

ENGLISH

Photoelectric sensor
for Zero Pressure Accumulation (ZPA)
IR Operating Instructions

8016163.YUR8 0616 COMAT

IR

Safety notes

➤ Not a safety component in accordance with EU Machinery Directive.

➤ Read the operating instructions before commissioning.

➤ Connection, mounting, and set up should only to be performed by trained specialists.

➤ When commissioning, protect the device from moisture and contamination.

Correct use

The IR sensor is a photoelectric sensor with integrated logic and optional valve for use with accumulation roller conveyors. It utilizes either back-ground suppression (BGS) or reflex technology and has a unique optical configuration that allows product to be detected overhead when the sensor is mounted between conveyor rollers. When consecutive IR sensors are daisy chained together, their accumulation logic solves Zero Pressure Accumulation applications on pneumatic or motor driven roller conveyors.

Starting operation

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Mounting, electrical & actuator installation:

Mounting installation:

Mount the IR sensor so that the top is positioned in the gap between conveyor rollers but below the conveying surface. Refer to Figure 1 and make sure that the sensing distance, direction of product flow and the minimum distance to the sensor are within sensor specifications. Mounting brackets must be ordered separately (www.sick.com).

Electrical Installation:

Daisy chain connection:

Attach consecutive IR sensors together via the M12 interconnecting daisy chain as shown in Drawing 8. The female M12 cable attaches downstream to the neighboring IR sensor's male M12 plug. Please note that downstream refers to the direction of product flow on the conveyor. Ensure that there is no tension in the cables. The female M12 connector on the furthest downstream IR sensor cable may be used to release product from the discharge zone via PIN 2 or PIN 4 if slug is present.

Power (Figure 3):

A Class 2 power source is required. Power may be applied to any point on the daisy chain: PIN 1 (24 VDC) and PIN 3 (0 VDC). Typically, this is done on the ends or at the center of the chain. All IR sensors connected on the daisy chain will be powered.

Depending on the valve type, it is possible to power approximately 30 IR sensors when power is supplied at the end of the IR daisy chain or 50 IR sensors when powering from the center. Please refer to the specifications for further information.

A power isolator cable (7027723) should be used when multiple power supplies are installed on the same daisy chain. The green indicating LED will illuminate on each sensor when power is correctly supplied.

Actuator Installation:

Valve versions

Connect the valve supply ports to the available compressed air supply and connect the output to the desired actuator.

Air to Brake (AtB) conveyors are compatible with IR sensors Ax1, Ex1 and supply air to stop the zone.

Air to Drive (AtD) conveyors are compatible with IR sensors Ax0, Ex0 and exhaust air to stop the zone.

Note:

For the IRT-xxxxC6x, the valve must be supplied separately.

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Adjusting the sensor:

The IR-Sensor has an 9 turn potentiometer, please handle carefully when reaching the end positions.

IRT Background Suppression (BGS)

If the amber LED is illuminated, turn the potentiometer counterclockwise until it is off as shown in Figure 2.

Position the darkest expected target at the maximum distance away from the sensor face.

Turn the potentiometer clockwise as shown in Figure 2 until the amber LED illuminates. If it does not illuminate, check the application again by referring to Figure 4.

Remove the target. The amber LED should turn off. If it does not, the background is disturbing the application. Check the application again by referring to Figure 4.

IRL Reflex

Diamond Grade Reflective tape (prefabricated) should be installed at max. 1.5 m away from IRL. Align red light spot of IRL on the middle of the reflector. Turn sensitivity control to the right until you have reached max., LED OFF. Turn sensitivity control back again to the left until LED is constant luminously.

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Logic functionality:

Single accumulation:

Single accumulation logic stops transfer of product in the upstream zone of any two consecutive zones that are detecting product. There are two ways to discharge product from the accumulation conveyor:

Single release: 24 VDC is applied to PIN 2 on the female M12 connector on the furthest downstream IR sensor (discharge zone). This zone will then transfer product as long as voltage is supplied. Upstream products will automatically transfer product per single accumulation logic.

Block (slug) release: 24 VDC is applied to PIN 4 of any IR sensor M12 connector. All zones will transfer product simultaneously as long as voltage is applied.

Single Accumulation w / sleep

Single accumulation logic stops transfer of product in the upstream zone of any two consecutive zones that are detecting product. Sleep stops the downstream zone of any two consecutive zones that are not detecting products for 9 s. An IR sensor is awoken to transfer product when either it or the upstream IR sensor is detecting product or after 24 VDC is applied to PIN 4 of the male M12 connector.

Additionally, IR sensors with this logic will transfer product for 9 s after power is applied when no product is detected.

Visit "http://www.sick.com/zonecontrol" for a simulation of the logic and more information on ZoneControl products.

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Maintenance

SICK photoelectric sensors are maintenance-free.

We recommend doing the following regularly:

- clean the external lens surfaces

- check the screw connections and plug-in connections

No modifications may be made to devices.

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Typicode Example / Beispiel Typenschlüssel:

IRx-P231A10

Code	Description
IRx	IR = Intelligent Roller, T = Proximity, L = Reflex
xxx-Pxxxxx	PNP / NPN Output
xxx-x23xxxx	Type of Logic, see Fig. 3
xxx-xxx1xxx	Daisy Chain Length. 1 = 1.2 m / 2 = 2.0 m
xxx-xxxxA1x	Output Type, see Fig. A
xxx-xxxx00	Valve: 0 = Air to Drive (N.C.) 1 = Air to Brake (N.O.) MDR: 3 = HIGH to Drive 4 = HIGH to Brake

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Specifications

IR Sensor

Supply voltage (PIN1, PIN3)	19.2 ... 27.6 VDC ³⁾ xC7x, xC8x and xC9x: 10 ... 30 VDC
Current consumption	< 20 mA @ 24 VDC ³⁾
Housing material	ABS housing, PMMA lens
Circuit protection	Short circuit and reverse polarity protected
Ambient operating temperature	-10 ... 55 °C (14 ... 131 °F) ³⁾ xC7x, xC8x and xC9x: -40 ... 60 °C (-40 ... 140 °F)
Storage temperature	-40 ... 75 °C (-40 ... 167 °F)
Approvals / certifications (UL, CSA, CE, RoHS, etc.)	cULus, CE, RoHS
EMC	EN 60947-5-2 / EN 61000-6-3
Protection class	IP65
Enclosure rating	xC7x, xC8x, xC9x: IP67
Optics	
Sensing range	IRL 60 ... 900 mm (2.4 ... 35.4 in.) IRT 250 ... 1500 mm (9.8 ... 59.1 in.)
Light spot diameter	20 mm @ 500 mm range (0.8" @ 19.7" range)
Light source	IRT Infrared ¹⁾ IRL Visible Red ¹⁾
Light spot exit angle	7°
Daisy chain	
Outputs (see fig. 3)	PNP (IRx-Pxxx) NPN (IRx-Nxxx)
Logic output type	Type of sortie logique
Logic output voltage	V _s - 0.5V
Logic output maximum switching current	100 mA
Logic output switching frequency	250 Hz
Inputs (see fig. 3)	Entrées (voir fig. 3)
Logic / Slug (Block) input response time	2 ms ⁴⁾
Interconnection	M12: Female connects downstream
Output (Valve versions)	
Medium	Compressed air, lubricated or unlubricated
Operating mode	Ax0, Ex0: Air to Drive (N. C.) Ax1, Ex1: Air to Brake (N. O.)
Type	3 / 2
Coil rating	1.0 W (2.0 W for E3x & E5x)
Port sizes	A1x: 0.375" supply, 0.25" output E3x: 8 mm supply, 8 mm output E4x, E5x: 8 mm supply, 4 mm output
Operating pressure range	A1x: 0 ... 65 psi E3x, E4x: 2.0 ... 8.0 bar E5x: 4.0 ... 7.0 bar
Output flow rate	A1x: 1.4 SCFM E3x: 600 Nl / min E4x, E5x: 20 Nl / min
Exhaust flow rate	A1x: 1.4 SCFM E3x: 600 Nl / min E4x: 130 Nl / min E5x: 100 Nl / min

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Dimensions

Valve Versions: IRx-xxxxA1x, IRx-xxxxE4x, IRx-xxxxE5x

MDR Versions: IRx-xxxxC7x, IRx-xxxxC8x and IRx-xxxxC9x

9.4mm DIN Valve Connectors: IRx-xxxxC6x

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Electrical Diagrams

Single accumulation, IRx-x21xxxx

Single accumulation, IRx-x23xxxx

Single accumulation w/ sleep, IRT-x23xxxx

Connection to conveyor

9.4 mm DIN cable, 300 mm

Q ACTUATOR

1 0 VDC

1x1x

1x4x

1x5x

Type 3/2 way valve

xC8x

xC8x: 4-PIN M12 Pigtail, 300 mm

xC7x

xC7x: Flying Leads

Brown / Braun = Q ACTUATOR

White / Weiß = 0 VDC

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Logic Diagrams

Single accumulation, IRx-x21xxxx

Single accumulation w / sleep, IRx-x23xxxx

*After 9 s of no product, sensor goes into sleep. Wake In input only active when sensor sleeping.

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Performance Graphs

IRT Sensor

Distance in mm (inch)

5 % / 90 %

90 % / 90 %

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