Distance settable Photoelectric Sensor for conveying applications

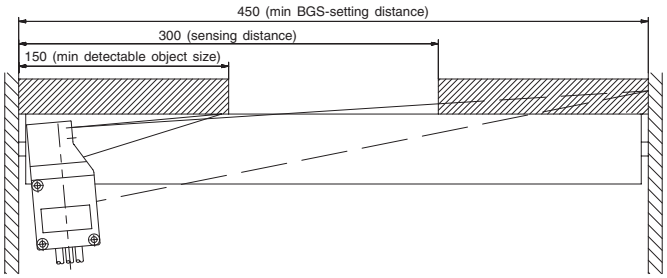
F3C-AA42-□□

- Background influences are eliminated by a unique optical system for setting the detection distance
- Small black-/white-error
- Sensing distance mechanically adjustable:
  BGS setting distance: 150 - 900 mm
  Detecting distance: 0 - 750 mm
- Small housing-case specially designed for conveyer-application (only 8 mm of thickness on the top of the housing)
- Minimal blind-zone through additional receiver
- Sensitivity adjustment for near side detector
- Integrated jamming control unit (Only F3C-AA42-3J)

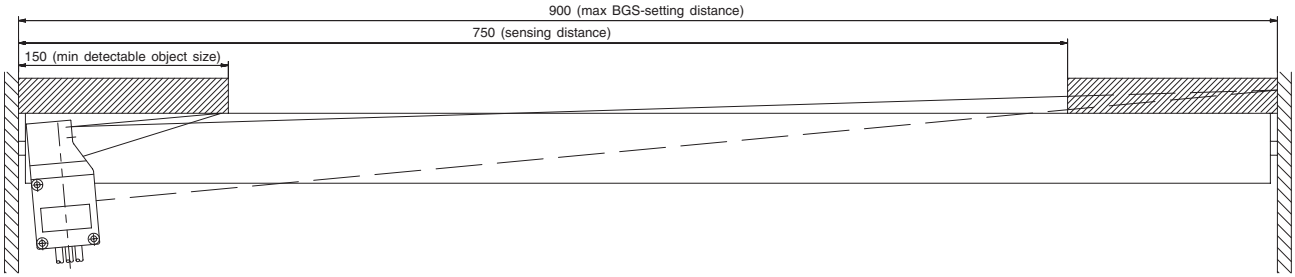
Stable Detection Background-Suppression-Type



Application



Example for sensing characteristics (detection area) in conveyor application and description of setting the minimum and maximum Background Suppression (BGS) function.



Specifications

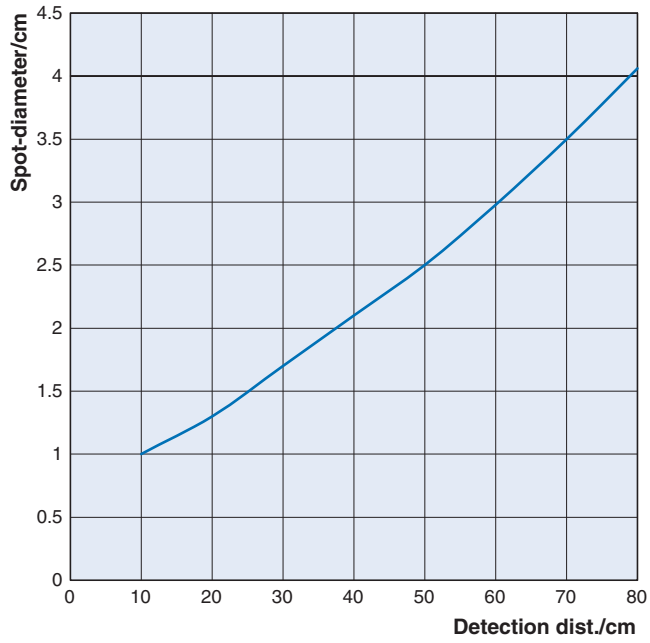
Item	F3C-AA42-1	F3C-AA42-3J
LED for emitter	Infrared LED (wavelength 880 nm)	
Sensitivity adjustment for BGS	6-turn endless adjustor	
Sensitivity adjustment for near side detector	1-turn potentiometer	
Typical adjustment range	0 ... 200 mm (Kodak -Gray-Card / 90 % reflectivity)	
Connecting method / cable length	Prewired Power supply (M12 plug) / 30 cm (4 x 0.34 mm²)	Prewired Power supply (M12 plug) / 30 cm (4 x 0.34 mm²) Neighbg. sensor (M12 socket) / 150 cm (4 x 0.34 mm²) Valve output (with socket) / 200 cm (2 x 0.35 mm²)
Output configuration	PNP	
Control output	Dark-on	Dark-on Jamming control output / input via M12 moulded plug / socket, prewired valve control output
Circuit protection	Load short-circuit protection and mutual interference suppression	
LED stability- / function indication	Permanent light: Object detected / stable function Blinking light: Object detected / instable function	
Materials	Case: ABS plastic Lenses: Acrylic, PMMA	
Weight	60 g	180 g
Attachment	Screwdriver for adjustment, instruction manual	

Ratings / Characteristics

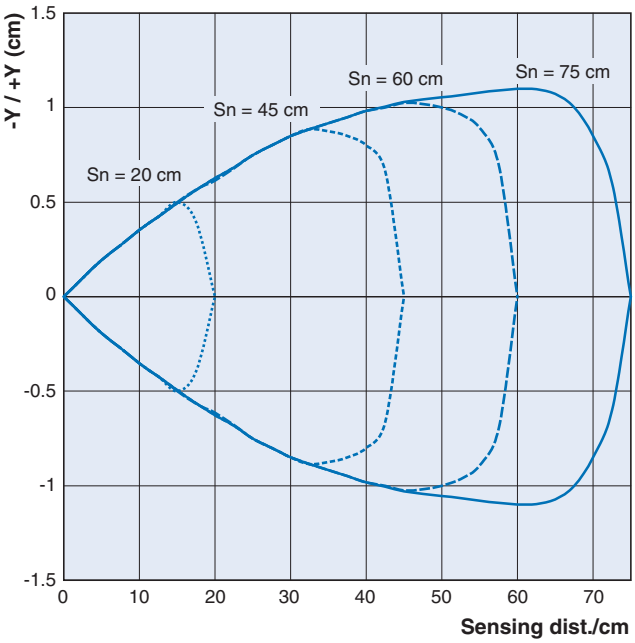
Item	F3C-AA42-1	F3C-AA42-3J
Power supply voltage	10 to 30 V DC; ripple 10 % max.	
Current consumption	40 mA max.	
Settable distance for background suppression	150 ... 900 mm (Kodak -Gray-Card / 90 % reflectivity, 200 x 200 mm)	
Detecting distance (recommended)	0 ... 750 mm (Kodak -Gray-Card / 90 % reflectivity, 200 x 200 mm)	
Hysteresis	BGS-receiver Max. 2 % of adjusted distance Energetic receiver:Max. 20 % of adjusted distance	
Reflectivity (Black-/white-error)	40 mm diameter at 750 mm detection distance	
Response time	max. 10 ms for both operation and release	
Control / Valve output current	---	150 mA max. at 30 V DC (voltage drop max. 2.0 V)
Jamming supply current	---	5 A amx. at 30 V DC (max. 30 sensor may be connected for jamming control)
Ambient illumination	Incandescent lamp:Illumination on optical spot: max. 5,000 lx Sunlight: Illumination on optical spot: max 5,000 lx Fluorescent lamps:max. 5,000 lx	
Ambient temperature	Operating: -5 °C to +55 °C (no icing)	
Insulation resistance	20 MΩ min. (at 500 V DC)	
Dielectric strength	1,000 V AC, 50/60 Hz for 1 min	
Vibration resistance	10 ... 55 Hz, amplitude = +/-1.5 mm (or 300 m/s²) for 2 hrs. each in X, Y and Z-direction	
Shock resistance	Pulse shape: half-sine, peak acceleration: 300 m/s², duration of pulse: 18 ms	
Enclosure rating	IP54	

Engineering Data

Spotdiameter via detection distance*1

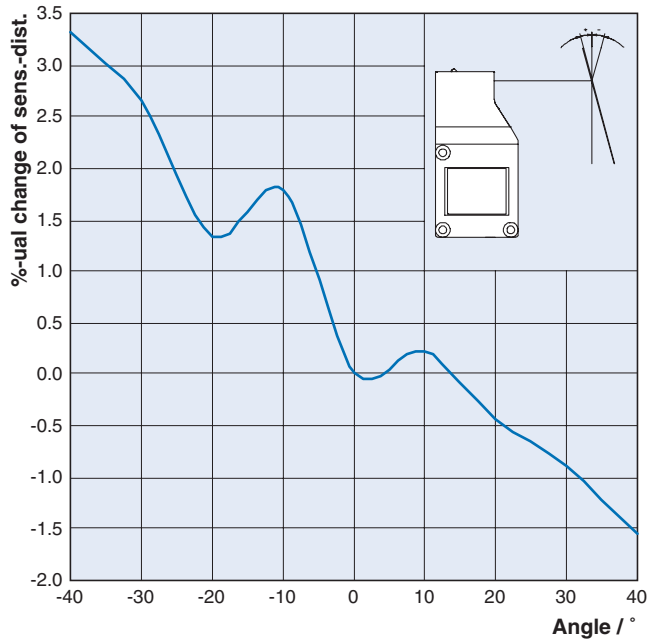


Operating range*1

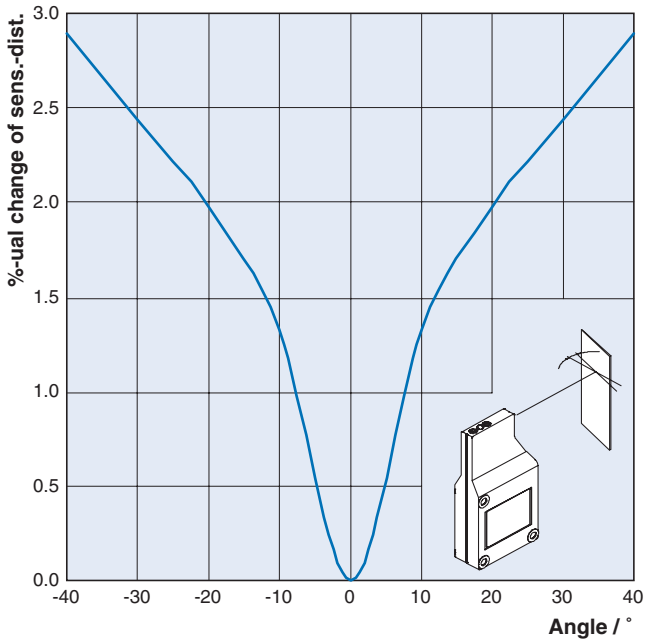


Angle Characteristics of F3C-BGS-Conveyor Sensor

Vertical detection*1

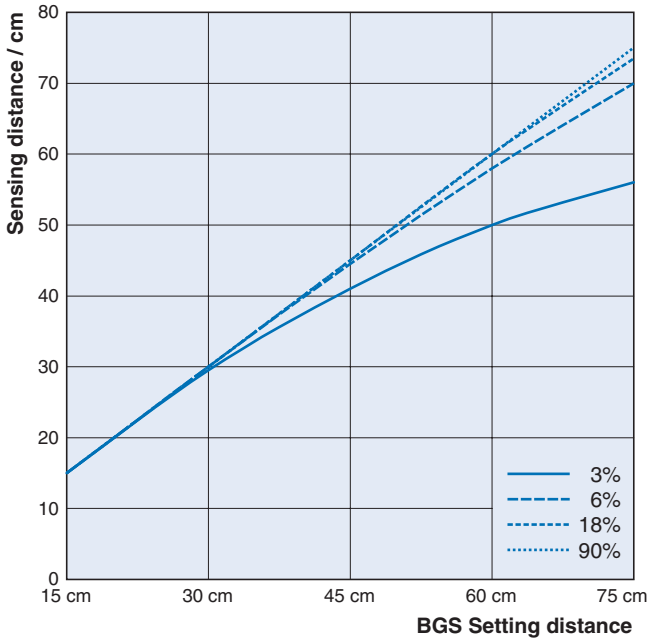


Horizontal detection*1



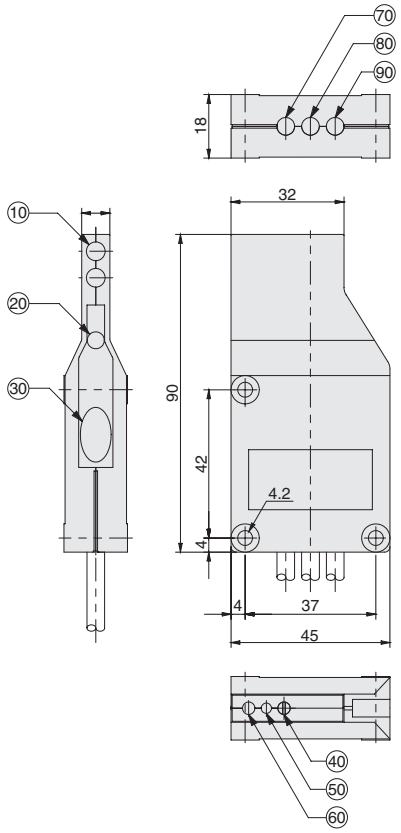
*1. Reflecting object: Kodak-Gray-Card / 90 % reflectivity / 200 mm x 200 mm

Black-/White-Error (related to Kodak-Gray-Card 90 %)



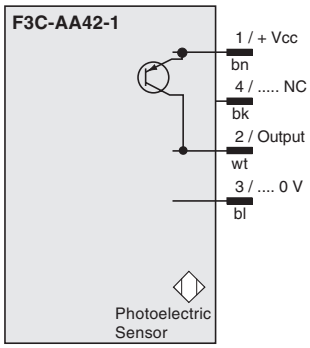
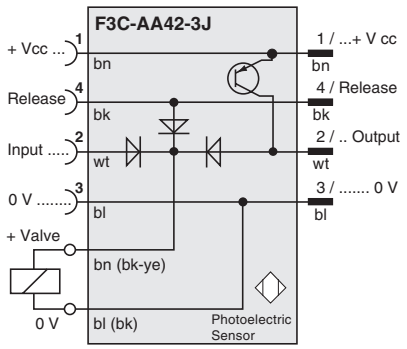
*1. Reflecting object: Kodak-Gray-Card / 90 % reflectivity / 200 mm x 200 mm

Nomenclature

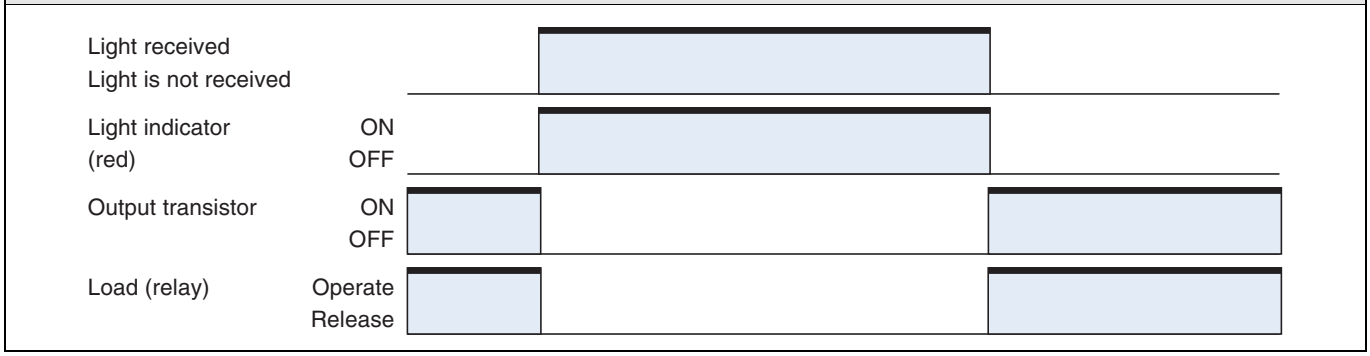


Pos.	Functional description
10	IR-emitting LED
20	Near-side detector
30	Optical module
40	Black coloured adjustment knob for setting distance (6-turns)
50	LED light-/stability indicator
60	Yellow knob for near-side adjustment (1-turn)
70	M12-plug for power supply
80	M12-socket for neighbouring sensor (Only 3J-type)
90	Valve cable (Only 3J-type)

Operation

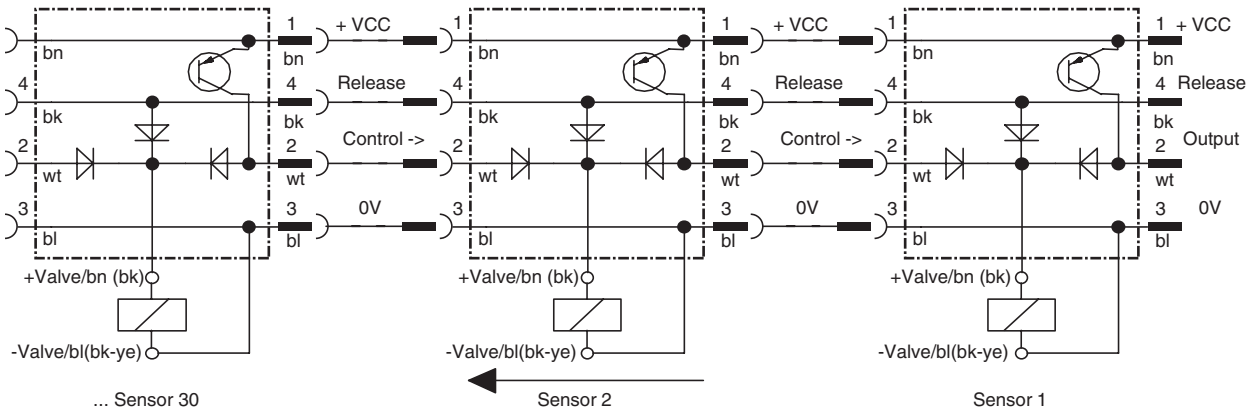
Output configuration	Mode switch	Output transistor	Output circuit	
			F3C-AA42-1	F3C-AA42-3J
PNP	Dark-ON	ON when light is not received		

Timing Chart



Jamming control connections and principal circuit (Only F3C-AA42-3J)

F3C-AA42-3J	Plug for power supply	Socket for neighbouring sensor	Cable for valve
No. 1 / bn	+Vcc(10 ... 30 V DC)	+Vcc(10 ... 30 V DC)	- / -
No. 2 / wt	Control output	Control input	- / -
No. 3 / bl	0 V	0 V	- / -
No. 4 / bk	Release input	Release output	- / -
bn (bk)	- / -	- / -	+ Valve output
bl (bk-ye)	- / -	- / -	0 V / Valve



Precautions

Installation and adjustment

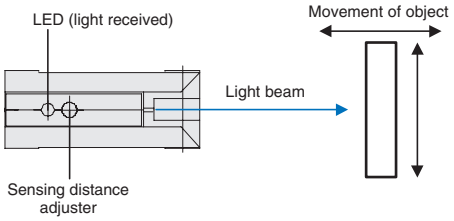
1. Switch off power supply
2. Connect sensor 1 to the power supply station. Make sure that the correct voltage value is adjusted. Max. 30 sensors can be connected together. The power supply is linked from oneswitch to the other via M12-connector.
3. Fix sensor, by using an adequate mounting bracket, in the middle of between the conveyer rolls and twist the case slighty backward (2-5°)
4. Turn black-coloured distance adjustment knob (Pos. 40) and yellow coloured screw (Pos. 60) for near-side-detection carefully counterclockwise until minimum position is reached
5. Switch on power supply
6. At first adjust the sensing distance by turning the black knob, that at least 5 % of the switching distance value can be guaranteed related to the reflecting background (check by using a Kodak Gray Card with 90 % reflectivity)
7. Activate near-side detector by turning the yellow-coloured knob (Pos. 60) clockwise - the red LED should not blink and should light permanently when the object is detected. Otherwise increase sensitivity by turning the yellow knob clockwise
8. When object is removed, the red LED should not light or blink

Recommended adjustment

The adjusted sensing-distance of the near-side detector should not exceed the BGS-Settingdistance.

Correct operation

The moving direction of the sensor or object should be preferably along the optical axis of the light beam. Lateral approach is also possible. Movement from the top to the bottom or opposite can case malfunction and should be avoided.



In case of installing two sensors facing each other, the optical axis should be moved to prevent any mutual interference.

Avoid influences of any strong ambient light sources that can decrease the sensitivity of the sensor or cause instable working condition.

Connections and precautions

If the input/output lines of the photoelectric sensor are placed in the same conduit or duct as power lines or high-voltage lines, the photoelectric sensor could be induced to malfunction, or even be damaged by electrical noise. Either separate the wiring or use shielded lines as input/output lines to the photoelectric sensor.

The cord connected to the Sensor can be extended up to 50 m provided that the diameter of each wire is 0,3 mm² minimum.

Maintenance

Normally the F3C doesn't need any maintenance. Only the optical surfaces should be cleaned from time to time by using a soft cloth.

Startup Operation

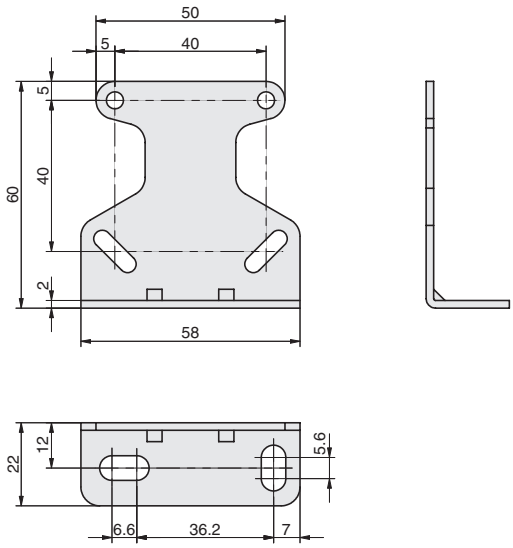
A maximum of 300 ms is required from the time power is turned on until F3C is able to detect objects. If power is supplied to the loads and the F3C from different sources, turn on power to the F3C first.

Water resistivity

Do not use F3C in water, in rain or outdoors.

Accessories

Standard mounting bracket for easy installation. Ordering number E39-L40



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. E27E-EN-01

In the interest of product improvement, specifications are subject to change without notice.