3-PHASE GENERATOR AVR REACTIVE POWER GUARD

KPVA17x

- **Precision Generator AVR Reactive Power Guard, not affected by heavily distorted waveforms**
- **Total processing time less than 50mS**
- **3 or 4-wire systems. Definite time trip delays**
- **2-level overload protection (F version)**
- **Optional fast analogue kVAr-signal output, <50mS**
- **Wide range setting of overload contact hysteresis**

Specifications

Monitored Voltage:	100-120V, 200-240V, 380-415V, 440-460 or 480VAC 40-70Hz (Fuse 0,5A)
Optional Separate Auxiliary Voltage AC:	100-120V, 200-240V, 380-415V, 440-460 or 480VAC 40-70Hz (Fuse 0,5A)
Optional Separate Auxiliary Voltage DC:	24, 48 or 110VDC (Fuse 2A) (Add nr **2** for models with separate aux. supply. ex: KPVA171C**2**)
Supply tolerance:	± 10%
Power rating:	1,5VA
Current Input:	1 or 5A C.T. <0,1VA
Contact rating:	AC: 100VA - 250V/2A max. DC: 50W - 100V/1A max.
Adjustments available:	Depending of selected model (see page 2)
Analogue outputs:	Up to 20mA, max 500ohm Up to 10VDC, min 100kohm (other outputs available on request)
Temperature:	-20 to +70ºC
Weight:	0.64kgs
Front protection:	IP52 (IP65 optional)

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.

Application

The digital controlled KPVA17x range provides precision (1.0%) reactive power and overload protection and monitoring of three phase generators. In cases where the AVR is failing - there will be an increase or decrease in the exitation voltage from the AVR.

Increasing voltage give export (overload) kVAr and and decreasing voltage will give import (reverse) of kVar.

Available for 3-phase 3-wire (2R3) and 4-wire (3R4) systems.

The unit measures the voltage and current true r.m.s. value, and accuracy is independent of any wave form distortion.

As standard the auxiliary voltage is taken from the unit monitored voltage input. A separate AC or DC auxiliary voltage is optionally available.

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 DIN96 instrument reads the power level directly in kVAr. The kVAr-meter and the triple-zone status LEDs at a glance gives the clear safety message:

- OVERLOAD
- NORMAL
- REVERSE POWER

RELAY OUTPUTS
Relay operation depends on the selected model. Other combinations are available on request.

OUTPUTS
If output is used for remote meter reading, we recommend 0-1mA for the slave indicator.

Related information:
The KPVA17x-range is also available for rail mounting as KCVA17x.

KPVA17x

Description

Relay Operation

KPVA171C - KPVA171H & KPVA176A - KPVA176H

Configuration: 3-Phase, 3-Wire (2R3) **Meter:** Bi-Polar 1

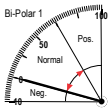
Both the reverse power (Import) relay (R1) and the overload (export) relay R2 is used to trip the generator breaker.

Relay R3 is intended for notification of a reverse power condition, or can be used for local indication, as input to an alarm system etc. R1 and R3 will latch after trip.

R2 are non-latching and have a adjustable hysteresis.

	REVERSE POWER	OVER LOAD	N/A	Fail Safe	Latch	Fixed Hysteresis	Adjustable Hysteresis
R1	√			√	*√		
R2		√					√
R3	√				*√		

Model	Latch	Output
KPVA171C*	X	-
KPVA171H	-	-
KPVA176A*	X	X
KPVA176H	-	X



Adjustments	Trip level	Delay
Overload:	0-100% of FSD	0-30secs
Reverse Power:	0-20% of FSD	0-30secs
Hysteresis:	2-50%	

KPVA171F & KPVA171HF - KPVA176F & KPVA176HF

Configuration: 3-Phase, 3-Wire (2R3) **Meter:** Bi-Polar 1

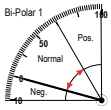
Both the reverse power (Import) relay (R1) and the overload (export) relay R3 is used to trip the generator breaker.

Relay R2 is intended for trip of non-essential load or tripping of bus-tie breaker to split up the system to reduce risk of total black out.

R2 and R3 are non-latching and have a 10% fixed hysteresis.

	REVERSE POWER	OVER LOAD 1	OVER LOAD 2	Fail Safe	Latch	Fixed Hysteresis	Adjustable Hysteresis
R1	√			√	*√		
R2		√				√	
R3			√			√	

Model	Latch	Output
KPVA171F*	X	-
KPVA171HF	-	-
KPVA176F*	X	X
KPVA176HF	-	X



Adjustments	Trip level	Delay
Overload 1:	0-100% of FSD	0-30secs
Overload 2:	0-100% of FSD	0-30secs
Reverse Power:	0-20% of FSD	0-30secs
Hysteresis:	Fixed 10%	

KPVA174C - KPVA174H & KPVA177A - KPVA177H

Configuration: 3-Phase, 4-Wire (3R4) **Meter:** Bi-Polar 1

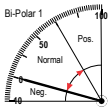
Both the reverse power (Import) relay (R1) and the overload (export) relay R2 is used to trip the generator breaker.

Relay R3 is intended for notification of a reverse power condition, or can be used for local indication, as input to an alarm system etc. R1 and R3 will latch after trip.

R2 are non-latching and have a adjustable hysteresis.

	REVERSE POWER	OVER LOAD	N/A	Fail Safe	Latch	Fixed Hysteresis	Adjustable Hysteresis
R1	√			√	*√		
R2		√					√
R3	√				*√		

Model	Latch	Output
KPVA174C*	X	-
KPVA174H	-	-
KPVA177A*	X	X
KPVA177H	-	X



Adjustments	Trip level	Delay
Overload:	0-100% of FSD	0-30secs
Reverse Power:	0-20% of FSD	0-30secs
Hysteresis:	2-50%	

KPVA174F & KPVA174HF - KPVA177F & KPVA177HF

Configuration: 3-Phase, 4-Wire (3R4) **Meter:** Bi-Polar 1

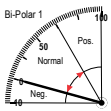
Both the reverse power (Import) relay (R1) and the overload (export) relay R3 is used to trip the generator breaker.

Relay R2 is intended for trip of non-essential load or tripping of bus-tie breaker to split up the system to reduce risk of total black out.

R2 and R3 are non-latching and have a 10% fixed hysteresis.

	REVERSE POWER	OVER LOAD 1	OVER LOAD 2	Fail Safe	Latch	Fixed Hysteresis	Adjustable Hysteresis
R1	√			√	*√		
R2		√				√	
R3			√			√	

Model	Latch	Output
KPVA174F*	X	-
KPVA174HF	-	-
KPVA177F*	X	X
KPVA177HF	-	X

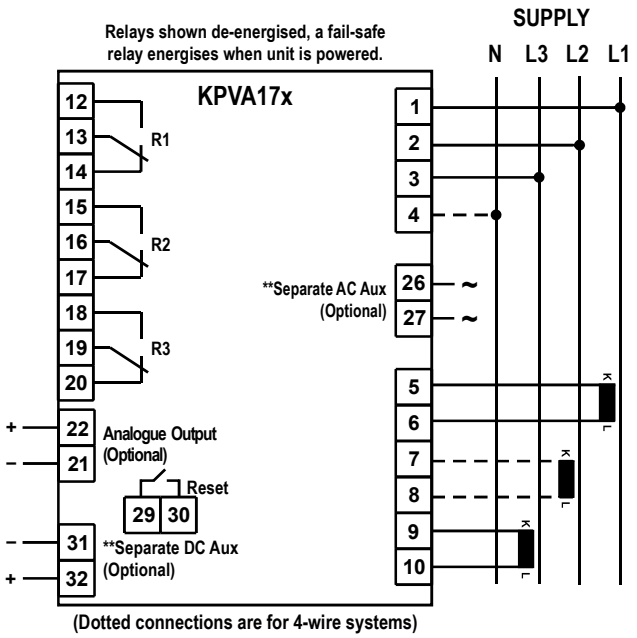


Adjustments	Trip level	Delay
Overload 1:	0-100% of FSD	0-30secs
Overload 2:	0-100% of FSD	0-30secs
Reverse Power:	0-20% of FSD	0-30secs
Hysteresis:	Fixed 10%	

Depending on application, select the model that matches the electrical installation.
If none of the listed models fit your purpose please contact Megacon for customer adaptation.

IS range

KPVA17x



To ensure correct kVAr measurement voltage phase sequence and CT, connections MUST be as shown on connection diagram.

Analogue Output

KPVA176A, KPVA176H, KPVA176F, KPVA176HF, KPVA177A, KPVA177H, KPVA177F and KPVA177HF have an analogue output proportional to kW-meter reading. The signal is specifically intended as input to a control system for kW monitoring, load sharing, load shedding etc.

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

O/P1	0 - 10mA	**O/P6**	-10 - 0 - +10mA
O/P2	0 - 20mA	**O/P7**	-20 - 0 - +20mA
O/P3	4 - 20mA	**O/P8**	0 - 10V
O/P4	4 - 12 - 20mA	**O/P9**	0,2 - 10V
O/P5	4 - 5,45 - 20mA	**O/P10**	4,3 - 20mA

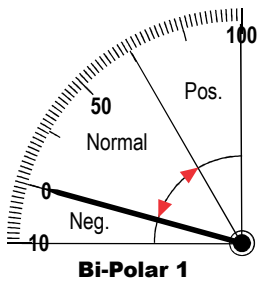
Relay Reset
Any latched relay is reset by linking terminals 29 and 30 or by interrupting voltage input to terminal 1 (terminal 26 for models with separate aux. supply).

****Optional separate aux. supply:**
Add nr **2** for models with separate aux. supply. (Example: KPVA171C**2**)

Relay Configurations

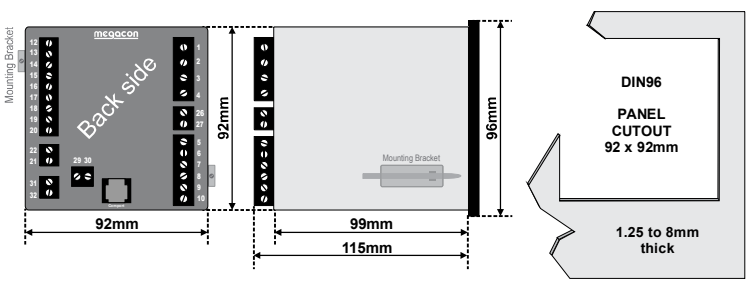
The relay operation is delayed in the arrow direction, the reset is instantaneous. Both trip levels can, independently, individually set over the scale range (0-100% FSD).

The **Bi-Polar 1** version is available
with 10% negative scale (standard version).



Bi-Polar 1

Dimensions



The MEGACON policy is one of continuous improvement, consequently equipment supplied may vary in detail from this publication.

ORDERING EXAMPLE:

Type:	KPVA176A2
Aux. Supply:	200-240VAC
Monitored Voltage:	440VAC
Input Current:	1500/5A
Range:	-150/0/+1500kVAr
Analogue O/P:	4/5,45/20mA

IS range