S3N New Mini

May 2022

DATASENSING
easing automation challenges

S3N – The New Datasensing Miniature

S3N

MINIATURE PHOTOELECTRIC SENSOR

CE c UL us UK CA IO-Link

- All models with visible and bright red emission
- LED and Laser emission models
- Multiple Background suppression functions
- Shiny and clear object detection

- Polarized RRX 7 m (Red LED emission)
- Polarized RRX 10 m (Red Laser emission)
- Through-beam 20 m and Laser 30 m
- Connection with 2 m Cable or M8 connector

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S3N – The new miniature family

S3Z only Trimmer version
1Trimmer and 2 Trimmer

Trimmer version products
1Trimmer and 2 Trimmer

NEW!

IO-Link
New ASIC

TEACH-IN push button products

- Covering all the S3Z LED and Laser optic functions
- One trimmer model L/D selectable by pn.
- Two trimmer with L/D trimmer
- Compatible mounting with S3Z

- Push button adjustment
- Electronic BGS available
- Led and Laser Emissons
- All IO-Link models

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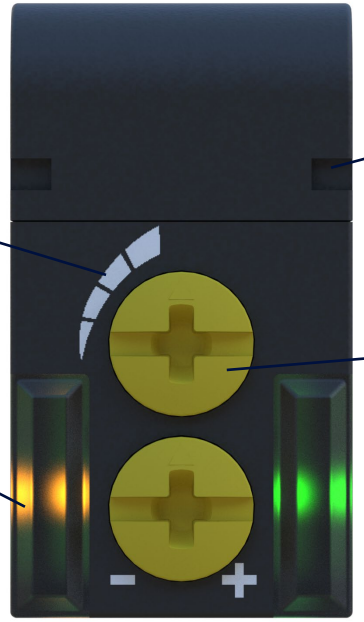
S3N User Interface Trimmer Version

Clear and precise laser marking

Slot plug fog slit mounting



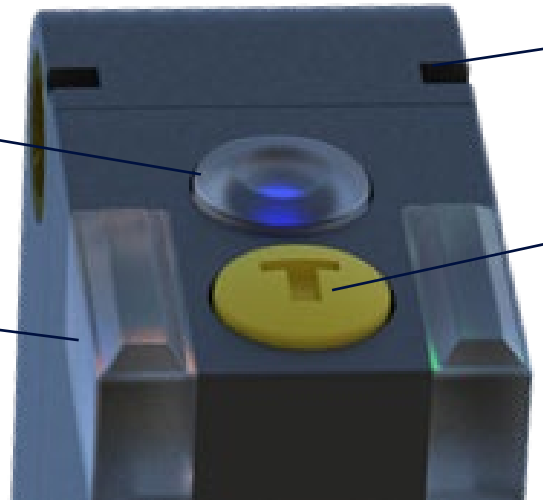
Big and universal trimmer knobs

Clear and bright signalizations

S3N Teach-in Push Button Version

IO-Link COM active signalizations

Clear and bright signalizations



Slot plug fog slit mounting

Teach-in push button

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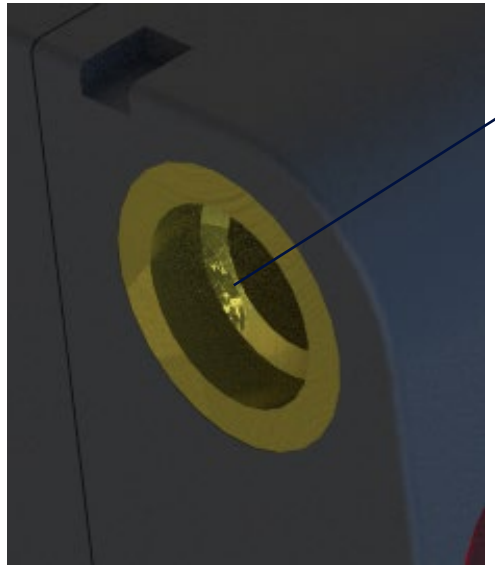
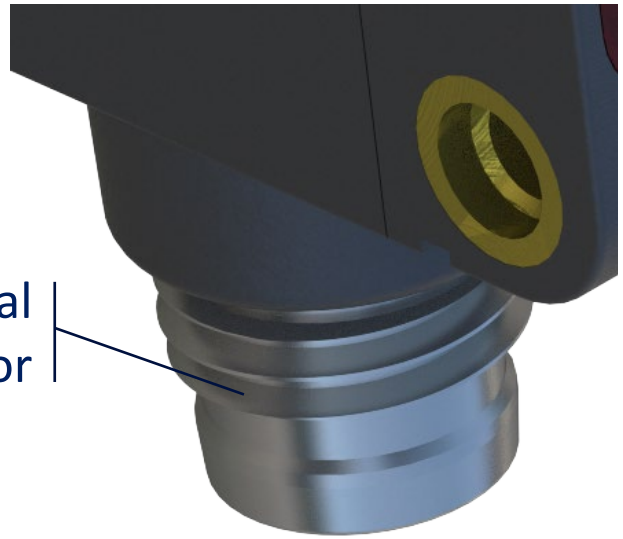
S3N – Mechanical improvements Vs S3Z



Robust metal insert

Rugged M8 metal connector



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S3N – P/N configuration and availability

- All the Current S3Z part number will be converted in S3N
- Additional models with PB Teach in and IO-Link are available
- Mark reader will be available in the 1Q 2023
- RRX for transparent detection T51 and T53 will be available in July 2022
- Pig tail models will be available as special version

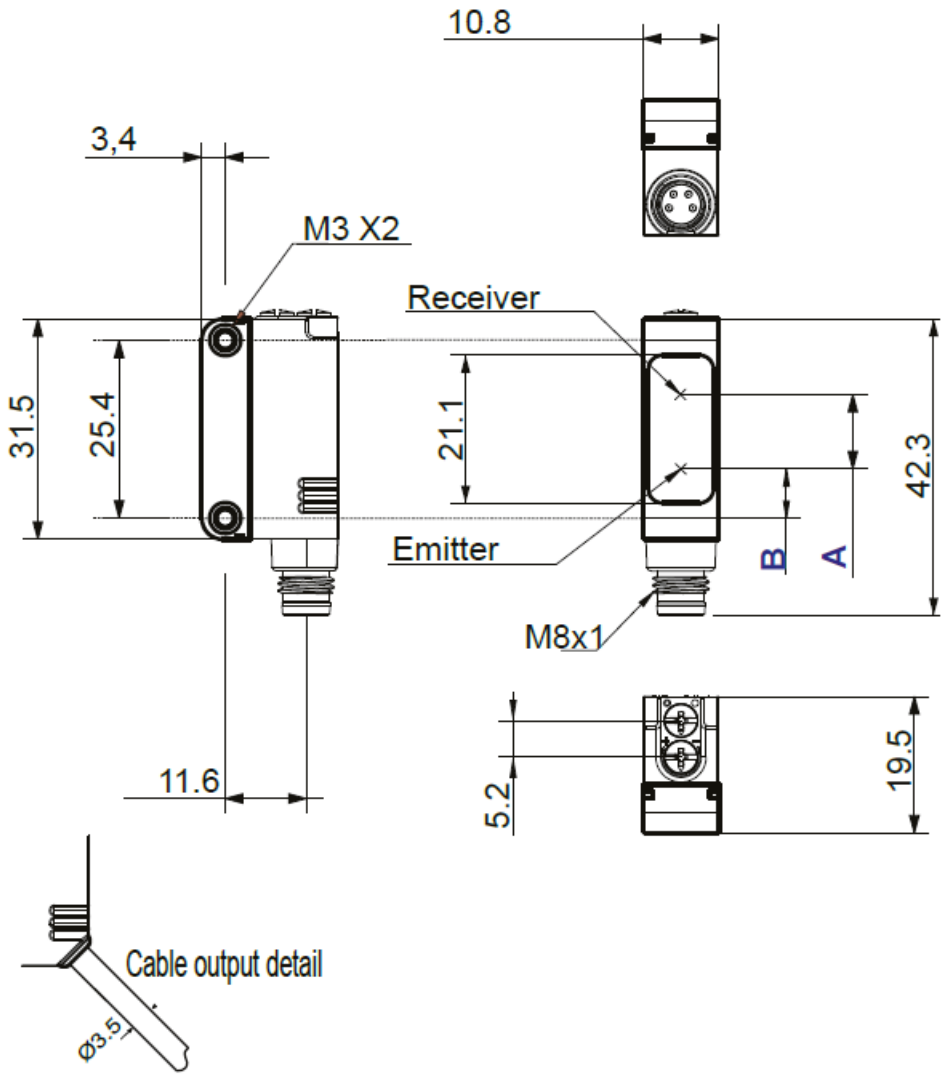
S3N General Improvements Vs S3Z

- Metal inserts with threaded holes up to housing layer.
- Bigger trimmer knobs for flat-blade and Phillips.
- Added Push Button models with very good tactile feeling.
- Comprehensive and bright user interface signalization.
- Product laser marking.

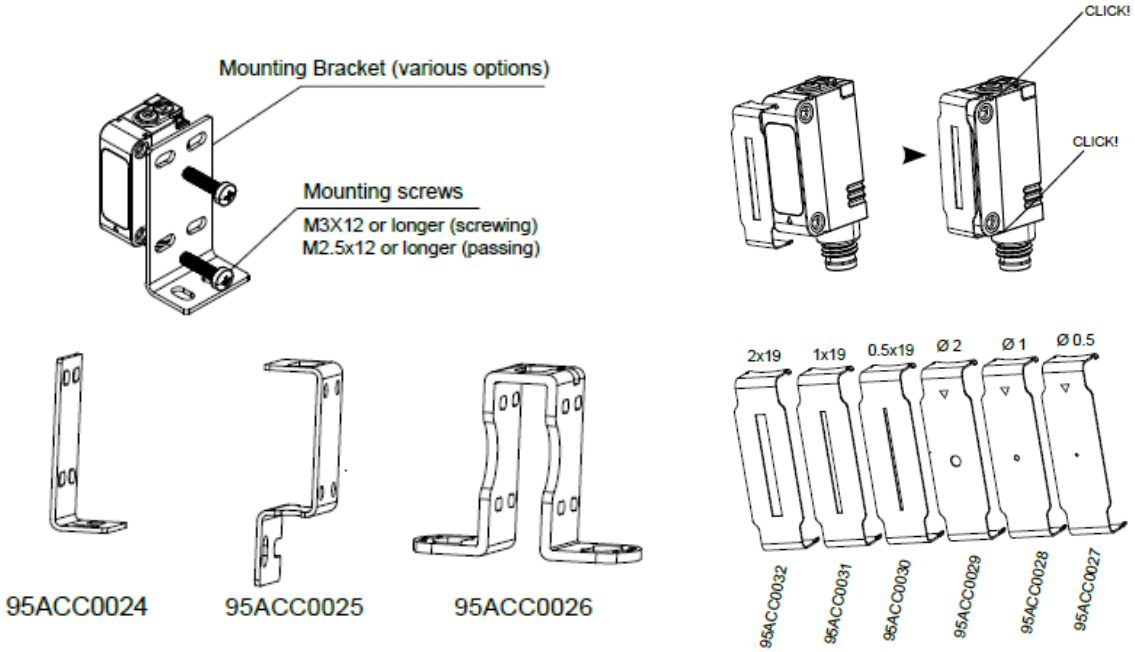
S3N General Improvements Vs S3Z

- Improved stability on optical detection features
- Improved sensitivity on black target (BGS)
- Increased ambient light immunity
- Improved cross talk features
- Increased EMI immunity

S3N Mechanic compatibility with S3Z



- Fully compatible dimensions with S3Z
- Fully compatible for mountig holes pitch and diameter
- Compatible with mounting holes and optical axes positoning
- Cable and connector versions as per S3Z family



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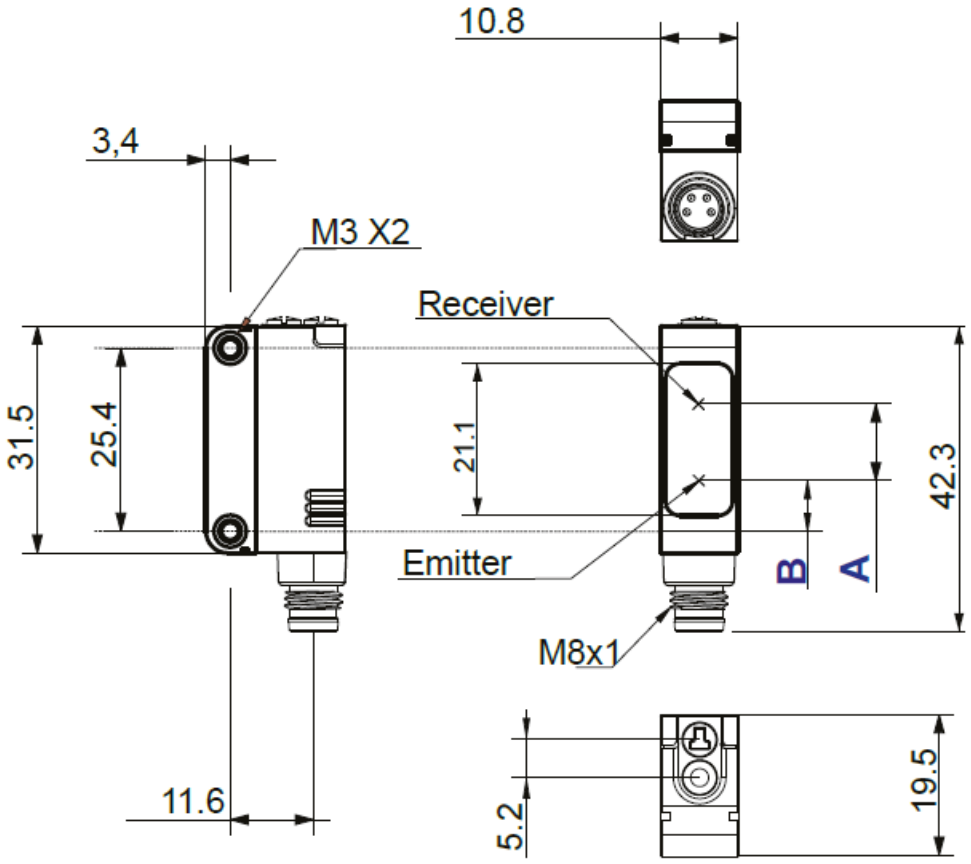
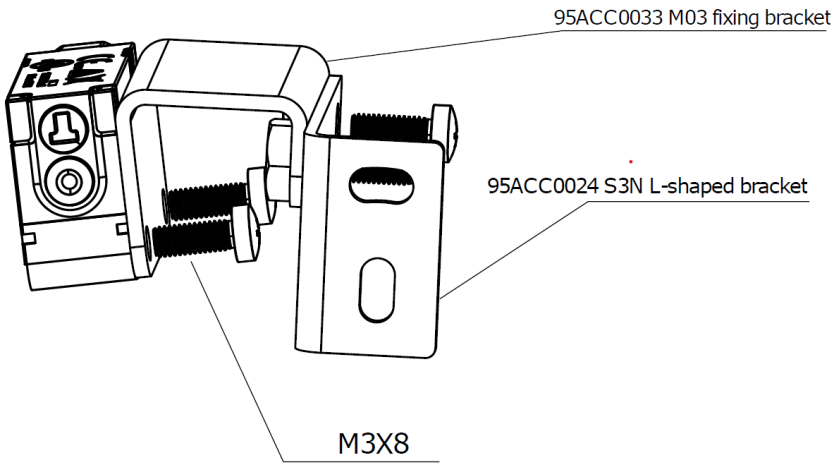
S3N New Push Button models with IO-LINK mechanics



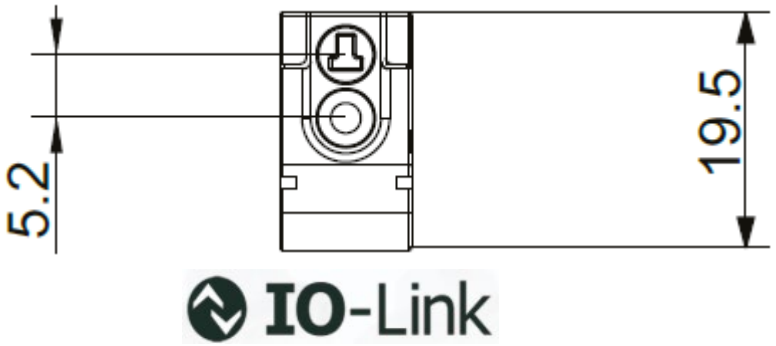
- The Teach in IO-Link models are available with M8 connector
- They are compatible with all the standard family accessories
- The BGS models have an additional bracket accessory

A special bracket is available to ease mechanical setup of S3N-PR-5-M03-OZ when used in «conveyor mode». The bracket helps setting up optimal angle between the sensor and the conveyor.

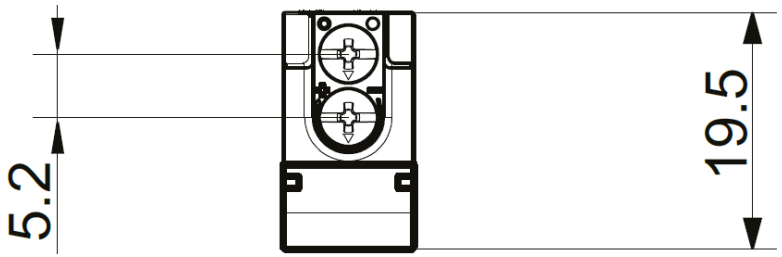


S3N – User Interface machanics

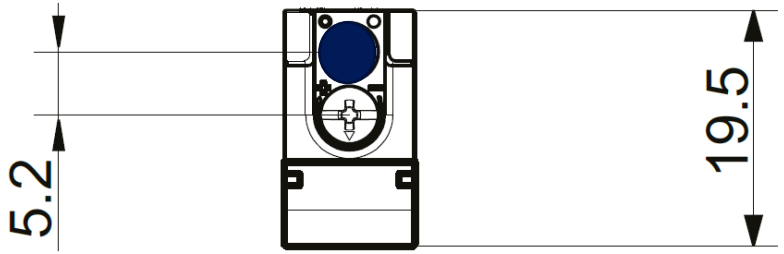
User Interface layout for LED / Laser IO-Link models with TEACH



User Interface layout for LED / Laser double trimmer models

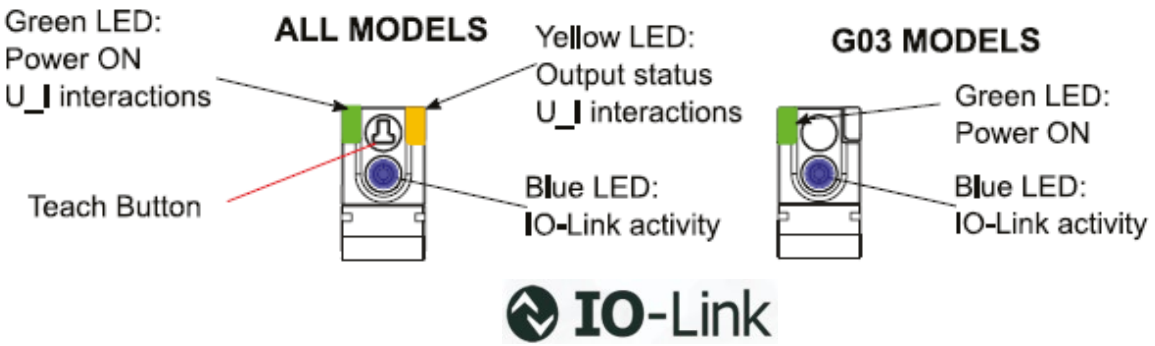


User Interface layout for LED / Laser single trimmer models



S3N – User Controls

User Interface Controls for LED / Laser IO-Link models with TEACH Button



Teach Button
Performs all User interface interactions.

Output LED
The yellow LED indicates the output status and supports user interface interactions during teach procedures.

Power On LED (All Models)
The green LED indicates that the sensor is operating.

IO-Link Activity LED
The Blue light is on during IO-Link data exchange.

User Interface Controls for LED / Laser with double and single trimmer models

Output LED
The yellow LED indicates the output status.

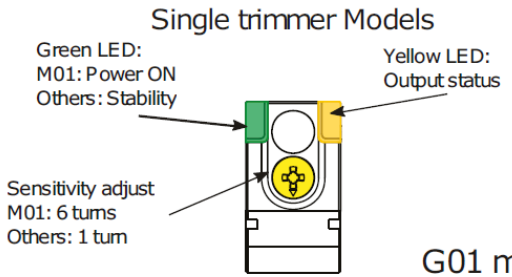
Stability LED (S3N-PR-C01/C11/B01/F01)
The green LED ON indicates that the received signal has a safety margin greater than 20% compared to the output switching value.

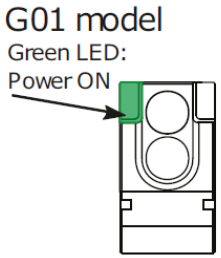
Power On LED (S3N-PR-x-G01/M01)
The green LED indicates that the sensor is operating.

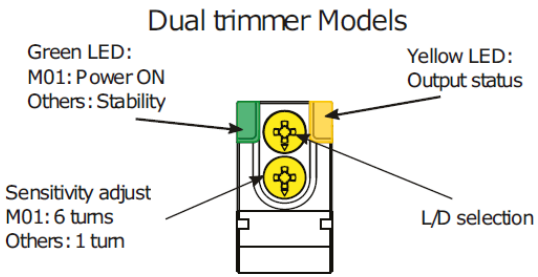
Sensitivity Knob (S3N-PR-x-B01/C01/C11/F01)
The trimmer can be used to adjust sensitivity; the operating distance increases turning the trimmer clockwise.

Adjustment Screw (S3N-PR-x-M01)
This control can be used to adjust the cutoff distance (6 turns screw); the operating distance increases turning the control clockwise.

Dark/Light Trimmer (S3N...B01/C01/C11/F01/M01-N/P)
This trimmer can be used to set LIGHT or DARK operation mode.
⚠ CAUTION: The trimmer rotation is limited to 250° by a mechanical stop. Do not apply excessive torque when adjusting (max 0.02 Nm).







S3N New family main performances

NEW!

- Improved long range (C11) Red LED diffused distance > 1m.
- IR Emission are now RED (C11, FG01)
- RRX Polarized up to 6m. on R2
- Distance BGS LED (IOL model with Teach-in) 180mm on black 6%
- Distance BGS Laser (Teach-in with IOL) 130mm on black 6%
- Same operating distance of S3Z trimmer model.
- Same operating frequency of S3Z trimmer models.
- 9 new model added with TEACH-IN and IO-Link

IO-Link

New ASIC

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S3N – Product code description

CODE DESCRIPTION

S3N - P R - 5 - B 0 1 - P L

series	S3N	Miniature photoelectric sensor
housing	P	standard housing
emission	R	Radial LED emission
	H	Radial LASER emission
connection	5	M8 connector
	2	2 m cable
function	B	Retro Reflex Polarized
	C	Diffused
	FG	Through Beam
	M	Background suppression
	T	Transparent (not available yet)
	W	Mark reader (not available yet)
distance	0	Standard distance
	1	Long distance
adjustment	1	Trimmer adjustment
	3	Teach-In push button
output	P	PNP output
	N	NPN output
	0	IO-LInk configurable static output IO-Link
output configuration		L/D configurable by trimmer
	L	NO output Light mode
	D	NO output Dark mode
	Z	IO-Link + configurable static output

S3N – Red LED emission models with trimmer

	Diffused Narrow Beam	Diffused Long Distance	Retro Reflex Polarized	Through Beam	Mechanic BGS
	S3N-PR-C01	S3N-PR-C11	S3N-PR-B01	S3N-PR-FG01	S3N-PR-M01
Power Supply:	10-30 Vdc; reverse polarity protected				
Ripple:	p-p 10% max.				
Current consumption	≤35mA				
Output:	Light ON, Dark ON or L/D selectable, PNP or NPN (short circuit protected);				
Output current:	100 mA max. short circuit protected				
Saturation voltage:	2 V max.				
Response time:	0.5 ms	0.5 ms	0.5 ms	1 ms	1 ms
Switching frequency:	1 kHz			500 Hz	
Indicators	Yellow: output status (G01 excluded) Green: Stability			Yellow: output status (G01 excluded) Green: Stability (F01), Power ON (M01 and G01)	
Setting:	Sensitivity: 1 turn trimmer L/D selection (-P, -N models only)			G01: None	Sensitivity: 6 turns L/D selection (-P, -N models only)
Operating Temperature:	-25°C...55°C (not condensing)				
Storage Temperature:	-40 ... +70 °C				
W/G and W/B difference:	W/G: ~70%; W/B: ~ 85%		n.a.		< 2% in BGS range
Operating distance:	2...250 mm on W90%	0...1000 mm on W90%	50...7000 mm on R5	0...20 m	200 mm (BGS) 800 mm (White)

New ASIC

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S3N – Red Laser emission models with trimmer

New ASIC

	Retro Reflex Pol	Through Beam	Mech BGS
	S3N-PH-B01	S3N-PH-FG01	S3N-PH-M01
Response time:	0.25 ms	0.25 ms	0.25 ms
Switching frequency:	2kHz	2kHz	2kHz
Setting:	Sensitivity: 1 turn G01: none		6 turns adjust-ment screw
	On dual trimmer models: L/D selector Single trimmer models and G01: None		
Operating Temperature:	-20°C...55°C (not condensing)		
Storage Temperature:	-40 ... +70 °C		
W/G and W/B difference:	n.a.		w/g=2%, w/b=5%
Operating distance:	0.1...12m on R7	30m	130mm (BGS), 600mm (White90%)
Emission Type:	Laser Light 650nm (red) Class 1 Laser product IEC 60825-1 Ed.3 2014		

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S3N – IOL LED/Laser Emission with Teach-in

	Red LED Emission					Red Laser Emission class 1		
	Diff. Narrow beam	Diff. Long distance	Through Beam	Retro Reflex Pol.	Electronic BGS	Electronic BGS	Retro Reflex Pol	Through Beam
	S3N-PR-C03	S3N-PR-C13	S3N-PR-FG03	S3N-PR-B03	S3N-PR-M03	S3N-PH-M03	S3N-PH-B03	S3N-PH-FG03
Power Supply:	10-30 Vdc; reverse polarity protected							
Ripple:	p-p 10% max.							
Current consumption	≤35mA (≤50mA below 12V supply)							
Output:	IO-Link (Pin 4)+ configurable I/O (Pin2)							
Output current:	100 mA max. (as sum of the 2 output currents) short circuit protected							
Saturation voltage:	2 V max.							
Response time:	0.5 ms	0.5 ms	1 ms	0.5 ms	1 ms	0.33 ms	0.25 ms	0.25 ms
Switching frequency:	1 kHz	1 kHz	500 Hz	1 kHz	500 Hz	1.5 kHz	2 kHz	2 kHz
Setting:	Setting distance, L/D configuration, special functions by Teach button or IO-link configuration (see settings table)							
LIGHT/DARK selection:	By teach button or IO-Link configuration							
PNP/NPN Output:	Configurable through IO link configuration							
W/G and W/B difference:	W/G: ~70%; W/B: ~ 85%	W/G: ~70%; W/B: ~ 85%	n.a.	n.a.	W/G: ~2%; W/B: ~ 5%	W/G: ~4%; W/B: ~ 5%	n.a.	n.a.
Operating distance:	2...250 mm on W90%	0...1000mm on W90%	0...20 m	50...7000mm on R5	180 mm	130 mm	0.1...12m on R7	30 m
Emission Type:	Red LED 635nm EC 62471 EXEMPT RISK GROUP (RG0)					Laser Light 650nm (red) Class 1 Laser product IEC 60825-1 Ed.3 2014		

IO-Link
New ASIC

IO-Link Teach in product are available with M8 4pin connector

NEW

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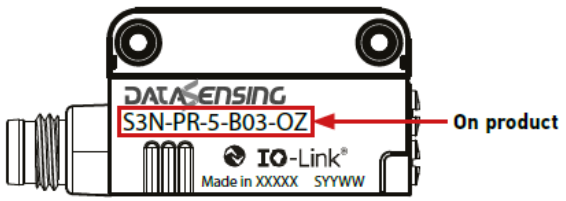
S3N IODD Handling

IO-Link IODD Files are directly addressed and downloaded by reading the related product QR code

WHERE TO FIND YOUR PRODUCT MODEL NAME



IO-LINK PARAMETERS

To download the respective IO-Link parameters, click or scan the QR codes below.

NOTE: To scan the correct QR code, see your product model name (refer to the images to the right to know where to find it). For example, if your product model name is "**S3N**-PR-5-**B03**-OZ", the QR code to scan is under "S3N-B03".

S3N-B03	S3N-Cx3	S3N-F03	S3N-G03	S3N-M03

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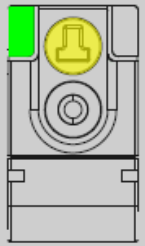
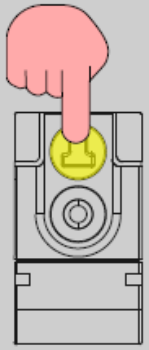
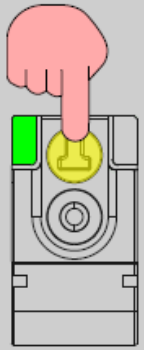
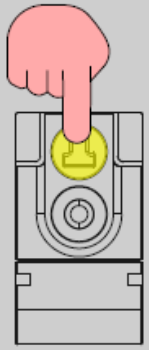
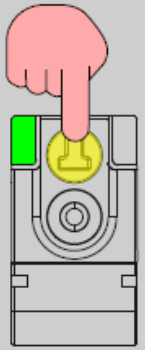
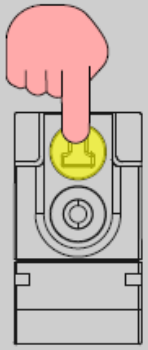
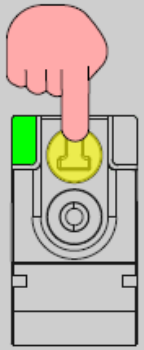
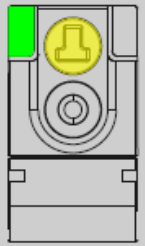
S3N – Advanced user interface for Teach in models

TEACH MODE FUNCTIONS

	Push and hold for...	1s	3s	6s	9s	12s	20s	Button release
Function	**Idle**	**Teach1**	**Teach2**	**Teach3**	**Teach4**	**Teach5**	**Teach6**	**Idle**
Visual Feedback	 Green LED on	 Green LED off	 Green LED on	 Green LED off	 Green LED on	 Green LED off	 Green LED on	 Green LED on
S3N-xx-5-C03/C13/ B03/FG03	Idle	Standard Teach (object)	Set max. sensitivity	L/D Select (Toggle)	Skipped - No LED TOGGLE → Hold until turns ON		Restore factory settings	Idle
S3N-PH-5-M03	Idle	Standard Teach (object)	Transparent/shiny (teach on back-ground)	L/D Select (Toggle)	Skipped - No LED TOGGLE → Hold until turns ON		Restore factory settings	Idle
S3N-PR-5-M03	Idle	Standard Teach (object)	Transparent/shiny (teach on back-ground)	Conveyor	Advanced Conveyor	L/D Select (Toggle)	Restore factory settings	Idle

The S3N Teach-In menu setting for push button models is very complete and very simple it needs just few user LED's guided steps to get fast and easy in the most useful and effective sensor setting. Then it can be possible, with few more steps, to handle one time environment sensor setting or enable expert functions to solve the most challanging applications.

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S3N – Advanced Teach for new IO-Link LED BGS models

The S3N Teach-In menu setting for LED BGS push button models is very complete and very simple to perform. The user can easily refer to LED status to set the most suitable adjustment for a proper object detecion, to solve easily any challanging application.
In case of the Red LED BGS Model S3N-PR-5-M03-OZ) the Teach 1 and Teach 2 are the most general setting to solve the most of BGS application also with shiny or transparent materials.
The Teach 3 and Teach 4 can be used in conveyor applications where particular target like irregular surface packages, particular packaging film has to be detected in a very stable way avoiding output instability and flickering

S3N-PR-5-M03-OZ

Teach1 (Standard BGS teach on target): Position the sensor in front of the target to be detected within the sensing range and perform Teach 1. The sensor is set up to detect the target in the taught position.
Teach 2 (Transparent/Shiny): Position the sensor in front of a stable background within the sensing range and execute Teach 2. The sensor is set up to detect transparent or shiny objects between the sensor and the background.
Teach 3 (Conveyor): Position the sensor in front of a running conveyor belt and perform Teach 3. The sensor is set up to reliably detect objects running on the conveyor. A special bracket is available to ease the mechanical setup of this application.
Teach 4 (Advanced Conveyor): Position the sensor in front of a running conveyor belt and perform Teach 4. The sensor is set up to reliably detect objects running on the conveyor. A special bracket is available to ease mechanical setup of this application.
Teach 5 (Toggle L/D behavior): Sensor behavior toggles between Ligh ON and Dark ON modes.

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S3N – Advanced Teach for new IO-Link Laser BGS models

The S3N Teach-In menu setting for Laser BGS push button models is very complete and very simple to perform. The user can easily refer to LED status to set the most suitable adjustment for a proper object detecion, to solve easily any challanging application.
In case of the Red Laser BGS Model (S3N-PH-5-M03-OZ) the Teach 1 and Teach 2 the detection algorithm has been designed to detect precisely small objects with very small difference between object and background also with shiny and transparent targets in a very stable way avoiding output instability and flickering.

S3N-PH-5-M03-OZ

Teach1 (Standard BGS teach on target): Position the sensor in front of the target to be detected within the sensing range and perform Teach 1. The sensor is set up to detect the target in the taught position.

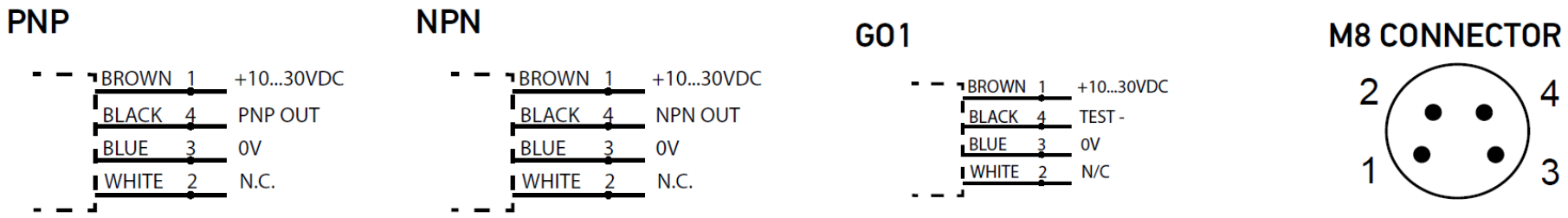
Teach 2 (Transparent/Shiny): Position the sensor in front of a stable background within the sensing range and perform Teach 2. The sensor is set up to detect transparent or shiny objects between the sensor and the background.

Teach 3 (Toggle L/D behavior): Sensor behavior toggles between Light ON and Dark ON modes.
the sensor and the background.

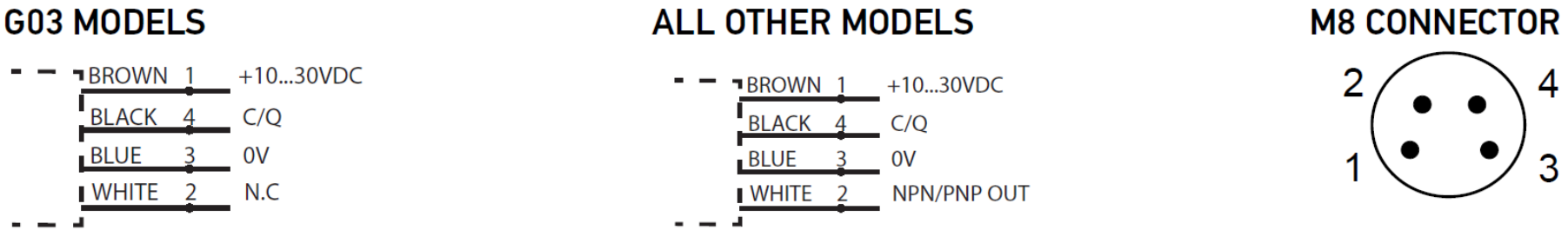
Red Laser Emission Class 1

S3N Connectivity

Cable and M8 4pins connectivity layout for LED/Laser Models with trimmer adjustment



M8 4pins connectivity layout for LED/Laser Models with Push Button TEACH IN adjustment and IO-Link communication



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S3N New Family IO-Link features

IO-Link
New ASIC

- IO-Link V1.1.2
- Smart sensor profile
- COM2 2,3ms cycle time
- Extended features with configurable process data
- Extended IO-Link features (Counter, Time stamp, ecc..)
- Comprehensive and exended detection modes (conveyor, window, ecc.)
- Double channel IO-Link
- Fully configurable I/O

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S3N - Applications

The S3N miniature family is very complete in terms of optical functions and object detection capability.
They can cover the most of the application of the former S3Z miniature family and even more with the new advanced models with advanced TEACH features and advanced IO-Link programmability.
The S3N is setting a new standard for all the application in the Datasensing's target industries.

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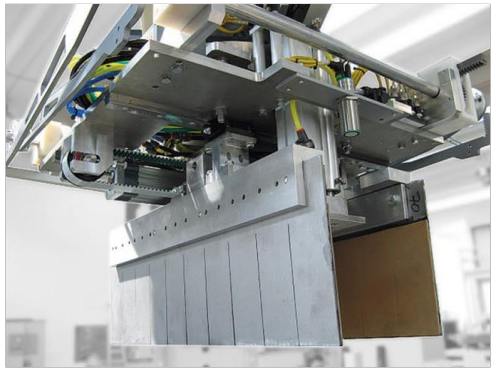
Load verification in a robot gripper

Inbound Logistics



In warehouse operations automated de-palletizing is enabled by means of robots. The photoelectric or ultrasonic sensors, placed on the robot gripper, are used to check the position on the material to handle and also verify for a loss of load during the movement of the robot arm.

S3N Background suppression model

- **Triangulation technology** guarantees an accurate and safety detection
- **LASER and LEDs technolgies** offer a flexible solution
- **M8 connector or cable version** for an easier mounting

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Object detection in flow pack machine

Primary Packaging

The “flow pack machines” are suitable for any need of flexible packaging for food and non-food applications. These machines operate with flexible plastic wrap reels based on various wrapping materials (Polyethylene, Polypropylene ...). These machines operate on continuous cycle, taking the plastic wrap from a reel, sealing it all around the product. BKGD suppression or polarized sensors are typically used to detect the material on the belt.

S3N Miniature sensor

- Sturdy and resistant plastic case
- High reliability detection
- Laser models

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Cardboard presence control in a case packer

Secondary Packaging

The Automatic case-packers are used to solve the works of forming, loading and sealing of cases. Photoelectric sensors are used to verify the presence and the position of the cases in order to guarantee the right process.

S3N Background Suppression model

- The triangulation technology guarantees an accurate and reliable detection
- Multi-turn trimmer adjustment to simplify the setting procedure
- Standard **M8 metal connector simplifies and speeds up the mounting phase**

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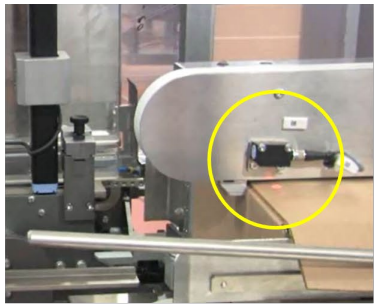
Cardboard presence control and positioning control

Secondary Packaging



In the automatic case-packers, photoelectric sensors are used to verify the presence and the position of the carton box in order to guarantee the correct insertion of the bundle.

S3N MINIATURE sensor (BKGD SUPP.)

- Compact housing
- Accurate and reliable detection also in case of different object colors
- Multi-turn trimmer adjustment

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Object detection: box positioning for tipper

Secondary Packaging

Moving from the automatic case-packers to the palletizer could be necessary to overturned the cardboard box in order to be sure that it enters in the area of the palletizer oriented correctly.

S3N MINIATURE sensor (RRX POL.)

- Compact housing
- Accurate and reliable detection also in case of very reflective objects
- Trimmer adjustment

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S3N - Availability

- The S3N miniature family is available by July 15 th
- The Transparent detection models (…T51 and …T53-OZ with TEACH and IO-Link) will be available on October 24 th
- The S3N family will be increased also by Mark Reader model available on March 2023

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S3N Red LED Emission Part Number

Distance	Adjustment	2 m 3 wires cable Ø 3.5 mm		M8 4pin		
		PNP	NPN	PNP	NPN	IO-Link + Conf. out
Red LED retro reflective polarized 0.05...7 m on R5	1 Trimmer (Adj.) LIGHT	S3N-PR-2-B01-PL (95B010092)	S3N-PR-2-B01-NL (95B010242)	S3N-PR-5-B01-PL (95B010092)	S3N-PR-5-B01-NL (95B010252)	-
	1 Trimmer (Adj.) DARK	S3N-PR-2-B01-PD (95B010102)	S3N-PR-2-B01-ND (95B010262)	S3N-PR-5-B01-PD (95B010112)	S3N-PR-5-B01-ND (95B010272)	-
	2 Trimmers (Adj.+ L/D)	S3N-PR-2-B01-P (95B010592)	S3N-PR-2-B01-N (95B010582)	S3N-PR-5-B01-P (95B010612)	S3N-PR-5-B01-N (95B010602)	-
	Push button	-	-	-	-	S3N-PR-5-B03-OZ (95B010790)
Red LED diffused Narrow Beam 1...250 mm	1 Trimmer (Adj.) LIGHT	S3N-PR-2-C01-PL (95B010042)	S3N-PR-2-C01-NL (95B010202)	S3N-PR-5-C01-PL (95B010052)	S3N-PR-5-C01-NL (95B010212)	-
	1 Trimmer (Adj.) DARK	S3N-PR-2-C01-PD (95B010062)	S3N-PR-2-C01-ND (95B010222)	S3N-PR-5-C01-PD (95B010072)	S3N-PR-5-C01-ND (95B010232)	-
	2 Trimmers (Adj.+ L/D)	S3N-PR-2-C01-P (95B010672)	S3N-PR-2-C01-N (95B010662)	S3N-PR-5-C01-P (95B010692)	S3N-PR-5-C01-N (95B010682)	-
	Push Button	-	-	-	-	S3N-PR-5-C03-OZ (95B010790)
Red LED diffused Long Distance 0...1000 mm	1 Trimmer (Adj.) LIGHT	S3N-PR-2-C11-PL (95B010002)	S3N-PR-2-C11-NL (95B010162)	S3N-PR-5-C11-PL (95B010012)	S3N-PR-5-C11-NL (95B010172)	-
	1 Trimmer (Adj.) DARK	S3N-PR-2-C11-PD (95B010022)	S3N-PR-2-C11-ND (95B010182)	S3N-PR-5-C11-PD (95B010032)	S3N-PR-5-C11-ND (95B010192)	-
	2 Trimmers (Adj.+ L/D)	S3N-PR-2-C11-P (95B010632)	S3N-PR-2-C11-N (95B010622)	S3N-PR-5-C11-P (95B010652)	S3N-PR-5-C11-N (95B010642)	-
	Push Button	-	-	-	-	S3N-PR-5-C13-OZ (95B010800)
Red LED through beam emitter and receiver 0...20 m	1 Trimmer (Adj.) LIGHT	S3N-PR-2-FG01-PL (95B010122)	S3N-PR-2-FG01-NL (95B010282)	S3N-PR-5-M01-PL (95B010352)	S3N-PR-5-FG01-NL (95B010292)	-
	1 Trimmer (Adj.) DARK	S3N-PR-2-FG01-PD (95B010142)	S3N-PR-2-FG01-ND (95B010302)	S3N-PR-5-FG01-PD (95B010152)	S3N-PR-5-FG01-ND (95B010312)	-
	2 Trimmers (Adj.+ L/D)	S3N-PR-2-FG01-P (95B010712)	S3N-PR-2-FG01-N (95B010702)	S3N-PR-5-FG01-P (95B010132)	S3N-PR-5-FG01-N (95B010722)	-
	Push Button	-	-	-	-	S3N-PR-5-FG03-OZ (95B010810)
Red LED background suppression Mechanic 0...800 mm (*)	1 Trimmer (Adj.) LIGHT	S3N-PR-2-M01-PL (95B010332)	S3N-PR-2-M01-NL (95B010322)	S3N-PR-5-M01-PL (95B010352)	S3N-PR-5-M01-NL (95B010342)	-
	1 Trimmer (Adj.) DARK	-	-	S3N-PR-5-M01-PD (95B010562)	-	-
	2 Trimmers (Adj.+ L/D)	S3N-PR-2-M01-P (95B010752)	S3N-PR-2-M01-N (95B010742)	S3N-PR-5-M01-P (95B010772)	S3N-PR-5-M01-N (95B010762)	-
Red LED bkgd.suppression electronic 0...180 mm (*)	Push Button	-	-	-	-	S3N-PR-5-M03-OZ (95B010820)

S3N Red Laser Emission Part Number

Distance	Adjustment	2 m 3 wires cable Ø 3.5 mm		M8 4pin		
		PNP	NPN	PNP	NPN	IO-Link + Conf. out
Red Laser Retro Reflex Polarized 0.05...10 m on R7	2 Trimmers (Adj.+ L/D)	S3N-PH-2-B01-P (95B010442)	S3N-PH-2-B01-N (95B010452)	S3N-PH-5-B01-P (95B010462)	S3N-PH-5-B01-N (95B010472)	-
	Push Button	-	-	-	-	S3N-PH-5-B03-OZ (95B010880)
Red Laser bkgd. suppres-sion mech. 0...350 mm (*)	2 Trimmers (Adj.+ L/D)	S3N-PH-2-M01-P (95B010482)	S3N-PH-2-M01-N (95B010492)	S3N-PH-5-M01-P (95B010502)	S3N-PH-5-M01-N (95B010512)	-
Red Laser bkgd. suppression electronic 0...130 mm (*)	Push Button	-	-	-	-	S3N-PH-5-M03-OZ (95B010900)
Red Laser Through beam emitter and receiver 0...20 m	2 Trimmers (Adj.+ L/D)	S3N-PH-2-FG01-P (95B010522)	S3N-PH-2-FG01-N (95B010532)	S3N-PH-5-FG01-P (95B010542)	S3N-PH-5-FG01-N (95B010552)	-
	Push Button	-	-	-	-	S3N-PR-5-FG03-OZ (95B010890)

THANK YOU

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