BTB Electric

CATALOGUE

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INTRODUCTION

BTB ELECTRIC is an European Technology Company, this brand name since 1976 in Turkey. As a famous Manufacturer of Power Capacitor, Harmonic Filter Reactor, Power factor Controller, Capacitor Duty Contactor.

Our products are manufactured in a high-class fully automated manufacturing unit under expert supervision. Each product goes through various stages of stringent quality checks to ensure the best quality. Our Products are exported throughout the world, and we have earned a great reputation from customers worldwide.We believe that developing the most unique and superior products is the best way to meet/exceed customers' expectations. We strive to provide our clients new products, advanced designs, and patented innovations so that they can stay on the top of their markets.

BTB Electric carries out production in strict accordance with the IS09001 quality management system.

BASIC CHARACTERISTICS

Many electrical devices, equipments and systems needs an electromagnetic field for their standard operation. This physical necessity leads to a consumption of reactive power which is used to provide basic function but not any active power. It means that transmission and distribution system is loaded with this reactive power and that's not an economically effective use and therefore it's penalized by electrical utility companies.

The solution is to use local power factor compensation to provide the required rective power from power capacitors directly to the appliance to avoid undesired load of the mains network.

CALCULATION TABLE AND FORMULA FOR REQUIRED REACTIVE POWER

Original cos φ_1	k coefficient for target cosφ_2										
	0,90	0,91	0,92	0,93	0,94	0,95	0,96	0,97	0,98	0,99	1,00
0,70	0,54	0,56	0,59	0,62	0,66	0,69	0,73	0,77	0,82	0,88	1,02
0,75	0,40	0,43	0,46	0,49	0,52	0,55	0,59	0,63	0,68	0,74	0,88
0,80	0,27	0,29	0,32	0,35	0,39	0,42	0,46	0,50	0,55	0,61	0,75
0,82	0,21	0,24	0,27	0,30	0,34	0,37	0,41	0,45	0,49	0,56	0,70
0,84	0,16	0,19	0,22	0,25	0,28	0,32	0,35	0,40	0,44	0,50	0,65
0,85	0,14	0,16	0,19	0,22	0,26	0,29	0,33	0,37	0,42	0,48	0,62
0,86	0,11	0,14	0,17	0,20	0,23	0,26	0,30	0,34	0,39	0,45	0,59
0,87	0,08	0,11	0,14	0,17	0,20	0,24	0,28	0,32	0,36	0,42	0,57
0,88	0,06	0,08	0,11	0,14	0,18	0,21	0,25	0,29	0,34	0,40	0,54
0,89	0,03	0,06	0,09	0,12	0,15	0,18	0,22	0,26	0,31	0,37	0,51
0,90		0,03	0,06	0,09	0,12	0,16	0,19	0,23	0,28	0,34	0,48
0,91			0,03	0,06	0,09	0,13	0,16	0,20	0,25	0,31	0,46
0,92				0,03	0,06	0,10	0,13	0,18	0,22	0,28	0,43
0,93					0,03	0,07	0,10	0,14	0,19	0,25	0,40
0,94						0,03	0,07	0,11	0,16	0,22	0,36
0,95							0,04	0,08	0,13	0,19	0,33

$$Q_c = P \cdot k = P \cdot (\tan \varphi_1 - \tan \varphi_2)$$
$$P = S \cdot \cos\varphi$$

Q_c - Reactive power of the required power capacitor
P - Active power of the load to be corrected
K - Conversion coefficient
φ_2 - Original cosφ
φ_1 - Target cosφ

CALCULATION EXAMPLE

Load power P = 100 kW
Original cosφ_1 = 0,75
Target cosφ_2 = 0,95
K coeff. (from table) = 0,55

Capacitor reactive power Q_C

$$Q_C = P \cdot k = 100 \cdot 0{,}55 = 55\ kvar$$

BASIC FORMULAS FOR DETUNED POWER FACTOR CORECTION

$$U_c = \frac{UN}{1 - \frac{p}{100\%}}$$

$$P = \frac{X_L}{X_c} \cdot 100\%$$

$$f_r = f_N \cdot \sqrt{\frac{100\%}{p}}$$

U_c - Capacitor voltage – rms value of required voltage of the capacitor. The reactor cause increase of the mains voltage at capacitor.
P - Detuning factor – ratio of reactor inductance and capacitor capacitance reactances
f_r - Serie resonance frequency between reactor and capacitior.
U_N - Nominal (rated) mains voltage
f_N - Nominal (rated) mains frequency

CAPACITOR DRAWING

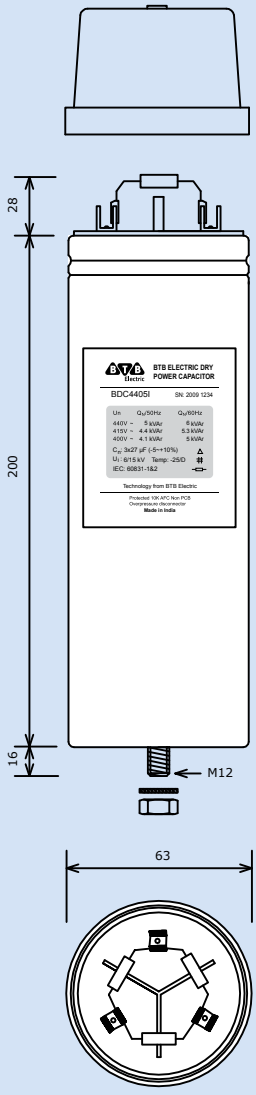


Fig: A

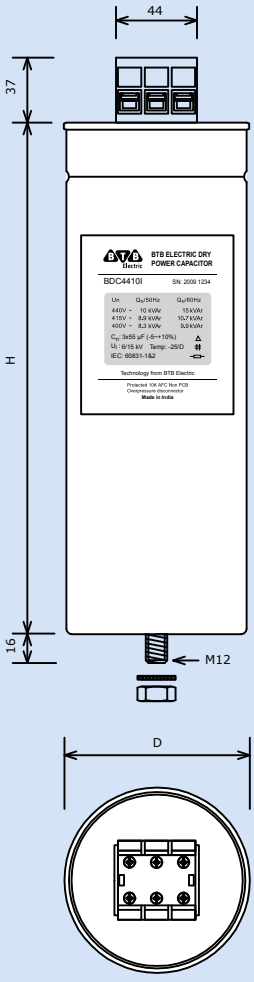


Fig: B

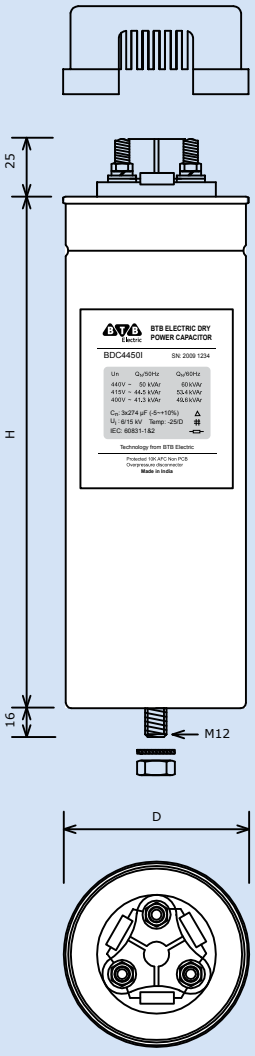


Fig:C

GENERAL TECHNICAL PARAMETERS

No	Specifications	Data (BDCxxxxl)
1	Construction	Cylindrical
2	External Terminal Box & Casing Finishing	Extruded Aluminum Casing
3	Type	Dry, Self Healing
4	Dielectric	Polypropylene (*)
5	Plate	Zinc-Aluminum Alloy
6	Rated Voltage (Un)	230V to 690V
7	Frequency	50/60Hz
8	Connection	3-phase (Internal Delta)
9	Temperature Category	- 25°C to +55°C (class D)
10	Max altitude	2000 m
11	Max relative humidity	95%
12	Capacitance Tolerance	-5% / +10%
13	Dielectric Loss	≤ 0.2W / kVAR
14	Testing Voltage Between Terminals / Time	2.15 Un / 10s
15	Testing Voltage Between Terminals And Container / Time	4kV / 10s
16	Maximum Permissible Voltage	1.1 Un (8hours in evenry 24hours)
		1.15 Un (30minutes in evenry 24hours)
		1.2 Un (5minutes)
		1.3 Un (1minute)
17	Maximum Permissible Current	1.5 In
18	Maximum inrush current	200 In
19	Lighting Impulse Test Between Terminal and Container	8kV (Peak)
20	Discharge Resistor | For 05 - 50 kVAR	Picture
21	Fastening / Earthing	Threaded M12 stud at the bottom (≤ 15Nm)
22	Terminal Arrangements	Screw Terminal Top Deck
23	Mounting Position	Any Position
24	Statistical Life Expectancy	> 130,000 Operating Hours (**)
25	Standards	IEC 60831-1/ 2
26	IP Rating	IP20
27	Safety Device	Auto disconnect, when capacitor has trouble (Pressure Active Series Interruptor)

(*) Metalized Polypropylene film with Zn / Al alloy. Special resisity & profile, special edge - Wave-cut (THD ≤5%)"

(**) Respect the manufacturer's technique

SPECS & SIZE : 250V, 50HZ

Product Code	Rated Voltage	Frequency	Rated Capacity		Rated Current	Dimensions (mm)		Discharge Resistor	Figure
	V AC	Hz	kVAR	µF	A	Ø D	H	kΩ (3 watt)	
BCD2505I	250	50	5	3x85	13	75	200	100	Fig A
BCD2510I	250	50	10	3x170	25	85	300	100	Fig C
BCD2515I	250	50	15	3x255	38	100	300	47	Fig C
BCD2520I	250	50	20	3x340	50	116	300	47	Fig C
BCD2525I	250	50	25	3x424	63	136	300	47	Fig C
BCD2530I	250	50	30	3x509	75	136	300	47	Fig C

SPECS & SIZE : 415V, 50HZ

Product Code	Rated Voltage	Frequency	Rated Capacity		Rated Current	Dimensions (mm)		Discharge Resistor	Figure
	V AC	Hz	kVAR	µF	A	Ø D	H	kΩ (3watt)	
BDC4105I	415	50	5	3x31	7	63	200	680	Fig A
BDC4110I	415	50	10	3x62	14	85	200	100	Fig B, C
BDC4115I	415	50	15	3x92	21	85	300	100	Fig B, C
BDC4120I	415	50	20	3x123	28	90	300	100	Fig B, C
BDC4125I	415	50	25	3x154	35	100	300	100	Fig B, C
BDC4130I	415	50	30	3x185	42	116	300	47	Fig B, C
BDC4140I	415	50	40	3x246	56	116	300	47	Fig C
BDC4150I	415	50	50	3x308	70	136	300	47	Fig C

SPECS & SIZE : 440V, 50HZ

Product Code	Rated Voltage	Frequency	Rated Capacity		Rated Current	Dimensions (mm)		Discharge Resistor	Figure
	V AC	Hz	kVAR	µF	A	Ø D	H	kΩ (3watt)	
BDC4405I	440	50	5	3x27	7	63	200	680	Fig A
BDC4410I	440	50	10	3x55	13	75	200	100	Fig B, C
BDC4415I	440	50	15	3x82	20	75	300	100	Fig B, C
BDC4420I	440	50	20	3x110	26	85	300	100	Fig B, C
BDC4425I	440	50	25	3x137	33	90	300	100	Fig B, C
BDC4430I	440	50	30	3x164	39	100	300	47	Fig B, C
BDC4440I	440	50	40	3x219	52	116	300	47	Fig C
BDC4450I	440	50	50	3x274	66	136	300	47	Fig C

SPECS & SIZE : 480V, 50HZ

Product Code	Rated Voltage	Frequency	Rated Capacity		Rated Current	Dimensions (mm)		Discharge Resistor	Figure
	V AC	Hz	kVAR	µF	A	Ø D	H	kΩ (3watt)	
BDC4805I	480	50	5	3x23	6	63	200	680	Fig A
BDC4810I	480	50	10	3x46	12	85	200	100	Fig B, C
BDC4815I	480	50	15	3x69	18	85	300	100	Fig B, C
BDC4820I	480	50	20	3x92	24	90	300	100	Fig B, C
BDC4825I	480	50	25	3x115	30	100	300	100	Fig B, C
BDC4830I	480	50	30	3x138	36	116	300	47	Fig B, C
BDC4840I	480	50	40	3x184	48	116	300	47	Fig C
BDC4850I	480	50	50	3x230	60	136	300	47	Fig C

SPECS & SIZE : 525V, 50HZ

Product Code	Rated Voltage	Frequency	Rated Capacity		Rated Current	Dimensions (mm)		Discharge Resistor	Figure
	V AC	Hz	kVAR	µF	A	Ø D	H	kΩ (3watt)	
BDC5205I	525	50	5	3x19	5	63	200	680	Fig A
BDC5210I	525	50	10	3x38	11	85	200	100	Fig B, C
BDC5215I	525	50	15	3x58	16	85	300	100	Fig B, C
BDC5220I	525	50	20	3x77	22	90	300	100	Fig B, C
BDC5225I	525	50	25	3x96	27	100	300	100	Fig B, C
BDC5230I	525	50	30	3x115	33	116	300	100	Fig B, C
BDC5240I	525	50	40	3x154	44	136	300	100	Fig C
BDC5250I	525	50	50	3x192	55	136	300	47	Fig C

SPECS & SIZE : 690V, 50HZ

Product Code	Rated Voltage	Frequency	Rated Capacity		Rated Current	Dimensions (mm)		Discharge Resistor	Figure
	V AC	Hz	kVAR	µF	A	Ø D	H	kΩ (3watt)	
BDC6905I	690	50	5	3x11	4	68	200	1 M	Fig A
BDC6910I	690	50	10	3x22	8	90	200	680	Fig B, C
BDC6915I	690	50	15	3x33	13	90	300	100	Fig B, C
BDC6920I	690	50	20	3x45	17	100	300	100	Fig B, C
BDC6925I	690	50	25	3x56	21	116	300	100	Fig B, C
BDC6930I	690	50	30	3x67	25	136	300	100	Fig B, C

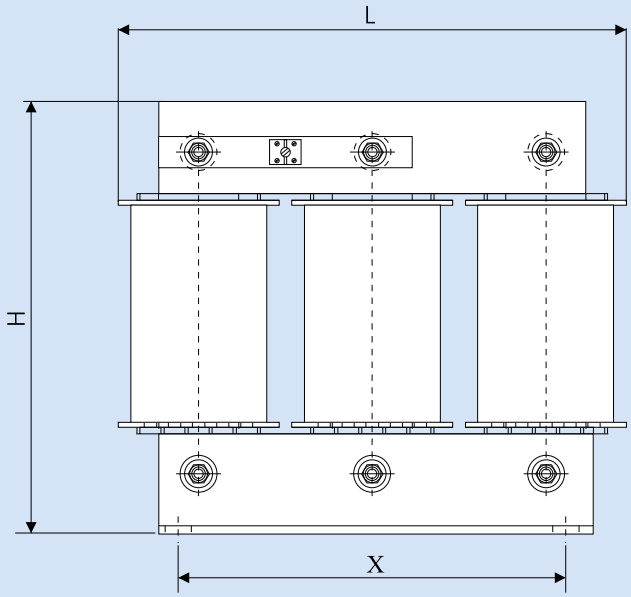
APPLICATION

Frequent use of power electronic devices with nonlinear loads leads to harmonic distortion in electrical system. This nonsinusoidal load causes increase of effective current of power capacitor and other components of the system as well as the possibility of capacitor resonance with other inductive loads. Finally it may lead to problems or even failures in the installation. The solution is to use detuning (filtering) reactors, which creates a series resonant circuit with power capacitors. This detuned system prevents the installation from resonance effect and also acts as a filter for higher harmonic content. Usually there is recommended to use detuning reactors for the total voltage distortion THD-U higher than 3 %

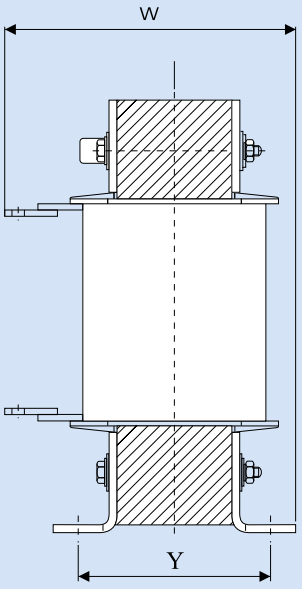
SALIENT FEATURES

- Special Design with High-Level Saturation
- Superior Performance
- High-Grade Laminations in Magnetic Circuit
- Easy Pad Termination & Mounting
- Low Power Losses
- Protection from Excess Temperature

REACTOR DRAWING



Elevation



R.H.SideView

GENERAL TECHNICAL PARAMETERS

No.	Specifications	Data
1	Rated voltage / Maximum Input Voltage	400 - 800 V / 1,1 kV
2	Frequency	50 Hz
3	Rated power	5 - 100kVAR (Ordered for special sizes)
4	Design	Three phase, iron core with multi air gap
5	Resonance Frequency	6% - 204Hz / 7% - 189 Hz / 14% - 134Hz
6	Impedance Ratio / Model	P= 6% of Capacitor Value / BRH3-6 P= 7% of Capacitor Value / BRH3-7 P= 14% of Capacitor Value / BRH3-14
7	Coil Winding Material	Copper[Aluminium on request]
8	Maximum Current Including Harmonics Overload	1.5 Times the Capacitor current
9	Tolerance of Inductance	+/- 3% at Effective Current (Ieff)
10	Linearity of Inductance	1.75 x Ic
11	Designed Limits for Harmonic Currents	I5 = 45%, I7 = 25%, I11 = 12.5%, I13 = 5%
12	Ventilation / IP Class	Air-Cooled / IP 00 [Indoor]
13	Maximum Reactor Operating Temperature	135°C at ambient temperature 45°C
14	Thermal Ovevrload Protection	Built-in thermostat cut off at 135°C
15	Insulation Class	Class F (155°C)
16	Max altitude	2000 m
17	Max relative humidity	95%
18	Statistical life expectancy	> 200 000 hours
19	Vacuum Impregnation	Yes
20	Insulation Strength Testing Voltage	3kV
21	Noise Level	Below 55db
22	Duty Cycle	Continuous
23	Compliance Standards	IEC60076-6

DETUNED HARMONIC FILTERS AT 400V NETWORK P=7% ACCORDING TO SPEC EN60076-6

Product code	Capacitor Power (kVAr)	Capacitor Voltage (V)	Reactor Inductance (mH)	Dimension (LxWxH) mm	Dimension (XxY) mm	Fixing Holes	Weight (kg)	I rms (A)	I lin (A)	R(mOhm)	Total Loss (W)
BRH1-7/400/5	5	440	7.66	148x80x127	80x64	6x10mm	4.6	7.6	14.5	111.2	41.5
BRH1-7/400/10	10	440	3.83	194x131x152	90x78	7x12mm	8.4	15.2	30	41.6	64.3
BRH1-7/400/12.5	12.5	440	3.07	194x131x152	90x78	7x12mm	8.6	19.4	36.9	34.3	76.8
BRH1-7/400/15	15	440	2.56	194x143x152	90x90	7x12mm	10.9	22.9	44.1	25.39	85.7
BRH1-7/400/20	20	440	1.92	245x125x203	120x70	7x12mm	12.5	30.5	49.1	18.10	95.8
BRH1-7/400/25	25	440	1.532	245x125x203	120x70	7x12mm	13.3	38.1	72.3	14.65	128.4
BRH1-7/400/30	30	440	1.28	245x125x203	120x70	7x12mm	13.5	45.7	73.6	12.74	152.6
BRH1-7/400/40	40	440	0.96	245x145x203	120x90	7x12mm	18.2	61	98.1	7.29	170.7
BRH1-7/400/50	50	440	0.767	270x143x245	140x121	9x17mm	20.2	76.2	122.7	6.13	215.6
BRH1-7/400/60	60	440	0.639	298x146x245	260x95	9x17mm	25.9	91.4	147.2	5.16	258.8
BRH1-7/400/70	70	440	0.548	298x166x245	260x115	9x17mm	28.6	106.7	171.8	3.15	279
BRH1-7/400/75	75	440	0.511	298x166x245	260x115	9x17mm	28.9	114.3	184.1	2.9	289
BRH1-7/400/80	80	440	0.479	298x166x245	260x115	9x17mm	29.3	121.9	196.3	2.74	308
BRH1-7/400/90	90	440	0.426	360x175x300	200x108	9x17mm	41.6	137.2	220.9	2.21	341
BRH1-7/400/100	100	440	0.384	360x175x300	200x108	9x17mm	42.7	152.4	245.4	1.96	353

Product code	Capacitor Power (kVAr)	Capacitor Voltage (V)	Reactor Inductance (mH)	Dimension (LxWxH) mm	Dimension (XxY) mm	Fixing Holes	Weight (kg)	I rms (A)	I lin (A)	R(mOhm)	Total Loss (W)
BRH3-7/400/5	5	440	7.67	180x85x200	125x60	8x12mm	5	8.03	14.17	296.2	34.6
BRH3-7/400/10	10	440	3.83	180x115x200	125x75	8x12mm	9.5	16.34	29.17	34.7	53.5
BRH3-7/400/12.5	12.5	440	3.07	180x115x200	125x90	8x12mm	10.1	20.39	36.67	34	63.6
BRH3-7/400/15	15	440	2.56	180x115x200	125x105	8x12mm	11	24.56	43.83	27.9	71.2
BRH3-7/400/20	20	440	1.92	240x110x215	175x85	8x15mm	14.5	32.63	58.33	14.6	79.6
BRH3-7/400/25	25	440	1.53	240x120x215	175x100	8x15mm	17	40.78	72.5	13	106
BRH3-7/400/30	30	440	1.28	240x130x215	175x115	8x15mm	21	49.01	87.5	8.5	127
BRH3-7/400/40	40	440	0.96	295x145x260	200x75	8x15mm	24.5	65.35	116.67	6.7	142
BRH3-7/400/50	50	440	0.77	295x155x260	200x125	8x15mm	26.5	81.68	145.83	4.7	179
BRH3-7/400/60	60	440	0.64	295x160x260	200x130	8x15mm	35	98	175	3.4	215
BRH3-7/400/70	70	440	0.54	295x180x260	200x140	8x15mm	41	120	215	2.7	232
BRH3-7/400/75	75	440	0.51	295x190x260	200x155	8x15mm	43	123	220	2.2	240
BRH3-7/400/80	80	440	0.48	350x170x325	250x100	12x20mm	46	130.4	233.33	2.6	256
BRH3-7/400/90	90	440	0.42	350x190x325	250x125	12x20mm	49	160	285	1.9	283
BRH3-7/400/100	100	440	0.38	350x190x325	250x125	12x20mm	50	163	293.33	1.8	293

Minimum 440V Capacitors should be used with these reactors

DETUNED HARMONIC FILTERS AT 400V NETWORK P=14% ACCORDING TO SPEC EN60076-6

Product code	Capacitor Power (kVAr)	Capacitor Voltage (V)	Reactor Inductance (mH)	Dimension (LxWxH) mm	Dimension (XxY) mm	Fixing Holes	Weight (kg)	I rms (A)	I lin (A)	R(mOhm)	Total Loss (W)
BRH1 14/400/5	5	480	16.5	177x90x152	90x68	7x12mm	6.7	7.7	10.1	170.2	60.1
BRH1 14/400/10	10	480	8.23	237x95x200	120x68	7x12mm	11.3	15.4	20.2	78.4	94.1
BRH1 14/400/12.5	12.5	480	6.45	237x105x200	120x78	7x12mm	15.9	19.2	25.3	52.7	121.2
BRH1 14/400/15	15	480	5.45	237x105x200	120x78	7x12mm	16.2	23.1	30.3	52.3	135.4
BRH1 14/400/20	20	480	4.08	298x137x245	260x86	7x12mm	19.8	30.8	40.4	32.2	136.4
BRH1 14/400/25	25	480	3.3	298x137x245	260x86	9x17mm	20.7	38.5	50.5	28.2	138.9
BRH1 14/400/30	30	480	2.75	298x156x245	260x105	9x17mm	31.4	46.2	60.6	16.8	168.7
BRH1 14/400/40	40	480	2.06	298x166x245	260x115	9x17mm	34.6	61.5	80.8	10.7	188.9
BRH1 14/400/50	50	480	1.66	358x166x300	200x102	9x17mm	42.8	76.9	101	10.06	280.8
BRH1 14/400/60	60	480	1.358	358x176x300	200x112	9x17mm	46.5	92.3	121.20	6.9	310.1
BRH1 14/400/70	70	480	1.164	358x196x300	200x132	9x17mm	56.5	107.7	141.40	4.95	327.6
BRH1 14/400/75	75	480	1.111	358x196x300	200x132	9x17mm	57.6	115.4	151.50	4.76	334
BRH1 14/400/80	80	480	1.018	415x200x350	240x122	13x20mm	61.7	123.0	161.60	4.26	389.2
BRH1 14/400/90	90	480	0.905	415x210x350	240x132	13x20mm	65.2	138.4	181.80	3.66	403.2
BRH1 14/400/100	100	480	0.815	415x210x350	240x132	13x20mm	68.5	153.8	202.0	3.51	429.2

Product code	Capacitor Power (kVAr)	Capacitor Voltage (V)	Reactor Inductance (mH)	Dimension (LxWxH) mm	Dimension (XxY) mm	Fixing Holes	Weight (kg)	I rms (A)	I lin (A)	R(mOhm)	Total Loss (W)
BRH3 14/400/5	5	480	16.6	180x135x200	125x90	8x12mm	8.5	7.65	11.67	192.7	49.5
BRH3 14/400/10	10	480	8.3	240x135x260	175x78	8x12mm	9.5	15.4	23.33	88.5	77.4
BRH3 14/400/12.5	12.5	480	6.63	240x134x260	175x78	8x12mm	11.9	19.21	29.25	77.8	99.4
BRH3 14/400/15	15	480	5.52	240x155x260	175x78	8x12mm	14.0	23.05	35.1	64.8	111
BRH3 14/400/20	20	480	4.15	260x160x247	200x95	8x15mm	21.3	30.8	47.5	28.8	114
BRH3 14/400/25	25	480	3.32	260x180x247	200x125	8x15mm	26.3	38.51	58.5	17.7	119
BRH3 14/400/30	30	480	2.76	300x180x252	200x110	8x15mm	31.5	46.22	70.83	11.7	138
BRH3 14/400/40	40	480	2.07	300x190x252	200x135	8x15mm	35.9	61.63	93.33	10.3	155
BRH3 14/400/50	50	480	1.66	300x200x252	200x145	8x15mm	40.0	77.03	116.67	6.8	230
BRH3 14/400/60	60	480	1.38	360x180x310	250x155	8x15mm	54.0	92.43	141.67	4.6	254
BRH3 14/400/70	70	480	1.18	360x180x310	250x155	8x15mm	65.0	107.83	165.28	3.9	269
BRH3 14/400/75	75	480	1.1	360x193x310	250x175	8x15mm	67.0	115.8	176.67	3.3	274
BRH3 14/400/80	80	480	1.03	360x200x310	250x185	12x20mm	69.0	123.52	201.9	3.09	319
BRH3 14/400/90	90	480	0.92	420x232x358	300x185	12x20mm	70.0	138.96	219.46	2.7	331
BRH3 14/400/100	100	480	0.83	420x232x358	300x185	12x20mm	72.0	154	225	2.1	352

Minimum 480V Capacitors should be used with these reactors

PFR 120b

80b

60b

96b

SALIENT FEATURES

- Manual, auto switching control
- Automatic C/K and rated step adjustment
- Automatic CT polarity correction
- Alarm Relay
- User-friendly setting
- Complies with IEC 61000-6-2 standard

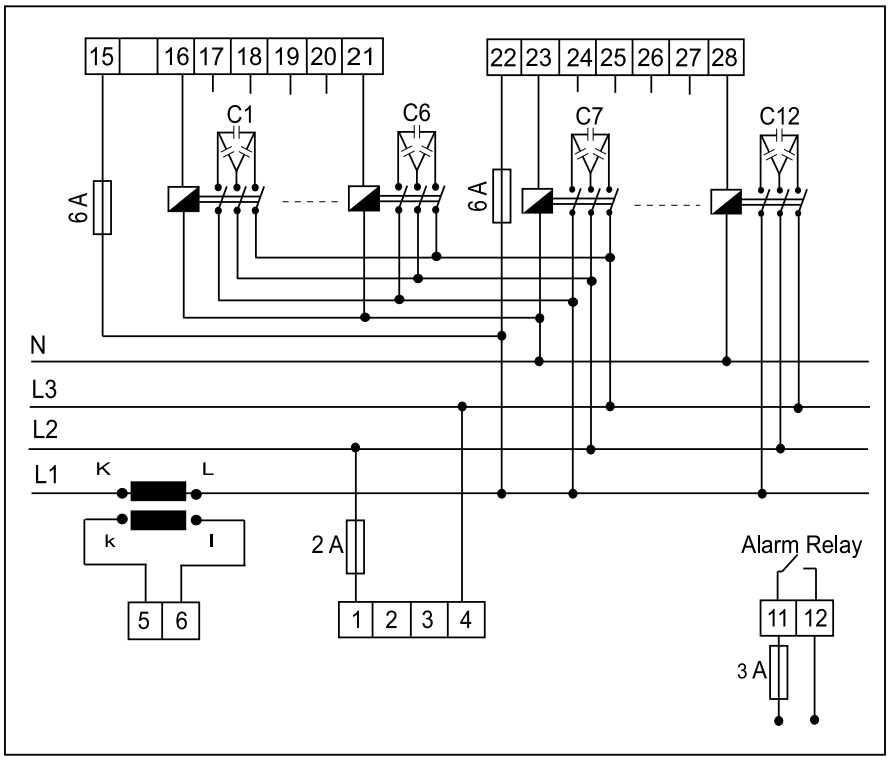
APPLICATION

Power Factor Controllers are used for measurement and control of power factor control units for central reactive power compensation.The Power Factor measured by PFR is compared with the set point values in order to provide necessary compensation, Power Factor Controller switches capacitor steps ON and OFF automatically. PFR is microcontroller relay, designed for flush mounting with rear plug-in connectors.In addition it displays the system's Cosφ,in Automatic Operating Mode, PFR displays the RMS value of Voltage (V), Current (I), Active Power (W), Reactive Power (kvar) and Apparent Power (VA) of measuring phase.

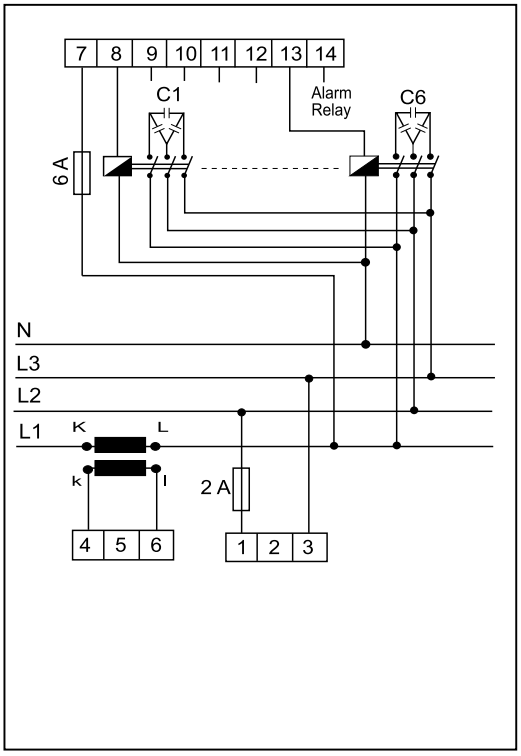
GENERAL TECHNICAL PARAMETERS

Function	Specifications	Data
Auxiliary Supply	Rated Voltage (Un)	240/415V
	Operating Voltage Range	(0.9-1.1)xUn
	Power Consumption	3VA – 10VA
	Rated Frequency	50 Hz / 60 Hz
Current Input	Rated current	5A
	Power Consumption	2VA max
	Operating Current Range	50 mA-5.5A
	Rated Frequency	50 Hz / 60 Hz
Relay Output	Numbers of outputs	6 / 8 / 12 (PFR96b, PFR60b/ PFR80b / PFR120b)
	Output Contact	5 A, 250V (NO Contact)
	Expected electrical life	> 100000 operations at rated current
	Expected mechanical life	> 5000000 operations
	No-Volt Feature	In case of power failure longer than 200 msec.all capacitor steps are disconnected automatically
	Alam relay	1 (NO Contact)
Control Range	Cosφ setting	0.85 (ind.)-1.00
	C/k Setting	Automatic / 0.02-1.0
	CT Value	5-10000/5
	Time Delay (on, off)	Between 2 sec.-1800 sec
	Over Voltage Values	240-275 (265) V/ 410-480 (475)V
	Switching Program	PS1 – PS5
Environmental Conditions	Ambient Temperature	-5°C - 55°C
	Humidity	5% - 95% non-condensing
	Protection Class	IP 40
	Terminal Block Protection Class	IP 00
	Equipment Protection Class	Double Insulation-Class II
Mechanical	Mounting	Panel mounting
	Connections	Socket terminals with screw
	Dimension (HxWxD)	143x143x67mm / 96x96x91mm
	Switchboard cut-out	139x139mm / 91x91mm
	Weight	0.8 kg

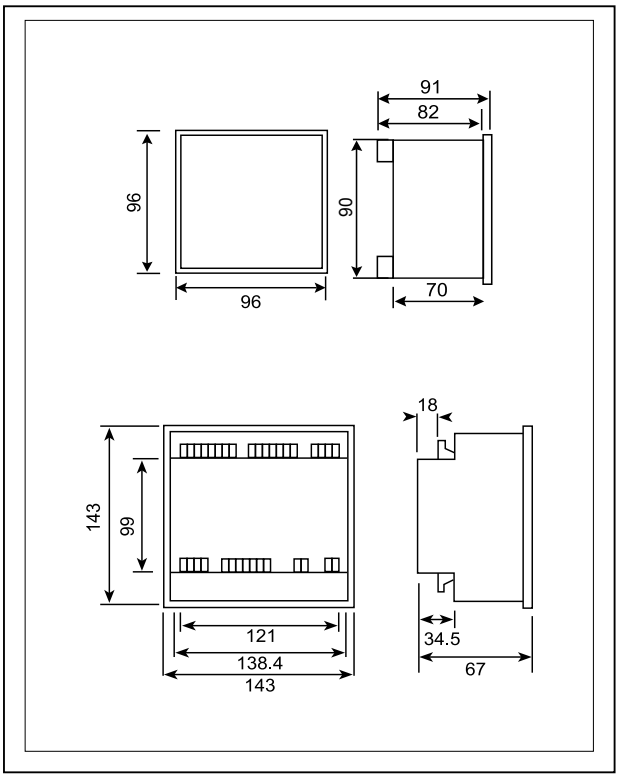
TYPICAL APPLICATION DIAGRAM



PFR96B (96X96)



DIMENSIONS

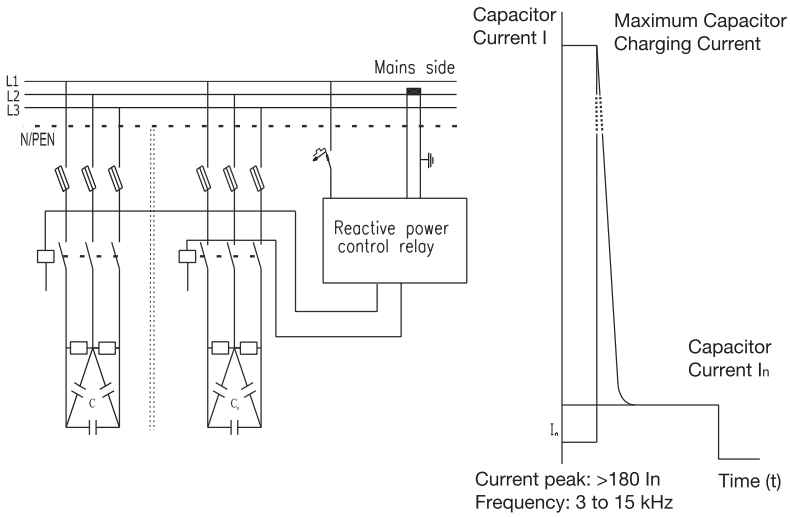


ORDERING INFORMATION

MODEL	DESCRIPTION
PFR60b - 415 - 50	6 Steps, 50 Hz system, auxiliary voltage 380~415 V AC
PFR80b - 415 - 50	8 Steps, 50 Hz system, auxiliary voltage 380~415 V AC
PFR120b - 415 - 50	12 Steps, 50 Hz system, auxiliary voltage 380~415 V AC
PFR96b - 415 - 50	6 Steps, 50 Hz system, auxiliary voltage 380~415 V AC
PFR 60b - 220 - 50	6 Steps, 50 Hz system, auxiliary voltage 220~240 V AC
PFR 80b - 220 - 50	8 Steps, 50 Hz system, auxiliary voltage 220~240 V AC
PFR 120b - 220 - 50	12 Steps, 50 Hz system, auxiliary voltage 220~240 V AC
PFR 96b - 220 - 50	6 Steps ,50 Hz system ,auxiliary voltage 220~240 V AC
PFR 60b - 415 - 60	6 Steps, 60 Hz system, auxiliary voltage 380~415 V AC
PFR 80b - 415 - 60	8 Steps, 60 Hz system, auxiliary voltage 380~415 V AC
PFR 120b - 415 - 60	12 Steps, 60 Hz system, auxiliary voltage 380~415 V AC
PFR 96b - 415 - 60	6 Steps, 60 Hz system ,auxiliary voltage 380~415 V AC
PFR 60b - 220 - 60	6 Steps, 60 Hz system, auxiliary voltage 220~240 V AC
PFR 80b - 220 - 60	8 Steps, 60 Hz system, auxiliary voltage 220~240 V AC
PFR 120b - 220 - 60	12 Steps, 60 Hz system, auxiliary voltage 220~240 V AC
PFR 96b - 220 - 60	6 Steps, 60 Hz system, auxiliary voltage 220~240 V AC

APPLICATION

In low voltage installations, when a Capacitor is switched-on, it results in resonant circuit damped to a greater degree. In addition to the rated current, over current of high amplitude (> 180 In) and high frequencies (3 ~ 15 kHz) occur during transit period (1 to 2 ms). The resultant high in-rush current peaks, caused due to capacitor switching, depends upon following factors (Network inductances, Transfomer power and short circuit voltage, Harmonics presence in the system…). The in-rush current of such high magnitudes is undesirable and it is likely to weld main poles of any standard contactor.



Capacitor contactor are specially designed to meet stringent requirements of capacitor switching as deliberated above. These contactors are fitted with front-mounted block of 3 early make auxiliary contact in series with quick discharge damping 6-resistors, 2-resistors per phase to limit peak current to value within contactor making capacity such that nomal rated capacitor current is carried by main contacts which, after closing, effectively short out the resistors.

SALIENT FEATURES

- Damping of inrush current
- Low ohmic losses
- Power quality improvement
- Enhanced equipment life
- Low maintenance and down – time
- Optimized solution cost
- Capacitor bank switching in parallel without derating

(Permanent current that can reach 1.5 time the nominal current of capacitor bank)

GENERAL TECHNICAL PARAMETERS

Number of poles	3 poles
Rated Operational Voltage (Ue)	690V
Rated Insulation Voltage (Ui)	690V
Impulse Withstand Voltage (Uimp)	8kV
Rated Frequency	50/60Hz
Reference Standard	IEC 60947-4-1
Contactors fitted wilh a block of early make poles and damping resistors	Yes

Product Code (2)	Operating Power 50/60 Hz θ ≤ 55 °C (kVAr) (1)			Instataneous auxillary contacts		Maximum operating rate (Operations/ hours)	Electrical durability atnominal load (Operations)		Prospective peak current at switch on (In)
	200V/240V	400V/440V	660V/690V	NO	NC		400V	690V	(In)
BCC10K11**	5.5	10	12.5	1	1	240	300000	200000	200
BCC15K11**	8.5	16.7	24	1	1	240	300000	200000	200
BCC20K11**	10	20	30	1	1	240	300000	200000	200
BCC25K11**	15	25	36	1	1	240	300000	200000	200
BCC30K12**	20	33.3	48	1	2	240	300000	200000	200
BCC40K12**	25	40	58	1	2	100	300000	200000	200
BCC50K12**	30	50	72	1	2	100	300000	200000	200
BCC60K12**	40	60	92	1	2	100	300000	200000	200
BCC75K12**	45	75	120	1	2	100	300000	200000	200
BCC80K12**	48	80	128	1	2	100	300000	200000	200
BCC100K12**	60	100	143	1	2	100	300000	200000	200

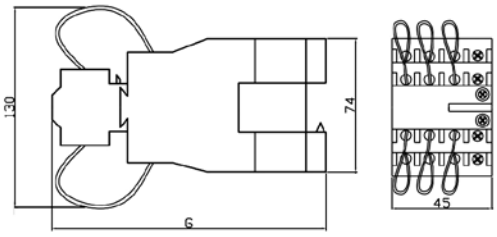
(1) The average temperature over a 24-hour period, in accordance with standards IEC 60070 and 60831 is 45 °C

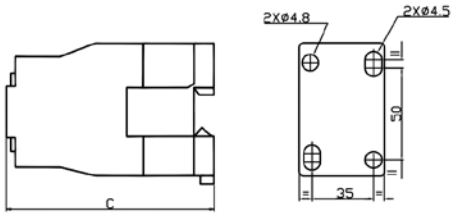
(2) ** AC Coil Voltage – Capacitor Duty Contactor

Control circuit voltage (Uc)	24V	110V	220V	415V
50Hz	B5	F5	M5	N5
50/60Hz	B7	F7	M7	N7
Operating range at ≤ 60°C	0.8 ~ 1.1 Uc			
Drop-out	0.3 ~ 0.6 Uc			

CONTACTORS DRAWING

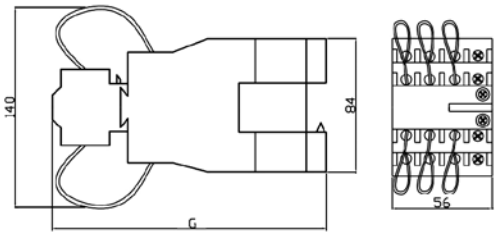
BCC-10K11, 15K11

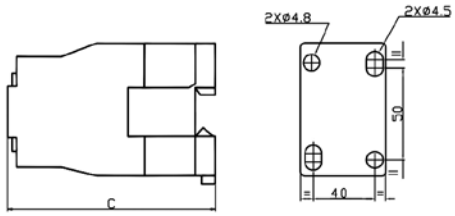




BCC	10K11	15K11
C	80	85
G	117	122

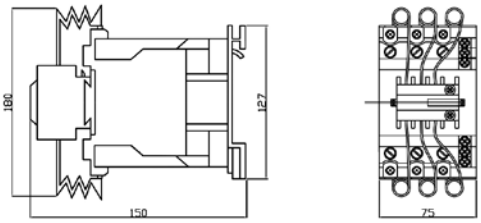
BCC-20K12, 25K12

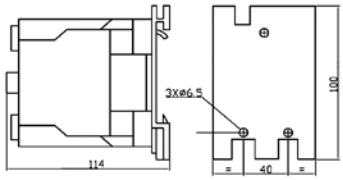




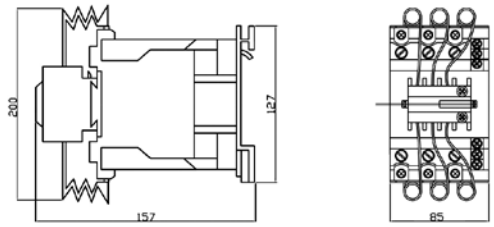
BCC	20K11	25K11
C	93	98
G	130	135

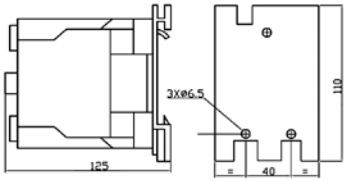
BCC-30K12, 40K12, 50K12



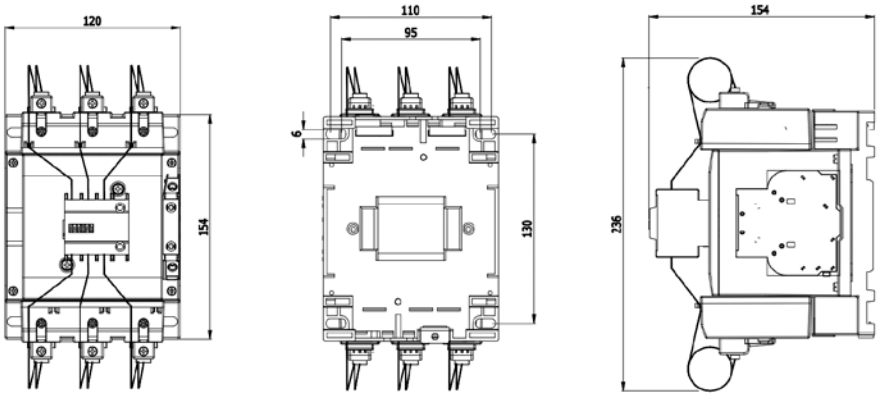


BCC-60K12, 75K12





BCC-80K12, 100K12



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