

# K93 TYPE -40°C +85°C 15000H

RoHS Compliant

- Design optimized for combining low equivalent series resistance with compact size.
- Surge-proof capacitor in aluminium can with insulation sleeve.
- To be mounted with ring clips or with threaded stud.

## APPLICATIONS

Designed for professional application.  
Switch mode power suppliers, high ripple current converters, motor drives.

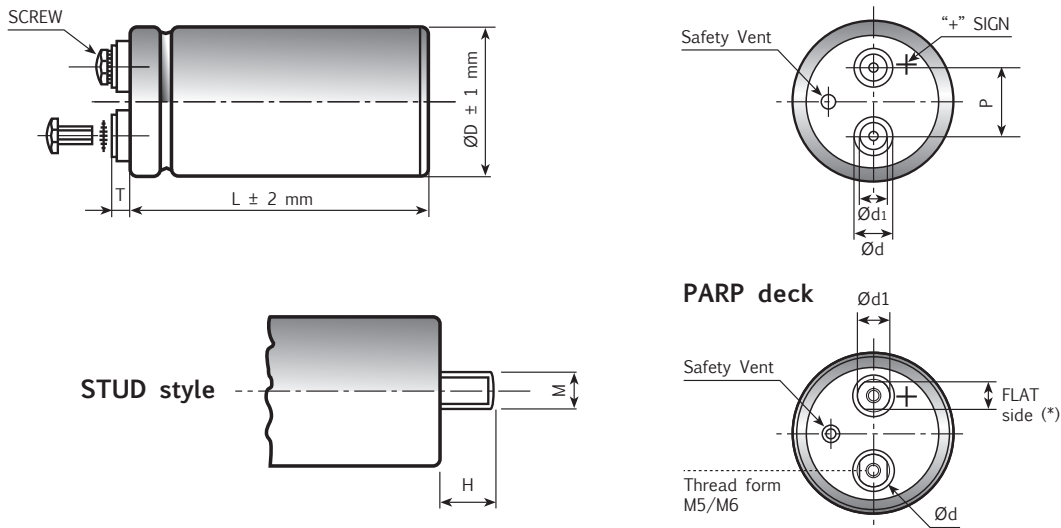


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD		INSERT	SCREW	INSERT STYLE CODE
					M	H			
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (\*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

## K93 TYPE SPECIFICATIONS

<b>Temperature Range</b>	Operating : -40°C +85°C [ Environmental classification 40/85/56 IEC-68 ] Storage : Preferably below +25°C, not exceeding +40°C																																																										
<b>Rated Voltage Range (V<sub>r</sub>)</b>	from 400V to 450V DC																																																										
<b>Surge Voltage (V<sub>p</sub>)</b>	V <sub>p</sub> = 1.10 V <sub>r</sub>																																																										
<b>Rated Capacitance Range</b>	from 470 µF to 15000 µF																																																										
<b>Capacitance Tolerance</b>	±20% at 100 Hz, 20°C [M class IEC-62] on request : -10% +30% at 100 Hz, 20°C [Q class IEC-62]																																																										
<b>Leakage Current (I<sub>L</sub>) (mA, 5 min, 20°C)</b>	max I <sub>L</sub> = 0.006 C <sub>r</sub> V <sub>r</sub> + 4 µA																																																										
<b>Ripple current (I<sub>r</sub>)</b>	Refer to table at 85°C and 100Hz : <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">FREQUENCY</td> <td style="text-align: center;">50Hz</td> <td style="text-align: center;">100Hz</td> <td style="text-align: center;">500Hz</td> <td style="text-align: center;">1000Hz</td> <td style="text-align: center;">&gt;10kHz</td> <td colspan="2"></td> </tr> <tr> <td style="text-align: left;">MULTIPLIER</td> <td style="text-align: center;">0.8</td> <td style="text-align: center;">1.0</td> <td style="text-align: center;">1.2</td> <td style="text-align: center;">1.3</td> <td style="text-align: center;">1.5</td> <td colspan="2"></td> </tr> <tr> <td colspan="8"> </td> </tr> <tr> <td style="text-align: left;">AMBIENT TEMP</td> <td style="text-align: center;">35°C</td> <td style="text-align: center;">45°C</td> <td style="text-align: center;">55°C</td> <td style="text-align: center;">65°C</td> <td style="text-align: center;">75°C</td> <td style="text-align: center;">85°C</td> <td style="text-align: center;">95°C</td> </tr> <tr> <td style="text-align: left;">MULTIPLIER</td> <td style="text-align: center;">2.2</td> <td style="text-align: center;">2.1</td> <td style="text-align: center;">1.8</td> <td style="text-align: center;">1.6</td> <td style="text-align: center;">1.4</td> <td style="text-align: center;">1.0</td> <td style="text-align: center;">0.5</td> </tr> </table> <p>Due to the current load capability of the contact elements, the following limits must not be exceeded:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: left;">CAPACITOR DIAMETER</td> <td style="text-align: center;">51mm</td> <td style="text-align: center;">63mm</td> <td style="text-align: center;">76mm</td> <td style="text-align: center;">90mm</td> <td colspan="3"></td> </tr> <tr> <td style="text-align: left;">Maximum current</td> <td style="text-align: center;">30A</td> <td style="text-align: center;">40A</td> <td style="text-align: center;">50A</td> <td style="text-align: center;">70A</td> <td colspan="3"></td> </tr> </table>			FREQUENCY	50Hz	100Hz	500Hz	1000Hz	>10kHz			MULTIPLIER	0.8	1.0	1.2	1.3	1.5											AMBIENT TEMP	35°C	45°C	55°C	65°C	75°C	85°C	95°C	MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5	CAPACITOR DIAMETER	51mm	63mm	76mm	90mm				Maximum current	30A	40A	50A	70A			
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<b>Insulation Resistance</b>	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.																																																										
<b>Vibration Resistance</b>	Frequency range : 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h																																																										
<b>Withstand voltage (between terminals bundled and plate)</b>	2500 VAC for 1 min																																																										
<b>Life test</b>	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside	Cap change tan δ Leakage current (I <sub>L</sub> ) Impedance (Z)	≤ 10% ≤ 130% < initial limit ≤ 130%																																																								
<b>Shelf life</b>	After leaving capacitors under no load for 2000 hours at 85°C, when restored at 20°C meet specifications aside	Cap change tan δ Leakage current (I <sub>L</sub> )	≤ ±15% ≤ 150% < initial limit																																																								
<b>Useful life (85°C, V<sub>n</sub>, I<sub>r</sub> applied) Operation up to 105°C with voltage derating 0,88 x V rated</b>	> 15.000 h at 85°C																																																										
<b>Failure percentage Failure rate</b>	≤ 1% (during useful life) ≤ 33 fit (33 10 <sup>-9</sup> /h)																																																										
<b>Self inductance</b>	Approx. 20 nH																																																										
<b>Damp heat test (V<sub>n</sub> applied, 2000 hours, 85% RH)</b>	Stable electrical parameters in humidity ambient condition 85°C																																																										
<b>Electrolyte</b>	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10																																																										
<b>Reference standards</b>	CECC 30.300 IEC 60384-4 LONG LIFE GRADE																																																										

## K93 TYPE STANDARD RATINGS

**RATED  
VOLTAGE  
VDC**

**400V**

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1500	51x105	0,07	50	32	8,41	K93400152_HMOG105
1500	63x105	0,07	50	32	9,56	K93400152_HMOH105
2200	51x105	0,07	33	21	10,40	K93400222_HMOG105
2200	63x105	0,07	33	21	11,80	K93400222_HMOH105
2200	76x105	0,07	36	22	12,70	K93400222_HMOJ105
3300	63x105	0,07	21	14	14,70	K93400332_HMOH105
3300	76x105	0,07	24	15	15,60	K93400332_HMOJ105
4700	76x105	0,07	17	11	18,50	K93400472_HMOJ105
4700	76x143	0,07	17	11	20,80	K93400472_HMOJ143
5600	76x143	0,07	14	9	22,70	K93400562_HMOJ143
6800	76x143	0,07	12	8	25,00	K93400682_HMOJ143
8200	76x143	0,13	13	9	24,10	K93400822_HMOJ143
10000	76x143	0,13	11	8	26,20	K93400103_HMOJ143
10000	76x214	0,13	10	7	31,50	K93400103_HMOJ214
15000	90x220	0,13	7	5	42,10	K93400153_HMOL220

**RATED  
VOLTAGE  
VDC**

**420V**

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
1000	51x79	0,07	70	44	6,34	K93420102_HMOG079
1500	51x105	0,06	44	27	8,94	K93420152_HMOG105
1500	63x105	0,06	44	27	10,20	K93420152_HMOH105
2200	51x105	0,06	31	20	10,60	K93420222_HMOG105
2200	63x105	0,06	31	20	12,10	K93420222_HMOH105
2200	76x105	0,07	35	21	12,90	K93420222_HMOJ105
3300	63x105	0,06	21	13	14,90	K93420332_HMOH105
3300	76x105	0,07	23	14	16,00	K93420332_HMOJ105
3300	76x143	0,07	23	14	17,90	K93420332_HMOJ143
4700	76x105	0,07	16	10	18,90	K93420472_HMOJ105
4700	76x143	0,07	16	10	21,30	K93420472_HMOJ143
5600	76x143	0,07	14	9	23,20	K93420562_HMOJ143
6800	76x143	0,07	11	7	25,60	K93420682_HMOJ143
8200	76x143	0,13	13	9	23,90	K93420822_HMOJ143
10000	76x143	0,14	11	8	25,70	K93420103_HMOJ143
10000	76x214	0,12	10	7	32,40	K93420103_HMOJ214
15000	90x220	0,13	7	5	43,20	K93420153_HMOL220

## K93 TYPE STANDARD RATINGS

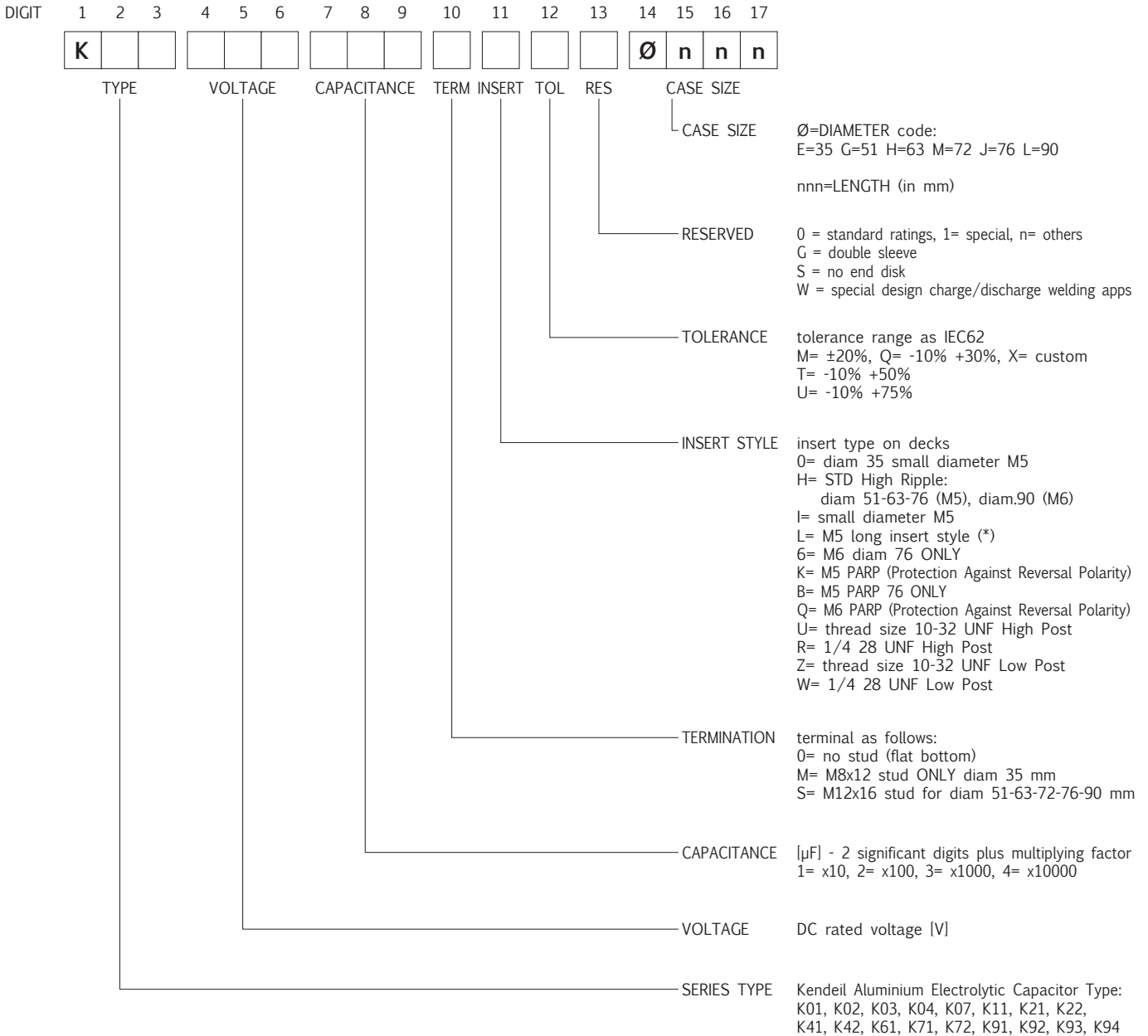
Cap $\mu\text{F}$	$\varnothing \times L$ mm	Tan $\delta$ MAX 100 Hz 20°C	ESR TYP $m\Omega$ 100 Hz 20°C	Z TYP $m\Omega$ 10 kHz 20°C	I <sub>r</sub> a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded
470	51x79	0,06	138	79	4,52	K93450471_HM0G079
680	51x79	0,06	98	56	5,37	K93450681_HM0G079
680	51x105	0,06	96	55	6,06	K93450681_HM0G105
1000	51x79	0,06	65	37	6,59	K93450102_HM0G079
1000	51x105	0,06	68	39	7,23	K93450102_HM0G105
1500	51x105	0,06	44	25	8,97	K93450152_HM0G105
1500	63x105	0,06	44	35	10,20	K93450152_HM0H105
2200	63x105	0,06	30	18	12,30	K93450222_HM0H105
2200	76x105	0,07	34	19	13,10	K93450222_HM0J105
2200	76x143	0,07	34	19	14,80	K93450222_HM0J143
3300	76x105	0,07	22	13	16,00	K93450332_HM0J105
3300	76x143	0,07	23	13	18,00	K93450332_HM0J143
4700	76x143	0,07	16	9	21,50	K93450472_HM0J143
5600	76x143	0,07	13	8	23,50	K93450562_HM0J143
6800	76x143	0,07	11	7	25,60	K93450682_HM0J143
8200	76x143	0,12	11	8	25,30	K93450822_HM0J143
10000	76x143	0,13	11	7	27,00	K93450103_HM0J143
10000	76x214	0,12	9	6	33,30	K93450103_HM0J214
12000	76x214	0,12	8	5	36,10	K93450123_HM0J214
15000	90x220	0,12	6	5	44,20	K93450153_HM0L220

**RATED  
VOLTAGE  
VDC**

**450V**

# PART NUMBER SYSTEM FOR SCREW TYPE CAPACITORS

New PART-NUMBER CODE in use since Sep 2010. Total length is 17 digits.  
Please see examples below and have a reference code from the standard ratings capacitors pages.



### EXAMPLES

K	0	1	1	0	0	2	2	3	0	H	M	0	H	1	0	5	K01 100V 22000µF, Hi ripple, -20%+20%, 63x105
K	0	1	0	6	3	2	2	3	S	H	Q	0	G	1	0	5	K01 63V 22000µF, stud M12x16, Hi rip. -10%+30%, 51x105
K	0	2	0	4	0	1	0	4	0	H	M	0	J	1	4	3	K02 40V 100000µF, Hi ripple, -20%+20%, 76x143

Specifications subject to change without notice

(\*) Note for INSERT STYLE digit\_11

M5 long insert style dedicated to not insulated bus bar (+2 mm height versus STD High Ripple code)