

1-Line System Fibre Sensor Amplifiers

FS-V21/V11/V1

 Refer to P.837 for a list of products complying with EU Directives.

 Refer to P.853 for UL Certified Products.



Features

- Dual digital display/Bar LED/Two-colour display
- Standard single output/Dual output/Analogue output
- Expansion connection reduces wiring

Expert Engineering Sites

www.sensorcentral.com



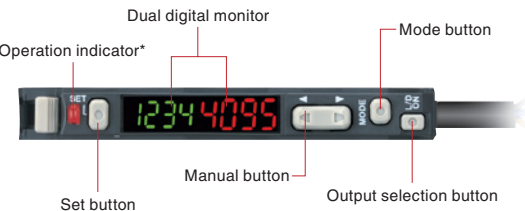
An on-line guide of automation knowledge and techniques

Dedicated parallel operation chip (FALCON)

Since 1996, the FS-V Series has utilised a parallel processing chip rather than a general-purpose CPU. This chip is designed especially for fibreoptic sensors in order to offer accelerated data processing and specialisation. This chip is what gives KEYENCE fibreoptic sensors their stunning performance.

Dual digital display indicates current value (received light intensity) + setting value

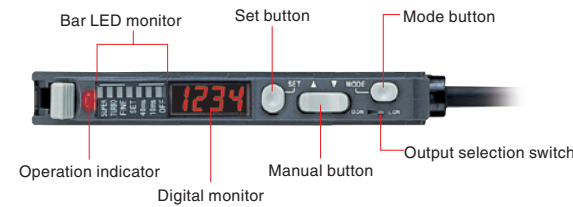
FS-V20 Series



* The operation indicator on the **FS-V21X** (infrared type) does not light up.

Current value (received light intensity) + sensitivity margin display

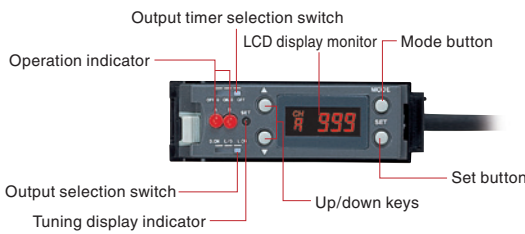
FS-V10 Series



Sensitivity margin can be checked on the bar LED in 5% increments.

Dual output as standard. Monitor intensity of received light for PS Series units

FS-V1 Series



It is possible to check the received light intensity of a PS-T2 unit or a PS Series expansion unit by simply connecting to the FS-V1.

Lineup

FS-V20 Series

Type	Dual digital display			
	Main unit			
	4-element LED	Green LED	Infrared LED	Monitor output
Model	NPN	FS-V21R	FS-V21G	FS-V21X
	PNP	FS-V21RP	—	—
Light source	Red, 4-element LED	Green LED	Infrared LED (950 nm)	Red, 4-element LED
Appearance				

Type	Dual digital display			
	1-line expansion unit			0-line expansion unit
	4-element LED	Green LED	Infrared LED	0-line
Model	NPN	FS-V22R	FS-V22G	FS-V22X
	PNP	FS-V22RP	—	—
Light source	Red, 4-element LED	Green LED	Infrared LED (950 nm)	Red, 4-element LED
Appearance	 			

FS-V10 Series, FS-V1

Type	Digital display			
	Main unit	1-line expansion unit	0-line expansion unit	Main unit
Model	NPN	FS-V11	FS-V12	FS-V10
	PNP	FS-V11P	FS-V12P	—
Light source	Red LED			
Appearance	   			

All series listed above require less wiring when using main and expansion units. **P.44** for details on wiring.

Main units include mounting brackets and expansion units include end units.



* **FS-V1(P)** is supplied with a different mounting bracket.

»TIP
Up to 16 expansion units can be added to a single main unit. Choose a main unit if using only a single amplifier.

Fibreoptic

Photoelectric

Proximity

Area Sensor

Pressure

Multi Function

High Precision

PLC/Touch Panel

Static Elimination

Vision System

Laser Marker

Barcode

Microscope

FIBREOPTIC
SELECTION GUIDE

FIBRE UNIT
FU

NEW AMPLIFIER
FS-N

MEGA-POWER
DUAL DISPLAY
FS-V30

FIBREOPTIC
FS-V21/V11/V1
FS-T/M
FS

Specifications									
Amplifier (FS-V20 Series)									
Type		Main unit				Expansion unit			
		4-element LED	Green LED	Infrared LED ³	Monitor output	4-element LED	Green LED	Infrared ³ LED	0-line
Model	NPN	FS-V21R	FS-V21G	FS-V21X	FS-V21RM	FS-V22R	FS-V22G	FS-V22X	FS-V20R
	PNP	FS-V21RP	—	—	—	FS-V22RP	—	—	—
Appearance									
Light source		Red, 4-element LED	Green LED	Infrared LED (950 nm)	Red, 4-element LED	Red, 4-element LED	Green LED	Infrared LED (950 nm)	Red, 4-element LED
Response time		250 μs (FINE)/500 μs (TURBO)/1 ms (SUPER TURBO)/4 ms (ULTRA TURBO)/500 μs (HIGH RESOLUTION)/50 μs (HIGH SPEED)							
Output selection		LIGHT-ON/DARK-ON (switch-selectable)							
Detection mode		Light intensity/rising edge/falling edge							
Display shift function		Max. ±1999 (variable)							
Timer function	Mode	Timer OFF/OFF-delay timer/ON-delay timer/One-shot timer, selectable							
	Accuracy	±10% of the Preset Value							
	Variable range	1 to 30 ms (in 1 ms increments), 30 to 50 ms (in 2 ms increments), 50 to 200 ms (in 10 ms increments), 200 to 500 ms (in 50 ms increments)							
Control output	NPN	NPN open-collector 100 mA max. (40 VDC max.) ⁴ , Residual voltage: 1 V max.				NPN open-collector 20 mA max. (40 VDC max.), Residual voltage: 1 V max.			
	PNP	PNP open-collector 100 mA max. (30 VDC max.) ⁴ , Residual voltage: 1 V max.				PNP open-collector 20 mA max. (30 VDC max.), Residual voltage: 1 V max.			
Monitor output ¹		1 to 5 load resistance to display 0-495 for FINE and TURBO. Voltage output: 1 to 5 V, Load resistance: 10 kΩ min., Repeatability: ±0.5% of F.S.							
No. of expansion units ²		Up to 16 expansion units can be connected (a total of 17 units).							
Mutual interference suppression		HIGH SPEED/ HIGH RESOLUTION: 0, FINE : 4, TURBO/SUPER/ULTRA: 8							
Power supply		12 to 24 VDC ±10%, ripple: 10% max., Class 2							
Current consumption	Normal	R type	S-APC OFF: 650 mW max.(27 mA max. at 24 VDC), S-APC ON: 720 mW max.(30 mA max. at 24 VDC)						
		Others	S-APC OFF: 580 mW max.(24 mA max. at 24 VDC), S-APC ON: 720 mW max.(30 mA max. at 24 VDC)						
	ECO half	R type	S-APC OFF: 530 mW max.(22 mA max. at 24 VDC), S-APC ON: 660 mW max.(25 mA max. at 24 VDC)						
		Others	S-APC OFF: 480 mW max.(20 mA max. at 24 VDC), S-APC ON: 600 mW max.(25 mA max. at 24 VDC)						
	ECO all	R type	S-APC OFF: 480 mW max.(20 mA max. at 24 VDC), S-APC ON: 550 mW max.(23 mA max. at 24 VDC)						
		Others	S-APC OFF: 430 mW max.(18 mA max. at 24 VDC), S-APC ON: 550 mW max.(23 mA max. at 24 VDC)						
Ambient illumination		Incandescent lamp: 20000 lux max., Sunlight: 30000 lux max.							
Relative humidity		35 to 85%, No condensation							
Ambient temperature		-10 to +55°C, No freezing							
Vibration resistance		10 to 55 Hz, double amplitude: 1.5 mm, 2 hours each in the X, Y and Z axis							
Shock resistance		500 m/s ² in X, Y, and Z directions, 3 times respectively							
Housing		Polycarbonate							
Size		30 mm (H) x 9 mm (W) x 70 mm (D)							
Weight (including 2-m cable)		Approx. 80 g				Approx. 45 g			

1. Use the **FS-V21RM** in the FINE or TURBO mode when outputting signals with a monitor.

2. If more than one unit is used together, the ambient temperature varies with the conditions below. Mount the units on the DIN rail with mounting brackets and check that the output current is 20 mA or less.
1 or 2 Units: -10 to 55°C, 3 to 10 Units: -10 to 50°C, 11 to 16 Units: -10 to 45°C

3. The operation indication light of the infrared types does not illuminate.

4. 20 mA at maximum for the expansion unit.

Amplifier (FS-V10 Series)

Type		Main unit	1-line expansion unit	0-line expansion unit	Main unit
Model	NPN	FS-V11	FS-V12	FS-V10	FS-V1
	PNP	FS-V11P	FS-V12P	—	FS-V1P
Appearance					
Light source		Red LED			
Response time		250 μs (FINE)/500 μs (TURBO)/1 ms (SUPER TURBO)		410 μs to 1.7 ms ²	250 μs
Operation mode		LIGHT-ON/DARK-ON (switch-selectable)			
Display indicator		Display indicator: Red LED Digital LED monitor: Seven segments, four digits, red LED Bar LED monitor: One orange LED and six green LEDs			Display indicator (Two): Red LED Received light display: LCD (Two colour display: Red and green) Calibration indicator: Orange LED
Timer function		ON-delay: 40 ms/OFF-delay: 10 ms/Timer OFF (switch-selectable)			ON-delay: 40 ms/OFF-delay: 40 ms/Timer OFF (switch-selectable)
Control output	NPN	NPN open-collector 100 mA max. (24 VDC max.), Residual voltage: 1 V max. ³			
	PNP	PNP open-collector 100 mA max. (24 VDC max.), Residual voltage: 1 V max. ³			
Protection circuit		Reversed polarity protection, over-current protection, surge absorber			
No. of expansion units ¹		Up to 16 expansion units can be connected (a total of 17 units).			
Mutual interference suppression		FINE : 4, TURBO/SUPER: 8			
Power supply		12 to 24 VDC (±10%), ripple (p-p): 10% max.,Class 2 ⁴			
Current consumption		50 mA max.			
Ambient illumination		Incandescent lamp: 10000 lux max., Sunlight: 20000 lux max.			
Ambient temperature		-10 to +55°C, No freezing			
Relative humidity		35 to 85%, No condensation			
Vibration resistance		10 to 55 Hz, double amplitude: 1.5 mm, 2 hours each in the X, Y and Z axis			
Shock resistance		500 m/s² in X, Y, and Z directions, 3 times respectively			
Housing		Polycarbonate			
Weight (including 2-m cable)		Approx. 80 g	Approx. 45 g	Approx. 20 g	Approx. 80 g

1. If more than one unit is used together, the ambient temperature varies with the conditions below. Mount the units on the DIN rail with mounting brackets and check that the output current is 20 mA or less.
3 to 10 Units: -10 to 50°C, 11 to 16 Units: -10 to 45°C

2. The response speed varies depending on the number of expansion units connected.

3. The **FS-V1** is equipped with two outputs. The **FS-V10** has no control output.

4. Neither the **FS-V12** nor the **FS-V10** can be used as a standalone unit.

Fibreoptic

Photoelectric

Proximity

Area Sensor

Pressure

Multi Function

High Precision

PLC/Touch Panel

Static Elimination

Vision System

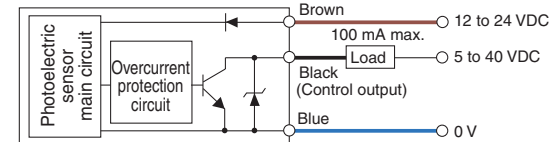
Laser Marker

Barcode

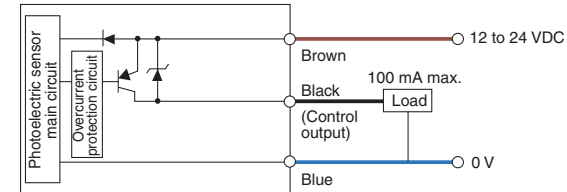
Microscope

Input/Output Circuits

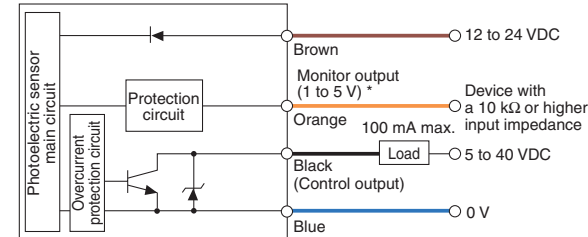
FS-V21R/21G/21X (Main unit)



FS-V21RP (Main unit)

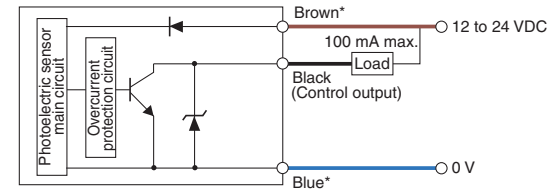


FS-V21RM



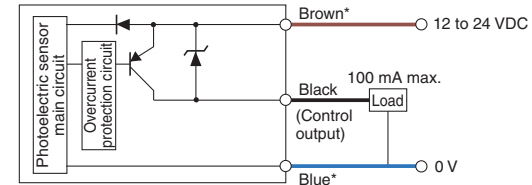
*FS-V21RM only.

FS-V11/V12



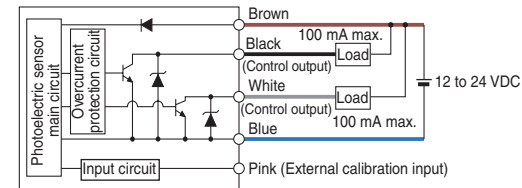
*FS-V11 only

FS-V11P/V12P

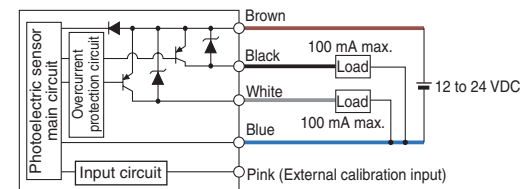


*FS-V11P only

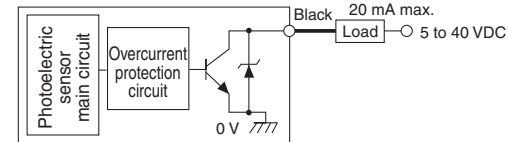
FS-V1



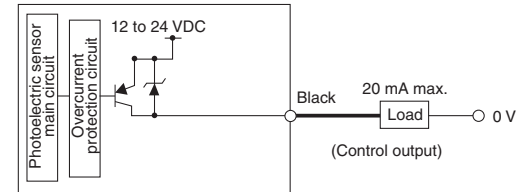
FS-V1P



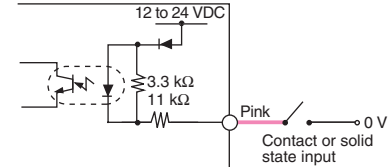
FS-V22R/22G/22X (Expansion unit)



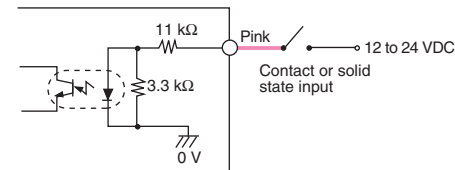
FS-V22RP (Expansion unit)



(External calibration input circuit)



(External calibration input circuit)

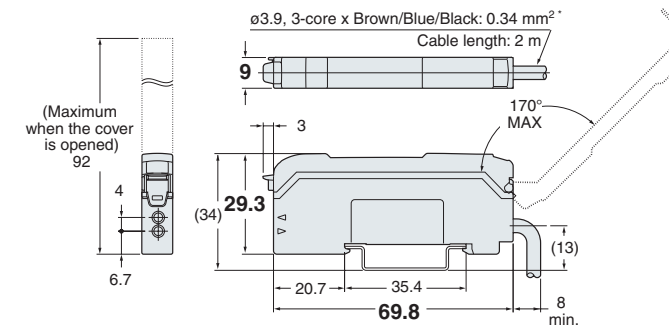
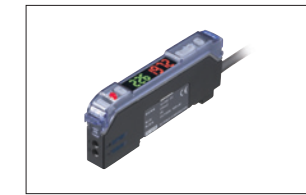
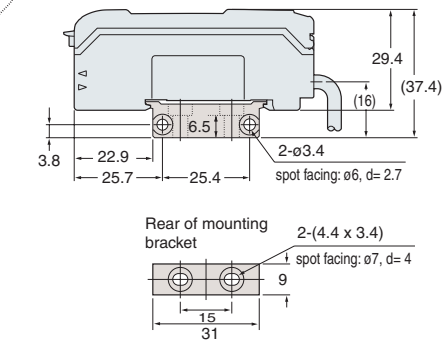


Dimensions

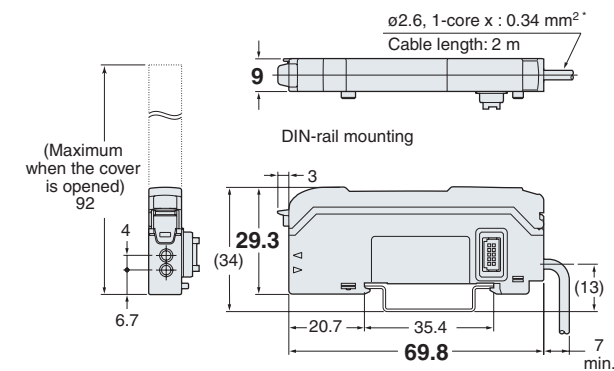
Unit: mm

Amplifier

FS-V21(R) Series (Main unit)

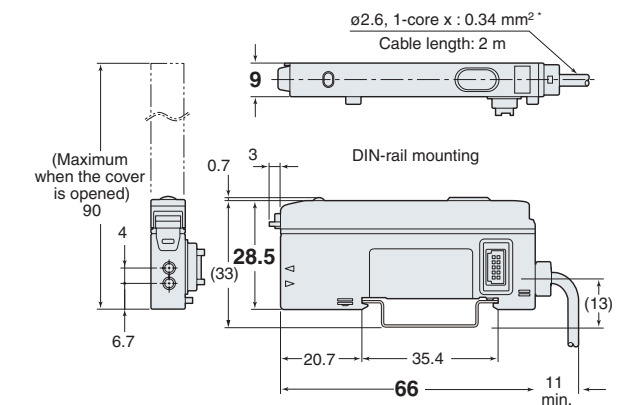
* FS-V21RM: ø3.9, 4-core x Brown/Blue/Black: 0.34 mm²
Black/Orange: 0.18 mm²When the mounting bracket (Optional)
FS-V21(R) (Main unit) is attached:

FS-V22(R)/V20R Series (Expansion unit)



* The FS-V20R does not have connecting cables.

FS-V10/V12/V12P

Accessory: End unit x 2
Caution label x 1

* The FS-V10 does not have connecting cables.

Fibreoptic

Photoelectric

Proximity

Area Sensor

Pressure

Multi Function

High Precision

PLC/Touch Panel

Static Elimination

Vision System

Laser Marker

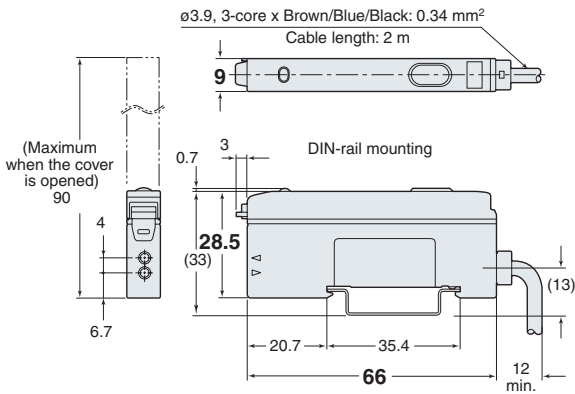
Barcode

Microscope

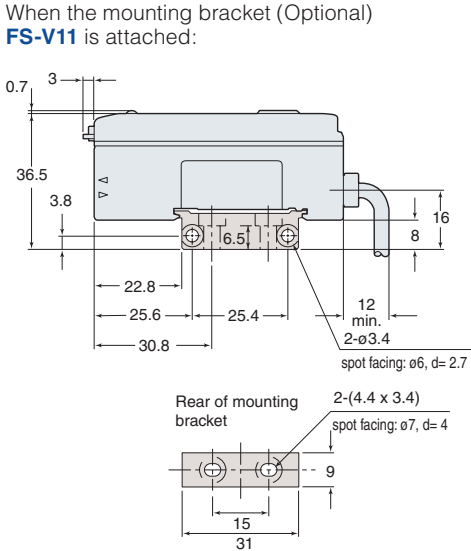
FIBREOPTIC
SELECTION GUIDEFIBRE UNIT
FUNEW AMPLIFIER
FS-NMEGA-POWER
DUAL DISPLAY
FS-V30FIBREOPTIC
FS-V21/V11/V1
FS-T/M
FS

FS-V21/V11/V1 1-Line System Fibre Sensor Amplifiers

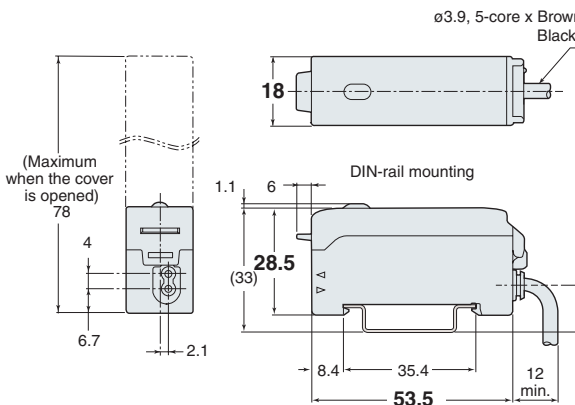
FS-V11/V11P



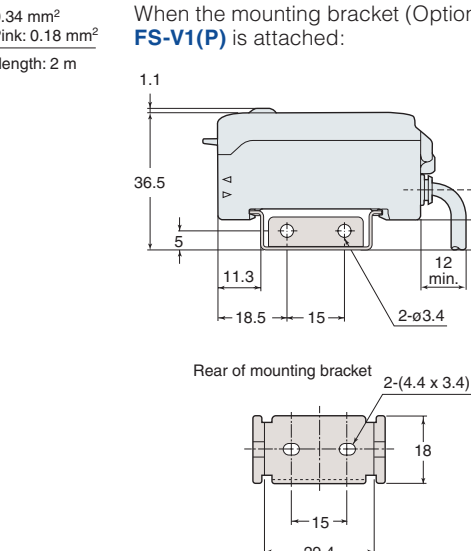
Accessory: Mounting bracket x 1



FS-V1/V1P

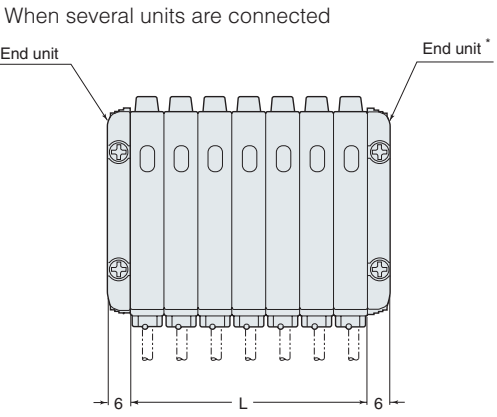
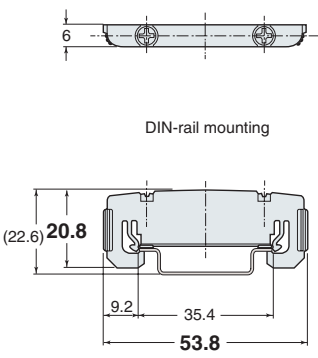


Accessory: Mounting bracket x 1



1-Line System Fibre Sensor Amplifiers FS-V21/V11/V1

End unit (Optional)
OP-26751



* The above is for the FS-T2 and M2.

No. of units	L (Unit: mm)
1	18
2	27
3	36
4	45
5	54
6	63
7	72
8	81
9	90
10	99
11	108
12	117
13	126
14	135
15	144
16	153