



- DC Voltage Guards
- Direct input up to 100VDC, up to 2000VDC with HV adapter
- Two individually settable relays
- Triple relay for more flexibility
- One fast response analogue output (<50mS), F-versions

## Specifications

Auxiliary Voltage:	24, 48 or 110VDC (Fuse 2A)
Optional Aux. Voltage:	100-120V, 200-240V, 380-415V, 440-460 or 480VAC 40-70Hz (Fuse 0,5A)
Supply tolerance:	± 10%
Power rating:	1,5VA
DC Input signal:	0-100VDC (up to 2000VDC via HV adapter)
Contact rating:	AC: 100VA -250V/2A max. DC: 50W -100V/1A max.
Adjustments:	
Trip level High:	0-100% of FSD (FSD = Full Scale Deflection)
Trip delay High:	0-30 secs
Hysteresis High:	2-50% of FSD (on non latching relays)
Trip level Low:	0-100% of FSD
Trip delay Low:	0-30 secs
Hysteresis Low:	2-50% of FSD (on non latching relays)
Analogue outputs:	Up to 20mA, max 500ohm (other on request) Up to 10V, min 100kohm
Temperature:	-20 to +70°C
Weight:	0.64kgs
Front protection:	IP52 (IP65 optional)

## Application

The KPV4x is a digitally controlled guard for monitoring of battery system voltage.

An AC or DC auxiliary voltage is required for the unit. A green LED indicates POWER on. Start of monitoring function is delayed when power is switched on (default 2 secs delay). In this way false tripping during power up is avoided.

The precision DIN96 moving coil meter reads the monitored parameter, and has low-reflection glass to ease reading at a distance.

The units three C/O relay outputs are configured as Low, High trip and Trip Status (R3). The triple-zone status LEDs at a glance gives the clear safety message:

- HIGH
- NORMAL
- LOW

The standard version has no analogue output. The optional F-version has an isolated analogue output signal proportional to meter deflection (see page 4 for available outputs).

The trip levels and trip delays are user settable on unit rear to suit most applications (see relay operation on page 2 & 3).

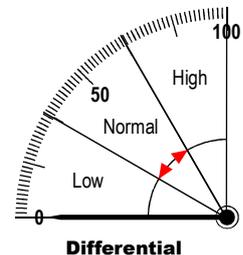
Red relay trip lamps flash instantly (approx. 1 flash per second) when the trip level is passed, the relay trips after elapsed delay. The lamp changes state and the trip relay operates after the pre-set delay. If a trip condition ends during the delay interval, the timer will automatically reset.

As standard the unit is supplied for automatic reset. Manual reset (latching relays) is optional (All G-versions).

## Relay Configurations

The relay operation is delayed in the arrow direction, the reset is instantaneous.

Both trip levels can, independently, individually set over the scale range (0-100% FSD).



The unit meets EN 61010-1 Cat. III, Pollution degree 2 and the relevant environmental and EMC tests specified in EN 61326-2-4 to comply with the requirements of the major Classification Societies.

Related information:  
The KPV4x series is also available for rail mounting as KCV4x serie.

## Description

## Relay Operation

### KPV401x

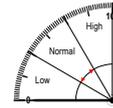
Relay Configuration: **Differential**

#### Over and Under DC Voltage Guard

A DC voltage guard for any scale range up to 100VDC. The unit is used for protection and monitoring of batteries.

Relay	Low	High	Fail Safe	Latch	Adjustable Hysteresis
R1		X		X	X
R2	X			X	X
R3	X	X	X	X	

Model	Latch	Output
KPV401E	-	-
KPV401F	-	X
KPV401G	X	-
KPV401GF	X	X



Adjustments	Trip level	Delay
Low:	0-100%	0-30secs
High:	0-100%	0-30secs
Hysteresis Low:	2-50% of FSD	
Hysteresis High:	2-50% of FSD	

Relays shown de-energised. R3 are fail-safe and energises when unit is powered.

### KPV402x

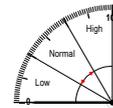
Relay Configuration: **Differential**

#### Over and Under DC Voltage Guard

Input from voltage divider for any voltage range. The unit is used for protection and monitoring of batteries.

Relay	Low	High	Fail Safe	Latch	Adjustable Hysteresis
R1		X		X	X
R2	X			X	X
R3	X	X	X	X	

Model	Latch	Output
KPV402E	-	-
KPV402F	-	X
KPV402G	X	-
KPV402GF	X	X



Adjustments	Trip level	Delay
Low:	0-100%	0-30secs
High:	0-100%	0-30secs
Hysteresis Low:	2-50% of FSD	
Hysteresis High:	2-50% of FSD	

Relays shown de-energised. R3 are fail-safe and energises when unit is powered.

Up to 200VDC via HV adapter RH200S series.

### KPV404x

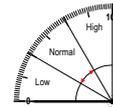
Relay Configuration: **Differential**

#### Over and Under DC Voltage Guard

Input from voltage divider for any voltage range. The unit is used for protection and monitoring of batteries.

Relay	Low	High	Fail Safe	Latch	Adjustable Hysteresis
R1		X		X	X
R2	X			X	X
R3	X	X	X	X	

Model	Latch	Output
KPV404E	-	-
KPV404F	-	X
KPV404G	X	-
KPV404GF	X	X



Adjustments	Trip level	Delay
Low:	0-100%	0-30secs
High:	0-100%	0-30secs
Hysteresis Low:	2-50% of FSD	
Hysteresis High:	2-50% of FSD	

Relays shown de-energised. R3 are fail-safe and energises when unit is powered.

Up to 400VDC via HV adapter RH400S series.

### KPV408x

Relay Configuration: **Differential**

#### Over and Under DC Voltage Guard

Input from voltage divider for any voltage range. The unit is used for protection and monitoring of batteries.

Relay	Low	High	Fail Safe	Latch	Adjustable Hysteresis
R1		X		X	X
R2	X			X	X
R3	X	X	X	X	

Model	Latch	Output
KPV408E	-	-
KPV408F	-	X
KPV408G	X	-
KPV408GF	X	X



Adjustments	Trip level	Delay
Low:	0-100%	0-30secs
High:	0-100%	0-30secs
Hysteresis Low:	2-50% of FSD	
Hysteresis High:	2-50% of FSD	

Relays shown de-energised. R3 are fail-safe and energises when unit is powered.

Up to 800VDC via HV adapter RH800S series.

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## Description

## Relay Operation

### KPV410x

Relay Configuration: **Differential**

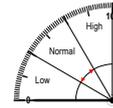
#### Over and Under DC Voltage Guard

Input from voltage divider for any voltage range. The unit is used for protection and monitoring of batteries.

Up to 1000VDC via HV adapter RH1000S series.

Relay	Low	High	Fail Safe	Latch	Adjustable Hysteresis
R1		X		X	X
R2	X			X	X
R3	X	X	X	X	

Model	Latch	Output
KPV410E	-	-
KPV410F	-	X
KPV410G	X	-
KPV410GF	X	X



Adjustments	Trip level	Delay
Low:	0-100%	0-30secs
High:	0-100%	0-30secs
Hysteresis Low:	2-50% of FSD	
Hysteresis High:	2-50% of FSD	

Relays shown de-energised. R3 are fail-safe and energises when unit is powered.

### KPV412x

Relay Configuration: **Differential**

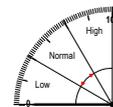
#### Over and Under DC Voltage Guard

Input from voltage divider for any voltage range. The unit is used for protection and monitoring of batteries.

Up to 1200VDC via HV adapter RH1200S series.

Relay	Low	High	Fail Safe	Latch	Adjustable Hysteresis
R1		X		X	X
R2	X			X	X
R3	X	X	X	X	

Model	Latch	Output
KPV412E	-	-
KPV412F	-	X
KPV412G	X	-
KPV412GF	X	X



Adjustments	Trip level	Delay
Low:	0-100%	0-30secs
High:	0-100%	0-30secs
Hysteresis Low:	2-50% of FSD	
Hysteresis High:	2-50% of FSD	

Relays shown de-energised. R3 are fail-safe and energises when unit is powered.

### KPV416x

Relay Configuration: **Differential**

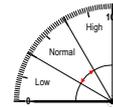
#### Over and Under DC Voltage Guard

Input from voltage divider for any voltage range. The unit is used for protection and monitoring of batteries.

Up to 1600VDC via HV adapter RH1600S series.

Relay	Low	High	Fail Safe	Latch	Adjustable Hysteresis
R1		X		X	X
R2	X			X	X
R3	X	X	X	X	

Model	Latch	Output
KPV416E	-	-
KPV416F	-	X
KPV416G	X	-
KPV416GF	X	X



Adjustments	Trip level	Delay
Low:	0-100%	0-30secs
High:	0-100%	0-30secs
Hysteresis Low:	2-50% of FSD	
Hysteresis High:	2-50% of FSD	

Relays shown de-energised. R3 are fail-safe and energises when unit is powered.

### KPV420x

Relay Configuration: **Differential**

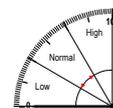
#### Over and Under DC Voltage Guard

Input from voltage divider for any voltage range. The unit is used for protection and monitoring of batteries.

Up to 2000VDC via HV adapter RH2000S series.

Relay	Low	High	Fail Safe	Latch	Adjustable Hysteresis
R1		X		X	X
R2	X			X	X
R3	X	X	X	X	

Model	Latch	Output
KPV420E	-	-
KPV420F	-	X
KPV420G	X	-
KPV420GF	X	X

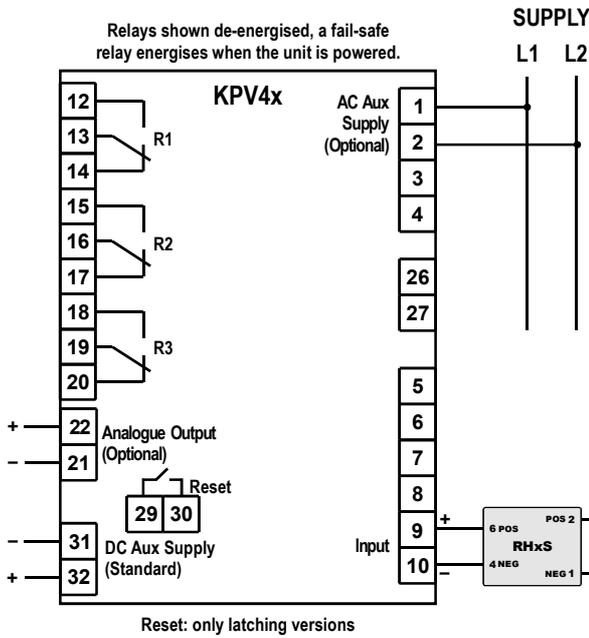


Adjustments	Trip level	Delay
Low:	0-100%	0-30secs
High:	0-100%	0-30secs
Hysteresis Low:	2-50% of FSD	
Hysteresis High:	2-50% of FSD	

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**Analogue Output**

All **F-versions** have an analogue output proportional to meter reading. The signal is specifically intended as input to a control system or for remote monitoring of the measured parameter. Other outputs available on request.

Add suffix from table below to type designation to specify output required:

O/P1	0-10mA	O/P6	N/A
O/P2	0-20mA	O/P7	N/A
O/P3	4-20mA	O/P8	0-10V
O/P4	N/A	O/P9	0,2-10V
O/P5	N/A	O/P10	4,3-20mA

**Relay Reset**

Any latched relay is reset by linking terminals 29 and 30 or by interrupting the voltage input to terminal 1.

**High Voltage Adaptors up to 2000VDC for KPV4x series**

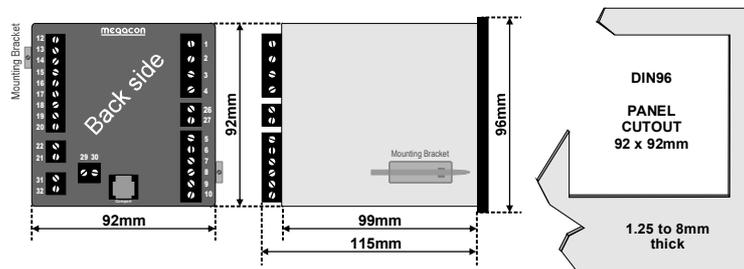
- HV Adaptor for DC Voltage Guards
- RHxS series, up to 2000VDC Voltage

Voltage Adaptors RHxS series are used for Voltage Guard KPV4x when the monitored voltage is higher than 100VDC.

These adapters are a passive resistor network and are potted in polyurethane.



**Dimensions**



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**ORDERING EXAMPLE:**

Type:	KPV412F
Aux. Supply:	24VDC
Input signal:	From RH1200S
Scale:	0-1200V
Analogue O/P:	(O/P3) 4-20mA

