## OMRON

Single beam safety sensor for long distance detection

F3SS

60-m long-distance detection. Single beam safety sensor for personnel detection (type 4) is ideal for perimeter protection or multi-sided detection of intrusion into large machines.



### **Features**

- Mutual interference protection function for up to four sets.
- Complies with IEC standards and North American standards (received IEC61496-1, -2, and UL/CSA certification). Can be used as a safety guard for satisfaction of OSHA requirements for on-site labor safety in North America.
- Special controller not needed. Detection of human body intrusion is possible using just the sensor unit.
- Includes "Start/restart interlock function" to prevent automatic reset of output.
- The emitter lens and receiver lens are equipped with heaters for worry-free operation even in environments where condensation is an issue.
- Optional glass and stainless steel mirrors are available.

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### **Ordering Information**

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Sensors								Infrared ray
Sensor type	Shape	Se	ensing d	istance		Minimum detectable object (mm)	Operating mode	Model
Through-beam	00			0.3 to 6	60m	31-mm dia.	Light ON	F3SS-AT60P

Note: Emitter: F3SS-AT60P-L, receiver F3SS-AT60P-D Can also be ordered as single units.

#### Accessories (Order Separately)

Item	Model
Laser alignment kit (for optical axis adjustment)	F39-LLK
Glass mirror	F39-MSG
Stainless steel mirror	F39-MSS
$45\Omega$ mirror clamp	F39-LM45
Mirror clamp for wall mounting	F39-LA
Sensor clamp for 42-mm dia. column stand	F39-LSP

Note: Wiring is based on a built-in terminal block. Please purchase a 4-mm to 7-mm (dia.) cable separately. Safety Relay Unit

For controlling the outputs we recommend to use safety relay units G9SA or G9SB

Appearance	Output	Model	
	Expandable relay unit series with up to 8 safety relay outputs. Time delay for stop category 1 can be realized. (Please refer to page G-119)	G9SA series	
	Small size safety relay unit with 17.5 mm and 22.5 mm size. Up to 3 safety relay outputs are available. (Please refer to page G-133)	G9SB series	
	Fletible and expandable safety unit with solid state outputs	G9ST series	

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### Rating/performance

Sensing distance       0.3 to 60 m         Number of optical axes       1 (single beam)         Beam diarreter       31 mm         Min. sensing object       Opaque object, 31-mm dia. or greater         Orientation angle       emitter/receiver: ±2.5° or less each (based on IEC61496-2 at detection distance of 3 m or greater)         Light source (wave length)       infrared LED (880 nm)         Power supply voltage       24 V DC ±10%, ripple (p-p) 5% or less         After power is turnedo 3       ts or less         Current consumption       Emitter: 170 mA or less, receiver: 800 mA or less (including load output current)         Operating       Auto start mode, start interlock mode, and start/restart interlock mode can all be selected using a switch in the receiver.         PNP transistor outputs X 2 outputs, load current 250 mA or less (residual voltage 1 V or less) (excluding voltage 4 ro less) (excluding voltage 5 ro less 4 ro cable extension), Light ON         Protective       Output load short circuit and power supply reverse connection protection         Response time       S ms max.         Atter torion/durability: 10 to 5 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Protective: <t< th=""><th>Item</th><th>Model</th><th>F3SS-AT60P</th></t<>	Item	Model	F3SS-AT60P			
axes         I (single beam)           Beam diameter         31 mm           Min. sening object         Opaque object, 31-mm dia. or greater           Orientalionaria         mgle           Drientalionaria         mgle           Orientalionaria         mgle           Orientalionaria         mitter/receiver: ±2.5° or less each (based on IEC61496-2 at detection distance of 3 m or greater)           Uight source         infrared LED (880 nm)           Power is turned on         a sor less           Current consumption         Faitre DE (880 nm)           Power is turned on         a sor less           Current consumption         Emitter: 170 mA or less, receiver: 800 mA or less (including load output current)           Current consumption         Muto start mode, start interlock mode, and start/restart interlock mode can all be selected using a switch in the receiver.           Consultionaria         Auto start mode, start interlock mode, and start/restart interlock mode can all be selected using a switch in the receiver.           Consultionaria         Output load short circuit and power supply reverse connection protection           Responsitionaria         Sins max.           Ambient Limidity         Operating/Storage: 0°C to 55°C (with no icing or condensation)           Vibrationaria         Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions	Sensing distance		0.3 to 60 m			
Min. sensing object       Opaque object, 31-mm dia. or greater         Orientation angle       emitter/receiver: ±2.5° or less each (based on IEC61496-2 at detection distance of 3 m or greater)         Light source       infrared LED (880 nm)         Power systpy voltage       24 V DC ±10%, ripple (p-p) 5% or less         After power is turned on       4 s or less         Current consumption       Emitter: 170 mA or less, receiver: 800 mA or less (including load output current)         Operations       Auto start mode, start interlock mode, and start/restart interlock mode can all be selected using a switch in the receiver.         Control vertions       Output load short circuit and power supply reverse connection protection         Response time (NA OFFF)       Operating/Storage: 0°C to 55°C (with no icing or condensation)         Ambient timedity       Operating/Storage: 0°C to 55°C (with no icing or condensation)         Ambient timedity       Operating/Storage: 0°C to 55°C (with no icing or condensation)         Vibration       Kalfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Shock resistance       Malfunction/durability: 10 om/s2, 1,000 times each in X, Y, and Z directions         Protective       Keofo529 Standard IP65         Connect to terminal block on internal board       Connect to terminal block on internal board         Weight (Packed state)       2.5 kg			1 (single beam)			
Orientation         angle         emitter/receiver: ±2.5° or less each (based on IEC61496-2 at detection distance of 3 m or greater)           Light source         infrared LED (880 nm)           Power supply voltage         24 V DC ±10%, ripple (p-p) 5% or less           After power is turned on         4 s or less           Current consumption         Emitter: 170 mA or less, receiver: 800 mA or less (including load output current)           Operating         Muto start mode, start interlock mode, and start/restart interlock mode can all be selected using a switch in the receiver.           Control         Vput         PNP transistor outputs x 2 outputs, load current 250 mA or less (residual voltage 1 V or less) (excluding voltage drop due to cable extension), Light ON           Protective         cruits         Output load short circuit and power supply reverse connection protection           Response time (NN-OFF)         35 ms max.         35 ms max.           Ambient temperature         Operating/Storage: 0°C to 55°C (with no icing or condensation)         Vibration/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions           Shock resistance         Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Connect to terminal block on internal board           Weight (Pa:ked state)         2.5 kg         Aluminum         Connect to terminal block on internal board           Konneettive         Set of mounting brackets, operation man	Beam di	ameter	31 mm			
Light source (wave length)       Infrared LED (880 nm)         Power supply voltage       24 V DC ±10%, ripple (p-p) 5% or less         After power is turned on Startup time       4 s or less         Current consumption       Emitter: 170 mA or less, receiver: 800 mA or less (including load output current)         Operating mode       Auto start mode, start interlock mode, and start/restart interlock mode can all be selected using a switch in the receiver.         Control output       PNP transistor outputs x 2 outputs, load current 250 mA or less (residual voltage 1 V or less) (excluding voltage drop due to cable extension), Light ON         Protective circuits       Output load short circuit and power supply reverse connection protection         Response time (ON-OFF)       35 ms max.         Ambient temperature       Operating/Storage: 0°C to 55°C (with no icing or condensation)         Vibration resistance       Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Shock resistance       Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Protective structure       IEC60529 Standard IP65         Connect to terminal block on internal board       2ase         Materi- al       Case       Aluminum         Accessories       Set of mounting brackets, operation manual, caps for unused conduits	Min. sen	sing object	Opaque object, 31-mm dia. or greater			
Intrared LED (880 nm)           Power supply voltage         24 V DC ±10%, ripple (p-p) 5% or less           After power is turned on Startup ime         4 s or less           Current consumption         Emitter: 170 mA or less, receiver: 800 mA or less (including load output current)           Operatime         Auto start mode, start interlock mode, and start/restart interlock mode can all be selected using a switch in the receiver.           Control vert         PNP transistor outputs x 2 outputs, load current 250 mA or less (residual voltage 1 V or less) (excluding voltage drop due to cable extension), Light ON           Protective:         Output load short circuit and power supply reverse connection protection           Responst         Ø         Operating/Storage: 0°C to 55°C (with no icing or condensation)           Ambientime         Operating/Storage: 0°C to 55°C (with no icing or condensation)           Vibratio         Sm max.           Storage:         Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions           Shok resistance         Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions           Shok resistance         Malfunction/durability: 10 m/s2, 1,000 times each in X, Y, and Z directions           Shok resistance         Malfunction/durability: 10 m/s2, 1,000 times each in X, Y, and Z directions           Shok resistance         Malfunction/durability: 10 m/s2, 1,000 times each in X, Y, and Z directions	Orientati	on angle	emitter/receiver: ±2.5° or less each (based on IEC61496-2 at detection distance of 3 m or greater)			
After power is turned on Startup time       4 s or less         Current consumption       Emitter: 170 mA or less, receiver: 800 mA or less (including load output current)         Operating mode       Auto start mode, start interlock mode, and start/restart interlock mode can all be selected using a switch in the receiver.         Control output       PNP transistor outputs x 2 outputs, load current 250 mA or less (residual voltage 1 V or less) (excluding voltage drop due to cable extension), Light ON         Protective:       Voltput load short circuit and power supply reverse connection protection         Response time (ON-OFF)       S5 ms max.         Ambient temperature       Operating/Storage: 0°C to 55°C (with no icing or condensation)         Ambient temperature       Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Shock resistance       Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Protective structure       IEC60529 Standard IP65         Connect to terminal block on internal board       Connect to terminal block on internal board         Weight {back resistance}       Aluminum         Gase       Aluminum         Gase       Aluminum         Auminum       Set of mounting brackets, operation manual, caps for unused conduits			Infrared LED (880 nm)			
Startup time       4 s or less         Current consumption       Emitter: 170 mA or less, receiver: 800 mA or less (including load output current)         Operative       Auto start mode, start interlock mode, and start/restart interlock mode can all be selected using a switch in the receiver.         Control ve       PNP transistor outputs x 2 outputs, load current 250 mA or less (residual voltage 1 V or less) (excluding voltage drop due to cable extension), Light ON         Protective       Cutput load short circuit and power supply reverse connection protection         Response time (ON-OFF)       35 ms max.         Ambient temperature       Operating/Storage: 0°C to 55°C (with no icing or condensation)         Ambient version       Operating/Storage: 35% to 95% RH (no condensation)         Vibratior versistance       Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Shock resistance       Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Protective structure       EC60529 Standard IP65         Connect to terminal block on internal board       Veight (Data)         Qase       Aluminum         Aluminum       Gase       Aluminum         Auminum       St of mounting brackets, operation manual, caps for unused conduits	Power s	upply voltage	24 V DC ±10%, ripple (p-p) 5% or less			
Operating mode       Auto start mode, start interlock mode, and start/restart interlock mode can all be selected using a switch in the receiver.         Control vertice       PNP transistor outputs x 2 outputs, load current 250 mA or less (residual voltage 1 V or less) (excluding voltage drop due to cable extension), Light ON         Protective       Circuits       Output load short circuit and power supply reverse connection protection         Response time (ON=OFF)       35 ms max.         Ambient temperature       Operating/Storage: 0°C to 55°C (with no icing or condensation)         Ambient temperature       Operating/Storage: 35% to 95% RH (no condensation)         Vibratior       Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Shock resistance       Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Protective structure       IEC60529 Standard IP65         Connect to terminal block on internal board       2.5 kg         Material       Case       Aluminum         Case       Aluminum         Accessories       Set of mounting brackets, operation manual, caps for unused conduits			4 s or less			
Operating mode       receiver.         Control vertice       PNP transistor outputs x 2 outputs, load current 250 mA or less (residual voltage 1 V or less) (excluding voltage drop due to cable extension), Light ON         Protective circuits       Output load short circuit and power supply reverse connection protection         Response time (ON-OFF)       0utput load short circuit and power supply reverse connection protection         Ambient temperature       Operating/Storage: 0°C to 55°C (with no icing or condensation)         Ambient temperature       Operating/Storage: 35% to 95% RH (no condensation)         Vibrative resistance       Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Shock resistance       Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Protective structure       IEC60529 Standard IP65         Connect to terminal block on internal board       Connect to terminal block on internal board         Weight (Packed state)       2.5 kg         Materia       Case       Aluminum         Cap       Aluminum         Accessevite       Set of mounting brackets, operation manual, caps for unused conduits	Current	consumption	Emitter: 170 mA or less, receiver: 800 mA or less (including load output current)			
Control ottput       drop due to cable extension), Light ON         Protective circuits       Output load short circuit and power supply reverse connection protection         Response time (ON-oFF)       35 ms max.         Ambient temperature       Operating/Storage: 0°C to 55°C (with no icing or condensation)         Ambient temperature       Operating/Storage: 35% to 95% RH (no condensation)         Vibrationer       Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Shock resistance       Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Protective structure       IEC60529 Standard IP65         Connect to terminal block on internal board       Case         Material       Case       Aluminum         Aluminum       St st of mounting brackets, operation manual, caps for unused conduits	Operating mode					
Response time (ON-OFF)       35 ms max.         Ambient temperature       Operating/Storage: 0°C to 55°C (with no icing or condensation)         Ambient humidity       Operating/Storage: 35% to 95% RH (no condensation)         Vibration resistance       Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Shock resistance       Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Protective structure       IEC60529 Standard IP65         Connect o terminal block on internal board         Weight (Packed state)       2.5 kg         Material       Case         Aluminum         Accessories       Set of mounting brackets, operation manual, caps for unused conduits	Control output					
(ON-OFF)       35 ms max.         Ambient temperature       Operating/Storage: 0°C to 55°C (with no icing or condensation)         Ambient humidity       Operating/Storage: 35% to 95% RH (no condensation)         Vibratior resistance       Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Shock resistance       Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Protective structure       IEC60529 Standard IP65         Connect to terminal block on internal board       Connect to terminal block on internal board         Weight (Packed state)       2.5 kg         Material       Case       Aluminum         al       Case       Aluminum         Accessories       Set of mounting brackets, operation manual, caps for unused conduits	Protectiv	e circuits	Output load short circuit and power supply reverse connection protection			
Ambient humidity       Operating/Storage: 35% to 95% RH (no condensation)         Vibration resistance       Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Shock resistance       Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Protective structure       IEC60529 Standard IP65         Connect to terminal block on internal board         Weight (Packed state)       2.5 kg         Material       Cape         Aluminum         Accessories       Set of mounting brackets, operation manual, caps for unused conduits			35 ms max.			
Vibration       Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions         Shock resistance       Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Protective structure       IEC60529 Standard IP65         Connection       method         Veight (Packed state)       2.5 kg         Material       Case         Aluminum         Accessories       Set of mounting brackets, operation manual, caps for unused conduits	Ambient temperature		Operating/Storage: 0°C to 55°C (with no icing or condensation)			
Shock resistance       Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions         Protective structure       IEC60529 Standard IP65         Connect to terminal block on internal board       Connect to terminal block on internal board         Weight / Lecked state)       2.5 kg         Material       Case       Aluminum         Accessory       Set of mounting brackets, operation manual, caps for unused conduits	Ambient humidity		Operating/Storage: 35% to 95% RH (no condensation)			
Protective       IEC60529 Standard IP65         Connective       Meteritation         Veight (value)       2.5 kg         Materitation       Aluminum         Accessory       Set of mounting brackets, operation manual, caps for unused conduits	Vibration resistance		Malfunction/durability: 10 to 50 Hz, amplitude 0.7 mm, 20 sweeps each in X, Y, and Z directions			
Connection     method     Connect to terminal block on internal board       Weight / Exced state)     2.5 kg       Materi- al     Case     Aluminum       Cap     Aluminum       Access/res     Set of mounting brackets, operation manual, caps for unused conduits	Shock resistance		Malfunction/durability: 100 m/s2, 1,000 times each in X, Y, and Z directions			
Weight (Facked state)     2.5 kg       Material     Case     Aluminum       Cap     Aluminum       Accessories     Set of mounting brackets, operation manual, caps for unused conduits	Protective structure		IEC60529 Standard IP65			
Material       Case       Aluminum         al       Cap       Aluminum         Accessories       Set of mounting brackets, operation manual, caps for unused conduits	Connection method		Connect to terminal block on internal board			
Accessories     Set of mounting brackets, operation manual, caps for unused conduits	Weight (Packed state)		2.5 kg			
Accessories         Set of mounting brackets, operation manual, caps for unused conduits	Materi- Case		Aluminum			
	al	Сар	Aluminum			
Applicable standards IEC (EN) 61496-1 TYPE4 ESPE <sup>1</sup> IEC61496-2 TYPE4 AOPD <sup>2</sup>	Accesso	ries	Set of mounting brackets, operation manual, caps for unused conduits			
	Applicab	le standards	IEC (EN) 61496-1 TYPE4 ESPE <sup>*1</sup> IEC61496-2 TYPE4 AOPD <sup>*2</sup>			

\*1) ESPE (Electro-Sensitive Protective Equipment)
\*2) AOPD (Active Opto-electronic Protective Devices)

### Wiring

Wire the F3SS only after all power has been turned off. Emitter

Terminal block number	Terminal name	Functions	Terminal block assignments	
J3	+24 VDC	+DC24V	$\oslash \oslash$	
55	RTN	0V (GND)	RTN +24VDC	

#### Receiver

Terminal block number	Terminal name	Functions	Terminal block assignments
	1	Control out- put 1 (+)	
	2	For control out- put 1/2 COM (-)	
J5	3	Control output 2 (+)	1 2 3 4 5 6 7
	4	START(-)	
	5	START(+)	
	6	+DC24V	
	7	0V (GND)	

Note: Ground the emitter and receiver to the ground terminal inside the case.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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

Cat. No. E17E-EN-01