Ultra-slim Signal Converter
K3FP Series

Complete Lineup of Ultra-slim, High-performance Converters for Every Application

- Ultra-slim 6.2-mm size.
  Close mounting makes devices more compact.
- Easily wired and flexible with 8 terminal blocks.
- Multi-range I/O provides flexibility for the desired signal format.
- High-precision analog conversion with minimum current consumption.
- Reduced wiring through power supply connection with DIN rail bus connector (optional).

Product Selection

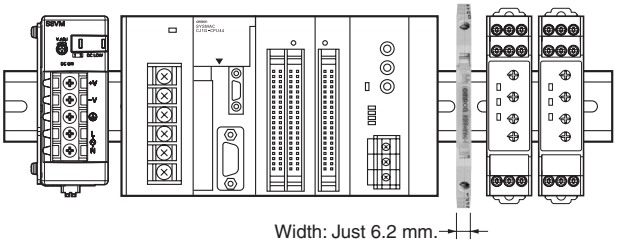
Product	Model	Input signal	Output signal	Power supply voltage	Reference page
3-Way Signal Isolator	K3FP-YV-I-I	0 (4) to 20 mA DC	0 (4) to 20 mA DC	24 V DC	3
3-Way Signal Isolator	K3FP-YV-U-U	−10 (0) to 10 V DC	−10 (0) to 10 V DC	24 V DC	
3-Way Signal Isolator	K3FP-VS-UI-UI	0 to 20 mA DC, 4 to 20 mA DC, 0 to 10 V DC, 2 to 10 V DC, 0 to 5 V DC, 1 to 5 V DC (selected by DIP switch setting)	0 to 20 mA DC, 4 to 20 mA DC, 0 to 10 V DC, 2 to 10 V DC, 0 to 5 V DC, 1 to 5 V DC (selected by DIP switch setting)	24 V DC	6
Dual Output 3-Way Signal Isolator	K3FP-VS-UI-2I	0 to 20 mA DC, 4 to 20 mA DC, 0 to 10 V DC, 1 to 5 V DC (selected by DIP switch setting)	0 to 20 mA DC, 4 to 20 mA DC (selected by DIP switch setting)	24 V DC	10
Loop-powered Isolator (1-channel)	K3FP-SN1-I-I	0 (4) to 20 mA DC	0 (4) to 20 mA DC	---	14
Loop-powered Isolator (2-channel)	K3FP-SN2-I-I	0 (4) to 20 mA DC	0 (4) to 20 mA DC	---	
Thermocouple Transducer	K3FP-TS-UI	Type J and K Thermocouples (Conforms to IEC 60584-1) (Input temperature range is selected by DIP switch setting.)	0 to 20 mA DC, 4 to 20 mA DC, 20 to 0 mA DC, 20 to 4 mA DC, 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC, 10 to 0 V DC (selected by DIP switch setting)	24 V DC	17
RTD Transducer	K3FP-RS-UI	PT100 Platinum Resistance Thermometer (Conforms to IEC 60751) (Input temperature range is selected by DIP switch setting.)	0 to 20 mA DC, 4 to 20 mA DC, 20 to 0 mA DC, 20 to 4 mA DC, 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC, 10 to 0 V DC (selected by DIP switch setting)	24 V DC	23
Repeater Power Supply	K3FP-DY-I-I	0 (4) to 20 mA DC	0 (4) to 20 mA DC	24 V DC	30
Limit Value Switch	K3FP-SL-UI	0 to 20 mA DC, 0 to 10 V DC (selected by DIP switch setting)	SPDT output	24 V DC	33

Applications

Install in Limited Space

K3FP Series

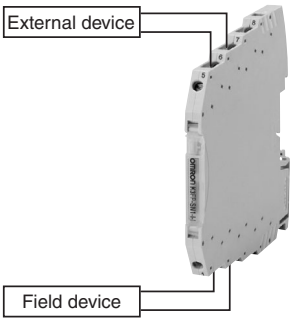
This ultra-slim 6.2-mm Signal Converter can be installed in limited space, such as where expansion is required, and help to reduce the overall size of devices.



Isolators That Do Not Require Power Supply

K3FP-SN1-I-I One-channel Passive Loop-powered Isolator Page 14
K3FP-SN2-I-I Two-channel Passive Loop-powered Isolator Page 14

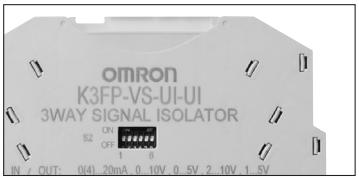
The input signal provides power for the Isolator, so power supply capacity does not need to be considered when expanding Units: No power line wiring is required.



Reduces Spare Parts

K3FP-VS-UI-UI 3-Way Signal Isolator Page 6

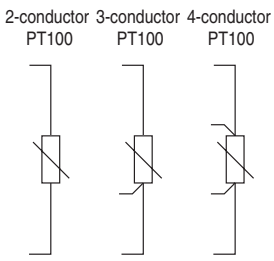
Input and output ranges are set using a DIP switch on the side of the Unit.



Input signal	Output signal
0 to 10 V DC	0 to 10 V DC
2 to 10 V DC	2 to 10 V DC
0 to 5 V DC	0 to 5 V DC
1 to 5 V DC	1 to 5 V DC
0 to 20 mA DC	0 to 20 mA DC
4 to 20 mA DC	4 to 20 mA DC

Three- and four-conductor RTD Transducers

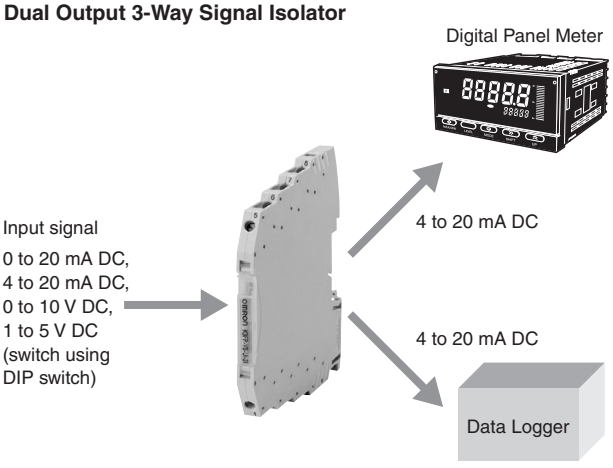
K3FP-RS-UI RTD Transducer Page 23



Select the number of conductors for the input platinum resistance thermometer using the DIP switch on the side of the Unit.
Set any input range from –150°C to 850°C.

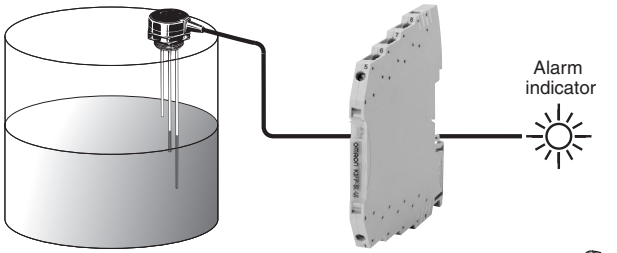
Isolated Duplicate Signal Output

K3FP-VS-UI-2I
Dual Output 3-Way Signal Isolator Page 10

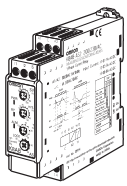


Limit Value Switches

K3FP-SL-UI Limit Value Switch Page 33



Note: Consider the following products for judging non-DC signal inputs.
For AC current single-phase signal inputs: K8AB-AS
For AC voltage single-phase signal inputs: K8AB-VS/K8AB-VW
For AC voltage three-phase signal inputs: K8AB-PW
For thermocouple and platinum resistance thermometer sensor inputs: K8AB-TH



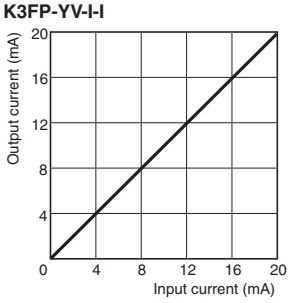
For details, refer to *Measuring and Monitoring Relays K8AB Series/ 61F-D21T* (Cat. No.: N141).

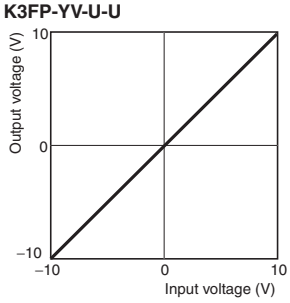
3-Way Signal Isolator
K3FP-YV-I-I/K3FP-YV-U-U

6.2-mm Ultra-slim Isolator

- Isolates between input, output, and power supply. 1,500 V AC dielectric strength.
- Close mounting.
- CE Marking compliant.
- UL certified.

⚠ **Refer to *Common Precautions* on page 38.**





Ordering Information

■ Isolator

Name	Model
DC Current Isolator	K3FP-YV-I-I
DC Voltage Isolator	K3FP-YV-U-U

■ Optional Products

Name	Model
DIN rail bus connector	K3FP-1

Model Number Structure

DC Current Isolator

K3FP-YV-I-I
1 2

1. **Model**
2. **Input or output signal**
   Current input
   I: 0 (4) to 20 mA DC
   Current output
   I: 0 (4) to 20 mA DC

DC Voltage Isolator

K3FP-YV-U-U
1 2

1. **Model**
2. **Input or output signal**
   Voltage input
   U: −10 (0) to 10 V DC
   Voltage output
   U: −10 (0) to 10 V DC

Ratings and Specifications

■ Ratings and Specifications

Item / Model	K3FP-YV-I-I	K3FP-YV-U-U
Supply voltage	24 V DC	
Allowable supply voltage range	80% to 125% of rated supply voltage	
Current consumption	20 mA DC max.	10 mA DC max.
Power consumption	450 mW max.	200 mW max.
Error	±0.1% FS max.	
Temperature coefficient	Maximum: 0.01%/°C max., Typical: 0.002%/°C max. (at 23°C)	
Cut-off frequency	100 Hz	
Response time (10% to 90%)	3.5 ms max.	
Insulation resistance	10 MΩ min. between inputs, outputs, and power supply (at 500 V DC)	
Dielectric strength	1,500 V AC, 50 Hz, 1 min (between inputs, outputs, and power supply)	
Noise resistance	Conforms to IEC 61000	
Ambient operating temperature	−20 to 65°C	
Ambient storage temperature	−40 to 85°C	
Ambient operating humidity	95% max. (with no condensation)	

Item	Model	K3FP-YV-I-I	K3FP-YV-U-U
Ambient storage humidity		95% max. (with no condensation)	
Connection method		Screw connections (M3)	
Tightening torque		0.5 N·m	
Connecting cable	Solid wire	0.14 to 2.5 mm^2	
	Stranded wire	0.2 to 2.5 mm^2	
	AWG	24 to 12	
	Wire stripping length	12 mm	
Degree of protection		IP20	
Housing material		PBT	
Weight		55 g	
Safety standards		UL 508	
EMC		EMI: Radiated EMI: EN 55011 EMS: ESD immunity: EN 61000-4-2 Rated electromagnetic field immunity: EN 61000-4-3 Burst immunity: EN 61000-4-4 Surge immunity: EN 61000-4-5 Conducted disturbance immunity: EN 61000-4-6	

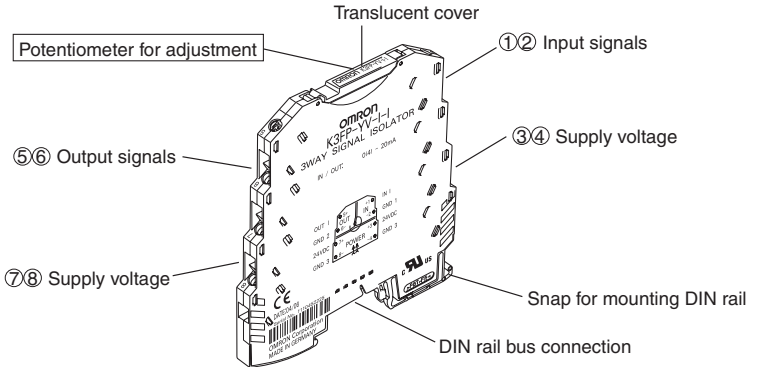
■ Input Specifications

Item / Input signal	0 (4) to 20 mA DC	−10 (0) to 10 V DC
Input impedance	Approx. 50 Ω	Approx. 100 kΩ
Max. input signal	50 mA	30 V

■ Output Specifications

Item / Output signal	0 (4) to 20 mA DC	−10 (0) to 10 V DC
Allowable load impedance	500 Ω max.	10 kΩ min.
Max. output signal	28 mA	12.5 V
Non-load voltage	12.5 V max.	---
Short-circuit current	---	22 mA max.
Ripple	20 mV pp max. (500 Ω)	20 mV pp max.
Span adjustment range	±0.5%	

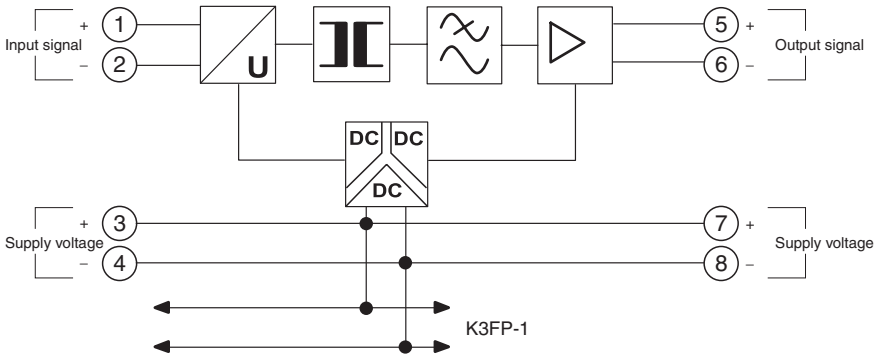
Nomenclature



Note: The potentiometer is for adjustment at the factory. Do not adjust the potentiometer.

Connections

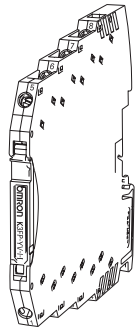
■ Internal Block Diagram

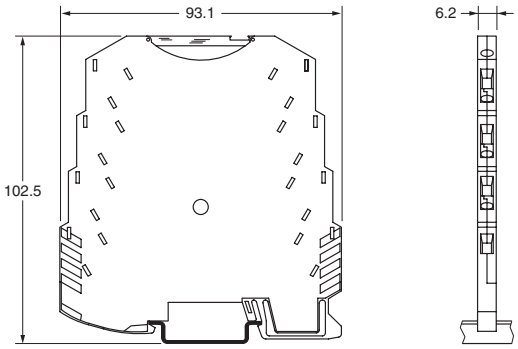


Dimensions

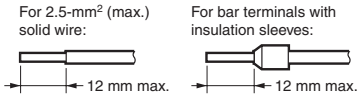
Note: All units are in millimeters unless otherwise indicated.

K3FP-YV-I-I
K3FP-YV-U-U





Note: 1. Use solid wire with a diameter of 2.5 mm^2 max. or bar terminals with insulation sleeves for terminal connections.
To preserve dielectric strength after connection, the length of the exposed conductive part inserted into the terminal must be 12 mm max.



2. Screw Tightening Torque
Recommended torque:
0.5 N·m

Precautions

Refer to pages 38 and 39 for common precautions.

3-Way Signal Isolator
K3FP-VS-UI-UI

6.2-mm Ultra-slim Isolator with 36 Input and Output Combinations.

- Input and output ranges can be easily changed using an external DIP switch.
- Isolates between input, output, and power supply. 1,500 V AC dielectric strength.
- Close mounting.
- CE Marking compliant.
- UL certified.

⚠ Refer to *Common Precautions* on page 38.

Ordering Information

■ Isolator

Name	Model
3-Way Signal Isolator	K3FP-VS-UI-UI

■ Optional Products

Name	Model
DIN rail bus connector	K3FP-1

Model Number Structure

K3FP-VS-UI-UI
1 2 3

1. **Model**
2. **Input signal**
   UI: 0 to 20 mA DC, 4 to 20 mA DC, 0 to 10 V DC, 2 to 10 V DC, 0 to 5 V DC, 1 to 5 V DC (selected by DIP switch setting)
3. **Output signal**
   UI: 0 to 20 mA DC, 4 to 20 mA DC, 0 to 10 V DC, 2 to 10 V DC, 0 to 5 V DC, 1 to 5 V DC (selected by DIP switch setting)

Ratings and Specifications

■ Ratings and Specifications

Supply voltage	24 V DC
Allowable supply voltage range	80% to 125% of rated supply voltage
Current consumption	20 mA DC max.
Power consumption	450 mW max.
Error	±0.1% FS max.
Temperature coefficient	0.01%/°C max. (at 23°C)
Cut-off frequency	100 Hz
Response time (10% to 90%)	3.5 ms max.
Insulation resistance	10 MΩ min. between inputs, outputs, and power supply (at 500 V DC)
Dielectric strength	1,500 V AC, 50 Hz, 1 min (between inputs, outputs, and power supply)
Noise resistance	Conforms to IEC 61000
Ambient operating temperature	–20 to 65°C
Ambient storage temperature	–40 to 85°C
Ambient operating humidity	95% max. (with no condensation)
Ambient storage humidity	95% max. (with no condensation)
Connection method	Screw connections (M3)
Tightening torque	0.5 N·m

Connecting cable	**Solid wire**	0.14 to 2.5 mm^2
	Stranded wire	0.2 to 2.5 mm^2
	AWG	24 to 12
	Wire stripping length	12 mm
Degree of protection		IP20
Housing material		PBT
Weight		55 g
Safety standards		UL 508
EMC		EMI: Radiated EMI: EN 55011 EMS: ESD immunity: EN 61000-4-2 Rated electromagnetic field immunity: EN 61000-4-3 Burst immunity: EN 61000-4-4 Surge immunity: EN 61000-4-5 Conducted disturbance immunity: EN 61000-4-6

■ Input Specifications

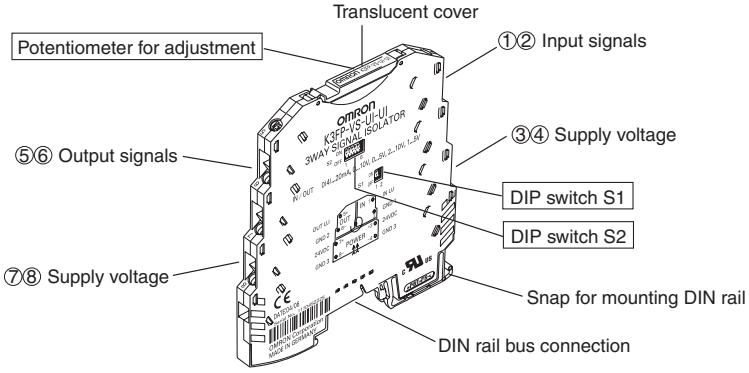
Input signal / Item	0 to 20 mA DC, 4 to 20 mA DC	0 to 10 V DC, 2 to 10 V DC, 0 to 5 V DC, 1 to 5 V DC
Input impedance	Approx. 50 Ω	Approx. 100 kΩ
Max. input signal	50 mA	30 V

■ Output Specifications

Output signal / Item	0 to 20 mA DC, 4 to 20 mA DC	0 to 10 V DC, 2 to 10 V DC, 0 to 5 V DC, 1 to 5 V DC
Allowable load impedance	500 Ω max.	10 kΩ min.
Max. output signal	28 mA	12.5 V
Non-load voltage	12.5 V max.	---
Short-circuit current	---	22 mA max.
Ripple	20 mV pp max. (500 Ω)	20 mV pp max.
Span adjustment range	±0.5%	

Dimensions

Note: All units are in millimeters unless otherwise indicated.



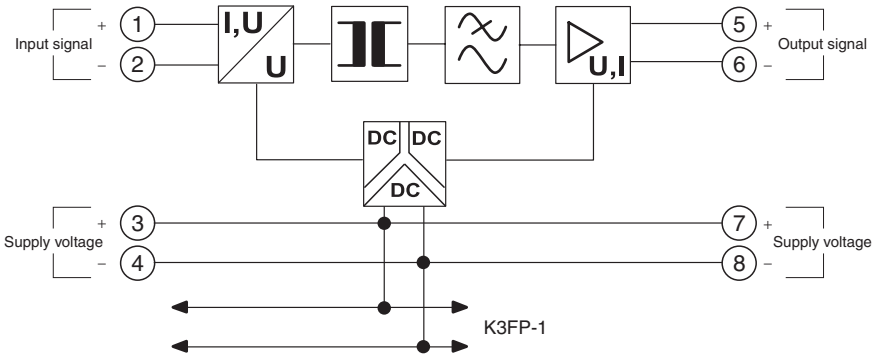
DIP Switch Settings

All DIP switches are turned OFF at shipment. Set input and output signals using DIP switches S1 and S2.

SWITCH		DIP switch S2						DIP switch S1	
ON ● ↑ OFF ○ ↓		1	2	3	4	5	6	1	2
Input signal	**Output signal**								
0 to 10 V	0 to 20 mA	○	○	○	○	○	○	○	○
	4 to 20 mA	○	○	○	○	○	●	○	○
	0 to 10 V	●	○	●	○	○	○	○	○
	2 to 10 V	●	○	●	○	○	●	○	○
	0 to 5 V	●	●	○	○	○	○	○	○
	1 to 5 V	●	●	○	○	○	●	○	○
2 to 10 V	0 to 20 mA	○	○	○	●	●	○	○	○
	4 to 20 mA	○	○	○	○	○	○	○	○
	0 to 10 V	●	○	●	●	●	○	○	○
	2 to 10 V	●	○	●	○	○	○	○	○
	0 to 5 V	●	●	○	●	●	○	○	○
	1 to 5 V	●	●	○	○	○	○	○	○
0 to 5 V	0 to 20 mA	○	○	○	○	○	○	●	○
	4 to 20 mA	○	○	○	○	○	●	●	○
	0 to 10 V	●	○	●	○	○	○	●	○
	2 to 10 V	●	○	●	○	○	●	●	○
	0 to 5 V	●	●	○	○	○	○	●	○
	1 to 5 V	●	●	○	○	○	●	●	○
1 to 5 V	0 to 20 mA	○	○	○	●	●	○	●	○
	4 to 20 mA	○	○	○	○	○	○	●	○
	0 to 10 V	●	○	●	●	●	○	●	○
	2 to 10 V	●	○	●	○	○	○	●	○
	0 to 5 V	●	●	○	●	●	○	●	○
	1 to 5 V	●	●	○	○	○	○	●	○
0 to 20 mA	0 to 20 mA	○	○	○	○	○	○	○	●
	4 to 20 mA	○	○	○	○	○	●	○	●
	0 to 10 V	●	○	●	○	○	○	○	●
	2 to 10 V	●	○	●	○	○	●	○	●
	0 to 5 V	●	●	○	○	○	○	○	●
	1 to 5 V	●	●	○	○	○	●	○	●
4 to 20 mA	0 to 20 mA	○	○	○	●	●	○	○	●
	4 to 20 mA	○	○	○	○	○	○	○	●
	0 to 10 V	●	○	●	●	●	○	○	●
	2 to 10 V	●	○	●	○	○	○	○	●
	0 to 5 V	●	●	○	●	●	○	○	●
	1 to 5 V	●	●	○	○	○	○	○	●

Connections

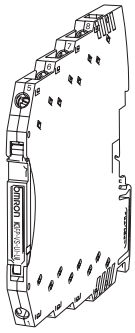
■ Internal Block Diagram

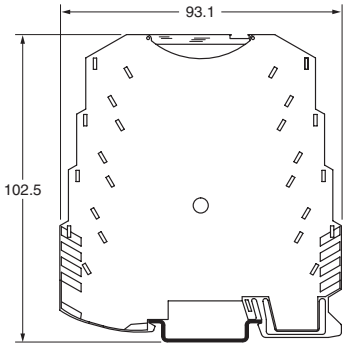


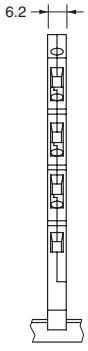
Dimensions

Note: All units are in millimeters unless otherwise indicated.

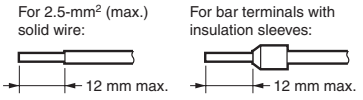
K3FP-VS-UI-UI







Note: 1. Use solid wire with a diameter of 2.5 mm^2 max. or bar terminals with insulation sleeves for terminal connections.
To preserve dielectric strength after connection, the length of the exposed conductive part inserted into the terminal must be 12 mm max.



2. Screw Tightening Torque
Recommended torque:
0.5 N·m

Precautions

Refer to pages 38 and 39 for common precautions.

■ Precautions for Correct Use

Potentiometer

- The potentiometer for adjustment located under the translucent cover can be used to make fine adjustments of analog signals after DIP switch settings have been changed.
- The error when no adjustments have been made is less than 0.4% but if the potentiometer for adjustment is used, the error can be reduced to less than 0.1%.

Dual Output 3-Way Signal Isolator
K3FP-VS-UI-2I

6.2-mm Ultra-slim Dual Output 3-Way Signal Isolator

- Outputs two isolated signals.
- Isolated between input, output 1, output 2, and between power supply. 1,500 V AC dielectric strength.
- Close mounting.
- CE Marking compliant.
- UL certified.

⚠ Refer to *Common Precautions* on page 38.

Ordering Information

■ Isolator

Name	Model
Dual Output 3-Way Signal Isolator	K3FP-VS-UI-2I

■ Optional Products

Name	Model
DIN rail bus connector	K3FP-1

Model Number Structure

K3FP-VS-UI-2I
1 2 3

1. **Model**
2. **Input signal**
   UI: 0 to 20 mA DC, 4 to 20 mA DC, 0 to 10 V DC, 1 to 5 V DC (select using DIP switch)
3. **Output signal**
   2I: 0 to 20 mA DC, 4 to 20 mA DC (select using DIP switch)

Ratings and Specifications

■ Ratings and Specifications

Supply voltage	24 V DC
Allowable supply voltage range	80% to 125% of rated supply voltage
Current consumption	30 mA DC max.
Power consumption	600 mW max.
Error	±0.2% FS max., Typ. ±0.1% FS max.
Temperature coefficient	Maximum: 0.01%/°C max., Typical: 0.004%/°C max. (at 23°C)
Cut-off frequency	35 Hz
Response time (10% to 90%)	10 ms max.
Insulation resistance	10 MΩ min. between inputs, outputs, and power supply (at 500 V DC)
Dielectric strength	1,500 V AC, 50 Hz, 1 min (between inputs, outputs, and power supply)
Noise resistance	Conforms to IEC 61000
Ambient operating temperature	–20 to 65°C
Ambient storage temperature	–40 to 85°C
Ambient operating humidity	95% max. (with no condensation)
Ambient storage humidity	95% max. (with no condensation)
Connection method	Screw connections (M3)
Tightening torque	0.5 N·m

Connecting cable	**Solid wire**	0.14 to 2.5 mm^2
	Stranded wire	0.2 to 2.5 mm^2
	AWG	24 to 12
	Wire stripping length	12 mm
Degree of protection		IP20
Housing material		PBT
Weight		54 g
Safety standards		UL 508
EMC		EMI: Radiated EMI: EN 55011 EMS: ESD immunity: EN 61000-4-2 Rated electromagnetic field immunity: EN 61000-4-3 Burst immunity: EN 61000-4-4 Surge immunity: EN 61000-4-5 Conducted disturbance immunity: EN 61000-4-6

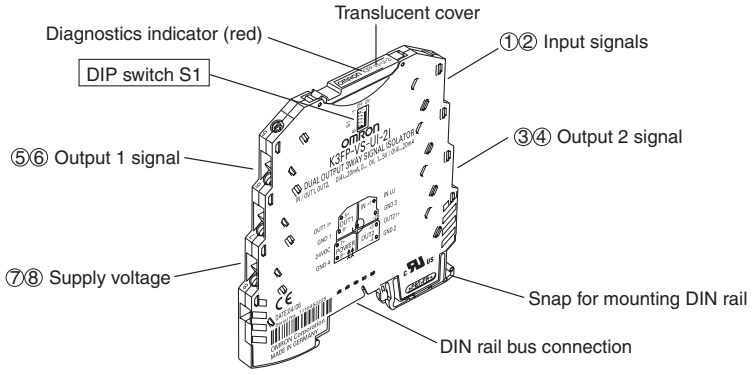
■ Input Specifications

Item / Input signal	0 to 20 mA DC, 4 to 20 mA DC	0 to 10 V DC, 1 to 5 V DC
Input impedance	Approx. 50 Ω	Approx. 100 kΩ
Max. input signal	50 mA	30 V

■ Output Specifications

Item / Output signal	0 to 20 mA DC, 4 to 20 mA DC
Allowable load impedance	250 Ω max.
Max. output signal	22 mA
Non-load voltage	---
Short-circuit current	---
Ripple	20 mV pp max. (500 Ω)

Nomenclature



DIP Switch Settings

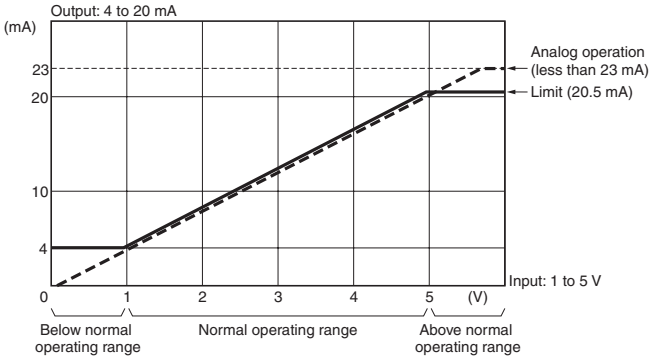
All DIP switches are turned OFF at shipment. DIP switch S1 is used to select input and output signals and analog output limit operation.

SWITCH		DIP switch S1					
ON ● ↑ OFF ❍ ↓		1	2	3	4	5	6
Input signal							
0 to 10 V		❍	❍	❍			
1 to 5 V		❍	●	❍			
0 to 20 mA		●	❍	●			
4 to 20 mA		●	●	●			
Analog output limit operation							
Limit function disabled					❍		
Limit function enabled					●		
Output 1 signal	**Output 2 signal**						
0 to 20 mA	0 to 20 mA					❍	❍
0 to 20 mA	4 to 20 mA					●	❍
4 to 20 mA	4 to 20 mA					❍	●
---	---					●	●

Note: Do not turn ON both pins 5 and 6 at the same time on DIP switch S1.

Analog Output Operation

Setting Example for 1 to 5-V Input and 4 to 20-mA Output:

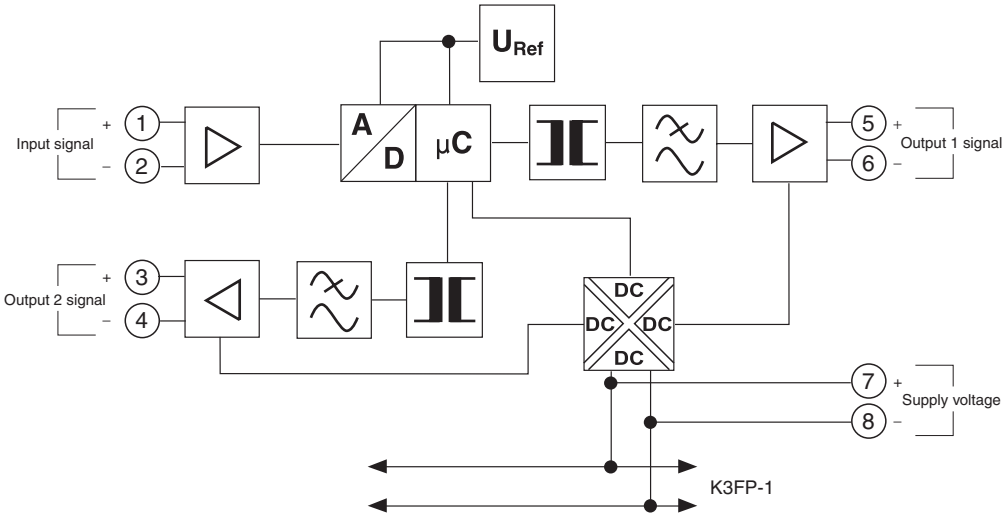


Note: The following table shows the output values that are held when the measurement range is exceeded while the limit function is enabled for analog outputs (i.e., pin 4 on DIP switch S1 turned ON).

Output signal selection	Below measurement range	Above measurement range
0 to 20 mA	The output signal is held at 0 mA.	The diagnostics indicator is lit (red) if the analog output is 20.5 mA or higher. The output signal is held at 20.5 mA.
4 to 20 mA	The output signal is held at 4 mA. The diagnostics indicator is lit (red) if the analog output is 3.5 mA or lower.	The diagnostics indicator is lit (red) if the analog output is 20.5 mA or higher. The output signal is held at 20.5 mA.

Connections

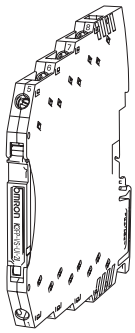
■ Internal Block Diagram

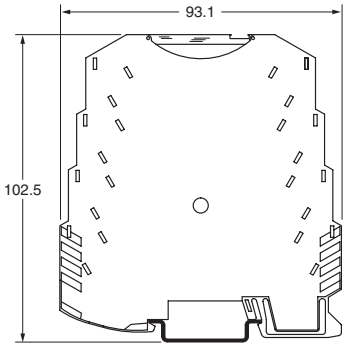


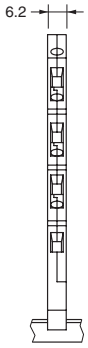
Dimensions

Note: All units are in millimeters unless otherwise indicated.

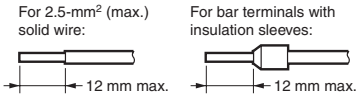
K3FP-VS-UI-2I







Note: 1. Use solid wire with a diameter of 2.5 mm^2 max. or bar terminals with insulation sleeves for terminal connections.
To preserve dielectric strength after connection, the length of the exposed conductive part inserted into the terminal must be 12 mm max.



2. Screw Tightening Torque
Recommended torque:
0.5 N·m

Precautions

Refer to pages 38 and 39 for common precautions.

■ Precautions for Correct Use

Diagnostics Indicator

The diagnostics indicator (LED) inside the translucent cover lights when the input or output signal exceed the set range while the limit function is enabled (i.e., pin 4 on DIP switch S1 turned ON).

The diagnostics indicator flashes to indicate parameter memory errors. If this occurs, the Unit must be inspected at the factory.

Loop-powered Isolator
K3FP-SN1-I-I/K3FP-SN2-I-I

6.2-mm Ultra-slim Loop-powered Isolator

- Draws the power required to drive the amplifier from the input current signal.
- Isolated between input and output. 1,500 V AC dielectric strength.
- Close mounting.
- CE Marking compliant.
- UL certified.

⚠ Refer to *Common Precautions* on page 38.

Ordering Information

■ Isolator

Name	I/O signal	Model
Loop-powered Isolator	Channel 1	K3FP-SN1-I-I
	Channel 2	K3FP-SN2-I-I

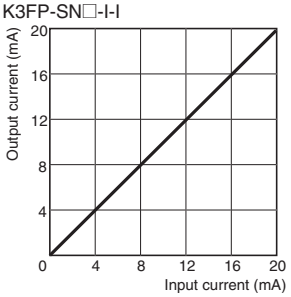
■ Optional Products

Name	Model
DIN rail bus connector	K3FP-1

Model Number Structure

K3FP-SN1-I-I
K3FP-SN2-I-I
1 2 3

1. **Model**
   SN1: Channel 1
   SN2: Channel 2
2. **Input signal**
   I: 0 (4) to 20 mA DC
3. **Output signal**
   I: 0 (4) to 20 mA DC



Ratings and Specifications

■ Ratings and Specifications

Item / Model	K3FP-SN1-I-I	K3FP-SN2-I-I
Error	±0.1% FS max.	
Other error per 100-Ω load	±0.03% of measured value max.	
Temperature coefficient per 100-Ω load	±0.002% of measured value max. (at 23°C)	
Cut-off frequency	75 Hz (3 dB)	
Response time (10% to 90%)	5 ms max. (for a 600-Ω load)	
Insulation resistance	10 MΩ min. between inputs, outputs, and power supply (at 500 V DC)	
Dielectric strength	1,500 V AC, 50 Hz, 1 min (between inputs, outputs, and power supply)	
Noise resistance	Conforms to IEC 61000	
Ambient operating temperature	−20 to 65°C	
Ambient storage temperature	−40 to 85°C	
Ambient operating humidity	95% max. (with no condensation)	
Ambient storage humidity	95% max. (with no condensation)	
Connection method	Screw connections (M3)	
Tightening torque	0.5 N·m	

Item	Model	K3FP-SN1-I-I	K3FP-SN2-I-I
Connecting cable	Solid wire	0.14 to 2.5 mm²	
	Stranded wire	0.2 to 2.5 mm²	
	AWG	24 to 12	
	Wire stripping length	12 mm	
Degree of protection		IP20	
Housing material		PBT	
Weight		54 g	58 g
Safety standards		UL 508	
EMC		EMI: Radiated EMI: EN 55011 EMS: ESD immunity: EN 61000-4-2 Rated electromagnetic field immunity: EN 61000-4-3 Burst immunity: EN 61000-4-4 Surge immunity: EN 61000-4-5 Conducted disturbance immunity: EN 61000-4-6	

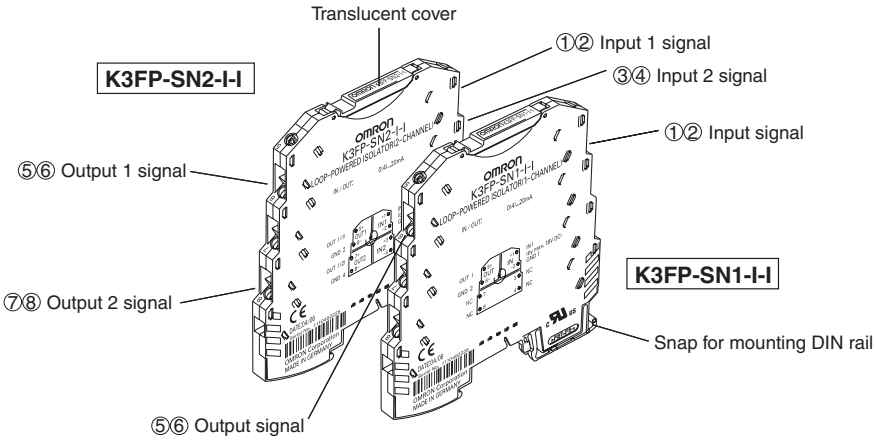
■ Input Specifications

Item / Input signal	0 to 20 mA DC, 4 to 20 mA DC
Input impedance	Changes depending on the load on the output side.
Response current	Approx. 150 μA
Voltage drop	Approx. 1.7 V (at I = 20 mA)
Max. input current/ overload	40 mA
Max. input voltage/ overload	18 V

■ Output Specifications

Item / Output signal	0 to 20 mA DC, 4 to 20 mA DC
Allowable load impedance	600 Ω max. (at I = 20 mA)
Ripple	10 mVeff max.

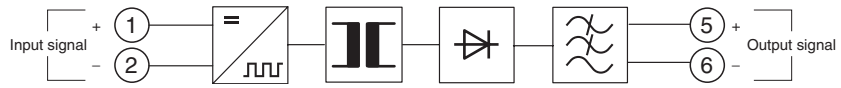
Nomenclature



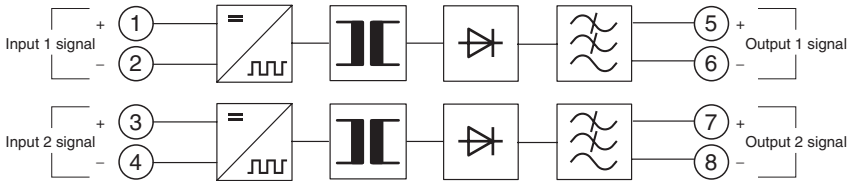
Connections

■ Internal Block Diagram

K3FP-SN1-I-I



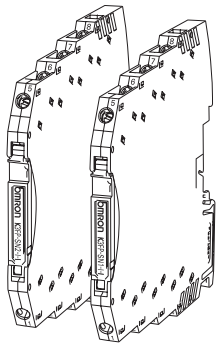
K3FP-SN2-I-I

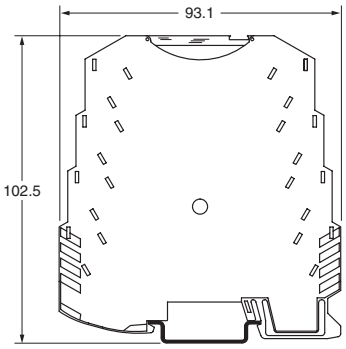


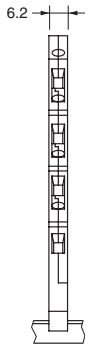
Dimensions

Note: All units are in millimeters unless otherwise indicated.

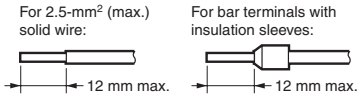
K3FP-SN1-I-I
K3FP-SN2-I-I







Note: 1. Use solid wire with a diameter of 2.5 mm^2 max. or bar terminals with insulation sleeves for terminal connections.
To preserve dielectric strength after connection, the length of the exposed conductive part inserted into the terminal must be 12 mm max.



2. Screw Tightening Torque
Recommended torque:
0.5 N·m

Precautions

Refer to pages 38 and 39 for common precautions.

■ Precautions for Correct Use

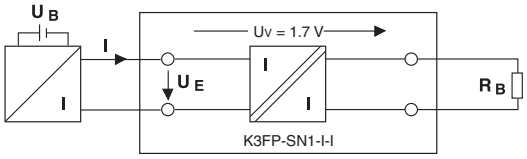
Operation

Passive Loop-powered Isolators draw the power required for isolation from the input signal.

Here, you must confirm that the current sourcing voltage of the measuring transducer U_B is sufficient to drive the maximum current of 20 mA via the Loop-powered Isolator with a voltage drop U_V of 1.7 V and a load R_B.

Thus:

$U_B \geq U_E = 1.7\ V + 20\ mA \times R_B$



Thermocouple Transducer
K3FP-TS-UI

6.2-mm Ultra-slim Thermocouple Transducer

- Converts measured values for type J and K thermocouple sensors into analog signals.
- Measurement range can be set between −150 and 1,350°C.
- Isolates between input, output, and power supply. 1,500 V AC dielectric strength.
- Close mounting.
- CE Marking compliant.
- UL certified.

⚠ Refer to *Common Precautions* on page 38.

Ordering Information

■ Thermocouple Transducer

Name	Model
Thermocouple Transducer	K3FP-TS-UI

■ Optional Products

Name	Model
DIN rail bus connector	K3FP-1

Model Number Structure

K3FP-TS-UI
1 2

1. **Model**
   Type J and K Thermocouples
   (Conforms to IEC 60584-1)
2. **Output signal**
   UI: 0 to 20 mA DC, 4 to 20 mA DC,
   20 to 0 mA DC, 20 to 4 mA DC,
   0 to 5 V DC, 1 to 5 V DC,
   0 to 10 V DC, 10 to 0 V DC
   (selected by DIP switch setting)

Ratings and Specifications

■ Ratings and Specifications

Supply voltage	24 V DC
Allowable supply voltage range	80% to 125% of rated supply voltage
Current consumption	25 mA DC max.
Power consumption	500 mW max.
Error (See note.)	Over maximum measurement span: ±0.2% max. Over set measurement span: ((150 K/set measurement span [K]) ±0.1)%
Temperature coefficient	Max. 0.02%/°C max. (at 23°C)
Cold junction error	3 K (average 2 K)
Response time (0% to 99%)	30 ms max.
Insulation resistance	10 MΩ min. between inputs, outputs, and power supply (at 500 V DC)
Dielectric strength	1,500 V AC, 50 Hz, 1 min (between inputs, outputs, and power supply)
Noise resistance	Conforms to IEC 61000
Ambient operating temperature	−20 to 65°C
Ambient storage temperature	−40 to 85°C
Ambient operating humidity	95% max. (with no condensation)
Ambient storage humidity	95% max. (with no condensation)
Connection method	Screw connections (M3)
Tightening torque	0.5 N·m

Connecting cable	**Solid wire**	0.14 to 2.5 mm^2
	Stranded wire	0.2 to 2.5 mm^2
	AWG	24 to 12
	Wire stripping length	12 mm
Degree of protection		IP20
Housing material		PBT
Weight		54 g
Safety standards		UL 508
EMC		EMI: Radiated EMI: EN 55011 EMS: ESD immunity: EN 61000-4-2 Rated electromagnetic field immunity: EN 61000-4-3 Burst immunity: EN 61000-4-4 Surge immunity: EN 61000-4-5 Conducted disturbance immunity: EN 61000-4-6

Note: K is the abbreviation for Kelvin, the unit for absolute temperature.

■ Input Specifications

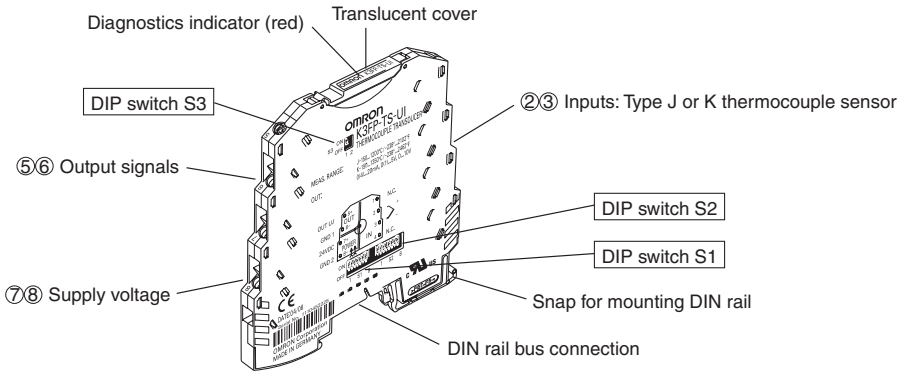
Item \ Input signal	Type J and K Thermocouples (Conforms to IEC 60584-1)
Measurement range	J: –150 to 1,200°C K: –150 to 1,350°C
Minimum measurement span (See note.)	Min. 50°C
Max. input signal	30 V

Note: Set the start and end temperatures using the DIP switch to 50°C or higher.

■ Output Specifications

Item \ Output signal	0 to 20 mA DC, 4 to 20 mA DC, 20 to 0 mA DC, 20 to 4 mA DC	0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC, 10 to 0 V DC
Allowable load impedance	500 Ω max.	10 kΩ min.
Max. output signal	23 mA	12.5 V
Non-load voltage	12.5 V max.	---
Short-circuit current	---	10 mA
Ripple	20 mV pp max. (500 Ω)	20 mV pp max.
Operation during sensor faults	0% to 105%	

Nomenclature



DIP Switch Settings

All DIP switches are turned OFF at shipment.

DIP Switch S1

DIP switch S1 is used to set the thermocouple type, cold junction compensation enable/disable, output signal range, and the start of the measurement range.

SWITCH / ON ● ↑ OFF ❍ ↓	DIP switch S1							
	1	2	3	4	5	6	7	8
Thermocouple type								
Type J	❍							
Type K	●							
Cold junction compensation enable/disable								
Enabled		●						
Disabled		❍						
Output signal range								
0 to 20 mA			❍	❍	❍			
20 to 0 mA			●	❍	❍			
4 to 20 mA			❍	●	❍			
20 to 4 mA			●	●	❍			
0 to 10 V			❍	❍	●			
10 to 0 V			●	❍	●			
0 to 5 V			❍	●	●			
1 to 5 V			●	●	●			
Start temperature								
[°C] / **[°F]**								
0 / 32						❍	❍	❍
–10 / 14						●	❍	❍
–20 / –4						❍	●	❍
–30 / –22						●	●	❍
–40 / –40						❍	❍	●
–50 / –58						●	❍	●
–100 / –148						❍	●	●
–150 / –238						●	●	●

DIP Switch S3

DIP switch S3 is used to select the current output and voltage output for output signals.

SWITCH / ON ● ↑ OFF ❍ ↓	DIP switch S3	
	1	2
Output signal		
0 to 20 mA	●	❍
20 to 0 mA		
4 to 20 mA		
20 to 4 mA		
0 to 10 V	❍	●
10 to 0 V		
0 to 5 V		
1 to 5 V		

DIP Switch S2

DIP switch S2 is used to select the measurement range end value and output status for errors.

SWITCH		DIP switch S2							
ON ● ↑ OFF ❍ ↓		1	2	3	4	5	6	7	8
End temperature									
[°C]	**[°F]**								
0	32	❍	❍	❍	❍	❍	❍		
10	50	●	❍	❍	❍	❍	❍		
20	68	❍	●	❍	❍	❍	❍		
30	86	●	●	❍	❍	❍	❍		
40	104	❍	❍	●	❍	❍	❍		
50	122	●	❍	●	❍	❍	❍		
60	140	❍	●	●	❍	❍	❍		
70	158	●	●	●	❍	❍	❍		
80	176	❍	❍	❍	●	❍	❍		
90	194	●	❍	❍	●	❍	❍		
100	212	❍	●	❍	●	❍	❍		
110	230	●	●	❍	●	❍	❍		
120	248	❍	❍	●	●	❍	❍		
130	266	●	❍	●	●	❍	❍		
140	284	❍	●	●	●	❍	❍		
150	302	●	●	●	●	❍	❍		
160	320	❍	❍	❍	❍	●	❍		
170	338	●	❍	❍	❍	●	❍		
180	356	❍	●	❍	❍	●	❍		
190	374	●	●	❍	❍	●	❍		
200	392	❍	❍	●	❍	●	❍		
210	410	●	❍	●	❍	●	❍		
220	428	❍	●	●	❍	●	❍		
230	446	●	●	●	❍	●	❍		
240	464	❍	❍	❍	●	●	❍		
250	482	●	❍	❍	●	●	❍		
260	500	❍	●	❍	●	●	❍		
270	518	●	●	❍	●	●	❍		
280	536	❍	❍	●	●	●	❍		
290	554	●	❍	●	●	●	❍		
300	572	❍	●	●	●	●	❍		
320	608	●	●	●	●	●	❍		
Output status for errors									
A								❍	❍
B								●	❍
C								❍	●
D								●	●

SWITCH		DIP switch S2							
ON ● ↑ OFF ❍ ↓		1	2	3	4	5	6	7	8
End temperature									
[°C]	**[°F]**								
340	644	❍	❍	❍	❍	❍	●		
360	680	●	❍	❍	❍	❍	●		
380	716	❍	●	❍	❍	❍	●		
400	752	●	●	❍	❍	❍	●		
420	788	❍	❍	●	❍	❍	●		
440	824	●	❍	●	❍	❍	●		
460	860	❍	●	●	❍	❍	●		
480	896	●	●	●	❍	❍	●		
500	932	❍	❍	❍	●	❍	●		
520	968	●	❍	❍	●	❍	●		
540	1004	❍	●	❍	●	❍	●		
560	1040	●	●	❍	●	❍	●		
580	1076	❍	❍	●	●	❍	●		
600	1112	●	❍	●	●	❍	●		
620	1148	❍	●	●	●	❍	●		
640	1184	●	●	●	●	❍	●		
660	1220	❍	❍	❍	❍	●	●		
680	1256	●	❍	❍	❍	●	●		
700	1292	❍	●	❍	❍	●	●		
750	1382	●	●	❍	❍	●	●		
800	1472	❍	❍	●	❍	●	●		
850	1562	●	❍	●	❍	●	●		
900	1652	❍	●	●	❍	●	●		
950	1742	●	●	●	❍	●	●		
1000	1832	❍	❍	❍	●	●	●		
1050	1922	●	❍	❍	●	●	●		
1100	2012	❍	●	❍	●	●	●		
1150	2102	●	●	❍	●	●	●		
1200	2192	❍	❍	●	●	●	●		
1250 (See note.)	2282	●	❍	●	●	●	●		
1300 (See note.)	2372	❍	●	●	●	●	●		
1350 (See note.)	2462	●	●	●	●	●	●		
Output status for errors									
A								❍	❍
B								●	❍
C								❍	●
D								●	●

Note: Type J supports up to 1,200°C and type K supports up to 1,350°C.

Output Status for Errors

SWITCH ON ● ↑ OFF ❍ ↓	DIP switch S2 7	 8			
Output status for errors			**When disconnected on thermocouple side**	**Above measurement range**	**Below measurement range**
A	❍	❍	Held at 5% of maximum rated output.	Held at 2.5% of maximum rated output.	Held at minimum rated output.
B	●	❍	Held at 5% of maximum rated output.	Held at 2.5% of maximum rated output.	Held at –12.5% of minimum rated output.
C	❍	●	Held at 5% of maximum rated output.	Held at maximum rated output.	Held at minimum rated output.
D	●	●	Held at minimum rated output.	Held at maximum rated output.	Held at minimum rated output.

Relationship between Output Signal Range Selection

Output Signal Ranges 0 to 20 mA or 20 to 0 mA

Output status for errors	DIP switch S2		When disconnected on thermocouple side	Above measurement range	Below measurement range
	7	8			
A	❍	❍	21 mA	20.5 mA	0 mA
B	●	❍	21 mA	20.5 mA	0 mA
C	❍	●	21 mA	20 mA	0 mA
D	●	●	0 mA	20 mA	0 mA

Output Signal Ranges 4 to 20 mA or 20 to 4 mA

Output status for errors	DIP switch S2		When disconnected on thermocouple side	Above measurement range	Below measurement range
	7	8			
A	❍	❍	21 mA	20.5 mA	4 mA
B	●	❍	21 mA	20.5 mA	3.5 mA
C	❍	●	21 mA	20 mA	4 mA
D	●	●	4 mA	20 mA	4 mA

Output Signal Ranges 0 to 10 V or 10 to 0 V

Output status for errors	DIP switch S2		When disconnected on thermocouple side	Above measurement range	Below measurement range
	7	8			
A	❍	❍	10.5 V	10.25 V	0 V
B	●	❍	10.5 V	10.25 V	0 V
C	❍	●	10.5 V	10 V	0 V
D	●	●	0 V	10 V	0 V

Output Signal Range 0 to 5 V

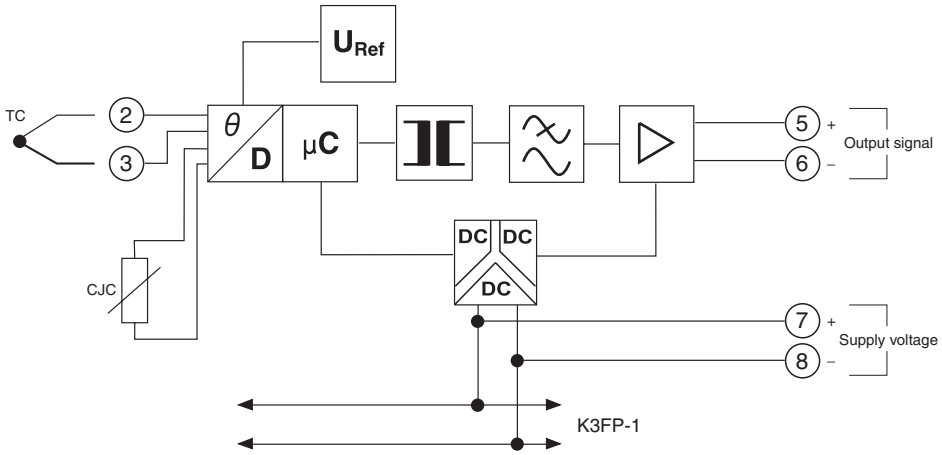
Output status for errors	DIP switch S2		When disconnected on thermocouple side	Above measurement range	Below measurement range
	7	8			
A	❍	❍	5.25 V	5.125 V	0 V
B	●	❍	5.25 V	5.125 V	0 V
C	❍	●	5.25 V	5 V	0 V
D	●	●	0 V	5 V	0 V

Output Signal Range 1 to 5 V

Output status for errors	DIP switch S2		When disconnected on thermocouple side	Above measurement range	Below measurement range
	7	8			
A	❍	❍	5.25 V	5.125 V	1 V
B	●	❍	5.25 V	5.125 V	0.875 V
C	❍	●	5.25 V	5 V	1 V
D	●	●	1 V	5 V	1 V

Connections

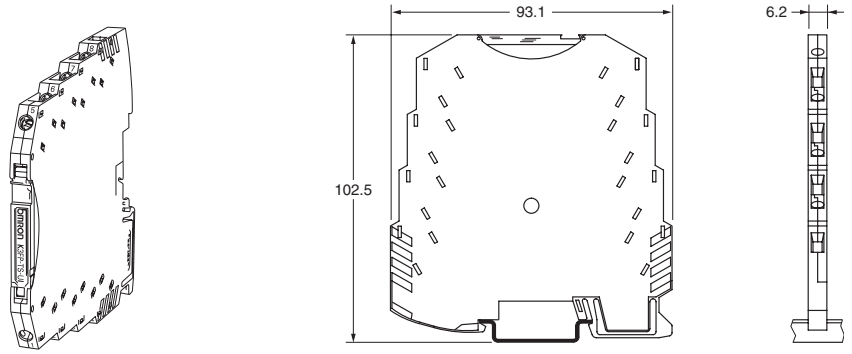
■ Internal Block Diagram



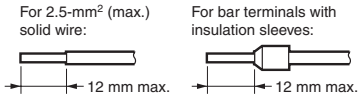
Dimensions

Note: All units are in millimeters unless otherwise indicated.

K3FP-TS-UI



Note: 1. Use solid wire with a diameter of 2.5 mm^2 max. or bar terminals with insulation sleeves for terminal connections.
To preserve dielectric strength after connection, the length of the exposed conductive part inserted into the terminal must be 12 mm max.



2. Screw Tightening Torque
Recommended torque:
0.5 N·m

Precautions

Refer to pages 38 and 39 for common precautions.

■ Precautions for Correct Use

Diagnostics Indicator

The diagnostics indicator (LED) inside the translucent cover shows the error status, as outlined in the following table.

Indicator status	Error details
Flashing	Measuring range span less than 50 K
	The upper limit of the measurement range for a type J thermocouple is set to 1,200°C or higher.
Lit	Disconnection on the thermocouple side
	Short circuit on the thermocouple side
	Above measurement range
	Below measurement range

RTD Transducer
K3FP-RS-UI

6.2-mm Ultra-slim RTD Transducer

- Converts measured values from PT100 platinum resistance thermometers into analog signals.
- A 2-conductor, 3-conductor, or 4-conductor PT100 platinum resistance thermometer can be connected to the input terminal.
- Measurement range can be set between –150 and 850°C.
- Isolates between input, output, and power supply. 1,500 V AC dielectric strength.
- Close mounting.
- CE Marking compliant.
- UL certified.

⚠ Refer to *Common Precautions* on page 38.

Ordering Information

■ RTD Transducer

Name	Model
RTD Transducer	K3FP-RS-UI

■ Optional Products

Name	Model
DIN rail bus connector	K3FP-1

Model Number Structure

K3FP-RS-UI
1 2

1. **Model**
   PT100 platinum resistance thermometer (conforms to IEC 60751)
   (selected by DIP switch setting)
2. **Output Signal**
   UI: 0 to 20 mA DC, 4 to 20 mA DC,
   20 to 0 mA DC, 20 to 4 mA DC,
   0 to 5 V DC, 1 to 5 V DC,
   0 to 10 V DC, 10 to 0 V DC
   (selected by DIP switch setting)

Ratings and Specifications

■ Ratings and Specifications

Supply voltage	24 VDC
Allowable supply voltage range	80% to 125% of rated supply voltage
Current consumption	25 mA DC max. (at 24 V DC)
Power consumption	500 mW max.
Error	Over maximum measurement span: ±0.2% max. Over set measurement span: ((100 K/set measurement span [K]) ±0.1)%
Temperature coefficient	Max. 0.02%/°C max. (at 23°C)
Response time (0% to 99%)	30 ms max.
Insulation resistance	10 MΩ min. between inputs, outputs, and power supply (at 500 V DC)
Dielectric strength	1,500 V AC, 50 Hz, 1 min (between inputs, outputs, and power supply)
Noise resistance	Conforms to IEC 61000
Ambient operating temperature	–20 to 65°C
Ambient storage temperature	–40 to 85°C
Ambient operating humidity	95% max. (with no condensation)
Ambient storage humidity	95% max. (with no condensation)
Connection method	Screw connections (M3)
Tightening torque	0.5 N·m

Connecting cable	**Solid wire**	0.14 to 2.5 mm^2
	Stranded wire	0.2 to 2.5 mm^2
	AWG	24 to 12
	Wire stripping length	12 mm
Degree of protection		IP20
Housing material		PBT
Weight		54 g
Safety standards		UL 508
EMC		EMI: Radiated EMI: EN 55011 EMS: ESD immunity: EN 61000-4-2 Rated electromagnetic field immunity: EN 61000-4-3 Burst immunity: EN 61000-4-4 Surge immunity: EN 61000-4-5 Conducted disturbance immunity: EN 61000-4-6

■ Input Specifications

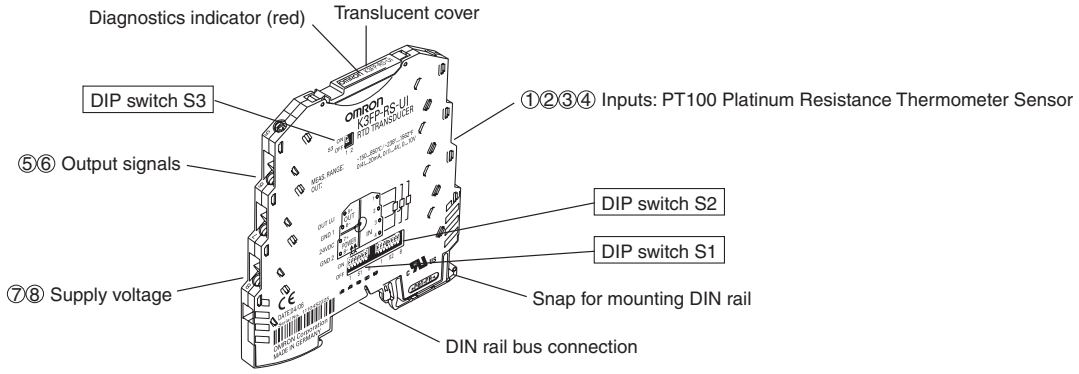
Item / Input signal	PT100 platinum resistance thermometer (conforms to IEC 60751)
Measurement range	–150 to 850°C
Min. measurement span	Min. 50°C
Max. input signal	30 V
Connection method	2-conductor, 3-conductor, or 4-conductor
Sensor input current	1 mA
Max. permissible conductor resistance	10 Ω per conductor

Note: Set the start and end temperatures using the DIP switch to 50°C or higher.

■ Output Specifications

Item / Output signal	0 to 20 mA DC, 4 to 20 mA DC, 20 to 0 mA DC, 20 to 4 mA DC	0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC, 10 to 0 V DC
Allowable load impedance	500 Ω max. (20 mA)	10 kΩ min.
Max. output signal	23 mA	12.5 V
Non-load voltage	12.5 V max.	---
Short-circuit current	---	10 mA max.
Ripple	20 mVpp max. (500 Ω)	20 mVpp max.
Operation during sensor faults	0% to 105%	

Nomenclature



DIP Switch Settings

All DIP switches are turned OFF at shipment.

DIP Switch S1

DIP switch S1 is used to set the connection method, output signal range, and measurement range start value.

SWITCH		DIP switch S1							
ON ● ↑ OFF ❍ ↓		1	2	3	4	5	6	7	8
Connection method									
2-conductor		❍	❍						
2-conductor		●	❍						
3-conductor		❍	●						
4-conductor		●	●						
Output signal range									
0 to 20 mA				❍	❍	❍			
20 to 0 mA				●	❍	❍			
4 to 20 mA				❍	●	❍			
20 to 4 mA				●	●	❍			
0 to 10 V				❍	❍	●			
10 to 0 V				●	❍	●			
0 to 5 V				❍	●	●			
1 to 5 V				●	●	●			
Start temperature									
[°C]	**[°F]**								
0	32						❍	❍	❍
–10	14						●	❍	❍
–20	–4						❍	●	❍
–30	–22						●	●	❍
–40	–40						❍	❍	●
–50	–58						●	❍	●
–100	–148						❍	●	●
–150	–238						●	●	●

DIP Switch S3

DIP switch S3 is used to select current and voltage outputs for output signals.

SWITCH	DIP switch S3	
ON ● ↑ OFF ❍ ↓	1	2
Output signal		
0 to 20 mA	●	❍
20 to 0 mA		
4 to 20 mA		
20 to 4 mA		
0 to 10 V	❍	●
10 to 0 V		
0 to 5 V		
1 to 5 V		

DIP Switch S2

DIP switch S2 is used to select the measurement range end value and output status for errors.

SWITCH		DIP Switch S2							
ON ● ↑ OFF ❍ ↓		1	2	3	4	5	6	7	8
End temperature									
[°C]	**[°F]**								
0	32	❍	❍	❍	❍	❍	❍		
5	41	●	❍	❍	❍	❍	❍		
10	50	❍	●	❍	❍	❍	❍		
15	59	●	●	❍	❍	❍	❍		
20	68	❍	❍	●	❍	❍	❍		
25	77	●	❍	●	❍	❍	❍		
30	86	❍	●	●	❍	❍	❍		
35	95	●	●	●	❍	❍	❍		
40	104	❍	❍	❍	●	❍	❍		
45	113	●	❍	❍	●	❍	❍		
50	122	❍	●	❍	●	❍	❍		
55	131	●	●	❍	●	❍	❍		
60	140	❍	❍	●	●	❍	❍		
65	149	●	❍	●	●	❍	❍		
70	158	❍	●	●	●	❍	❍		
75	167	●	●	●	●	❍	❍		
80	176	❍	❍	❍	❍	●	❍		
85	185	●	❍	❍	❍	●	❍		
90	194	❍	●	❍	❍	●	❍		
95	203	●	●	❍	❍	●	❍		
100	212	❍	❍	●	❍	●	❍		
110	230	●	❍	●	❍	●	❍		
120	248	❍	●	●	❍	●	❍		
130	266	●	●	●	❍	●	❍		
140	284	❍	❍	❍	●	●	❍		
150	302	●	❍	❍	●	●	❍		
160	320	❍	●	❍	●	●	❍		
170	338	●	●	❍	●	●	❍		
180	356	❍	❍	●	●	●	❍		
190	374	●	❍	●	●	●	❍		
200	392	❍	●	●	●	●	❍		
210	410	●	●	●	●	●	❍		
Output status for errors									
A								❍	❍
B								●	❍
C								❍	●
D								●	●

SWITCH		DIP Switch S2							
ON ● ↑ OFF ❍ ↓		1	2	3	4	5	6	7	8
End temperature									
[°C]	**[°F]**								
220	428	❍	❍	❍	❍	❍	●		
230	446	●	❍	❍	❍	❍	●		
240	464	❍	●	❍	❍	❍	●		
250	482	●	●	❍	❍	❍	●		
260	500	❍	❍	●	❍	❍	●		
270	518	●	❍	●	❍	❍	●		
280	536	❍	●	●	❍	❍	●		
290	554	●	●	●	❍	❍	●		
300	572	❍	❍	❍	●	❍	●		
320	608	●	❍	❍	●	❍	●		
340	644	❍	●	❍	●	❍	●		
360	680	●	●	❍	●	❍	●		
380	716	❍	❍	●	●	❍	●		
400	752	●	❍	●	●	❍	●		
420	788	❍	●	●	●	❍	●		
440	824	●	●	●	●	❍	●		
460	860	❍	❍	❍	❍	●	●		
480	896	●	❍	❍	❍	●	●		
500	932	❍	●	❍	❍	●	●		
520	968	●	●	❍	❍	●	●		
540	1004	❍	❍	●	❍	●	●		
560	1040	●	❍	●	❍	●	●		
580	1076	❍	●	●	❍	●	●		
600	1112	●	●	●	❍	●	●		
620	1148	❍	❍	❍	●	●	●		
640	1184	●	❍	❍	●	●	●		
660	1220	❍	●	❍	●	●	●		
680	1256	●	●	❍	●	●	●		
700	1292	❍	❍	●	●	●	●		
750	1382	●	❍	●	●	●	●		
800	1472	❍	●	●	●	●	●		
850	1562	●	●	●	●	●	●		
Output status for errors									
A								❍	❍
B								●	❍
C								❍	●
D								●	●

Output Status for Errors

SWITCH	DIP switch S2					
ON ● ↑ OFF ❍ ↓	7 	8 				
Output status for errors			**When disconnected on platinum resistance thermometer side**	**Above measurement range**	**Below measurement range**	**When short-circuited on platinum resistance thermometer side**
A	❍	❍	Held at 5% of maximum rated output.	Held at 2.5% of maximum rated output.	Held at minimum rated output.	Held at minimum rated output.
B	●	❍	Held at 5% of maximum rated output.	Held at 2.5% of maximum rated output.	Held at −12.5% of minimum rated output.	Held at −25% of minimum rated output.
C	❍	●	Held at 5% of maximum rated output.	Held at maximum rated output.	Held at minimum rated output.	Held at 5% of maximum rated output.
D	●	●	Held at minimum rated output.	Held at maximum rated output.	Held at minimum rated output.	Held at minimum rated output.

Relationship between Output Signal Range Selection and Output Status for Errors

Output Signal Ranges 0 to 20 mA or 20 to 0 mA

Output status for errors	DIP switch S2		When disconnected on platinum resistance thermometer side	Above measurement range	Below measurement range	When short-circuited on platinum resistance thermometer side
	7	8				
A	❍	❍	21 mA	20.5 mA	0 mA	0 mA
B	●	❍	21 mA	20.5 mA	0 mA	0 mA
C	❍	●	21 mA	20 mA	0 mA	21 mA
D	●	●	0 mA	20 mA	0 mA	0 mA

Output Signal Ranges 4 to 20 mA or 20 to 4 mA

Output status for errors	DIP switch S2		When disconnected on platinum resistance thermometer side	Above measurement range	Below measurement range	When short-circuited on platinum resistance thermometer side
	7	8				
A	❍	❍	21 mA	20.5 mA	4 mA	4 mA
B	●	❍	21 mA	20.5 mA	3.5 mA	3mA
C	❍	●	21 mA	20 mA	4 mA	21 mA
D	●	●	4 mA	20 mA	4 mA	4 mA

Output Signal Ranges 0 to 10 V or 10 to 0 V

Output status for errors	DIP switch S2		When disconnected on platinum resistance thermometer side	Above measurement range	Below measurement range	When short-circuited on platinum resistance thermometer side
	7	8				
A	❍	❍	10.5 V	10.25 V	0 V	0 V
B	●	❍	10.5 V	10.25 V	0 V	0 V
C	❍	●	10.5 V	10 V	0 V	10.5 V
D	●	●	0 V	10 V	0 V	0 V

Output Signal Range 0 to 5 V

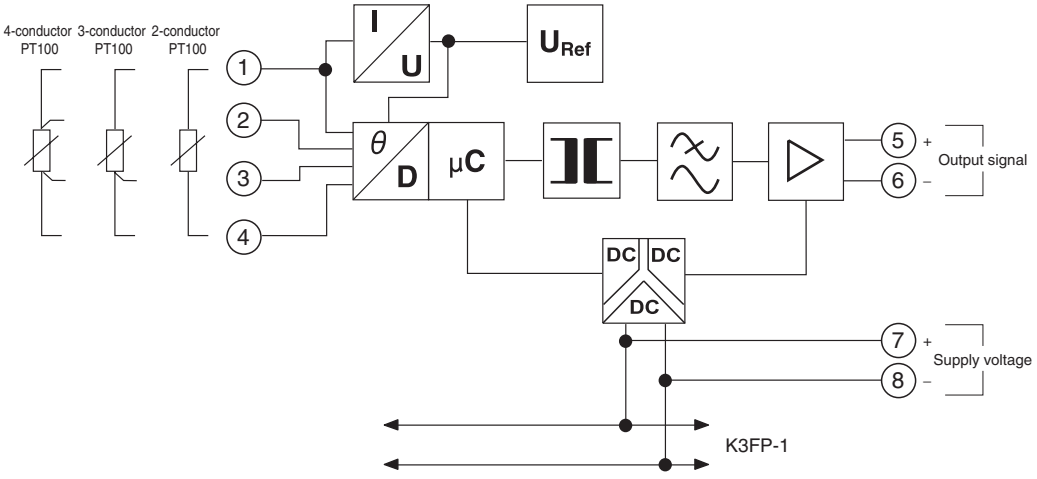
Output status for errors	DIP switch S2		When disconnected on platinum resistance thermometer side	Above measurement range	Below measurement range	When short-circuited on platinum resistance thermometer side
	7	8				
A	❍	❍	5.25 V	5.125 V	0 V	0 V
B	●	❍	5.25 V	5.125 V	0 V	0 V
C	❍	●	5.25 V	5 V	0 V	5.25 V
D	●	●	0 V	5 V	0 V	0 V

Output Signal Range 1 to 5 V

Output status for errors	DIP switch S2		When disconnected on platinum resistance thermometer side	Above measurement range	Below measurement range	When short-circuited on platinum resistance thermometer side
	7	8				
A	❍	❍	5.25 V	5.125 V	1 V	1 V
B	●	❍	5.25 V	5.125 V	0.875 V	0.75 V
C	❍	●	5.25 V	5 V	1 V	5.25 V
D	●	●	1 V	5 V	1 V	1 V

Connections

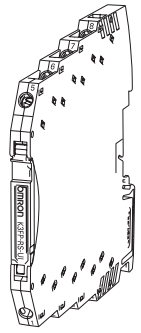
■ Internal Block Diagram

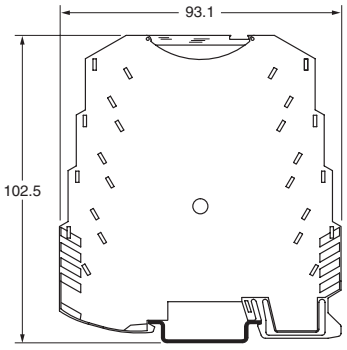


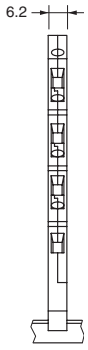
Dimensions

Note: All units are in millimeters unless otherwise indicated.

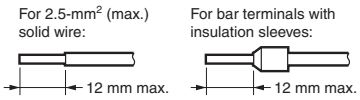
K3FP-RS-UI







Note: 1. Use solid wire with a diameter of 2.5 mm^2 max. or bar terminals with insulation sleeves for terminal connections.
To preserve dielectric strength after connection, the length of the exposed conductive part inserted into the terminal must be 12 mm max.



2. Screw Tightening Torque
Recommended torque:
0.5 N·m

Precautions

Refer to pages 38 and 39 for common precautions.

■ Precautions for Correct Use

Diagnostics Indicator

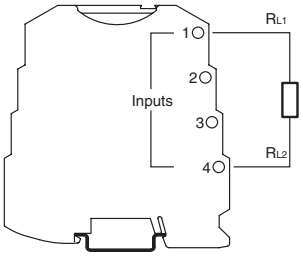
The diagnostics indicator (LED) inside the translucent cover shows the error status, as outlined in the following table.

Indicator status	Error details
Flashing	Measuring range span less than 50 K
Lit	Disconnection on the platinum resistance thermometer side
	Short circuit on the platinum resistance thermometer side
	Above measurement range
	Below measurement range

Connections

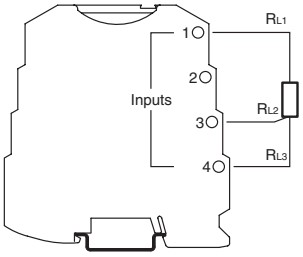
2-conductor Connection

- For short distances (less than 10 m)
- Cable resistances R_{L1} and R_{L2} are incorporated in the measurement result directly and falsify the result accordingly.



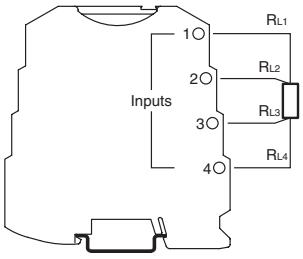
3-conductor Connection

- For long distances between PT100 platinum resistance thermometers and K3FP-RS-UI RTD Transducers.
- The value of all cable resistances must be exactly the same to balance out the PT100 platinum resistance thermometer cable resistances ($R_{L1} = R_{L2} = R_{L3}$).



4-conductor Connections

- For long distances between the PT100 platinum resistance thermometer and the K3FP-RS-UI and different cable resistances ($R_{L1} \neq R_{L2} \neq R_{L3} \neq R_{L4}$).



Repeater Power Supply
K3FP-DY-I-I

6.2-mm Ultra-slim Repeater Power Supply

- Isolates between input, output, and power supply. 1,500 V AC dielectric strength.
- Close mounting.
- CE Marking compliant.
- UL certified.

⚠ Refer to *Common Precautions* on page 38.

Ordering Information

■ Repeater Power Supply

Name	Model
Repeater Power Supply	K3FP-DY-I-I

■ Optional Products

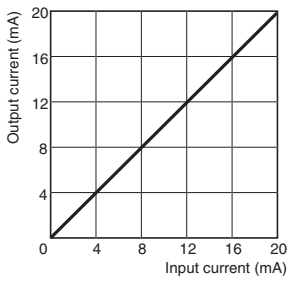
Name	Model
DIN rail bus connector	K3FP-1

Model Number Structure

K3FP-DY-I-I
1 2 3

1. **Model**
2. **Input Signal**
   I: 0 to 20 mA DC, 4 to 20 mA DC
3. **Output Signal**
   I: 0 to 20 mA DC, 4 to 20 mA DC

K3FP-DY-I-I



Ratings and Specifications

■ Ratings and Specifications

Supply voltage		24 V DC
Allowable supply voltage range		80% to 125% of rated supply voltage
Current consumption		40 mA DC max. (at 24 V DC, including 20 mA load current)
Power consumption		600 mA max.
Error		±0.2% FS max.
Temperature coefficient		0.01%/°C max., Typical: 0.002%/°C max. (at 23°C)
Cut-off frequency		100 Hz
Response time (10% to 90%)		3.5 ms max.
Insulation resistance		10 MΩ min. between inputs, outputs, and power supply (at 500 V DC)
Dielectric strength		1,500 V AC, 50 Hz, 1 min (between inputs, outputs, and power supply)
Noise resistance		Conforms to IEC 61000
Ambient operating temperature		–20 to 65°C
Ambient storage temperature		–40 to 85°C
Ambient operating humidity		95% max. (with no condensation)
Ambient storage humidity		95% max. (with no condensation)
Connection method		Screw connections (M3)
Tightening torque		0.5 N·m
Connecting cable	**Solid wire**	0.14 to 2.5 mm^2
	Stranded wire	0.2 to 2.5 mm^2
	AWG	24 to 12
	Wire stripping length	12 mm
Degree of protection		IP20

Housing material	PBT
Weight	55 g
Safety standards	UL 508
EMC	EMI: Radiated EMI: EN 55011 EMS: ESD immunity: EN 61000-4-2 Rated electromagnetic field immunity: EN 61000-4-3 Burst immunity: EN 61000-4-4 Surge immunity: EN 61000-4-5 Conducted disturbance immunity: EN 61000-4-6

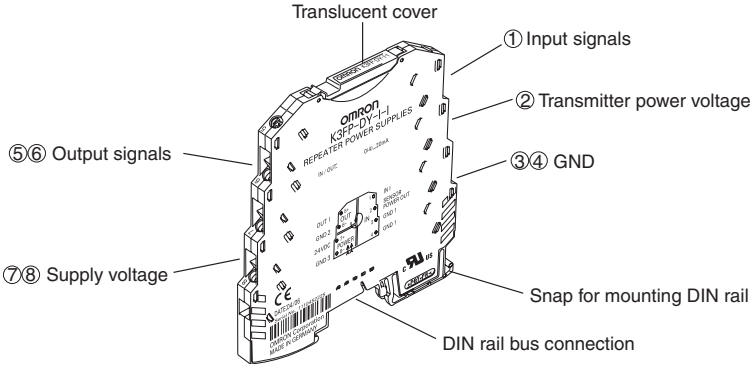
■ Input Specifications

Input signal / Item	0 to 20 mA DC, 4 to 20 mA DC
Input impedance	Approx. 50 Ω
Max. input signal	50 mA
Transmitter supply voltage	Power supply voltage: 4.5 V max.
Transmitter supply current	28 mA max.
Overcurrent detection	Approx. 28 mA

■ Output Specifications

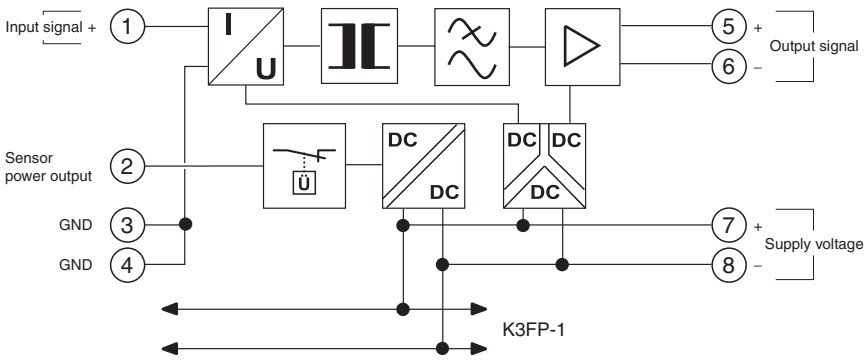
Output signal / Item	0 to 20 mA DC, 4 to 20 mA DC
Allowable load impedance	500 Ω max. (at I = 20 mA)
Max. output signal	28 mA
Non-load voltage	12.5 V max.
Short-circuit current	---
Ripple	20 mV pp max.

Nomenclature



Connections

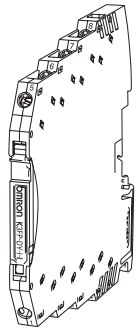
■ Internal Block Diagram

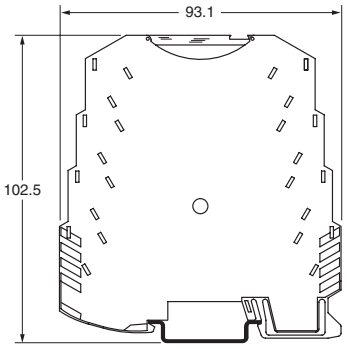


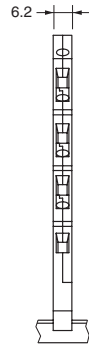
Dimensions

Note: All units are in millimeters unless otherwise indicated.

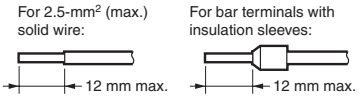
K3FP-DY-I-I







Note: 1. Use solid wire with a diameter of 2.5 mm^2 max. or bar terminals with insulation sleeves for terminal connections.
To preserve dielectric strength after connection, the length of the exposed conductive part inserted into the terminal must be 12 mm max.



2. Screw Tightening Torque
Recommended torque:
0.5 N·m

Precautions

Refer to pages 38 and 39 for common precautions.

Limit Value Switch
K3FP-SL-UI

6.2-mm Ultra-slim Limit Value Switch

- Accurate setting of comparative judgment values using the Unit's potentiometer.
- Isolates between input, output, and power supply. 1,500 V AC dielectric strength.
- Close mounting.
- CE Marking compliant.
- UL certified.

⚠ Refer to *Common Precautions* on page 38.

Ordering Information

■ Limit Value Switch

Name	Model
Limit Value Switch	K3FP-SL-UI

■ Optional Products

Name	Model
DIN rail bus connector	K3FP-1

Model Number Structure

K3FP-SL-UI
1 2

1. **Model**
2. **Input Signal**
   UI: 0 to 20 mA DC, 0 to 10 V DC
   (selected by DIP switch setting)
   Output Signal
   SPDT output

Ratings and Specifications

■ Ratings and Specifications

Supply voltage		24 V DC
Allowable supply voltage range		80% to 125% of rated supply voltage
Current consumption		15 mA DC max. (at 24 V DC)
Power consumption		450 mW max.
Error		±0.05% FS max.
Temperature coefficient		0.02%/°C max. (at 23°C)
Response time (10% to 90%)		35 ms max.
Insulation resistance		10 MΩ min. between inputs, outputs, and power supply (at 500 V DC)
Dielectric strength		1,500 V AC, 50 Hz, 1 min (between inputs, outputs, and power supply)
Noise resistance		Conforms to IEC 61000
Ambient operating temperature		–20 to 65°C
Ambient storage temperature		–40 to 85°C
Ambient operating humidity		95% max. (with no condensation)
Ambient storage humidity		95% max. (with no condensation)
Connection method		Screw connections (M3)
Tightening torque		0.5 N·m
Connecting cable	**Solid wire**	0.14 to 2.5 mm^2
	Stranded wire	0.2 to 2.5 mm^2
	AWG	24 to 12
	Wire stripping length	12 mm
Degree of protection		IP20
Housing material		PBT
Weight		58 g

Safety standards	UL 508
EMC	EMI: Radiated EMI: EN 55011 EMS: ESD immunity: EN 61000-4-2 Rated electromagnetic field immunity: EN 61000-4-3 Burst immunity: EN 61000-4-4 Surge immunity: EN 61000-4-5 Conducted disturbance immunity: EN 61000-4-6

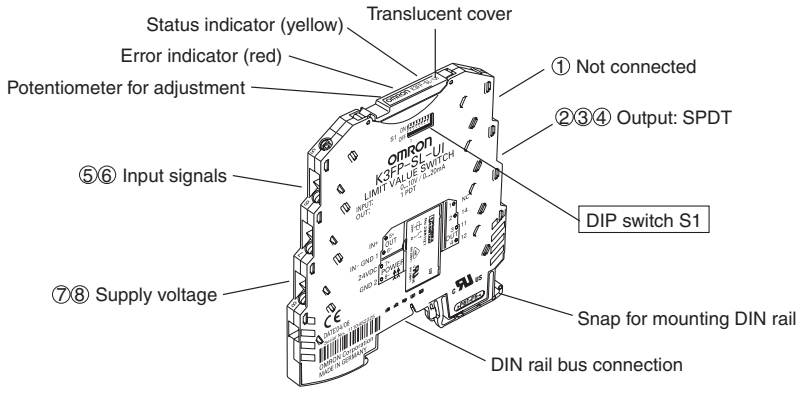
■ Input Specifications

Item / Input signal	0 to 20 mA DC	0 to 10 V DC
Input impedance	Approx. 50 Ω	Approx. 110 kΩ
Max. input signal	100 mA	30 V
Alarm output setting	Using 25-speed potentiometer	

■ Output Specifications

Item / Output signal	SPDT
Contact output status display	Yellow indicator (LED)
Applicable load	250 V AC, 2 A
Contact material	$AgSnO_2$
Max. contact voltage	250 V AC
Max. contact current	2 A
Max. switching capacity	500 VA (250 V AC)
Mechanical life	20 million operations
Electrical life	200,000 operations
Hysteresis	0.1%, 1% 2.5%, 5% (can be set using the DIP switch)
Contact drive method	NO, NC (can be set using the DIP switch)
Contact operation (delay time)	0 s, 1 s, 2 s, 3 s, 4 s, 6 s, 8 s, 10 s (can be set using the DIP switch)

Nomenclature



DIP Switch Settings

All DIP switches are turned OFF at shipment.

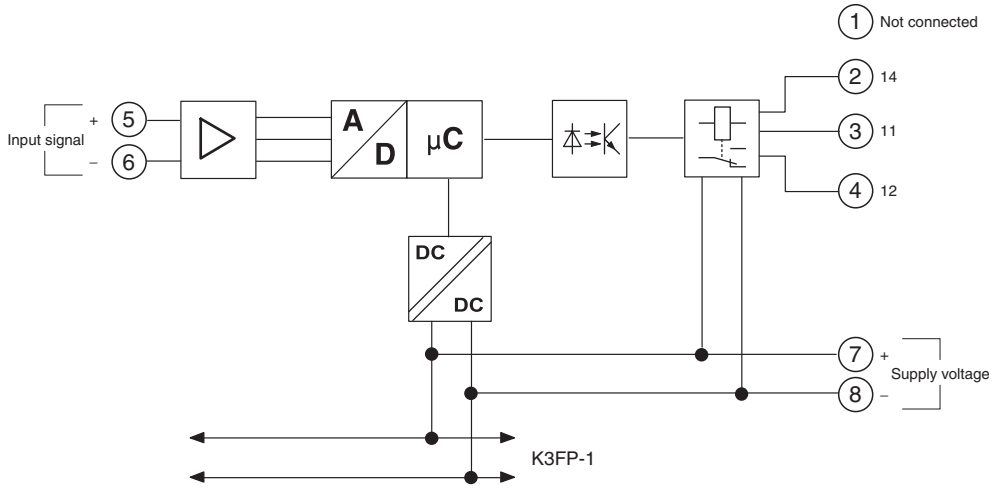
DIP Switch 1

DIP switch S1 is used to set the input signal range, hysteresis, contact operation (delay time), and contact drive method.

SWITCH / ON ● ↑ OFF ❍ ↓	DIP switch S1							
	1	2	3	4	5	6	7	8
Input signal								
0 to 10 V	❍	❍						
0 to 20 mA	●	●						
Hysteresis								
0.1%			❍	❍				
1.0%			●	❍				
2.5%			❍	●				
5.0%			●	●				
Contact operation (delay time)								
0 s					❍	❍	❍	
1 s					●	❍	❍	
2 s					❍	●	❍	
3 s					●	●	❍	
4 s					❍	❍	●	
6 s					●	❍	●	
8 s					❍	●	●	
10 s					●	●	●	
Contact drive method								
NO								❍
NC								●

Connections

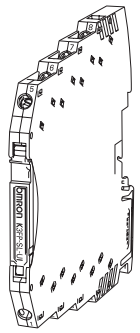
■ Internal Block Diagram

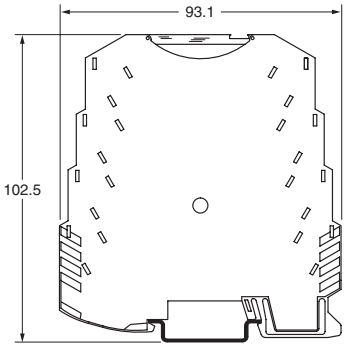


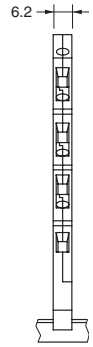
Dimensions

Note: All units are in millimeters unless otherwise indicated.

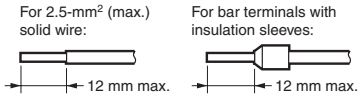
K3FP-SL-UI







Note: 1. Use solid wire with a diameter of 2.5 mm^2 max. or bar terminals with insulation sleeves for terminal connections.
To preserve dielectric strength after connection, the length of the exposed conductive part inserted into the terminal must be 12 mm max.



2. Screw Tightening Torque
Recommended torque:
0.5 N·m

Precautions

Refer to pages 38 and 39 for common precautions.

■ Precautions for Correct Use

Indicators

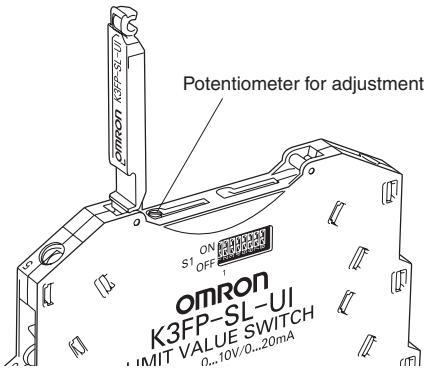
The status indicator (yellow LED) inside the translucent cover shows when voltage is applied to the contact coil, i.e., that the contact is switching.

The error indicator (red LED) inside the translucent cover shows the following error status.

Error indicator status	Error details
Lit	Overrange: 102.5% or more
Flashing	Unit malfunction

Setting Output Operation Values

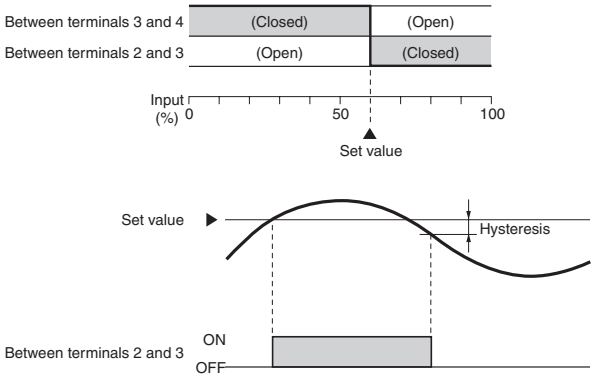
The output operation values can be set using the potentiometer for adjustment inside the translucent cover.



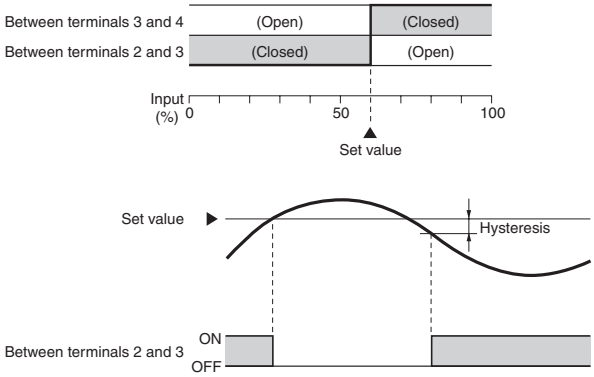
Output Operation

Terminals 3 and 4 are closed and terminals 2 and 3 are open when the Unit power is OFF.

(1) Pin 8 on DIP Switch S1 Is OFF



(2) Pin 8 on DIP Switch S1 Is ON



Setting Method

1. Set the input signal, hysteresis, contact operation (delay time), and contact drive method using the DIP switch.
2. Mount the Unit to DIN rail and wire it.
3. Apply a real input signal, enter the input value (output operation value) for comparative judgment, and adjust using the potentiometer.

Note: The output operation can be checked by whether the status indicator (yellow) is lit or not lit.

Common Precautions

Refer to *Precautions* in each product information sheet for specific precautions for individual products.

⚠ CAUTION	
Do not touch terminals while power is supplied. Doing so may occasionally result in minor or moderate injury.	
Do not allow pieces of metal, wire clippings, or fine metallic shavings or filings to enter the product. Doing so may occasionally result in minor or moderate injury or in property damage due to electric shock, fire, or malfunction caused by internal short circuiting.	
Do not use the product in locations where flammable or explosive gases are present. Doing so may occasionally result in minor or moderate explosion, causing minor or moderate injury, or property damage.	
Tighten the screws on the terminal block and the connector locking screws securely using the recommended tightening torque of 0.5 N·m. Loose screws may occasionally cause fire, resulting in minor or moderate injury, or damage to the equipment.	
Product failure may occasionally prevent operation of comparative outputs, resulting in damage to the connected facilities and equipment. Ensure safety in the event of product failure by taking safety measures, such as installing a separate monitoring system.	
Do not attempt to disassemble, repair, or modify the product. Doing so may occasionally result in minor or moderate injury due to electric shock.	

■ Precautions for Safe Use

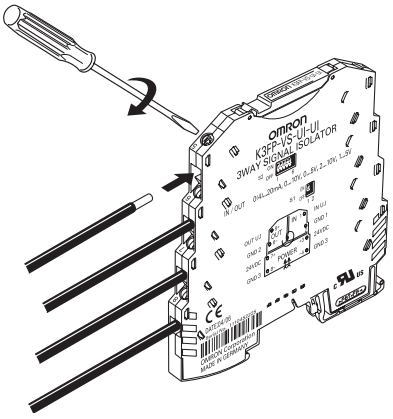
1. Do not use or store the product in the following locations.
   - Locations subject to direct radiant heat from heating equipment
   - Locations where the product may come into contact with water, oil, or salt water
   - Locations subject to direct sunlight
   - Locations where dust or corrosive gases (in particular, sulfuric or ammonia gas) are present
   - Locations subject to extreme temperature changes
   - Locations where icing or condensation may occur
   - Locations subject to excessive shocks or vibration
   - Locations subject to temperatures outside the specified range
   - Locations outdoors or exposed to wind or rain
   - Locations subject to static electricity or noise
2. Do not use the product in locations subject to temperatures outside the specified ranges or in locations subject to condensation. If the product is installed in a panel, be sure that the temperature around the product (not the temperature around the panel) does not go outside the specified range. The life of components is dependent on the temperature. The life of components shortens when the temperature rises, and it lengthens when the temperature falls. The life of components can be lengthened by lowering the temperature inside the product.
3. In order to prevent inductive noise, wire the lines connected to the product separately from power lines carrying high voltages or currents. Do not wire in parallel with or in the same cable as power lines. Other measures for reducing noise include running lines along separate ducts and using shield lines.
4. Do not install the product near devices generating strong high-frequency waves or surges. When using a noise filter, check the voltage and current and install it as close to the product as possible.
5. Do not use organic solvents (e.g., thinners or benzene), strong alkaline, or strong acidic material on the outside of the product. Doing so will damage the outer cover of the product.
6. Dispose of the product as industrial waste.

■ Precautions for Correct Use

Wiring

- Do not touch terminals or perform wiring while power is supplied to the product. Doing so may result in injury or malfunction.
- The K3FP contains components that may be damaged or destroyed by electrostatic discharge. When handling the K3FP, observe the necessary safety precautions against electrostatic discharge (ESD) in accordance with EN 61340-5-1 and EN 61340-5-2 as well as IEC 61340-5-1 and IEC 61340-5-2.
- Wire to the correct terminal number. Incorrect wiring may result in damage to or burning of components.

Screw Connections

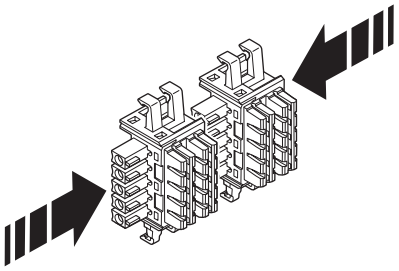


Mounting

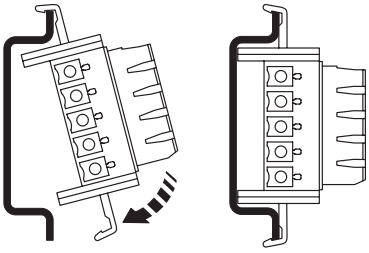
- The K3FP can be mounted on to all 35-mm DIN rail corresponding to EN 60715. When connecting the K3FP to a DIN rail bus connector, take particular care with the direction of both the K3FP and the Power Bridge.
- When connecting to a DIN rail bus connector, mount the DIN rail bus connector to the DIN rail before connecting the K3FP to the DIN rail bus connector.

Mounting DIN Rail Bus Connectors

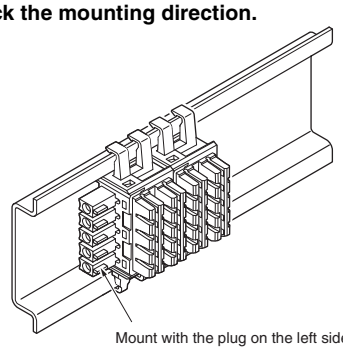
1. Connect the DIN rail bus connectors together.



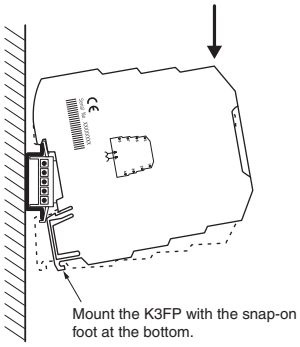
2. Mount the connectors to the DIN rail.



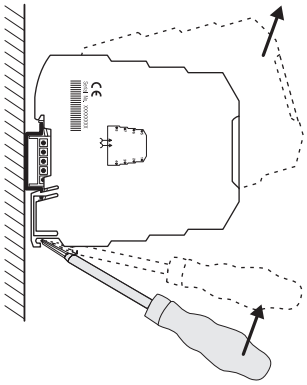
3. Check the mounting direction.



Mounting the K3FP



Removing the K3FP



- A DIN rail bus connector supplies the active devices. No DIN rail bus connector is necessary to operate the K3FP-SN1-1-1 or K3FP-SN2-1-1 Passive Loop-powered Isolators. It is, however, possible to snap the passive loop-powered isolators onto a DIN rail bus connector. An electrically conductive connection is not established so no existing DIN rail bus connection needs to be disconnected.
- Refer to the *Internal Block Diagram* for each product for block diagrams.
- Be sure that the DIN rail is mounted securely with no loose screws. If the screws are loose, vibration or shock may cause the product or wiring to become disconnected.

Power Supply Voltage

- Never connect power supply voltage directly to the DIN rail bus connector.
- Do not draw power from the DIN rail bus connector or from individual K3FP Units.
- When the total current consumption of the aligned K3FP Units does not exceed 400 mA, the power can be fed in directly at the connecting terminal blocks of a K3FP. It is recommended that a 400-mA fuse is connected upstream.
- Be sure power supplies and power lines for control power supply and inputs have appropriate specifications. Not using power supplies and power lines with appropriate specifications may result in malfunction, burning, or electric shock.

Recommended Drivers

Manufactured by Phoenix Contact

SZS 0.6 × 3.5 (insulated)
SZF 1-0.6 × 3.5 (non-insulated)

Warranty and Application Considerations

Read and Understand this Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

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OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Disclaimers

PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON *Warranty and Limitations of Liability.*

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your OMRON representative at any time to confirm actual specifications of purchased product.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

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. N152-E1-02 **In the interest of product improvement, specifications are subject to change without notice.**

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