

# Power Electronics Capacitors

## GENERAL PURPOSE CAPACITORS



### GP 42 Series

RMS Voltage range	250÷930 V
Capacitance range	0,1÷100 µF
Capacitance tolerance	±5% / ±10%
Max. RMS current	10 A / 16 A
Maximum working frequency	10 kHz
Thermal resistance natural cooling (R <sub>THC</sub> )	< 12 °C/W
Series resistance (R <sub>s</sub> )	< 5 mΩ
Terminals	Single or double tag 6,3x0,8 mm
Working temperature	-40 / +70 °C
Storage temperature	-40 / +85 °C
Test voltage	U <sub>tc</sub> = 3 kVac / 6 kVac @50 Hz 10s U <sub>tt</sub> = 1,5 x U <sub>NDC</sub> 10s
Filling	Dry polyurethane resin
Dielectric	Metallized PPM film
Cylindrical case	Aluminum
Life expectancy	80.000 h (*)
Failure quota	300/10E9
Reference standard	IEC 1071-1/2; UL 810
Integrated overpressure protection	
M8 fixing bolt	Max 5 Nm
M12 fixing bolt	Max 10 Nm

(\*) Life Derating at operating voltage (according to the chart on page 10)

Life expectancy	4.16.42.1xxx Series	4.16.42.2xxx Series	4.16.42.3xxx Series	4.16.42.4xxx Series	4.16.42.6xxx Series	4.16.42.9xxx Series
80.000 h (rated)	250 V	330 V	450 V	550 V	690 V	930 V
40.000 h	275 V	360 V	500 V	575 V	760 V	1025 V
20.000 h	300 V	400 V	540 V	630 V	830 V	1120 V
10.000 h	330 V	450 V	600 V	690 V	930 V	1250 V

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Cn [μF]	I <sub>MAX</sub> [A]	I <sub>PK</sub> C <sub>w</sub> [A]	I <sub>s</sub> [kA]	dV/dT <sub>max</sub> [V/μs]	R <sub>THC</sub> natural cooling [°C/W]	Tanδ <sub>MAX</sub> @50Hz [10 <sup>-4</sup> ]	Ø [mm]	H [mm]	Weight [g]	Part n. 416.42.	Pcs. / box	Box type
<b>Urms = 250 V</b>				<b>Un<sub>AC</sub> = 350 V</b>			<b>Un<sub>DC</sub> = 490 V</b>		<b>Us = 840 V</b>			
2	5,0	8	0,1	50	11,7	3,5	25	60	40	1.05.x	250	6
5	6,5	10	0,3	50	9,4	4,0	30	60	50	1.23.x	200	6
10	7,5	11	0,5	45	6,8	4,5	35	72	80	1.42.x	100	7
15	8,0	12	0,7	45	5,8	5,0	40	72	100	1.55.x	100	6
20	8,5	13	0,7	30	4,5	5,5	40	98	140	1.63.x	50	7
25	8,5	13	0,8	30	4,5	5,5	40	98	150	1.68.x	50	7
30	9,0	14	1,0	30	3,9	5,5	40	98	170	1.69.x	50	7
40	10,0	15	0,9	20	3,3	6,0	45	122	220	1.82.x	25	7
50	10,0	15	1,1	20	3,3	6,0	45	122	230	1.89.x	25	7
60	10,0	15	1,3	20	2,9	6,0	50	122	270	1.92.x	25	7
70	10,0	15	1,5	20	2,6	6,5	55	122	320	1.95.x	25	6
80	10,0	15	1,5	20	2,6	6,5	55	122	330	1.97.x	25	6
100	10,0	15	1,7	15	2,1	7,0	60	137	420	1.99.x	25	6
<b>Urms = 330 V</b>				<b>Un<sub>AC</sub> = 470 V</b>			<b>Un<sub>DC</sub> = 600 V</b>		<b>Us = 1120 V</b>			
1	5,0	8	0,1	50	11,7	3,5	25	60	40	2.03.x	250	6
2	6,0	9	0,2	70	10,4	3,5	30	53	50	2.12.x	200	7
5	7,0	11	0,3	50	7,8	4,5	35	60	80	2.39.x	125	6
10	8,0	12	0,5	45	5,8	5,0	40	72	100	2.49.x	100	6
15	8,5	13	0,5	30	4,5	5,5	40	98	140	2.58.x	50	7
20	9,0	14	0,7	30	3,9	5,5	45	98	180	2.68.x	50	6
25	10,0	15	0,6	20	3,3	6,0	45	122	220	2.75.x	25	7
35	10,0	15	0,8	20	2,9	6,5	50	122	270	2.88.x	25	7
50	10,0	15	0,8	15	2,4	6,5	55	132	350	2.94.x	25	6
60	10,0	15	1,0	15	2,1	7,0	60	137	430	2.98.x	25	6
<b>Urms = 450 V</b>				<b>Un<sub>AC</sub> = 640 V</b>			<b>Un<sub>DC</sub> = 890 V</b>		<b>Us = 1400 V</b>			
1	5,0	8	0,1	50	11,7	3,5	25	60	40	3.08.x	250	6
2	6,5	10	0,1	50	9,4	4,0	30	60	50	3.29.x	200	6
5	8,0	12	0,2	45	5,8	5,0	40	72	100	3.47.x	100	6
10	8,5	13	0,3	30	4,5	5,5	40	98	140	3.58.x	50	7
15	10,0	15	0,3	20	3,3	6,0	45	122	220	3.77.x	25	7
20	10,0	15	0,4	20	2,9	6,5	50	122	270	3.88.x	25	7
25	10,0	15	0,4	15	2,4	6,5	55	132	350	3.92.x	25	6
30	10,0	15	0,5	15	2,4	6,5	55	132	360	3.95.x	25	6
35	10,0	15	0,6	15	2,1	7,0	60	137	430	3.97.x	25	6
40	10,0	15	0,7	15	2,1	7,0	60	137	440	3.99.x	25	6

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Cn [μF]	I <sub>MAX</sub> [A]	I <sub>PK</sub> C <sub>w</sub> [A]	I <sub>s</sub> [kA]	dV/dT <sub>max</sub> [V/μs]	R <sub>THC</sub> natural cooling [°C/W]	Tanδ <sub>MAX</sub> @50Hz [10 <sup>-4</sup> ]	Ø [mm]	H [mm]	Weight [g]	Part. n. 416.42.	Pcs. / box	Box type
<b>Urms = 550 V</b>				<b>Un<sub>AC</sub> = 780 V</b>			<b>Un<sub>DC</sub> = 940 V</b>		<b>Us = 1680 V</b>			
1	7,0	11	0,1	60	6,3	3,0	30	98	70	4.10.x	125	6
2	7,0	11	0,1	60	5,2	3,0	30	98	80	4.15.x	125	6
5	8,5	13	0,3	60	4,5	3,5	40	98	140	4.33.x	50	7
10	9,5	14	0,7	60	3,5	4,0	50	98	220	4.58.x	25	7
15	10,0	15	0,7	40	2,4	4,5	55	132	360	4.63.x	25	6
20	10,0	15	0,9	40	2,4	4,5	55	132	370	4.68.x	25	6
25	10,0	15	1,1	40	2,1	5,0	60	137	420	4.78.x	25	6
35	10,0	15	1,0	25	1,7	5,5	60	181	560	4.88.x	18	6
<b>Urms = 690 V</b>				<b>Un<sub>AC</sub> = 990 V</b>			<b>Un<sub>DC</sub> = 1350 V</b>		<b>Us = 2240 V</b>			
0,68	7,0	11	0,1	60	6,3	3,0	30	98	80	6.12.x	125	6
1	7,0	11	0,1	60	6,3	3,0	30	98	90	6.15.x	125	6
2	8,0	12	0,1	60	5,2	3,0	35	98	110	6.23.x	50	7
5	9,5	14	0,3	60	3,5	4,0	50	98	220	6.51.x	25	7
8	10,0	15	0,4	40	2,4	4,5	55	132	360	6.62.x	25	6
10	10,0	15	0,4	40	2,4	4,5	55	132	370	6.68.x	25	6
12	10,0	15	0,7	40	2,1	5,0	60	137	420	6.74.x	25	6
20	10,0	15	0,6	25	1,7	5,5	60	181	560	6.88.x	18	6
<b>Urms = 930 V</b>				<b>Un<sub>AC</sub> = 1300V</b>			<b>Un<sub>DC</sub> = 1700 V</b>		<b>Us = 2800 V</b>			
0,68	8,5	13	0,1	60	3,9	3,0	40	115	160	9.10.4	50	7
1	8,5	13	0,1	60	3,9	3,0	40	115	170	9.14.4	50	7
2	8,5	13	0,1	60	3,9	3,0	40	115	190	9.18.4	50	7
5	10,5	16	0,3	60	2,7	4,0	55	115	300	9.49.4	25	6
8	12,0	18	0,4	40	2,0	4,5	60	150	470	9.61.4	25	6
10	14,0	21	0,4	40	1,8	5,0	65	150	550	9.75.4	20	6
12	16,0	24	0,5	35	1,7	5,5	65	165	600	9.85.4	15	6
14	16,0	24	0,5	35	1,7	5,5	65	165	620	9.89.4	15	6

(Cn) Standard values, other values on request.

Code "x": according to the mechanical configuration, see figures at page 17 (only for A solution).

Box TYPE	Standard box dimensions
6	mm 195 x 390 x 250
7	mm 195 x 390 x 200

STUD	Capacitor diameter
M8	Ø 25 - 30 - 40 - 45 - 50
M12	Ø 55 - 60

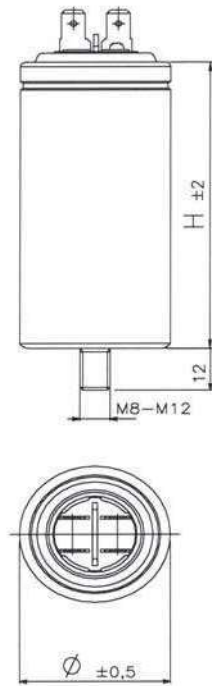
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#### Mechanical Solutions

**A solution**  
 $U_{rms} \leq 690V$



X = according to table 1

**B solution**  
 $U_{rms} = 930V$



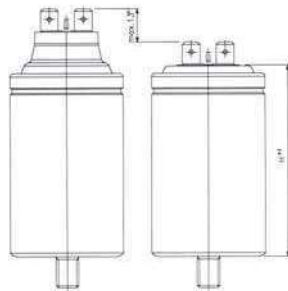
X = 4

#### Over pressure safety device

**A solution**

**Overpressure safety device**

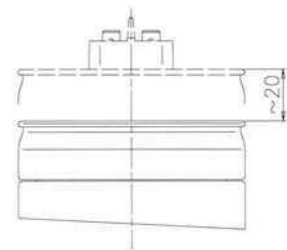
In order to ensure proper device operation, when the capacitor is installed, a clearance of at least 10mm must be left above terminals.



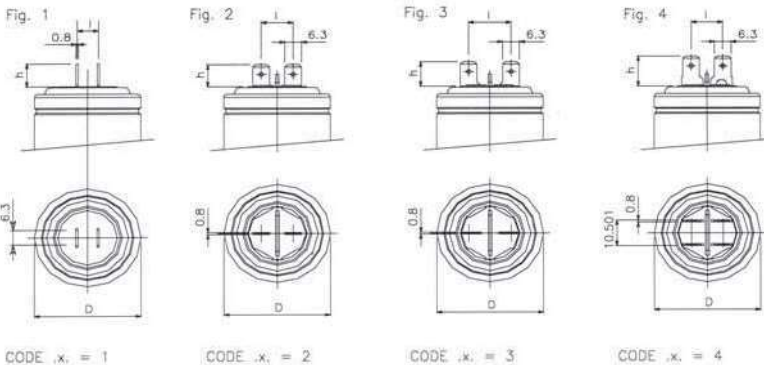
**B solution**

**Overpressure safety device**

In order to ensure proper device operation, when the capacitor is installed, a clearance of at least 20mm must be left above terminals.



#### Plastic cover configurations - only for A solutions



CODE .x. = 1

CODE .x. = 2

CODE .x. = 3

CODE .x. = 4

**Table 1**

øD Cap.	Fig.1		Fig.2		Fig.3		Fig.4	
	h (mm)	l (mm)	h (mm)	l (mm)	h (mm)	l (mm)	h (mm)	l (mm)
25	10.9	8						
30			9	12				
35			9	12			12.2	12
40			9	12	10	16	12.2	12
45			9	12	10	16	12.2	12
50			9	12	10	16	12.2	12
55			9	12	10	16	12.2	12
60			8.9	15.5			12	20.5