



VOLTAGE RELAY

# FVS TYPE

**Easy setting, long life voltage relay**  
**Easy to use new models are available**



## FEATURES

### Easy setting by digital switches

Setting reference voltage can be easily set by DIP switches.  
Setting voltage value can be set by digital switch of direct voltage and percent value and it prevents malfunction.

### Long life design

Long life is achieved by a design not using aluminum electrolytic capacitors.

### Wide variety of control power

Standard 100 / 110V type and multi power 100 - 220V AC / DC type are available for control power.

### Conformed to B-402 standards

FVS has high noise withstand, voltage fluctuation and insulation performance.

### LED lamp for operation monitor

Control power presence and operating condition can be easily checked by LED lamps.

### Variety-rich product development

New FVS-SS type can monitor high voltage over 200V and minute voltage less than 300mV.

The newly added FVS-SDG type performs two main operations of overvoltage detection and undervoltage detection in a single unit with 8-pin type. It allows space saving.

HOW TO ORDER

FVS - SS ☐ - 100/200

Basic type    Shape code    Circuit code    Control power voltage

Shape code	Circuit code	Control power voltage	Monitoring voltage range	OV monitor	UV monitor	Setting style	Pin number	Remark	Page
SS	A	100 / 220	5 to 99V (Setting voltage range : 100V) 100 to 199V (Setting voltage range : 200V) 200 to 249V (Setting voltage range : 250V)	1c	1c	V	8 pin	Standard	D13 to D14
	B		0.5 to 9.9V (Setting voltage range : 10V) 10.0 to 19.9V (Setting voltage range : 20V) 20.0 to 29.9V (Setting voltage range : 30V)	1c					
	C		5 to 99mV (Setting voltage range : 100mV) 100 to 199mV (Setting voltage range : 200mV) 200 to 299mV (Setting voltage range : 300mV)	1c					

HOW TO ORDER

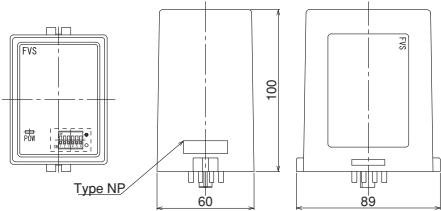
FVS - ☐ ☐ ☐ - 100/220 - A

Basic type    Shape code    Circuit code    Control power voltage    Code

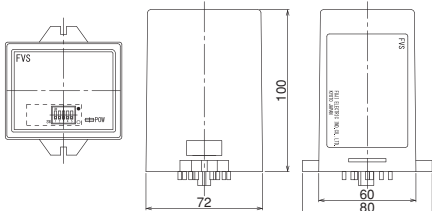
Shape code	Circuit code	Control power voltage	Monitoring voltage range	OV monitor	UV monitor	Setting style	Pin number	Remark	Page
S	DG	100 / 220	DC : 100 / 110 / 200 / 220V AC : 63.5 / 100 / 110 / 200 / 220V	1b	1b	%	8 pin	Standard	D15 to D16
	U		DC : 100 / 110 / 200 / 220V AC : 63.5 / 100 / 110 / 200 / 220V	—	1c			Sub standard	
	O		DC : 100 / 110 / 200 / 220V AC : 63.5 / 100 / 110 / 200 / 220V	1c	—			Sub standard	
	UB		DC : 12 / 24 / 48V AC : 12 / 24 / 48V	—	1c			Sub standard	
	OB		DC : 6 / 12 / 24 / 48V AC : 6 / 12 / 24 / 48V	1c	—			Sub standard	
Shape code	Circuit code	Control power voltage	Monitoring voltage range	OV monitor	UV monitor	Setting style	Pin number	Remark	Page
H	DF	100 / 220	0 to 99V, 100 to 199V	1a 1b	2c	V	14 pin	Standard	D17 to D18
	UF		0 to 99V, 100 to 199V	—	1a 1b 2c			Sub standard	
	WF		0 to 99V, 100 to 199V	—	SET1: 1a 1b SET2: 2c			Special	
	WE		0 to 99V, 100 to 199V	—	SET1: 1a 1b SET2: 2c			Sub standard	
Shape code	Circuit code	Control power voltage	Monitoring voltage range	OV monitor	UV monitor	Setting style	Pin number	Remark	Page
(none)	D	100 / 220	DC : 100 / 110 / 200 / 220V AC : 63.5 / 100 / 110 / 200 / 220V	1a 1b	2c	%	14 pin	Standard	D19 to D20
	DD		DC : 125 / 200 / 220V AC : 125 / 200 / 220V	1a 1b	2c			Sub standard	
	U		DC : 100 / 110 / 200 / 220V AC : 63.5 / 100 / 110 / 200 / 220V	—	1a 1b 2c			Special	
	UA		DC : 100 / 110 / 200 / 240V AC : 63.5 / 100 / 110 / 200 / 240V	—	1a 1b 2c			Sub standard	

\* a = NO contact, b = NC contact, c = Changeover contact

<8 pin - voltage setting type, % setting style 8pin / 14pin outline>



<14 pin - voltage setting type outline>





VOLTAGE RELAY

# FVS TYPE

## SPECIFICATIONS

### 8 pin-voltage setting type

Applicable standard: B402 (2016)

Specification		Type	FVS-SSA	FVS-SSB	FVS-SSC
Rating	Rated insulation voltage (Ui)		250V		
	Control power voltage		100 to 220V AC / DC (free input)		
	Fluctuation range of control power voltage	100 to 220V AC / DC (free input)	80V to 250V		
	Input voltage style		AC (50Hz / 60Hz), DC		
	Max. input voltage style		250V AC / DC		50V AC / DC
	Input impedance		Approx. 1MΩ		Approx. 100KΩ
	Output contact rating	Max. operational voltage	380V AC max., 125V DC max.		
		Rated current-carrying capacity (Ith)	5A		
	Making and breaking capacity (reference)	Resistive load	1,250VA AC, 150W DC		
	Inductive load (cos φ=0.4, L/R=7ms)	500VA AC, 90W DC			
Specification / Performance	Setting reference voltage		100V, 200V, 250V	10V, 20V, 30V	100mV, 200mV, 300mV
	Setting voltage range		100V range : 5 to 99V 200V range : 100 to 199V 250V range : 200 to 249V	10V range : 0.5 to 9.9V 20V range : 10.0 to 19.9V 30V range : 20.0 to 29.9V	100mV range : 5 to 99mV 200mV range : 100 to 199mV 300mV range : 200 to 299mV
	Set / Reset time		1sec. max.(approx. 0.5sec. when relay is ON)		
	Error range		100V range : ±2V 200V range : ±4V 250V range : ±6V	10V range : ±0.2V 20V range : ±0.4V 30V range : ±0.6V	100mV range : ±2mV 200mV range : ±4mV 300mV range : ±6mV
	Reset dead band		±4 to 99V	±0.4 to 9.9V	±4 to 99mV
	Holding error		100V range : ± 4V 200V range : ± 8V 250V range : ±12V	10V range : ±0.4V 20V range : ±0.8V 30V range : ±1.2V	100mV range : ± 4mV 200mV range : ± 8mV 300mV range : ±12mV
	Temperature effect		±0.5V / 10℃ max.	±0.05V / 10℃ max.	±0.5mV / 10℃ max.
	Operational indication color	Control power	Yellow		
		Output contact	Yellow		
	Insulated resistance	Between all circuit and ground	10MΩ or more (DC500V mega)		
		Between poles			
	Power-frequency withstand voltage	Between all circuit and ground	2,000V AC / 1min.		
		Between poles			
	Impulse withstand voltage (Uimp)	Between all circuit and ground	±7kV (each 3 time for monitor input, output contact, every control power terminal ⇔ mount rail)		
		Between poles①	±4.5kV (each 3 time for monitor input ⇔ output contact, monitor input ⇔ control power terminal)		
		Between poles②	±3kV (3 time for output contact ⇔ control power terminal)		
	Noise resistance	Electric wave noise	150MHz band, 400MHz band, 2GHz band		
		Static noise	Contact discharge : 8kV, Air discharge : 15kV		
	Vibration resistance		Frequency : 16.7Hz, Width : 0.4mm, 3 directions, 10min.		
	Shock resistance		294m/s <sup>2</sup> , each 3 time for 6 directions		
	Power consumption (When operated by rated control power voltage, output relay is working)		Approx. 2W		
	Weight		Approx. 200g		
Normal service condition	Operating temperature		0℃ to 40℃		
	Storing temperature		-20℃ to 60℃		
	Relative humidity		30% to 90% (no condensation)		
	Altitude		2,000 m max.		

## STANDARD PRODUCTS

## 8 pin-voltage setting type

## FVS-SSA-100/220

OV, UV select type

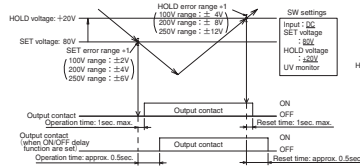


## ●Accessory

Socket	8PFA1	(Optional)
Voltage label	FVS V-NP-SSA	(Attached)

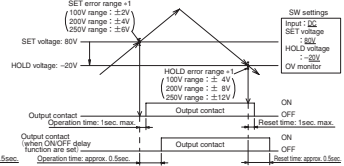
## ●Operation chart

Example1: UV (Under Voltage) monitor SET voltage=80V DC, HOLD voltage +20V



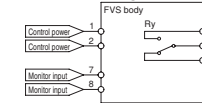
\* The above chart shows a contact (NO contact) operation.

Example2: OV (Over Voltage) monitor SET voltage=80V DC, HOLD voltage -20V



\* The above chart shows a contact (NO contact) operation.

## ●Connection diagram



- \*1 Error range of SET and HOLD shows the error towards absolute voltage values.  
SET voltage 80V :  $80V \pm 2V$   
HOLD voltage +20V :  $100V \pm 4V$
- \*2 When SET voltage is less than 5V, the above error range is not applicable.
- \*3 Please do not set SET voltage less than 8V for OV setting.

## FVS-SSB-100/220

OV, UV select type

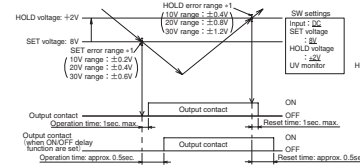


## ●Accessory

Socket	8PFA1	(Optional)
Voltage label	FVS V-NP-SSB	(Attached)

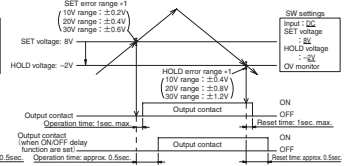
## ●Operation chart

Example1: UV (Under Voltage) monitor SET voltage=8V DC, HOLD voltage +2V



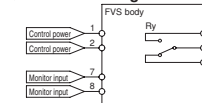
\* The above chart shows a contact (NO contact) operation.

Example2: OV (Over Voltage) monitor SET voltage=8V DC, HOLD voltage -2V



\* The above chart shows a contact (NO contact) operation.

## ●Connection diagram



- \*1 Error range of SET and HOLD shows the error towards absolute voltage values.  
SET voltage 8V :  $8V \pm 0.2V$   
HOLD voltage +2V :  $10V \pm 0.4V$
- \*2 When SET voltage is less than 0.5V, the above error range is not applicable.
- \*3 Please do not set SET voltage less than 0.8V for OV setting.

## FVS-SSC-100/220

OV, UV select type

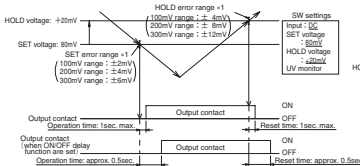


## ●Accessory

Socket	8PFA1	(Optional)
Voltage label	FVS V-NP-SSC	(Attached)

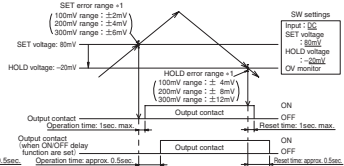
## ●Operation chart

Example1: UV (Under Voltage) monitor SET voltage=80mV DC, HOLD voltage +20mV



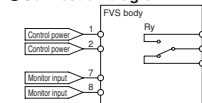
\* The above chart shows a contact (NO contact) operation.

Example2: OV (Over Voltage) monitor SET voltage=80mV DC, HOLD voltage -20mV



\* The above chart shows a contact (NO contact) operation.

## ●Connection diagram



- \*1 Error range of SET and HOLD shows the error towards absolute voltage values.  
SET voltage 80mV :  $80mV \pm 2mV$   
HOLD voltage +20mV :  $100mV \pm 4mV$
- \*2 When SET voltage is less than 5mV, the above error range is not applicable.
- \*3 Please do not set SET voltage less than 8mV for OV setting.



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## SPECIFICATIONS

### 8 pin-percent setting type

Specification		Type	FVS-SDG	FVS-SU	FVS-SO	FVS-SUB	FVS-SOB	
Rating	Rated insulation voltage (Ui)		250V					
	Control power voltage		100 to 220V AC / DC (free input)					
	Fluctuation range of control power voltage	100 to 220V AC / DC (free input)	80V to 255V					
	Input voltage style		AC (50Hz / 60Hz), DC					
	Max. input voltage		250V			(Setting reference voltage X3) V		
	Input impedance		Approx. 1MΩ			Approx. 200KΩ		
	Output contact rating	Max. operational voltage	380V AC max., 125V DC max.					
		Rated current-carrying capacity (Ith)	5A					
Making and breaking capacity (reference)	Resistive load	1,250VA AC, 150W DC						
	Inductive load (cos φ =0.4, L/R=7ms)	500VA AC, 90W DC						
Specification / Performance	Setting reference voltage		DC : 100, 110, 200, 220V AC : 63.5, 100, 110, 200, 220V			12V, 24V, 48V		6V, 12V, 24V, 48V
	Setting voltage range		3% to 96%					
	Set / Reset time		0.5sec. max. (50% max. towards setting range)					
	Error range		±2% max. (towards setting reference voltage)					
	Reset dead band (Setting reference voltage %)		OVER : -6% UNDER : +6%	+6% max.	-6% max.	+6% max.	-6% max.	
	Temperature effect		±0.5% / 10°C max. (towards setting reference voltage)					
	Operational indication color	Control power	Yellow					
		Output contact	Yellow					
	Insulated resistance	Between all circuit and ground	10MΩ or more (500V DC mega)					
		Between poles						
	Power-frequency withstand voltage	Between all circuit and ground	2,000V AC / 1min.					
		Between poles						
	Impulse withstand voltage (Uimp)	Between all circuit and ground	±7kV (each 3 time for monitor input, output contact, every control power terminal ⇔ mount rail)					
		Between poles①	±4.5kV (each 3 time for monitor input ⇔ output contact, monitor input ⇔ control power terminal)					
		Between poles②	±3kV (3 time for output contact ⇔ control power terminal)					
	Noise resistance	Electric wave noise	150MHz band, 400MHz band, 900MHz band					
		Static noise	Contact discharge : 8kV, Air discharge : 15kV					
	Vibration resistance		Frequency : 16.7Hz, Width : 0.4mm, 3 directions, 10min.					
	Shock resistance		294m/s <sup>2</sup> , each 3 time for 6 directions					
	Power consumption (When operated by rated control power voltage, output relay is working)		Approx. 1.5W					
	Weight		Approx. 200g			Approx. 220g		Approx. 200g
Normal service condition	Operating temperature		0°C to 40°C					
	Storing temperature		-20°C to 60°C					
	Relative humidity		30% to 90% (no condensation)					
	Altitude		2,000 m max.					

## STANDARD PRODUCTS

## 8 pin-percent setting type

## FVS-SU-100/220

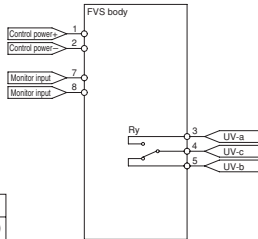
## UV type



## ●Accessory

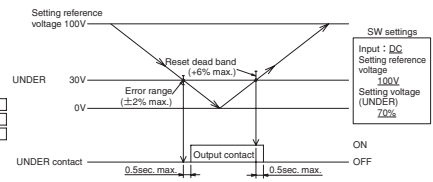
Socket	8PFA1	(Optional)
Voltage label	FVS V-NP	(Attached)

## ●Connection diagram



## ●Operation chart

Example : Operation voltage is UNDER=30V DC



\* % of Error range and reset dead band are value towards setting reference voltage.  
\* The above chart shows a contact (NO contact) operation.

## FVS-SO-100/220

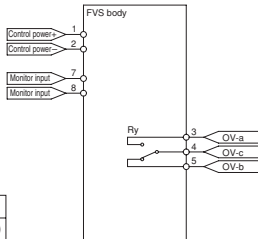
## OV type



## ●Accessory

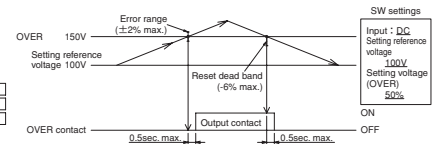
Socket	8PFA1	(Optional)
Voltage label	FVS V-NP	(Attached)

## ●Connection diagram



## ●Operation chart

Example : Operation voltage is OVER=150V DC



\* % of Error range and reset dead band are value towards setting reference voltage.  
\* The above chart shows a contact (NO contact) operation.

## FVS-SUB-100/220

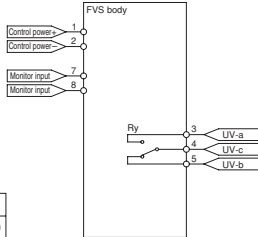
## UV type



## ●Accessory

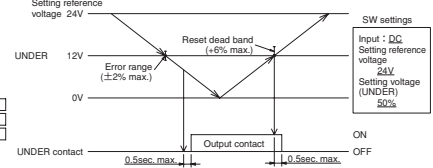
Socket	8PFA1	(Optional)
Voltage label	FVS V-NP B	(Attached)

## ●Connection diagram



## ●Operation chart

Example : Operation voltage is UNDER=12V DC



\* % of Error range and reset dead band are value towards setting reference voltage.  
\* The above chart shows a contact (NO contact) operation.

## FVS-SOB-100/220

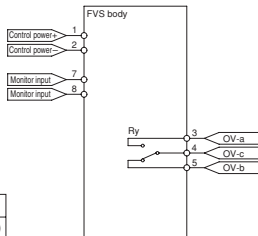
## OV type



## ●Accessory

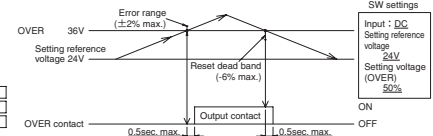
Socket	8PFA1	(Optional)
Voltage label	FVS V-NP B2	(Attached)

## ●Connection diagram



## ●Operation chart

Example : Operation voltage is OVER=36V DC



\* % of Error range and reset dead band are value towards setting reference voltage.  
\* The above chart shows a contact (NO contact) operation.



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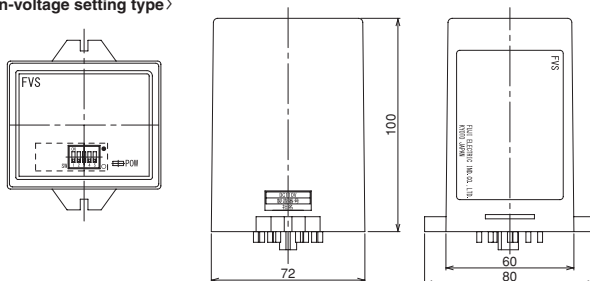
# FVS TYPE

## SPECIFICATIONS

### 14 pin-voltage setting type

Specification		Type	FVS-HDF	FVS-HUF	FVS-HWF	FVS-HWE
Rating	Rated insulation voltage (Ui)		250V			
	Control power voltage		100 to 220V AC / DC (free input)			
	Fluctuation range of control power voltage	100 to 220V AC / DC (free input)	80V to 255V			
	Input voltage style		AC (50Hz / 60Hz), DC			
	Max. input voltage		250V			
	Input Impedance		Approx. 1M Ω			
	Output contact rating	Max. operational voltage	380V AC max., 125V DC max.			
		Rated current-carrying capacity (Ith)	5A			
Making and breaking capacity (reference)	Resistive load	1,250VA AC, 150W DC				
	Inductive load (cos φ =0.4, L/R=7ms)	500VA AC, 90W DC				
Specification / Performance	Setting reference voltage		03 to 99V (UV) 06 to 99V (OV) 100 to 196V (OV, UV)	03 to 99V, 100 to 196V		
	Setting voltage range		0 to 99V, 100 to 199V			
	Set / Reset time		1.5sec. max.			
	Error range		±2V max.			
	Reset dead band		±6V max.		+6V max.	
	Temperature effect		±0.5% / 10°C max.			
	Operational indication color	Control power	Yellow			
		Output contact	Yellow			
	Insulated resistance	Between all circuit and ground	10M Ω or more (500V DC mega)			
		Between poles				
	Power-frequency withstand voltage	Between all circuit and ground	2,000V AC / 1min.			
		Between poles				
	Impulse withstand voltage (Uimp)	Between all circuit and ground	±7kV (each 3 time for monitor input, output contact, every control power terminal ⇔ mount rail)			
		Between poles①	±4.5kV (each 3 time for monitor input ⇔ output contact, monitor input ⇔ control power terminal)			
		Between poles②	±3kV (3 time for output contact ⇔ control power terminal)			
	Noise resistance	Electric wave noise	150MHz band, 400MHz band, 900MHz band			
		Static noise	Contact discharge : 8kV, Air discharge : 15kV			
	Vibration resistance		Frequency : 16.7Hz, Width : 0.4mm, 3 directions, 10min.			
	Shock resistance		294m/s <sup>2</sup> , each 3 time for 6 directions			
	Power consumption (When operated by rated control power voltage, output relay is working)		Approx. 2W			
	Weight		Approx. 220g			
Normal service condition	Operating temperature		0°C to 40°C			
	Storing temperature		-20°C to 60°C			
	Relative humidity		30% to 90%			
	Altitude		2,000 m max.			

〈Outlines of 14 pin-voltage setting type〉



## STANDARD PRODUCTS

### 14 pin-voltage setting type

#### FVS-HDF-100/220

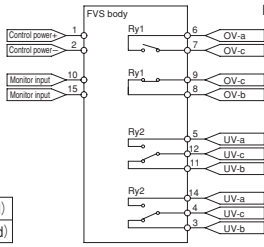
OV type, UV type



##### ●Accessory

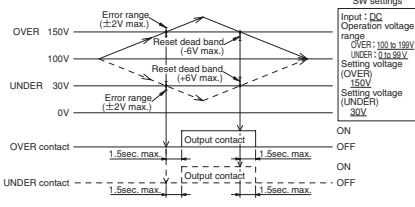
Socket	14PFA	(Optional)
Voltage label	FVS V-NP HDF1	(Attached)

##### ●Connection diagram



##### ●Operation chart

Example : Setting voltage are OVER=150V DC, UNDER=30V DC



\* The above chart shows a contact (NO contact) operation.

#### FVS-HUF-100/220

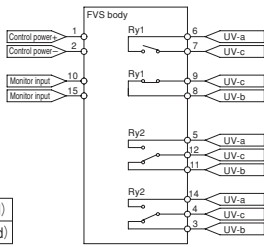
UV type



##### ●Accessory

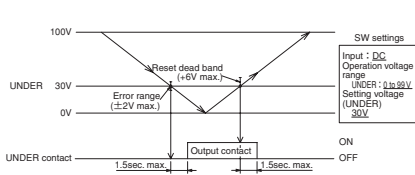
Socket	14PFA	(Optional)
Voltage label	FVS V-NP HUF1	(Attached)

##### ●Connection diagram



##### ●Operation chart

Example : Operation voltage is UNDER=30V DC



\* The above chart shows a contact (NO contact) operation.

#### FVS-HWF-100/220

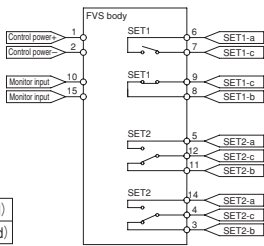
UV2 type



##### ●Accessory

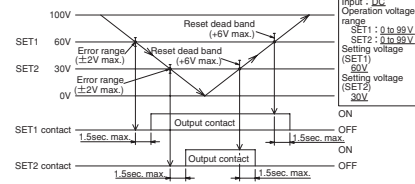
Socket	14PFA	(Optional)
Voltage label	FVS V-NP HWE1	(Attached)

##### ●Connection diagram



##### ●Operation chart

Example : Setting voltage are SET1=60V DC, SET2=30V DC



\* The above chart shows a contact (NO contact) operation.

#### FVS-HWE-100/220

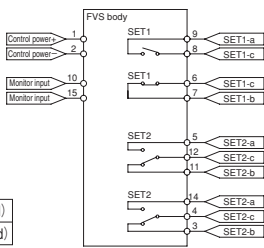
UV2 type



##### ●Accessory

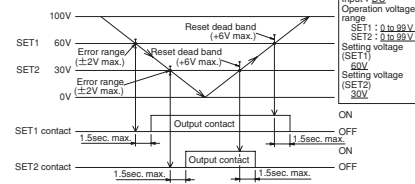
Socket	14PFA	(Optional)
Voltage label	FVS V-NP HWE1	(Attached)

##### ●Connection diagram



##### ●Operation chart

Example : Setting voltage are SET1=60V DC, SET2=30V DC



\* The above chart shows a contact (NO contact) operation.





VOLTAGE RELAY

# FVS TYPE

## SPECIFICATIONS

### 14 pin-percent setting type

Specification		Type	FVS-D	FVS-DD	FVS-U	FVS-UA	
Rating	Rated insulation voltage (Ui)		250V				
	Control power voltage		100 to 220V AC / DC (free input)				
	Fluctuation range of control power voltage	100 to 220V AC / DC (free input)	80V to 255V				
	Input voltage style		AC(50Hz / 60Hz), DC				
	Max. input voltage		250V				
	Input impedance		Approx. 1MΩ				
	Output contact rating	Max. operational voltage	380V AC max., 125V DC max.				
		Rated current-carrying capacity (Ith)	5A				
Making and breaking capacity (reference)	Resistive load		1,250VA AC, 150W DC				
	Inductive load (cos φ =0.4, L/R=7ms)		500VA AC, 90W DC				
Specification / Performance	Setting reference voltage		AC: 63.5,100,110,200,220V DC: 100,110,200,220V	125V, 200V, 220V	AC: 63.5,100,110,200,220V DC: 100,110,200,220V	AC: 63.5,100,110,200,240V DC: 100,110,200,240V	
	Setting voltage range		3% to 96%				
	Set / Reset time		0.5sec. max. (50% max. towards setting range)				
	Error range		±2% max. (towards setting reference voltage)				
	Reset dead band (Setting reference voltage %)		±6% max.				
	Temperature effect		±0.5% / 10℃ max. (towards setting reference voltage)				
	Operational indication color	Control power		Green			
		Output contact		Red			
	Insulated resistance	Between all circuit and ground		10MΩ or more (500V DC mega)			
		Between poles					
	Power-frequency withstand voltage	Between all circuit and ground		2,000V AC / 1min.			
		Between poles					
	Impulse withstand voltage (Uimp)	Between all circuit and ground		±7kV (each 3 time for monitor input, output contact, every control power terminal ⇔ mount rail)			
		Between poles①		±4.5kV (each 3 time for monitor input ⇔ output contact, monitor input ⇔ control power terminal)			
		Between poles②		±3kV (3 time for output contact ⇔ control power terminal)			
	Noise resistance	Electric wave noise		150MHz band, 400MHz band, 900MHz band			
		Static noise		Contact discharge : 8kV, Air discharge : 15kV			
	Vibration resistance		Frequency : 16.7Hz, Width : 0.4mm, 3 directions, 10min.				
	Shock resistance		294m/s <sup>2</sup> , each 3 time for 6 directions				
	Power consumption (When operated by rated control power voltage, output relay is working)		Approx. 1.5W		Approx. 2W		
	Weight		Approx. 220g				
	Normal service condition	Operating temperature		0℃ to 40℃			
		Storing temperature		-20℃ to 60℃			
Relative humidity		30% to 90%					
Altitude		2,000 m max.					

STANDARD PRODUCTS

14 pin-percent setting type

FVS-D-100/220

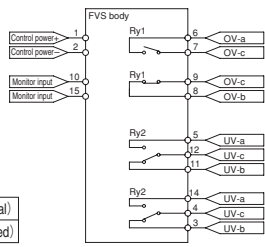
OV, UV type



●Accessory

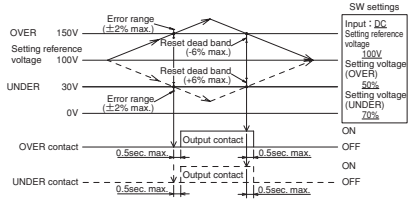
Socket	14PFA	(Optional)
Voltage label	FVS V-NP	(Attached)

●Connection diagram



●Operation chart

Example : Operation voltage are OVER=150V DC, UNDER=30V DC



\* % of Error range and reset dead band are value towards setting reference voltage.  
\* The above chart shows a contact (NO contact) operation.

FVS-DD-100/220

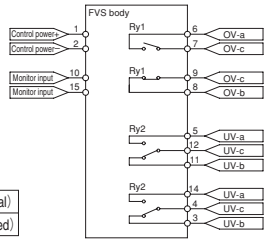
OV, UV type



●Accessory

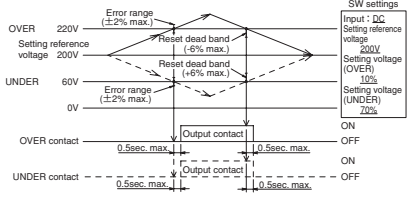
Socket	14PFA	(Optional)
Voltage label	FVS V-NP A	(Attached)

●Connection diagram



●Operation chart

Example : Operation voltage are OVER=220V DC, UNDER=60V DC



\* % of Error range and reset dead band are value towards setting reference voltage.  
\* The above chart shows a contact (NO contact) operation.

FVS-U/FVS-UA-100/220

UV type

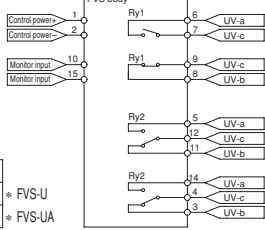


●Accessory

Socket	14PFA	(Optional)
Voltage label	FVS V-NP	(Attached) * FVS-U
	FVS V-NP A	(Attached) * FVS-UA

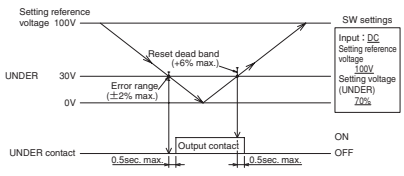
FVS-UA=Setting reference voltage 240V DC

●Connection diagram



●Operation chart

Example : Operation voltage is UNDER=30V DC



\* % of Error range and reset dead band are value towards setting reference voltage.  
\* The above chart shows a contact (NO contact) operation.

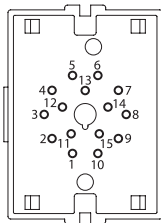


VOLTAGE RELAY

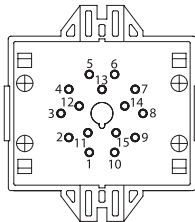
# FVS TYPE

## PIN ARRANGEMENT

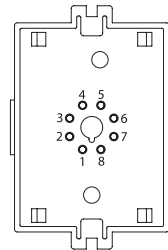
### Vertical 14 pin type



### Horizontal 14 pin type (H)



### Vertical 8 pin type (S, SS)

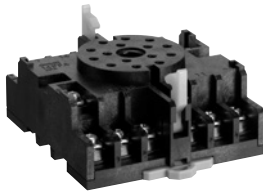


## ACCESSORIES

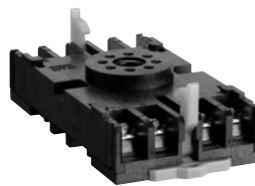
### Applicable sockets

(Order unit: 10)

#### 14PFA [OMRON]



#### 8PFA1 [OMRON]



\* Vertical 14 pin type is applicable to PL15, too (OMRON).

### Voltage labels

(Order unit: 10)

#### FVS V-NP- type

##### Label list

Product type	Voltage label type
FVS-SSA	FVS V-NP-SSA
FVS-SSB	FVS V-NP-SSB
FVS-SSC	FVS V-NP-SSC
FVS-SDG	FVS V-NP
FVS-SU	FVS V-NP
FVS-SO	FVS V-NP
FVS-SUB	FVS V-NP B
FVS-SOB	FVS V-NP B2
FVS-HDF	FVS V-NP HDF1
FVS-HUF	FVS V-NP HUF1
FVS-HWF	FVS V-NP HWE1
FVS-HWE	FVS V-NP HWE1
FVS-D	FVS V-NP
FVS-DD	FVS V-NP A
FVS-U	FVS V-NP
FVS-UA	FVS V-NP A



電圧入力	DC	電圧入力	AC
SET1	0V~99V	SET1	0V~99V
SET2	0V~99V	SET2	0V~99V
アンプは、この電圧範囲で使用可能です。アンプは、この電圧範囲で使用可能です。			
電圧入力	DC	電圧入力	AC
SET1	0V~99V	SET1	0V~99V
SET2	100V~199V	SET2	100V~199V
アンプは、この電圧範囲で使用可能です。アンプは、この電圧範囲で使用可能です。			
電圧入力	DC	電圧入力	AC
SET1	100V~199V	SET1	100V~199V
SET2	0V~99V	SET2	0V~99V
アンプは、この電圧範囲で使用可能です。アンプは、この電圧範囲で使用可能です。			
電圧入力	DC	電圧入力	AC
SET1	100V~199V	SET1	100V~199V
SET2	100V~199V	SET2	100V~199V
アンプは、この電圧範囲で使用可能です。アンプは、この電圧範囲で使用可能です。			

ご注意  
本ラベルは設定電圧時に使用しますので  
大切に保管してください  
このラベルは上向き表示にご使用ください

INSTRUCTIONS

■How to set monitor voltage (FVS-SS, voltage setting type)

Example: FVS-SSA type

Setting NP

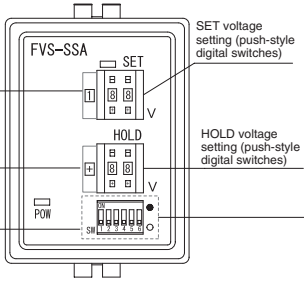
監視入力	DC	監視入力	AC
SET	5V~99V	SET	5V~99V
HOLD	4V~99V	HOLD	4V~99V
※設定可能な監視電圧範囲は、 監視電圧の10%以上、90%以下です。			
監視入力	DC	監視入力	AC
SET	100V~199V	SET	100V~199V
HOLD	4V~99V	HOLD	4V~99V
※設定可能な監視電圧範囲は、 監視電圧の10%以上、90%以下です。			
監視入力	DC	監視入力	AC
SET	200V~249V	SET	200V~249V
HOLD	4V~99V	HOLD	4V~99V
※設定可能な監視電圧範囲は、 監視電圧の10%以上、90%以下です。			

（ご注意）  
本スイッチは、監視電圧の  
設定値を、必ず設定  
値に準拠してください。  
その際は、上掲の表示に  
ご注意ください。

SET voltage NP  
This NP is used when  
SET voltage range is  
100V~ and 200V~.  
(included in setting NP)

HOLD voltage NP  
used for ± indication  
(included in setting NP)

Setting NP  
attachment position  
(attached after SW setting)



Monitor input setting  
SET voltage setting  
(push-style digital switches)  
Delay function setting

●Monitor input setting  
SW1→ ON : UV (Under Voltage) monitor  
OFF: OV (Over Voltage) monitor  
SW2→ ON : AC  
OFF: DC

●SET voltage setting

SET voltage range	5-99V	100-199V	200-249V
SW3	OFF	ON (OFF)	ON
SW4	OFF	OFF (ON)	ON

●Delay function setting  
SW5→ ON : ON delay (normal operation time + approx. 0.5sec.)  
OFF: no delay (normal operation time = 1sec. max.)  
SW6→ ON : OFF delay (normal reset time + approx. 0.5sec.)  
OFF: no delay (normal operation time = 1sec. max.)

1. Monitor voltage style setting (UV or OV)

- Select monitor voltage style (UV or OV) by setting No.1 DIP switch.
- Set ON for UV monitor and set OFF for OV monitor.

2. Monitor input setting

- Select monitor input (AC or DC) by setting No.2 DIP switch.
- Set ON for AC and set OFF for DC.

3. Reference voltage range setting

- Select reference voltage range by setting NO.3 and 4 DIP switches.
- Set OFF both No.3 and 4 for range 5-99V, set ON No.3 and OFF No.4 for range 100-199V, set ON both No.3 and 4 for range 200-249V.
- Voltage range differ from each type. Refer to "DIP switch setting list" on the side of product bodies.

4. Delay function setting

- Select delay functions for SET delay and HOLD delay by setting NO.5 and 6 DIP switches.
- Use delay function when operation time is delayed for 0.5sec.
- Set ON No.5 for setting SET delay function and set ON No.6 for setting HOLD delay function.

5. Monitor voltage setting

- Set monitor voltage for UV or OV by setting upper digital switches, and set HOLD voltage by setting lower digital switches.
- HOLD voltage is over value from monitor voltage of UV or under value from monitor voltage of OV.

6. Voltage label attachment

- Attach each NP for SET voltage, HOLD voltage polarity and each setting.



Caution for setting

Prevent setting under the monitoring condition because it may cause malfunction and output error.  
(Setting instruction under monitoring condition is shown on page D25.)



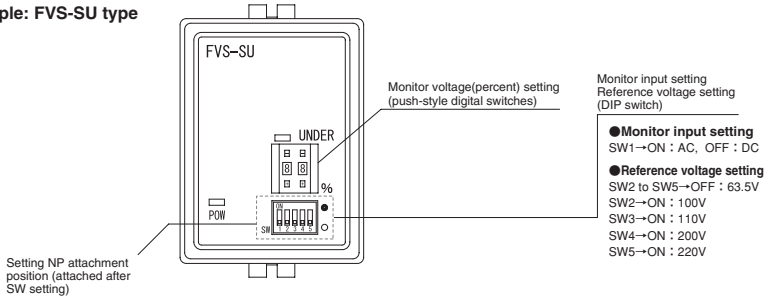
VOLTAGE RELAY

# FVS TYPE

## INSTRUCTIONS

### ■ How to set monitor voltage (percent-setting type)

Example: FVS-SU type



#### 1 . Monitor input setting

- Select monitor input (AC or DC) by setting No.2 DIP switch.
- Set ON for AC and set OFF for DC.

#### 2 . Reference voltage setting

- Select reference voltage by setting DIP switch No.2, 3, 4 and 5.
- Set all DIP switches OFF for 63.5V, set only No.2 ON for 100V, set only No.3 for 110V, set only No.4 for 200V and set only No. 5 for 220V as reference voltage.
- Voltage range differ from each type. Refer to "DIP switch setting list" on the side of product bodies.

#### 3 . Monitor voltage setting

- Set the value for monitor voltage by setting digital switch.
- Monitor voltage is (reference voltage) – (reference voltage) × (setting voltage : percent).  
Example: when reference voltage = 110V and setting value is 80 (%), monitor voltage is 88V.

#### 4 . Voltage label attachment

- Attach each NP for each setting.



#### Caution for setting

Prevent setting under the monitoring condition because it causes malfunction and output error.  
(Setting instruction under monitoring condition is shown on page D25.)

■How to set monitor voltage (voltage-setting type)

Example: FVS-HDF type

Setting NP

監視入力	DC	監視入力	AC
OVER	0V~99V	OVER	0V~99V
UNDER	0V~99V	UNDER	0V~99V
※25.12V・199Vは電圧変動に依存せず、25.12V・199Vは電圧変動に依存せず			
監視入力	DC	監視入力	AC
OVER	0V~99V	OVER	0V~99V
UNDER	100V~199V	UNDER	100V~199V
※25.12V・199Vは電圧変動に依存せず、25.12V・199Vは電圧変動に依存せず			
監視入力	DC	監視入力	AC
OVER	100V~199V	OVER	100V~199V
UNDER	0V~99V	UNDER	0V~99V
※25.12V・199Vは電圧変動に依存せず、25.12V・199Vは電圧変動に依存せず			
監視入力	DC	監視入力	AC
OVER	100V~199V	OVER	100V~199V
UNDER	100V~199V	UNDER	100V~199V
※25.12V・199Vは電圧変動に依存せず、25.12V・199Vは電圧変動に依存せず			

この図表は、本シリーズは設定変更時に使用します。必ず、  
大に確認してください。  
左のNPは、上図表の例に準拠してください。

Setting voltage NP  
This NP is used when setting voltage range is 100 to 199V.  
(included in setting NP)

Setting NP attachment position (attached after SW setting)

Monitor voltage setting (push-style digital switches)

Monitor input setting  
Voltage range setting  
(DIP switch)

- Monitor input setting  
SW1→ON : AC, OFF : DC
- Voltage range setting  
SW2(OVER) → OFF : 0 to 99V  
ON : 100 to 199V  
SW3(UNDER) → OFF : 0 to 99V  
ON : 100 to 199V  
SW4→non-use  
SW5→non-use

1. Monitor input setting

- Select monitor input (AC or DC) by setting No.2 DIP switch.
- Set ON for AC and set OFF for DC.

2. Voltage range setting

- Select voltage range by setting DIP switch No.2 and 3.
- Set No.2 for OVER side voltage range and set No.3 for UNDER side voltage range.
- When each switch is OFF, voltage range is 0-99V. When each switch is ON, voltage range is 100-199V.
- Voltage range differ from each type. Refer to "DIP switch setting list" on the side of product bodies.

3. Monitor voltage setting

- Set the monitor voltage by setting digital switch.
- Voltage can be set every 1V.

4. Voltage label attachment

- Attach each NP for setting voltage and each setting.

⚠ Caution for setting

Prevent setting under the monitoring condition because it causes malfunction and output error.  
(Setting instruction under monitoring condition is shown on page D25.)



## TECHNICAL DATA

### Polarity of FVS type

There is instruction for polarity as "pin No.1 is + (P) pole and No.2 is - (N) pole", some users check polarity while wiring. However rectifier circuit is built-in the circuit for control power (Diagram1) and polarity instruction is not necessary.

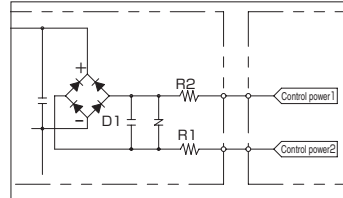


Diagram 1

### Setting instruction under monitoring condition

Setting under monitoring condition is not recommended because it may cause malfunction and output error.

If you need to change under monitoring condition, please set by following the right chart.

- ① Set number "9" of the one's digit.
- ② Set ten's digit.
- ③ Set one's digit.

### Noise resistance

Under each operating condition based on Power Standard B-402: Table 6,1-15 "Relay Test Conditions, Undervoltage Relay", It has been confirmed that irradiation of the specified radio noise does not interfere with the performance.

#### Test results

Control power voltage: 80V DC (rated x 80%)    Monitoring input power supply: 88V

##### Test 1: Relay standby state (normal monitoring state)

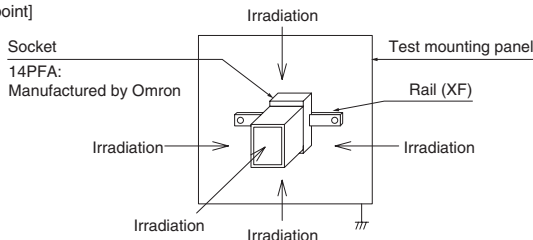
No.	Checklist	Output	Monitoring input voltage	Operating voltage setting	Before voltage application	Abnormalities (Malfunction and false output)	Judgment
1	150MHz	5W	88V AC	80V AC	Relay standby	NA	Good
2	400MHz	5W	88V AC	80V AC	Relay standby	NA	Good
3	900MHz	cellular phone	88V AC	80V AC	Relay standby	NA	Good

Control power voltage: 80V DC (rated x 80%)    Monitoring input power supply: 72V

##### Test 2: Relay operating state (output operating state)

No.	Checklist	Output	Monitoring input voltage	Operating voltage setting	Before voltage application	Abnormalities (Malfunction and false output)	Judgment
1	150MHz	5W	72V AC	80V AC	Relay standby	NA	Good
2	400MHz	5W	72V AC	80V AC	Relay standby	NA	Good
3	900MHz	cellular phone	72V AC	80V AC	Relay standby	NA	Good

[Irradiation point]



## Product life time

We conducted acceleration test (environment test for 5,000 hours) for forecasting product life time in field, and confirmed that problems of components deterioration and functional disorder do not happen.

We calculate 12.9 years for product's life time under 40°C environment. (But this life time differ from actual life time by usage environment changes.)

## Frequency characteristic

We conducted operation test by the following frequency other than commercial frequency (50Hz / 60Hz) for monitor input voltage.

Tested frequency: 20 / 40 / 60 / 80 / 100 / 300 / 500 / 700Hz

### 1) Confirmation of malfunction for rated frequency

Confirm whether operation / reset voltage change and malfunction happens or not when monitor input frequency change between 47.5Hz to 63Hz.

Rated frequency: 50 / 60Hz, Voltage variation :  $\pm 5\%$ , Judge range: operation voltage =  $\pm 2V$ , reset voltage =  $-6V$  (OV),  $+6V$  (UV)

Frequency	Criterion range	Result	Malfunction	Judgement
Rated frequency 50 / 60Hz	Operation $\pm 2V$	○ (in Criterion range)	No malfunction	Good
Variation frequency ( $\pm 5\%$ ) -5% of 50Hz = 47.5Hz +5% of 60Hz = 63.0Hz	Reset OV : $-6V$ UV : $+6V$			

### 2) Confirmation of malfunction for out range of rated frequency

Confirm whether operation / reset voltage change and malfunction happens or not when monitor input frequency change from 20Hz to 700Hz.

Frequency	Criterion range	Result	Malfunction	Judgement
Out range of rated frequency (20 to 700Hz)	Reference test	Gap happens from 100Hz between setting voltage and operation voltage	—	Reference

## Use as normal excitation condition

Use as normal condition (non-normal excitation) and normal excitation condition are not different for continuous use time, and both of them can be used without problems.