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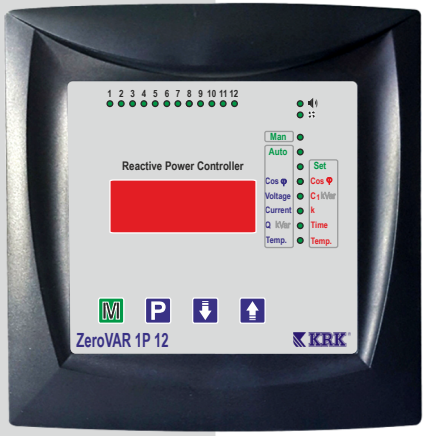
ISO 9001:2008

KRK®

ELECTRONIC CONTROL SOLUTIONS & PANEL INSTRUMENTS

NEW

2 YIL GARANTİ

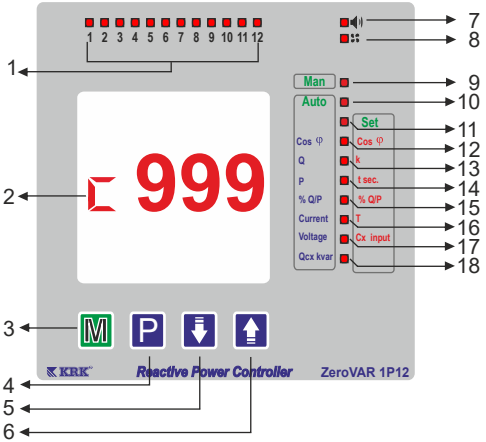


ZeroVAR 1P 6 - 1P 8 - 1P 12
REACTIVE POWER CONTROLLER
USER GUIDE

www.krk.com.tr

GENERAL SPECIFICATIONS

- ZeroVAR 1Px, compensates the system according to total reactive power by measuring voltage and current from single phase. It must be used with threephase capacitors.
- It compensates according to system's cosφ value. It must be used with threephase capacitors.
- Measures cosφ , current, voltage, reactive power, active power and temperature.
- to reach target cosφ, receive or release the steps
- Target cosφ value can be adjusted to be inductive or capacitive
- Adjustable Delay On, Delay Off, Dicharge time
- Over conpensation, insufficient compensation and temperature alarm gives alerts.
-It has a fan output to cool the panel and temperature value can be adjusted. Fan can be made passive by user in Menu mode.
- Device sense current directions of phase
- Automatic set, easy usage



1- 1,2,3.....12: Shows the steps which capacitor is switched on.

2- End.Cap: ı : It shows that Cosφ value is inductive.
c : It shows that Cosφ value is capacitive.

3- M **Auto/Set/Man:** With this buton you can choose Auto mode, Set mode or Man mode

4- P **Parametre:** It's used for selecting a parameter that is wanted to be adjusted

5- **:** In manuel mode, it is used for switch off the step. In Set mode, it is used for decreasing the value displayed.

6- **:** In Manuel mode is used for switch on the step. In Menu mode, it used for increasing the value displayed.

7- **:** shows that the alarm output is turned on.

8- **:** shows that fan is started to cool the panel.

9- Man. : Shows that the controller is in Manuel mode.

10- Auto : shows that the controller is in Automatic mode.

11- Set : shows that the controller is in Set mode.

12- Cosφ/Cosφ: In Auto mode and Manuel mode, the value displayed is cosφ value. In Set mode, it shows that Target Cosφ parameter is selected to adjust.

13- Q/k : In Auto Mode and Manuel Mode shows reactive power. In Set mode you can enter current transformer ratio.

14- P/t : In Auto mode and Manuel mode shows active power. In Set mode, ton, toff, td is entered.

15- %Q/P : In Auto mode and Manuel mode shows penalty rates. In set mode penalty rates can be entered.

16- Current/T : In Auto mode and Manuel mode shows systems current. In Set mode panel temperature can be entered

17- Voltage / Cx input : In Auto mode and Manuel mode shows the related voltage. In set mode steps power can be entered.

18- Qcx : In Auto mode and Manuel mode shows the steps power.

USING THE CONTROLLER

1- Operating mode select: "M" buton is used for selecting mode. If ''Auto'' lights, the controller is in automatic mode and compensate the system. In Auto mode the device try to reach target cosφ value. If ''Man'' lights, manually steps on or step off can be choosed. In set mode, user can make adjustment of the controller.

2- Switching on / off the steps: When ''up'' buton is pressed, one step is switched on. Related step light is on. When ''down'' button is pressed switched off the step.

3- Target cosφ adjustment: Press ''M'' buton to choose Set. Target cosφ adjustment is selected by ''P'' buton. Using down and Up butons, target cosφ can be adjusted. If you wait 10 second adjusted value is written to the memory and return to the automatic.

4- k adjustment: Press ''M'' buton to choose Set mode. Press''P'' button to choose ''k'' and enter current transformer ratio. If any button is not pressed for 10 seconds, adjusted value is written to the memory.

5- Switched-on time (ton) adjustment : Set mode is selected by ''M'' button. Ton adjustment is selected by parameter buton. Using Up/Down buttons, switched-on time can be adjusted in 1..99 seconds range. If any button is not pressed for 10 seconds, adjusted value is written to the memory and return to the auto mode.

6- Switched-off time (toff) : Set mode is selected by ''M'' button. ''Toff'' adjustment is selected by ''P'' buton. Using Up/Down buttons, switched-on time can be adjusted in 1..99 seconds range. If any button is not pressed for 10 seconds, adjusted value is written to the memory.

7- Temperature adjustment : Set mode is selected by "M'' button. Temperature adjustment is selected by parameter button. Using Up/Down buttons, temperature can be adjusted. If any button is not pressed for 10 seconds, adjusted value is written to the memory.

8-Cx Input: Set mode is selected by ''M'' button. Cx input is selected by ''P'' button. Using Up/Down button enter power of capacitor. If any button is not pressed for 10 seconds, adjusted value is written to the memory.

ALARMS

1- Insufficient compansation alarm: If the controller swithes on all the steps and it does not reach to system's target cosφ value. It ligts insufficient compensation alarm. If this continues 60 sec and alarm is turned on (1 sec.) .

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2- Over compansation alarm: If the controller is swithes off all the steps and it's cosφ value is bigger than systems target cosφ value, it lights over compensation alarm. If this continues 60 sec and alarm is turned on (1 sec).

3- Over temperature alarm : If panel temperature exceeds adjusted value fan output is actived 5 second later. If panel temperature is under 5 C of adjusted value fan output is passive.

TARGET COSφ TABLE

	Target CosØ					
CosØ (Ind)	0,80	0,85	0,90	0,95	1,00	(Cap.) 0,95
0,40	1,54	1,67	1,81	1,96	2,29	2,62
0,42	1,41	1,54	1,68	1,83	2,16	2,49
0,44	1,29	1,42	1,56	1,71	2,04	2,37
0,46	1,18	1,31	1,45	1,60	1,93	2,26
0,48	1,08	1,21	1,34	1,56	1,89	2,22
0,50	0,98	1,11	1,25	1,40	1,73	2,06
0,52	0,98	1,03	1,16	1,31	1,64	1,97
0,54	0,81	0,94	1,08	1,23	1,56	1,89
0,56	0,73	0,86	1,00	1,15	1,48	1,81
0,58	0,66	0,78	0,92	1,08	1,41	1,74
0,60	0,58	0,71	0,85	1,01	1,33	1,65
0,62	0,52	0,65	0,78	0,94	1,27	1,60
0,64	0,45	0,58	0,72	0,87	1,20	1,53
0,66	0,39	0,52	0,66	0,81	1,14	1,47
0,68	0,33	0,46	0,59	0,75	1,08	1,41
0,70	0,27	0,40	0,54	0,69	1,02	1,35
0,72	0,21	0,34	0,48	0,64	0,96	1,28
0,74	0,16	0,29	0,43	0,58	0,91	1,24
0,76	0,11	0,23	0,37	0,53	0,86	1,19
0,78	0,05	0,18	0,32	0,47	0,80	1,13
0,80	-	0,13	0,27	0,42	0,75	1,08
0,82	-	0,08	0,21	0,37	0,70	1,03
0,84	-	0,03	0,16	0,32	0,65	0,98
0,86	-	-	0,11	0,26	0,59	0,92
0,88	-	-	0,06	0,21	0,54	0,87
0,90	-	-	-	0,16	0,48	0,80
0,92	-	-	-	0,10	0,43	0,76
0,94	-	-	-	0,04	0,36	0,68
0,96	-	-	-	-	0,29	0,61
0,98	-	-	-	-	0,20	0,52

INSTALLATION OF COMPANSATION SYSTEM

Example: Cosφ=0,80 ve 50kVA There is a system that has cos =0,80 and 50 kVA total power. What are the total capacitor power ? How can we do capacitor power distrubition ?

Solution : Total power S=50 kVA

P=SxCosφ = 50x0,80 = 40 kW

Cosφ 0,80 value is reached to target cos =1 value by using multiplier that is taken from 'Target Cosφ Table'.

Multiplier that is taken from table is 0,75.

Reactive Power Q=PxMultiplier=40x0,75=30kVAR is found.

Current 50/(220x3)=75 A

Current transformer is selected as a near value to the upper 100/5

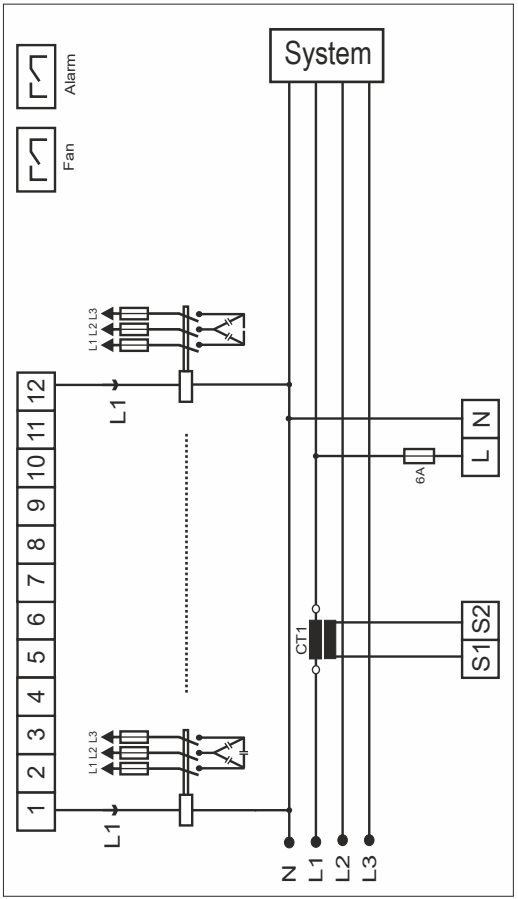
For 6 steps if we think this way 1 2 4 4 8 16 ; in total 33 electrical steps are obtained.

First step's capacitor power 30 kVAR /33 = 0,9 k VAR

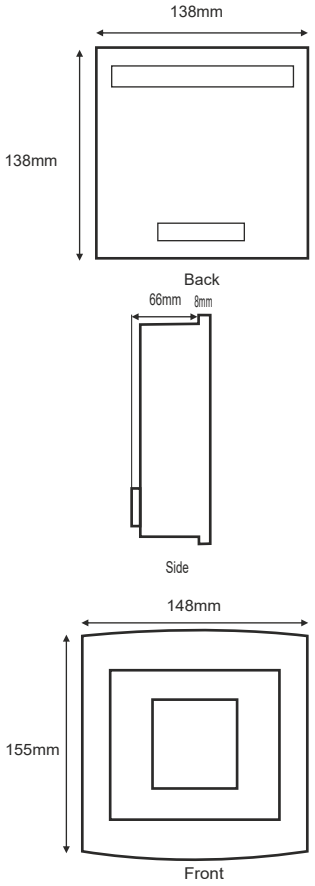
Nearest value 1 kVAR is selected.

1 1,5 2,5 5 10 15 = 35 kVAR is found.

CONNECTION DIAGRAM



DIMENSIONS



TECHNICAL SPECIFICATIONS

Supply Voltage	: 220Vac±%20(L1-N), 50 Hz
Power Consumption	: <5VA
Current Transformer	: .../5A
Current Meas. Range	: 40 mA..6A
Temperature Meas. Range	: -10..100 °C
Control Output	: Relay, 5A/250Vac(Resistive Load)
Cosφ Range	: 0,95(Ind.)...0,95(Cap.)
Step Delay	:
Switch-on time ton	: 1..99 sec.
Switch-off time toff	: 1..99 sec.
Comp. Alarm Delay	: 60sec.
Temperature Setting Range	: 30..65 °C
Factory Set Values	: Cosφ=1,00; k=20 ; ton=2sec.; toff=2sec. Ind %Q/P = 15 cap %Q/P = 10 Temperature=50 °C (Alarm ON)
Ambient Temperature	: -5...+55 °C
Display	: 3 Digits Red Display
Protection Class	: In Front: IP54 In Rear: IP20
Weight	: 0,90 kg