APP

LOW VOLTAGE POWER CAPACTORS

RINA QUACER

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LOW VOLTAGE POWER CAPACITORS

Application and Construction

Capacitors are intended for improvement of power factor in low voltage power networks. Used MKP technology consists of metallized PP film with extremely low loss factor. Dieletric system is selfhealing and completely dry with no liquid impregnation.

Capacitor elements in cylindrical aluminium boxes are N2 Gas or molded by dry material that has vegetable origin and presents no ecologically problems. For this reason there is not any dangerous environment pollution. The case of capacitors is protected by over pressure disconnector against the rapture of case. It ensures safety disconnecting of capacitors from power line during the short circuit and the end of life time.

Capacitors are equipped with three discharge resistors and due to all the mentioned characteristics have very high reliability and durability.

Technical Data

Rated voltage:	230V, 240V, 260V, 400V, 440V, 480V, 525V, 600V (the other voltages by request)
Rated frequency:	50Hz or 60Hz
Max. voltage:	1.1×Ua
Max. current:	1.3×Ia
Max. inrush current:	200×Ia
Temperature Category:	-25 / +50℃
Dielectric losses:	≦0.2W/kvar
Capacitor losses:	≦0.3W/kvar
Total losses:	≦0.5W/kvar
Tolerance of capacitance:	-5%...+15%
Insulating level:	3kV/10s, Terminal -terminal 2.15×Ua / 10s
Standards:	IEC831 – 1.2/87, VDE0560
Discharge resistors:	Discharging winthin 1 minute to 50 V
Construction:	Indoor instalation, single and three phase
Coverage:	- Cylindrical case IP00, IP20 (IP44 by request) - Square case IP00(IP42 by request)

Operating temperature range

Symbol	Ambient air temperature(℃)		
	Maximum	Highest mean over any period of	
		24h	1 year
A	+40	+30	+20
B	+45	+35	+25
C	+50	+40	+30
D	+55	+45	+35

Permitted operating voltage

Rated voltage	230V	400V	440V	480V	525V
Permanent	260V	440V	460V	520V	580V
8 h / day	270V	470V	490V	560V	610V
30 min / day	280V	500V	520V	590V	640V
5 min / 200 times	290V	520V	540V	620V	670V
1 min / 200 times	310V	560V	580V	660V	710V
Permitted peak voltage during operation	900V	1250V	1350V	1500V	1580V

Recommended values of connected cables

Cross section of Cu cable (mm^2)	Rated power (kvar) for 400V and 440V
2.5	≦8
4	≦12.5
6	≦20
10	≦25
35	≦60
70	≦80
95	≦100

Capacity Table

230V Three Phase

Type	Power (Kvar)	Capacutance (μF)	Current (A)	Dimension D×H(mm)	Mass (Kg)	Fig
AP230/5	5	3×83.6	12.6	85×245	2.3	1
AP230/10	10	3×167.2	25.2	110×261	2.5	1 , 2
AP230/15	15	3×250.8	37.8	110×261	2.5	2
AP230/20	20	3×334.4	50.2	136×261	3.7	2
AP230/25	25	3×418.1	62.8	136×261	3.8	2

240V Three Phase

Type	Power (Kvar)	Capacutance (μF)	Current (A)	Dimension D×H(mm)	Mass (Kg)	Fig
AP240/5	5	3×76.8	12.0	85×245	2.3	1
AP240/10	10	3×153.6	24.0	110×261	2.5	1 , 2
AP240/15	15	3×230.4	36.0	110×261	2.5	2
AP240/20	20	3×307.1	48.1	136×261	3.7	2
AP240/25	25	3×383.9	60.1	136×261	3.8	2

260V Three Phase

Type	Power (Kvar)	Capacutance (μF)	Current (A)	Dimension D×H(mm)	Mass (Kg)	Fig
AP260/5	5	3×65.4	11.1	85×245	2.3	1
AP260/10	10	3×130.8	22.2	110×261	2.5	1 , 2
AP260/15	15	3×196.2	33.3	110×261	2.5	2
AP260/20	20	3×261.7	44.4	136×261	3.7	2
AP260/25	25	3×327.1	55.5	136×261	3.8	2

400V Three Phase

Type	Power (Kvar)	Capacutance (μF)	Current (A)	Dimension D×H(mm)	Mass (Kg)	Fig
AP400/5	5	3×33.2	7.2	85×175	1.2	1
AP400/10	10	3×66.4	14.4	85×245	1.6	1
AP400/15	15	3×99.6	21.6	85×245	2.6	1
AP400/20	20	3×132.8	28.8	110×261	2.6	1 , 2
AP400/25	25	3×166.0	36.0	110×261	2.9	2
AP400/30	30	3×199.2	43.2	110×261	2.9	2
AP400/40	40	3×265.6	57.7	136×261	3.5	2
AP400/50	50	3×332.0	72.2	136×355	4.6	2
AP400/60	60	3×398.4	86.6	136×355	4.6	2

440V Three Phase

Type	Power (Kvar)	Capacutance (μF)	Current (A)	Dimension D×H(mm)	Mass (Kg)	Fig
AP440/5	5	3×27.4	6.6	85×175	1.2	1
AP440/10	10	3×54.8	13.2	85×245	1.6	1
AP440/15	15	3×82.2	19.8	85×245	2.6	1
AP440/20	20	3×109.6	26.4	110×261	2.6	1 , 2
AP440/25	25	3×137.0	33.0	110×261	2.9	2
AP440/30	30	3×164.4	39.6	110×261	2.9	2
AP440/40	40	3×219.2	52.5	136×261	3.5	2
AP440/50	50	3×274.0	65.6	136×355	4.6	2
AP440/60	60	3×328.8	78.7	136×355	4.6	2

480V Three Phase

Type	Power (Kvar)	Capacutance (μF)	Current (A)	Dimension D×H(mm)	Mass (Kg)	Fig
AP480/5	5	3×23	6.0	85×175	1.2	1
AP480/10	10	3×46.1	12.0	85×245	1.2	1
AP480/15	15	3×69.0	18.0	110×261	2.0	1
AP480/20	20	3×92.1	24.1	110×261	2.6	1 , 2
AP480/25	25	3×115.2	30.1	110×261	2.6	2
AP480/30	30	3×138.2	36.1	136×220	3.2	2
AP480/40	40	3×184.4	48.1	136×261	3.5	2
AP480/50	50	3×230.5	60.1	136×355	4.6	2
AP480/60	60	3×276.6	72.2	136×355	4.6	2

525V Three Phase

Type	Power (Kvar)	Capacutance (μF)	Current (A)	Dimension D×H(mm)	Mass (Kg)	Fig
AP525/10	10	3×38.4	11.0	85×245	1.6	1
AP525/15	15	3×57.6	16.5	110×245	2.6	1
AP525/20	20	3×76.8	22.0	110×261	2.6	1 , 2
AP525/30	30	3×115.2	33.0	110×261	3.2	2
AP525/40	40	3×153.6	44.0	146×261	3.5	2
AP525/50	50	3×192.0	55.0	146×355	4.6	2
AP525/60	60	3×230.4	66.0	146×355	4.6	2

Dimensions

Fig.1
IP20

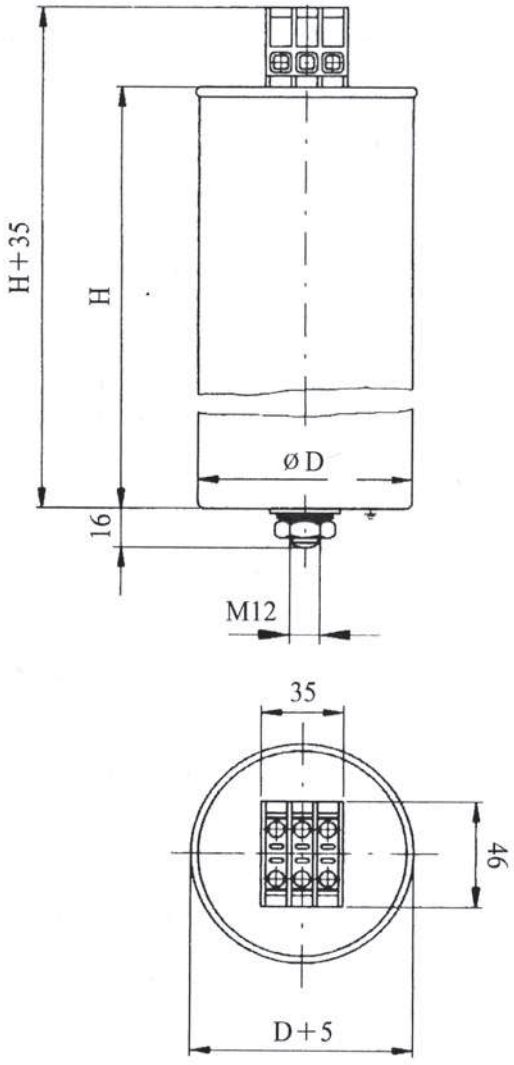
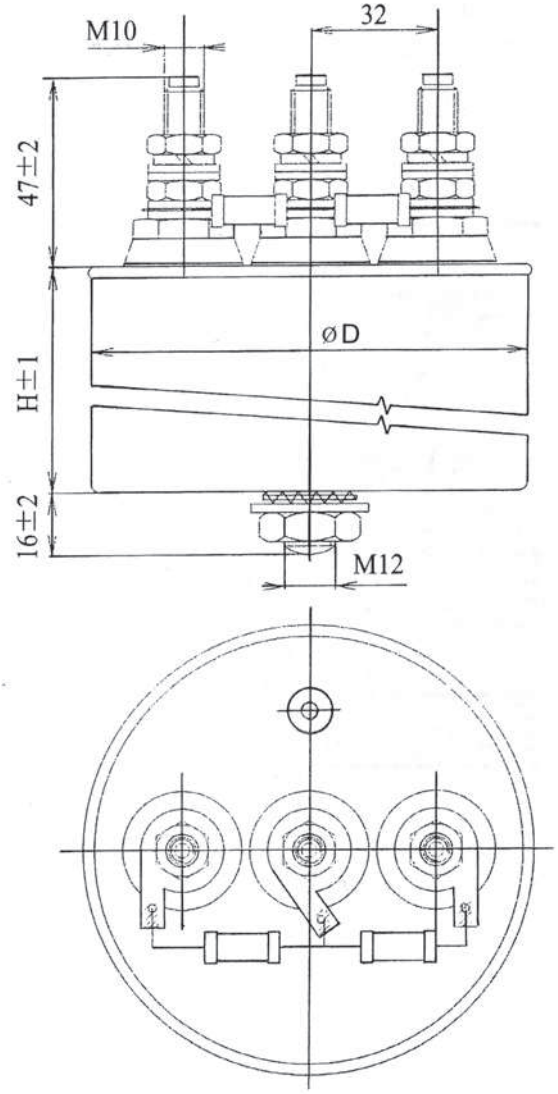


Fig.2



MODULES FOR RECONSTRUCTION OF CAPACITOR BANKS

Construction

Capacitor block is installed on supporting instrument 2mm thick metal plate with dimensions of 570 x 200 x 155mm (width x height x deep). Surface finish is made by powder paint. Max. dimensions of module installed elements are 570 x 331 x 310mm. Distance of fixed holes for bolts M10 (oval 12 x 30mm) is 530 x 100mm.

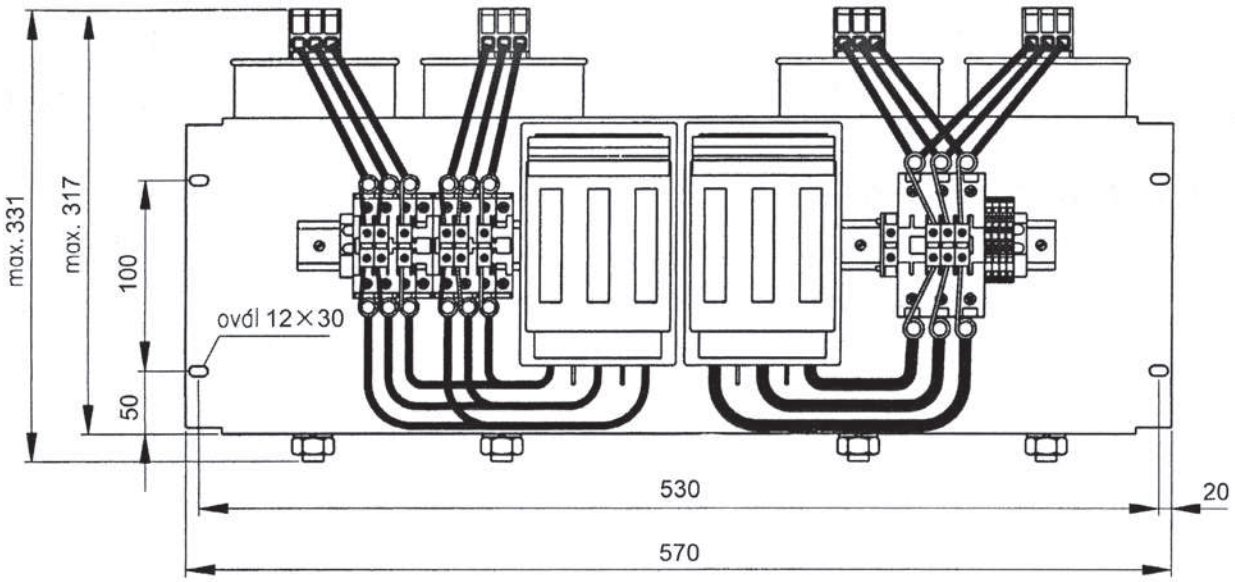
There are two switch-disconnectors type LTL 00 with fuses PN 00 or PN 000 (characteristic "gG") and double step contactors with resistive switching of capacitors (their control circuits are connected to nonscrew - shaped terminal) on the front side of panel.

There are placed the selfhealing capacitors on the rear side of panel. The value of protection element and connection conductors is calculated according to switched power. All conductors have the moulded outlets (cavities and loop-holes).

Standard module block is made in two - up to four - step performance with power up to 100 kVAr and voltage 230 V,240 V,260 V, 400 V, 440 V, 480 V, 525 V, 600 V.

Customer can choose the module blocks (see table) according to the total required power, connect outlets to switchdisconnectors with bus-bars and connect also control conductors to regulator. Then capacitor bank can be put into operation according to instruction of regulator.

Dimensions



MODULE FOR 230V

Type	Number of steps	Total power of module(kvar)	Power steps of module(kvar)	Current (A)
BP230/10	1	10	10	25.1
BP230/20	1	20	20	50.2
BP230/30	1	30	30	75.3
BP230/30	2	30	15+15	37.7+37.7
BP230/40	1	40	40	100.4
BP230/50	1	50	50	125.5
BP230/60	3	60	20+20+20	50.2+50.2+50.2

MODULE FOR 400V

Type	Number of steps	Total power of module(kvar)	Power steps of module(kvar)	Current (A)
BP400/10	1	10	10	14.4
BP400/10	1	10	10	14.4
BP400/20	1	20	20	28.8
BP400/30	1	30	30	43.2
BP400/40	1	40	40	57.6
BP400/40	2	40	20+20	28.8+28.8
BP400/50	1	50	50	72
BP400/60	1	60	60	86.4
BP400/60	2	60	30+30	43.2+43.2
BP400/80	1	80	80	115.2
BP400/100	4	100	25+25+25+25	36.1+36.1+36.1+36.1

* Other power capacity and voltage by request.
* Harmonic circuit filter reactors 6% or 7% are available as optional requirement.
* Thyristor power modules for switching of power capacitors.

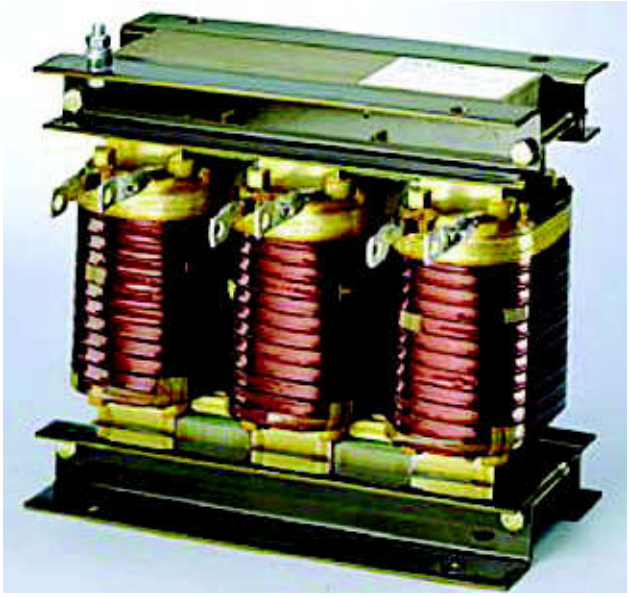
FILTERING REACTORS

Construction

Standard design is intended for detuned capacitor banks. Reactors have high linearity low losses and minimal noise. Cooling process is improved by special construction of air cooling channels and subsequent bigger surface. Inductance is fixed to the exact vale with tolerance of -1/+3%. Outlets of winding are connected to terminals on the top of core. Temperature sensor is situated inside the middle part of winding and connected to special terminal. Switch off temperature is 120℃ and insulation class is "F" .

Function of Reactors

- Limiting in rash current during switching of capacitors.
- Limiting resonances and protection of capacitor banks against over loading arising form higher harmonics.
- Avoiding loss of line frequency (power remote control) from power company.
- Getting power resonance circuits tuned to higher harmonic frequencies.



Technical Data

Rated voltage:	3§230V,240V,260V,400V,440V,480V,525V,600V
Frequency of system:	50/60Hz
Filter factor (μk):	6% 13%
Frequency of filter:	245Hz 166Hz
Tolerance of inductance:	±3%
Test voltage:	5000V
Degree of protection:	IP00
Ambient temperature:	+45℃
Standard:	IEC 61558-2-20

⊙ Other voltage, frequency, factors enclosures and cast - resin type are possible on request.