



Series AP(U)X 85°C 15.000 h

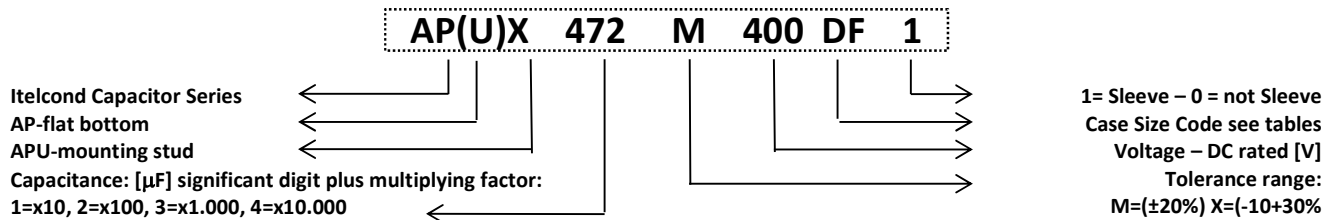
Capacitors screw terminal type – Heavy Transient

- AP- Flat Bottom
- APU - Mounting Stud
- Capacitance Tolerance: -20 + 20% – standard (M)
- Capacitance Tolerance: -10 + 30% - on request (X)
- Climatic category: 40/85/56
- Case: 51x83 – 90x240
- Temperature – 40°C + 85°C
- All welded construction reliable electrical contact

Mechanical Outlines

- Case: aluminium made
- Terminals: screw
- Sealing: hermetic by EPR gasket, on a resin cover
- Pressure Release Vent: silicone-rubber
- Sleeve: self-extinguishing thermo shrinkable
- Size: see enclosed drawings
- Mounting Hardware: see hardware section
- External Material UL94-V0

Ordering Code: Example



Ripple Current

The allowable values of ripple current in Ampères, are related to the temperature and frequency by following equation:

$$I_{\text{Ripple}} = K_t \cdot K_f \cdot I_{\text{Ripple}@85^\circ\text{C}}$$

Where:

- $I_{\text{Ripple}@85^\circ\text{C}}$ is the limit given by tables, @ 85°C/100HZ
- K_t is the Temperature Correlation Factor
- K_f is the Frequency Correlation Factor

Note. Superimposed alternating voltage summed to DC voltage must not exceed rated voltage, rated ripple current must not be exceeded, and no reverse polarity is allowed

°C	40	55	65	75	85
K_t	1.65	1.50	1.40	1.20	1.00

Table 1- K_t Values

Vn/Hz	Kf
	V>300 Diameter Code C, D, E
50	0.72
100	1.00
120	1.03
200	1.14
300	1.24
400	1.29
500	1.32
>1000	1.37

Table 2- K_f Values

Expected Lifetime End of Life Criteria

During useful life typical electrical parameters of electrolytic capacitor are subject to change.

End of Life criteria, when rated temperature, voltage and ripple are applied, are:

$$\frac{\Delta C}{C_{t0}} \leq 30\% \quad \text{Equation 1}$$

$$ESR \leq 3 \cdot ESR_0 \quad \text{Equation 2}$$

$$I_f \leq I_{ft0} \quad \text{Equation 3}$$

where t_0 is the initial value

Voltage Endurance Test Requirements

On Voltage Endurance Test are based Expected Lifetime Curves.

End of Life criteria, when rated temperature, and voltage are applied for 2'000hrs, are

$$\frac{\Delta C}{C_{t0}} \leq 10\% \quad \text{Equation 4}$$

$$ESR \leq 1,3 \cdot ESR_0 \quad \text{Equation 5}$$

$$I_f \leq I_{ft0} \quad \text{Equation 6}$$

where t_0 is the initial value

Expected Lifetime Vs Temperature and Ripple Current

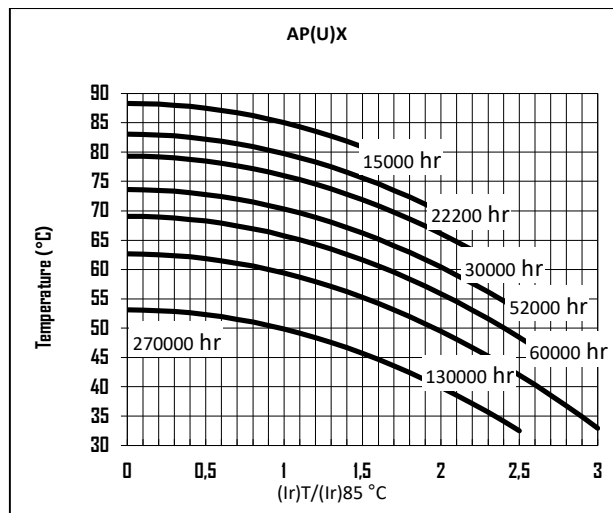


Table 3

Leakage Current

After the rated voltage has been applied to the capacitor for 5 minutes the leakage current must be within those limits.

Maximum limit	@25°C	$I_f \leq 0,001 \times C \times V$
Operating limit	@25°C	$I_f \leq 0,0005 \times C \times V$

Where: I_f =leakage current [μ A], C =capacitance [μ F], V =rated voltage [V]

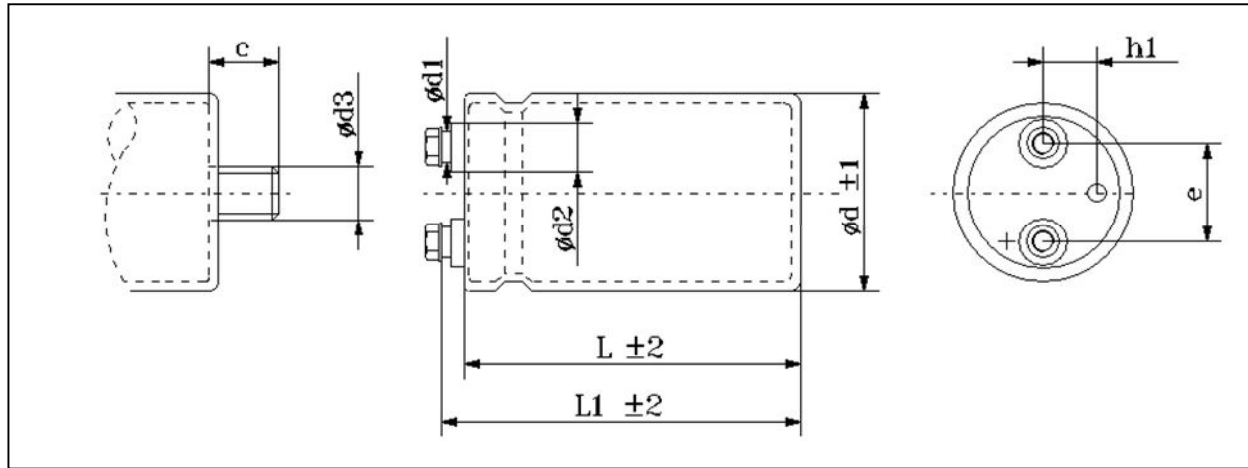
Surge Voltage

Working Voltage	63	75	100	160	200	250	350	400	420	450
Surge Voltage	73	86	115	185	230	290	385	440	460	495

	Capacitance	Case	Diam	Height	Tan δ	ESRmax typ		Zmax	Iripple @100Hz		Ordering Code
	[uF]@100Hz		[mm]	[mm]	[%]@100Hz	[m Ω]@100Hz	[m Ω]@10KHz		[A]@55°C	[A]@85°C	(U) for mounting stud
40	10000	AA	35	50	0,27	43	34	32	7,8	5,2	AP(U)X103M040AA1
	15000	AB	35	83	0,35	37	30	28	10,5	7,0	AP(U)X153M040AB1
	22000	AC	35	105	0,42	30	24	23	13,0	8,7	AP(U)X223M040AC1
	33000	BB	51	83	0,45	22	17	16	17,0	11,3	AP(U)X333M040BB1
	47000	BB	51	83	0,48	16	13	12	19,7	13,1	AP(U)X473M040BB1
		BC	51	105	0,51	17	14	13	21,1	14,1	AP(U)X473M040BC1
	100000	CC	63	105	0,70	11	9	8	29,9	19,9	AP(U)X104M040CC1
	150000	DC	76	105	0,90	10	8	7	35,9	23,9	AP(U)X154M040DC1
220000	DF	76	145	1,30	9	8	7	41,5	27,7	AP(U)X224M040DF1	
63	22000	BB	51	83	0,26	19	15	14	18,8	12,5	AP(U)X223M063BB1
		BC	51	105	0,24	17	14	13	21,7	14,5	AP(U)X223M063BC1
	33000	BC	51	105	0,28	14	11	10	24,6	16,4	AP(U)X333M063BC1
		CC	63	105	0,27	13	10	10	28,5	19,0	AP(U)X333M063CC1
	47000	CC	63	105	0,30	10	8	8	32,2	21,5	AP(U)X473M063CC1
	68000	DC	76	105	0,36	8	7	6	39,0	26,0	AP(U)X683M063DC1
	100000	DF	76	145	0,40	6	5	5	52,0	34,6	AP(U)X103M063DF1
100	10000	BB	51	83	0,12	19	15	14	18,7	12,4	AP(U)X103M100BB1
		BC	51	105	0,1	16	13	12	22,7	15,1	AP(U)X103M100BC1
	15000	BC	51	105	0,11	12	9	9	26,5	17,7	AP(U)X153M100BC1
	22000	CC	63	105	0,15	11	9	8	31,2	20,8	AP(U)X223M100CC1
		DC	76	105	0,14	10	8	8	35,9	23,9	AP(U)X223M100DC1
	33000	DC	76	105	0,18	9	7	7	38,8	25,8	AP(U)X333M100DC1
		DF	76	145	0,16	8	6	6	47,2	31,5	AP(U)X333M100DF1
	47000	DF	76	145	0,18	6	5	5	53,1	35,4	AP(U)X473M100DF1
160	4700	BC	51	105	0,1	34	27	25	15,5	10,4	AP(U)X472M160BC1
		CC	63	105	0,09	30	24	23	18,6	12,4	AP(U)X472M160CC1
	6800	DC	76	105	0,1	23	19	18	23,6	15,7	AP(U)X682M160DC1
	10000	DC	76	105	0,11	18	14	13	27,3	18,2	AP(U)X103M160DC1
	15000	DF	76	145	0,12	13	10	10	36,7	24,5	AP(U)X153M160DF1
	22000	DF	76	145	0,15	11	9	8	39,8	26,5	AP(U)X223M160DF1
		EF	90	222	0,14	10	8	8	54,2	36,1	AP(U)X223M160EF1
200	3300	BC	51	105	0,10	48	39	36	13,0	8,7	AP(U)X332M200BC1
	4700	CC	63	105	0,10	34	27	25	17,6	11,8	AP(U)X472M200CC1
		DC	76	105	0,09	30	24	23	20,7	13,8	AP(U)X472M200DC1
	6800	DC	76	105	0,10	23	19	18	23,6	15,7	AP(U)X682M200DC1
	10000	DF	76	145	0,11	18	14	13	31,3	20,9	AP(U)X103M200DF1
	15000	DF	76	145	0,12	13	10	10	36,7	24,5	AP(U)X153M200DF1
	22000	DF	76	145	0,12	9	7	7	44,5	29,7	AP(U)X223M200DF1
		DK	76	167	0,12	9	7	7	47,1	31,4	AP(U)X223M200DK1
33000	DK	76	167	0,12	6	5	4	57,7	38,5	AP(U)X333M200DK1	

	Capacitance	Case	Diam	Height	Tan δ	ESRmax typ		Zmax	Iripple @100Hz		Ordering Code
	[μ F]@100Hz		[mm]	[mm]	[%]@100Hz	[m Ω]@100Hz	[m Ω]@10KHz		[A]@55°C	[A]@85°C	(U) for mounting stud
250	2200	BB	51	83	0,09	65	52	49	10,1	6,7	AP(U)X222M250BB1
	3300	BC	51	105	0,10	48	39	36	13,0	8,7	AP(U)X332M250BC1
	3300	CC	63	105	0,09	43	35	33	15,6	10,4	AP(U)X332M250CC1
	4700	DC	76	105	0,10	34	27	25	19,6	13,1	AP(U)X472M250DC1
	6800	DC	76	105	0,10	23	19	18	23,6	15,7	AP(U)X682M250DC1
	10000	DF	76	145	0,10	16	13	12	32,9	21,9	AP(U)X103M250DF1
	10000	EC	90	105	0,10	16	13	12	31,6	21,1	AP(U)X103M250EC1
	15000	DF	76	145	0,10	11	8	8	40,3	26,8	AP(U)X153M250DF1
	15000	EJ	90	222	0,10	11	8	8	53,2	35,4	AP(U)X153M250EJ1
350	2200	BC	51	105	0,09	65	52	49	11,2	7,5	AP(U)X222M350BC1
	3300	CC	63	105	0,09	43	35	33	15,6	10,4	AP(U)X332M350CC1
		DC	76	105	0,08	39	31	29	18,4	12,3	AP(U)X332M350DC1
	4700	DC	76	105	0,09	30	24	23	20,7	13,8	AP(U)X472M350DC1
		DF	76	145	0,08	27	22	20	25,2	16,8	AP(U)X472M350DF1
	6800	DF	76	145	0,08	19	15	14	30,3	20,2	AP(U)X682M350DF1
		DJ	76	222	0,09	21	17	16	34,4	23,0	AP(U)X682M350DJ1
		EC	90	105	0,11	26	21	19	24,8	16,6	AP(U)X682M350EC1
	10000	DF	76	145	0,11	18	14	13	31,3	20,9	AP(U)X103M350DF1
		DJ	76	222	0,10	16	13	12	39,6	26,4	AP(U)X103M350DJ1
		EC	90	105	0,10	16	13	12	31,6	21,1	AP(U)X103M350EC1
	15000	DF	76	145	0,10	11	8	8	40,3	26,8	AP(U)X153M350DF1
		DJ	76	222	0,10	11	8	8	48,5	32,3	AP(U)X153M350DJ1
		EF	90	145	0,12	13	10	10	40,4	26,9	AP(U)X153M350EF1
		EJ	90	222	0,12	13	10	10	48,5	32,4	AP(U)X153M350EJ1
	18000	EF	90	145	0,12	11	8	8	44,3	29,5	AP(U)X183M350EF1
22000	EJ	90	222	0,12	9	7	7	58,8	39,2	AP(U)X223M350EJ1	
27000	EJ	90	222	0,12	7	6	5	65,1	43,4	AP(U)X273M350EJ1	
25000	EL	90	240	0,12	8	6	6	54,9	43,3	AP(U)X253M350EL1	
400	1500	BB	51	83	0,10	106	85	80	7,9	5,3	AP(U)X152M400BB1
		BC	51	105	0,10	106	85	80	8,8	5,9	AP(U)X152M400BC1
	2200	BC	51	105	0,10	72	58	54	10,6	7,1	AP(U)X222M400BC1
		CC	63	105	0,09	65	52	49	12,7	8,5	AP(U)X222M400CC1
		DC	76	105	0,08	58	46	43	15,0	10,0	AP(U)X222M400DC1
	3300	CC	63	105	0,09	43	35	33	15,6	10,4	AP(U)X332M400CC1
		DC	76	107	0,09	43	35	33	17,3	11,6	AP(U)X332M400DC1
		DF	76	145	0,09	43	35	33	19,9	13,3	AP(U)X332M400DF1
	4700	DC	76	105	0,10	34	27	25	19,6	13,1	AP(U)X472M400DC1
		DF	76	145	0,09	30	24	23	23,8	15,8	AP(U)X472M400DF1
	6800	DF	76	145	0,08	19	15	14	30,3	20,2	AP(U)X682M400DF1
	10000	DJ	76	222	0,11	18	14	13	37,8	25,2	AP(U)X103M400DJ1
		EF	90	145	0,11	18	14	13	34,5	23,0	AP(U)X103M400EF1
15000	EJ	90	222	0,08	8	7	6	59,4	39,6	AP(U)X153M400EJ1	

	Capacitance	Case	Diam	Height	Tan δ	ESRmax typ		Zmax	Iripple @100Hz		Ordering Code
	[μ F]@100Hz		[mm]	[mm]	[%]@100Hz	[m Ω]@100Hz	[m Ω]@10KHz		[A]@55°C	[A]@85°C	(U) for mounting stud
400	15000	EJ	90	222	0,08	8	7	6	59,4	39,6	AP(U)X153M400EJ1
	18000	EJ	90	222	0,08	7	6	5	65,1	43,4	AP(U)X183M400EJ1
	20000	EL	90	240	0,08	6	5	5	71,4	47,4	AP(U)X203M400EL1
450	1000	BB	51	83	0,12	191	153	143	5,9	3,9	AP(U)X102M450BB1
	1500	BB	51	83	0,11	117	93	88	7,6	5,0	AP(U)X152M450BB1
		BC	51	105	0,10	106	85	80	8,8	5,9	AP(U)X152M450BC1
	2200	CC	63	105	0,12	87	69	65	11,0	7,3	AP(U)X222M450CC1
		DC	76	105	0,11	80	64	60	12,8	8,5	AP(U)X222M450DC1
	3300	DC	76	105	0,12	58	46	43	15,0	10,0	AP(U)X332M450DC1
		DF	76	145	0,1	48	39	36	18,9	12,6	AP(U)X332M450DF1
	4700	DF	76	145	0,12	41	33	30	20,6	13,7	AP(U)X472M450DF1
		EC	90	105	0,11	37	30	28	20,7	13,8	AP(U)X472M450EC1
	6800	DF	76	145	0,13	30	24	23	23,8	15,8	AP(U)X682M450DF1
		DJ	76	222	0,12	28	22	21	29,8	19,9	AP(U)X682M450DJ1
	10000	DJ	76	222	0,12	19	15	14	36,2	24,1	AP(U)X103M450DJ1
		EJ	90	222	0,12	19	15	14	39,6	26,4	AP(U)X103M450EJ1
15000	EJ	90	222	0,13	14	11	10	46,6	31,1	AP(U)X153M450EJ1	
18000	EL	90	240	0,13	12	9	9	52,9	35,3	AP(U)X183M450EL1	

Dimension, Quantity and Weight for box


Case				Connections							Mounting Stud			Packaging	
Code	DxL	L1	h1	d1	d2	e	Terminal	Screw			Screw			Pcs/Box	Weight/box
							Code	Thread	Torque	Lenght	d3	c	Torque		
BB	51x83	85	13	13	18	22.2	X	M5	2,0	10	M12	16	10Nm	30	6-9
BC	51x105	109	13	13	18	22.2	X	M5	2,0	10	M12	16	10Nm	30	6-9
CC	63x105	111	16	13	18	28.6	X	M5	2,0	10	M12	16	10Nm	20	6-8
DC	76x105	111	19	13	18	31.8	X	M5	2,0	10	M12	16	10Nm	12	5-7
DF	76x145	151	19	13	18	31.8	X	M5	2,0	10	M12	16	10Nm	12	6-14
				18	23		G	M6	2,5						
DK	76x165	173	19	13	18	31.8	X	M5	2,0	10	M12	16	10Nm	12	6-14
				18	23		G	M6	2,5						
DJ	76x222	222	19	13	18	31.8	X	M5	2,0	10	M12	16	10Nm	8	9-11
				18	23		G	M6	2,5						
EC	90x105	112	19	18	23	31,8	G	M6	2,5	10	M12	16	10Nm	6	7-9
EF	90x145	153	19	18	23	31,8	G	M6	2,5	10	M12	16	10Nm	6	9-11
EJ	90x222	227	19	18	23	31,8	G	M6	2,5	10	M12	16	10Nm	6	8-12
EL	90x240	245	19	18	23	31,8	G	M6	2,5	10	M12	16	10Nm	6	9-13

All dimensions in mm, torque in Nm, weight in kg