Voltage relay

FVS-TYPE

To enhance flame-retardance (self-extinguishing performance), high-performance engineering plastic is used for the storing case.

Output contact status can be monitored with the LED.

Easy setting of a reference voltage with the digital switch.
The switch is the pen-push type, which prevents the setting from being accidentally changed.

Since the digital switch indicates a reference setting, the reference voltage can be set for each monitoring item. The reference setting is displayed in a percentage or voltage.

The reference voltage (monitoring voltage range) can be selected by the DIP switch settings.

A label that indicates the reference voltage setting (monitoring voltage range) is provided as a standard accessory. You can easily check the reference voltage setting (monitoring voltage range) with the label.

Control power supply ON / OFF status can be monitored with the LED.

FEATURES

1 The digital switch enables direct setting of a reference value in voltage or percent.

2 Since the FVS type is equipped with a variety of output contacts suitable for each monitoring item, no amplification relay is required.

3 The FVS type voltage relay provides noise immunity that conforms to the power standard (B402). The FVS type also provides excellent performance in power supply voltage fluctuation and insulation.

4 With high impedance, the FVS type can reduce the PT load.

5 You can check the operation status with the operation monitor LED. (Power, OV, UV.)

6 For the control power supply, a multi-hybrid D/D converter is provided. The FVS type enables long-life design, weight reduction and low power consumption without using an electrolytic capacitor.

SPECIFICATION (RATINGS AND PERFORMANCE)

Specification \ Type	FVS-D	FVS-U	FVS-W	FVS-HDF	FVS-HUF	FVS-HWF	FVS-SU	FVS-SO
Rated insulation voltage (Ui)	250V AC / DC							
Rated operating voltage (Ith)	100 / 110 V DC (Control power supply voltage)							
Output contact	OV 1a,1b UV 2c	OV / UV 1a,1b,2c	UV1 1a,1b UV2 2c	OV 1a,1b UV 2c	OV / UV 1a,1b,2c	SET1 1a,1b SET2 2c	OV / UV 1c	OV 1c UV /
Reference voltage (Monitoring voltage range)	AC: 63.5V, 100V, 110V, 200V, 220V DC: 100V, 110V, 200V, 220V			(AC: 0 to 99V, 100 to 199V DC: 0 to 99V, 100 to 199V)			AC: 63.5V, 100V, 110V, 200V, 220V DC: 100V, 110V, 200V, 220V	
Setting range	3% to 96%			3V to 99V, 100V to 196V			3% to 96%	
Withstand voltage	(L-A) 2,000 V AC for one minute							
Lightning impulse	(L-A) ±7,000 V, 3 times for each pole (1.2 / 50 μs)							
Output contact rating	Maximum operating voltage: 380 V AC, 125 V DC, Rated current-carrying capacity: 5 A							
Input impedance	PT input: Approx. 1 MΩ							
Noise immunity	Square wave: 1 kV, 1 ns / 100, Radio wave: 150, 400, 900 MHz bandwidths Static electricity: 15 kV (Air discharge) 8 kV (Contact discharge)							
Shock resistance	294m/s^2							
Power supply voltage fluctuation	−20 to +30%							
Operating temperature	−10 to 55°C							
Storing temperature	−20 to 60°C							
Altitude	2,000 m max.							

Voltage relay

FVS-TYPE

HOW TO ORDER

See the product coding.

PRODUCT CODING

FVS-H DF-DC11

Basic type

Control power supply voltage: 100 / 110 V DC

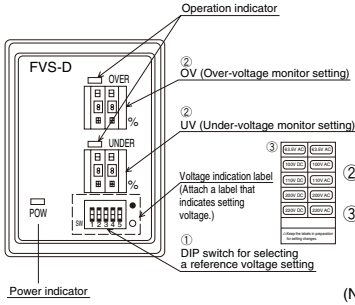
Shape code	Type	Circuit code	Classification	Monitoring item	Setting mode	Remarks
None	Vertical 14 pins	D	Standard	Over-voltage monitor (OV) Under-voltage monitor (UV)	%	
		U		Under-voltage monitor (UV)		
		W		Under-voltage monitor 1 (UV1) Under-voltage monitor 2 (UV2)		
		DD	Special	Over-voltage monitor (OV) Under-voltage monitor (UV)		125 V DC control power supply, special reference voltage
		UA		Under-voltage monitor (UV)		Special reference voltage
H	Horizontal 14 pins	DF	Standard	Over-voltage monitor (OV) Under-voltage monitor (UV)	V	
		UF		Under-voltage monitor (UV)		
		WF		Under-voltage monitor 1 (SET1) Under-voltage monitor 2 (SET2)		
		WE	Special	Under-voltage monitor 1 (SET1) Under-voltage monitor 2 (SET2)		Different type of SET1 output contacts
S	Vertical 8 pins	U	Standard	Under-voltage monitor (UV)	%	
		O		Over-voltage monitor (OV)		
		UB	Special	Under-voltage monitor (UV)		Special reference voltage
		OB		Over-voltage monitor (OV)		Special reference voltage

OPERATING INSTRUCTIONS

■Reference setting procedure

Example: Reference setting procedure for FVS type (D type)

①Set a reference voltage by selecting the DIP switch setting.



DIP switch voltage selection table
(attached on the side of the relay unit)

SWITCH	● ON / ○ OFF	No. 1	2	3	4	5
INPUT	AC	●				
	DC	○				
SETTING VOLTAGE RANGE	63.5V		○	○	○	○
	100V		●	○	○	○
	110V		○	●	○	○
	200V		○	○	●	○
	220V		○	○	○	●

②Set a value for each monitoring item (OV, UV) in percent. (Note 1)

③Select a voltage label that indicates the specified reference voltage from the supplied labels, and attach the label near the DIP switch.

(Note 1) If you conduct the reference voltage setting procedure when the FVS relay is in the voltage monitoring mode, it causes an indication error or output error. To set a reference voltage in the voltage monitoring mode, follow the procedure described below:

[①Set "9" in the first digit of the digital switch.
②Set a reference voltage in the second digit.
③Set a reference voltage in the first digit.]

For the detailed procedure, refer to the next page.

OPERATING INSTRUCTIONS

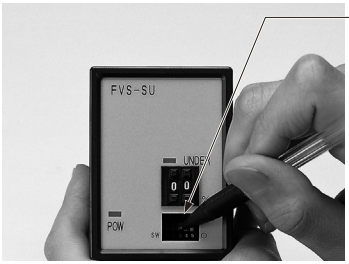
Monitoring voltage reference setting procedure (Percent-setting type)

Example: FVS type (SU type) reference setting procedure

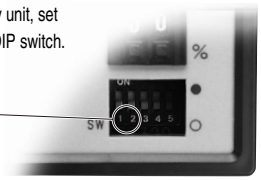
⚠ Precautions for reference setting

If you conduct the reference voltage setting procedure when the FVS relay is in the voltage monitoring mode, it causes an indication error or output error. It is recommended that the reference setting should be conducted when the voltage relay is not in the voltage monitoring mode. (The procedure for setting a reference voltage in the voltage monitoring mode is described in "Note 1" on p. 403.)

■1. Setting a reference voltage

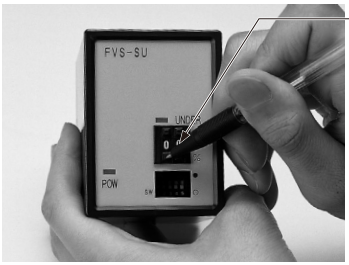


By referring to the "DIP switch voltage selection table" attached on the side of the relay unit, set a reference voltage by operating the DIP switch. (Example: To set "100 V AC", turn ON the No. 1 and No. 2 bits.)



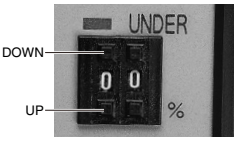
FVS type enables a reference voltage setting simply with the DIP switch.

■2. Setting a monitoring voltage



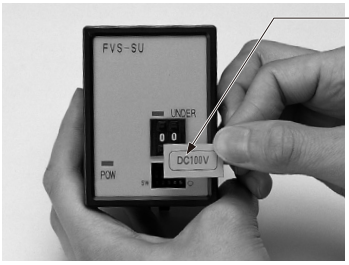
Set an under-voltage monitoring value (in percent) with the digital switch.

(Percent indicates a ratio relative to a reference voltage.)



You can set a FVS monitoring value in units of 1%, and check the setting as a digital value. The monitoring value can be set with the pen-push type digital switch which prevents accidental change.

■3. Attaching a voltage label



Attach the label that indicates the reference voltage specified in Step 1.

After setting a reference voltage, be sure to attach the supplied voltage indication label so that the voltage is not accidentally changed. Before attaching the label, check the DIP switch setting with the DIP switch voltage selection table attached on the side of the relay unit. Keep the rest labels in preparation for when the reference voltage setting is changed in the future.

OPERATING INSTRUCTIONS

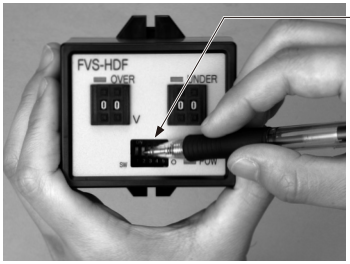
Monitoring voltage reference setting procedure (Voltage-setting type)

Example: FVS type (HDF type) reference setting procedure

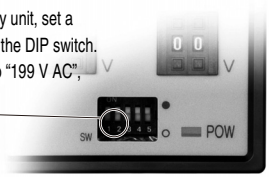
⚠ Precautions for reference setting

If you conduct the reference voltage setting procedure when the FVS relay is in the voltage monitoring mode, it causes an indication error or output error. It is recommended that the reference setting should be conducted when the voltage relay is not in the voltage monitoring mode. (The procedure for setting a reference voltage in the voltage monitoring mode is described in "Note 1" on p. 403.)

■1. Setting a reference voltage range

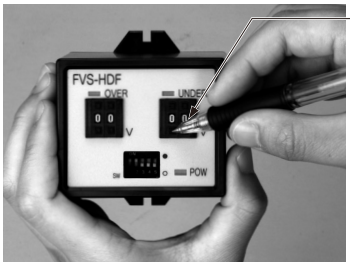


By referring to the "DIP switch voltage selection table" attached on the side of the relay unit, set a reference voltage range by operating the DIP switch. (Example: To set a range of "100 V to "199 V AC", turn ON the No. 1 and No. 2 bits.)

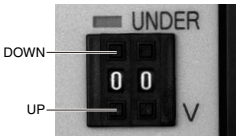


The FVS type enables a reference voltage range setting simply with the DIP switch.

■2. Setting a monitoring voltage

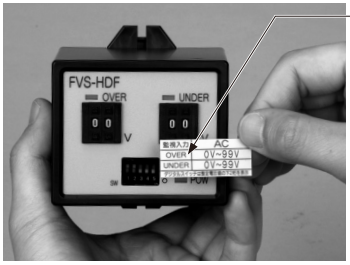


Set an under-voltage (over-voltage) monitoring value with the digital switch.



You can set a FVS monitoring value in units of 1%, and check the setting as a digital value. The monitoring value can be set with the pen-push type digital switch which prevents the setting from being accidentally changed.

■3. Attaching a voltage label



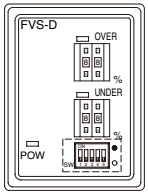
Attach the label that indicates the reference voltage range specified in Step 1.

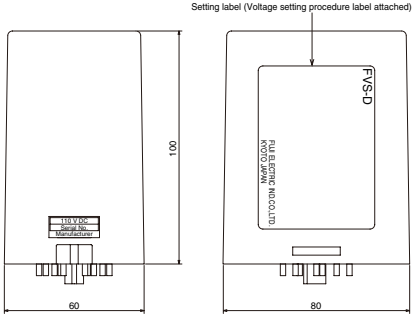
After setting a reference voltage, be sure to attach the supplied voltage indication label so that the voltage is not accidentally changed. Before attaching the label, check the DIP switch setting with the DIP switch voltage selection table attached on the side of the relay unit. Keep the rest labels in preparation for when the reference voltage setting is changed in the future.

STANDARD PRODUCTS *(Percent-setting, 14-pin type)*

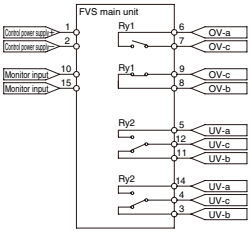
FVS-D-DC11

OV / UV type



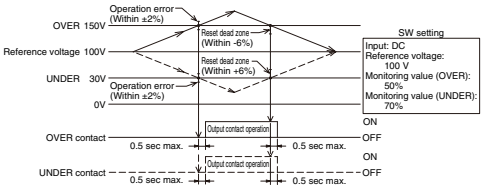


●Connection diagram



●Operation chart

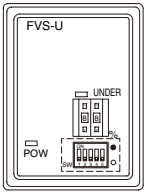
(Example: Monitoring voltage OVER = 150 V DC, UNDER = 30 V DC)

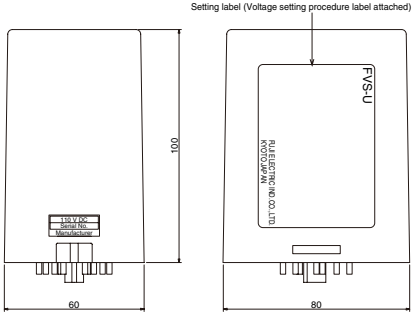


Note) The operation error, reset dead zone indicates a value relative to a reference voltage.
The above operation chart is applied to the output a-contact.

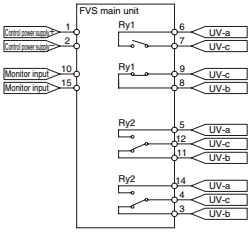
FVS-U-DC11

UV type



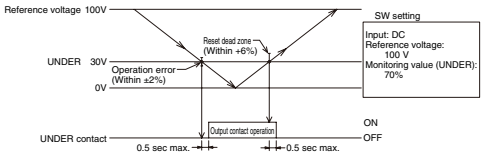


●Connection diagram



●Operation chart

(Example: Monitoring voltage UNDER = 30 V DC)



Note) The operation error reset dead zone indicates a value relative to a reference voltage.
The above operation chart is applied to the output a-contact.

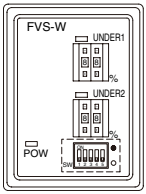
Voltage relay

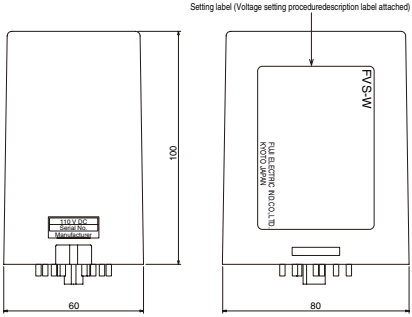
FVS-TYPE

STANDARD PRODUCTS *(Percent-setting, 14-pin type)*

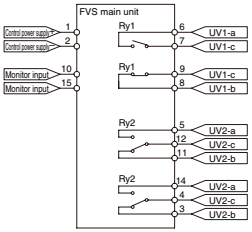
FVS-W-DC11

UV2 type



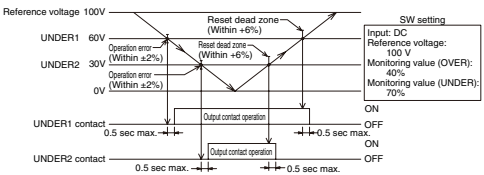


●Connection diagram



●Operation chart

(Example: Monitoring voltage UNDER1= 60 V DC, UNDER2 = 30 V DC)

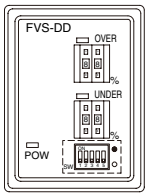


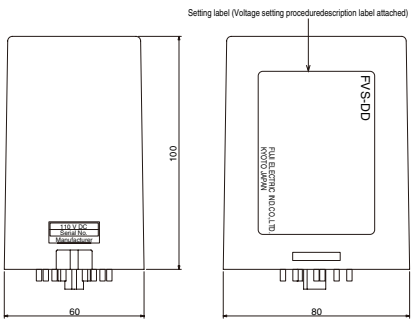
Note) The operation error reset dead zone indicates a value relative to a reference voltage.
The above operation chart is applied to the output a-contact.

SPECIAL PRODUCTS *(Percent-setting, 14-pin type)*

FVS-DD-DC12

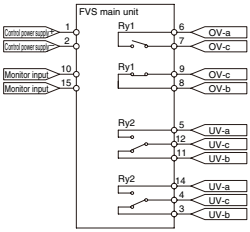
OV / UV type





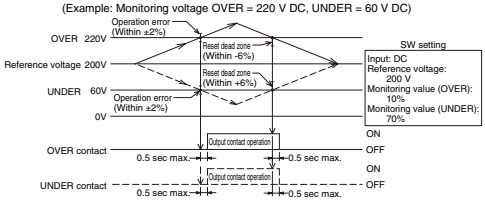
This type uses a 125 V DC control power supply voltage.
This type provides the same performance as the D type.
However, available reference voltage settings are 125 V, 200 V and 220 V AC, and 125 V, 200 V and 220 V DC.

●Connection diagram



●Operation chart

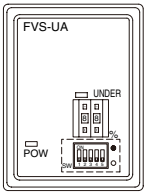
(Example: Monitoring voltage OVER = 220 V DC, UNDER = 60 V DC)

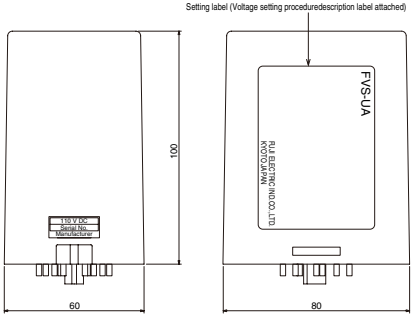


Note) The operation error reset dead zone indicates a value relative to a reference voltage.
The above operation chart is applied to the output a-contact.

FVS-UA-DC11

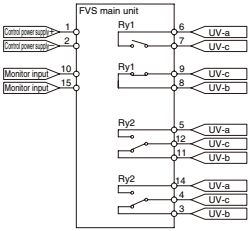
UV type





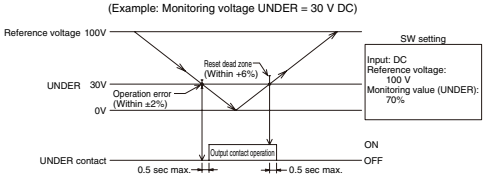
This type provides the same performance as the U type.
However, available reference voltage settings are 63.5 V, 100 V, 110 V, 200 V and 220 V AC, and 100 V, 110 V, 200 V and 220 V DC.

●Connection diagram



●Operation chart

(Example: Monitoring voltage UNDER = 30 V DC)



Note) The operation error reset dead zone indicates a value relative to a reference voltage.
The above operation chart is applied to the output a-contact.

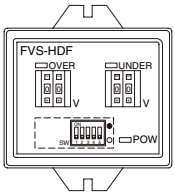
Voltage relay

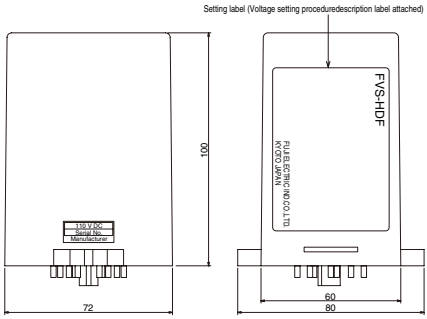
FVS-TYPE

STANDARD PRODUCTS *(Voltage-setting, 14-pin type)*

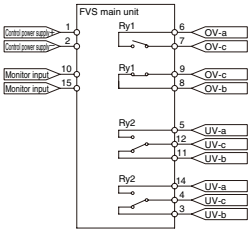
FVS-HDF-DC11

OV / UV type



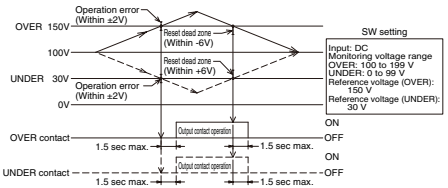


●Connection diagram



●Operation chart

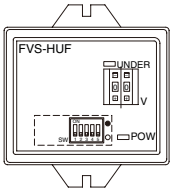
(Example: Reference voltage OVER = 150 V DC, UNDER = 30 V DC)

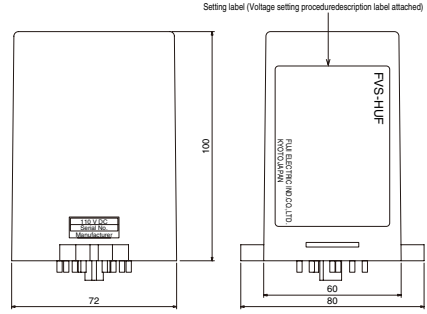


Note) The above operation chart is applied to the output a-contact.

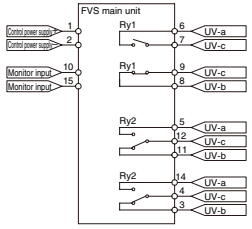
FVS-HUF-DC11

UV type



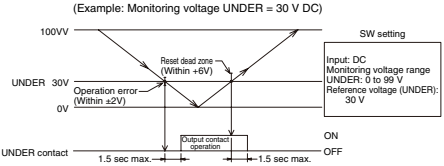


●Connection diagram



●Operation chart

(Example: Monitoring voltage UNDER = 30 V DC)

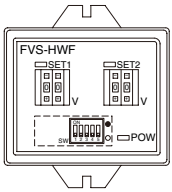


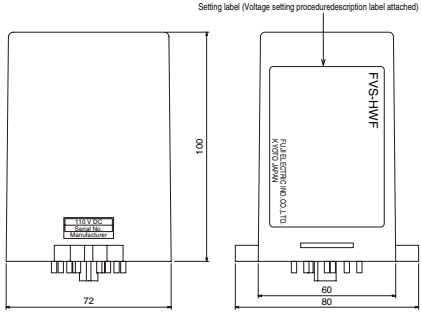
Note) The above operation chart is applied to the output a-contact.

STANDARD PRODUCTS *(Voltage-setting, 14-pin type)*

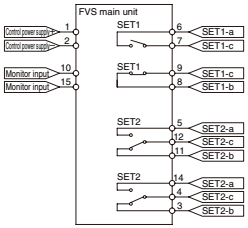
FVS-HWF-DC11

UV2 type



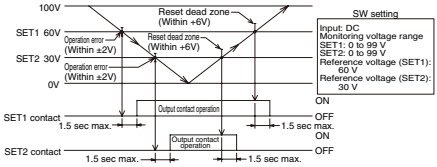


●Connection diagram



●Operation chart

(Example: Reference voltage SET1 = 60 V DC, SET2= 30 V DC)

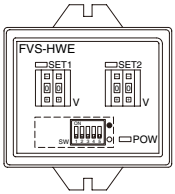


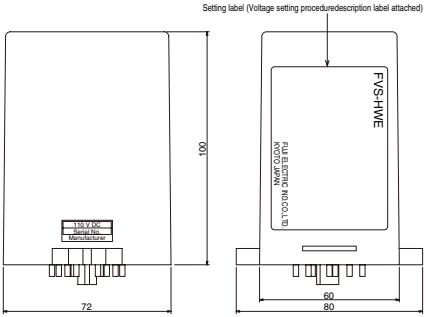
Note) The above operation chart is applied to the output a-contact.

CUSTOM PRODUCTS *(Voltage-setting, 14-pin type)*

FVS-HWE-DC11

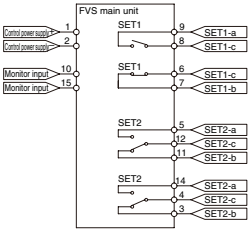
UV2 type





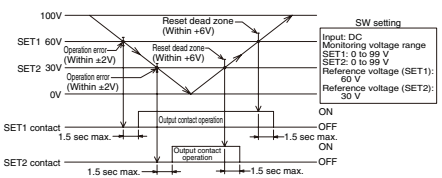
This type provides the same functions as the HWF type.
However, the SET1 output contact is different.

●Connection diagram



●Operation chart

(Example: Reference voltage SET1 = 60 V DC, SET2= 30 V DC)



Note) The above operation chart is applied to the output a-contact.