



Power Electronics Capacitors

GENERAL PURPOSE CAPACITORS

GP SERIES

Metallized Polypropylene AC and DC capacitors for power electronics application with high current and harmonics distortion with long expected life.


FEATURES

- Cylindrical aluminum case
- Over pressure device
- Dry resin
- Double/single tags or screw type bolts terminals
- Self healing PPM/PPMh dielectric
- AC / DC voltage applications

TYPICAL APPLICATIONS

- Inverter
- Filtering
- Switching
- High power lighting



<i>GENERAL CHARACTERISTICS</i>	
RMS voltage	250 - 1000V (*)
Rated Voltage DC	420 - 2100V (*)
Rate Capacitance	0,1÷600 µF
Test voltage between terminals	1,5Un 10s
Test voltage between terminals and case	3kV 50Hz 10s
Terminals	Single or double tag 6.3 x 0.8 mm (GP 42 series) 2 x M6 or 2 x M10 screw-type bolts (GP 84 series)
Working temperature	-40 / +70°C
Storage temperature	-40 / +85°C
Protection degree	IP 00
Filling	Dry polyurethane resin
Dielectric	Self-healing metallized polypropylene film
Case	Aluminum
Protection	Over pressure device
Maximum altitude	2000m a.s.l.
Installation	Vertical / horizontal
Reference standard	IEC 1071-1/2; UL 810
Approvals	UL-CSA c  US (**)

(*) Standard values, other values on request

(**) For GP84 series

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GP 42 Series

Rated AC Voltage	250÷930V
Rated capacitance	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 _{THC})	< 12 °C/W
Series resistance (R _s)	< 5 mΩ
Terminals	Single or double tag 6,3x0,8 mm.
Working temperature	-40 / + 70 °C
Storage temperature	-40 / + 85 °C
Test voltage	U _{tc} = 3 kVac / 6kVac @50Hz 10s U _{tt} = 1,5 x U _n dc 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 Threaded fixing bolt	5 Nm
M12 Threaded fixing bolt	10 Nm

(*) Life Derating at operating voltage (according to the chart on page 4)

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 _{MAX} [A]	I _{PK} C _w [A]	I _s [kA]	dV/dT _{max} [V/μs]	R _{THC} natural cooling [°C/W]	Tanδ _{MAX} @50Hz [10 ⁻⁴]	Ø [mm]	H [mm]	Weight [g]	Part n. 416.42.	Pcs. X box	Box type
Urms = 250V			Un AC = 350V			Un DC = 490V		Us = 840V				
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
Urms = 330V			Un AC = 470V			Un DC = 600V		Us = 1120V				
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
Urms = 450V			Un AC = 640V			Un DC = 890V		Us = 1400V				
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 _{MAX} [A]	I _{PK} C _w [A]	I _s [kA]	dV/dT _{max} [V/μs]	R _{THC} natural cooling [°C/W]	Tanδ _{MAX} @50Hz [10 ⁻⁴]	Ø [mm]	H [mm]	Weight [g]	Part. n. 416.42.	Pcs. X box	Box type
Urms = 550V				Un AC = 780V			Un DC = 940V		Us = 1680V			
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	25	6
Urms = 690V				Un AC = 990V			Un DC = 1350V		Us = 2240V			
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	25	6
Urms = 930V				Un AC = 1300V			Un DC = 1700V		Us = 2800V			
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 11 (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

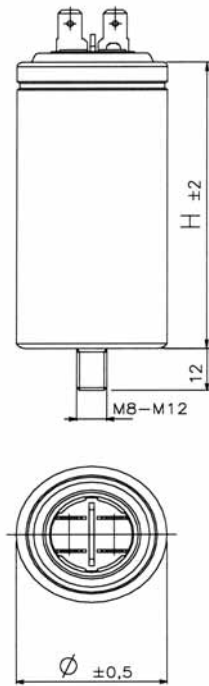
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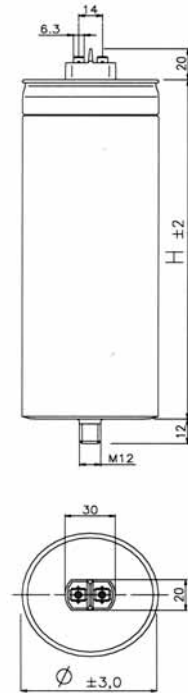
Mechanical Solutions

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



X = according to table 1

B solution
 $U_{rms} = 930V$

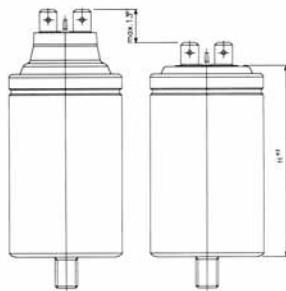


X = 4

Over pressure safety device

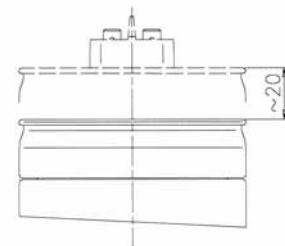
A solution
Overpressure safety device

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

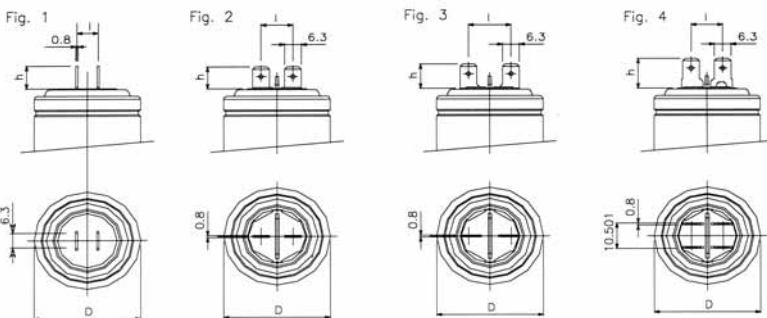


B solution
Overpressure safety device

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

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GP 84 Series

Rated AC Voltage	250÷1000V
Range capacitance	10÷600 μ F
Capacitance tolerance	\pm 5% / \pm 10%
Max. rms current	80 A
Series resistance (R_s)	< 8 m Ω
Thermal resistance natural cooling (R_{THc})	< 3,0 $^{\circ}$ C/W
Max. voltage raise of rise (dV/dT)	\leq 100 V/ μ s
Terminals	M6 or M10 screw-type bolts or double tag 6,3 x 0,8 mm.
Working temperature	-40 / + 70 $^{\circ}$ C
Storage temperature	-40 / + 85 $^{\circ}$ C
Test voltage	U_{tc} = 3 kVac / 6kVac @50Hz 10s U_{tt} = 1,5 x U_n dc 10s
Filling	Dry polyurethane resin
Dielectric	Metallized PPMh film
Cylindrical case	Aluminum
Life expectancy	100.000h (*)
Failure quota	300/10E9
Reference standard	IEC 1071-1/2; UL 810
UL-CSA approved (c  us) -10 kA AFC	File n. E102953 (**)
Integrated overpressure protection	
M12 Theaded fixing bolt	10 Nm
Maximum fixing torque for M6 terminals	3 Nm
Maximum fixing torque for M10 terminals	6 Nm (***)

(*) Life Derating at operating voltage (according to the chart on page 4)

Life expectancy	4.16.84.2xxx Series	4.16.84.3xxx Series	4.16.84.4xxx Series	4.16.84.5xxx Series	4.16.84.6xxx Series	4.16.84.9xxx Series
100.000 h (rated)	250 V	330 V	450 V	550 V	690 V	930 V
50.000 h	275 V	360 V	500 V	575 V	760 V	1025 V
25.000 h	300 V	400 V	540 V	630 V	830 V	1120 V
12.500 h	330 V	450 V	600 V	690 V	930 V	1250 V

(**) UL Approved for A, B and C solution (excepted series 690V - 930V solution A). F solution in progress (expected end 2010).

(***) To avoid breaking, complete the tighten of the nuts using two wrenches.

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Cn [μF]	Imax* [A]	IpK Cw [A]	IpK Iw [kA]	Is [kA]	RthC [°C/W]	LESr [nH]	TanδMAX @50Hz [10 ⁻⁴]	Ø [mm]	H [mm]	Weight [g]	Mechanical solution	Part. n. 416.84.	Pcs. X box	Box type
Urms = 250V				Un ac = 350V				Un dc =490V		Us=950V				
60	22	33	1,7	9	2,7	130	5,0	55	115	300	A / C	2.1x.y	28	1
80	22	33	1,7	9	2,7	130	5,0	55	115	340	A / C	2.1x.y	28	1
100	25	38	1,9	11	2,2	160	5,0	55	150	370	A / C	2.2x.y	21	1
120	25	38	1,9	11	2,2	160	5,0	55	150	390	A / C	2.2x.y	21	1
150	32	48	2,4	13	2,0	160	5,5	60	150	450	A / C	2.3x.y	18	1
175	36	54	2,7	16	1,8	170	6,0	65	150	520	A / C	2.4x.y	16	1
200	38	57	2,9	12	1,7	180	6,5	65	165	580	A / C	2.5x.y	16	1
230	40	60	3,0	20	1,3	200	7,0	75	180	820	F	2.6x.7	6	2
250	40	60	3,0	20	1,3	200	7,0	75	180	830	F	2.6x.7	6	2
300	40	60	3,0	20	1,3	200	7,0	75	180	860	F	2.6x.7	6	2
350	45	68	3,4	20	1,1	210	7,5	85	180	980	F	2.7x.7	6	2
400	45	68	3,4	20	1,1	210	7,5	85	180	1050	F	2.7x.7	6	2
500	78	117	5,9	20	0,9	230	8,5	90	210	1400	F	2.9x.7	6	3
600	80	120	6,0	18	0,8	300	9,0	85	280	1700	F	2.9x.7	6	4
Urms = 330V				Un ac = 470V				Un dc =600V		Us=1150V				
50	22	33	1,7	7	2,7	160	5,0	55	115	320	A / C	3.1x.y	28	1
80	26	39	2,0	8	2,2	160	6,0	55	150	390	A / C	3.2x.y	21	1
100	26	39	2,0	8	2,2	160	6,0	55	150	400	A / C	3.2x.y	21	1
120	30	45	2,3	10	2,0	160	6,0	60	150	460	A / C	3.3x.y	18	1
150	34	51	2,6	13	1,8	170	6,5	65	150	540	A / C	3.4x.y	16	1
175	38	57	2,9	10	1,7	180	7,0	65	165	600	A / C	3.5x.y	16	1
200	40	60	3,0	14	1,3	200	7,5	75	180	860	F	3.6x.7	6	2
250	40	60	3,0	14	1,3	200	7,5	75	180	860	F	3.6x.7	6	2
300	45	68	3,4	18	1,1	210	7,5	85	180	1100	F	3.7x.7	6	2
350	70	105	5,3	16	1,0	230	8,0	85	210	1350	F	3.8x.7	6	3
400	75	113	5,6	18	0,9	230	8,5	90	210	1450	F	3.9x.7	6	3
450	80	120	6,0	13	0,8	300	9,0	85	280	1750	F	3.9x.7	6	4
Urms = 450V				Un ac = 630V				Un dc =825V		Us=1600V				
20	20	30	1,5	4	2,7	130	5,0	55	115	250	A / C	4.0x.y	28	1
30	20	30	1,5	4	2,7	130	5,0	55	115	300	A / C	4.0x.y	28	1
40	24	36	1,8	4,5	2,2	160	6,0	55	150	370	A / C	4.1x.y	21	1
50	24	36	1,8	4,5	2,2	160	6,0	55	150	400	A / C	4.1x.y	21	1
70	28	42	2,1	6,8	1,8	170	6,5	65	150	530	A / C	4.3x.y	16	1
80	28	42	2,1	6,8	1,8	170	6,5	65	150	550	A / C	4.3x.y	16	1
90	32	48	2,4	5,2	1,7	180	7,0	65	165	590	A / C	4.4x.y	16	1
100	38	57	2,9	7,4	1,3	200	7,5	75	180	860	F	4.5x.7	6	2
150	42	63	3,2	9,9	1,1	210	8,0	85	180	1100	F	4.6x.7	6	2
200	70	105	5,3	9,7	0,9	230	8,5	90	210	1450	F	4.8x.7	6	3
250	75	113	5,6	7,9	0,8	300	9,0	85	280	1710	F	4.9x.7	6	4
300	78	117	5,9	9,1	0,7	300	9,0	90	280	1920	F	4.9x.7	6	4

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Cn [μF]	Imax* [A]	Ipk Cw [A]	Ipk Iw [kA]	Is [kA]	Rthc [°C/W]	LESr [nH]	TanδMAX @50Hz [10 ⁻⁴]	Ø [mm]	H [mm]	Weight [g]	Technical solution	Part. n. 416.84.	Pcs. X box	Box type
Urms = 550V				Un ac = 790V				Un dc =940V		Us=1800V				
20	18	27	1,4	2,9	2,7	130	5,0	55	115	300	A / C	5.0x.y	28	1
30	20	30	1,5	3,3	2,2	160	5,5	55	150	350	A / C	5.1x.y	21	1
40	20	30	1,5	3,3	2,2	160	5,5	55	150	390	A / C	5.1x.y	21	1
50	22	33	1,7	4,1	2,0	160	6,0	60	150	460	A / C	5.2x.y	18	1
70	26	39	2,0	3,9	1,7	180	7,0	65	165	590	A / C	5.4x.y	16	1
80	34	51	2,6	5,3	1,3	200	7,5	75	180	820	F	5.5x.7	6	2
100	38	57	2,9	7,2	1,1	210	8,0	85	180	950	F	5.6x.7	6	2
125	38	57	2,9	7,2	1,1	210	8,0	85	180	1050	F	5.6x.7	6	2
150	70	105	5,3	5,7	0,8	300	8,5	85	280	1550	F	5.8x.7	6	4
200	70	105	5,3	5,7	0,8	300	8,5	85	280	1700	F	5.8x.7	6	4
250	76	114	5,7	8,3	0,6	320	9,0	100	280	2100	F	5.9x.7	6	5
300	76	114	5,7	8,3	0,6	320	9,0	100	280	2400	F	5.9x.7	6	5
Urms = 690V				Un ac = 990V				Un dc =1350V		Us=2600V				
10	20	30	1,0	1,8	2,2	160	5,0	55	150	310	A / C	6.0x.y	21	1
15	20	30	1,0	1,8	2,2	160	5,0	55	150	350	A / C	6.0x.y	21	1
20	22	33	1,1	2,8	1,8	170	5,0	65	150	500	A / C	6.1x.y	16	1
30	26	39	1,3	2,9	1,7	180	5,0	65	165	560	A / C	6.2x.y	16	1
40	30	45	1,5	4,0	1,3	200	5,5	75	180	780	F	6.3x.7	6	2
50	30	45	1,5	4,0	1,3	200	5,5	75	180	850	F	6.3x.7	6	2
70	34	51	1,7	4,9	1,0	210	6,0	85	210	1150	F	6.5x.7	6	3
85	36	54	1,8	5,5	0,9	220	6,5	90	210	1400	F	6.6x.7	6	3
100	38	57	1,9	7,1	0,8	220	7,0	100	210	1680	F	6.7x.7	6	5
125	40	60	2,0	4,2	0,7	300	7,5	90	280	1860	F	6.8x.7	6	4
150	45	68	2,3	5,3	0,6	300	8,0	100	280	2150	F	6.9x.7	6	5
175	45	68	2,3	5,3	0,6	300	8,0	100	280	2360	F	6.9x.7	6	5
Urms = 930V				Un ac = 1300V				Un dc =1700V		Us=3250V				
10	18	27	0,9	1,2	2,2	160	4,5	55	150	360	A / C	9.0x.y	21	1
15	20	30	1,0	1,8	1,8	170	4,7	65	150	480	A / C	9.1x.y	16	1
20	22	33	1,1	1,8	1,7	180	5,0	65	165	550	A / C	9.2x.y	16	1
30	24	36	1,2	2,6	1,3	200	5,3	75	180	840	F	9.3x.7	6	2
35	28	42	1,4	2,3	1,1	210	5,5	75	210	980	F	9.4x.7	6	3
40	30	45	1,5	3,1	1,0	210	5,5	85	210	1150	F	9.5x.7	6	3
45	30	45	1,5	3,1	1,0	210	5,5	85	210	1220	F	9.5x.7	6	3
50	30	45	1,5	3,1	1,0	210	5,5	85	210	1280	F	9.5x.7	6	3
55	34	51	1,7	3,5	0,9	220	5,7	90	210	1380	F	9.6x.7	6	3
70	38	57	1,9	4,5	0,8	220	5,7	100	210	1720	F	9.7x.7	6	5
85	42	63	2,1	2,7	0,7	300	6,0	90	280	1840	F	9.8x.7	6	4
100	45	68	2,3	3,4	0,6	300	6,5	100	280	2250	F	9.9x.7	6	5

(Cn) standard values, other values on request.

Code "x": internal reference. Code "y": mechanical solution.

(*) The maximum rms current is referring to A or F solutions. Imax ≤ 16A for C solution.

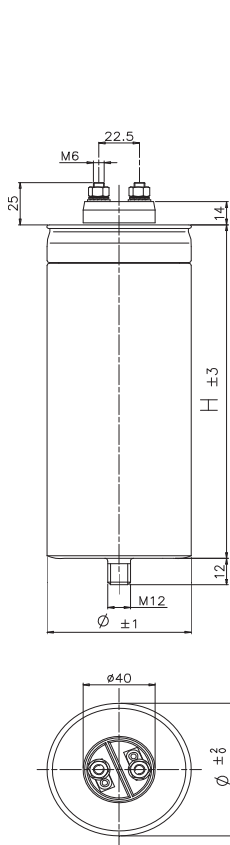
Box TYPE	Standard box dimensions
1	mm 250 x 386 x 190
2	mm 190 x 285 x 265
3	mm 190 x 285 x 325
4	mm 190 x 285 x 375
5	mm 335 x 220 x 375

Power Electronics Capacitors

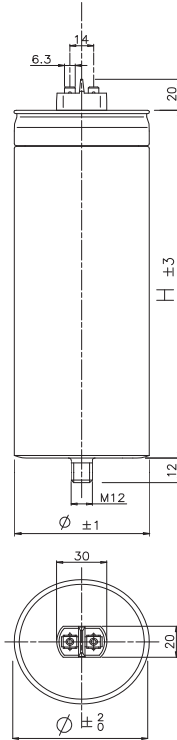
GENERAL PURPOSE CAPACITORS

GP 84 Series

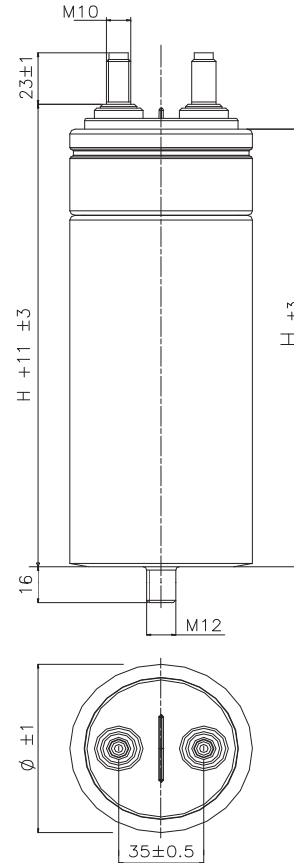
Mechanical Configurations



A solution
M6 Screw-type bolts
CODE: 41684.xxx.0
Code "y" = 0



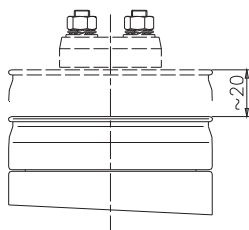
C solution
Double tag 6,3x0,8 mm
CODE: 41684.xxx.2
Code "y" = 2



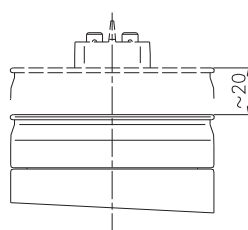
F solution
M10 Screw-type bolts
CODE: 41684.xxx.7

Overpressure safety device

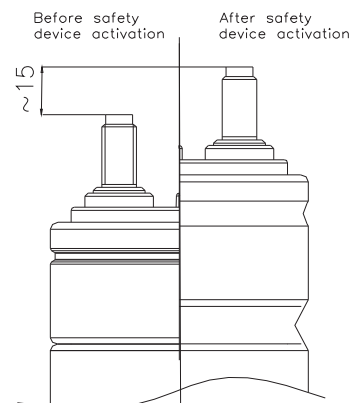
In order to ensure proper device operation, when the capacitor is installed, a clearance of at least the values given on drawing below must be left above terminals.



Dimension with overpressure device activated



Dimension with overpressure device activated



Dimension with overpressure device activated