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General Specification

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Auxiliary Supply		100-120V, 220-240V, 380-415V, 440V AC 50-60Hz 24, 48V DC (optional 110, 220V DC on selected instruments)
Measured Signal AC		up to 480V AC direct 1A or 5A from C.T.
Measured Signal DC		60mV to 300V DC 1mA to 10A DC
Overcurrent/Shortcircuit		1.2 x In continuous, 2 x In for 10 seconds 10 x In for 1 second
Relay Contacts		250V AC @ 2A, 100V DC @ 0.5A resistive
Temperature	working storage	0 to +55ºC -40 to +85ºC
Humidity		Non condensing to 95% RH
Analogue Outputs	milliamp volts	maximum 20mA per output limited to 10V maximum 10V into minimum 500 ohms

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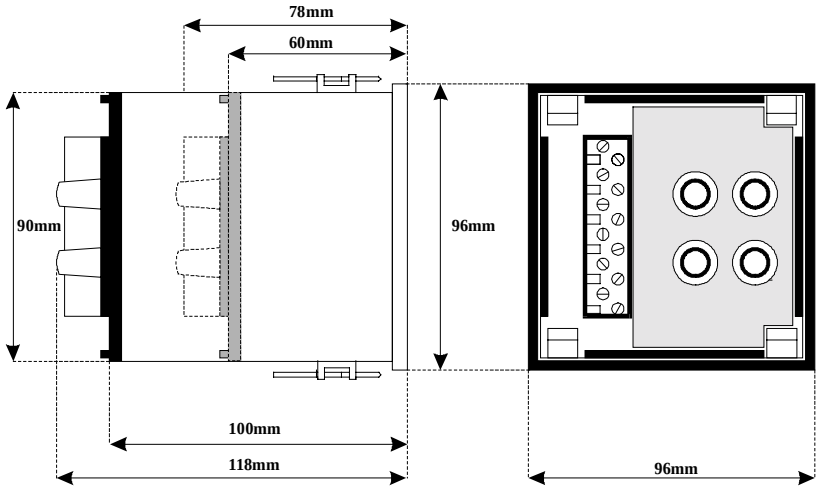
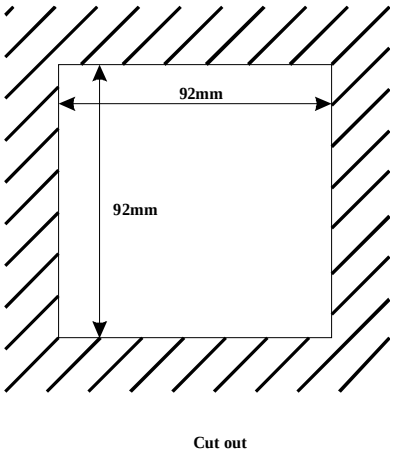
The instruments are manufactured in accordance with the following standards where applicable:-

BS89	Direct acting indicating electrical instruments and their accessories.
BS50081-2 BS50082-2	EMC Generic Emission Standard – Industrial environment EMC Compatibility – Generic Immunity – Industrial environment
BS EN 60688 IEC688	Electrical measuring transducers for converting A.C. electrical quantities into D.C. electrical quantities.
BS4889	Specifying the performance of electronic measuring equipment.
BS6221-3,20,23	Printed wiring boards
BS7000-2	Guide to managing the design of manufactured goods
BS EN61036	Alternating Current Static Watthour meters for active energy (Classes 1 and 2)
CEI IEC 255	Electrical Relays
DISC PD2000-1	Year 2000 Conformity Requirements

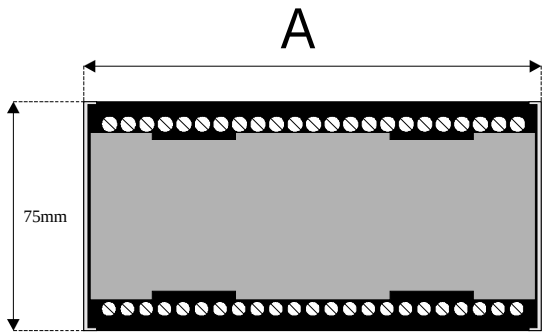
Dimensions

Contents

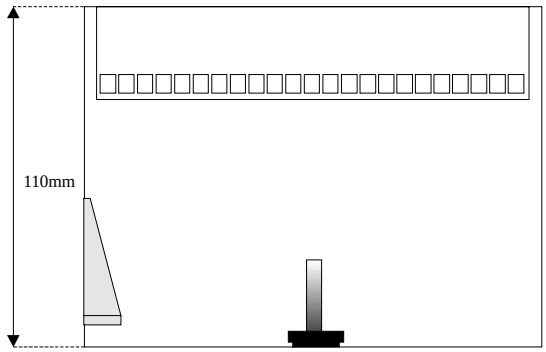


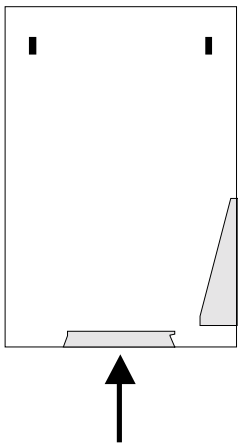


Cut out

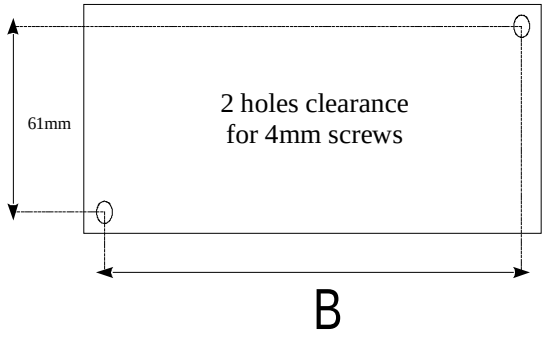


A	B
55mm	37mm
100mm	85mm
150mm	136mm





DIN Rail 46277



Kilowatt Scaling

Contents

megacon

Standard Scaling

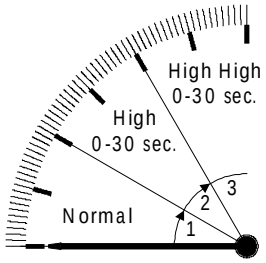
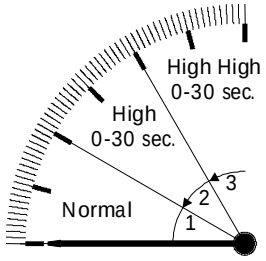
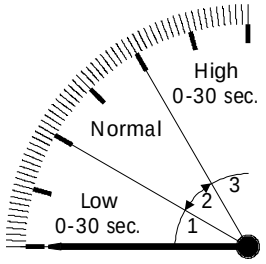
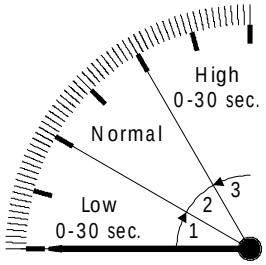
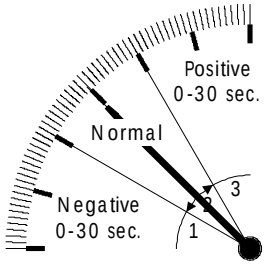
Three Phase L-L	Current Transformer Primary	Recommended FSD (kW)
220-240V	100	25 – 30 – 40
	125	30 – 40 – 50
	150	40 – 50 – 60
	200	50 – 60 – 80
	250	60 – 80 – 100
	300	80 – 100 – 120
	400	100 – 120 – 150
	500	120 – 150 – 200
	600	150 – 200 – 250
	750	200 – 250 – 300
	800	200 – 250 – 300
	1000	350 – 400 – 500
380-415V	100	40 – 50 – 60
	125	50 – 60 – 75
	150	60 – 75 – 100
	200	100 – 120 – 150
	250	100 – 120 – 150
	300	120 – 150 – 200
	400	200 – 250 – 300
	500	250 – 300 – 350
	600	300 – 350 – 400
	750	350 – 400 – 500
	800	400 – 500 – 600
	1000	600 – 750 – 800
440V	100	50 – 60 – 75
	125	60 – 80 – 100
	150	100 – 120 – 150
	200	100 – 120 – 150
	250	120 – 150 – 200
	300	150 – 200 – 250
	400	200 – 250 – 300
	500	250 – 300 – 400
	600	300 – 400 – 500
	750	400 – 500 – 600
	800	500 – 600 – 750
	1000	600 – 750 – 800

Relay Configurations

Contents

The Megacon range of DIN96 instruments are available in five main relay configurations:-

1) Cascade
2) Reverse Cascade
3) Differential
4) Reverse Differential
5) Bi-directional

Cascade	The two trips and time delays are arranged to react to rising inputs. NOTE: relative cascade is also used where the High High trip level is relative to the set High level	
Reverse Cascade	The trip relays and time delays are arranged to react to falling inputs. NOTE: relative reverse cascade is also used where the High trip level is relative to the set High High level	
Differential	The trip relays and time delays are arranged to react to rising and falling inputs about a nominal setting. NOTE: relative differential is also used where the Low trip level is relative to the set High level.	
Reverse Differential	The trip relays and time delays are arranged to react to rising and falling inputs towards a nominal setting.	
Bi-directional	The trip relays and time delays are arranged to react to positive and negative inputs.	

Contents

SINGLE PHASE CURRENT GUARD

KEC101

AC current overload protection

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Denmark
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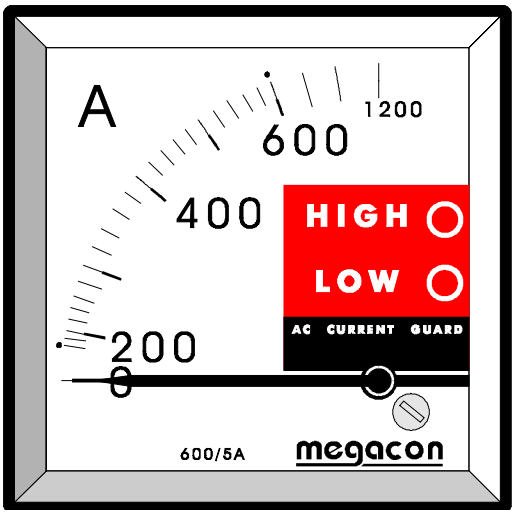
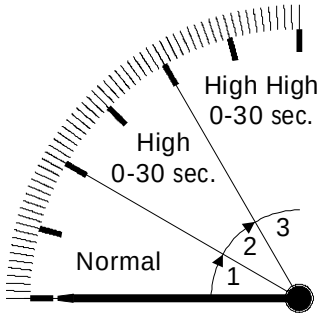
E-mail: megacon@firma.tele.dk

FEATURES

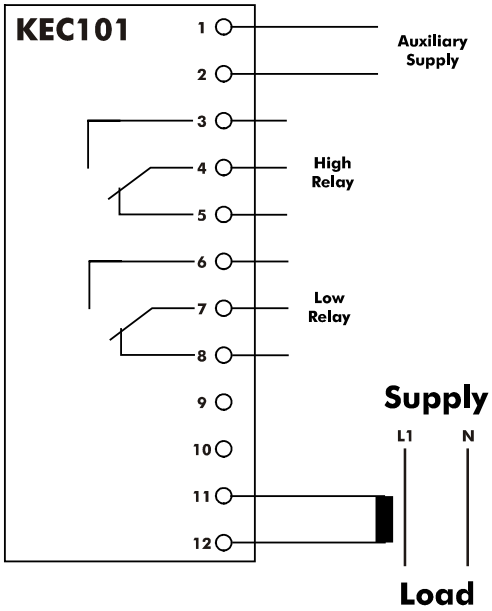
The KEC101 is a moving iron ammeter which incorporates dual level trip relays.

KEC101 monitors the single current transformer (C.T.) input and converts it to a DC signal proportional to the input. This signal is then fed to the two independent trip channels arranged in cascade configuration.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On	3-4 and 7-8	Off
Above trip level Low	3-4 and 6-7	Low on
Above trip level High	4-5 and 6-7	High on



Voltage
100-120V AC
220-240V AC
380-440V AC
18-36V or 36-72V DC
Nominal +/- 10%

Input
1A C.T.
or
5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level Low : 0-100%
Trip time Low : 0-30 sec.
Trip level High : 0-100%
Trip time High : 0-30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
CT Ratio :

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

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ELECTRONIC CONTROL AND INSTRUMENTATION

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Contents

SINGLE PHASE CURRENT GUARD

KEC102

AC current overload protection

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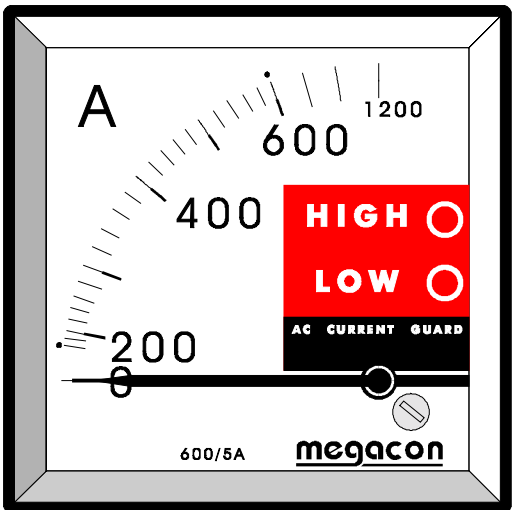
E-mail: megacon@megacon.no

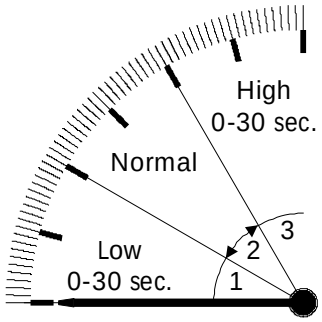
Denmark
Tel : +45 35 42 69 69 Fax : +45 35 42 69 59
E-mail: megacon@firma.tele.dk

FEATURES

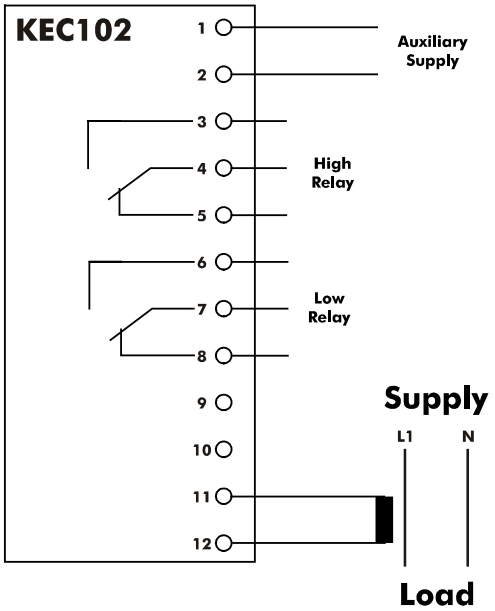
The KEC102 is a moving iron ammeter which incorporates dual level trip relays.

KEC102 monitors the single current transformer (C.T.) input and converts it to a DC signal proportional to the input. This signal is then fed to the two independent trip channels arranged in differential configuration.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Below trip level Low	3-4 and 7-8	Low on
Above trip level Low	3-4 and 6-7	Off
Above trip level High	4-5 and 6-7	High on



Voltage
100-120V AC
220-240V AC
380-440V AC
18-36V or 36-72V DC
Nominal +/- 10%

Input
1A C.T.
or
5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level Low : 0-100%
Trip time Low : 0-30 sec.
Trip level High : 0-100%
Trip time High : 0-30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
CT Ratio :

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Contents

THREE PHASE OVERCURRENT SHORTCIRCUIT GUARD

KCC115

AC current overload protection
AC current short circuit protection

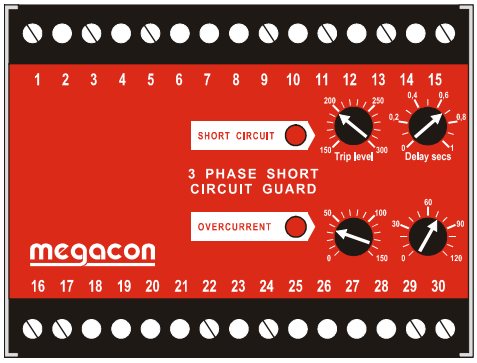
FEATURES

MEGACON AS
Norway
Tel : +47 55 54 68 00
Fax : +47 55 54 68 10

Basic Variant

KCC115 monitors the three current transformer (C.T.) inputs and converts them to a DC signal proportional to the average of the HIGHEST input. This signal is then fed to the two independent trip channels.

The unit has an internal reserve power reservoir to support the short circuit output relay for three seconds in the event of a complete loss of auxiliary supply.



The generator full load current (FLC) can be set by removing the lid of the instrument. This allows the overcurrent and short circuit levels to be adjusted directly as percentages of FLC.

The Short Circuit (S/C) and Overcurrent (O/C) relays are both latching and are reset using an external pushbutton. The Pathfinder function gives indication of the phase at fault.

On the Basic variant, the third relay energises if the overcurrent relay OR the short circuit relay operate.

MEGACON INTERNATIONAL
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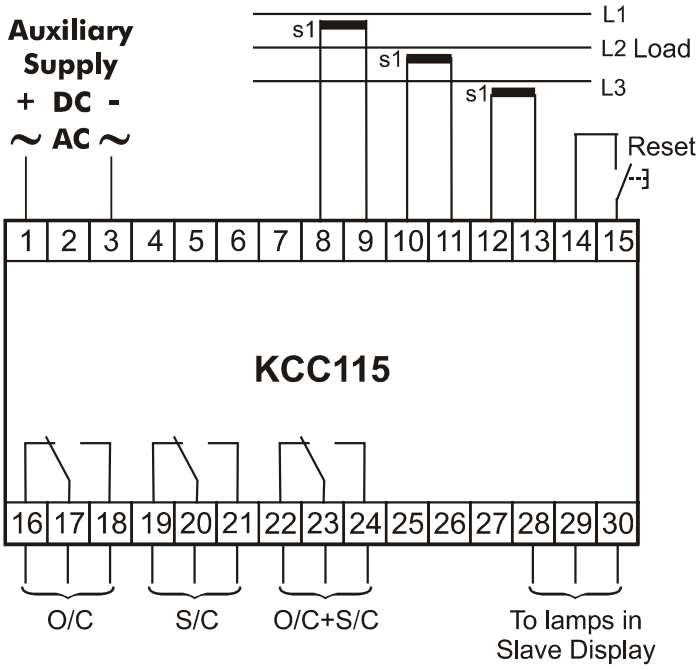
e-mail: megacon@megacon.no



Relays shown de-energised.

Voltage
100-120V AC
220-240V AC
380-440V AC
24V DC
Nominal +/- 10%

Input
3 x 1A C.T.
or
3 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments

Trip level O/C	:	0-150% FLC.
Trip time O/C	:	1 to 60 sec.
Trip level S/C	:	0-300% FLC.
Trip time S/C	:	0.1 to 1.0 sec.
Full load current	:	60-100% C.T.

MEGACON GENERATORTEKNIK ApS
Denmark
Tel : +45 42 84 45 14
Fax : +45 42 84 45 94

ORDERING INFORMATION

Auxiliary voltage :
CT Input :

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THREE PHASE OVERCURRENT GUARD

KEC112

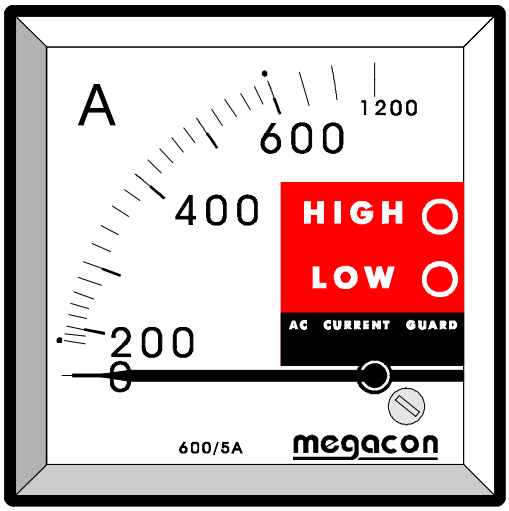
AC current overload protection

FEATURES

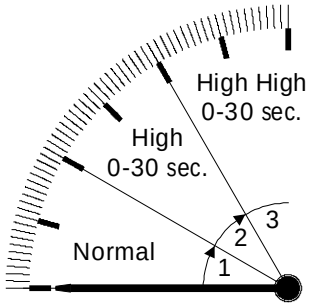
The KEC112 is a moving iron ammeter which incorporates dual level trip relays. Connection to the Ammeter is via independent stud connections allowing standard external switching to display individual phase currents.

KEC112 monitors the three current transformer (C.T.) inputs and converts them to a DC signal proportional to the average of the HIGHEST input. This signal is then fed to the two independent trip channels.

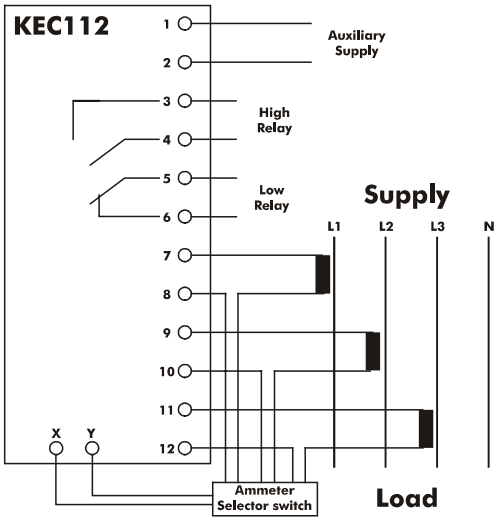
If the output needs to be maintained for a short duration after a complete loss of auxiliary supply, the unit can be fitted with an internal reserve power reservoir to support the short circuit output relay for three seconds. Alternatively a separate DC supply can be used.



The generator full load current (FLC) can be set on the rear of the instrument. This allows the overcurrent levels to be adjusted directly as percentages of FLC.



Condition	Contacts Closed	Lamp Status
Aux. Power Off	5-6	Off
Aux. Power On (Normal)	3-4 and 5-6	Off
Above trip level Low	3-4	LOW on
Above trip level High	-	HIGH on



Voltage
100-120V AC
220-240V AC
380-440V AC
24V DC
Nominal +/- 10%

Input
3 x 1A C.T.
or
3 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level High : 0-150% FLC.
Trip time High : 0-30 sec.
Trip level Low : 0-150% FLC.
Trip time Low : 0-30 sec.
Full Load Current : 60-100% C.T.

ORDERING INFORMATION

Auxiliary voltage. :
CT Ratio :

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

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New Version

THREE PHASE OVERCURRENT SHORTCIRCUIT GUARD

KEC115

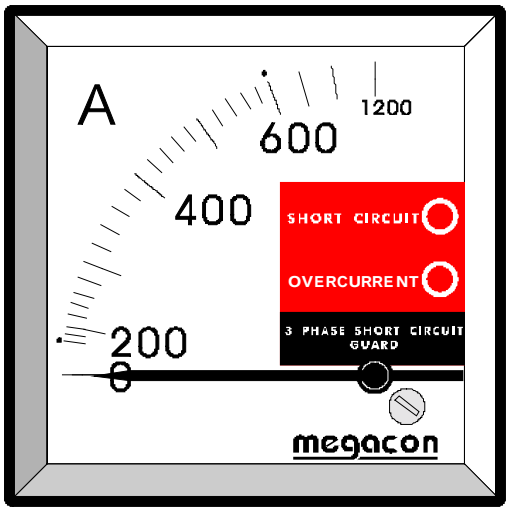
AC current overload protection
AC current short circuit protection

FEATURES

The KEC115 is a moving iron ammeter which incorporates dual level trip relays. Connection to the Ammeter is via independent terminal connections allowing standard external switching to display individual phase currents.

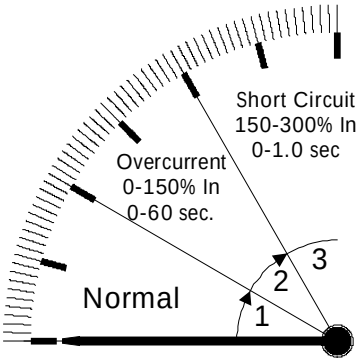
KEC115 monitors the three current transformer (C.T.) inputs and converts them to a DC signal proportional to the average of the HIGHEST input. This signal is then fed to the two independent trip channels.

The unit has an internal reserve power reservoir to support the short circuit output relay for three seconds in the event of a complete loss of auxiliary supply.

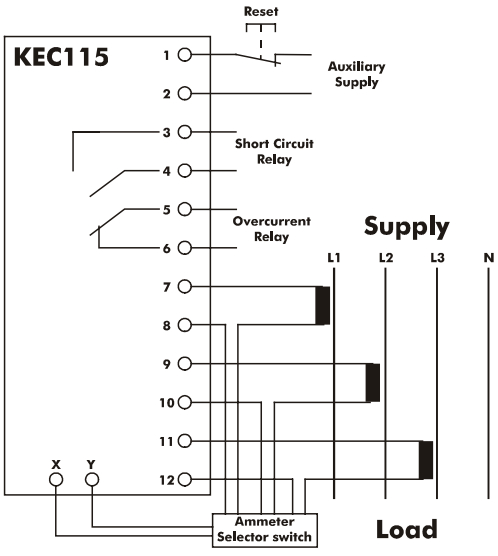


The generator full load current (FLC) can be set on the rear of the instrument. This allows the overcurrent and short circuit levels to be adjusted directly as percentages of FLC.

The Short Circuit (S/C) and Overcurrent (O/C) relays are both latching and are reset by removing the auxiliary supply for approximately seven seconds.



Condition	Contacts Closed	Lamp Status
Aux. Power Off	5-6	Off
Aux. Power On (Normal)	3-4 and 5-6	Off
Above trip level Overcurrent	3-4	O/C on
Above trip level Short circuit		S/C on



Voltage
100-120V AC
220-240V AC
380-440V AC
24V DC
Nominal +/- 10%

Input
3 x 1A C.T.
or
3 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments

Trip level O/C	:	0-150% FLC.
Trip time O/C	:	1 to 60 sec.
Trip level S/C	:	0-300% FLC.
Trip time S/C	:	0.1 to 1.0 sec.
Full Load Current	:	60-100% C.T.

ORDERING INFORMATION

Auxiliary voltage. :
CT Ratio :

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

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CURRENT IMBALANCE GUARD

KPC110

AC current imbalance protection

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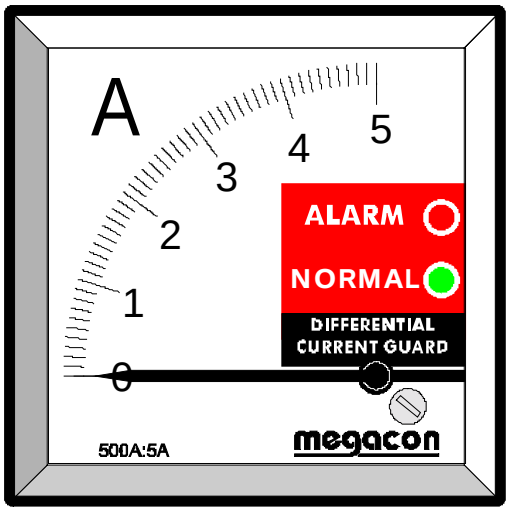
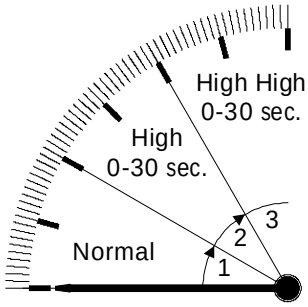
E-mail: megacon@firma.tele.dk

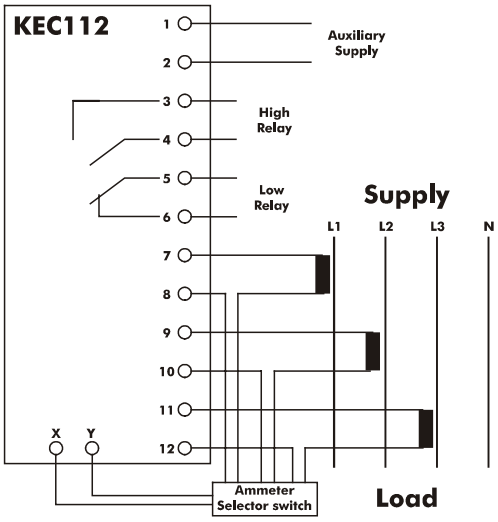
FEATURES

KPC110 monitors the three current transformer (C.T.) inputs and converts them to a DC signal proportional to the difference between the HIGHEST and LOWEST inputs. This signal is then fed to the two independent trip channels.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	5-6	Off
Aux. Power On (Normal)	3-4 and 5-6	Normal On
Above trip level Low	3-4	Off
Above trip level High	-	Alarm on



Voltage
100-120V AC
220-240V AC
380-440V AC
24V DC
Nominal +/- 10%

Input
3 x 1A C.T.
or
3 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level High : 0-150% FLC.
Trip time High : 0-30 sec.
Trip level Low : 0-150% FLC.
Trip time Low : 0-30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
CT Ratio :

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Contents

CURRENT DIFFERENTIAL GUARD

KPC112

AC differential current protection

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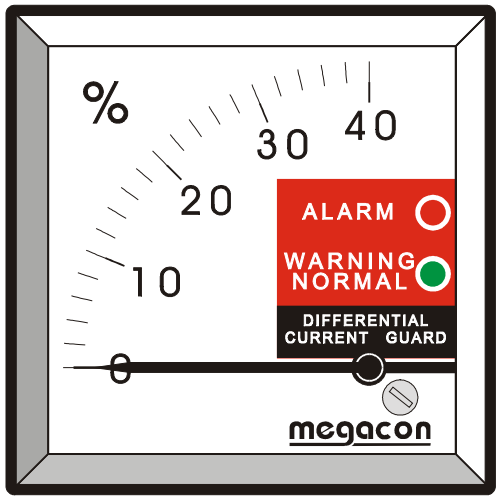
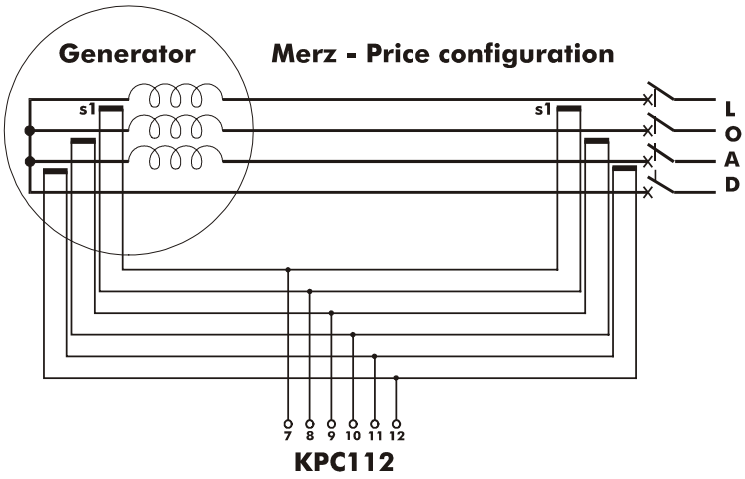
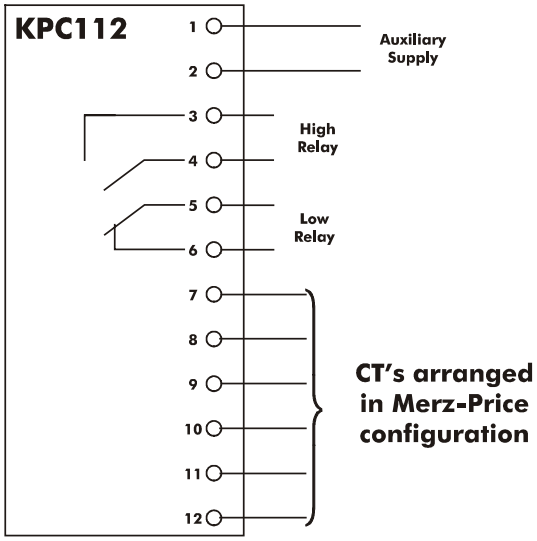
FEATURES

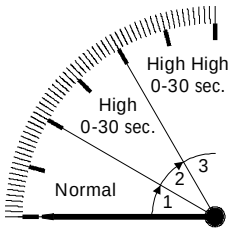
KPC112 monitors six current transformer (C.T.) inputs, arranged in a Mertz-Price configuration, and converts them to a DC signal proportional to the HIGHEST input. This signal is then fed to the two independent trip channels.







Condition	Contacts Closed	Lamp Status
Aux. Power Off	5-6	Off
Aux. Power On (Normal)	3-4 and 5-6	Normal On
Above trip level Low	3-4	Off
Above trip level High	-	Alarm on



Voltage
100-120V AC
220-240V AC
380-440V AC
24V DC
Nominal +/- 10%

Input
6 x 1A C.T. (class 0.2)
or
6 x 5A C.T. (class 0.2)

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level High : 0-40%
Trip time High : 0-3 sec.
Trip level Low : 0-40%
Trip time Low : 0-30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
CT Ratio :

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Contents

DC CURRENT GUARD

KPC121

DC current protection

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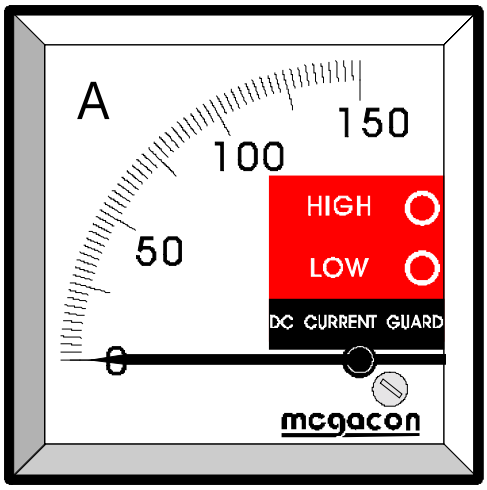
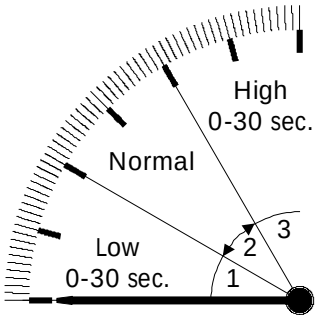
FEATURES

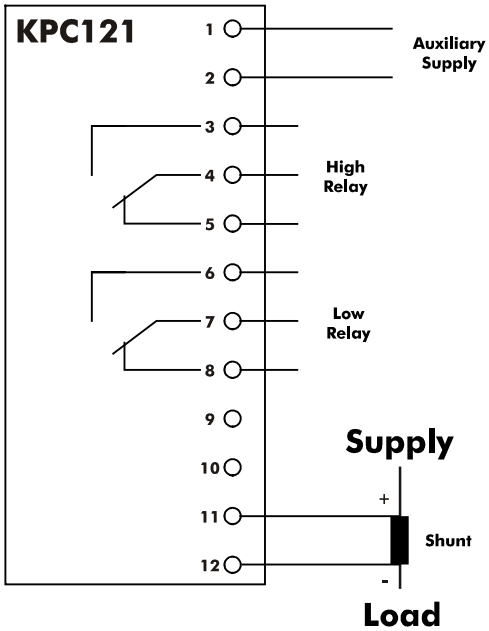
KPC121 monitors the voltage from a DC shunt and converts it to a DC signal proportional to the input. This signal is then fed to the two independent trip channels.

The two trip channels are arranged in a relative differential configuration.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On Low current	3-4 and 6-7	Off
Above trip level Low	3-4 and 7-8	Low On
Above trip level High	4-5 and 7-8	High On



Voltage
100-120V AC
220-240V AC
380-440V AC
24V DC
Nominal +/- 10%

Input
60, 75, 100mV shunt

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level High : 0-100%
Trip time High : 0-30 sec.
Trip level Low : 0-100% of high setting
Trip time Low : 0-30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
CT Ratio :
Scale :

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Contents

DC CURRENT GUARD

KPC123

DC current protection

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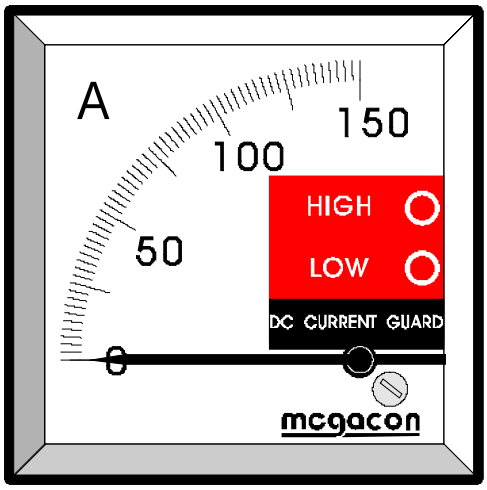
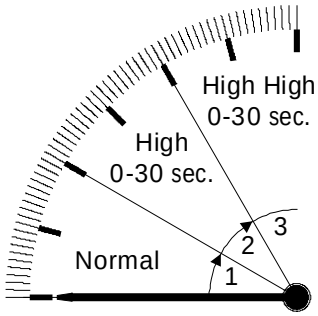
FEATURES

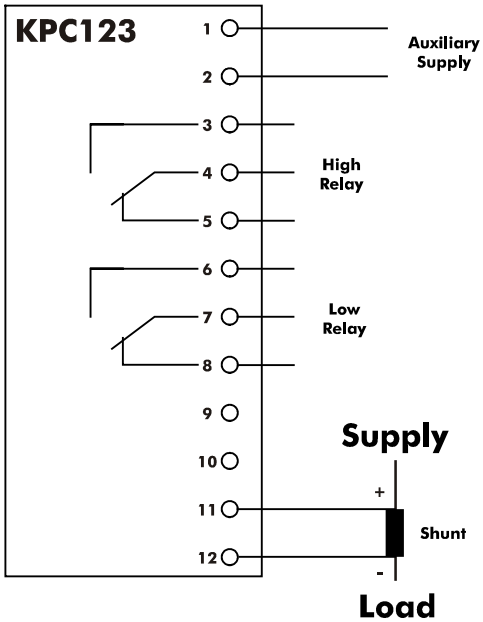
KPC123 monitors the voltage from a DC shunt and converts it to a DC signal proportional to the input. This signal is then fed to the two independent trip channels.

The two trip channels are arranged in a cascade configuration.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On	3-4 and 7-8	Off
Above trip level Low	3-4 and 6-7	Low On
Above trip level High	4-5 and 6-7	Low On High On



Voltage
100-120V AC
220-240V AC
380-440V AC
24V DC
Nominal +/- 10%

Input
60, 75, 100mV shunt

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level High : 0-100%
Trip time High : 0-30 sec.
Trip level Low : 0-100%
Trip time Low : 0-30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
CT Ratio :
Scale :

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DC CURRENT GUARD

KPC126

DC current protection

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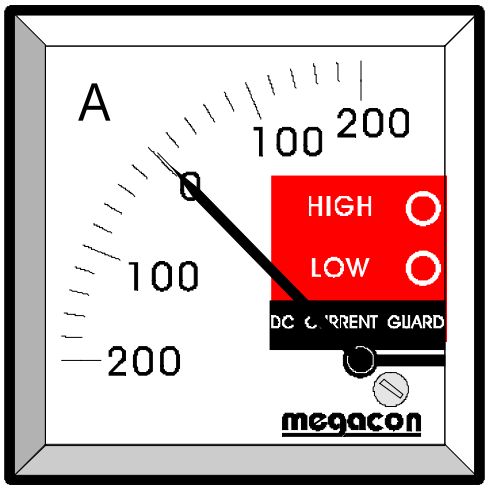
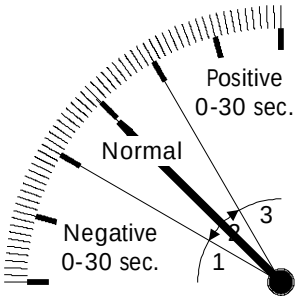
FEATURES

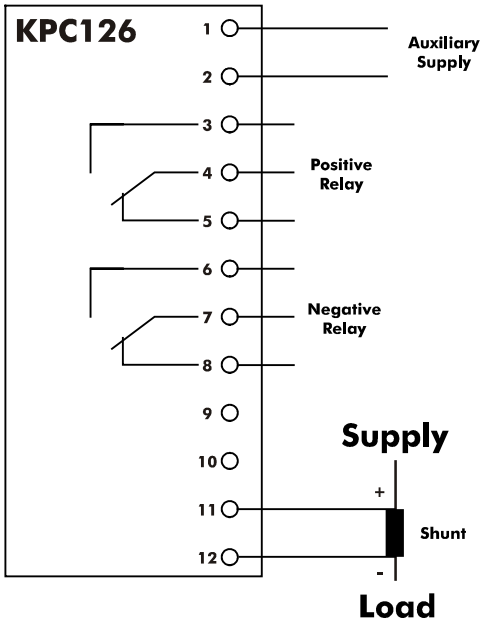
KPC126 monitors the voltage from a DC shunt and converts it to a DC signal proportional to the input. This signal is then fed to the two independent trip channels.

The two trip channels are arranged in a cascade configuration.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Below trip level low	4-5 and 6-7	NEG On
Above trip level Low	4-5 and 7-8	Off
Above trip level High	3-4 and 7-8	POS On



Voltage
100-120V AC
220-240V AC
380-440V AC
24V DC
Nominal +/- 10%

Input
60, 75, 100mV shunt

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level Pos. : 0-100%
Trip time Pos. : 0-30 sec.
Trip level Neg. : 0-100%
Trip time Neg. : 0-30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
CT Ratio :
Scale :

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Contents

FREQUENCY GUARD

KPF221

Over Frequency and Under Frequency Protection

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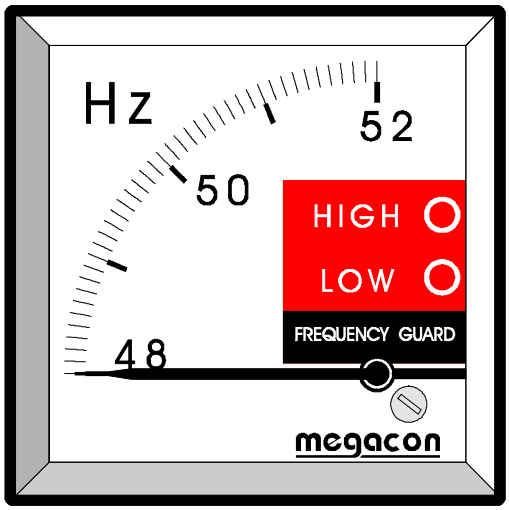
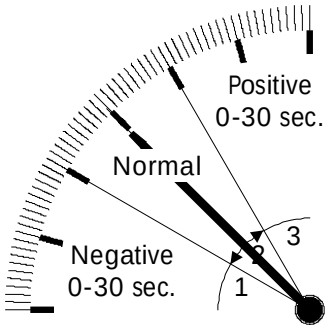
FEATURES

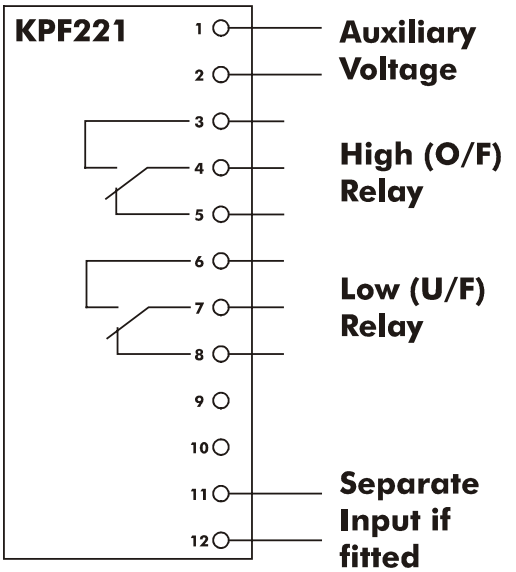
The KPF221 is a frequency indicator with integral frequency transducer. This transducer output is then fed to the two independent trip channels.

Indication of the trip levels being exceeded are indicated by the two LED's.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On (Normal)	3-4 and 6-7	Off
Below trip level Under frequency	4-5 and 7-8	LOW on
Above trip level Over frequency	3-4 and 6-7	HIGH on



Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Input
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Frequency
50 or 60Hz nominal

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level O/F : 0-10% nominal
Trip time O/F : 0 to 30 sec.
Trip level U/F : 0-10% nominal
Trip time U/F : 0 to 30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
Input :
Scale :

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Contents

COMBINED VOLTAGE AND FREQUENCY GUARD

KCVF103

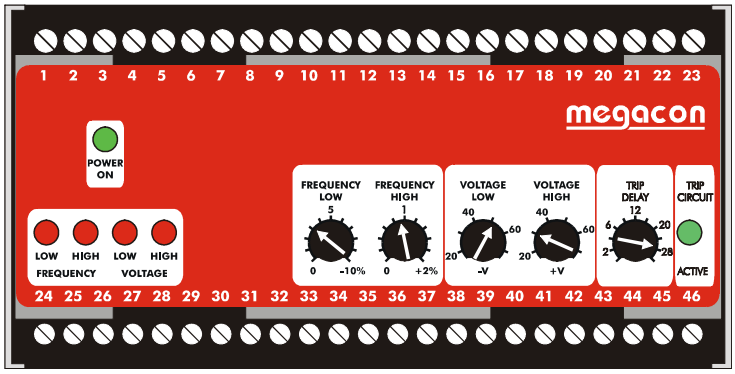
High an Low Voltage Alarms
High and Low Frequency Alarms

FEATURES

The KCVF103 and KCVF104 are fully self contained “All in One” instrument which measures and monitors both voltage and frequency in AC power systems.

Model KCVF103 is designed for use on three phase, three wire systems and the KCVF104 is designed for three phase, four wire systems.

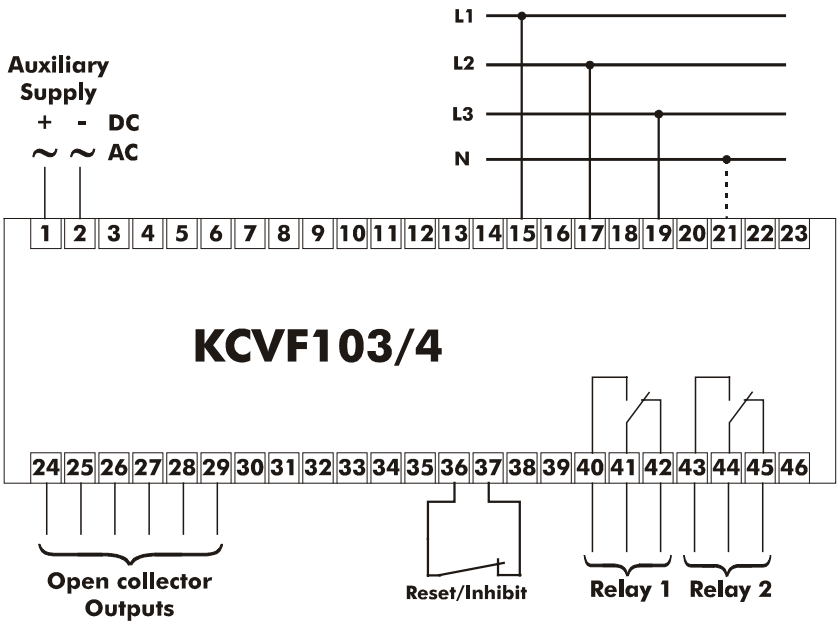
A green LED indicates when the unit is monitoring the input.



Voltage and Frequency limits can be adjusted by potentiometers mounted on the front of the instrument. Each model has three possible nominal voltage settings – e.g. 380, 400 and 415V which are selected by switches under the cover.

The trip relay is fail safe and will de-energise after the set delay time once the voltage or frequency limit is exceeded. The relay is non latching and will reset as soon as the monitored supply is within limits. The external reset/inhibit only affects the open collector outputs and does not affect the relay operation.

The appropriate RED “tripped” LED is illuminated and open collector output active when the voltage or frequency limit is exceeded and the delay period exceeded. These are latched and can be reset by an external inhibit/reset switch. They are also reset if the monitored supply is removed and then re-applied.



Relays shown de-energised.

Auxiliary Voltage
100-120V AC
220-240V AC
380-415V AC
24V, 48V DC
Nominal +/- 10%

Monitored Voltage
100-120V AC
220-240V AC
380-415V AC
Nominal +/- 10%

Frequency
Nominal 50Hz

Adjustments

Over Voltage	: Vn +20%
Under Voltage	: Vn –20%
Over Freq.	: Fn +10%
Under Freq.	: Fn –10%
Trip Delay	: 2-30 sec.

Open collectors
10mA 30V max.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

ORDERING INFORMATION	Auxiliary voltage : Monitored voltage :

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Contents

SINGLE PHASE AC VOLTAGE GUARD

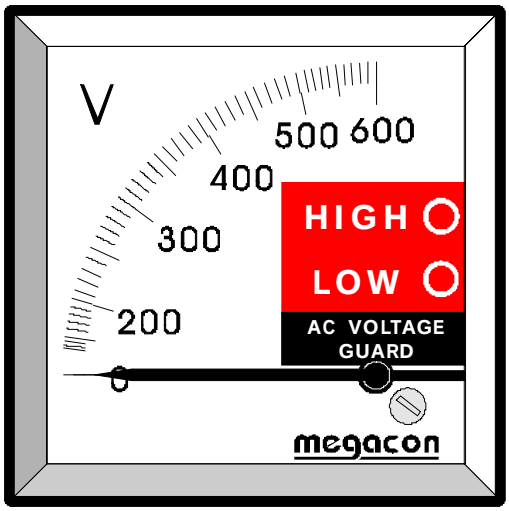
KEV114

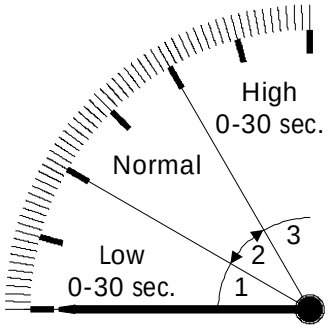
Over Voltage protection
Under Voltage protection

FEATURES

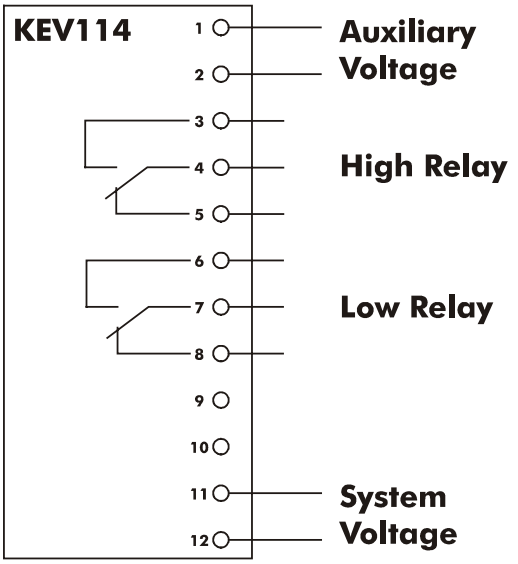
The KEV114 is a moving iron voltmeter which incorporates dual level trip relays.

KEV114 monitors the single voltage input and converts it to a DC signal proportional to the average voltage. This signal is then fed to the two independent trip channels.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On (Normal)	3-4 and 6-7	Off
Below trip level LOW	3-4 and 7-8	LOW on
Above trip level HIGH	4-5 and 6-7	HIGH on



Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level HIGH : Nominal +20%
Trip time HIGH : 0 to 30 sec.
Trip level LOW : Nominal –20%
Trip time LOW : 0 to 30 sec.
.

ORDERING INFORMATION	System voltage. : Scale : Nominal voltage :

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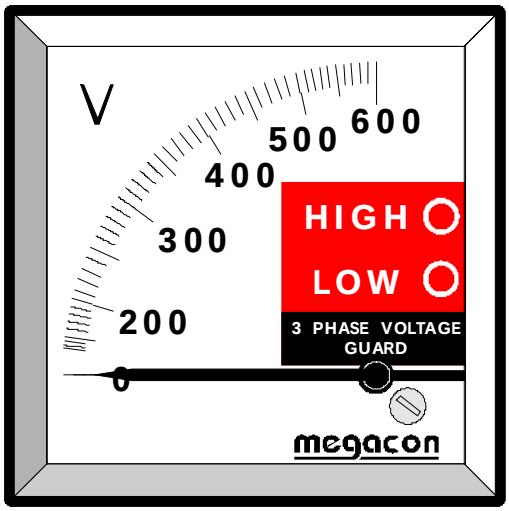
Contents

THREE PHASE AC VOLTAGE GUARD

KEV233/4

Over Voltage protection
Under Voltage protection

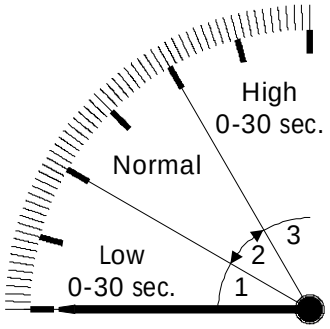
FEATURES



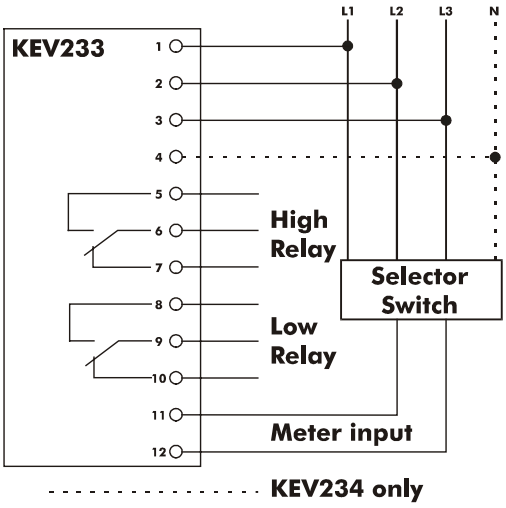
The KEV233 and KEV234 are moving iron voltmeters which incorporate dual level trip relays. Connection to the Voltmeter is via dedicated terminals allowing standard external switching to display individual phase voltages.

KEV233 is for three phase, three wire systems and KEV234 is for three phase, four wire systems.

KEV233/4 monitors the three voltage inputs and converts them to a DC signal proportional to the average of the HIGHEST and LOWEST input. This signal is then fed to the two independent trip channels.



Condition	Contacts Closed	Lamp Status
Aux. Power Off	6-7 and 9-10	Off
Aux. Power On (Normal)	5-6 and 8-9	Off
Below trip level LOW	5-6 and 9-10	LOW on
Above trip level HIGH	6-7 and 8-9	HIGH on



Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level HIGH : Nominal +20%
Trip time HIGH : 0 to 30 sec.
Trip level LOW : Nominal –20%
Trip time LOW : 0 to 30 sec.
.

ORDERING INFORMATION	System voltage. : Scale : Nominal voltage :

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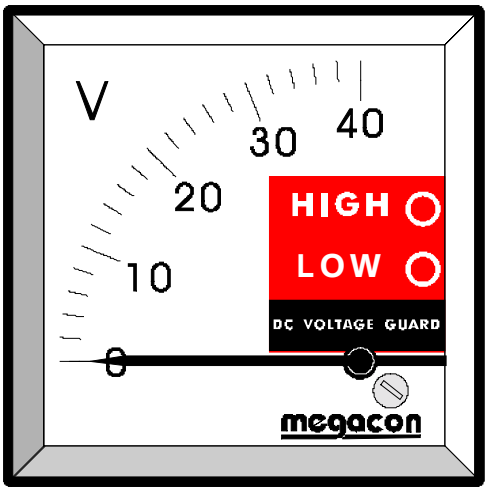
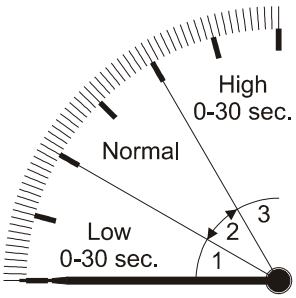
DC Voltage Guard

FEATURES

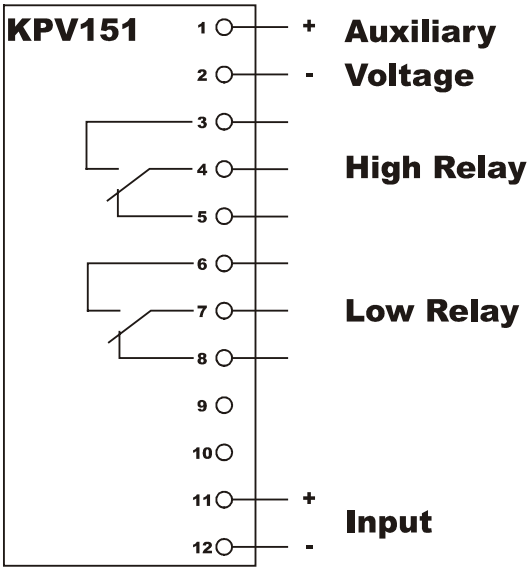
The KPV151 directly measures DC voltages up to 600V. This is converted to a DC signal which is fed to dual level trip relays.

The two trip levels are arranged in a differential configuration around a factory set nominal voltage.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Below trip level LOW	3-4 and 7-8	LOW on
Above trip level LOW (normal)	3-4 and 6-7	Off
Above trip level HIGH	4-5 and 6-7	HIGH on



Auxiliary Voltage
24V DC
48V DC
110V DC
220V DC
Nominal +/- 10%

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level HIGH : Vn + 20%
Trip time HIGH : 0 to 30 sec.
Trip level LOW : Vn - 20%
Trip time LOW : 0 to 30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
Monitored voltage :

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Contents

New Version

BI-DIRECTIONAL AC POWER GUARD

KCW171B

Reverse Power protection
Kilowatt overload protection

FEATURES

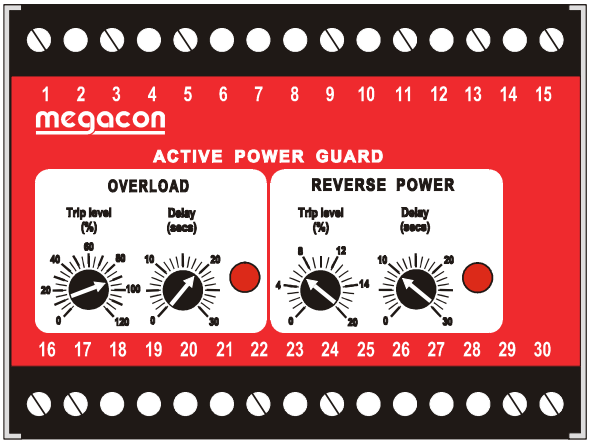
The KCW171B is a bi-directional kilowatt power transducer with two independent trip channels.

The KCW171B is for use on three phase, three wire unbalanced loads.

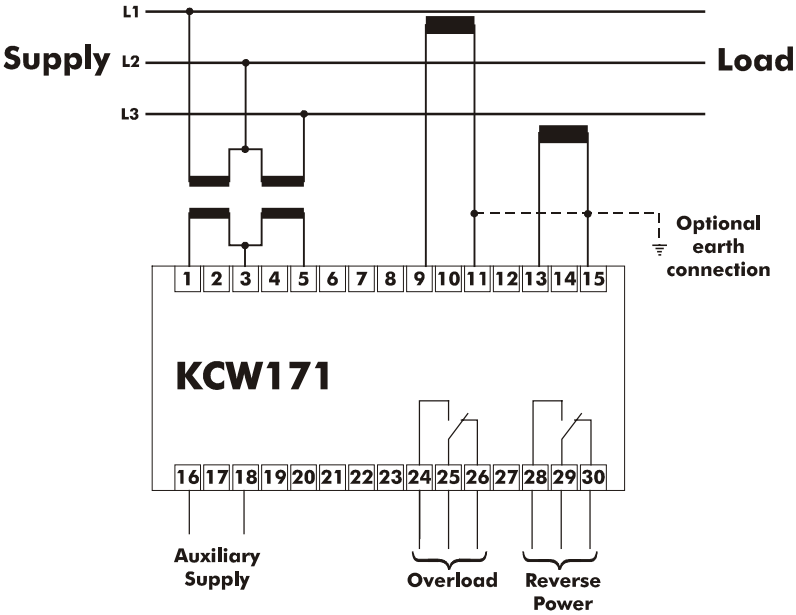
The kilowatt transducer is not affected by heavily distorted waveforms or non-linear loads.

The reverse power relay (R/P) can be used to open the generator breaker either via a shunt trip or under voltage coil.

The overload relay (O/L) can be used either for non-essential load release or as a start signal to another generator set.



An adjustment is available for setting the hysteresis of the overload contact. This enables this contact to be used for a non- essential load to be reconnected or for a stop signal to another generator.



Voltage
24V DC
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Input
3 x 1A C.T.
or
3 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments

Trip level O/L	:	0-120% cal.
Trip time O/L	:	0 to 30 sec.
Hysteresis O/L	:	1-50% cal
Trip level R/P	:	0-20% cal.
Trip time R/P	:	0 to 30 sec.

ORDERING INFORMATION			
	Supply voltage.	:	Aux. voltage :
	CT Ratio	:	
	Range	:	

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Contents

New Version

BI-DIRECTIONAL AC POWER GUARD

KPW171B

Reverse Power protection
Kilowatt overload protection

FEATURES

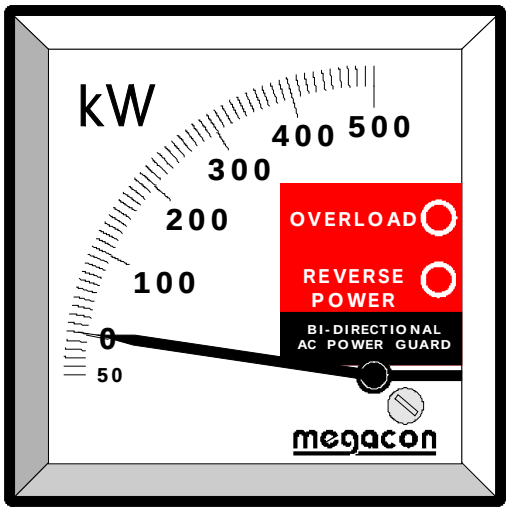
The KPW171B is a bi-directional kilowatt indicator with integral power transducer. This transducer output is then fed to the two independent trip channels.

The KPW171B is for use on three phase, three wire unbalanced loads.

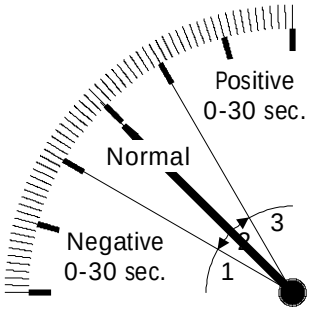
The integral kilowatt transducer is not affected by heavily distorted waveforms or non-linear loads.

The reverse power relay (R/P) can be used to open the generator breaker either via a shunt trip or under voltage coil.

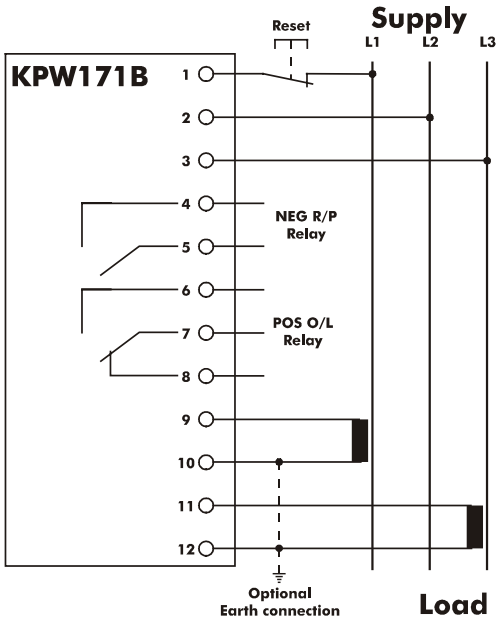
The overload relay (O/L) can be used either for non-essential load release or as a start signal to another generator set.



An adjustment is available, on the rear of the unit, for setting the hysteresis of the overload contact. This enables this contact to be used for a non- essential load to be reconnected or for a stop signal to another generator.



Condition	Contacts Closed	Lamp Status
Aux. Power Off	7-8	Off
Aux. Power On (Normal)	4-5 and 7-8	Off
Above trip level Reverse Power	7-8	R/P on
Above trip level Overload	4-5 and 6-7	O/L on



Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Input
3 x 1A C.T.
or
3 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments

Trip level O/L	:	0-100% FSD.
Trip time O/L	:	0 to 30 sec.
Hysteresis O/L	:	1-50% FSD
Trip level R/P	:	0-20% FSD.
Trip time R/P	:	0 to 30 sec.

.

ORDERING INFORMATION

Supply voltage. :
CT Ratio :
Scale :

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Contents

AC POWER GUARD

KPW181

Kilowatt overload protection

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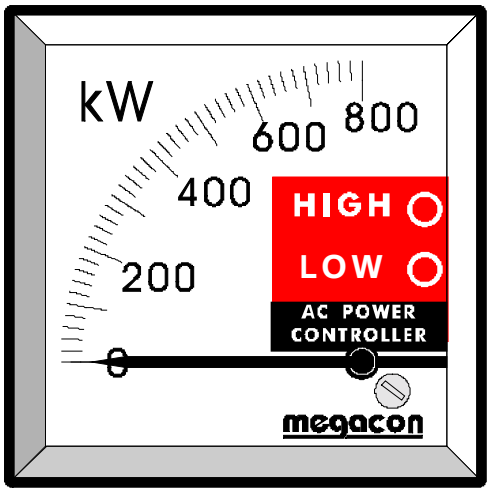
FEATURES

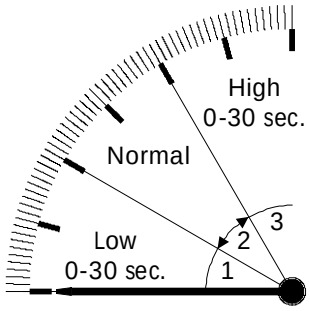
The KPW181 is a kilowatt indicator with integral power transducer. This transducer output is fed to the two independent trip channels.

The KPW181 is for use on three phase, three wire unbalanced loads.

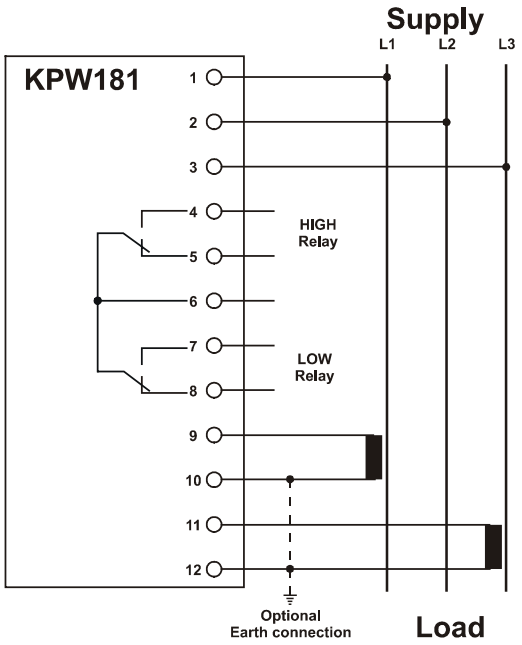
The integral kilowatt transducer is not affected by heavily distorted waveforms or non-linear loads.

The two trip channels are arranged in a differential configuration to monitor kilowatt readings around a nominal level.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	5-6 and 6-8	Off
Below trip level LOW	4-6 and 6-8	LOW on
Above trip level LOW (normal)	4-6 and 6-7	Off
Above trip level HIGH	5-6 and 6-7	O/L on



Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Input
2 x 1A C.T.
or
2 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments

Trip level LOW	:	0-100% of HIGH level.
Trip time LOW	:	0 to 30 sec.
Trip level HIGH	:	0-100% FSD.
Trip time HIGH	:	0 to 30 sec.

.

ORDERING INFORMATION

Supply voltage. :
CT Ratio :
Scale :

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AC POWER GUARD

KPW191

Kilowatt overload protection

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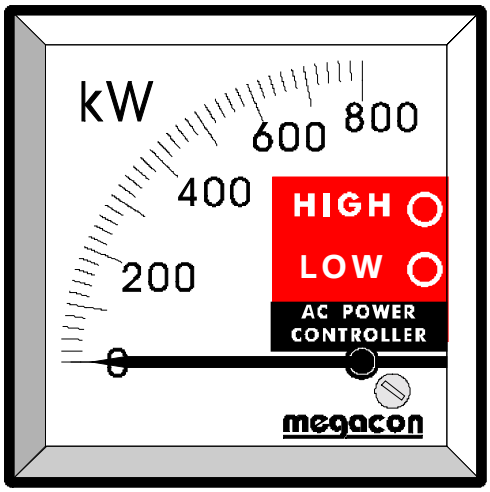
FEATURES

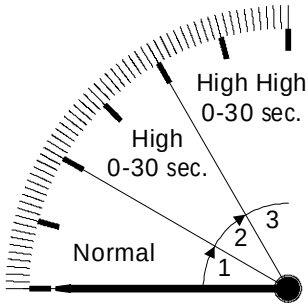
The KPW191 is a kilowatt indicator with integral power transducer. This transducer output is fed to the two independent trip channels.

The KPW191 is for use on three phase, three wire unbalanced loads.

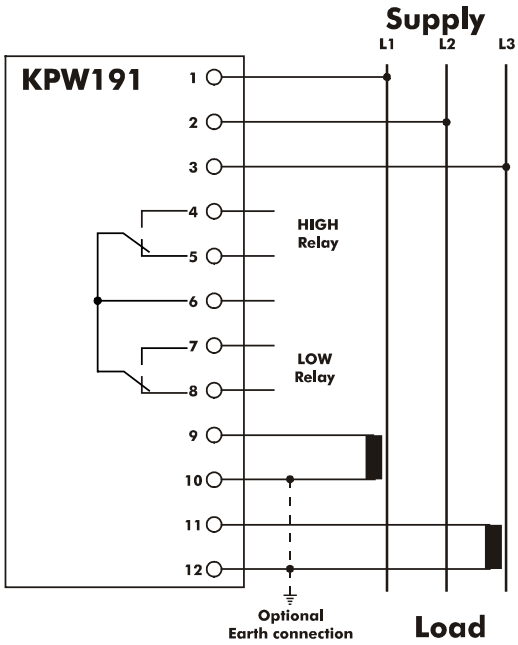
The integral kilowatt transducer is not affected by heavily distorted waveforms or non-linear loads.

The two trip channels are arranged in a cascade configuration.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	5-6 and 6-8	Off
Normal	4-6 and 6-8	Off
Above trip level LOW	4-6 and 6-7	LOW on
Above trip level HIGH	5-6 and 6-7	LOW on HIGH on



Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Input
3 x 1A C.T.
or
3 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments

Trip level LOW	:	0-100% of HIGH level.
Trip time LOW	:	0 to 30 sec.
Trip level HIGH	:	0-100% FSD.
Trip time HIGH	:	0 to 30 sec.

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ORDERING INFORMATION

Supply voltage. :
CT Ratio :
Scale :

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Contents

New Version

BI-DIRECTIONAL AC POWER GUARD

KPW174B

Reverse Power protection
Kilowatt overload protection

FEATURES

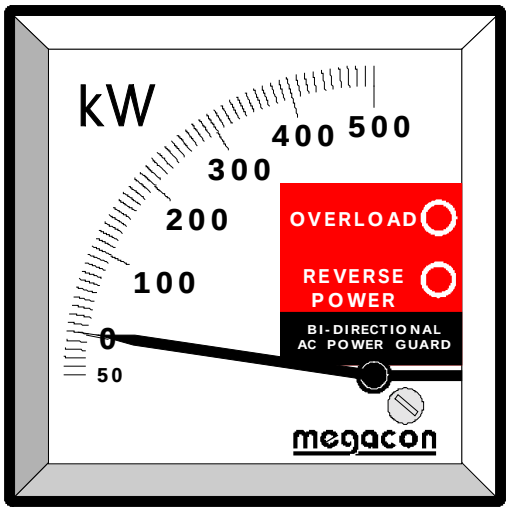
The KPW174B is a bi-directional kilowatt indicator with integral power transducer. This transducer output is then fed to the two independent trip channels.

The KPW174B is for use on three phase, four wire unbalanced loads.

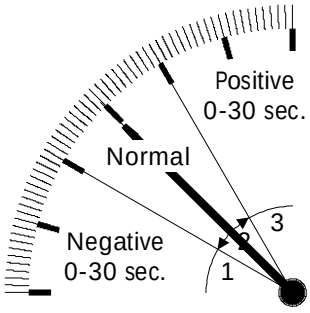
The integral kilowatt transducer is not affected by heavily distorted waveforms or non-linear loads.

The reverse power relay (R/P) can be used to open the generator breaker either via a shunt trip or under voltage coil.

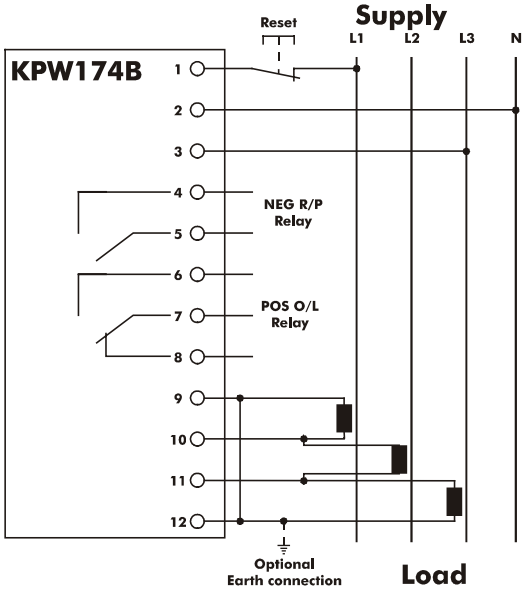
The overload relay (O/L) can be used either for non-essential load release or as a start signal to another generator set.



An adjustment is available, on the rear of the unit, for setting the hysteresis of the overload contact. This enables this contact to be used for a non- essential load to be reconnected or for a stop signal to another generator.



Condition	Contacts Closed	Lamp Status
Aux. Power Off	7-8	Off
Aux. Power On (Normal)	4-5 and 7-8	Off
Above trip level Reverse Power	7-8	R/P on
Above trip level Overload	4-5 and 6-7	O/L on



Voltage
100-120V AC
220-240V AC
380-440V AC
24V DC
Nominal +/- 10%

Input
3 x 1A C.T.
or
3 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments

Trip level O/L	:	0-100% FSD.
Trip time O/L	:	0 to 30 sec.
Hysteresis O/L	:	1-50% FSD
Trip level R/P	:	0-20% FSD.
Trip time R/P	:	0 to 30 sec.

.

ORDERING INFORMATION		
	Supply voltage.	:
	CT Ratio	:
	Scale	:

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AC POWER GUARD

KPW184

Kilowatt overload protection

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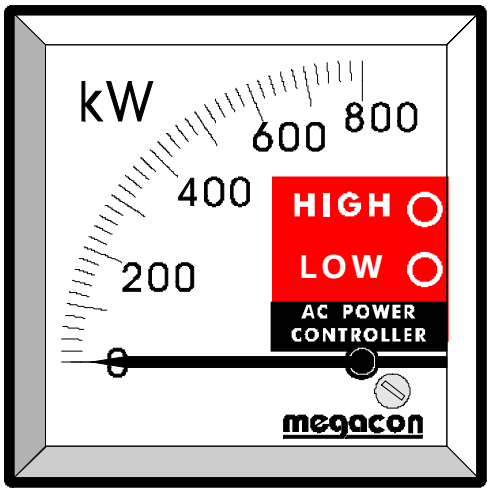
FEATURES

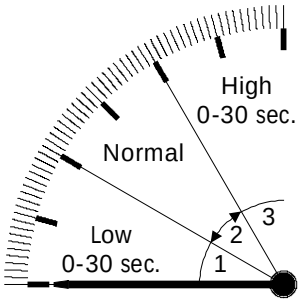
The KPW184 is a kilowatt indicator with integral power transducer. This transducer output is fed to the two independent trip channels.

The KPW184 is for use on three phase, four wire unbalanced loads.

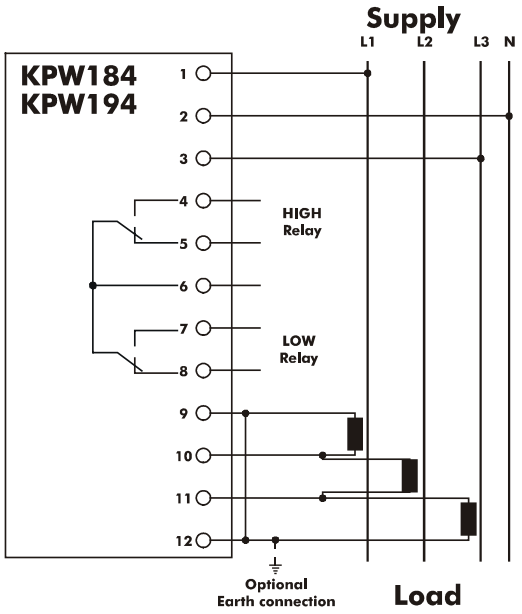
The integral kilowatt transducer is not affected by heavily distorted waveforms or non-linear loads.

The two trip channels are arranged in a differential configuration to monitor kilowatt readings around a nominal level.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	5-6 and 6-8	Off
Below trip level LOW	4-6 and 6-8	Off
Above trip level LOW	4-6 and 6-7	LOW on
Above trip level HIGH	5-6 and 6-7	LOW on HIGH on



Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Input
3 x 1A C.T.
or
3 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments

Trip level LOW	:	0-100% of HIGH level.
Trip time LOW	:	0 to 30 sec.
Trip level HIGH	:	0-100% FSD.
Trip time HIGH	:	0 to 30 sec.

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ORDERING INFORMATION

Supply voltage. :
CT Ratio :
Scale :

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AC POWER GUARD

KPW194

Kilowatt overload protection

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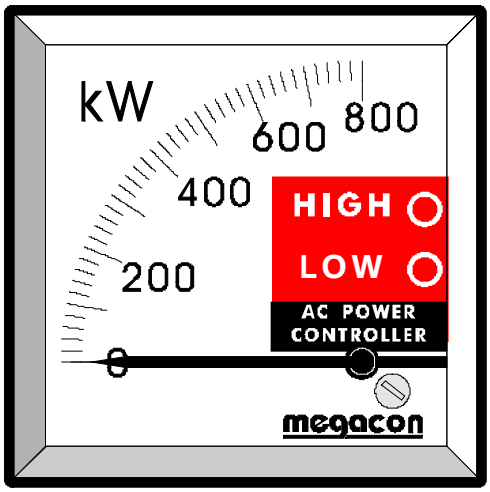
FEATURES

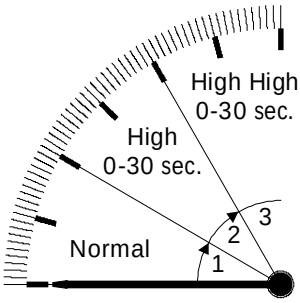
The KPW194 is a kilowatt indicator with integral power transducer. This transducer output is fed to the two independent trip channels.

The KPW194 is for use on three phase, four wire unbalanced loads.

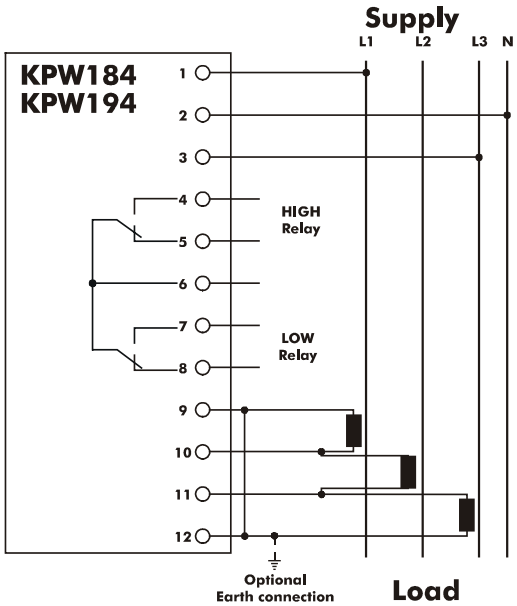
The integral kilowatt transducer is not affected by heavily distorted waveforms or non-linear loads.

The two trip channels are arranged in a differential configuration to monitor kilowatt readings around a nominal level.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	5-6 and 6-8	Off
Below trip level LOW	4-6 and 6-8	Off
Above trip level LOW	4-6 and 6-7	LOW on
Above trip level HIGH	5-6 and 6-7	LOW on HIGH on



Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Input
3 x 1A C.T.
or
3 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments

Trip level LOW	:	0-100% of HIGH level.
Trip time LOW	:	0 to 30 sec.
Trip level HIGH	:	0-100% FSD.
Trip time HIGH	:	0 to 30 sec.

.

ORDERING INFORMATION		
	Supply voltage.	:
	CT Ratio	:
	Scale	:

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Contents

BI-DIRECTIONAL AC POWER GUARD

KPM173

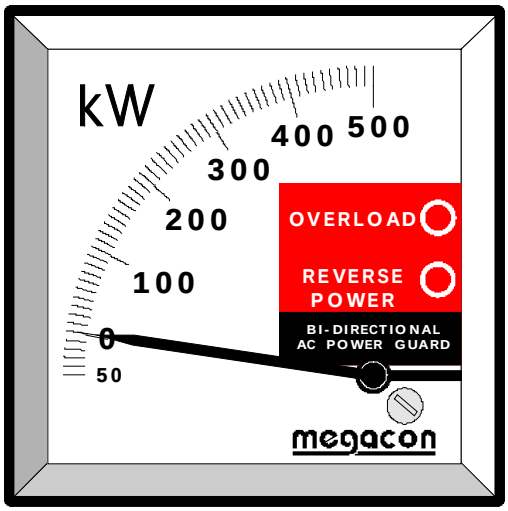
Reverse Power protection
Kilowatt overload protection

FEATURES

The KPM173 is a bi-directional kilowatt indicator with an input from a suitable power transducer. This transducer input is fed to the two independent trip channels.

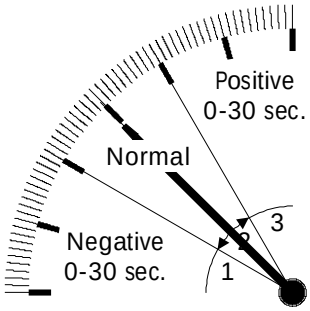
The reverse power relay (R/P) can be used to open the generator breaker either via a shunt trip or under voltage coil.

The overload relay (O/L) can be used either for non-essential load release or as a start signal to another generator set.

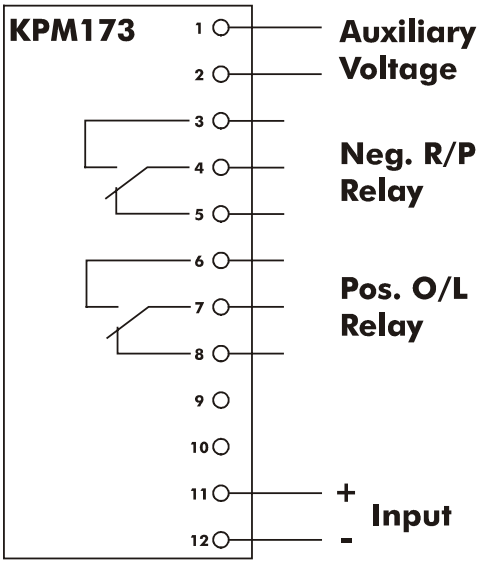


An adjustment is available, on the rear of the unit, for setting the hysteresis of the overload contact. This enables this contact to be used for a non- essential load to be reconnected or for a stop signal to another generator.

A gain potentiometer is also available to adjust the input required to produce full scale deflection (FSD).



Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On (Normal)	3-4 and 7-8	Off
Above trip level Reverse Power	4-5 and 7-8	R/P on
Above trip level Overload	3-4 and 6-7	O/L on



Voltage
100-120V AC
220-240V AC
380-440V AC
24V 48V DC
Nominal +/- 10%

Input
Standard : 1-0-10mA
custom : Consult Megacon

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level O/L : 0-100% FSD.
Trip time O/L : 0 to 30 sec.
Hysteresis O/L : 1-50% FSD
Trip level R/P : 0-20% FSD.
Trip time R/P : 0 to 30 sec.
Gain : 0-30% FSD

ORDERING INFORMATION	Auxiliary voltage. : Input : Scale :

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Total or Surplus Power Indication
Two adjustable trip channels

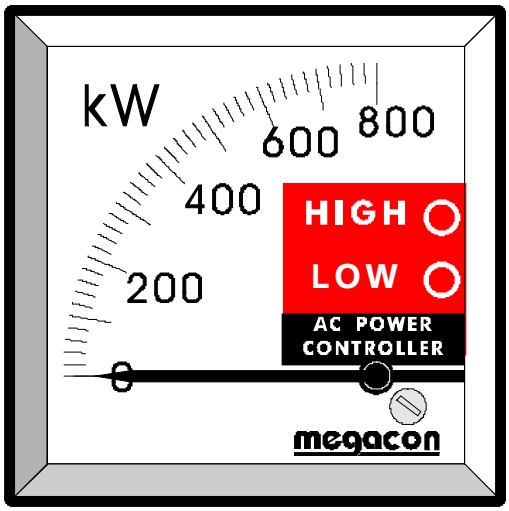
FEATURES

The KPM151 is a Power indicator which incorporates dual level trip relays.

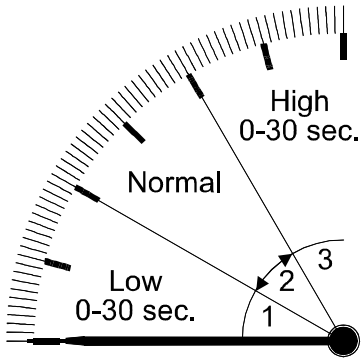
It is designed to operate from outputs from the MCE105D+ controller, however it can be fed from any low level DC signal i.e. 0-5V, 4-20mA etc.

When used as a “Total power” instrument, it monitors the combined output of a generator system. The trip relays can be used to automatically start and stop generators in a simple system or for preferential tripping.

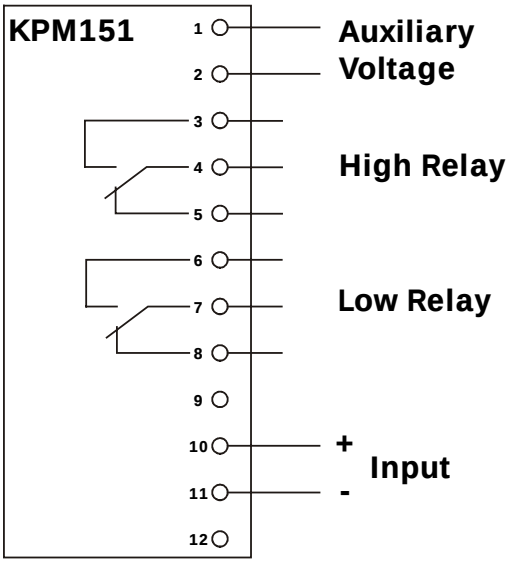
As a “Surplus power” instrument, it monitors the remaining available power and therefore the relays can be used for load blocking of heavy loads.



The standard instrument is arranged with the relays in a differential configuration but other configurations are available.



Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On	4-5 and 6-7	LOW on
Above trip level Low	4-5 and 7-8	Off
Above trip level High	3-4 and 7-8	HIGH on



Voltage
100-120V AC
220-240V AC
380-440V AC
24V, 48V and 110V DC
Nominal +/- 10%

Input
From MCE105D+
or
suitable analogue input

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level High : 0-100% FSD.
Trip time High : 0 to 30 sec.
Trip level Low : 0-100% FSD.
Trip time Low : 0 to 30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
Input : Range of input :

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Contents

BI-DIRECTIONAL AC POWER GUARD

KPVA181

Reverse Power protection
Kilowatt overload protection

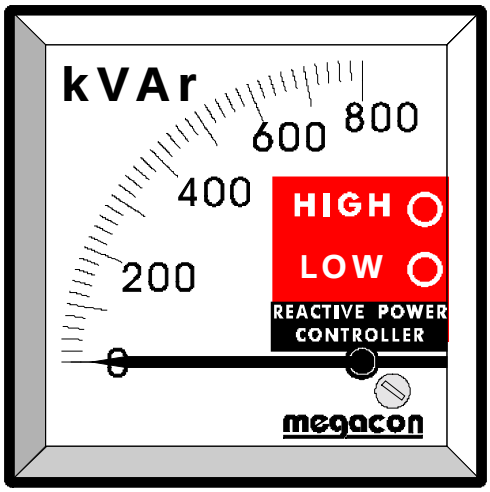
FEATURES

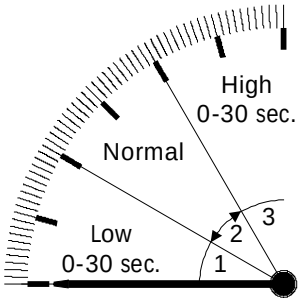
The KPVA181 is a uni-directional kilovar indicator with integral reactive power transducer. This transducer output is then fed to the two independent trip channels.

The KPVA181 is for use on three phase, three wire unbalanced loads.

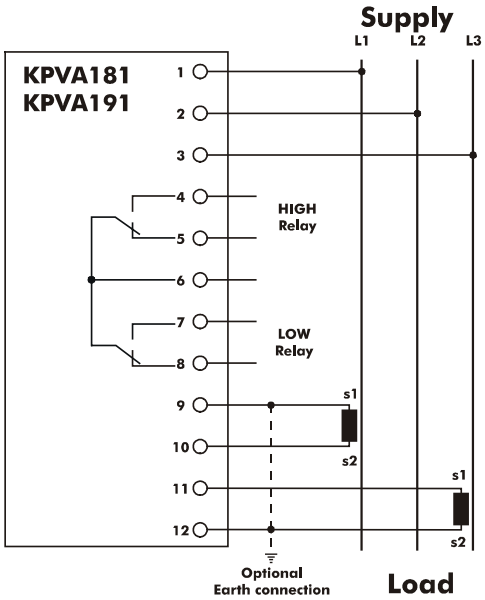
The integral kilovar transducer is not affected by heavily distorted waveforms or non-linear loads.

The LOW and HIGH relays are intended for monitoring the reactive load around a nominal level.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	6-8 and 6-5	Off
Aux. Power On (Normal)	6-4 and 6-7	Off
Below trip level LOW	6-4 and 6-8	LOW on
Above trip level HIGH	6-5 and 6-7	HIGH on



Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Input
2 x 1A C.T.
or
2 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level HIGH : 0-100% FSD.
Trip time HIGH : 0 to 30 sec.
Trip level LOW : 0-20% FSD.
Trip time LOW : 0 to 30 sec.
.

ORDERING INFORMATION

Supply voltage. :
CT Ratio :
Scale :

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Contents

LED SYNCHROSCOPE SQE96s

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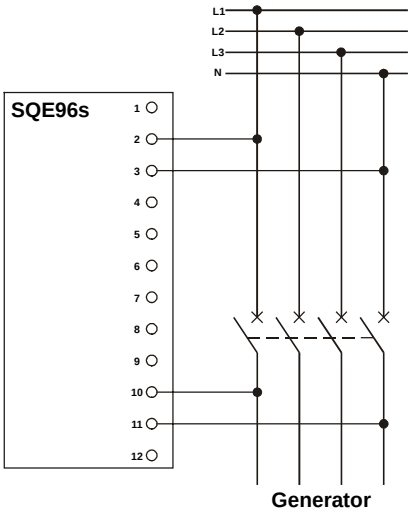


Voltage:
100-120V AC
220-240V AC
380-440V AC
Nominal +/-10%

Frequency:
45-65Hz

The “Rotating LED” display indicates the frequency and phase angle relationship of the two sources.

Nine groups of RED LED’s are illuminated in sequence with the in phase condition indicated by the GREEN LED’s in the “12 o’clock” position illuminating.

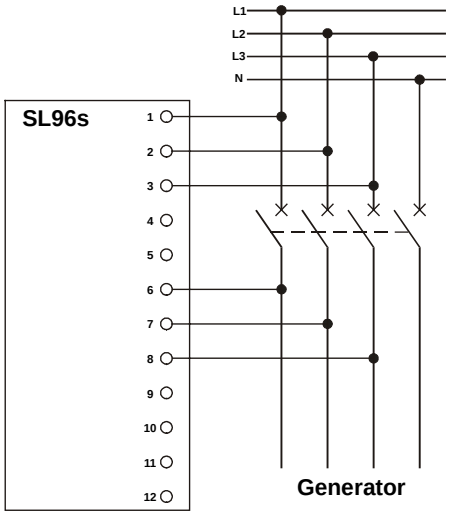
The unit is rated for continuous operation.

ORDERING INFORMATION

System voltage :

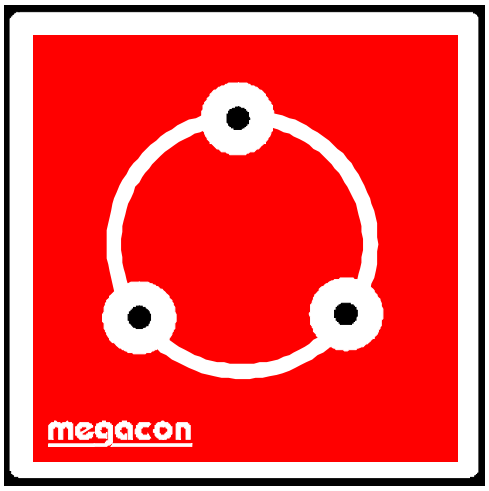
Norway
Tel: +47 55 11 75 10 Fax: +47 55 11 75 30
E-mail: megacon@megacon.no

“LAMP” SYNCHROSCOPE SL96s



Voltage:
100-120V AC
220-240V AC
380-440V AC
Nominal +/-10%

Frequency:
45-65Hz



The “Rotating LED” display indicates the frequency and phase angle relationship of the two sources.

Nine groups of RED LED’s are illuminated in sequence with the in phase condition indicated by the GREEN LED’s in the “12 o’clock” position illuminating.

The unit is rated for continuous operation.

ORDERING INFORMATION

System voltage :

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Contents

CHECK SYNCHRONISING RELAY

KCQ331A

Check Synchronising Relay

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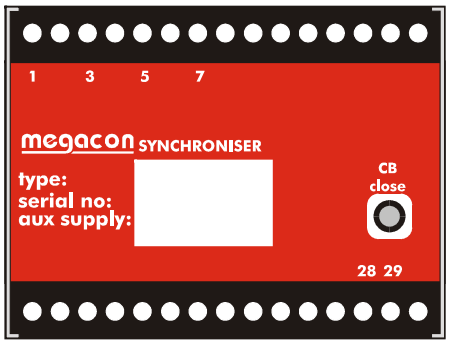
FEATURES

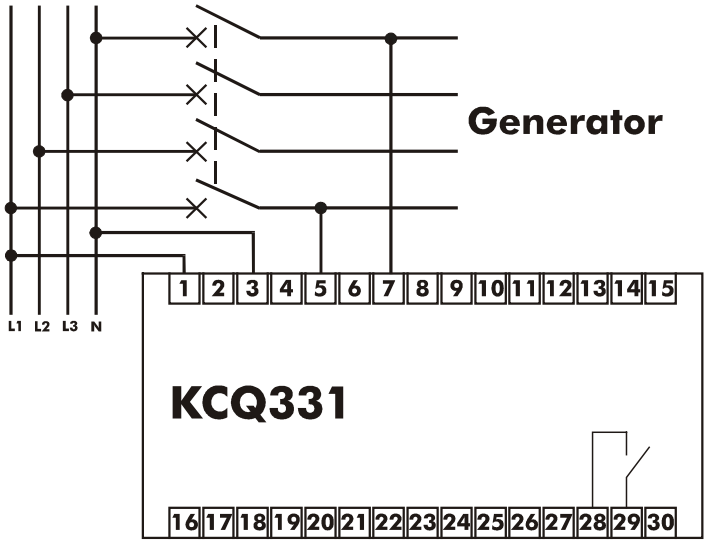
The KCQ331A provides a control relay signal necessary to permit check synchronising of two supplies.



The integral check synchronising relay contacts (terminals 28-29) will close only when the voltage and phase error have been within set limits for the preset delay period. Indication of this condition is given by the green “CB Close” lamp illuminating.

KCQ331 is rated for continuous operation and therefore can be left connected when not in use.

The instrument is designed for use in the under volts circuit of the incoming circuit breaker. It should NOT be used for automatic synchronising as it does not compensate for circuit breaker closing time.



Relay shown de-energised

Relay energises when inputs are within limits.

Voltage:
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Frequency:
45-65Hz

Frequency Difference:
Factory set +/- 0.5Hz

Voltage Difference:
Factory set Nominal +/-10%

Contact Rating:
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

ORDERING INFORMATION	System voltage. :

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New Version

CHECK SYNCHRONISING RELAY

KSQ331

Precision Synchroscope – Check Synchronising Relay
Voltage Differential Monitoring

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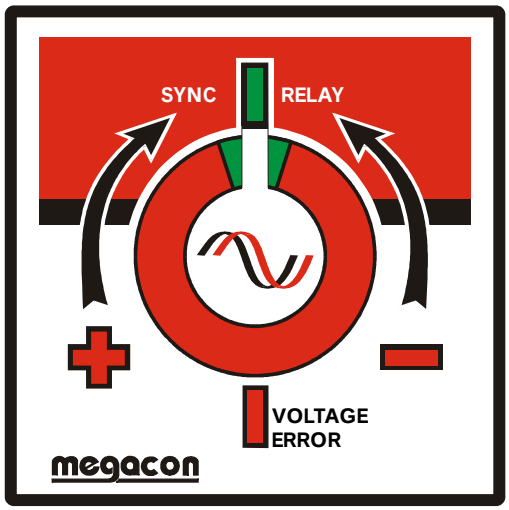
FEATURES

The KSQ331 provides both visual indication and a control relay signal necessary to permit check synchronising of two supplies.

The "Rotating LED" lamp display indicates the frequency and phase angle relationship of the two sources.

The red "voltage error" lamp indicates that the voltage difference between the two inputs is outside set limits. The synchronising relay can not be energised when the "voltage error" lamp is lit.



The integral check synchronising relay contacts (terminals 6-7) will close only when the voltage and phase error have been within set limits for the preset delay period. Indication of this condition is given by the green "Sync relay" lamp illuminating on the display.

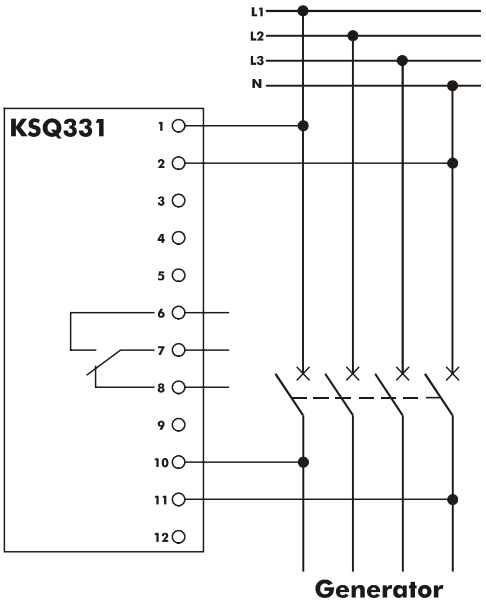
KSQ331 is rated for continuous operation and therefore can be left connected when not in use.

The instrument is designed for use in the under volts circuit of the incoming circuit breaker. It should NOT be used for automatic synchronising as it does not compensate for circuit breaker closing time.

Relay shown de-energised.

Relay energises when generator output is within set voltage and phase angle limits for the preset delay period.

The relay contact will remain closed after synchronising until one of the inputs is removed or the breaker is open.



Voltage:
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Frequency:
45-65Hz

Contact Rating:
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments:

Max phase error	:	4 to 30 deg.
Delay	:	0 to 500mS
Low voltage limit	:	0 to -15%
High voltage limit	:	0 to +15%

ORDERING INFORMATION	System voltage. :

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Contents

CHECK SYNCHRONISING RELAY

KSQ332

Precision Synchroscope – Check Synchronising Relay
Dead-bus facility – Voltage Differential Monitoring

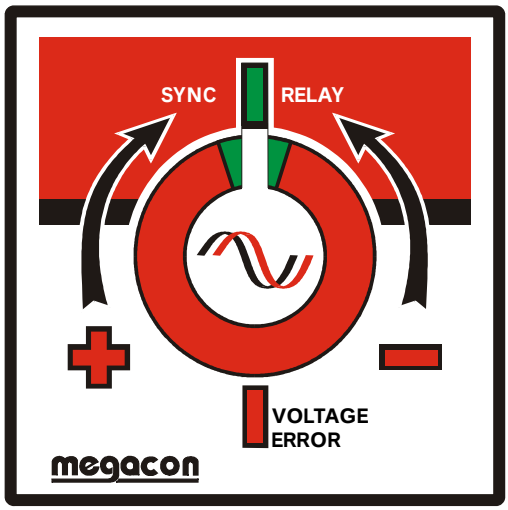
FEATURES

The KSQ332 provides both visual indication and a control relay signal necessary to permit check synchronising of two supplies.

A dead bus facility is also available.

The “Rotating LED” lamp display indicates the frequency and phase angle relationship of the two sources.

The red “voltage error” lamp indicates that the voltage difference between the two inputs is outside set limits. The synchronising relay can not be energised when the “voltage error” lamp is lit.



The integral check synchronising relay contacts (terminals 6-7) will close either
1) when the voltage and phase error have been within set limits for the preset delay period
2) a dead bus condition (generator voltage present only) is detected and not inhibited.
Indication that the sync relay is closed is given by the green “Sync relay” lamp illuminating on the display.

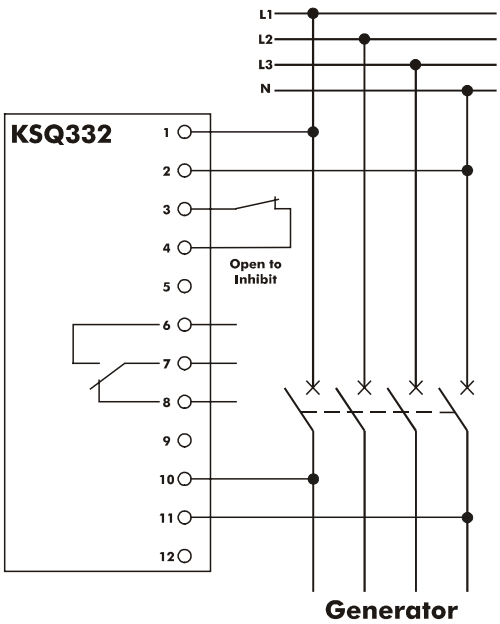
KSQ332 is rated for continuous operation and therefore can be left connected when not in use.

The instrument is designed for use in the under volts circuit of the incoming circuit breaker. It should NOT be used for automatic synchronising as it does not compensate for circuit breaker closing time.

Relay shown de-energised.

Relay energises when generator output is within set voltage and phase angle limits for the preset delay period or under dead bus conditions.

The relay contact will remain closed after synchronising until one of the inputs is removed or the breaker is open.



Voltage:
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Frequency:
45-65Hz

Contact Rating:
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments:

Max phase error	:	4 to 30 deg.
Delay	:	0 to 500mS
Low voltage limit	:	0 to -15%
High voltage limit	:	0 to +15%

ORDERING INFORMATION	System voltage. :

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Contents

New Version

AUTOMATIC SYNCHRONISING RELAY

KSQ104

Precision Synchroscope – Automatic Synchronising Relay
Raise/Lower Control Signals

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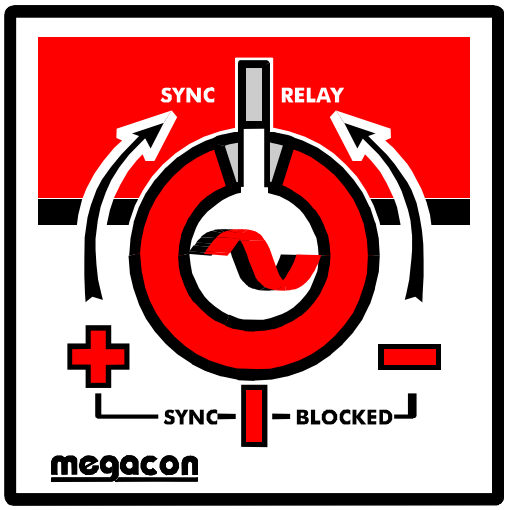
FEATURES

The KSQ104 provides both visual indication, control relay signal and volt free raise/lower speed outputs necessary to permit automatic synchronising of two supplies.

The "Rotating LED" lamp display indicates the frequency and phase angle relationship of the two sources.

Indication of relative speed to allow closure of the breaker is by illumination of the "+" symbol (too fast) and the "-" symbol (too slow).

The raise/lower outputs are adjustable pulses proportional to the relative speed of the monitored supplies.



The integral synchronising relay contacts (terminals 7-8) will close only when the two supplies are within the set frequency difference and the voltage error input (terminals 5-6) is closed. Indication of this condition is given by the green "Sync relay" lamp illuminating on the display. An external voltage comparator relay, KRV43B, can be connected to terminals 5-6 to provide voltage error protection.

The KSQ104 compensates for circuit breaker closing time. This can be adjusted to match the characteristic of the controlled breaker.

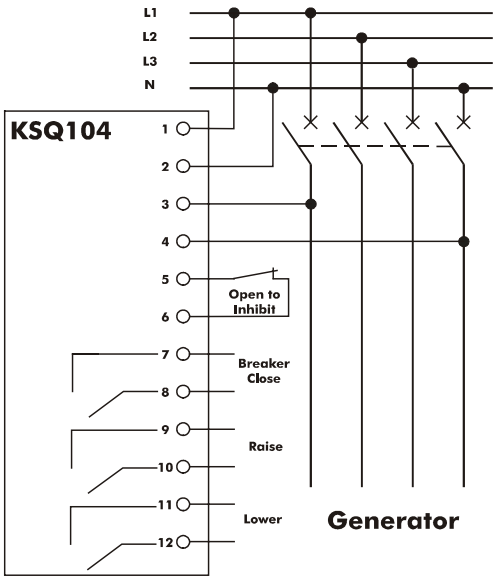
KSQ104 is rated for continuous operation and therefore can be left connected when not in use.

Relay shown de-energised.

Relay energises when generator output is within set parameters and not inhibited.

Terminals 5 and 6 need to be linked if external voltage comparison is not used.

The relay contact will remain closed after synchronising until one of the inputs is removed or the breaker is open.



Voltage:
100-120V AC
220-240V AC
380-415V AC
440V AC
Nominal +/- 10%

Frequency:
45-65Hz

Contact Rating:
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments:
Max Sync Frequency Diff. : 0 – 2Hz

Breaker closing Delay : 0 to 120mS

Pulse length : 0.1-1.6 sec
Pulse rate : 10-60 ppm

ORDERING INFORMATION	System voltage. :

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Contents

New Version

AUTOMATIC SYNCHRONISING RELAY

KSQ105

Precision Synchroscope – Automatic Synchronising Relay
Raise/Lower Control Signal

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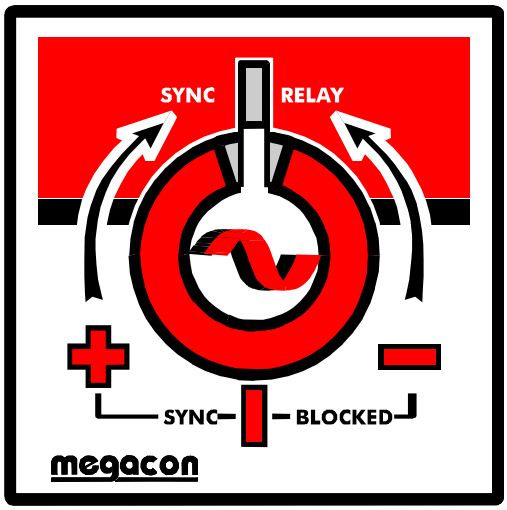
FEATURES

The KSQ105 provides both visual indication, control relay signal and analogue raise/lower speed output necessary to permit automatic synchronising of two supplies. It has been designed for use with Megacon's MCE105D generator controller but can be adapted for other analogue systems.

The "Rotating LED" lamp display indicates the frequency and phase angle relationship of the two sources.

Indication of relative speed to allow closure of the breaker is by illumination of the "+" symbol (too fast) and the "-" symbol (too slow).

The raise/lower analogue output is proportional to the relative speed of the monitored supplies.



The integral synchronising relay contacts (terminals 7-8) will close only when the two supplies are within the set frequency difference and the voltage error input (terminals 5-6) is closed. Indication of this condition is given by the green "Sync relay" lamp illuminating on the display. An external voltage comparator relay, KRV43B, can be connected to terminals 5-6 to provide voltage error protection.

The KSQ105 compensates for circuit breaker closing time. This can be adjusted to match the characteristic of the controlled breaker.

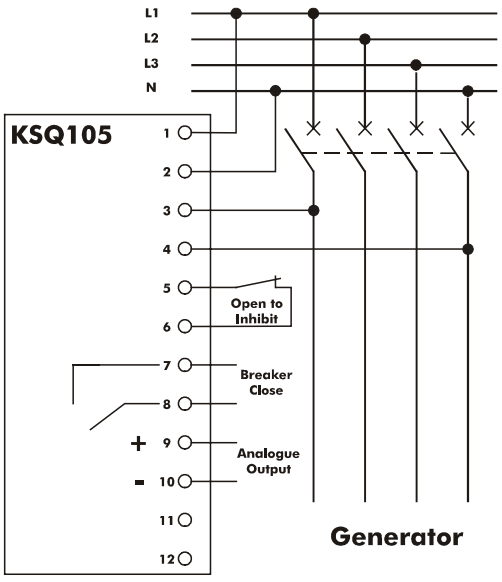
KSQ105 is rated for continuous operation and therefore can be left connected when not in use.

Relay shown de-energised.

Relay energises when generator output is within set parameters and not inhibited.

Terminals 5 and 6 need to be linked if external voltage comparison is not used.

The relay contact will remain closed after synchronising until one of the inputs is removed or the breaker is open.



Voltage:
100-120V AC
220-240V AC
380-415V AC
440V AC
Nominal +/- 10%

Frequency:
45-65Hz

Contact Rating:
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments:
Max Sync Frequency Diff. : 0 – 2Hz

Breaker closing Delay : 0 to 120mS

ORDERING INFORMATION	System voltage. :

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Contents

AUTOMATIC SYNCHRONISING RELAY

KCQ104

Automatic Synchronising Relay
Raise/Lower Control Signals

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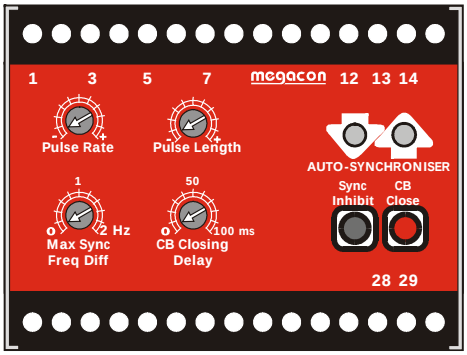
FEATURES

The KCQ104 provides control relay signal and volt free raise/lower speed outputs necessary to permit automatic synchronising of two supplies.

The raise/lower outputs are adjustable pulses proportional to the relative speed of the monitored supplies. These are indicated by two LED's on the instrument.



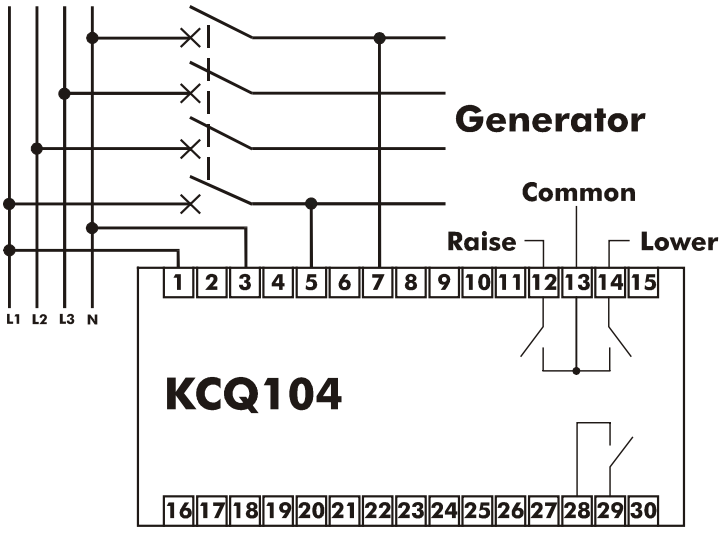
The integral synchronising relay contacts (terminals 28-29) will close only when the two supplies are within the set frequency difference. Indication of this condition is given by the green "CB Close" LED illuminating.

The KCQ104 compensates for circuit breaker closing time. This can be adjusted to match the characteristic of the controlled breaker.

Available variations of this instrument are:-

1) KCQ104A Circuit breaker close time 0-100mS
2) KCQ104AV as for KCQ104A with integral voltage comparator
3) KCQ104B extended circuit breaker close time 0-200mS
4) KCQ104BV as for KCQ104B with integral voltage comparator

KCQ104 is rated for continuous operation and therefore can be left connected when not in use.



Breaker close relay (28-29) shown de-energised
Relay energises when inputs are within limits.

Voltage:
100-110V AC
110-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Frequency:
45-65Hz

Contact Rating:
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments:
Max Sync
Frequency Diff. : 0 – 2Hz

Breaker closing Delay
A version : 0-100mS
B version : 0-200mS

Pulse length : 0.08 - 1.6 sec
Pulse rate : 12-60 ppm

ORDERING INFORMATION	System voltage. :

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Voltage Comparator Relay

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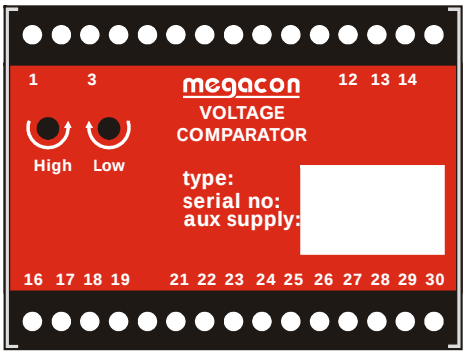
FEATURES

The KRV43B is used in conjunction with the KSQ104 and KSQ105 automatic synchronisers.

The relay output will only close when the voltage difference is within the set parameters. This output is connected to the inhibit function of the associated synchroniser.

The factory set default value is +/- 2% of nominal.



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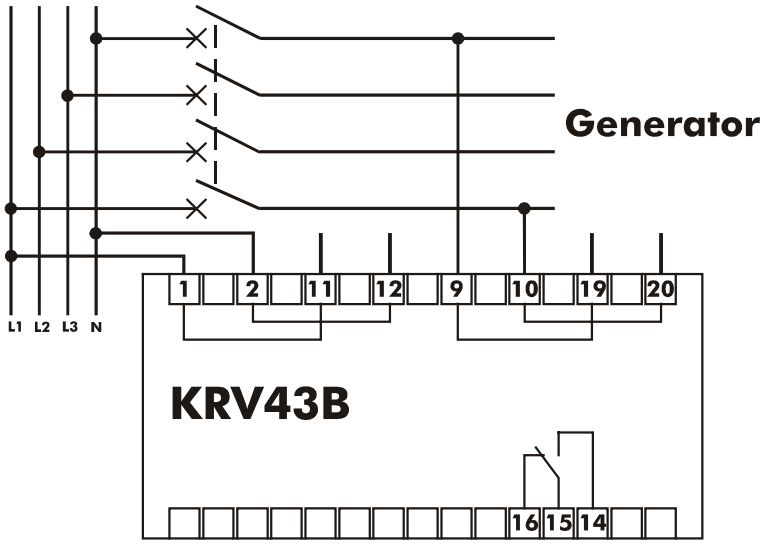

Relay (28-29) shown de-energised
Relay energises when inputs are within limits.

Voltage:
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Frequency:
45-65Hz

Contact Rating:
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments:
Voltage High : 0 – 15%

Voltage Low : 0 – 15%

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ORDERING INFORMATION	System voltage. :

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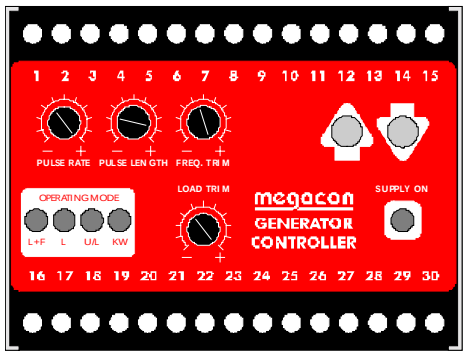
Contents

GENERATOR CONTROLLER MCE105D

Frequency – Synchronising – Load Sharing
Soft Unload Control

FEATURES



The MCE105D provides volt free raise/lower signals to control the speed of the prime mover of a generator.

The raise/lower outputs will provide a constant output until they reach 95% of their target speed and then will change to a pulsed output.

These control signals are produced depending upon the operating status of the controller. For detailed information on use of this controller, refer to Megacon technical publication.

The MCE105D has five operating modes:-

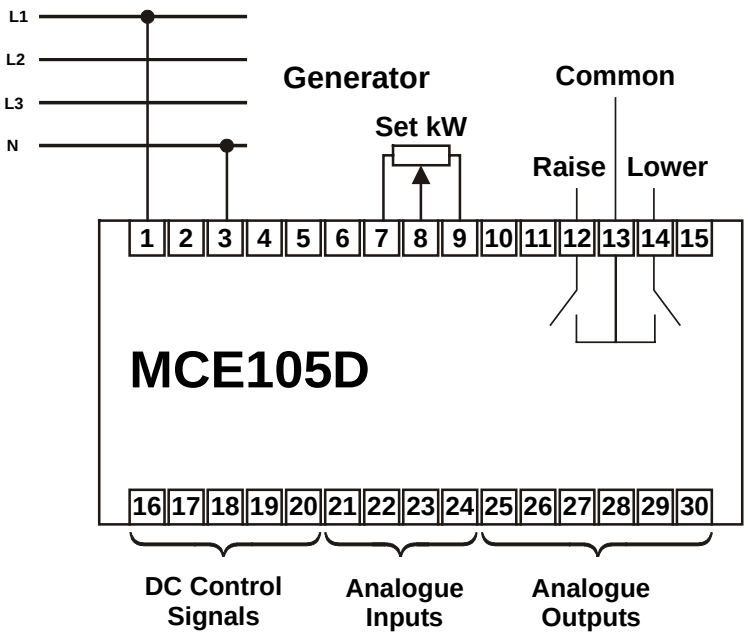
1) Synchronising Control — monitors an analogue input from KSQ105 synchroniser.

2) Load and Frequency — maintains a frequency set within the unit and will load share with any other MCE105D within the system.

3) Load only — used when synchronised to the mains (infinite bus).

4) Unload — reduces the speed of the prime mover until zero kilowatts is detected.

5) Fixed kilowatt — controls the speed of the prime mover to match a kilowatt output relative to a value set by an external potentiometer.



System Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Control Voltage
24VDC or 12VDC

Frequency
50 or 60Hz

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Pulse rate
Pulse length
Frequency trim
Load trim

Inputs
Power i/p : -1/0/10mA (MCxWx)
Synchronising i/p : -10/0/10mA (KSQ105)

Outputs
Total power : 0-5mA
Surplus power : 0-5mA

ORDERING INFORMATION		
System voltage. :		System Frequency. :
Generator size :		Control Voltage :

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Contents

New Version

ELECTRONIC POTENTIOMETER

MXR845B

Electronic Potentiometer

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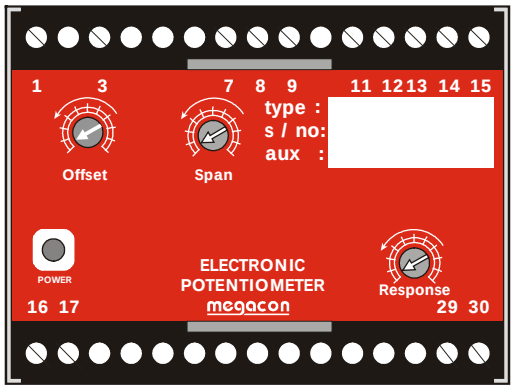
FEATURES

The MXR845B and MXR845BI are interface units for converting between any volt free raise/lower inputs to an analogue DC output suitable for speed controllers with remote control facilities.

MXR845BI is used where galvanic isolation is required between the auxiliary supply and the DC output.

It is designed to be used with the MCE105D+, KSQ104 and KCQ104 instruments, however it will accept inputs from push buttons or PLC digital outputs.



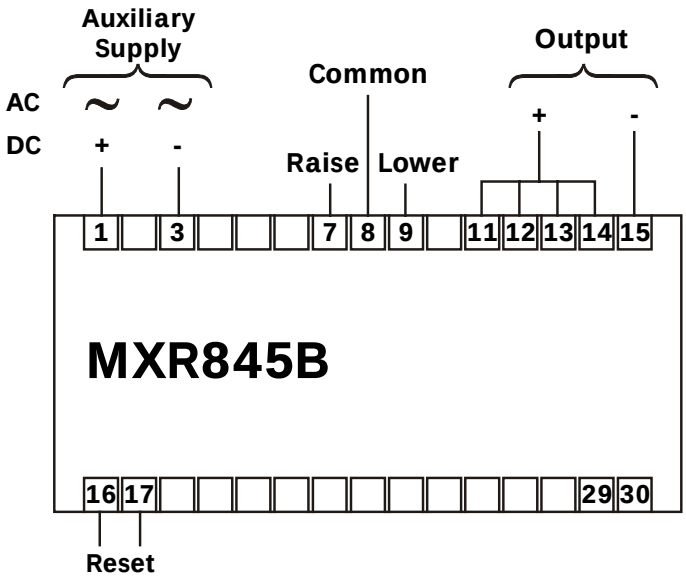
Span, Offset and response can be adjusted to suit the operating characteristics of the speed controllers.

Four output levels are available together with two response ranges to give maximum flexibility.

The unit will accept an external reset signal, which will restore the unit to the set “offset” output.

The electronic potentiometer removes the two problems generally associated with motorised potentiometers.

1) Opening a generators breaker whilst on load will mean that the generator will start above synchronising or nominal speed on restart. The MXR845 is simply reset.
2) Mechanical wear produces a “memory” error and physical limits to accuracy. The MXR845 has no moving parts.



Momentary connection of terminal 16 to 17 will reset the unit
Link terminal 29 to 30 for Response 2 characteristics.

Voltage — MXR845BI
100-120V AC
220-240V AC
380-440V AC
12V, 24V or 48V DC
Nominal +/- 10%

Output
MXR845BI : 8V DC max.

Adjustments
Span : 1 – 5.5V DC
Offset : 0 – 8V DC
Response 1 : 3 – 33 seconds
Response 2 : 33 – 360 seconds

Voltage — MXR845B
24V or 48V DC
Nominal +/- 10%

Output
MXR845B : 12V DC max.

Adjustments
Span : 1 – 10V DC
Offset : 0 – 10V DC
Response 1 : 3 – 33 seconds
Response 2 : 33 – 360 seconds

ORDERING INFORMATION	Auxiliary voltage. :

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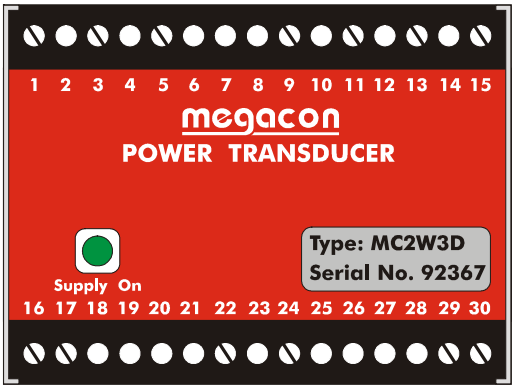
Active power transducer for three phase, three wire, unbalanced loads with two analogue outputs

FEATURES



The MC2W3 is a AC measuring converter with two independent output signals.

MC2W3C can provide two outputs of 10mA maximum each (2 x 0-10mA).

MC2W3D can provide two outputs, one of 10mA and one of 20mA maximum (1 x 0-10mA + 1 x 4-20mA).

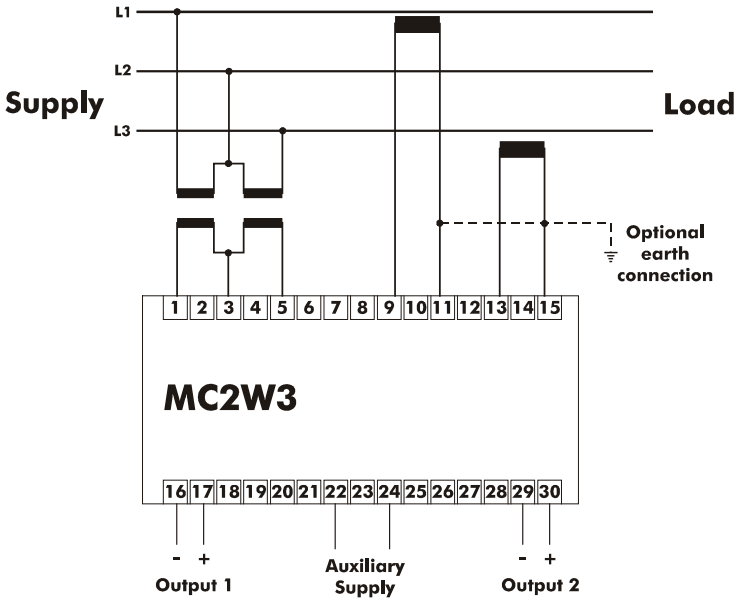
A third variant is available with a pulsed kilowatthour output designated MC2W3P – see separate datasheet.

A green “Supply On” LED indicates the auxiliary supply is present.

The voltage inputs can be connected directly to systems up to 440V or calibrated for voltage transformer (V.T.) inputs. The current inputs can accept standard 1A or 5A secondary current transformer (C.T.) inputs.

The outputs are true calorimetric values proportional to the level and direction of flow of active power. They are designed for use on three phase, three wire systems with balanced or unbalanced loads.

The outputs are protected against short circuit or open circuit conditions and can be directly added or subtracted with other Megacon transducer outputs.



The use of screened cable is recommended for the output signals.
The negatives of the output signals MUST NOT be earthed.

Auxiliary Supply
100-120V AC
200-240V AC
380-440V AC
18-36V, 36-72V DC
Nominal +/- 10%

Current Input
/1A or /5A secondary C.T.
Class 1 recommended

Voltage Input
up to 440V direct
or via voltage transformer (V.T.)

Accuracy
Class 1 between 30 to 120%In

Output – MC2W3C
Maximum combined output : 20mA
Typical 2 x –1.0.10mA

Output – MC2W3D
Maximum combined output : 30mA
Typical 1 x –1.0.10mA
1 x 4.4.20mA

Outputs – General
Milliamp outputs : max. 500Ω load
Voltage outputs : min. 500Ω load

ORDERING INFORMATION					
	Auxiliary voltage	:		Kilowatt range	:
	System voltage	:		Output 1	:
	C.T. ratio	:		Output 2	:

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Contents

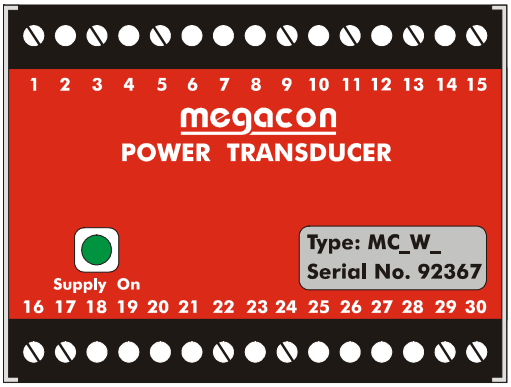
POWER TRANSDUCER MC2W4CP

Active power transducer for three phase, four wire, unbalanced loads with analogue and pulse outputs

FEATURES

The MC2W4CP is a AC measuring converter with two independent output signals.

MC2W4CP can provide an analogue output of 20mA maximum and a pulsed kilowatthour output.

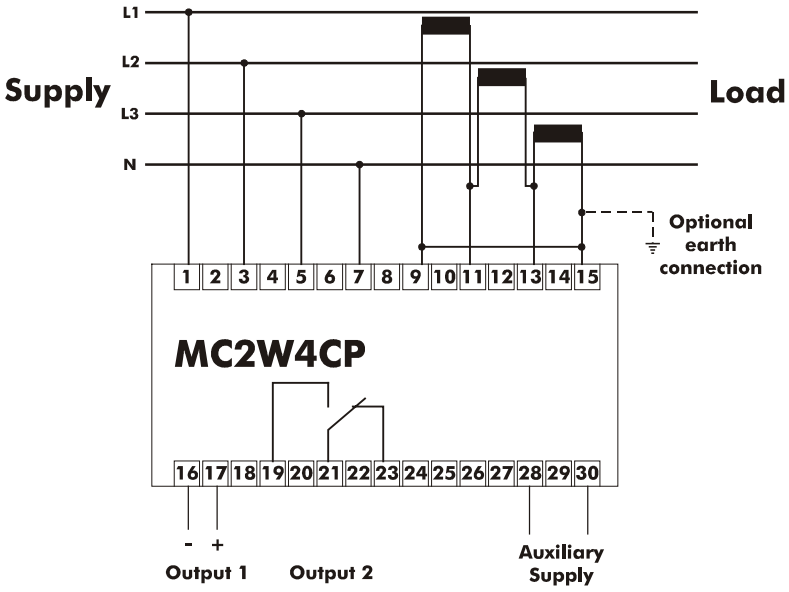


A green “Supply On” LED indicates the auxiliary supply is present.

The voltage inputs can be connected directly to systems up to 440V or calibrated for voltage transformer (V.T.) inputs. The current inputs can accept standard 1A or 5A secondary current transformer (C.T.) inputs.

The outputs are true calorimetric values proportional to the level and direction of flow of active power. They are designed for use on three phase, four wire systems with balanced or unbalanced loads.

The analogue output is protected against short circuit or open circuit conditions and can be directly added or subtracted with other Megacon transducer outputs.



Auxiliary Supply
100-120V AC
200-240V AC
380-440V AC
18-36V, 36-72V DC
Nominal +/- 10%

Current Input
/1A or /5A secondary C.T.
Class 1 recommended

Voltage Input
up to 440V direct
or via voltage transformer (V.T.)

Accuracy
Class 1 between 30 to 120%In

Outputs
Analogue : 20mA limited to 10V
KWh : calibrated as req’d

Outputs – General
Milliamp outputs : max. 500Ω load
Voltage outputs : min. 500Ω load

The use of screened cable is recommended for the output signals.
The negatives of the output signals MUST NOT be earthed.

ORDERING INFORMATION				
	Auxiliary voltage	:	Kilowatt range	:
	System voltage	:	Output 1	:
	C.T. ratio	:	Output 2	:

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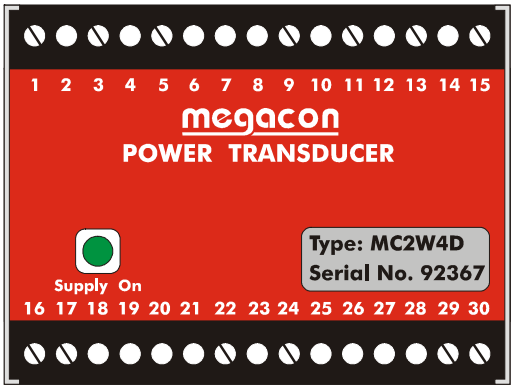
Active power transducer for three phase, four wire, unbalanced loads with two analogue outputs

FEATURES



The MC2W4 is a AC measuring converter with two independent output signals.

MC2W4C can provide two outputs of 10mA maximum each (2 x 0-10mA).

MC2W4D can provide two outputs, one of 10mA and one of 20mA maximum (1 x 0-10mA + 1 x 4-20mA).

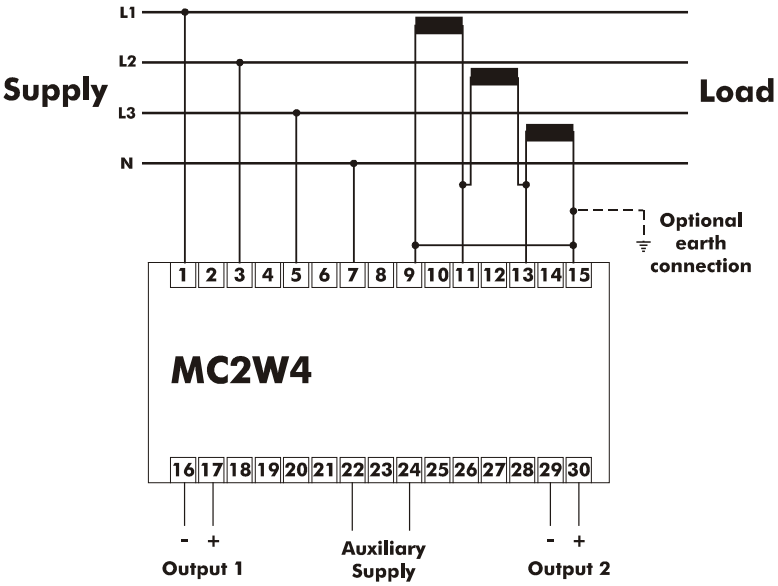
A third variant is available with a pulsed kilowatthour output designated MC2W4P – see separate datasheet.

A green “Supply On” LED indicates the auxiliary supply is present.

The voltage inputs can be connected directly to systems up to 440V or calibrated for voltage transformer (V.T.) inputs. The current inputs can accept standard 1A or 5A secondary current transformer (C.T.) inputs.

The outputs are true calorimetric values proportional to the level and direction of flow of active power. They are designed for use on three phase, four wire systems with balanced or unbalanced loads.

The outputs are protected against short circuit or open circuit conditions and can be directly added or subtracted with other Megacon transducer outputs.



The use of screened cable is recommended for the output signals.
The negatives of the output signals MUST NOT be earthed.

Auxiliary Supply
100-120V AC
200-240V AC
380-440V AC
18-36V, 36-72V DC
Nominal +/- 10%

Current Input
/1A or /5A secondary C.T.
Class 1 recommended

Voltage Input
up to 440V direct
or via voltage transformer (V.T.)

Accuracy
Class 1 between 30 to 120%In

Output – MC2W4C
Maximum combined output : 20mA
Typical 2 x –1.0.10mA

Output – MC2W4D
Maximum combined output : 30mA
Typical 1 x –1.0.10mA
1 x 4.4.20mA

Outputs – General
Milliamp outputs : max. 500Ω load
Voltage outputs : min. 500Ω load

ORDERING INFORMATION				
	Auxiliary voltage	:	Kilowatt range	:
	System voltage	:	Output 1	:
	C.T. ratio	:	Output 2	:

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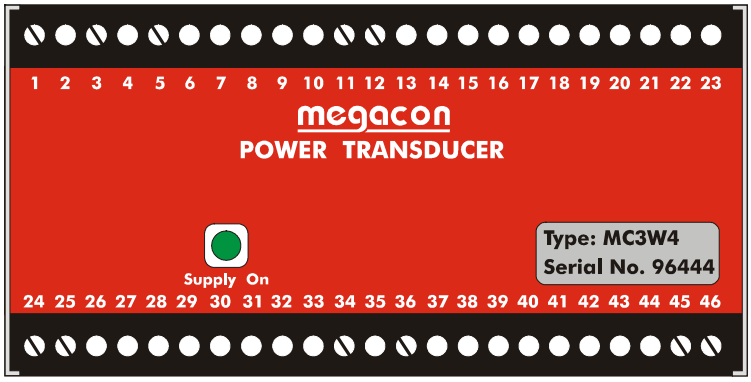
Active power transducer for three phase, four wire, unbalanced loads with two analogue outputs

FEATURES



The MC3W4 is a AC measuring converter with two independent output signals.

MC3W4C can provide two outputs of 10mA maximum each (2 x 0-10mA).

MC2W4D can provide two outputs, one of 10mA and one of 20mA maximum (1 x 0-10mA + 1 x 4-20mA).

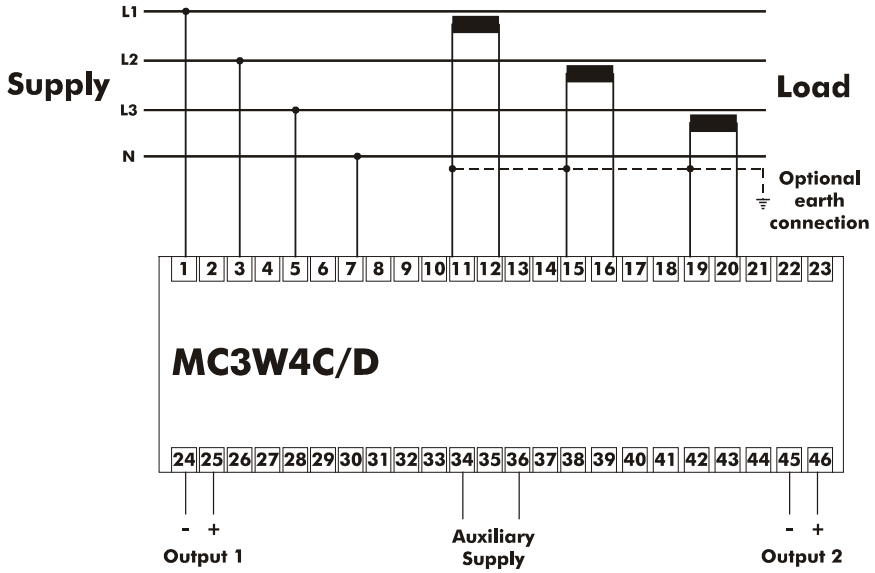
A third variant is available with a pulsed kilowatthour output designated MC3W4CP – see separate datasheet.

A green “Supply On” LED indicates the auxiliary supply is present.

The voltage inputs can be connected directly to systems up to 440V or calibrated for voltage transformer (V.T.) inputs. The current inputs can accept standard 1A or 5A secondary current transformer (C.T.) inputs.

The outputs are true calorimetric values proportional to the level and direction of flow of active power. They are designed for use on three phase, three wire systems with balanced or unbalanced loads.

The outputs are protected against short circuit or open circuit conditions and can be directly added or subtracted with other Megacon transducer outputs.



The use of screened cable is recommended for the output signals.
The negatives of the output signals MUST NOT be earthed.

Auxiliary Supply
100-120V AC
200-240V AC
380-440V AC
18-36V, 36-72V DC
Nominal +/- 10%

Current Input
/1A or /5A secondary C.T.
Class 1 recommended

Voltage Input
up to 440V direct
or via voltage transformer (V.T.)

Accuracy
Class 1 between 30 to 120%In

Output – MC3W4C
Maximum combined output : 20mA
Typical 2 x –1.0.10mA

Output – MC3W4D
Maximum combined output : 30mA
Typical 1 x –1.0.10mA
1 x 4.4.20mA

Outputs – General
Milliamp outputs : max. 500Ω load
Voltage outputs : min. 500Ω load

ORDERING INFORMATION				
	Auxiliary voltage	:	Kilowatt range	:
	System voltage	:	Output 1	:
	C.T. ratio	:	Output 2	:

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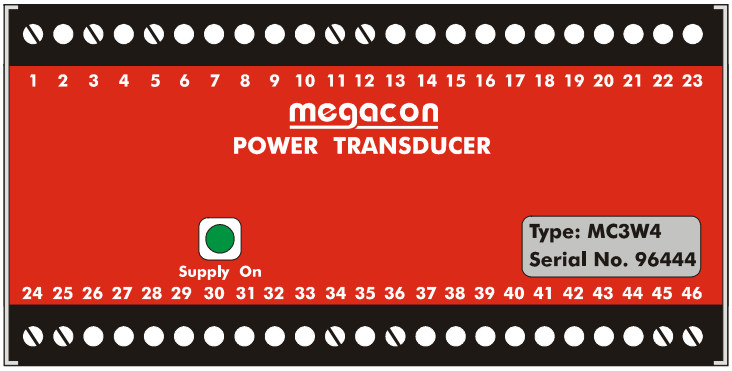
REF: Page 6.260-G-1004

Active power transducer for three phase, four wire, unbalanced loads with analogue and pulse outputs

FEATURES

The MC3W4CP is a AC measuring converter with two independent output signals.

MC3W4CP can provide an analogue output of 20mA maximum and a pulsed kilowatthour output.

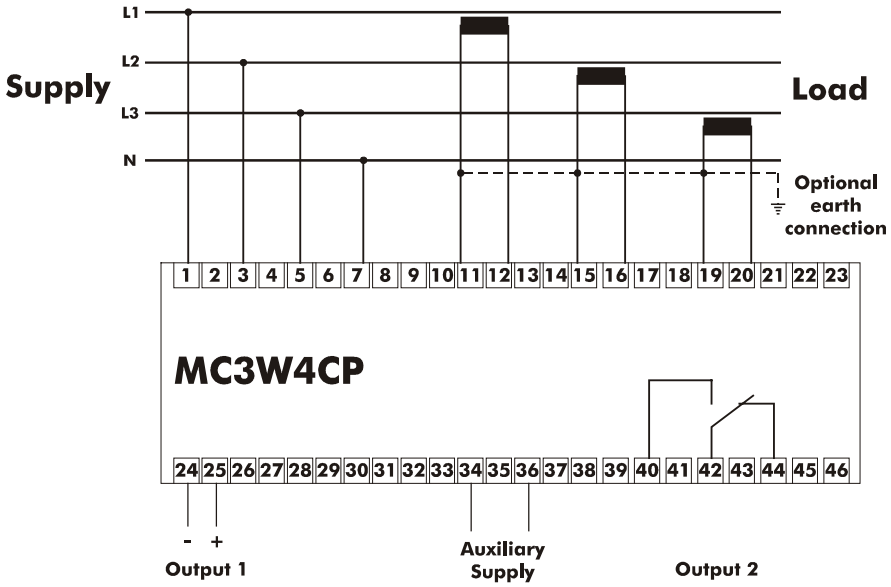


A green “Supply On” LED indicates the auxiliary supply is present.

The voltage inputs can be connected directly to systems up to 440V or calibrated for voltage transformer (V.T.) inputs. The current inputs can accept standard 1A or 5A secondary current transformer (C.T.) inputs.

The outputs are true calorimetric values proportional to the level and direction of flow of active power. They are designed for use on three phase, four wire systems with balanced or unbalanced loads.

The analogue output is protected against short circuit or open circuit conditions and can be directly added or subtracted with other Megacon transducer outputs.



Auxiliary Supply
100-120V AC
200-240V AC
380-440V AC
18-36V, 36-72V DC
Nominal +/- 10%

Current Input
/1A or /5A secondary C.T.
Class 1 recommended

Voltage Input
up to 440V direct
or via voltage transformer (V.T.)

Accuracy
Class 1 between 30 to 120%In

Outputs
Analogue : 20mA limited to 10V
KWh : calibrated as req'd

Outputs – General
Milliamp outputs : max. 500Ω load
Voltage outputs : min. 500Ω load

The use of screened cable is recommended for the output signals.
The negatives of the output signals MUST NOT be earthed.

ORDERING INFORMATION

Auxiliary voltage	:	Kilowatt range	:
System voltage	:	Output 1	:
C.T. ratio	:	Output 2	:

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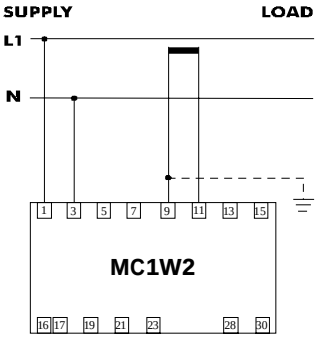
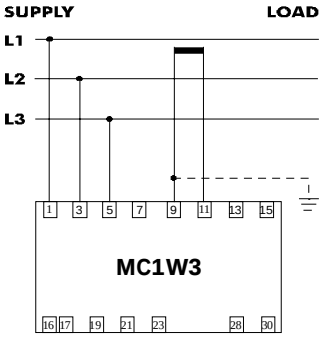
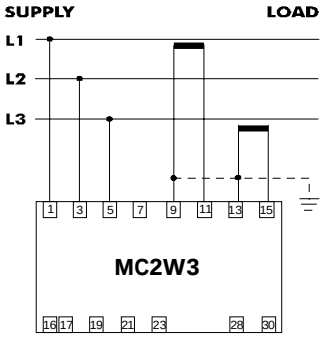
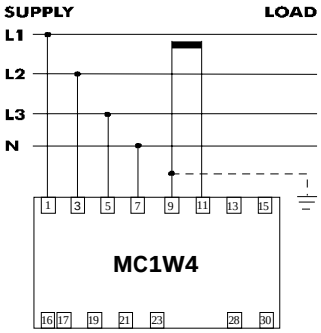
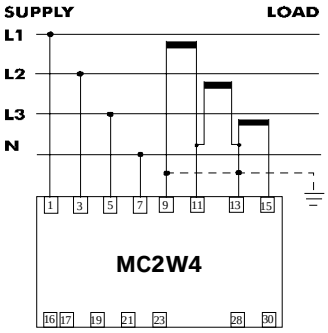
Input Configurations

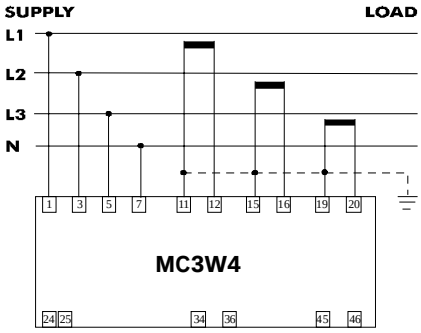




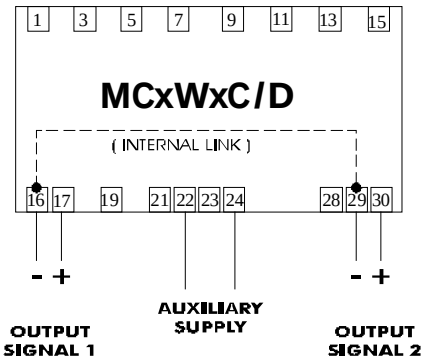


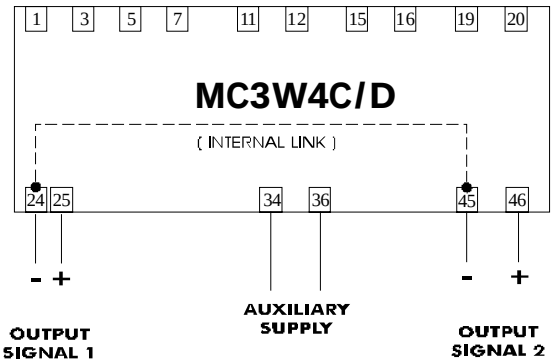


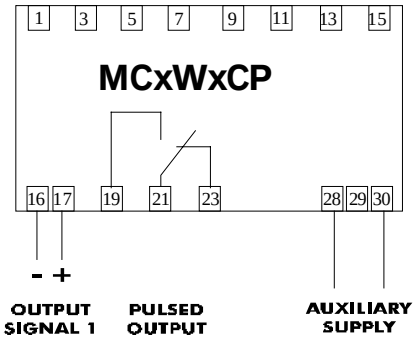


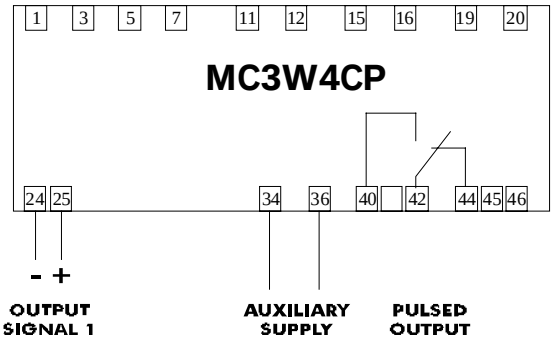


Output Configurations









AC Current transducer with analogue output

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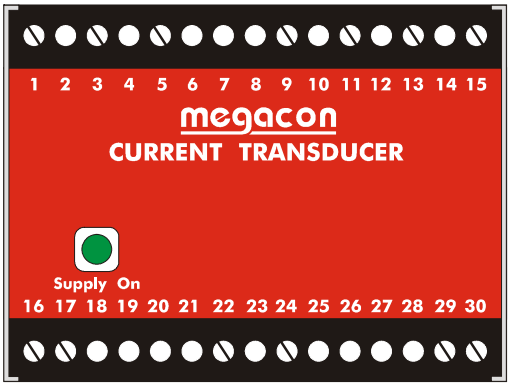
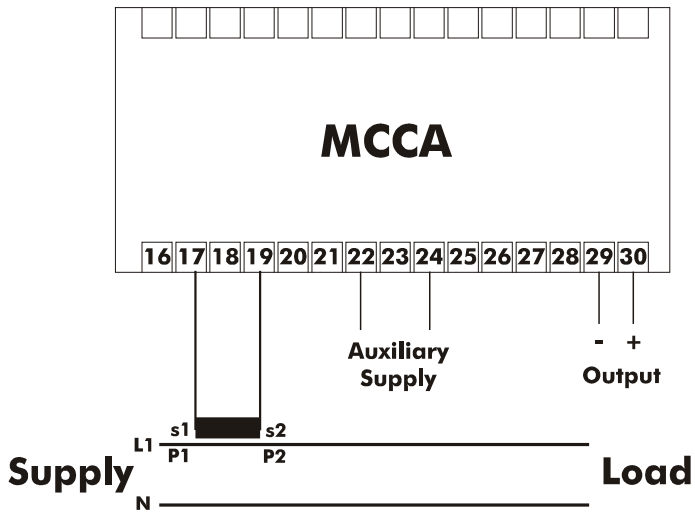
FEATURES

The MCCA is a AC measuring converter with a single independent output signal.

The transducer converts a single current transformer (C.T.) input into a DC analogue output which can be milliamps or volts.

A green “Supply On” LED indicates the auxiliary supply is present.





Auxiliary Supply
100-120V AC
200-240V AC
380-440V AC
18-36V, 36-72V DC
Nominal +/- 10%

Current Input
/1A or /5A secondary C.T.
Class 1 recommended

Accuracy
Class 1 between 30 to 120%In

Output
Maximum output : 20mA
Maximum output : 10V

Outputs – General
Milliamp outputs : max. 500Ω load
Voltage outputs : min. 500Ω load

The use of screened cable is recommended for the output signals.
The negatives of the output signals MUST NOT be earthed.

ORDERING INFORMATION				
	Auxiliary voltage	:	Range	:
	C.T. ratio	:	Output	:

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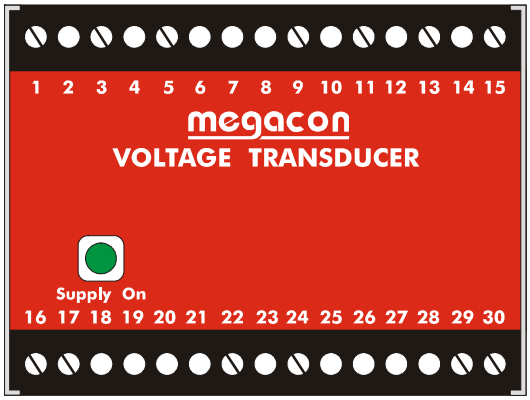
AC Voltage transducer with analogue output

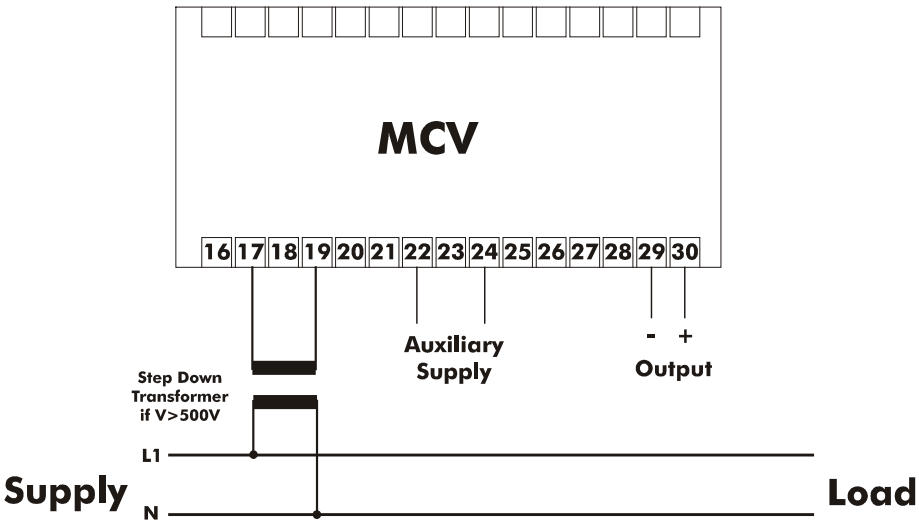
FEATURES

The MCV is a AC measuring converter with a single independent output signal.

The transducer converts a single voltage input into a DC analogue output which can be milliamps or volts.

A green “Supply On” LED indicates the auxiliary supply is present.





Auxiliary Supply
100-120V AC
200-240V AC
380-440V AC
18-36V, 36-72V DC
Nominal +/- 10%

Voltage Input
Up to 500V directly

Accuracy
Class 1

Output
Maximum output : 20mA
Maximum output : 10V

Outputs – General
Milliamp outputs : max. 500Ω load
Voltage outputs : min. 500Ω load

The use of screened cable is recommended for the output signals.
The negatives of the output signals MUST NOT be earthed.

ORDERING INFORMATION

Auxiliary voltage :
Monitored voltage :
Range :
Output :

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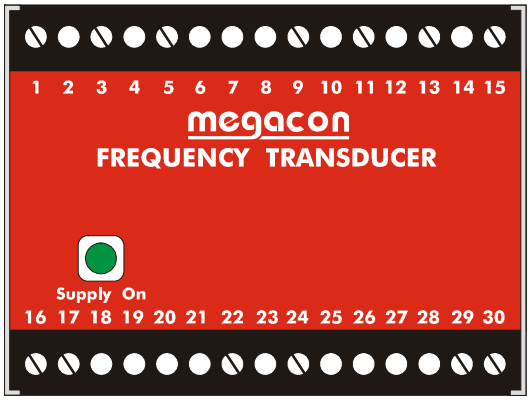
AC Frequency transducer with analogue output

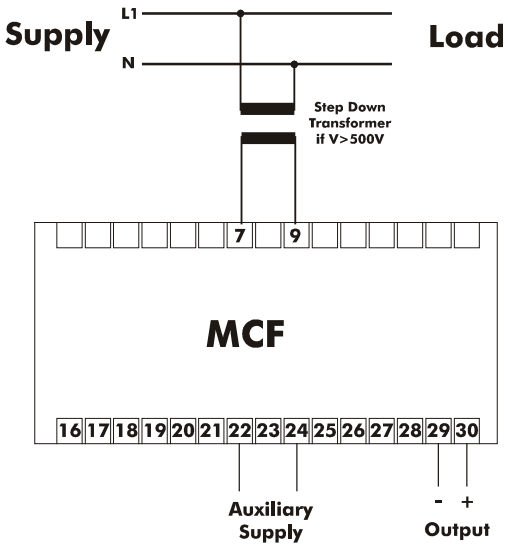
FEATURES

The MCF is a AC frequency measuring converter with a single independent output signal.

The transducer monitors an AC voltage input and converts the frequency into a DC analogue output which can be milliamps or volts.

A green “Supply On” LED indicates the auxiliary supply is present.





Auxiliary Supply
100-120V AC
200-240V AC
380-440V AC
18-36V, 36-72V DC
Nominal +/- 10%

Input
Up to 500V directly
40-70Hz

Accuracy
Class 0.5

Output
Maximum output : 20mA
Maximum output : 10V

Outputs – General
Milliamp outputs : max. 500Ω load
Voltage outputs : min. 500Ω load

The use of screened cable is recommended for the output signals.
The negatives of the output signals MUST NOT be earthed.

ORDERING INFORMATION				
	Auxiliary voltage	:	Range	:
	Monitored input	:	Output	:

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Contents

New Version

LOSS OF MAINS RELAY

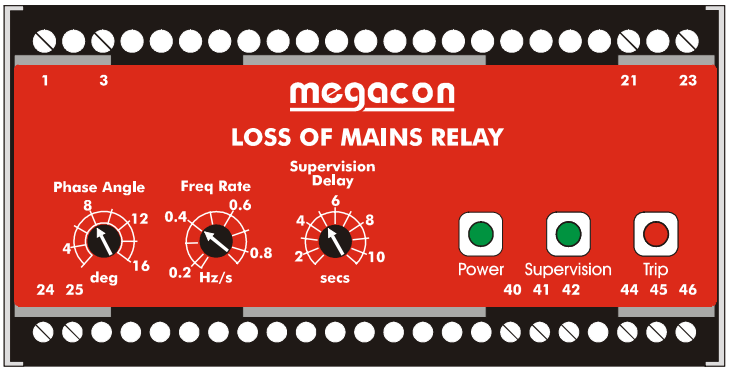
KCG592

Step Phase Angle Detection
Rate of Change of Frequency (R.O.C.O.F.)

FEATURES

The KCG592 has been designed to meet the protection requirements of Regional Electricity Companies (REC's) for private generation connected to mains supply – such as defined in G59 recommendations.

It combines both Rate of Change of Frequency (R.O.C.O.F.) and Step Phase Angle protection in one single unit.

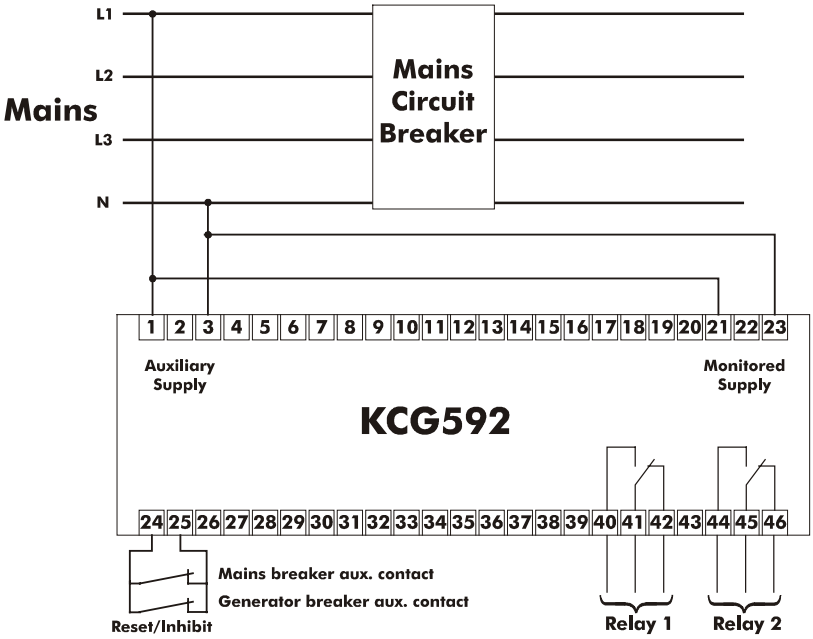


An inhibit input is controlled by auxiliary contacts on the generator and mains breakers so that the relay outputs are only enabled when both breakers are closed. An adjustable Supervision delay is fitted to overcome spurious tripping that may occur when synchronising with the mains.

Typical trip times are 20-50mS for step phase angle change and 200-300mS for rate of change of frequency.

Auxiliary supply and monitored inputs can be from the same source, as shown, or independent.

Indication of relay status is indicated by three LED's.



Relays shown de-energised.

Voltage
100-120V AC
220-240V AC
380-440V AC
24V, 48V DC
Nominal +/- 10%

Frequency
45-65Hz

Adjustments
Rate of change of frequency : 0.2 – 0.8Hz /s
Step phase angle change : 2 – 16 degrees
Supervision Delay : 1-10 sec.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

ORDERING INFORMATION	Auxiliary voltage : Monitored voltage :

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COMBINED VOLTAGE AND FREQUENCY GUARD

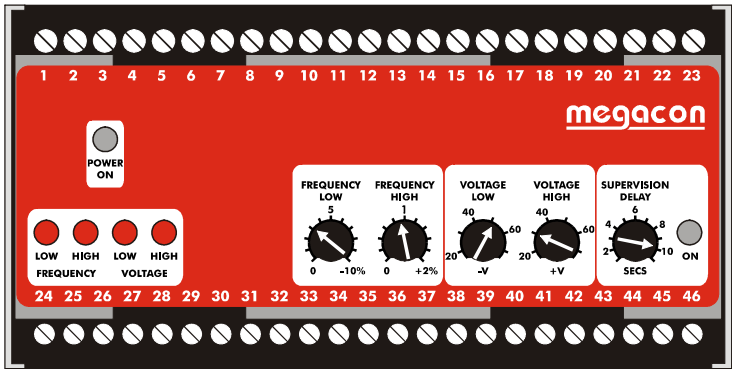
KCVF593/4

High an Low Voltage Alarms
High and Low Frequency Alarms

FEATURES

The KCVF593/KCVF594 is a fully self contained "All in One" instrument which measures and monitors both voltage and frequency in AC power systems. The instrument has been designed to meet the G59 requirements for under and over voltage and frequency protection.

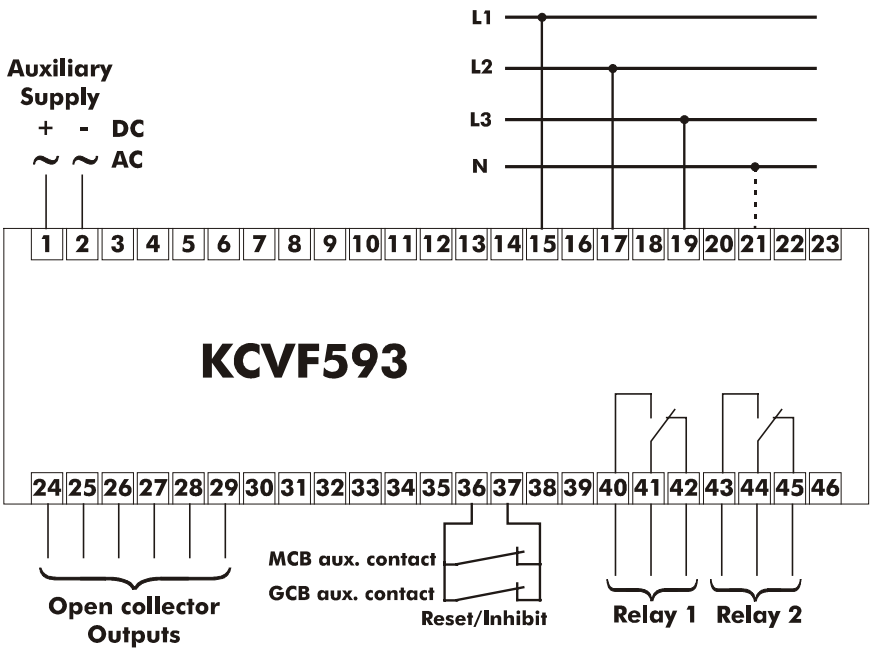
Model KCVF593 is designed for use on three phase, three wire systems and the KCVF594 is designed for three phase, four wire systems.



Voltage and Frequency limits can be adjusted by potentiometers mounted on the front of the instrument. Each model has three possible nominal voltage settings – e.g. 380, 400 and 415V which are selected by switches under the cover.

The appropriate RED "tripped" LED is illuminated on a first up principle when the pre-set voltage or frequency limit is exceeded. The trip relay is fail safe and will de-energise instantaneously on operation (maximum 300 milliseconds). Following a fault operation the relays latch and can be reset by an external inhibit/reset switch.

Repeater open collector transistor outputs are provided for remote indication or annunciation purposes.



Relays shown de-energised.

Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
24V, 48V DC
Nominal +/- 10%

Monitored Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Frequency
45-65Hz

Adjustments

Over Voltage	:	Vn +20%
Under Voltage	:	Vn –20%
Over Freq.	:	Fn +2%
Under Freq.	:	Fn –10%
Supervision Delay	:	1-10 sec.

Open collectors
10mA 30V max.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

ORDERING INFORMATION	Auxiliary voltage : Monitored voltage :

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THREE PHASE DIRECTIONAL OVERCURRENT GUARD

KEC112PB

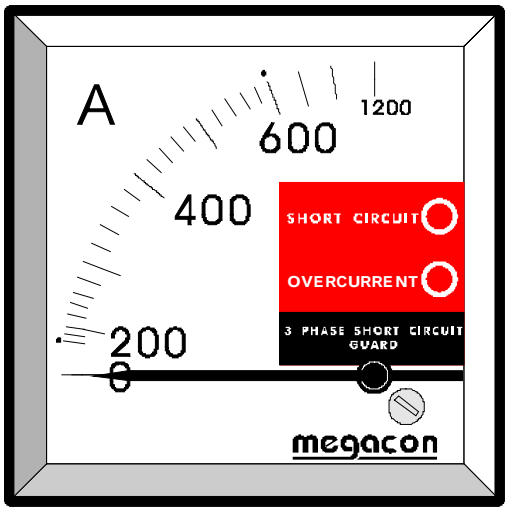
Three Phase Directional Overcurrent Protection when used KCPA3

FEATURES

The KEC112PB is a moving iron ammeter which incorporates a single overcurrent trip channel which, when used in conjunction with KCPA3, will provide directional overcurrent protection.

The instrument monitors all three CT inputs and reacts to the HIGHEST of the three.

This is a requirement of some Regional Electricity Companies (REC's) when private generation is connected to the mains supply – such as defined in G10 recommendations.



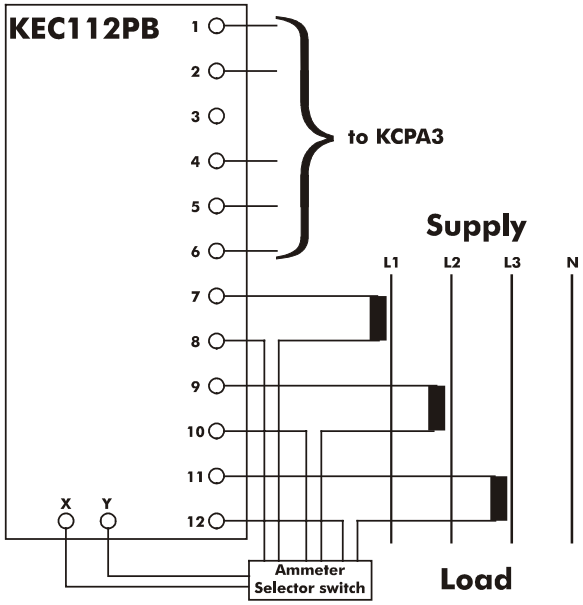
The KEC112PB has an adjustable trip level which is set to the required level. When the current exceeds this level the Overcurrent (O/C) LED will be illuminated and an output is given to the KCPA3 to enable it.

If this signal is present AND the phase angle is within 150 to 300 degrees, the relay output will de-energise. The KCPA3 will signal the KEC112PB that it is tripped and this will be indicated by the Directional Overcurrent (DIR O/C) LED illuminating.

Under normal operating conditions the relay will have typical trip times of 100mS.

KEC112PB and KCPA3 can be operated from a common set of CT's.

KEC112PB will not operate if the input current is below 20% of CT range.



Voltage
100-120V AC
220-240V AC
380-440V AC
24V DC
Nominal +/- 10%

Input
3 x 1A C.T.
or
3 x 5A C.T.

Adjustments
Trip level O/C : 0-150% FLC.
Trip time O/C : 0 to 3 sec.

ORDERING INFORMATION	Auxiliary voltage. : CT Ratio :

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PHASE ANGLE MONITORING RELAY

KCPA3

Three Phase Directional Overcurrent Protection when used KEC112PB

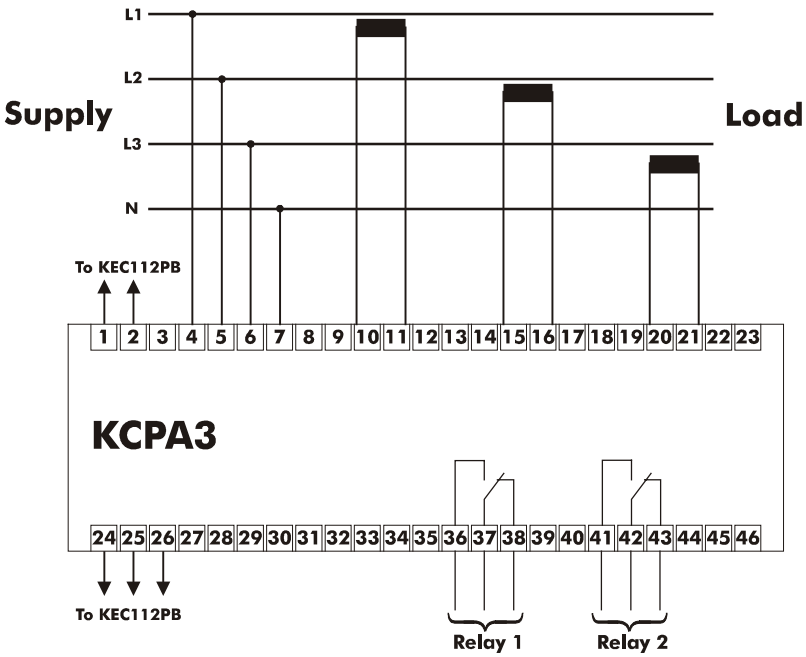
FEATURES

The KCPA3 is a three phase, phase angle monitoring relay which, when used in conjunction with KEC112PB, will provide directional overcurrent protection.

This is a requirement of some Regional Electricity Companies (REC's) when private generation is connected to mains supply – such as defined in G10 recommendations.

The KCPA3 has two output relays which will de-energise when the monitored voltages are within a phase angle window of 150 to 300 degrees AND an overcurrent signal is provided from the KEC112PB. They will also operate if any of the supply voltages are not present.

Under normal operating conditions the relay will have typical trip times of 100mS.



Relays shown de-energised.

Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Frequency
45-65Hz

Input
3 x 1A C.T.
or
3 x 5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

ORDERING INFORMATION	System voltage. : CT ratio :

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ELECTRONIC CONTROL AND INSTRUMENTATION

A Megacon International Publication

REF: Page 2.060-G-1004

Contents

Isolated AC Insulation Guard

KPM161

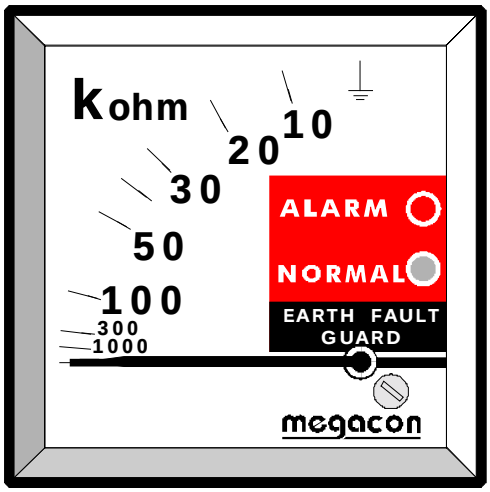
Insulation Guard for use on non earthed systems

FEATURES

The KPM161 measures the insulation, directly in kohms (kΩ), of isolated (non earthed) AC systems. This input is then fed to the two independent trip channels.

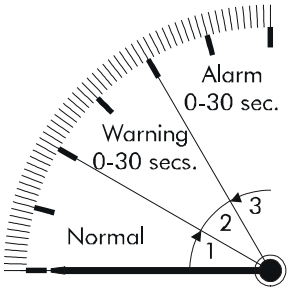
It can monitor the system regardless of whether the system is live or non-live, on systems up to 660V AC.

For systems above 660V, KPM165 can be used (see separate datasheet).

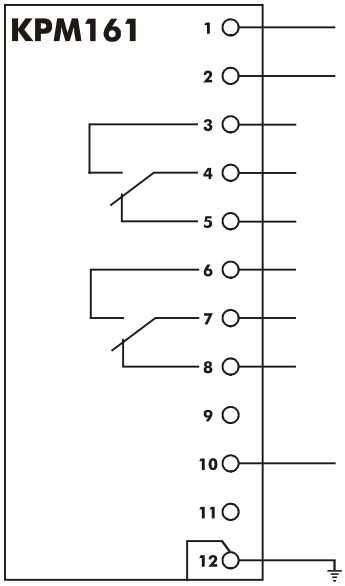


The KPM161 can be used together with the ELU96 to indicate which phase is causing the earth fault.

NOTE: The KPM161 unit uses a superimposed DC monitoring voltage and so only one unit can be connected to each isolated system.



Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On (Normal)	4-5 and 6-7	Normal on (Green)
Above trip level Normal	3-4 and 6-7	Normal on (Amber)
Above trip level Alarm	3-4 and 7-8	Alarm on (Red)



Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Monitored voltage
up to 660V AC

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level normal : 0-1000kΩ
Trip time normal : 0 to 30 sec.
Trip level alarm : 0-1000kΩ
Trip time alarm : 0 to 30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
Monitored voltage. :

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Contents

Isolated AC Insulation Relay

KRM161

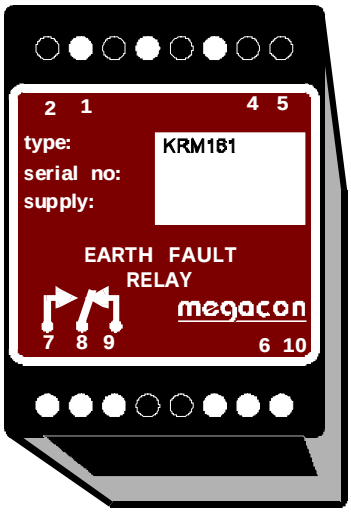
Insulation Relay for use on non earthed systems

FEATURES

The KRM161 measures the insulation, directly in kohms (kΩ), of isolated (non earthed) AC systems. This input is then fed to a single trip relay.

The trip level is factory set and will operate after a delay of approximately two seconds.

It can monitor the system regardless of whether the system is live or non-live, on systems up to 660V AC.

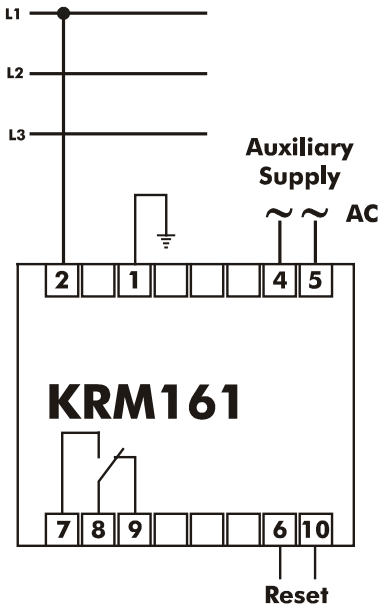


NOTE: The KRM161 unit uses a superimposed DC monitoring voltage and so only one unit can be connected to each isolated system.

NOTE:

1) Relay is latching and is reset by closing the external reset.

2) To make relay non-latching, link terminals 6 and 10.



Condition	Contacts Closed
Aux. Power Off	8-9
Aux. Power On (Normal)	7-8
Below trip level	8-9

Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Monitored voltage
up to 660V AC

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

ORDERING INFORMATION

Auxiliary voltage. :
Trip level :

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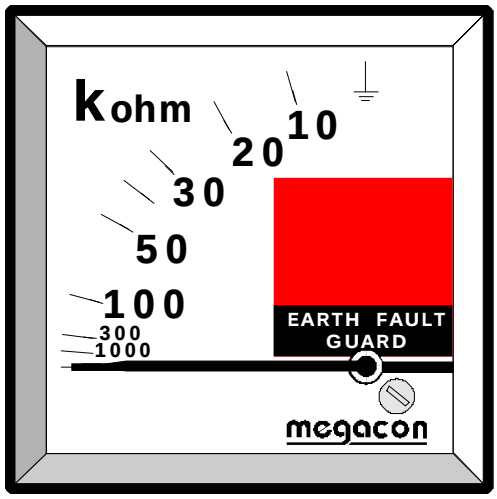
Insulation Indicator for use on non earthed systems

FEATURES

The MPI161 measures the insulation, directly in kohms (kΩ), of isolated (non earthed) AC systems.

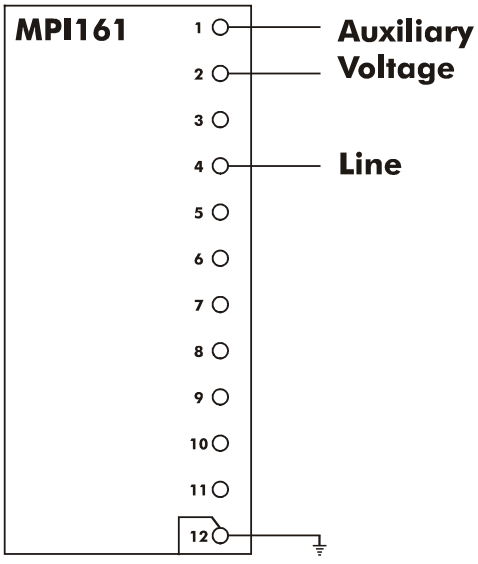
It can monitor the system regardless of whether the system is live or non-live, on systems up to 660V AC.

For systems above 660V, KPM165 can be used (see separate datasheet).



The MPI161 can be used together with the ELU96 to indicate which phase is causing the earth fault.

NOTE: The MPI161 unit uses a superimposed DC monitoring voltage and so only one unit can be connected to each isolated system.



Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Monitored voltage
up to 660V AC

ORDERING INFORMATION	Auxiliary voltage. : Monitored voltage. :

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Contents

NEUTRAL VOLTAGE DISPLACEMENT GUARD

KPV14

Earth fault protection (NVD – 59N)

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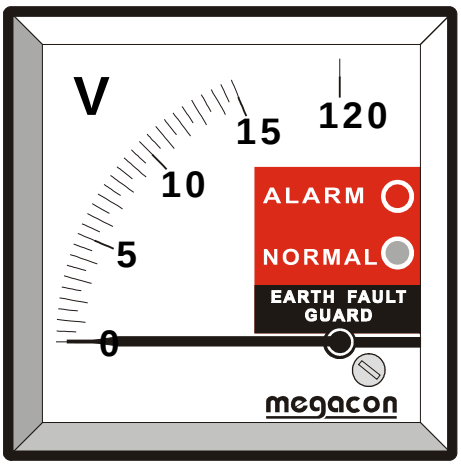
FEATURES

The KPV14 measures the output voltage of a open delta winding of HV power transformers. This is converted to a DC signal which is fed to dual level trip relays.

It is designed for use on three phase, three wire isolated A.C. HV systems.



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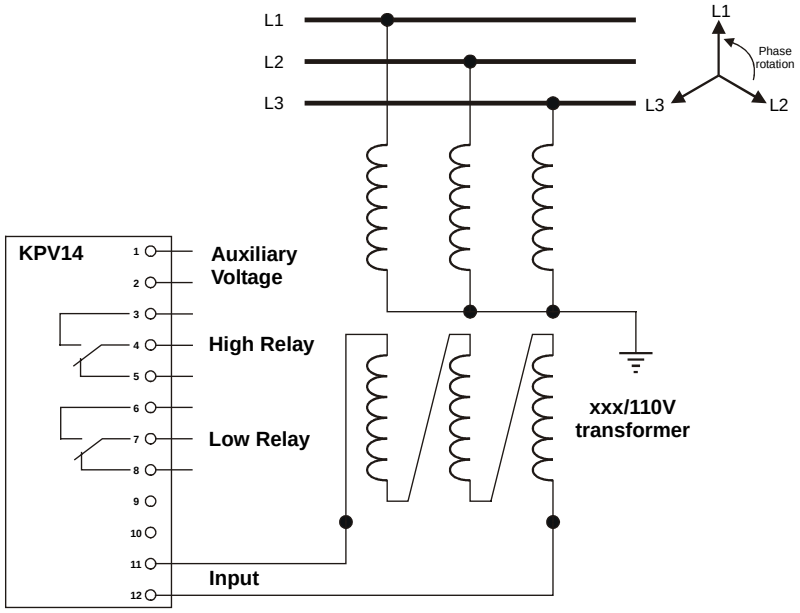

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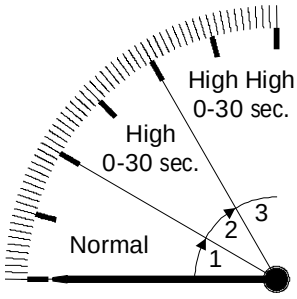
Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On (Normal)	4-5 and 7-8	Off
Above trip level LOW	4-5 and 6-7	LOW on
Above trip level HIGH	3-4 and 6-7	HIGH on



Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
24V, 48V, 110V DC
Nominal +/- 10%

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level HIGH : 0-100%
Trip time HIGH : 0 to 30 sec.
Trip level LOW : 0-100%
Trip time LOW : 0 to 30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
Monitored voltage :

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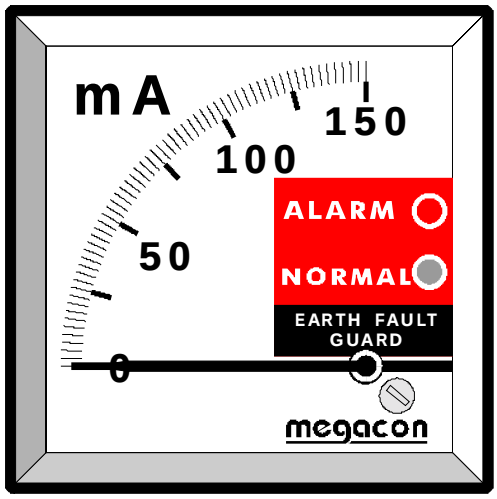
Earth Leakage Guard for use on earthed systems

FEATURES

The KPM162 measures the earth leakage, directly in milliamps, of earthed AC systems. This input is then fed to the two independent trip channels.

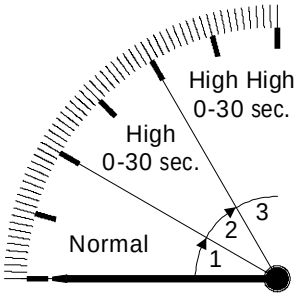
The instrument is fed from a suitable Core Balance current transformer (CBCT – see separate datasheet)

The standard instrument is as shown with a 0-150mA range. Larger scale values are available, typically 0-1A, 0-2A, 0-5A and
0-10A

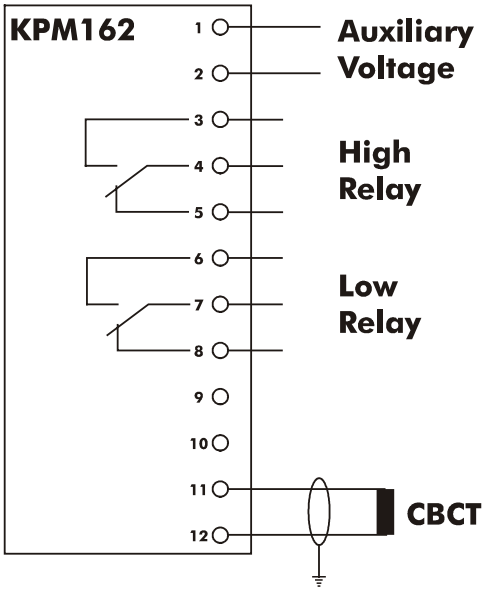


All current carrying conductors must pass through the core balance CT. Metal sheaths or braiding on any cables must NOT be passed through the CBCT.

A zero set potentiometer is provided on the rear of the instrument to allow for normal capacitive currents to be ignored.



Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On (Normal)	3-4 and 7-8	Normal on (Green)
Above trip level Warning (LOW)	3-4 and 6-7	Off
Above trip level Alarm (HIGH)	4-5 and 6-7	Alarm on (Red)



Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level HIGH : 0-100%
Trip time HIGH : 0 to 30 sec.
Trip level LOW : 0-100%
Trip time LOW : 0 to 30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
Scale :

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Three channel AC Earth Leakage Guard

KPM362

Earth Leakage Guard for use on earthed systems

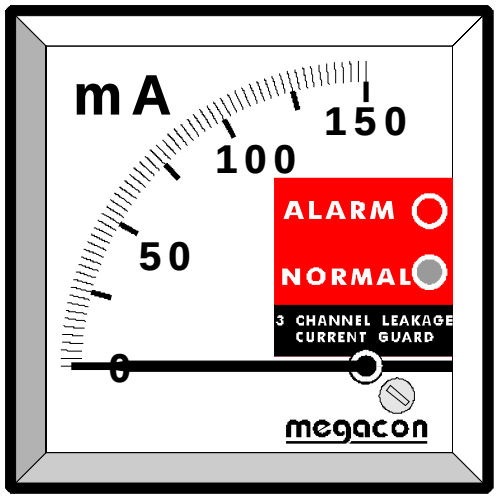
FEATURES

The KPM362 measures the earth leakage, directly in milliamps, of three earthed AC systems. These inputs are then fed to a highest up bus and thence into the two independent trip channels.

The instrument is fed from three suitable Core Balance current transformers (CBCT – see separate datasheet)

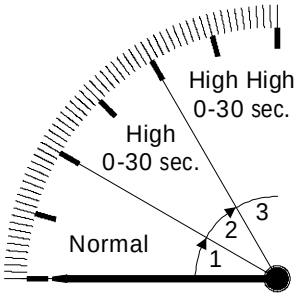
The standard instrument is as shown with a 0-150mA range. Larger scale values are available, typically 0-1A, 0-2A, 0-5A and 0-10A.

The display will show the reading of the highest of the three channels.

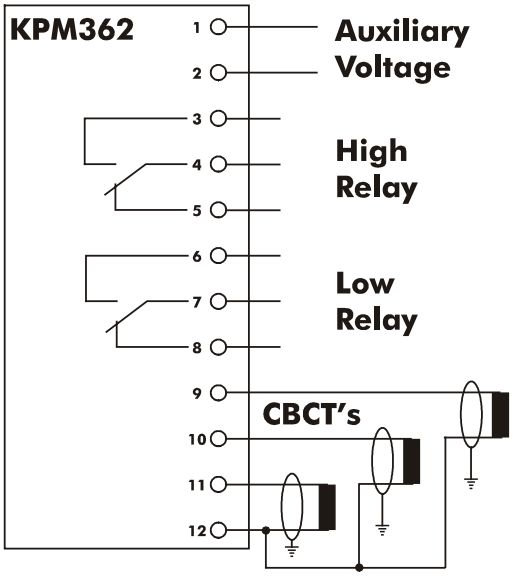


All current carrying conductors must pass through the core balance CT. Metal sheaths or braiding on any cables must NOT be passed through the CBCT.

A zero set potentiometer is provided on the rear of the instrument to allow for normal capacitive currents to be ignored.



Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On (Normal)	3-4 and 7-8	Normal on (Green)
Above trip level Warning (LOW)	3-4 and 6-7	Off
Above trip level Alarm (HIGH)	4-5 and 6-7	Alarm on (Red)



Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level HIGH : 0-100%
Trip time HIGH : 0 to 30 sec.
Trip level LOW : 0-100%
Trip time LOW : 0 to 30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
Scale :

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Earth Leakage Relay for use on earthed AC systems

FEATURES

The KRM162 measures the insulation, directly in milliamps, of earthed AC systems. This input is then fed to a single trip relay.

The instrument is fed from a suitable Core Balance current transformer (CBCT – see separate datasheet)

The standard instrument has a 0-150mA range with a trip level of 100mA. Larger scale values are available, typically 0-1A, 0-2A, 0-5A and 0-10A

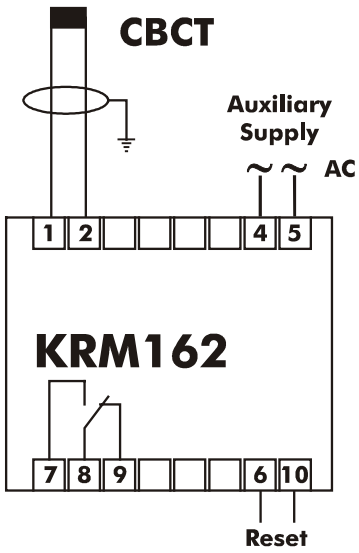
The trip level is factory set and will operate after a delay of approximately two seconds.

All current carrying conductors must pass through the core balance CT. Metal sheaths or braiding on any cables must NOT be passed through the CBCT.

NOTE:

1) Relay is latching and is reset by closing the external reset.

2) To make relay non-latching, link terminals 6 and 10.



Condition	Contacts Closed
Aux. Power Off	8-9
Aux. Power On (Normal)	7-8
Below trip level	8-9

Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

ORDERING INFORMATION

Auxiliary voltage. :
Trip level :

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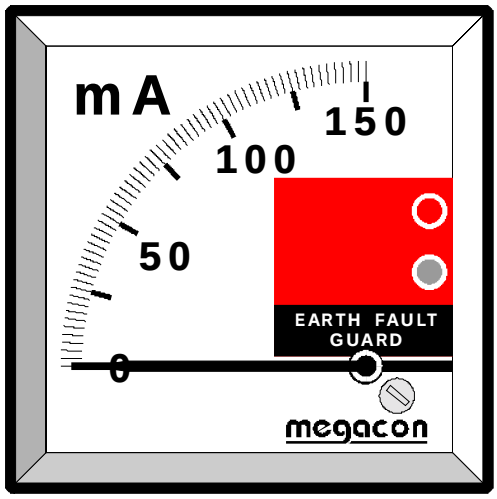
Earth Leakage Monitor for use on earthed systems

FEATURES

The MPI162 measures the earth leakage, directly in milliamps, of earthed AC systems.

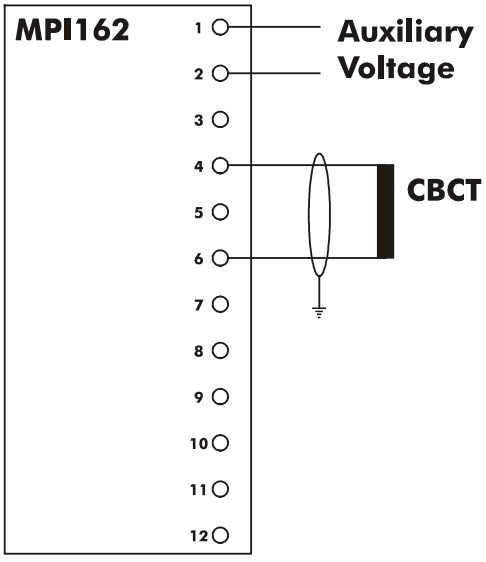
The instrument is fed from a suitable Core Balance current transformer (CBCT – see separate datasheet)

The standard instrument is as shown with a 0-150mA range. Larger scale values are available, typically 0-1A, 0-2A, 0-5A and
0-10A



All current carrying conductors must pass through the core balance CT. Metal sheaths or braiding on any cables must NOT be passed through the CBCT.

A zero set potentiometer is provided on the rear of the instrument to allow for normal capacitive currents to be ignored.



Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

ORDERING INFORMATION	Auxiliary voltage. : Scale :

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Type - Circular	Internal Diameter	External Diameter
IGT-30	30mm	56mm
IGT-60	60mm	96mm
IGT-110	110mm	154mm
IGT-200	200mm	244mm
IGT-400	400mm	444mm

Other sizes available

Type - Rectangular	Internal Length	External Width
R1507	150mm	70mm
R2015	200mm	150mm
R2213	220mm	130mm
R3010	300mm	100mm
R3510	350mm	100mm
R4010	400mm	100mm
R5010	500mm	100mm

Other sizes available

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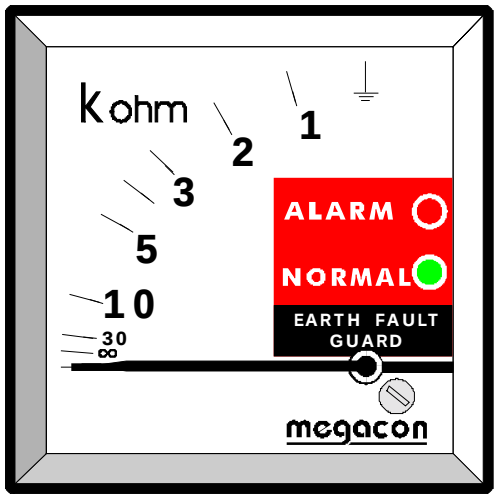
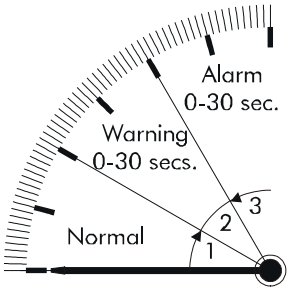
Insulation Guard for use on non earthed DC systems

FEATURES

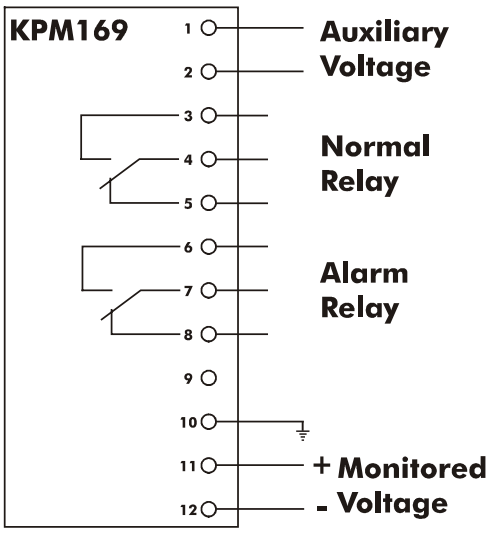
The KPM169C measures the insulation, directly in kohms (kΩ), of isolated (non earthed) DC systems. This input is then fed to the two independent trip channels.

The scale shown is typical for a 24V DC instrument.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On (Normal)	4-5 and 6-7	Normal on (Green)
Above trip level Normal	3-4 and 6-7	Off
Above trip level Alarm	3-4 and 7-8	Alarm on (Red)



Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%
or as per monitored voltage

Monitored voltage
24V DC
48V DC
110V DC
220V DC

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level normal : 0-100 fsd
Trip time normal : 0 to 30 sec.
Trip level alarm : 0-100 fsd
Trip time alarm : 0 to 30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
Monitored voltage. :

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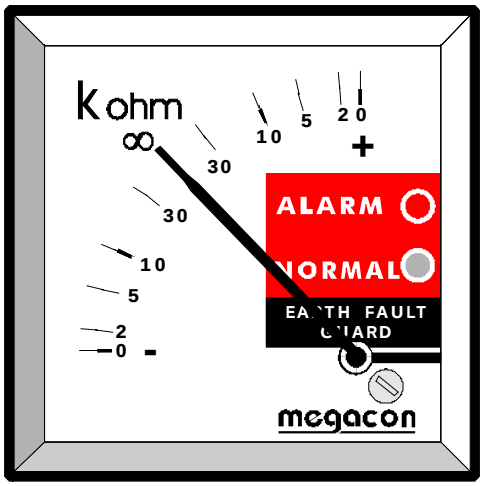
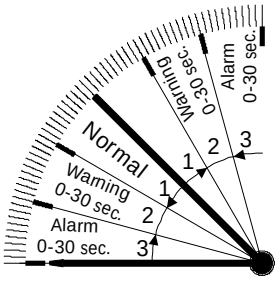
Insulation Guard for use on non earthed DC systems

FEATURES

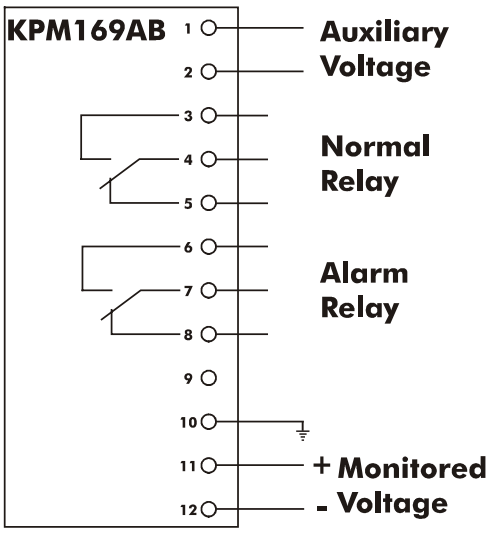
The KPM169AB measures the insulation, directly in kohms (kΩ), of isolated (non earthed) DC systems. This input is then fed to the two independent trip channels.

The scale shown is typical for a 24V DC instrument and indicates whether the fault is on the negative or positive rail of the system.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On (Normal)	4-5 and 6-7	Normal on (Green)
Above trip level Normal	3-4 and 6-7	Off
Above trip level Alarm	3-4 and 7-8	Alarm on (Red)



Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%
or as per monitored voltage

Monitored voltage
24V DC
48V DC
110V DC
220V DC

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level normal : 0-100 fsd
Trip time normal : 0 to 30 sec.
Trip level alarm : 0-100 fsd
Trip time alarm : 0 to 30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
Monitored voltage. :

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Contents

DC Insulation Relay

KRM169D

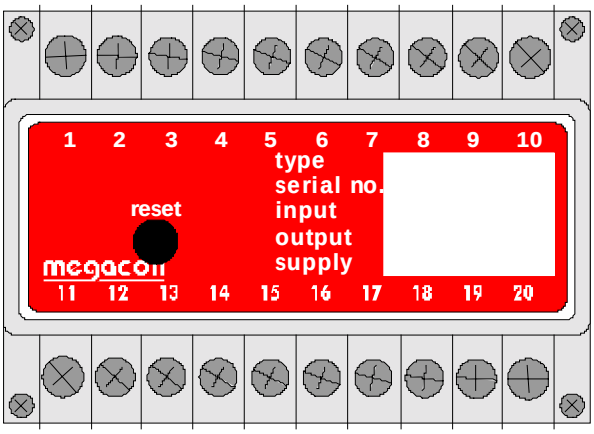
Insulation Relay for use on Non-earthed DC systems

FEATURES

The KRM169D measures the insulation, directly in kohms, of non-earthed DC systems. This input is then fed to a single trip relay.

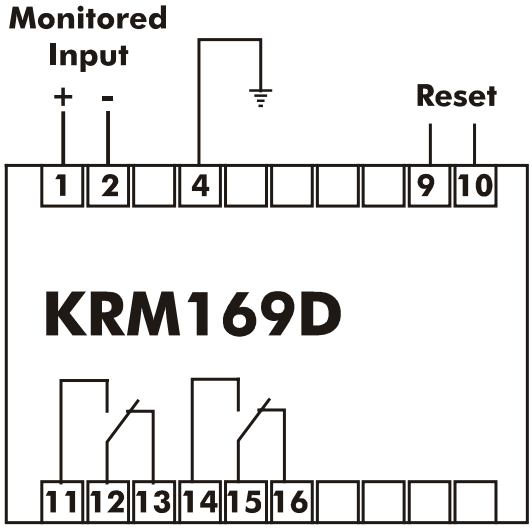
The standard 24V DC instrument has a 100 kohms range with a trip level of 30 kohms. Trip levels vary depending on monitored nominal voltage.

The trip level is factory set and will operate after a delay of approximately four seconds.



NOTE:

1) Relays are latching and are reset by operating the integral reset button or an external reset.



Condition	Contacts Closed
Aux. Power Off	12-13 and 15-16
Aux. Power On (Normal)	11-12 and 14-15
Below trip level	12-13 and 15-16

Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%
or as per monitored voltage

Monitored voltage
24V DC
48V DC
110V DC
220V DC

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

ORDERING INFORMATION

Auxiliary voltage. :
Trip level :

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Isolated DC Insulation Monitor

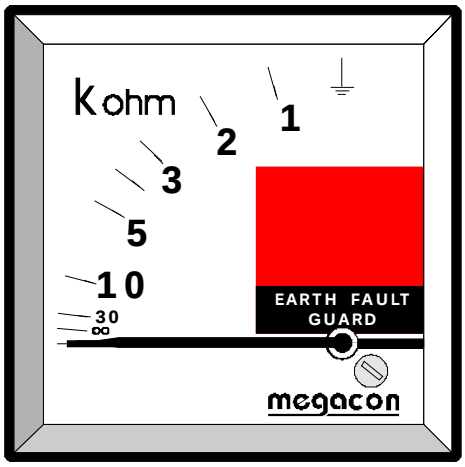
MPI169

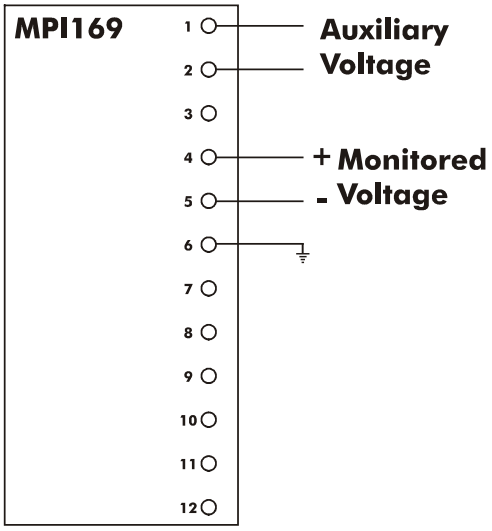
Insulation Monitor for use on non earthed DC systems

FEATURES

The MPI169 measures and displays the insulation, directly in kohms (kΩ), of isolated (non earthed) DC systems.

The scale shown is typical for a 24V DC instrument.





Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%
or as per monitored voltage

Monitored voltage
24V DC
48V DC
110V DC
220V DC

ORDERING INFORMATION	Auxiliary voltage. : Monitored voltage. :

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Three Channel Temperature Guard

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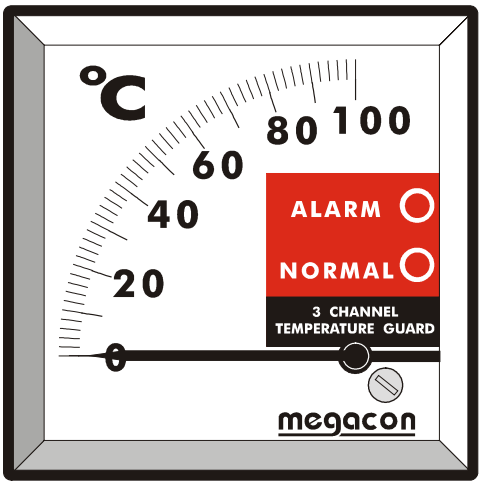
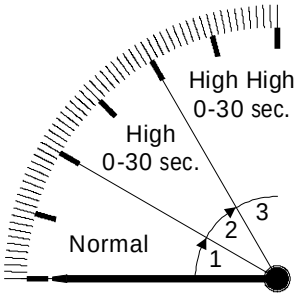
FEATURES

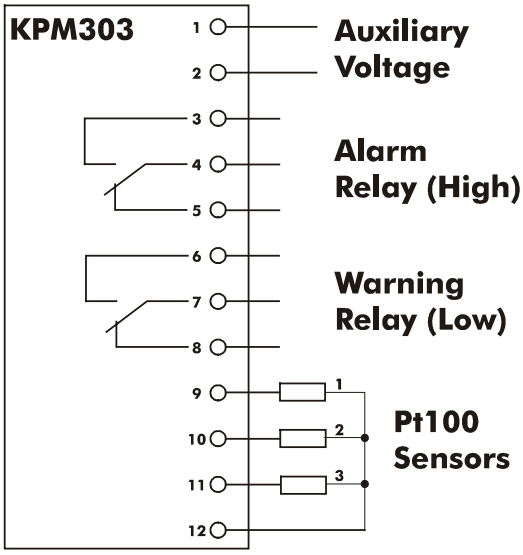
The KPM303 accepts inputs from up to three Pt100 resistance temperature detectors (RTD's) It is designed to monitor temperatures of machine bearings, windings etc but may be used on many other applications.

The display will show the reading of the HIGHEST of the three channels. The warning and Alarm relays also react to the highest input.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On (Normal)	3-4 and 7-8	Normal on (Green)
Above trip level Warning (LOW)	3-4 and 6-7	Off
Above trip level Alarm (HIGH)	4-5 and 6-7	Alarm on (Red)



Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level HIGH : 0-100%
Trip time HIGH : 0 to 30 sec.
Trip level LOW : 0-100%
Trip time LOW : 0 to 30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
Scale :

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Contents

Three Channel Temperature Relay

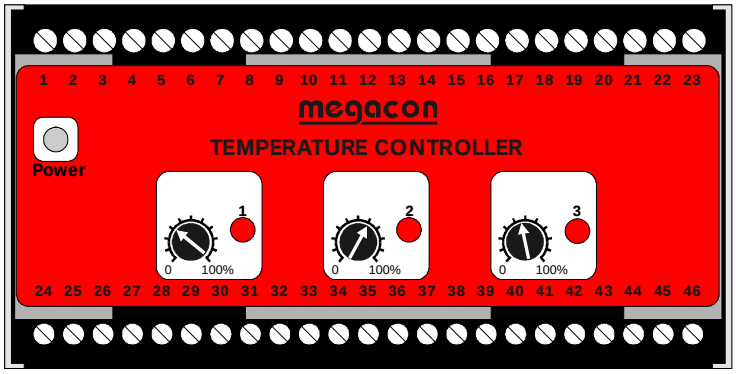
KCT3

Three channel Temperature Protection Relay for use with PT100 inputs

FEATURES

The KCT3 converts three PT100 inputs to three independent analogue signals. These signals are processed depending upon the instrument type – see below.

The PT100 inputs can be of the two or three wire type.

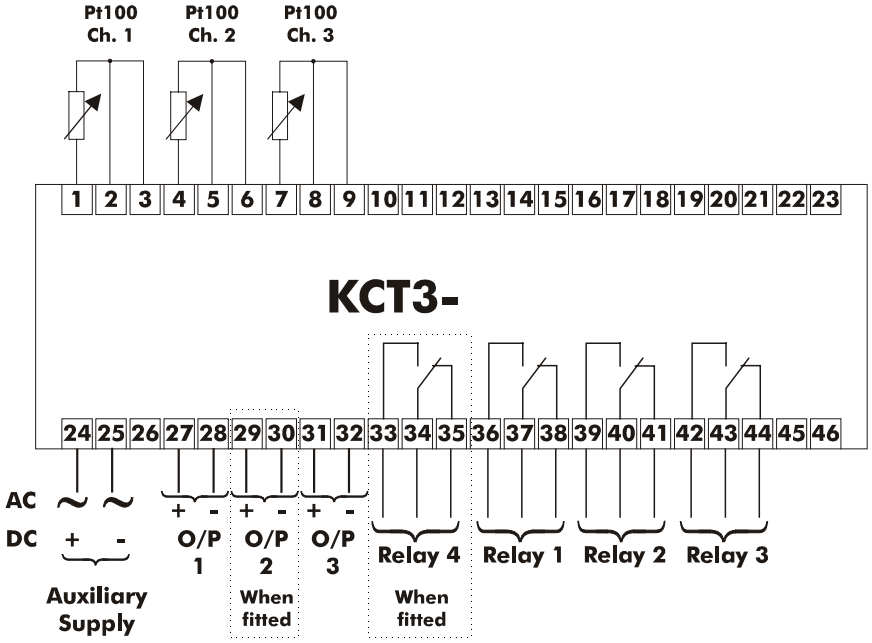


Typical Configurations

KCT31 The three inputs are connected to a common bus with the three output relays operating on the highest input. A single milliamp output relative to the highest input.

KCT32 The three inputs are grouped with two inputs to one channel and the third input to a second channel. One relay output and one analogue output relative to each grouping.

KCT33 The three inputs each have an individual channel with one relay output and one analogue output.



Relays shown de-energised.

Auxiliary Voltage
85-265V AC
18-36V DC
36-72V DC
100-300V DC

Adjustments
Trip level 1 : 0-100% FSD
Trip level 2 : 0-100% FSD
Trip level 3 : 1-100% FSD

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

ORDERING INFORMATION	Auxiliary voltage : Temperature range : Instrument type :

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Contents

UNIVERSAL LEVEL CONTROLLER

KPM13

Two channel Controller/Guard

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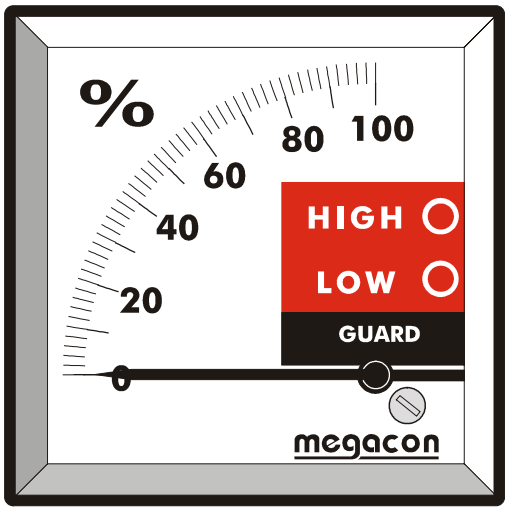
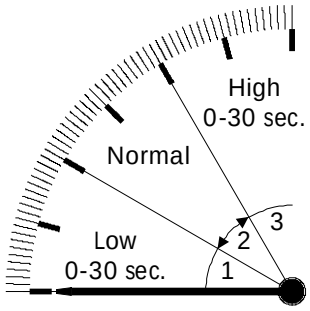
FEATURES

The KPM13 is an indicator with an input from a suitable transducer. This transducer input is fed to the two independent trip channels.

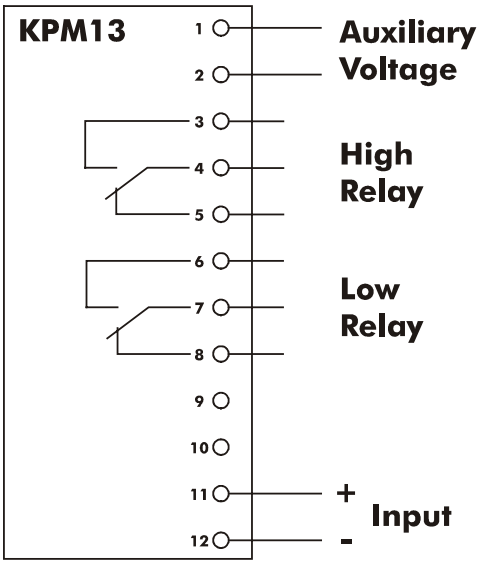
It can be scaled to suit most requirements such as weight, percentage, angular displacement, speed etc.

All standard relay configurations can be arranged.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On		
LOW	3-4 and 7-8	LOW on
NORMAL	3-4 and 6-7	Both off
HIGH	4-5 and 6-7	HIGH on



Voltage
100-120V AC
220-240V AC
380-440V AC
24V, 48V DC
Nominal +/- 10%

Typical Inputs
0-10mA
4-20mA
0-1mA
0-10V

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level LOW : 0-100% FSD.
Trip time LOW : 0 to 30 sec.
Trip level HIGH : 0-100% FSD.
Trip time HIGH : 0 to 30 sec.

ORDERING INFORMATION

Auxiliary voltage. :
Input :
Scale :
Relay Configuration :

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POWER FACTOR GUARD

KPPF3

Power Factor protection or Compensation Control

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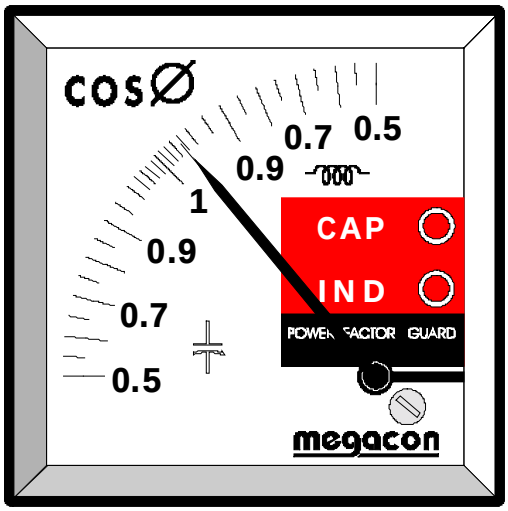
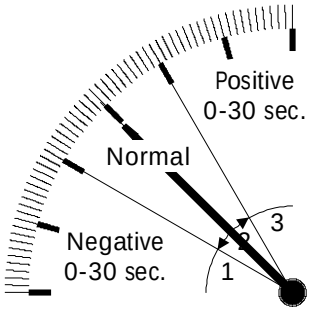
FEATURES

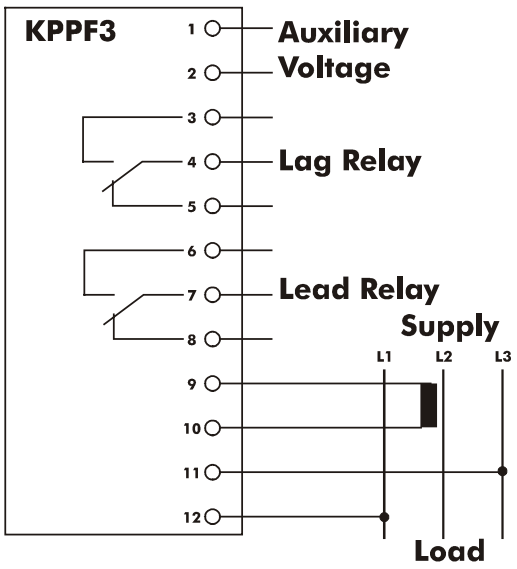
The KPPF3 gives indication of power factor between 0.5 lead to 0.5 lag.

Two output relays are available and are configured for one in the lead sector and one in the lag sector. These can be used to control power factor compensation equipment or control and AVR via a suitable motorised potentiometer.





Condition	Contacts Closed	Lamp Status
Aux. Power Off	4-5 and 7-8	Off
Aux. Power On (Normal)	4-5 and 7-8	Off
Above trip level Lead	4-5 and 6-7	Lead on
Above trip level Lag	3-4 and 7-8	Lag on



Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Input
1A C.T.
or
5A C.T.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Adjustments
Trip level LEAD : 1-0.5 LEAD
Trip time LEAD : 0 to 30 sec.
Trip level LAG : 1-0.5 LAG
Trip time LAG : 0 to 30 sec.

ORDERING INFORMATION	Supply voltage. : CT Ratio :

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KILOWATTHOUR METER

MDWH

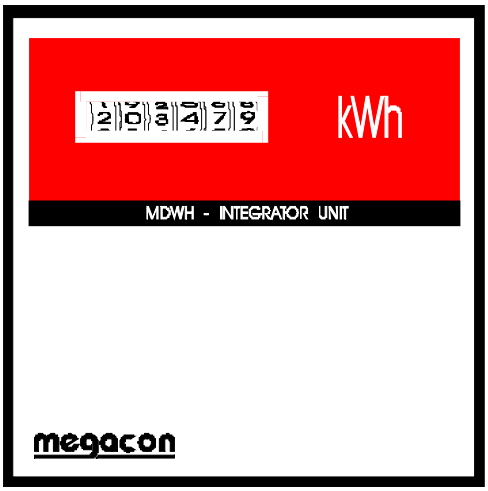
Six Digit Kilowatthour meter

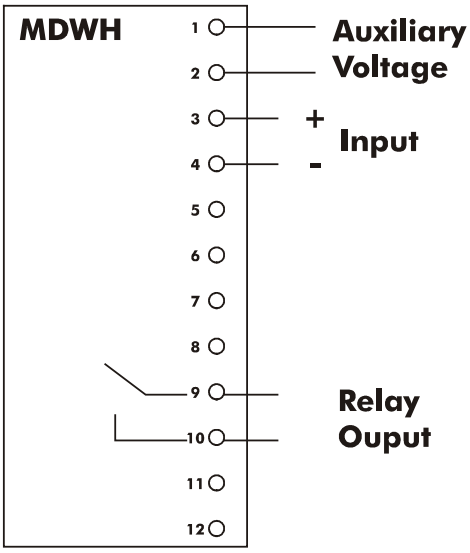
FEATURES

The MDWH is a mechanical, non resetting, six digit kilowatthour meter.

The input is fed by an analogue input from a suitable power transducer. A repeat pulsed output proportional to the kWh is also available.

It should be noted that due to tolerance errors, these units are not suitable for use over long periods on zero or very low load levels.





Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Typical Input
0-10mA

Relay Output
As indicated scaling
Pulse width 100mS +/-20mS
Min. rate 20 pulse/hour
Max. rate 20,000 pulse/hour
at max pulse rate the unit will reset every 500 hours.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

ORDERING INFORMATION	Auxiliary voltage. : Input :

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KILOWATTHOUR METER

MDWH1W2P

Six Digit Kilowatthour meter

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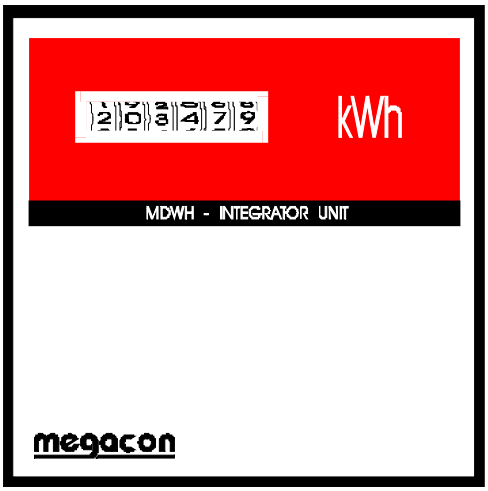
FEATURES

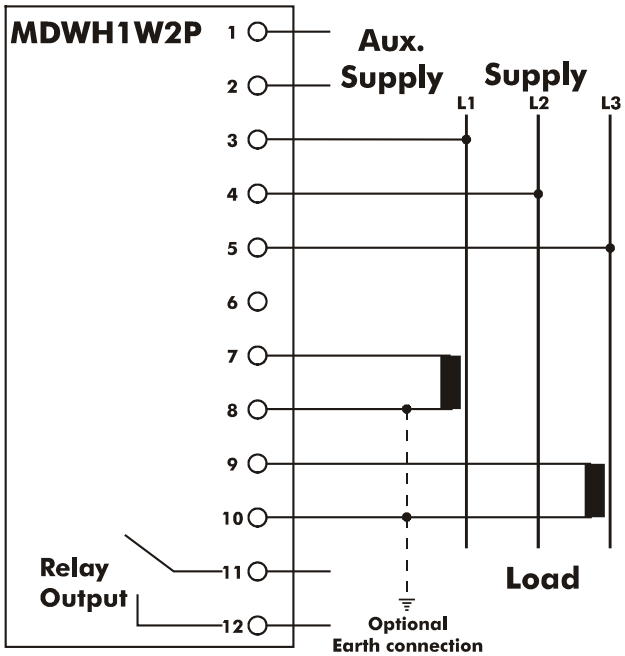
The MDWH1W2P is a mechanical, non resetting, six digit kilowatthour meter with integrated power measuring converter.

The MDWH1W2P is for use on three phase, three wire balanced loads.

A repeat pulsed output proportional to the kWh is also available. An optional DC analogue output is also available as a –0.22 / 0 /+2.2V signal representing –10% / 0 / +100% kilowatt range.

It should be noted that due to tolerance errors, these units are not suitable for use over long periods on zero or very low load levels.





Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

CT Input
/5A or /1A

Relay Output
As indicated scaling
Pulse width 100mS +/-20mS
Min. rate 20 pulse/hour
Max. rate 20,000 pulse/hour
at max pulse rate the unit will reset every 500 hours.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Analogue output - optional
-0.22 to 0 to +2.2V

ORDERING INFORMATION	Auxiliary voltage. : Monitored voltage : CT Input :

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KILOWATTHOUR METER

MDWH2W3P

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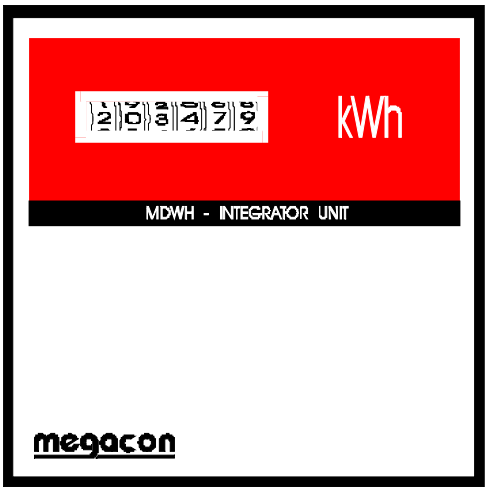
FEATURES

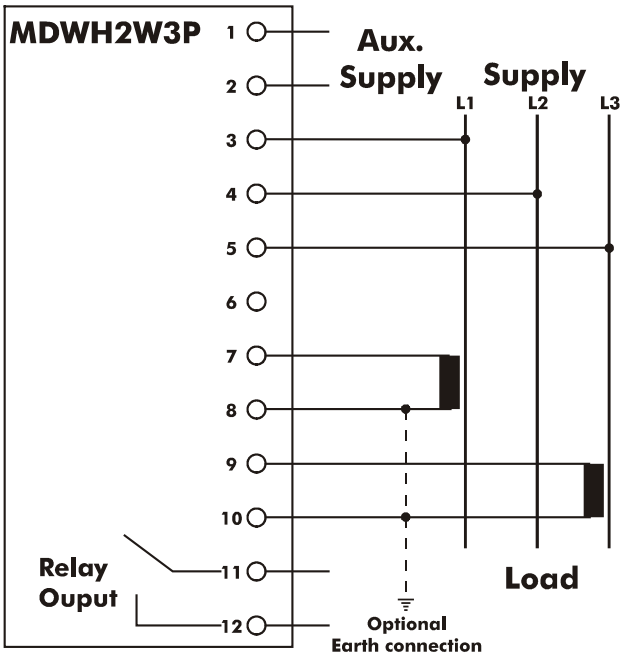
The MDWH2W3P is a mechanical, non resetting, six digit kilowatthour meter with integrated power measuring converter.

The MDWH2W3P is for use on three phase, three wire balanced or unbalanced loads.

A repeat pulsed output proportional to the kWh is also available. An optional DC analogue output is also available as a –0.22 / 0 /+2.2V signal representing –10% / 0 / +100% kilowatt range.

It should be noted that due to tolerance errors, these units are not suitable for use over long periods on zero or very low load levels.





Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

CT Input
/5A or /1A

Relay Output
As indicated scaling
Pulse width 100mS +/-20mS
Min. rate 20 pulse/hour
Max. rate 20,000 pulse/hour
at max pulse rate the unit will reset every 500 hours.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Analogue output - optional
-0.22 to 0 to +2.2V

ORDERING INFORMATION	Auxiliary voltage. : Monitored voltage : CT Input :

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

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ELECTRONIC CONTROL AND INSTRUMENTATION

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Contents

KILOWATTHOUR METER

MDWH2W4P

Six Digit Kilowatthour meter

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Denmark
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E-mail: megacon@firma.tele.dk

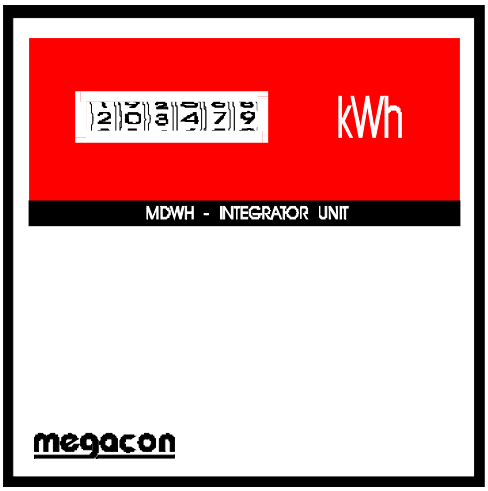
FEATURES

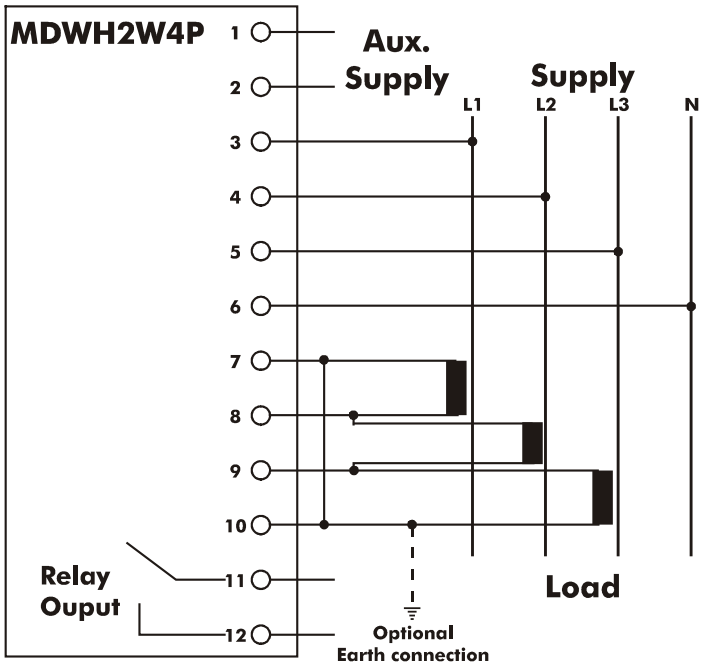
The MDWH2W4P is a mechanical, non resetting, six digit kilowatthour meter with integrated power measuring converter.

The MDWH2W4P is for use on three phase, four wire unbalanced loads.

A repeat pulsed output proportional to the kWh is also available. An optional DC analogue output is also available as a –0.22 / 0 /+2.2V signal representing –10% / 0 / +100% kilowatt range.

It should be noted that due to tolerance errors, these units are not suitable for use over long periods on zero or very low load levels.





Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

CT Input
/5A or /1A

Relay Output
As indicated scaling
Pulse width 100mS +/-20mS
Min. rate 20 pulse/hour
Max. rate 20,000 pulse/hour
at max pulse rate the unit will reset every 500 hours.

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

Analogue output - optional
-0.22 to 0 to +2.2V

ORDERING INFORMATION	Auxiliary voltage. : Monitored voltage : CT Input :

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

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Contents

PHASE MONITORING GUARD

KSP34

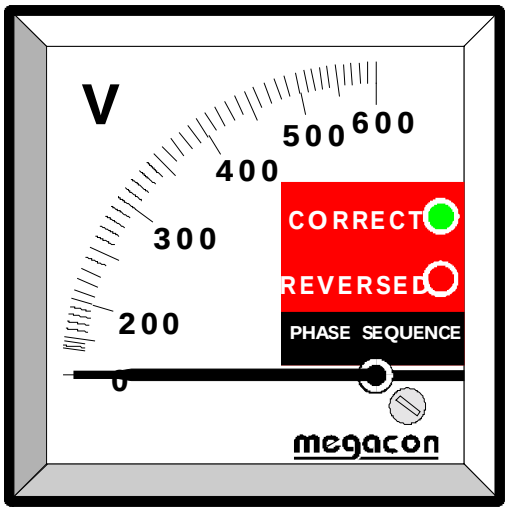
Phase sequence protection
Phase failure protection

FEATURES

The KSP34 is a moving iron voltmeter which incorporates a phase sequence and phase failure trip relay.

KSP34 monitors the three voltage inputs and converts it to a DC signal proportional to the average voltage for the phase failure trip. A separate circuit checks the phase rotation. These signals are then fed to the common trip relay.

LED's are provided to indicate if the sequence is "Correct" or "Reversed"



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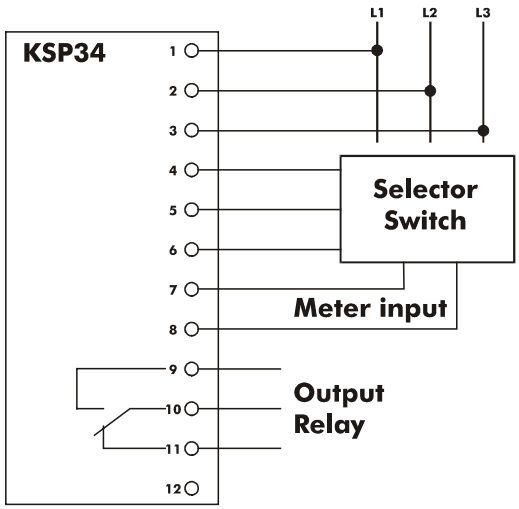

Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Contact Rating
AC : 2A (415V, 800VA)
DC : 250mA (50W resistive)

.

Condition	Contacts Closed	Lamp Status
Aux. Power Off	10-11	Off
Aux. Power On (Normal)	9-10	Correct on
Phase failure	10-11	Reversed on
Sequence failure	10-11	Reversed on

ORDERING INFORMATION

System voltage. :

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World-wide distributors

Contents

ELECTRONIC POTENTIOMETER MXR845C

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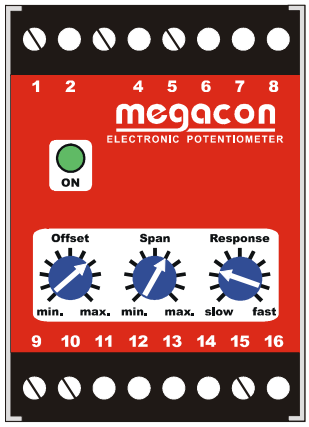
E-mail: megacon@firma.tele.dk

- **DC Voltage and DC milliamp output**
- **Adjustable Offset, Span and Response**
- **Volt free control inputs**
- **Governor matching outputs**
- **Instant reset to offset output**



The MXR845C is an interface unit for converting any volt free raise/lower input to analogue DC outputs. These are suitable for applications requiring either a –2 to 10V or 4-20mA control signal, such as speed and AVR controllers, with remote control facilities.

The unit is designed to be used with the Megacon frequency, synchronising and load sharing instruments, however it will accept inputs from any volt free inputs such as push buttons or PLC digital outputs.

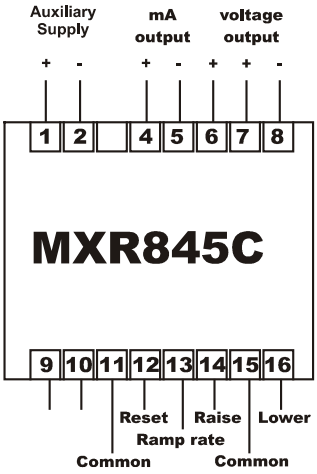
Span, Offset and response can be adjusted to suit the operating characteristics of most applications..

Four voltage output levels are available together with two response ranges to give maximum flexibility. The 4-20mA output follows the –2 to 10V output. The two outputs can be used independently or both at the same time. Note the two outputs are galvanically isolated from the auxiliary supply but NOT galvanically isolated from each other. See “MXR845C application note” for further details.

The unit can be reset to the “offset” output either using the external input or by interrupting the auxiliary supply.

The MXR845C removes the two problems generally associated with motorised potentiometers:

1) Opening a generators breaker whilst on load will mean that the generator will start above synchronising or nominal speed on restart. The MXR845C is simply reset.
2) Mechanical wear produces a “memory” error and physical limits to accuracy. The MXR845C has no moving parts.



Momentary connection of terminal 11 to 12 will reset the unit
Link terminal 11 to 13 for Response 2 characteristics.

Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
12V, 24V or 48V DC
Nominal +/- 10%

Output

Voltage	:	-2 to 10V DC
Resolution	:	**0.5mV max.**
Current	:	4-20mA
Resolution	:	**5µA max.**

Adjustments

Span	:	1 – 10V DC
Offset	:	0 – 10V DC
Response 1	:	3 – 33 seconds
Response 2	:	33 – 360 seconds

ORDERING INFORMATION	Auxiliary voltage. :
Related information	General Applications note MAN-1102, contact Megacon for governor interfaces

Contents

MXR845C Application Note

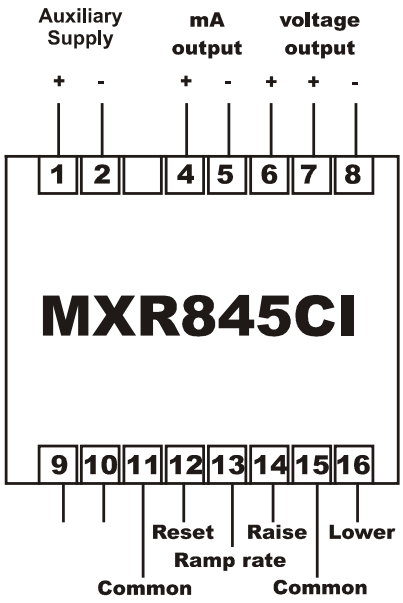


Fig. 1

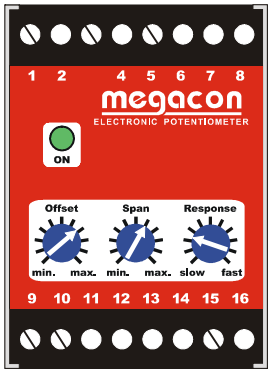


Fig. 2

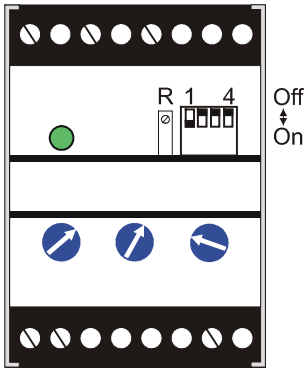


Fig. 3

NOTES:

1. The outputs offset and span can be independently adjusted by trim pots shown in Fig 2.

2. The unit will be set to the offset output on applying auxiliary power and will remain at this output until a raise or lower input is applied.

3. The unit can be reset to the offset output by momentary closure between terminals 11 and 12.

4. The standard response can be adjusted by the trim pot shown in Fig.2 from 3-30 seconds but can be increased to 30-300 seconds by linking terminals 11 and 13.

5. The direct voltage output is between terminals 7 and 8.
For input resistance matching to governors, terminals 6 and 8 should be used.
Series resistors can then be selected using the four way switch located under the lid Fig. 3.

switch 'on'	Resistor
1	10k (adjustable under lid) "R" in Fig 3
2	100k
3	470k
4	n/a

6. Guide for use with generator electronic speed governors (ESG) with voltage input.

   6a) With the MXR845C disconnected, measure the voltage between battery negative and the terminal to which the MXR845C will be connected.

   6b) Measure between terminals 7 and 8 and adjust the offset until the voltage matches the reading taken in 6a). Span and response should be set to mid point.

   6c) Stop the generator and connect the MXR845C. Restart the generator and if required adjust the offset until nominal speed is achieved.

   6d) If the generator speed adjustment is too coarse it can be reduced by changing to terminal 6 and switching in a series resistor. The generator should be stopped whilst the switch is selected. ESG sensitivity will be reduced with increase of series resistor (1 to 3 above).

7. The voltage and milliamp outputs are NOT galvanically isolated from each other. If both outputs are utilised then one must be galvanically isolated externally to the MXR845C.

Contents

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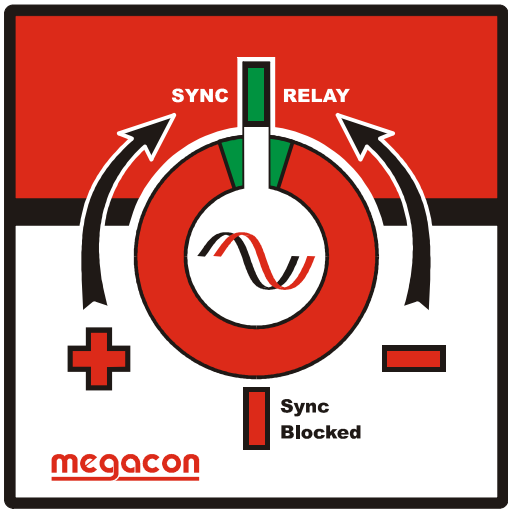
E-mail: megacon@firma.tele.dk

- **Precision automatic synchronisation**
- **Volt free Raise/Lower outputs**
- **Breaker close time compensation**
- **Synchronise Inhibit input**
- **Relative frequency indication**
- **Integral LED Synchroscope**



Description

The KSQ104 provides both visual indication, control relay signal and volt free raise/lower outputs necessary to permit automatic synchronising of two supplies.

The “Rotating LED” lamp display indicates the frequency and phase angle relationship of the two sources.

Indication of relative frequency is by illumination of the “+” symbol (too fast) and the “-“ symbol (too slow).

The raise/lower outputs are adjustable pulses proportional to the relative frequency of the monitored supplies.

Operation

The integral synchronising relay contacts (terminals 11-12) will close only when the two supplies are within the set frequency difference, the inhibit input (terminals 8-9) is closed and the generator frequency is greater than the busbar frequency. Indication of this condition is given by the green “Sync relay” lamp illuminating on the display.

An external voltage comparator relay, KRV43B, can be connected to terminals 8-9 to provide voltage error protection.

The KSQ104 compensates for circuit breaker closing time. This can be adjusted to match the characteristic of the controlled breaker.

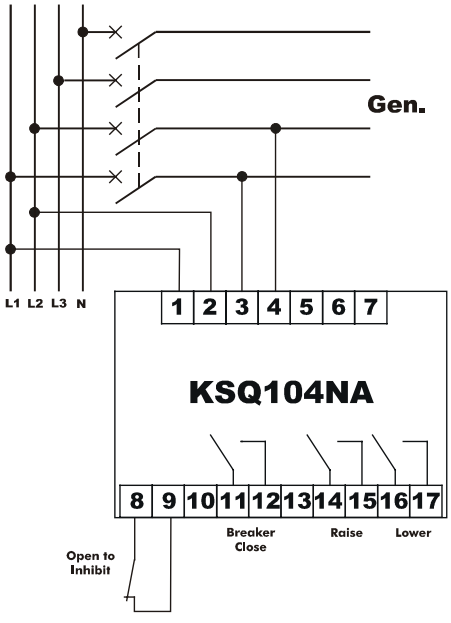
KSQ104 is rated for continuous operation and therefore can be left connected when not in use.

Relays shown de-energised.

Relay energises when generator frequency is within set parameters and not inhibited.

Terminals 8 and 9 need to be linked if external inhibit is not used.

The relay contact will remain closed after synchronising until one of the inputs is removed or the breaker is open.



Voltage:
100-120V AC
220-240V AC
380-415V AC
440V AC
Nominal +/- 10%

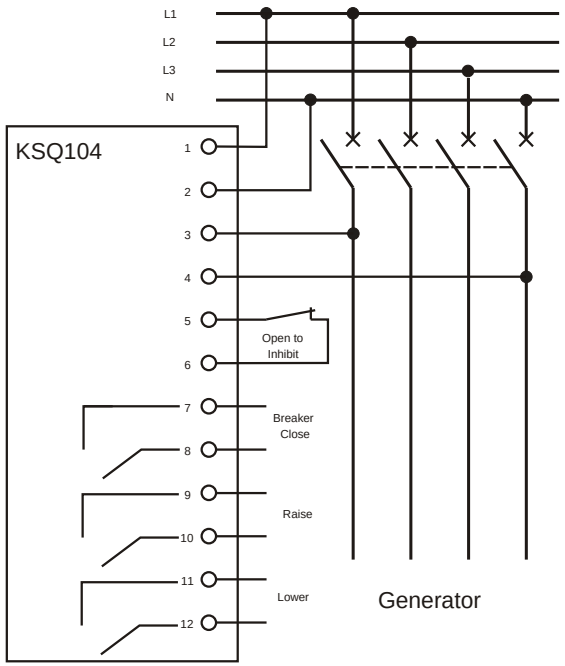
Frequency:
45-65Hz

Contact Rating:
AC : 100VA – 250V/2A max.
DC : 50W – 100V/1A max.

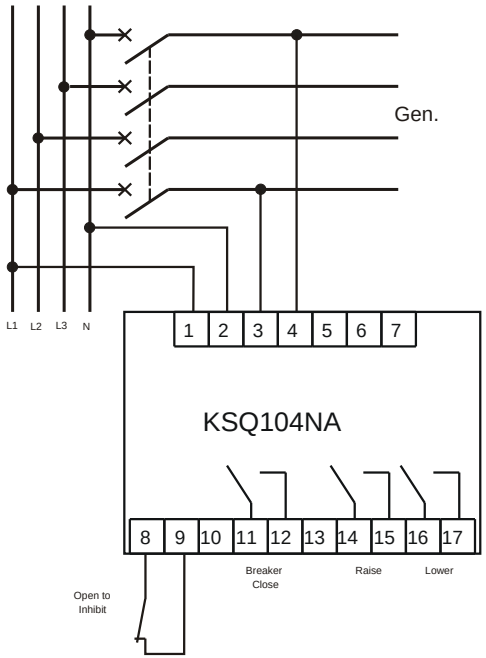
Adjustments:

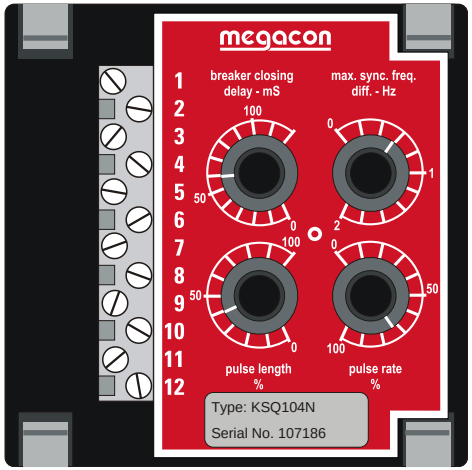
Max Sync Frequency Diff.	: 0 – 2Hz
Breaker closing Delay	: 0 to 120mS
Pulse length	: 0.1-1.6 sec
Pulse rate	: 10-60 ppm

ORDERING INFORMATION	Voltage input :



KSQ104N Terminal	KSQ104NA Terminal
1	1
2	2
3	3
4	4
5	8
6	9
7	11
8	12
9	14
10	15
11	16
12	17





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www.megacon.com

Terminal connection changes:
KSQ104N single part connectors to KSQ104NA two part connectors

MTD KSQ104T-A

Drawn: CJT

Checked:

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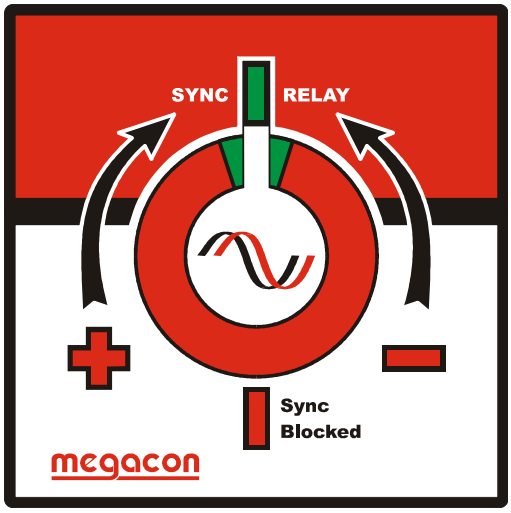
- **Precision automatic synchronisation**
- **Analogue Raise/Lower signal**
- **Breaker close time compensation**
- **Synchronise Inhibit input**
- **Relative frequency indication**
- **Integral LED Synchroscope**



Description

The KSQ105 provides both visual indication, breaker control relay signal and DC analogue voltage output necessary to permit automatic synchronising of two supplies. It is designed for use with the MCE105D generator control unit.

The “Rotating LED” lamp display indicates the frequency and phase angle relationship of the two sources.

Indication of relative frequency to allow closure of the breaker is by illumination of the “+” symbol (too fast) and the “-“ symbol (too slow).

The bi-directional DC analogue output voltage is proportional to the frequency error.

Operation

The integral synchronising relay contacts (terminals 11-12) will close only when the two supplies are within the set frequency difference, the inhibit input (terminals 8-9) is closed and the generator frequency is greater than the busbar frequency. Indication of this condition is given by the green “Sync relay” lamp illuminating on the display.

An external voltage comparator relay, KRV43B, can be connected to terminals 8-9 to provide voltage error protection.

The KSQ105 compensates for circuit breaker closing time. This can be adjusted to match the characteristic of the controlled breaker.

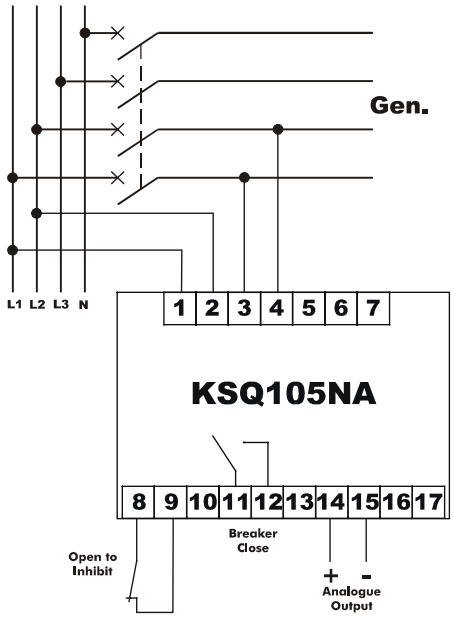
KSQ105 is rated for continuous operation and therefore can be left connected when not in use.

Relay shown de-energised.

Relay energises when generator frequency is within set parameters and not inhibited.

Terminals 8 and 9 need to be linked if external inhibit is not used.

The relay contact will remain closed after synchronising until one of the inputs is removed or the breaker is open.



Voltage:
100-120V AC
220-240V AC
380-415V AC
440V AC
Nominal +/- 10%

Frequency:
45-65Hz

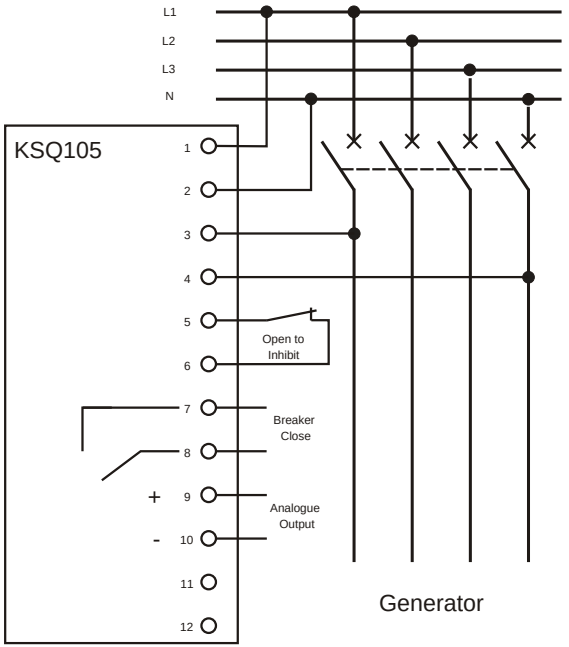
Contact Rating:
AC : 100VA – 250V/2A max.
DC : 50W – 100V/1A max.

Adjustments:
Max Sync Frequency Diff. : 0 – 2Hz

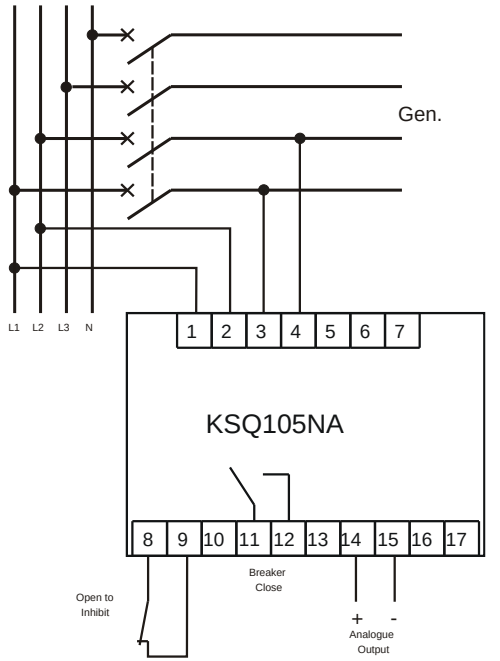
Breaker closing Delay : 0 to 120mS

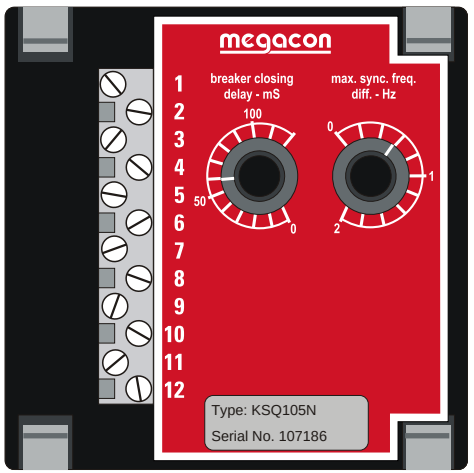
ORDERING INFORMATION

Voltage input :



KSQ105N Terminal	KSQ105NA Terminal
1	1
2	2
3	3
4	4
5	8
6	9
7	11
8	12
9	14
10	15





Terminal connection changes:
KSQ105N single part connectors to KSQ105NA two part connectors

MTD KSQ105T-A

Drawn: CJT Checked:

Contents

CHECK SYNCHRONISING RELAY

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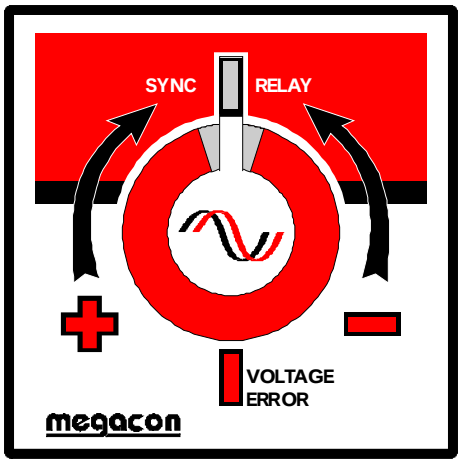
E-mail: megacon@firma.tele.dk

- **Check synchronoscope**
- **Check synchronising relay**
- **Voltage differential monitoring**
- **Two part connectors**



Description

The KSQ331 provides both visual indication and control relay signal necessary to permit check synchronising of two supplies.

The “Rotating LED” lamp display indicates the frequency and phase angle relationship of the two sources.

The red “voltage error” lamp indicates that the voltage difference between the two inputs is outside the factory set limits.

Operation

The integral synchronising relay contacts (terminals 11-12) will close only when the voltage and phase error have been within the set limits for the set delay period. The synchronising relay will not close whilst the “voltage error” lamp is on.

KSQ331 is rated for continuous operation and therefore can be left connected when not in use.

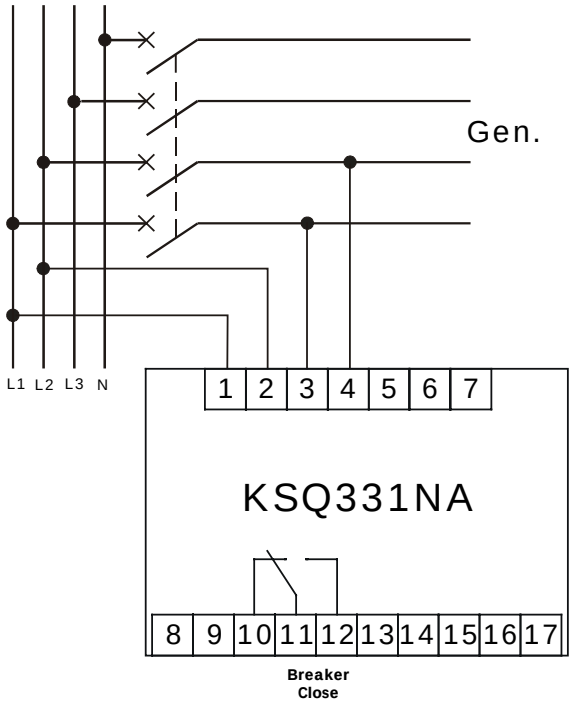
The KSQ331 should not be used for automatic synchronisation as it does not compensate for the breaker closing delay (see KCQ104 / KSQ104).

Relay shown de-energised.

Relay energises when voltage and phase error have been within set limits for the set delay period.

The relay contact will remain closed after synchronising until one of the inputs is removed or the breaker is opened.

The inputs can be connected between line and neutral as long as both sides are from the same source once the breaker is closed.



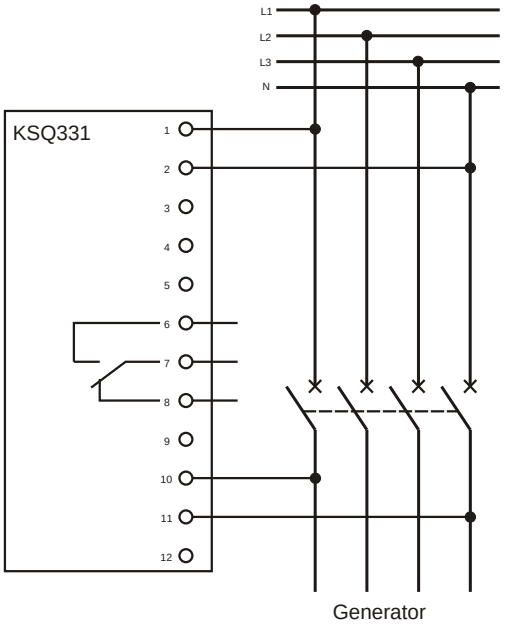
Voltage:
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Frequency:
45-65Hz

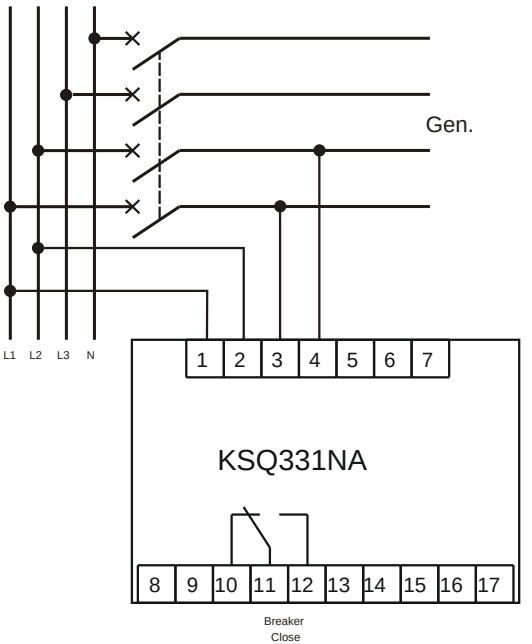
Contact Rating:
AC : 100VA – 250V/2A max.
DC : 50W – 100V/1A max.

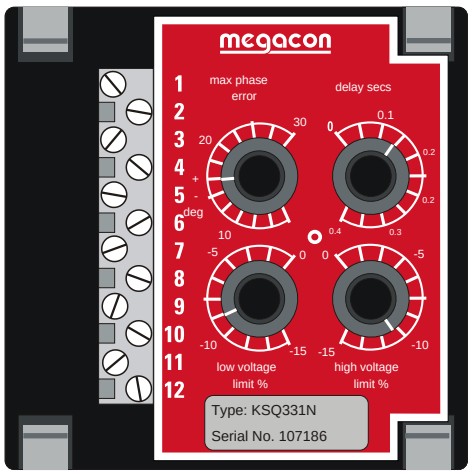
Adjustments:
Max Phase error : 4 – 30 deg.
Delay : 0 to 500mS
Low voltage limit : -15%
High voltage limit : +15%

ORDERING INFORMATION	Voltage input :



KSQ331N Terminal	KSQ331NA Terminal
1	1
2	2
3	
4	
5	
6	10
7	11
8	12
9	
10	3
11	4
12	





Megacon - Norway - UK - Denmark

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Terminal connection changes:
KSQ331N single part connectors to KSQ331NA two part connectors

MTD KSQ331T-A

Drawn: CJT

Checked:

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Earth Leakage Guard for use on earthed systems

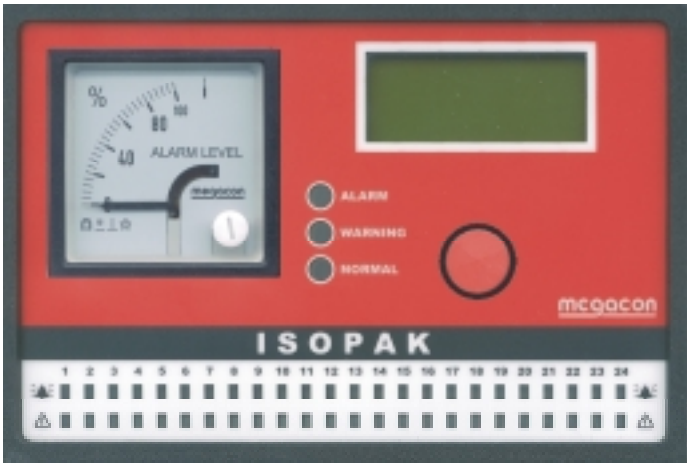
FEATURES

The Isopak24 measures the earth leakage, directly in milliamps, of up to 24 channels on earthed AC systems.

The instrument is fed from suitable Core Balance current transformers (CBCT – see separate datasheet)

The inputs can be individually programmed for channel identification, range, warning level, alarm level and trip delay.

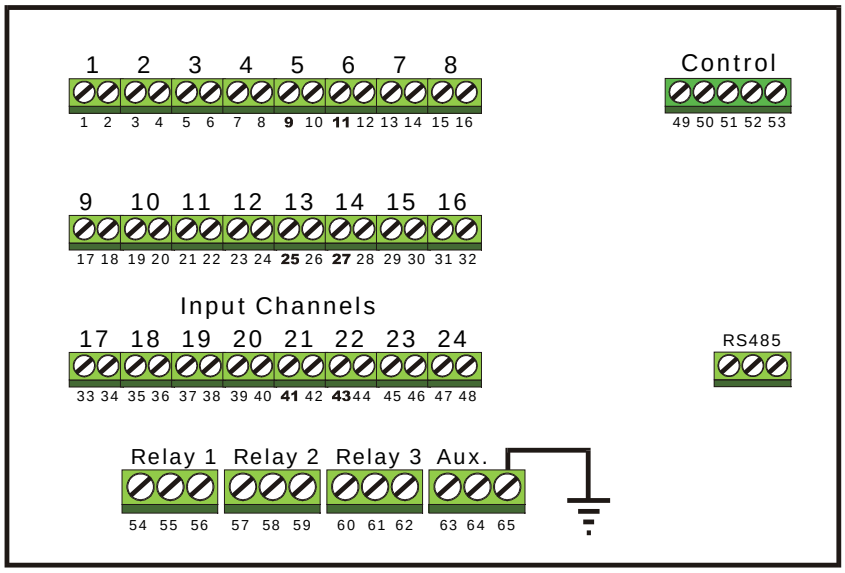
The analogue display will show the reading of the highest of the input channels as a percentage of set trip level.



All current carrying conductors must pass through the core balance CT. Metal sheaths or braiding on any cables must NOT be passed through the CBCT.

See Isopak24 manual for programming and operational information.

Isopak is avaiable in 8, 16 and 24 channel variations



Auxiliary Voltage
100-120V AC
220-240V AC
380-440V AC
Nominal +/- 10%

Contact Rating
AC : 2A (415V, 800VA)
DC : 1A (100V, 50W)

Input Range
0-10A programmable

ORDERING INFORMATION	Auxiliary voltage. :

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

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A Megacon International Publication

REF: Page 3.175-J-1004

Contents

LOSS OF MAINS RELAY

KCG593

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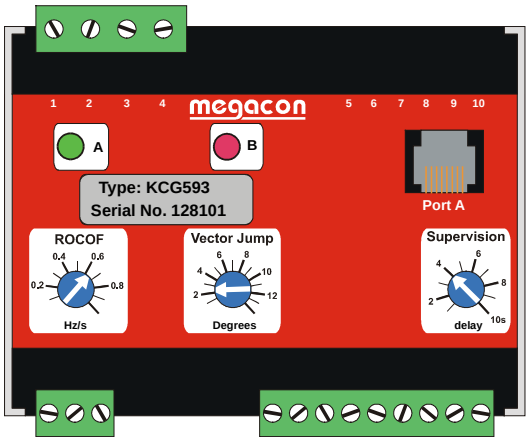
E-mail: megacon@firma.tele.dk

- **Rate of Change of Frequency (R.O.C.O.F / df/dt)**
- **Step Phase Angle – Vector Shift**
- **Triple relay operation**
- **Adjustable Supervision delay**



Description

The KCG593 has been designed to meet the protection requirements of Regional Electricity Companies (REC's) for private generation connected to mains supply – such as defined in G59 recommendations.

It combines both Rate of Change of Frequency (R.O.C.O.F.) and Step Phase Angle protection in one single unit.

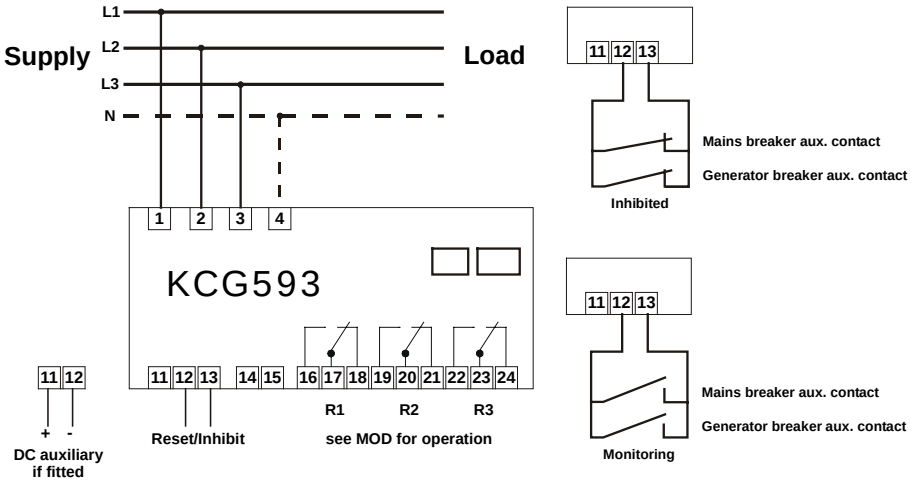
Applications

An inhibit input is controlled by auxiliary contacts on the generator and mains breakers so that the relay outputs are only enabled when both breakers are closed. An adjustable Supervision delay is fitted to overcome spurious tripping that may occur when synchronising with the mains.

Typical trip times are 20-50mS for step phase angle change and 200-300mS for rate of change of frequency.

Auxiliary supply and monitored inputs can be from the same source, as shown, or independent.

Trip status is indicated by two LED's.



Notes:
1) Relays shown de-energised.
2) R3 is fail safe

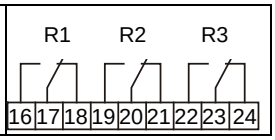
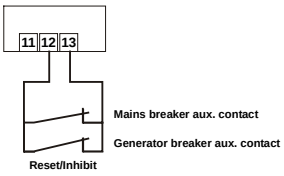
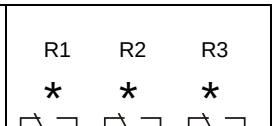
Auxiliary Voltage
24 V DC
standard voltages 100-440V

Monitored Voltage Input
100-120V AC
220-240V AC
350-450V AC
440-480V AC

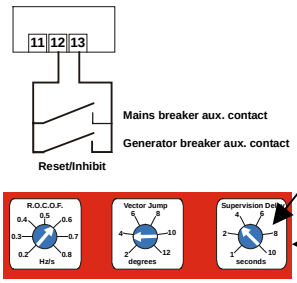
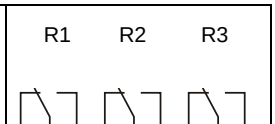
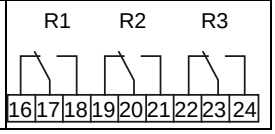
Contact Rating
AC : 100VA - 250V/2A max.
DC : 50W - 100V/1A max.

Standard Adjustments
Phase Angle : 1-14 degrees
Rate of Frequency : 0.1-1.0 Hz/sec
Supervision Delay : 1-10 seconds.

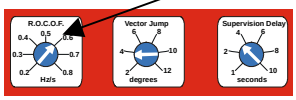
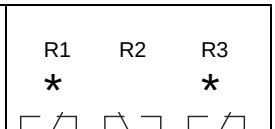
ORDERING INFORMATION	Product type : KCG593 Voltage input : Auxiliary Supply :
	Example : KCG593, 415V, 24V DC aux.
Related information	KCG593 MOD

	Auxiliary supply off	 Both LED's off	
	Aux. supply on, unit inhibited.	 Steady Green A LED	

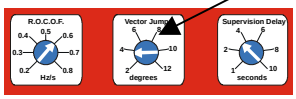
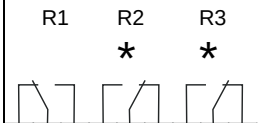
Generator and mains breakers closed

	during supervision delay 1-10 seconds	 Steady Green A LED Flashing Green B LED	
	after delay	 Steady Green A and B LED's	

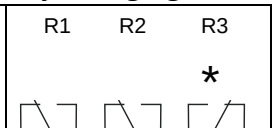
Above R.O.C.O.F. trip level 0.1 – 1.0 Hz/second

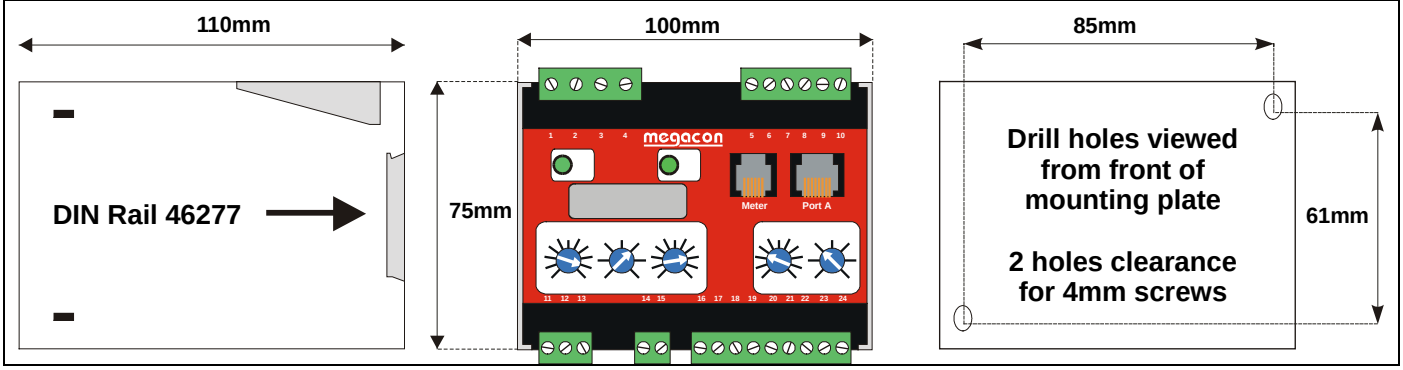
		 Steady Red A LED (R.O.C.O.F.)	
	If auxiliary supply is maintained, R1 and R3 latch and are reset by connecting terminals 12 and 13.		

Above vector shift trip level 1-14 degrees

		 Steady Red B LED (Vector jump)	
	If auxiliary supply is maintained, R2 and R3 latch and are reset by connecting terminals 12 and 13.		

* indicates relay changing state

If one or more phases of the monitored supply is lost, relay 3 de-energises.	 Flashing Red B LED	



ACTIVE POWER CONTROL AND PROTECTION

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Reverse Power

If the prime mover of any generating set fails whilst connected to a second electrical source, the generator will act as a motor and will import power. This will cause damage to the set and so must be protected against. The fault is resolved by opening the generator breaker.
This function is typically set to 5% for 5 seconds in order to allow a slight movement into reverse power which can be experienced when rapidly unloading two or more sets.
A second instantaneous setting can be used which is typically twice the normal setting – in this case 10%. (Type C)

Overload

This is when the load exceeds the permitted maximum rating of a generator set. This would normally be set depending on the overload capability of the machine but typically 110% for 30 seconds. The fault is resolved by opening the generator breaker or as described in high load.

High Load

To reduce the maintenance of the prime mover, it is preferred that the generator is loaded between 70-100% of its maximum load. Within this range a monitored point would typically have two actions:-

1) Start next generator. This is a signal to start another set(s) to increase the load available. It must have a hysteresis to its action if it is to be used also as a stop signal (Type J)
2) Preferential tripping. This is a signal to disconnect any non important loads. (Type J, K or L)

Its is also normal to have a combination of the two.

Unload

When a generator is no longer required due to lowering of load, it is good practice to reduce the load to nearly zero before opening the breaker. In this case a signal is required to open the breaker on falling power. This would be set as an instantaneous trip at typically 5% or less.

Import/Export

When a generator is paralleled with the mains (utility) supply it is often required that the generator must never supply power into the grid (export). A protection device needs to operate as soon as the generator goes from import to export (Type R)

Megacon's KCW17x series of instruments are designed to meet these requirements
Other relays configurations are available on request.

R3 relative to reverse power

		R/P	A/P	Fail Safe	Latching	Delay	Function
	R1	√		√	√	t	
	R2		√			t	
	R3	√				t	Status
B	R1	√			√	t	
	R2		√			t	
	R3	√				½ t	Predictor
C	R1	√			√	t	
	R2		√			t	
	R3	√				no delay	Advisor

R3 relative to active power (A/P)

		R/P	A/P	Fail Safe	Latching	Delay	Function
J	R1	√		√	√	t	
	R2		√			t	
	R3		√			t	Status
K	R1	√			√	t	
	R2		√			t	
	R3		√			½ t	Predictor
L	R1	√			√	t	
	R2		√			t	
	R3		√			no delay	Advisor

R3 relative to change in direction of power

		R/P	A/P	Fail Safe	Latching	Delay	Function
R	R1	√		√	√	t	
	R2					t	
	R3					no delay	Advisor

R3 on falling kilowatts

		R/P	A/P	Fail Safe	Latching	Delay	Function
U	R1	√		√	√	t	
	R2		√			t	
	R3		√			no delay	Unload

Contents

REVERSE POWER AND OVERLOAD GUARD

KCW176

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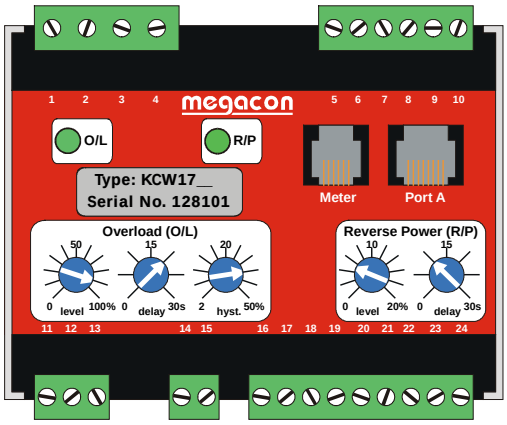
E-mail: megacon@firma.tele.dk

- **Reverse Power and Overload Protection**
- **Integral true RMS transducer**
- **Triple relay operation**
- **Isolated Analogue output**
- **Adjustable overload hysteresis**
- **Megacon slave indicator output**



Description

KCW176 is for use on three phase, three wire systems.

It contains a true RMS kilowatt transducer that is not affected by heavily distorted waveforms.

R1 and R2 are used for reverse power and forward power respectively. **R3** is used for either reverse power or active power dependant on the application required.

The analogue output is fully isolated.

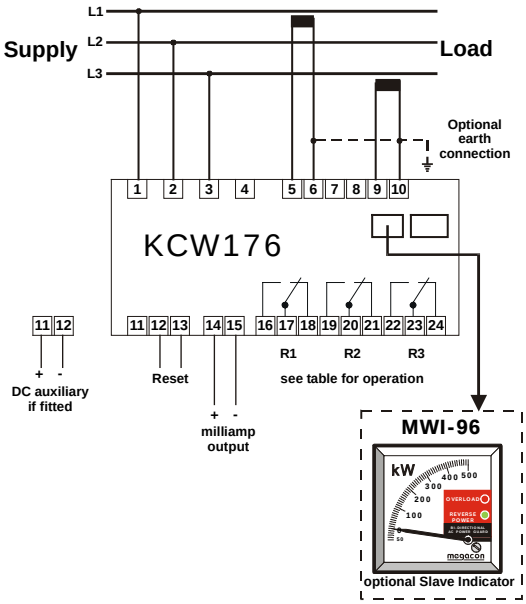
Applications

Basic: Reverse power and overload protection with additional repeat reverse power relay (R3).

Predictor: R3 operates after half of reverse power trip time.

Advisor: R3 operates as soon as reverse power trip level is exceeded.

see MOD documents for operation



Notes:
1) Relays shown de-energised
2) To ensure correct kilowatt readings, voltage and CT connections MUST be as shown.
3) R1 and R3 latch after trip and are reset on terminals 12/13.

Key
R/P Reverse Power
A/P Active Power

		R/P	A/P	Fail safe	Set Delay = t
Basic **KCW176B**	R1	√		√	t
	R2		√		t
	R3	√			t
Predictor **KCW176P**	R1	√		√	t
	R2		√		t
	R3	√			½ t
Advisor **KCW176A**	R1	√		√	t
	R2		√		t
	R3	√			no delay

Auxiliary Voltage
24 V DC
standard voltages 100-440V

Monitored Voltage Input
100-120V AC
220-240V AC
350-450V AC
440-480V AC

Current Input
KCW177 : 3 x 1A C.T.
: 3 x 5A C.T.

Milliamp output
4-20mA, 0-10mA, -1/0/10mA

Contact Rating
AC : 100VA - 250V/2A max.
DC : 50W - 100V/1A max.

Standard Adjustments

Trip level O/L	:	0-100% FSD.
Trip time O/L	:	0-30 seconds.
Trip level R/P	:	0-20% FSD.
Trip time R/P	:	0-30 seconds.
Hysteresis	:	2-100% O/L
Operational Temperature	:	-10 to +60°C

ORDERING INFORMATION

Product type : KCW176
Voltage input :
CT Ratio :
Scale :

Example : KCW176 basic, 440/110V, 500/5A, 400kW

Related information: Operation = KCW17x MOD basic, predictor and advisor

Contents

REVERSE POWER AND OVERLOAD GUARD

KCW177

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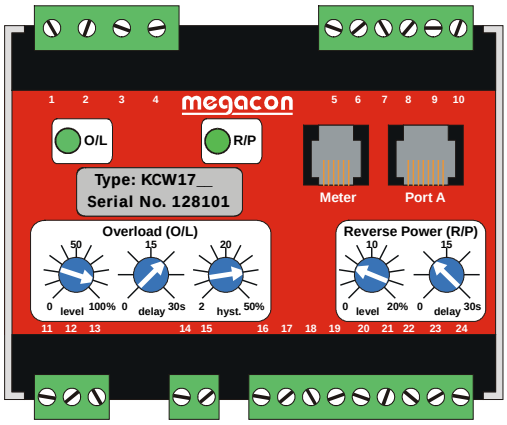
E-mail: megacon@firma.tele.dk

- **Reverse Power and Overload Protection**
- **Integral true RMS transducer**
- **Triple relay operation**
- **Isolated Analogue output**
- **Adjustable overload hysteresis**
- **Megacon slave indicator output**



Description

KCW177 is for use on three phase, four wire systems.

It contains a true RMS kilowatt transducer that is not affected by heavily distorted waveforms.

R1 and R2 are used for reverse power and forward power respectively. **R3** is used for either reverse power or active power dependant on the application required.

The analogue output is fully isolated.

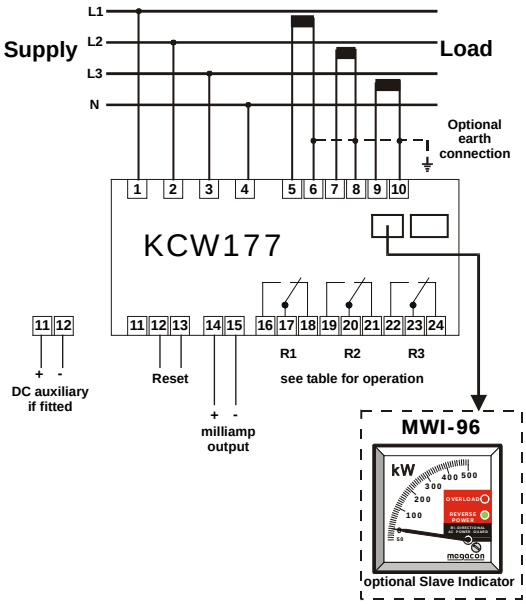
Applications

Basic: Reverse power and overload protection with additional repeat reverse power relay (R3).

Predictor: R3 operates after half of reverse power trip time.

Advisor: R3 operates as soon as reverse power trip level is exceeded.

see MOD documents for operation



Notes:
1) Relays shown de-energised
2) To ensure correct kilowatt readings, voltage and CT connections MUST be as shown.
3) R1 and R3 latch after trip and are reset on terminals 12/13.

Key
R/P Reverse Power
A/P Active Power

		R/P	A/P	Fail safe	Set Delay = t
Basic **KCW177**	R1	√		√	t
	R2		√		t
	R3	√			t
Predictor **KCW177P**	R1	√		√	t
	R2		√		t
	R3	√			½ t
Advisor **KCW177A**	R1	√		√	t
	R2		√		t
	R3	√			no delay

Auxiliary Voltage
24 V DC
standard voltages 100-440V

Monitored Voltage Input
100-120V AC
220-240V AC
350-450V AC
440-480V AC

Current Input
KCW177 : 3 x 1A C.T.
: 3 x 5A C.T.

Milliamp output
4-20mA, 0-10mA, -1/0/10mA

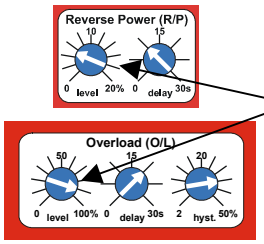
Contact Rating
AC : 100VA - 250V/2A max.
DC : 50W - 100V/1A max.

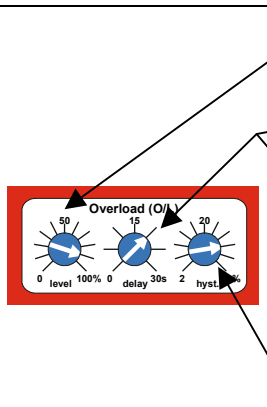
Standard Adjustments

Trip level O/L	:	0-100% FSD.
Trip time O/L	:	0-30 seconds.
Trip level R/P	:	0-20% FSD.
Trip time R/P	:	0-30 seconds.
Hysteresis	:	2-100% O/L
Operational Temperature	:	-10 to +60°C

ORDERING INFORMATION		
	Product type : KCW177 Voltage input : CT Ratio : Scale :	DS range
	Example : KCW177 basic, 440/110V, 500/5A, 400kW	
Related information	Operation = KCW17x MOD basic, predictor and advisor	

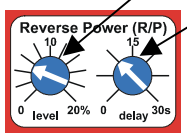
OPERATION | KCW17x – Basic

KCW171 **KCW174** **KCW176** **KCW177**	Auxiliary supply off	O/L R/P Both LED's off	R1 R2 R3 16 17 18 19 20 21 22 23 24
	Aux. supply on, more positive than reverse power trip and below overload trip level.	O/L R/P Steady Green R/P on	R1 R2 R3 * 16 17 18 19 20 21 22 23 24



Above overload trip level 0-100% FSD

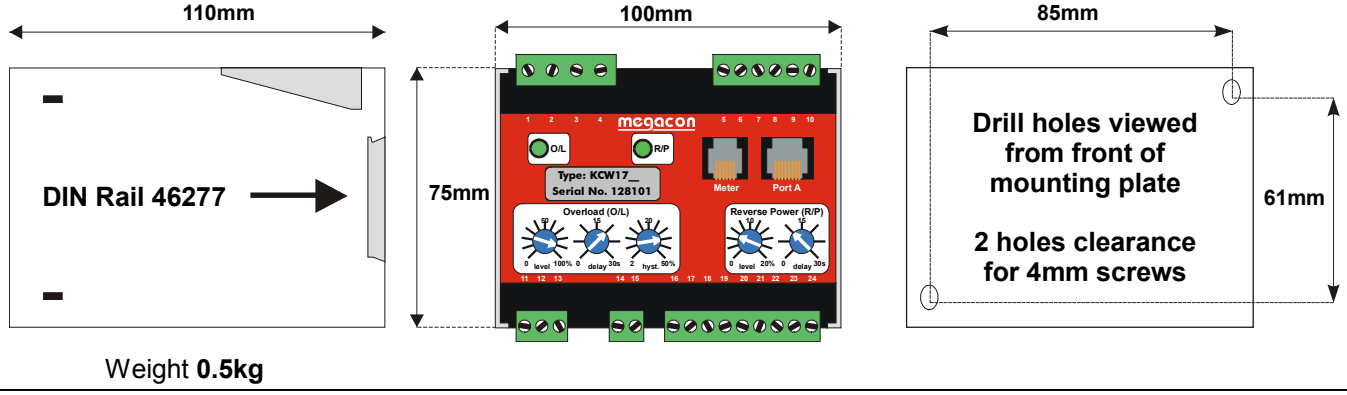
during delay 0-30 seconds	O/L R/P Flashing Red O/L once per second	R1 R2 R3 16 17 18 19 20 21 22 23 24
after delay	O/L R/P Steady Red O/L	R1 R2 R3 * 16 17 18 19 20 21 22 23 24
Hysteresis	R2 will reset below trip level minus hysteresis set point	



Above reverse power trip level 0-20% FSD

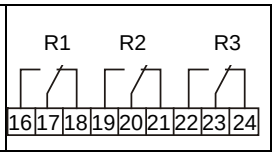
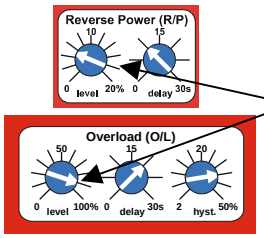
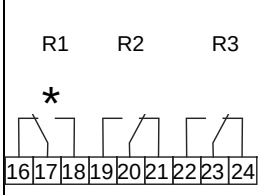
during delay 0 to 30 seconds	O/L R/P Flashing Red R/P once per second	R1 R2 R3 16 17 18 19 20 21 22 23 24
after delay	O/L R/P Steady Red R/P Relays latched	R1 R2 R3 * * 16 17 18 19 20 21 22 23 24
Reset	Latch is reset by disconnecting terminal 1 or shorting terminals 12-13	

* indicates relay changing state

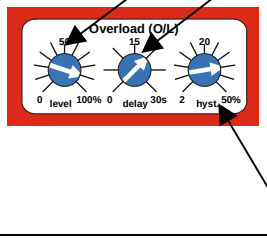


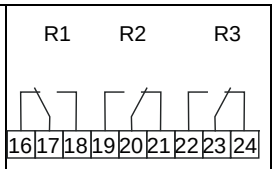
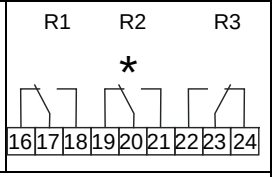
Weight **0.5kg**

OPERATION KCW17x – Advisor

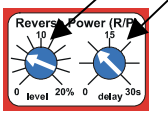
KCW171 **KCW174** **KCW176A** **KCW177A**	Auxiliary supply off	 Both LED's off	
	Aux. supply on, more positive than reverse power trip and below overload trip level.	 Steady Green R/P on	

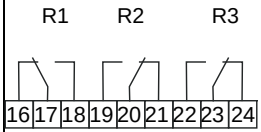
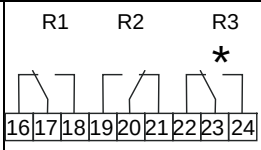
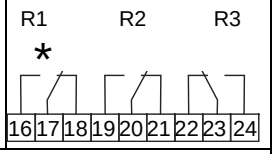
Above overload trip level 0-100% FSD



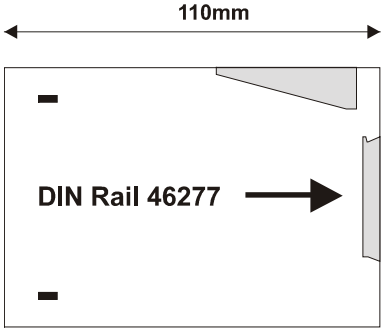
during delay 0-30 seconds	 Flashing Red R/P once per second	
after delay	 Steady Red O/L	
Hysteresis	R2 will reset below trip level minus hysteresis set point	

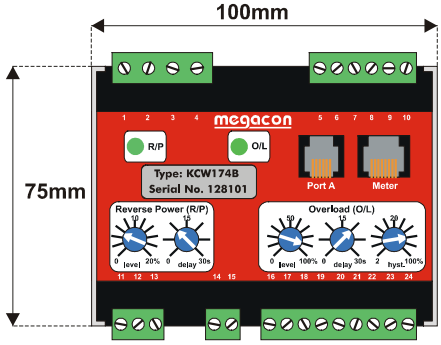
Above reverse power trip level 0-20% FSD

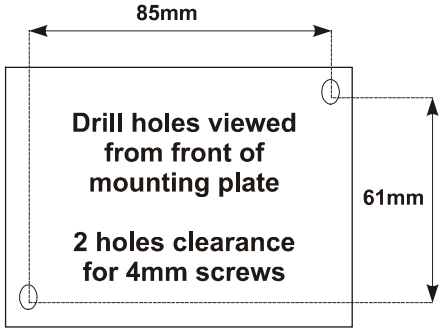


during delay 0 to 30 seconds	 Flashing Red R/P once per second	
instantaneous	 Flashing Red R/P once per second	
after full delay	 Steady Red R/P Relays Latched	
Reset	Latch is reset by disconnecting terminal 1 or shorting terminals 12-13	

* indicates relay changing state

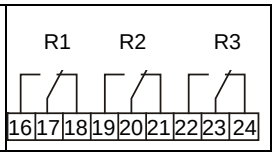
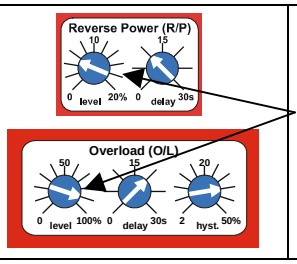
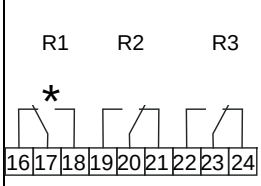
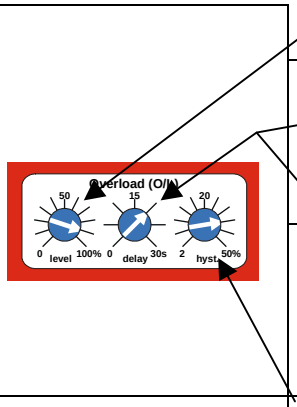
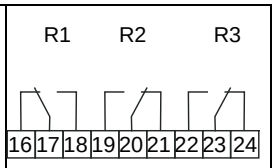
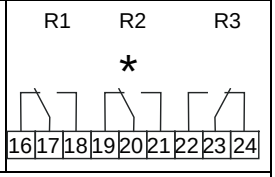
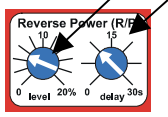
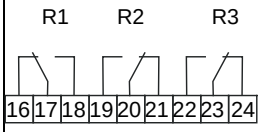
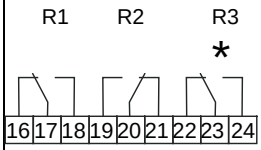
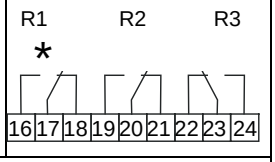




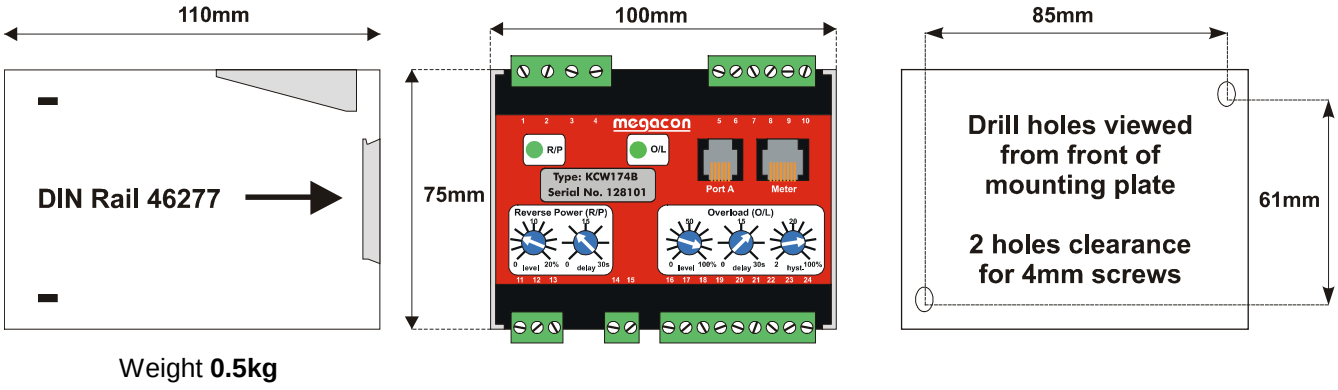


Weight **0.5kg**

OPERATION | KCW17x – Predictor

KCW171P **KCW174P** **KCW176P** **KCW177P**	Auxiliary supply off	 Both LED's off	
	Aux. supply on, more positive than reverse power trip and below overload trip level.	 Steady Green R/P on	
	**Above overload trip level 0-100% FSD** during delay 0-30 seconds	 Flashing Red O/L	
	after delay	 Steady Red O/L	
	Hysteresis	R2 will reset below trip level minus hysteresis set point	
	**Above reverse power trip level 0-20% FSD** during delay 0 to 30 seconds	 Flashing Red R/P once per second	
	after half delay	 Flashing Red R/P once per second	
	after full delay	 Steady Red R/P Relays Latched	
	Reset	Latch is reset by disconnecting terminal 1 or shorting terminals 12-13	

* indicates relay changing state



Weight **0.5kg**

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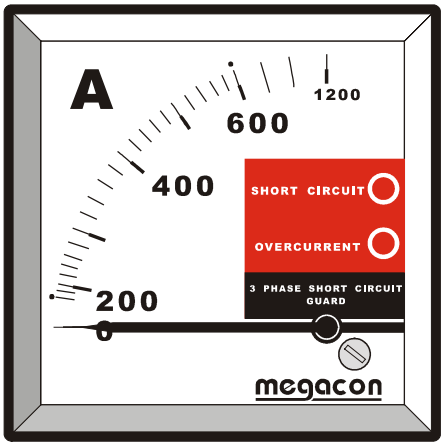
E-mail: megacon@firma.tele.dk

Contents

SHORT CIRCUIT AND OVERCURRENT GUARD

KEC115E

- **Short circuit and Overcurrent Protection**
- **Triple relay operation**
- **Variable Time overload release function**
- **"Pathfinder" function**
- **Integral true RMS transducer**
- **Independent moving iron ammeter**



Description

KEC115E is for use with up to three current transformer inputs.

It contains a true RMS transducer that is not affected by heavily distorted waveforms and provides highest up protection.

The three output relays are controlled dependant on the application required.

The independent ammeter input allows the input to be switched to display individual currents.

Overcurrent time delay reduces with level of overload
See MOD-A-0603 for overcurrent release characteristic.

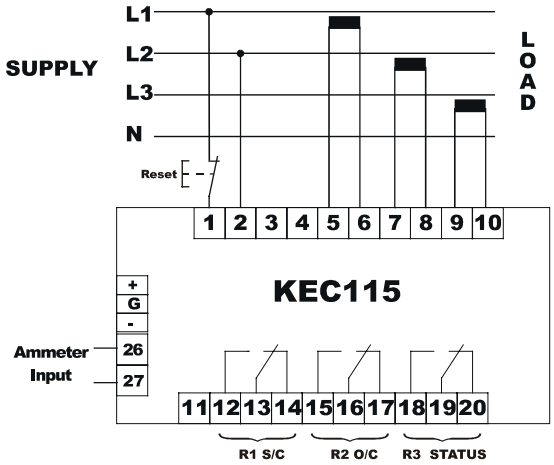
Application

Short circuit and overcurrent protection with a third relay (R3) that operates if either the overcurrent (R1) or shortcircuit (R2) operate.

R3 can be used to open the generator breaker and R1/R2 can be used for local indication, BMS input, alarm system input etc.

The phase causing the trip is indicated by the "Pathfinder" function. This is an indication shown by a flashing pattern on the relevant LED.

See MOD-A-0603 for further details.



Notes
1) Relays shown de-energised
2) R1 is fail safe and energises when auxiliary supply is present

	S/C	O/C	Fail safe	Set Delay = t
R1	√		√	t *
R2		√		t *
R3	√	√		t

* see MOD-A-0603

Auxiliary Supply
100-120V AC
220-240V AC
380-415V AC
440-480V AC
+/-10%

Frequency
nominal 50Hz and 60Hz

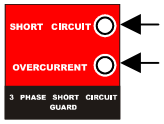
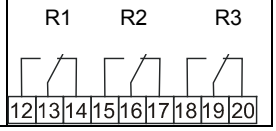
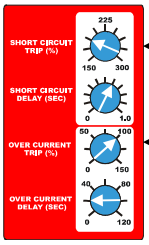
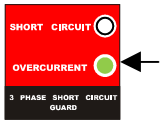
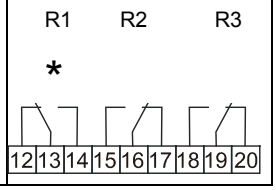
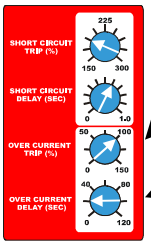
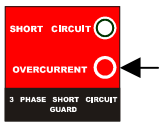
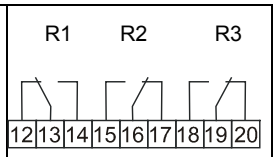
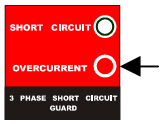
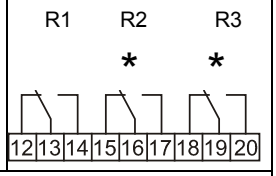
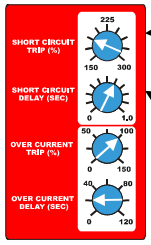
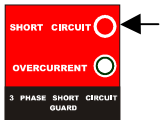
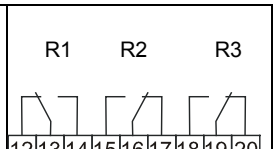
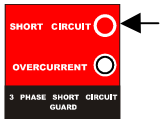
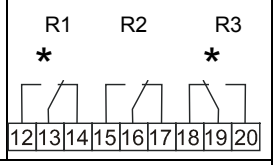
Current Input
3 x 1A C.T.
3 x 5A C.T.

Contact Rating
AC : 100VA -250V/2A max.
DC : 50W -100V/1A max.

Adjustments
Trip level O/C : 0-150% of FLC
Trip time O/C : 0-120 seconds.
Trip level S/C : 150-300% of FLC
Trip time S/C : 0.1-1.0 second.
FLC : factory set

ORDERING INFORMATION	Product type : KEC115E Aux. Voltage : CT Ratio :
	Example : KEC115, 110V, 500/5A
Related information	Operation = KEC115E MOD-A-0603

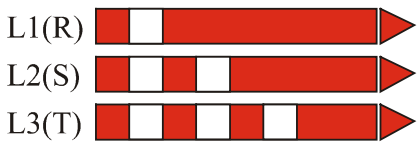
OPERATION KEC115E

	Auxiliary supply off	 Both LED's off	
	Aux. supply on, below overcurrent and short circuit trip levels	 Green LED on	
	**Above overcurrent trip level 0-150% FSD** during delay 0-120 seconds	 Flashing Red once per second	
	after delay	 Red over current LED on see pathfinder function below	
	Reset	R2 and R3 latch and are reset by disconnecting terminal 1	
	**Above short circuit trip level 150-300% red mark** during delay 0.1 to 1.0 seconds	 Flashing Red	
	after delay	 Red short circuit LED on see pathfinder function below	
	Reset	R1 and R3 latch and are reset by disconnecting terminal 1	

* indicates relay changing state

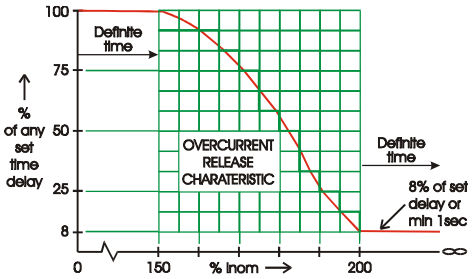
Pathfinder Function

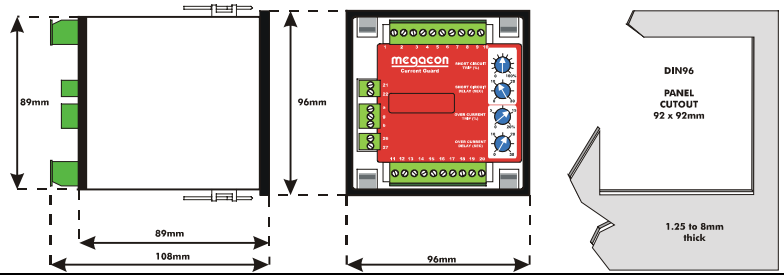
When either shortcircuit or overcurrent have operated the relevant LED will flash in the following pattern to indicate the phase producing the trip.



Red indicates LED on

Overcurrent release characteristic





Contents

REVERSE POWER AND OVERLOAD GUARD

KPW176A

UK
Tel : +44 (0)1453 824471 Fax : +44 (0)1453 825234
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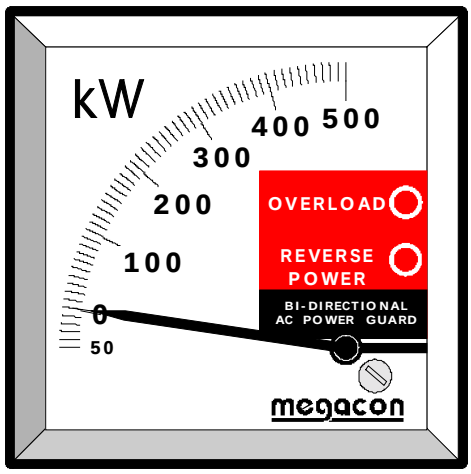
Norway
Tel: +47 55 11 75 10 Fax: +47 55 11 75 30
E-mail: megacon@megacon.no

Denmark
Tel : +45 35 42 69 69 Fax : +45 35 42 69 59
E-mail: megacon@firma.tele.dk

- **Reverse Power and Overload Protection**
- **Integral true RMS transducer**
- **Triple relay operation**
- **Adjustable overload hysteresis**
- **Isolated analogue output with fast response**



Description

KPW176 is for use on three phase, three wire systems.

It contains a true RMS kilowatt transducer that is not affected by heavily distorted waveforms.

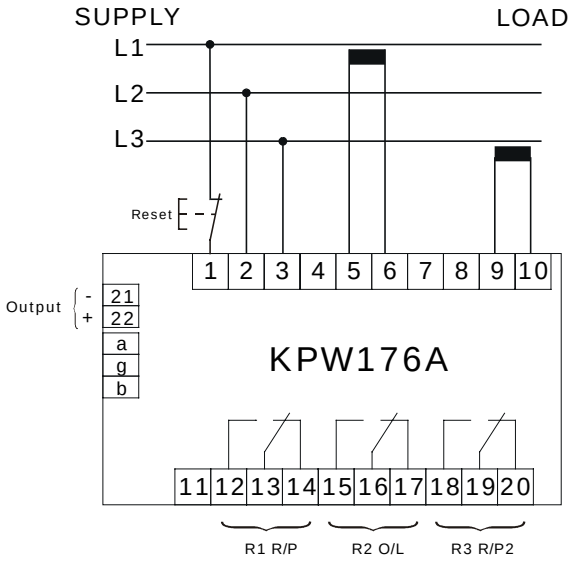
The three output relays are controlled dependant on the application required.

The analogue output is fully isolated.

Application

Basic: Reverse power and overload protection with additional reverse power relay. Milliamp output relative to the kilowatt range.

Other relay configurations available – contact Megacon



Notes

1) Relays shown de-energised
2) R1 is fail safe and energises when auxiliary supply is present.
3) CT and voltage connections must be as the diagram to ensure correct kilowatt readings.

	R/P	O/L	Fail safe	Set Delay = t
R1	√		√	t
R2		√		t
R3	√			t

Voltage Input
100-120V AC
220-240V AC
350-450V AC
440-480V AC
+/-10%

Frequency
nominal 50Hz and 60Hz

Current Input
KPW176A : 2 x 1A C.T.
: 2 x 5A C.T.

Contact Rating
AC : 100VA - 250V/2A max.
DC : 50W - 100V/1A max.

Adjustments
Trip level O/L : 0-100% FSD.
Trip time O/L : 0-30 seconds.
Trip level R/P : 0-20% FSD.
Trip time R/P : 0-30 seconds.
Hysteresis : 2-100% O/L

Output
DC current : 4-20mA, -1-0-10mA max. 500Ω.
Response time : < 50mS

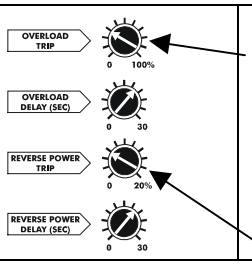
ORDERING INFORMATION

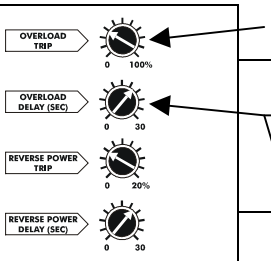
Product type : KPW176A
Voltage input :
CT Ratio :
Scale :
Output :

IS range

Example : KPW176A, 440/110V, 500/5A, 400kW, 4-20mA

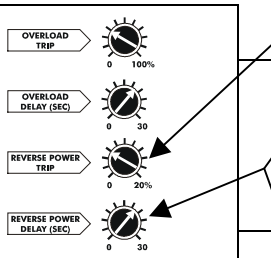
Related information: Operation = KPW176A MOD, Three phase four wire = KPW177A MPD

	Auxiliary supply off	OVERLOAD, REVERSE POWER, BI-DIRECTIONAL AC POWER GUARD — Both LED's off	R1 R2 R3 / 12 13 14 15 16 17 18 19 20
	Aux. supply on, below overload trip level and below reverse power trip level	OVERLOAD, REVERSE POWER, BI-DIRECTIONAL AC POWER GUARD — Green LED on	R1 R2 R3 * / 12 13 14 15 16 17 18 19 20



Above overload trip level 0-100% FSD

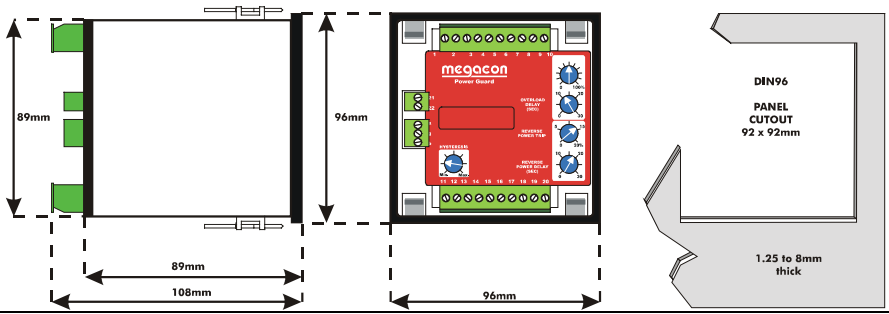
during delay 0-30 seconds	OVERLOAD, REVERSE POWER, BI-DIRECTIONAL AC POWER GUARD — Flashing Red once per second; Green LED off	R1 R2 R3 / 12 13 14 15 16 17 18 19 20
after delay	OVERLOAD, REVERSE POWER, BI-DIRECTIONAL AC POWER GUARD — Red overload LED on; Green LED off	R1 R2 R3 * / 12 13 14 15 16 17 18 19 20
	Hysteresis	R2 will reset below trip level minus hysteresis set point	



Above reverse power trip level 0-20% FSD

during delay 0 to 30 seconds	OVERLOAD, REVERSE POWER, BI-DIRECTIONAL AC POWER GUARD — Flashing Red once per second	R1 R2 R3 / 12 13 14 15 16 17 18 19 20
after delay	OVERLOAD, REVERSE POWER, BI-DIRECTIONAL AC POWER GUARD — Red reverse power LED on	R1 R2 R3 * * / 12 13 14 15 16 17 18 19 20
	Reset	R1 and R3 latch and are reset by disconnecting terminal 1	

* indicates relay changing state



Contents

REVERSE POWER AND OVERLOAD GUARD

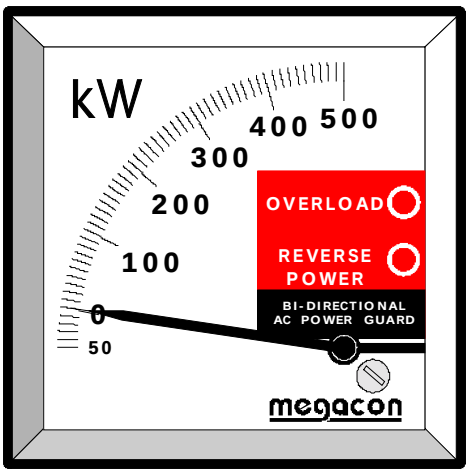
KPW177A

UK
Tel : +44 (0)1453 824471 Fax : +44 (0)1453 825234
E-mail: sales@megacon.co.uk

Norway
Tel: +47 55 11 75 10 Fax: +47 55 11 75 30
E-mail: megacon@megacon.no

Denmark
Tel : +45 35 42 69 69 Fax : +45 35 42 69 59
E-mail: megacon@firma.tele.dk

- **Reverse Power and Overload Protection**
- **Integral true RMS transducer**
- **Triple relay operation**
- **Adjustable overload hysteresis**
- **Isolated analogue output with fast response**



Description

KPW177 is for use on three phase, four wire systems.

It contains a true RMS kilowatt transducer that is not affected by heavily distorted waveforms.

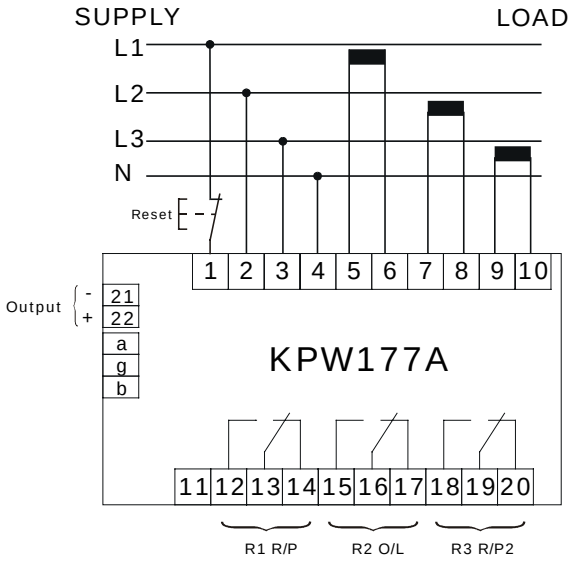
The three output relays are controlled dependant on the application required.

The analogue output is fully isolated.

Application

Basic: Reverse power and overload protection with additional reverse power relay. Milliamp output relative to the kilowatt range.

Other relay configurations available – contact Megacon



Notes

1) Relays shown de-energised
2) R1 is fail safe and energises when auxiliary supply is present.
3) CT and voltage connections must be as the diagram to ensure correct kilowatt readings.

	R/P	O/L	Fail safe	Set Delay = t
R1	√		√	t
R2		√		t
R3	√			t

Voltage Input
100-120V AC
220-240V AC
350-450V AC
440-480V AC
+/-10%

Frequency
nominal 50Hz and 60Hz

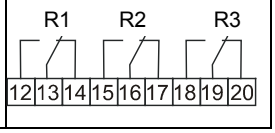
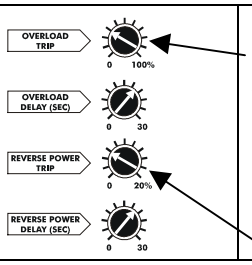
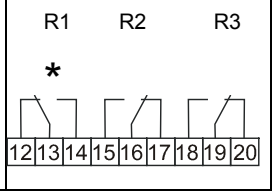
Current Input
KPW177A : 3 x 1A C.T.
: 3 x 5A C.T.

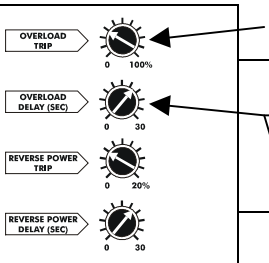
Contact Rating
AC : 100VA - 250V/2A max.
DC : 50W - 100V/1A max.

Adjustments
Trip level O/L : 0-100% FSD.
Trip time O/L : 0-30 seconds.
Trip level R/P : 0-20% FSD.
Trip time R/P : 0-30 seconds.
Hysteresis : 2-100% O/L

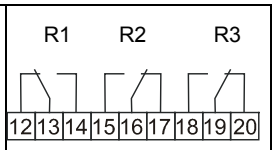
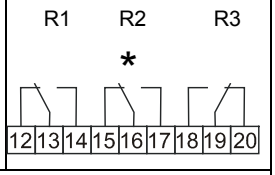
Output
DC current : 4-20mA, -1-0-10mA
500Ω max.
Response time : >50mS

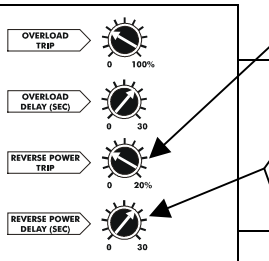
ORDERING INFORMATION		
	Product type : KPW177A Voltage input : CT Ratio : Scale : Output :	DS range
	Example : KPW177A, 440/110V, 500/5A, 400kW, 4-20mA	
Related information	Operation = KPW177A MOD, Three phase three wire = KPW176A MPD	

	Auxiliary supply off	 Both LED's off	
	Aux. supply on, below overload trip level and below reverse power trip level	 Green LED on	

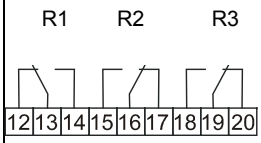
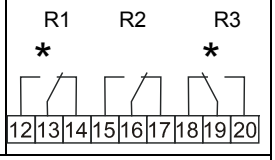


Above overload trip level 0-100% FSD

during delay 0-30 seconds	 Flashing Red once per second Green LED off	
after delay	 Red overload LED on Green LED off	
Hysteresis	R2 will reset below trip level minus hysteresis set point	



Above reverse power trip level 0-20% FSD

during delay 0 to 30 seconds	 Flashing Red once per second	
after delay	 Red reverse power LED on	
Reset	R1 and R3 latch and are reset by disconnecting terminal 1	

* indicates relay changing state