Allen-Bradley

Installation Instructions
PHOTOSWITCH® Bulletin 44N Zone Control Photoelectric Sensors

IMPORTANT: SAVE THESE INSTRUCTIONS FOR FUTURE USE.
Refer to the product catalog pages for additional information.

Description

The 44N provides an economical, noncontact, solution to zero pressure accumulation conveyor systems by combining built-in zone control with a photoelectric sensor. This simple approach replaces the conventional mechanical switch sensing device, central PLC, and large quantities of interconnecting wiring.

The use of a photoelectric sensor eliminates the need for minimum weight restrictions required by mechanically actuated switches. The polarized retroreflective sensing mode ensures reliable detection of even shiny packages over a 4.8 m (16 ft) range.

The 44N comes complete with micro QD connections to both an upstream and downstream 44N along with a variety of connection options for common pneumatic valves. Power for the 44N and the valve is distributed through these connections.

The zone logic of the 44N ensures that product being loaded on the conveyor will be separated into zone length gaps thus providing zero pressure accumulation throughout the conveyor system. Once product has accumulated, it may be released individually (singulate) or simultaneously as a train (slug). This release is activated through an external contact closure.

Features

- Singulation release
- Slug release
- Adjustable 200 ms…10 secs ON (run) delay
- NEMA 4X rated

Connection Types [mm (in.)]

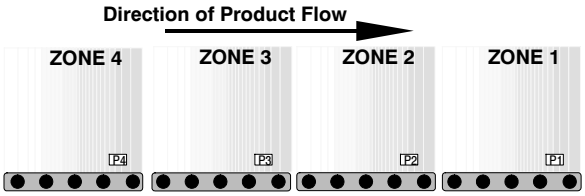
44NSP-2JPBD5-Z01	• 838 (33) pigtail with 4-pin DC male micro QD (downstream) • 838 (33) pigtail with 4-pin DC female micro QD (upstream) • 304.88 (12 in.) cable for load
44NSP-2JPBD5-Z02	• 838 (33) pigtail with 4-pin DC male micro QD (downstream) • 838 (33) pigtail with 4-pin DC female micro QD (upstream) • Female right angle pico (M8) QD connector on a 533.4 (21 in.) cable for load
44NSP-2JPBD5-Z03	• 351 (15) pigtail with 4-pin DC male micro QD (downstream) • 351 (15) pigtail with 4-pin DC female micro QD (upstream) • Female right angle pico (M8) QD connector on a 533.4 (21 in.) cable for load

Specifications

Environmental	
Certifications	cULus Listed and CE Marked for all applicable directives
Operating Environment	NEMA 4, 4X, 6, 12, IP67
Operating Temperature [C(F)]	-20…+70° (-4…+158°)
Vibration	10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2
Shock	30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2
Relative Humidity	5…95% (noncondensing)
Optical	
Sensing Modes	Polarized retroreflective
Sensing Range	50.8 mm…4.8 m (50.8 in…16 ft) with 92-39 reflector
Field of View	1.5°
Light Source	Visible red (660 nm)
Adjustments	On delay (200 ms…10 s), DIP switch
LED Indicators	Green output LED indicator
Electrical	
Voltage	10…30V DC
Current Consumption	20 mA max
Sensor Protection	Overload, short circuit, reverse polarity, false pulse
Outputs	
Response Time	2 ms
Output Type	PNP
Output Mode	Light or dark operate selectable by dip switch (1 L.O., 0 D.O.)
Output Current	100 mA @ 30V DC max
Mechanical	
Housing Material	Valox®
Lens Material	Acrylic
Supplied Accessories	129-130 mounting nut
Optional Accessories	Mounting brackets, reflectors, cordsets

System Overview

Figure 1. System Overview



The following section describes the general sequence of operation of conveyors using the 44NSP Zero Pressure Accumulation Sensor. These systems offer two modes of accumulation that can be defined by the user: singulation release and slug release. The loading and unloading of the conveyor for both modes are described as follows:

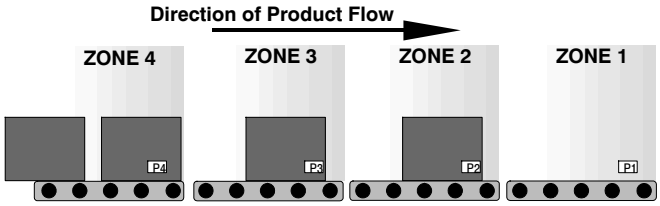
Loading Product onto the Conveyor

Starting with your conveyor empty (no boxes present) and your conveyor rollers active (running) a box placed on the conveyor continues until it reaches the discharge zone (zone 1). As product passes through the loading zone (zone 4) a gap will be formed equal to the zone length.

When box 1 reaches P1, zone 1 stops driving. A signal is sent to zone 2 to indicate that zone 1 is occupied (see Figure 1).

When box 2 reaches P2, zone 2 stops driving. A signal is sent to zone 3 to indicate that zone 2 is occupied. This sequence is repeated until the conveyor is fully loaded

Figure 2. Loading the Conveyor

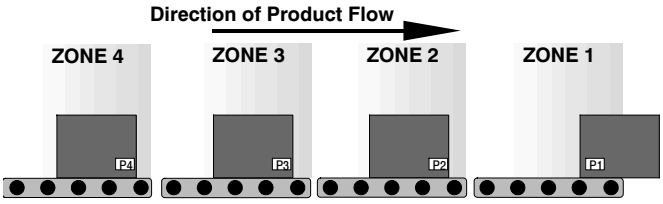


Unloading Product onto the Conveyor

Singulation Release

To unload box 1 from the discharge zone (zone1) activate the zone release signal. When box 1 leaves P1, box 2 will move to the next zone creating a gap between itself and box 3. This sequence will be repeated until the conveyor has been completely unloaded.

Figure 3. Singulation Release of Accumulated Product



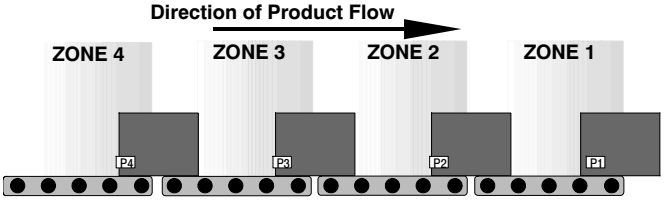
Note: P1, P2, P3, P4 are used to reference 44N sensors in an accumulation system.

Slug Release

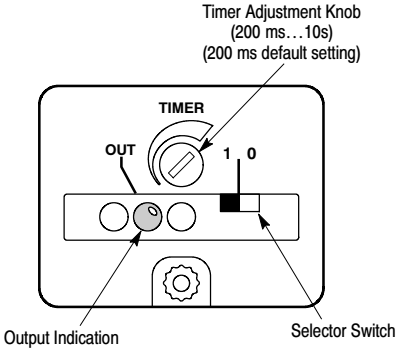
Unloading all accumulated product can be achieved by activating the slug release signal. This will cause all zones to drive without singulating (separating) the boxes.

Upon de-activation of the slug release signal, the system will resume to normal accumulation.

Figure 4. Slug Release of Accumulated Product



User Interface

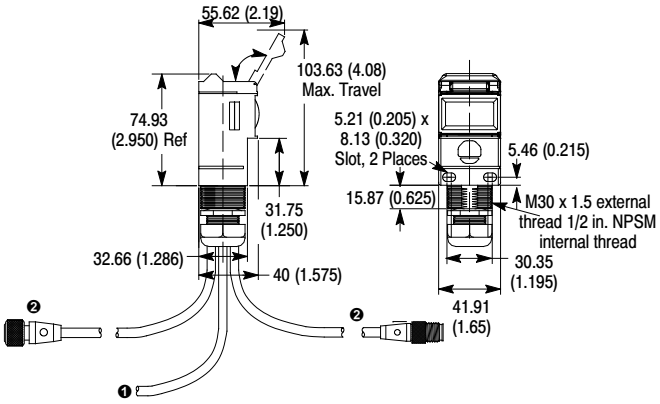


Selector Switch Function

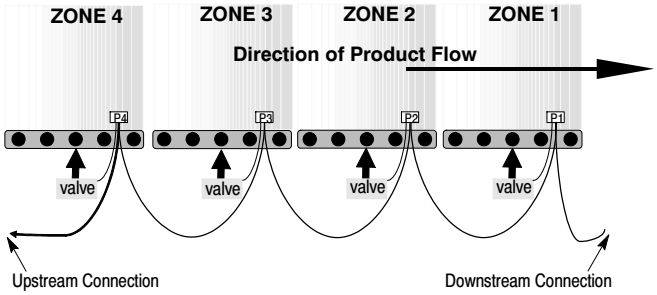
Position	Description
1	Air-to-Drive. Sensor output is active (driving load) while the reflector is unblocked. This is the factory default setting.
0	Air-to-Break. Sensor output will be active (driving load) while the reflector is blocked.

The on delay timer function can be used to delay the release of product.

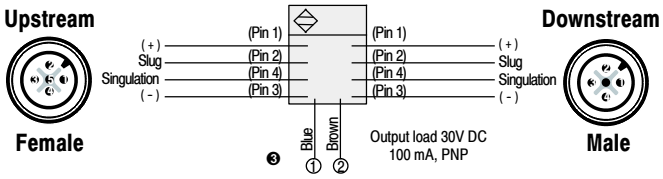
Approximate Dimensions [mm (in.)]



❶ 304.88 mm (12 in.) cable on 44NSP-2JPBD-Z01. Female right angle pico (M8) QD on a 533.4 mm (21 in.) cable on 44NSP-2JPBD-Z02 and 44NSP-2JPBD-Z03.
❷ Refer to page 1 for downstream and upstream cable lengths.



Wiring Diagrams



❸ Product comes with 22 AWG cable.

Downstream Connection (Discharge End)

For Singulation Release:

To activate the singulation release signal connect pin 4 (black wire using an 889D-F4BC-2 cable) to +24V DC. The discharge zone will singulate as long as the singulation release signal is active.

For Slug Release:

To activate the slug release signal connect pin 2 (white wire using an 889D-F4BC-2 cable) to +24V DC. All the zones will drive simultaneously without singulating (separating) the boxes.

Upstream Connection (Infeed End)

The 44N Zone Control sensor allows the user to monitor the status of the infeed zone by using an 889D-M4BC-2 male cordset connected to the upstream connection of the infeed sensor.

The black wire of the 889D-M4BC-2 cordset provides this signal. A voltage signal indicates that there is no object blocking the infeed zone. A 0V DC signal indicates that the infeed sensor is blocked.

The upstream connection output current is limited by a 3 kΩ resistor, which would allow the sensor to drive certain I/O cards. Rockwell Automation recommends the following I/O cards for reliable output detection.

1769-IB16I
1756-IB32
1756-IB16
1769-1Q32
1769-1Q16

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PN-39825
10000024950 Ver 02
July 13, 2009