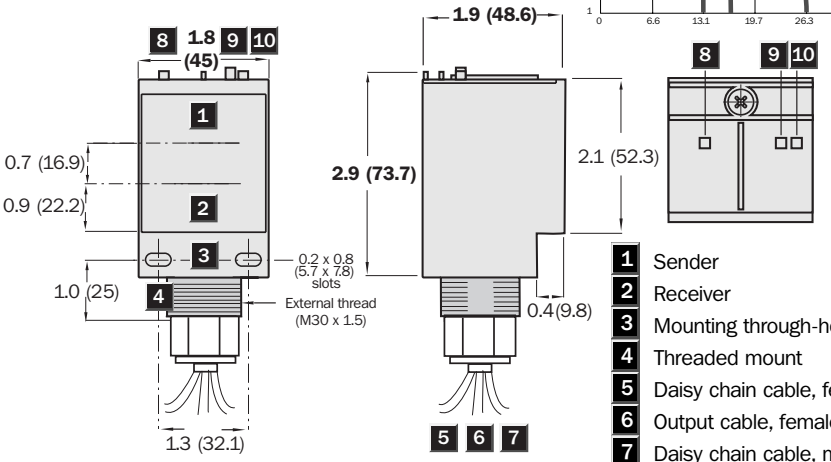
Excess Gain



Features

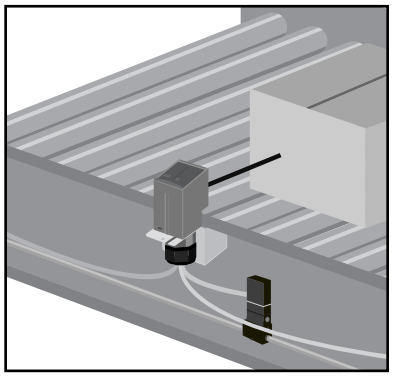
- Over-the-Conveyor Mount
- Integrated ZPA logic, photoelectric sensor, pneumatic valve cable and daisy chain cables
- AC supply voltage
- Output cable for connection to electric motor control or pneumatic valve
- Linear polarized retroreflective sensing technology eliminates false detection of shiny or plastic-wrapped objects
- Adjustable time delay accumulation
- Single or slug time delay release
- Individual slug release configurability, switch selectable
- Industrial grade M12 daisy chain cables
- Sealed to withstand harsh environments and washdown

Dimensional Drawings



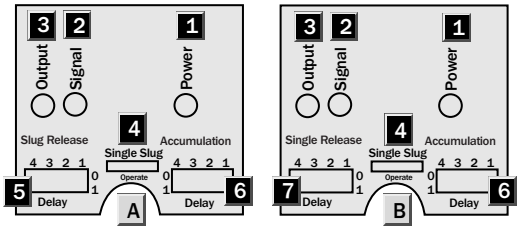
dimensions in inches (mm)

1. Sender
2. Receiver
3. Mounting through-holes (x2)
4. Threaded mount
5. Daisy chain cable, female
6. Output cable, female
7. Daisy chain cable, male
8. Power indicator
9. Signal strength indicator
10. Output status indicator



Inside Cover and Adjustments

WLR 2100-M6361	WLR 2100-M6381
WLR 2100-M6362	WLR 2100-M6382



1. Power indicator
2. Signal strength indicator
3. Output status indicator
4. Single/slug selector switch
5. Slug release time delay DIP switches
6. Accumulation time delay DIP switches
7. Single release time delay DIP switches

A Slug/Accumulation Delay Settings 0...2 seconds

msec.	4321	msec.	4321
0	0000	1095	1000
360	0001	1225	1001
300	0010	1370	1010
435	0011	1500	1011
550	0100	1615	1100
680	0101	1745	1101
820	0110	1890	1110
955	0111	2020	1111

B Release/Accumulation Delay Settings 0...10 seconds

msec.	4321	msec.	4321
0.1	0000	5.2	1000
0.7	0001	5.9	1001
1.4	0010	6.6	1010
2.0	0011	7.2	1011
2.6	0100	7.8	1100
3.2	0101	8.4	1101
3.9	0110	9.1	1110
4.6	0111	9.8	1111

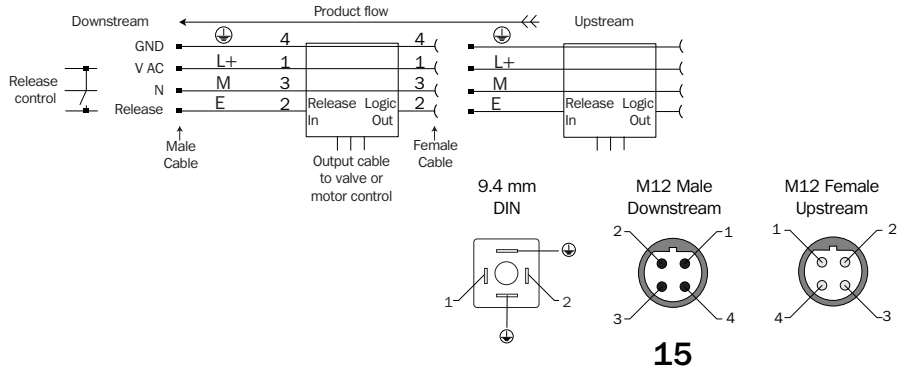
WLR 2100-M

Technical Data	WLR 2100 -M....
Power	
Supply voltage V_s	90…240 V AC
Ripple	< 5 V_{ss} within V_s
Power consumption	≤ 6 W
Sensor	
Sensing range	0…29.5 ft (0…9 m) with PL 80A reflector
Light spot diameter	Approx. 8.0 in at 29.5 ft (205 mm at 9 m)
Light source	LED, red, polarized, average life 100,000 hours at 77°F (25°C)
Interconnection	
Logic output type	FET
Logic output current max.	100 mA
Logic output switching frequency/response time	250 Hz/2.0 ms
Daisy chain connection type	Cable: 300 mm, 4-pin M12 male (connects to downstream sensor)
	Cable: 1.1 m or 2.1 m, 4-pin M12 female (connects to upstream sensor)
Circuit protection	Short circuit protection; interference pulse suppression; V_s reverse polarity protected
Modules per End Tap (440 W source, 5 W load)	24 V_s: 3 ft zones = 27, 6 ft zones = 22
Modules per Center Tap (440 W source, 5 W load)	24 V_s: 3 ft zones = 40, 6 ft zones = 40
Logic function	
Accumulation mode	Adjustable time delay
Release mode	Single and adjustable time delay slug (switch configurable) or slug and adjustable time delay single (switch configurable)
Output to motor control or external valve	
Output voltage	HIGH = V_s - (≤ 2 V); LOW = 0 V
Output current max.	150 mA
Circuit protection	None
Connection type	Cable: 300 mm, 9.4 mm DIN (43650) type C female (connects to local zone)
Switching frequency/response time	500 Hz/1.0 ms
Physical properties	
VDE protection class	⧈
Enclosure rating	IP 67, NEMA 6
Ambient operating temperature	-13…131°F (-25…55°C)
Storage temperature	-40…158°F (-40…70°C)
Shock load	IEC 68
Approximate weight	5.3 oz (150 g) with 1.1 m cable; 6.6 oz (188 g) with 2.1 m cable
Housing material	Glass fiber reinforced ABS
Typical mounting location	Over-the-Conveyor

Selection Table

Zone Length	Valve Connection	Adjustable Accumulation - Single or Adjustable Slug Release ⇩	Adjustable Accumulation - Slug or Adjustable Single Release ⇩
3 ft	DIN 9.4 mm ⇨	WLR 2100-M6361	WLR 2100-M6381
6 ft	DIN 9.4 mm ⇨	WLR 2100-M6362	WLR 2100-M6382

Connection Diagram



Order Information

Model Number	Part Number
WLR 2100-M6381	7 027 819
WLR 2100-M6382	7 027 820
WLR 2100-M6361	7 027 089
WLR 2100-M6362	7 027 090

Accessories	Page
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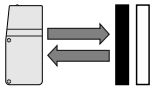
WTR 2
Photoelectric Sensor for Integration with ZLM 1

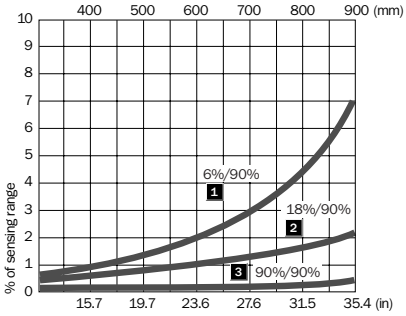
Conveyor Sensors



3.9...35.4 in (100...900 mm)

sensing range

Background Suppression

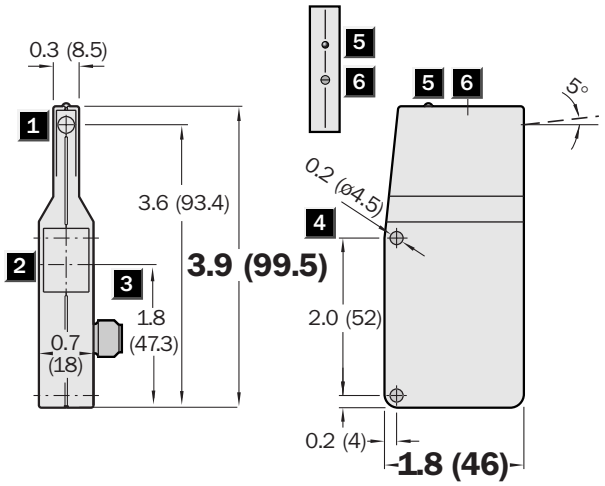


1	Sensing range on black, 6% remission
2	Sensing range on grey, 18% remission
3	Sensing range on white, 90% remission

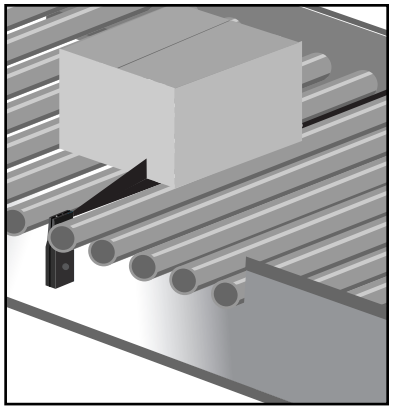
Features

- Under-the-Conveyor Mount
- Stand alone sensor easily integrated with ZPA systems
- Multiple output configurations including: PNP, NPN, light and dark operate
- Adjustable Background Suppression (ABS) sensing technology, ignores background targets and no reflector is required
- Industrial grade M12 cable connection

Dimensional Drawings



dimensions in inches (mm)

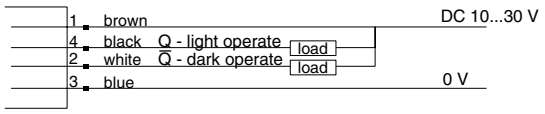


1	Sender
2	Receiver
3	Connector, M12 male
4	Mounting through-holes (x2)
5	Signal strength indicator
6	Sensing distance adjustment

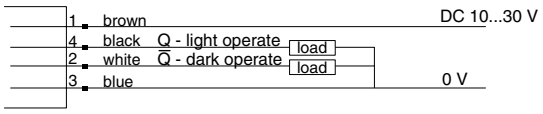
Technical Data WTR 2-	P551S08	N551S05	N551S06	P521S14	P521	P511
Sensing range	3.9…35.4 in (100…900 mm)					
Adjustable background suppression	11.8…35.4 in (300…900 mm)					
Light spot diameter	Approx. 1.6 in at 35.4 in (40 mm at 900 mm)					
Light source	LED, infrared light					
External light immunity	Modulated light source with digital signal evaluation via SICK custom ASIC					
Crosstalk immunity	Automatic modulation frequency shift via SICK custom ASIC					
Response time frequency	< 25 ms beam block, < 1 ms beam unblock/40 Hz				< 1 ms/500 Hz	
Supply voltage V_S	10…30 V DC (limit values)					
Ripple (within V_S tolerance)	< 5 V peak to peak					
Current consumption (no load)	< 40 mA					
Switching type	PNP	NPN		PNP		
Switching current max.	200 mA					
Alarm output type	-		NPN	-		
Alarm output current max.	-		200 mA	-		
Output switching mode	Light or dark switching via complimentary outputs		Dark switching			Light switching
Connection type	M12 4-pin connector					
Housing	Glass fiber reinforced plastic					
Enclosure rating	IP 54					
VDE protection class	□					
EMC	IEC 801					
Shock rating	IEC 68					
Circuit protection	Outputs short circuit protected, V_S reverse polarity protected					
Ambient operating temperature	-40…140°F (-40…60°C)3					
Storage temperature	-40…167°F (-40…75°C)					
Mounting bracket	2 017 417 (not included)					
Approximate weight	Approx. 3.5 oz (100 g)					

Connection Diagram

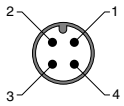
WTR2-N551S05



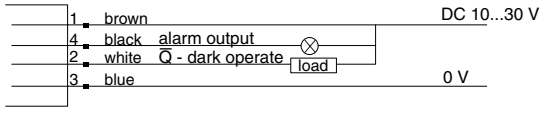
WTR2-P551S08



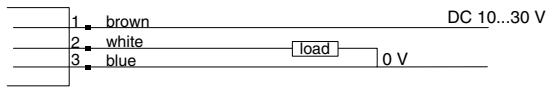
M12 Male



WTR2-N551S06

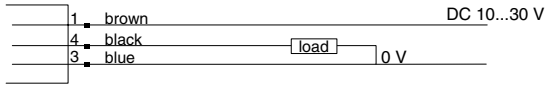


WTR2-P521
WTR2-P511



wire colors refer to standard cable, not included

WTR2-P521S14

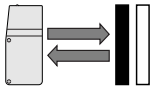


Accessories	Page
Reflectors	22
Cables	23
Mounting brackets	25
Interface module	20

Order Information	
Model Number	**Part Number**
WTR 2-P551S08	1 022 927
WTR 2-N551S05	1 019 320
WTR 2-N551S06	1 019 583
WTR 2-P521	1 015 074
WTR 2-P511	1 015 158
WTR 2-P521S14	1 025 619

ELF
Photoelectric Sensor for Integration with ZLM 1

Conveyor Sensors



3.9...35.4 in (100...900 mm)

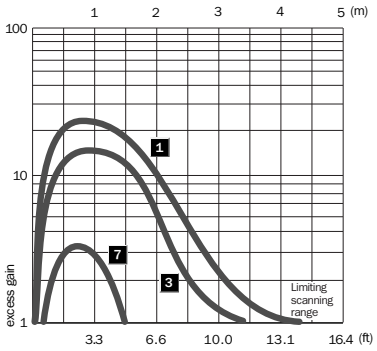
sensing range

CE

c UL us

Class 2 source required

Excess Gain - Reflex/Retro-Reflective

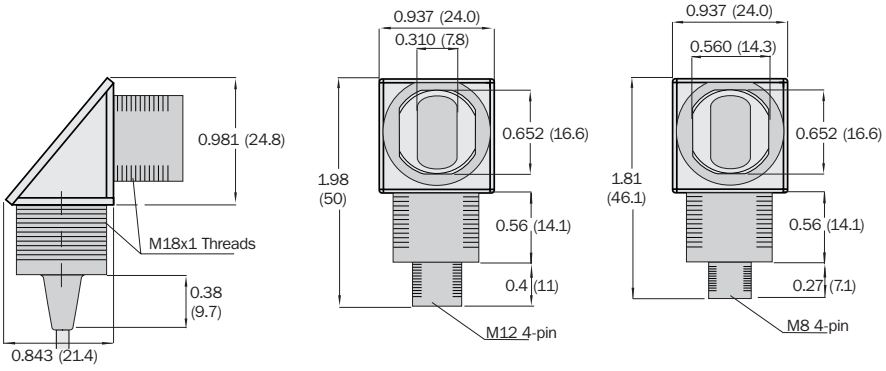


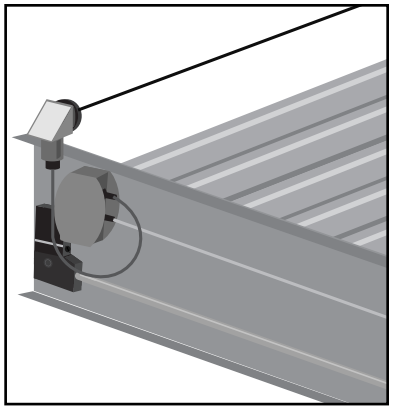
**See additional reflector information on opposite page*

Features

- ELF - Economical Little Functional
- Extremely compact to fit almost any application
- Universal mounting configuration for simple installation
- Unparalleled optical performance
- Electrical functionality previously available only in large sensors
- Available with M8 or M12 connector or pre-leaded cable

Dimensional Drawings

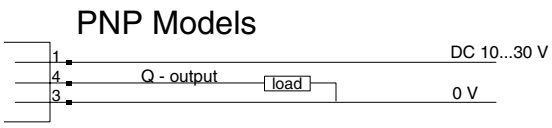


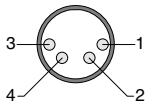


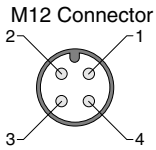
dimensions in inches (mm)

Technical Data ELF	
Light source	LED, red light, polarized; average life 100,000 hours at 77°F (25°C)
Light spot	3.1 x 3.1 in at 78.7 in (80 x 80 mm at 2 m)
Supply voltage VS	10...30 V DC
Ripple	< 5 V_{SS}, must be within VS tolerances
Current consumption	< 20 mA, without load
Switching outputs	PNP, light operate
Output current IA max.	50 mA
Response time	< 2.5 ms
Switching frequency	200 Hz
Connection types	□
Connector	M12 4-pin, M8 4-pin
Enclosure rating	IP 54
Ambient temperature	Operation: -13...122°F (-25...50°C); storage: -40...158°F (-40...70°C)
Housing material	Glass fiber reinforced ABS
Circuit protection	Reverse polarity protection, overload and short circuit protection
Mounting hardware	Quantity 1, M18 x 1 nut which can be used near connector or lens

Connection Diagram







Reflector Type		Sensing Range
1	PL 80 A	0.07...4.0 m
2	PL 50 A	0.07...2.7 m
3	P250	0.07...3.3 m
4	PL 40 A	0.07...2.4 m
5	PL 30 A	0.07...2.1 m
6	PL 20 A	0.07...1.5 m
7	2000X reflective tape min 50 x 50 mm^2	0.2...1.5 m

Order Information		
Model Number	**Part Number**	**Connector**
EL 1-P124	7 027 214	M12
EL 1-P127	7 027 268	M8

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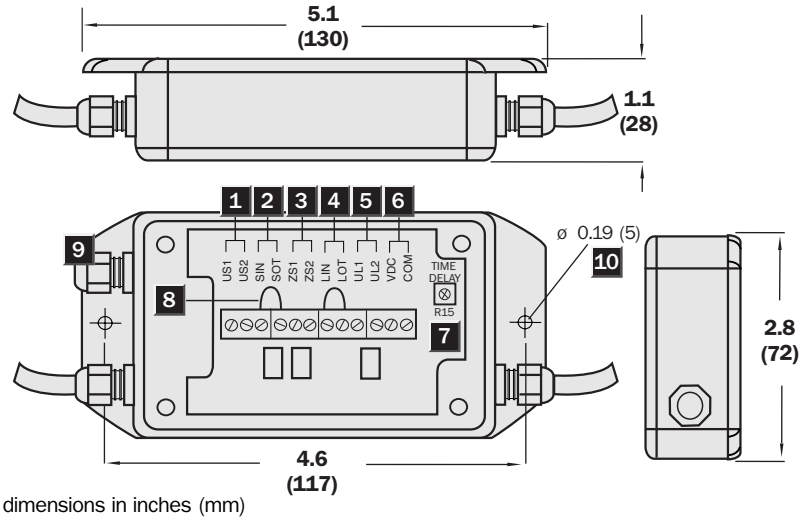
ZIM
ZPA Interface Module

Dimensional Drawings

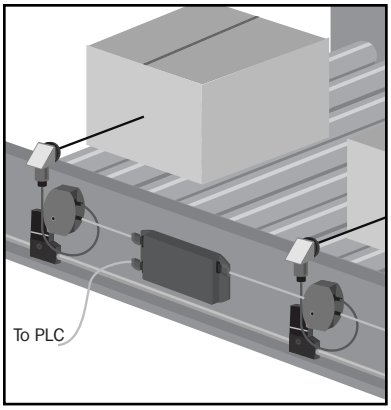


dimensions in inches (mm)

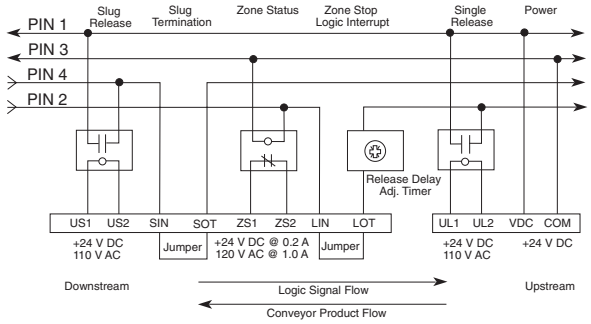
	Terminal	Function
1	US1/US2	Slug release
2	SIN/SOT	Slug release
3	ZS1/ZS2	Zone status
4	LIN/LOT	Logic interrupt
5	UL1/UL2	Single release
6	VDC/COM	Power
7	R15	Release delay
8	Jumpers (x2)	
9	Cable gland, PG7 (x3), I.D. 2.3 to 6.4 mm	
10	Mounting through-holes (x2)	

Features

- Provides simple and flexible interface to ZPA control systems
- Reduces installation labor and component costs
- Plug-n-play connectivity provides error proof installation
- Relay isolated single and slug release
- Adjustable zone release time delay to 20 seconds
- Zone status reporting
- Stop zone function
- Provides power tap connections



Connection Diagram



Technical Data ZIM-	B111	B211
Interface to ZPA system	ZLM1, WLR2100-D	WTR
Upstream connection	Female, M12, 4-PIN, 300 mm cable	Male, M12, 4-PIN, 300 mm cable
Downstream connection	Male, M12, 4-PIN, 300 mm cable	Female, M12, 4-PIN, 300 mm cable
Power		
Supply voltage	24 V DC (±15%)	
Power consumption	≤ 20 mA	
Supply voltage terminal	V DC, COM	
Single release		
Single release input voltage	24…120 V AC/DC (± 10%)	
Single release input current consumption	≤ 25 mA	
Single release input terminals	UL2, UL1	
Slug release		
Slug release input voltage	24…120 V AC/DC (± 10%)	
Slug release input current consumption	≤ 25 mA	
Slug release input terminals	US2, US1	
Zone status		
Zone status output	Dry contact relay (see functional description below)	
Zone status relay output max. voltage/current	30 V DC / 1.0 amps, 120 V AC / 0.2 amps	
Zone status relay output terminals	ZS2, ZS1	
Logic signal		
Logic/release time delay	0.1…20 seconds adjustable, 270° potentiometer	
Logic signal interrupt (stop zone) terminals	LIN, LOT remove jumper to interrupt logic signal	
Slug termination		
Slug termination terminals	SIN, SOT remove jumper to terminate slug release	
Physical properties		
Terminal block wire	24 to 12 AWG, strip length 6.0 mm (0.24 in)	
Screw terminal torque	0.4…0.5 Nm (3.5…4.4 in-lb)	
Enclosure rating	IP 42, NEMA 2	
Operating temperature	-13…131°F (-25…55°C)	
Storage temperature	-40…158°F (-40…70°C)	
Approximate weight	0.9 lb (400 g)	

Functional Descriptions

Single Release Input - will release the immediate upstream zone.

Slug Release Input - will release all zones in the ZPA string, upstream and downstream, unless prohibited by a slug termination.

Zone Status Output - Single Accumulation - relay is closed when the immediate downstream sensor detects a package.

Zone Status Output - Slug Accumulation - relay is closed when the immediate downstream zone is accumulated.

Logic Signal Interrupt Removable Jumper - when removed, will not allow the logic signal to pass upstream resulting in an upstream “Stop Zone”.

Slug Signal Termination Removable Jumper - when removed, will not allow the slug signal to pass through the next upstream/downstream ZPA module.

Single Release Time Delay - will delay the logic signal to the upstream zone by 0.1 to 20 seconds, user adjustable. The result is a delayed release at the upstream zone which generates additional package gap directly proportional to the time delay setting, as the time delay increases the package gap increases.

CAUTION

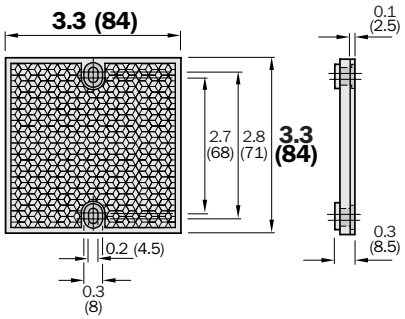
RISK OF ELECTRICAL SHOCK-MORE THAN ONE DISCONNECT SWITCH MAY BE REQUIRED TO DE-ENERGIZE THE EQUIPMENT BEFORE SERVICING

Order Information	
Model Number	**Part Number**
ZIM 1-B111	7 027 714
ZIM 2-B211	7 027 715

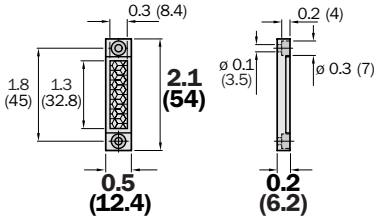
Accessories

Reflectors

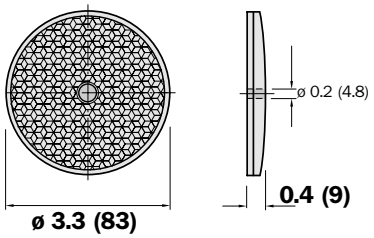
Reflective area 80 x 80 mm	
Model Number	**Part Number**
PL 80A	1 003 865



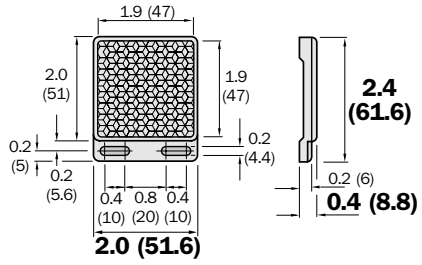
Reflective area 32.8 x 8.4 mm	
Model Number	**Part Number**
P 45	5 308 002



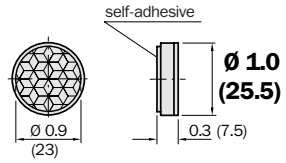
Reflector Ø 83 mm, center hole mounting	
Model Number	**Part Number**
P 975	7 020 558



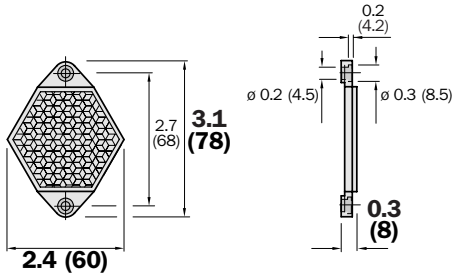
Reflective area 47 x 47 mm	
Model Number	**Part Number**
P 250	5 304 812



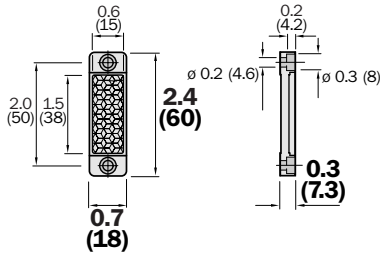
Reflective area ø 23 mm, self-adhesive	
Model Number	**Part Number**
PL 22-2	1 003 621



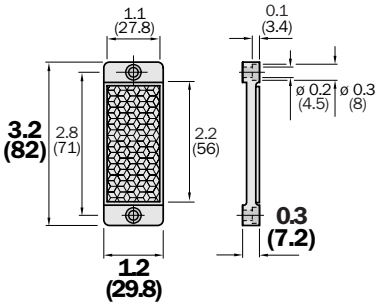
Reflector hexagonal	
Model Number	**Part Number**
PL 50A	1 000 132



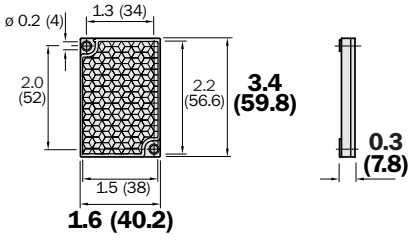
Reflector area 15 x 38 mm	
Model Number	**Part Number**
PL 20A	1 012 719



Reflective area 28 x 56 mm	
Model Number	**Part Number**
PL 30A	1 002 314



Reflective area 38 x 56 mm	
Model Number	**Part Number**
PL 40A	1 012 720



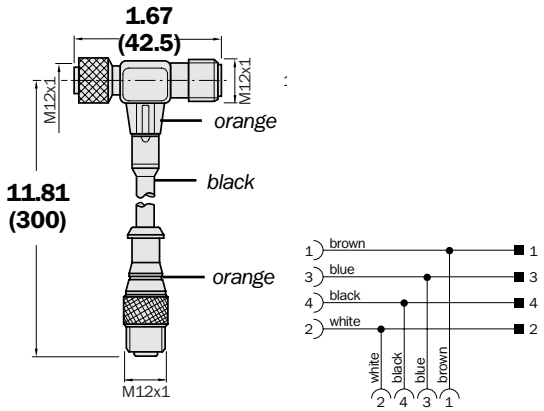
dimensions in inches (mm)

Accessories

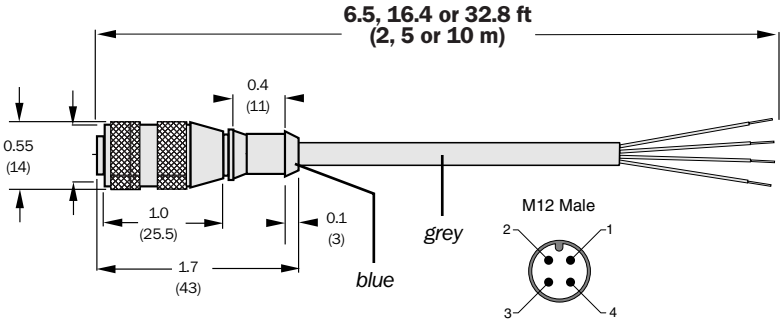
Cables

Power and Interconnect Cables		
Model Number	**Part Number**	**Description**
JD4-TM12300A	6 011 682	T-cable type 1, M12 DC 4-pin
JD4-TM12300B	6 011 683	T-cable type 2, M12 DC 4-pin
KD4-SIM122	7 020 020	2 m straight M12 DC 4-pin cable
KD4-SIM125	7 020 678	5 m straight M12 DC 4-pin cable
KD4-SIM1210	7 020 080	10 m straight M12 DC 4-pin cable
KD4-RIM122	7 020 023	2 m right angle M12 DC 4-pin cable
KD4-RIM125	7 020 679	5 m right angle M12 DC 4-pin cable
KD4-RIM1210	7 021 244	10 m right angle M12 DC 4-pin cable
ZPI-P1	7 027 723	Power isolator
ZSI-P4	7 027 187	Slug terminator
ZGC-1	7 027 804	Gender changer - male/male
ZGC-2	7 028 421	Gender changer - female/female
KA14-SEM121	7 027 083	1 m straight M12 reverse-key AC 4-pin cable
KA14-SEM122	7 027 086	2 m straight M12 reverse-key AC 4-pin cable
-	7 028 451	Kit, 1/4” plug and clip
-	7 028 457	1/4” plug
-	7 028 425	3/8” plug

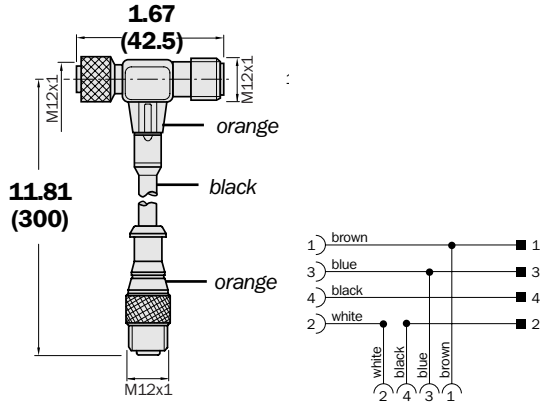
T-cable type 1, M12 DC 4-pin



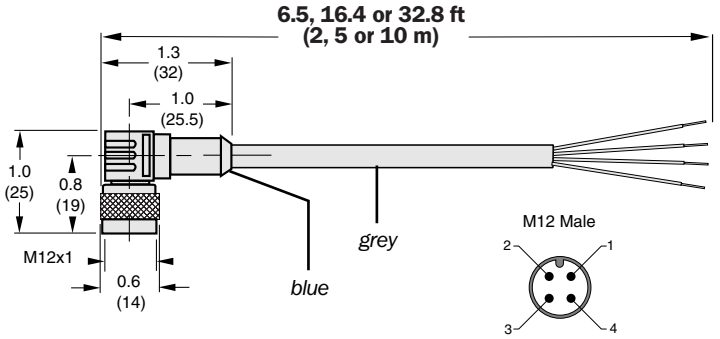
2 m, 5 m, 10 m straight M12 DC 4-pin cable



T-cable type 2, M12 DC 4-pin



2 m, 5 m, 10 m right angle M12 DC 4-pin cable

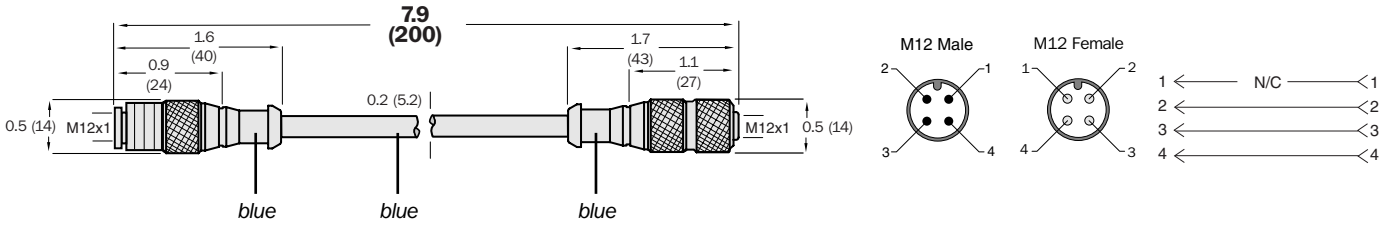


dimensions in inches (mm)

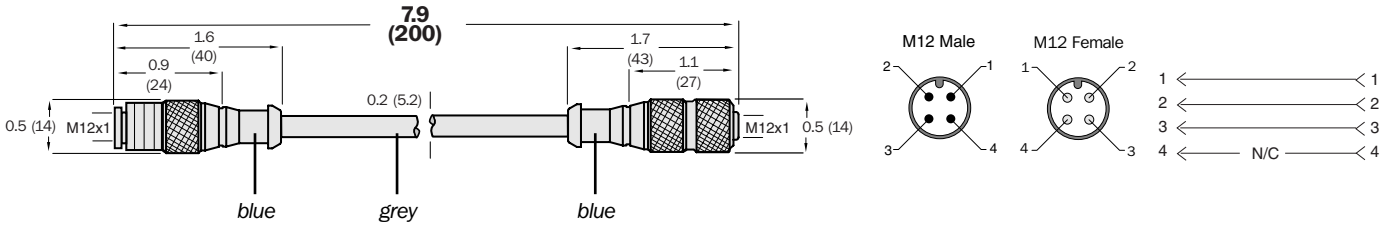
Accessories

Cables

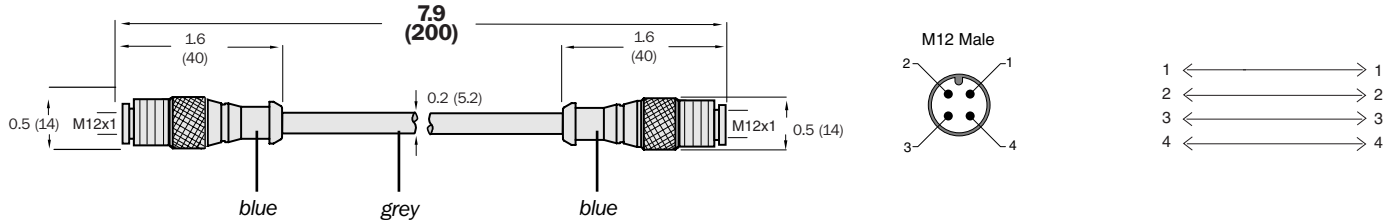
Power isolator



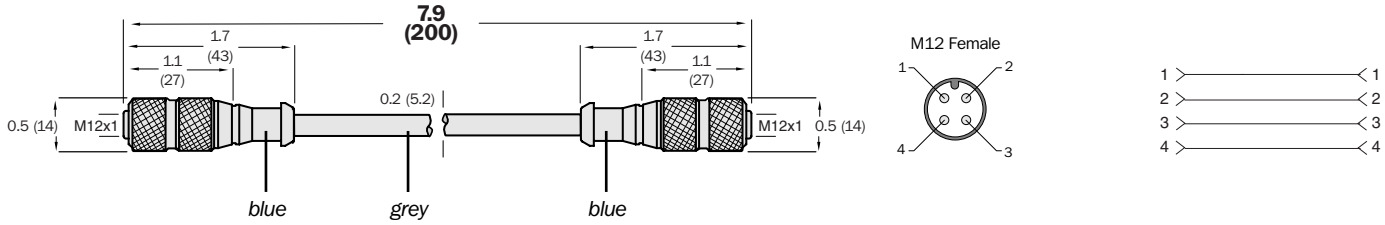
Slug terminator



Gender changer - male/male



Gender changer - female/female

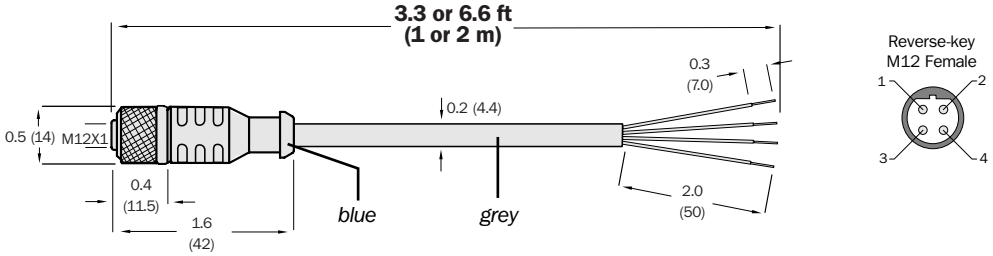


dimensions in inches (mm)

Accessories

Cables

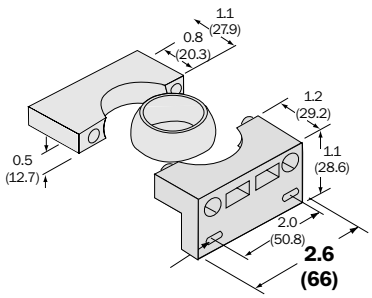
1 m, 2 m, straight M12 reverse-key AC 4-pin cable



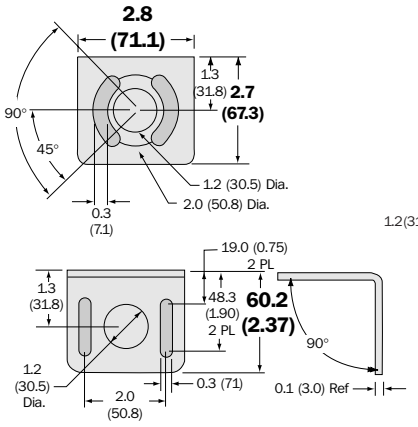
dimensions in inches (mm)

Mounting Brackets

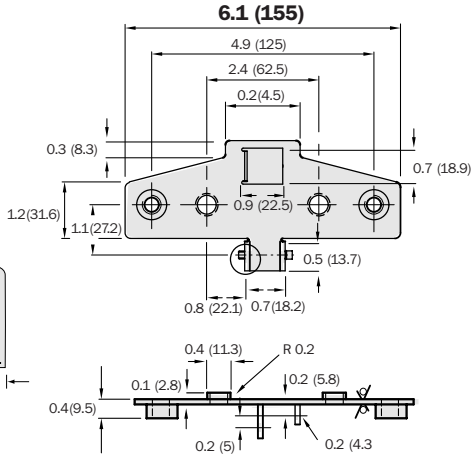
Mounting bracket, W.2000, stainless steel	
Model Number	**Part Number**
MB-W2000B	7 022 976



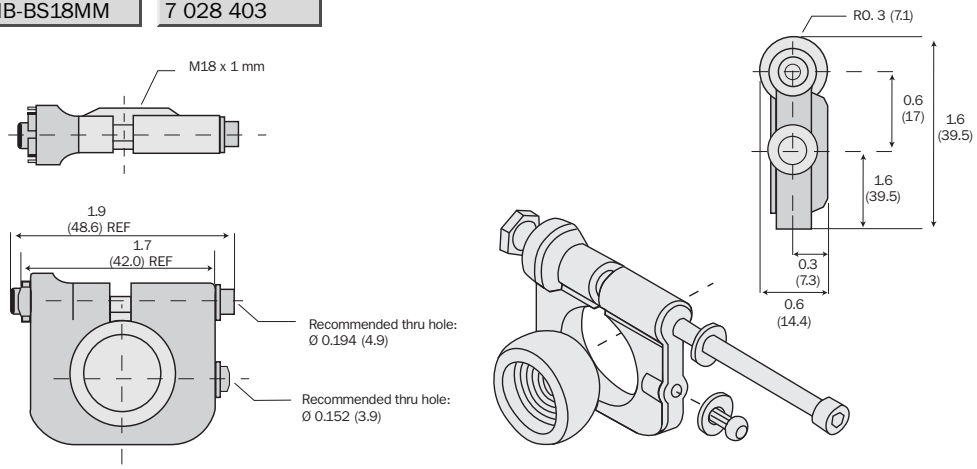
Mounting bracket, W.2000, stainless steel	
Model Number	**Part Number**
MB-W2000	7 022 981



Mounting bracket, WTR	
Model Number	**Part Number**
BEF-WN-WTR	2 017 417



Mounting Bracket for 18 mm threaded sensors	
Model Number	**Part Number**
MB-BS18MM	7 028 403



dimensions in inches (mm)

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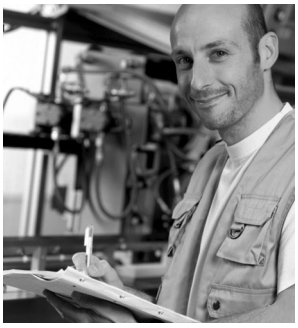

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