



* FASTUS is a product brand of OPEX FA.



- Easy-to-read OLED display
- Fiber insertion indicators for instant verification
- Large LED indicators for excellent visibility
- Enhanced Detection in a Long Distance
- Fast response time
- Batch setting to connect amplifiers
- Sink(NPN)/Source(PNP) switchable
- IO-Link network supported

Ultra-High-Speed Digital Fiber Sensor Amplifier

D4RF Series



Easy-to-Read, Easy-to-Use, Fiber Sensor Amplifier

Lineup

Connection	Type		Shape	No. of wires	OLED display	Interface				Model	
Cable	Stand-alone models			5	Yes	2 outputs	1 input	-	-	D4RF-TD	IO-Link
				4	Yes	1 output	-	1 switchable output/input	-	D4RF-T	IO-Link
				5	Yes	1 output	1 input	-	1 analog output	D4RF-TA	
	Inter-connection models	Main unit		5	Yes	2 outputs	1 input	-	-	D4RF-TDM	
				4	Yes	1 output	-	1 switchable output/input	-	D4RF-TM	
		Expansion unit		3	Yes	2 outputs	1 input	-	-	D4RF-TDS	
			2	Yes	1 output	-	1 switchable output/input	-	D4RF-TS		
Connector	Stand-alone models			4	Yes	1 output	-	1 switchable output/input	-	D4RF-TC4	IO-Link
				4	Yes	1 output	-	1 switchable output/input	-	D4RF-TMC4	
	Inter-connection models	Main unit		2	No	-	-	-	-	D4RF-MC4	
		Expansion unit		2	Yes	1 output	-	1 switchable output/input	-	D4RF-TSC4	
Cable-less	Inter-connection models	Main unit		0	Yes	-	-	-	-	D4RF-TM-0	
		Expansion unit		0	Yes	-	-	-	-	D4RF-TS-0	
				0	No	-	-	-	-	D4RF-S	

Specifications

Type		Stand-alone model (IO-Link device)		Analog output	
Model	1 output and 1 switchable output/input*1	Cable	D4RF-T		-
	2 outputs and 1 input	Connector	D4RF-TC4		
		Cable	D4RF-TD		
		Analog output	Cable	-	
Light source		4-element Red LED (wavelength: 660 nm)		D4RF-TA	
Response time		16 μs, 70 μs, 250 μs, 500 μs, 1 ms, 2 ms, 8 ms			
Teach Mode		1 point, 2 points, Auto, Through, 1-point Zone, 2-point Zone, Manual		Channel A (analog output) setting: Analog 2 points teach, Analog auto teach, Manual Channel 1 (control output) setting: 1 point, 2 points, Auto, Through, 1-point Zone, 2-point Zone, Manual	
Display	Digital display	OLED display 128 × 22 pixel Menu languages: English, Japanese, Korean, Simplified Chinese, Spanish			
	Indicators	2 × Output indicator (orange), Power indicator (green): Lights up when power is on (blinks during IO-Link communication for stand-alone unit)		Control output indicator (orange), Analog output indicator (orange), Power indicator (green): Lights up when power is on	
Interface	Control output	NPN/PNP open collector or Push-pull selectable by setting 1 output: Max. 100 mA, 2 outputs: Max. 50 mA/30 VDC, residual voltage: 1.8 V or less		NPN/PNP open collector or Push-pull selectable by setting Max. 50 mA/30 VDC, residual voltage: 1.8 V or less	
	Analog output	-		Current output: 4 to 20 mA, load impedance: 300 ohm or less Voltage output: 0 to 10 V, 1 to 5 V, output impedance: 100 ohm or less, selectable by setting	
	External input	Teach, Counter-reset, Emitter off or Preset loading*2		Teach, Counter-reset, Emitter off, Hold out reset or Preset loading	
	IO-Link	Control output 1 is switchable to IO-Link		-	
IO-Link	Revision	1.1		-	
	Baud rate	COM 3 (230.4 kbps)		-	
	Number of process input data bytes	4 bytes		-	
	Minimum cycle time	0.5 ms		-	
Timer function		On delay, Off delay, On/off delay, Pulse output, On delay pulse, Adjustable 1 to 30,000 ms			
Output mode		Light ON/Dark ON, selectable by setting			
Connection		Cable model: 2 m, 5 wires with 2-output and 1-input models, 4 wires with 1-output and 1-switchable-output/input models, Minimum bending radius: 4 × cable diameter Connector model: M8 4-pin plug connector		Cable length 2 m Minimum bending radius: 4 × cable diameter	
Insulation resistance		20 Megohm or more (with 500 VDC)			
Rating	Supply voltage	SIO mode	12 to 30 VDC ± 10% including 10% ripple (p-p)		12 to 24 VDC ± 10% including 10% ripple (p-p)
		IO-Link mode	18 to 30 VDC ± 10% including 10% ripple (p-p)		-
	Current consumption	Eco mode: Off	870 mW max. (29 mA or less at 30 VDC, 33 mA or less at 24 VDC, 52 mA or less at 12 VDC)		840 mW max. (35 mA or less at 24 VDC, 52 mA or less at 12 VDC)
		Eco mode: On	780 mW max. (26 mA or less at 30 VDC, 29 mA or less at 24 VDC, 43 mA or less at 12 VDC)		744 mW max. (31 mA or less at 24 VDC, 43 mA or less at 12 VDC)
Warm-up time		300 ms			
Applicable regulations	EMC	EU EMC directive (2014/30/EU) UK directive EMC (The Electromagnetic Compatibility Regulations 2016)			
	Environment	EU RoHS directive (2011/65/EU) UK RoHS (The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012) China RoHS (MIIT Order No.32)			
Applicable standards		EN 60947-5-2			
NRTL certification		UL Listed or Recognized Components Proximity Switch Certified for US and Canada		UL Recognized Component Proximity Switch Certified for US and Canada	
Company standards		Noise resistance: Feilen Level 4 cleared			
Protection circuit		Reverse connection protection, Overcurrent protection			
Environmental resistance	Ambient temperature/humidity		-25 to 55°C/35 to 85% RH (no freezing or condensation)		
	Ambient illuminance		Sunlight: 10000 lx or less, Incandescent light: 3000 lx or less		
	Vibration resistance		10 to 55 Hz, Double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions		
	Shock resistance		Approx. 50 G (500 m/s ²) 3 times in each of the X, Y, and Z directions		
	Degree of protection		IP54		
Material		Housing, cover: PC			
Weight		Cable model: Approx. 71 g Connector model: Approx. 25 g		Approx. 71 g	
Included items		Mounting bracket, Instruction manual			

*1: Input/output is not switchable for analog output.

*2: Preset loading is selectable only on 2-output and 1-output models.

Model specifications

Type		Standard inter-connection		Inter-connection for communication unit				
		With display and keys		With display and keys		Without display and keys		
		Main unit	Expansion unit	Main unit	Expansion unit	Main unit	Expansion unit	
Model	1 output and 1 switchable output/input	Cable	D4RF-TM	D4RF-TS	-	-	-	-
	2 outputs and 1 input	Connector	D4RF-TMC4	D4RF-TSC4	-	-	-	-
		Cable	D4RF-TDM	D4RF-TDS	-	-	-	-
	Without output/input wires	Connector	-	-	-	-	D4RF-MC4	-
	Cable-less	-	-	D4RF-TM-0	D4RF-TS-0	-	D4RF-S	
Light source		4-element Red LED (wavelength: 660 nm)						
Response time	Stand-alone use	16 μs, 70 μs, 250 μs, 500 μs, 1 ms, 2 ms, 8 ms	-	-	-	-	-	
	Inter-connection use	22 μs, 70 μs, 250 μs, 500 μs, 1 ms, 2 ms, 8 ms						
Teach Mode		1 point, 2 points, Auto, Through, 1-point Zone, 2-point Zone, Manual						
Display	Digital display	OLED display 128 × 22 pixel Menu languages: English, Japanese, Korean, Simplified Chinese, Spanish						
	Indicators	2 × Output indicator (orange), Power indicator (green): Lights up when power is on						
Interface	Control output**1	NPN/PNP open collector or Push-pull selectable by setting 1 output: Max. 100 mA, 2 outputs: Max. 50 mA/30 VDC, residual voltage: 1.8 V or less		-		-		
	External input	Teach, Counter-reset, Emitter off or Preset loading*2		-		-		
Number of units with cross talk prevention		Response time 22 μs: 2 units, 70 μs: 3 units, 250 μs: 4 units, 500 μs: 9 units, 1 ms: 9 units, 2 ms: 12 units, 8 ms: 14 units (including main unit)						
Timer function		On delay, Off delay, On/off delay, Pulse output, On delay pulse, Adjustable 1 to 30,000 ms						
Output mode		Light ON/Dark ON, selectable by setting						
Number of connectable units		Max. 16 units (including main unit)						
Connection		Cable model: 2 m, Minimum bending radius: 4 × cable diameter 5 wires with 2-outputs and 1-input main unit models, 4 wires with 1-output and 1-switchable-output/input main unit models, 3 wires with 2-outputs and 1-input expansion unit models, 2 wires with 1-output and 1-switchable output/input expansion unit models, Connector model: M8 4-pin plug connector		Without cable or connector		Connector model: M8 4-pin plug connector (For supplying power)	Without cable or connector	
Insulation resistance		20 Megohm or more (with 500 VDC)						
Rating	Supply voltage	Supplied directly or from communication unit*3 12 to 24 VDC ± 10 % including 10% ripple (p-p)	Supplied from main unit or communication unit*3 12 to 24 VDC ± 10 % including 10% ripple (p-p)	Supplied from communication unit*3 12 to 24 VDC ± 10 % including 10% ripple (p-p)		Supplied directly or from communication unit*3 12 to 24 VDC ± 10 % including 10% ripple (p-p)	Supplied from communication unit*3 12 to 24 VDC ± 10 % including 10% ripple (p-p)	
	Current consumption*1	Eco mode: Off 792 mW max. (33 mA or less at 24 VDC, 52 mA or less at 12 VDC)	696 mW max. (29 mA or less at 24 VDC, 43 mA or less at 12 VDC)	720 mW max. (30 mA or less at 24 VDC, 49 mA or less at 12 VDC)	624 mW max. (26 mA or less at 24 VDC, 41 mA or less at 12 VDC)	624 mW max.	-	
Weight		Cable models: Approx. 71 g (including cable), Connector model: Approx. 25 g		Approx. 23 g				

*1: The load current and ambient temperature are limited by the number of connected units (including inter-connection main unit) as shown in the table below.

Standard inter-connection use: 20 mA when connected with a 1-output setting or 10 mA with a 2-output setting.

*2: Preset loading is selectable only on 2-output and 1-output models.

*3: For details on supplying power from the communication unit, refer to the instruction manual of the respective communication unit.

*4: The upper ambient temperature limit is as follows depending on the number of connected units.

3 to 5 connected units: 50°C, 6 to 16 connected units: 45°C (When used as UL certified product, 6 to 8 connected units: 45°C, 9 to 16 connected units: 40°C)

● Specifications are subject to change without prior notice.

Common specifications

Applicable regulations	EMC	EU EMC directive (2014/30/EU) UK directive EMC (The Electromagnetic Compatibility Regulations 2016)
	Environment	EU RoHS directive (2011/65/EU) UK RoHS (The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012) China RoHS (MIIT Order No.32)
Applicable standards		EN 60947-5-2
NRTL certification		UL Listed or Recognized Components Proximity Switch Certified for US and Canada
Company standards		Noise resistance: Feilen Level 4 cleared
Protection circuit		Reverse connection protection, Overcurrent protection
Environmental resistance	Ambient temperature ⁴ /humidity	-25 to 55°C/35 to 85% RH (no freezing or condensation)
	Ambient illuminance	Sunlight: 10000 lx or less, Incandescent light: 3000 lx or less
	Vibration resistance	10 to 55 Hz, Double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions
	Shock resistance	Approx. 50 G (500 m/s ²) 3 times in each of the X, Y, and Z directions
Degree of protection		IP54
Material		Housing, cover: PC
Included accessories		Mounting bracket, Instruction manual



Options

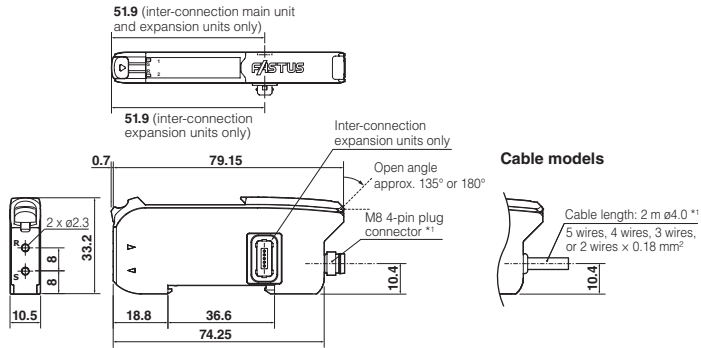
Type	Model	Description
Connector cables	M84CN-2S	Straight, 2 m
	M84CN-5S	Straight, 5 m
	M84CN-10S	Straight, 10 m
	M84CN-2L	L-shaped, 2 m
	M84CN-5L	L-shaped, 5 m
	M84CN-10L	L-shaped, 10 m
End plate	BEF-EB01-W190	2 pieces
Mounting bracket	BEF- WLL180	1 piece

Dimensions (Unit: mm)

Stand-alone and inter-connection models (with display and keys) (D4RF-TD/-T/-TA/-TDM/-TM/-TDS/-TS/-TC4/-TMC4/-TSC4/-TM-0/-TS-0)

Amplifier

Connector models

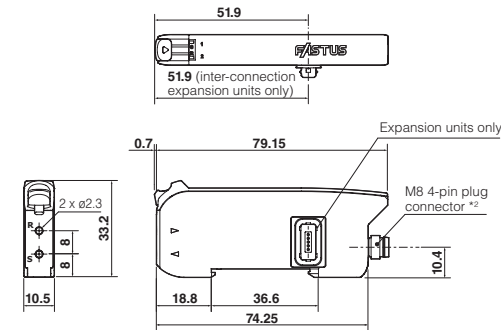


*1 D4RF-TM-0 and D4RF-TS-0 are not equipped with connectors and cables.

Inter-connection models (without display and keys) (D4RF-MC4/D4RF-S)

Amplifier

Connector models

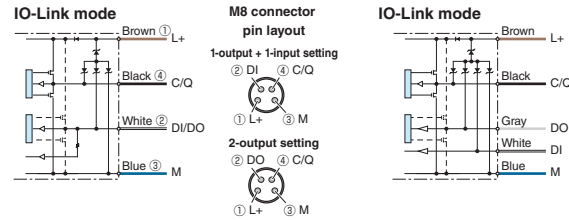


*2 D4RF-S is not equipped with connectors and cables.

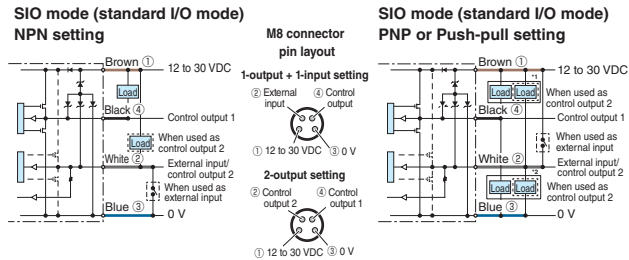
Circuit diagrams

Stand-alone model (IO-Link device)

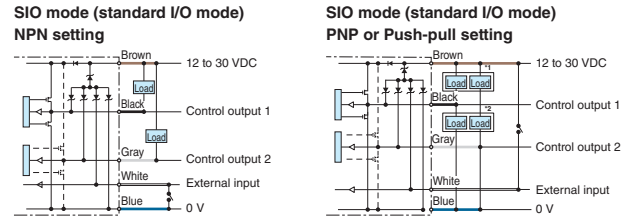
[1-output and 1-switchable-output/input models] (D4RF-T/D4RF-TC4)



[1-output and 1-switchable-output/input models] (D4RF-T/D4RF-TC4)



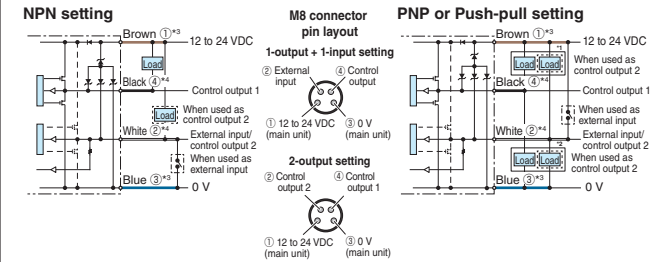
[2-outputs and 1-input models] (D4RF-TD)



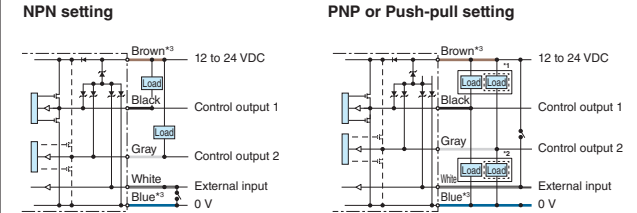
*1 When I/O polarity is set to Push-pull and the sensor is connected with plus common circuits. *2 When I/O polarity is set to Push-pull or PNP and the sensor is connected with minus common circuits. *3 Power supply wires (Brown ①, Blue ③) are not equipped on the inter-connection expansion units. *4 Input and output wires (White ②, Black ④) are not equipped on models "Without output/input wires".

Inter-connection model

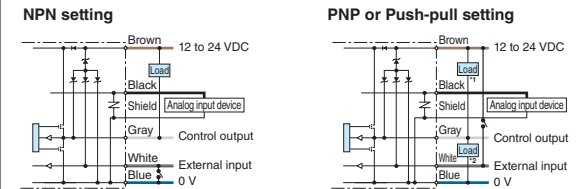
[1-output and 1-switchable-output/input models, including models without output/input wires] (D4RF-TM/D4RF-TS/D4RF-TMC4/D4RF-TSC4/D4RF-MC4/D4RF-S)



[2-outputs and 1-input models] (D4RF-TDM/D4RF-TDS)



Analog output model (D4RF-TA)



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