RIFA

PHH 481



Applications

Primarily as commutating capacitors or protection capacitors in combination with a resistance in thyristor circuits. The capacitors are also suitable for all non-sine wave applications.

PHH 481 is a range of metallized polypropylene capacitors specially designed for low losses and low series resistance. Other characteristics are high pulse current capability and small dimensions. The metallized polypropylene design is characterized by self-healing in the event of dielectric breakdown without any interruption of operation. High voltage of short duration will not therefore damage the capacitor, and the series provides excellent perfomrance in conditions where high pulse voltages and high transients occur.

Basic data

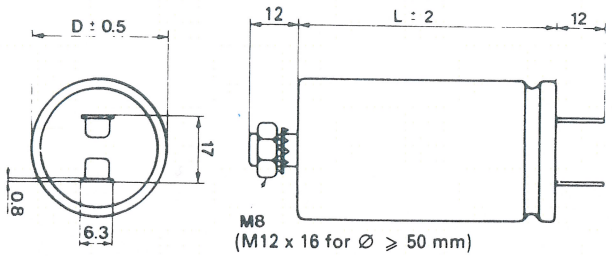
Rated voltage (V)	220	350	450
Capacitance range (µF)	4–60	2–45	0.5–25
Temperature range (°C)	−40 till +85	−40 till +85	

Technical data

Table 1

Rated voltage U_R	220 V
U_{rms}	160 VAC 50 Hz
Non repetitive voltage U_S	480 V
I_{rms} max	15 A
Insulation	
Between terminals	$\geq 1 \times 10^4$ ΩF
Between terminals and case	$\geq 1 \times 10^4$ MΩ
Hot spot temperature T_{HS}	95°C

Code No. PHH 481 ...	HC 7400 K	HC 7500 K	HA 7600 K	HA 7800 K	HA 8100 K	HD 8120 K	HD 8160 K	HG 8200 K	HB 8240 K	HE 8360 K	HH 8500 K	HK 8600 K
Rated capacitance C_R (µF)	4	5	6	8	10	12	16	20	24	36	50	60
Tolerance ±10%												
dU/dt (V/µs)	80	80	50	50	50	50	50	20	20	20	20	20
tanδ=(2+K · f_{kHz})· 10^{-4}; K=	0.8	0.9	1.7	1.9	2.1	2.2	2.5	2.9	8.1	9.6	11.3	12.6
ESR (mΩ)	3.3	2.8	4.6	3.8	3.3	2.9	2.5	2.3	5.4	4.3	3.6	3.3
L (nH)	34	35	43	44	44	45	46	47	75	78	80	82
Thermal resistance (°C/W)												
Hot spot-case, R_{thhc}	32.5	28.5	26.0	22.5	20.0	18.0	16.0	15.0	15.0	14.5	14.5	14.0
Case—ambient R_{thca}	9.3	9.3	7.7	7.7	7.7	7.0	7.0	6.9	6.6	6.4	6.4	6.0
Dimensions D (mm)	30	30	30	30	30	35	35	40	30	35	40	45
L (mm)	55	55	73	73	73	73	73	73	128	128	128	128



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Table 2

Rated voltage U_R	350 V
U_{rms}	250 VAC 50 Hz
Non repetitive voltage U_S	750 V
I_{rms} max	15 A
Insulation	
Between terminals	$\geq 1 \times 10^4$ ΩF
Between terminals and case	$\geq 1 \times 10^4$ MΩ
Hot spot temperature T_{HS}	95°C

2	3	4	5	6	7	8	9	10	12	14	16	18	20	25	30	35	40	45
80	80	50	50	50	50	50	50	50	50	20	20	20	20	20	20	20	20	20
0.6	0.6	1.3	1.3	1.4	1.5	1.6	1.7	1.7	1.9	5.6	5.9	6.1	6.4	7.0	7.6	8.2	8.8	9.4
4.5	3.3	5.1	4.3	3.8	3.4	3.2	2.9	2.8	2.5	6.4	5.8	5.4	5.1	4.4	4.0	3.7	3.5	3.3
34	35	44	44	45	45	46	46	46	47	75	76	77	78	80	81	82	83	84
43.0	32.0	27.5	24.0	21.5	19.5	18.5	17.0	16.0	14.5	13.5	13.0	12.5	12.5	12.5	12.5	12.0	12.0	11.5
9.3	9.3	7.7	7.7	7.0	7.0	7.0	6.9	6.9	6.9	6.4	6.4	6.4	6.4	6.4	6.0	6.0	5.7	5.7
30	30	30	30	35	35	35	40	40	40	35	35	35	40	40	45	45	50	50
55	55	73	73	73	73	73	73	73	73	128	128	128	128	128	128	128	128	128
MC 7200 K	MC 7300 K	MA 7400 K	MA 7500 K	MD 7600 K	MD 7700 K	MD 7800 K	MG 7900 K	MG 8100 K	MG 8120 K	ME 8140 K	ME 8160 K	ME 8180 K	MH 8200 K	MH 8250 K	MK 8300 K	MK 8350 K	ML 8400 K	ML 8450 K

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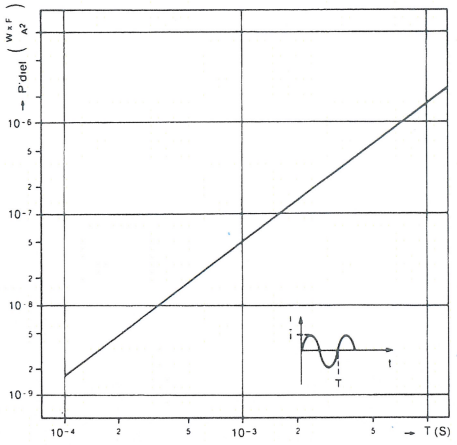
Technical data

Table 3

Rated voltage U_R	450 V
U_{rms}	320 VAC 50 Hz
Non repetitive voltage U_S	1000 V
I_{rms} max	15 A
Insulation	
Between terminals	$\geq 1 \times 10^4$ ΩF
Between terminals and case	$\geq 1 \times 10^4$ MΩ
Hot spot temperature T_{HS}	95°C

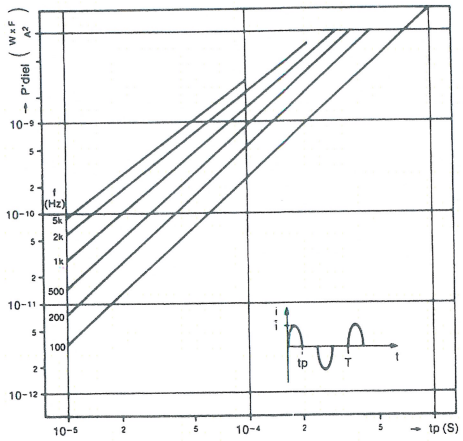
0.5	1	2	4	6	8	10	12	14	16	20	25
80	80	80	50	50	50	20	20	20	20	20	20
0-3	0.3	0.5	1.1	1.2	1.4	4.3	4.6	4.8	5.1	5.6	6.2
8.4	4.7	3.8	4.3	3.3	2.8	6.9	6.1	5.5	5.1	4.4	3.9
34	35	35	45	46	47	76	77	78	79	81	83
27.5	22.5	22.0	16.5	14.5	12.0	11.0	10.5	10.0	10.0	10.0	9.5
9.3	9.3	9.3	7.7	7.0	6.9	6.4	6.4	6.4	6.4	6.0	6.2
30	30	30	30	35	40	35	35	40	40	45	50
55	55	55	73	73	73	128	128	128	128	128	128
OC 6500 K	OC 7100 K	OC 7200 K	OA 7400 K	OD 7600 K	OG 7800 K	OE 8100 K	OE 8120 K	OH 8140 K	OH 8160 K	OK 8200 K	OL 8250 K

Normalized dielectric power loss for different wave shapes

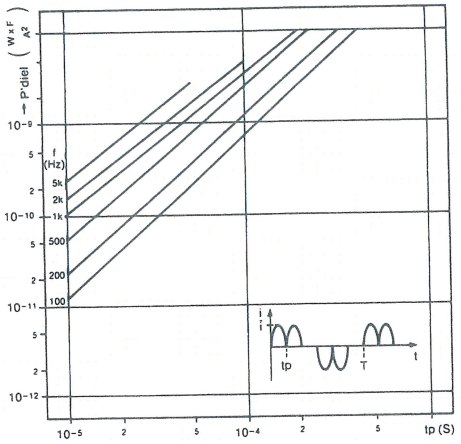


Cont.
Normalized dielectric power loss for different wave shapes

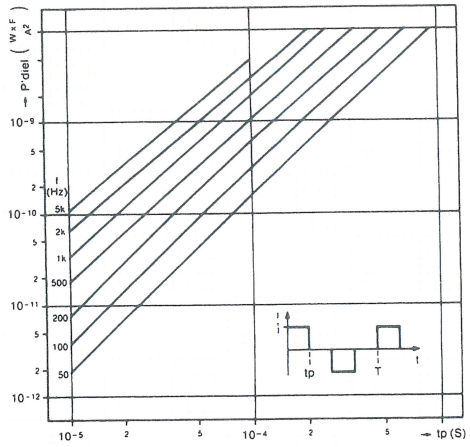
Sinusodial



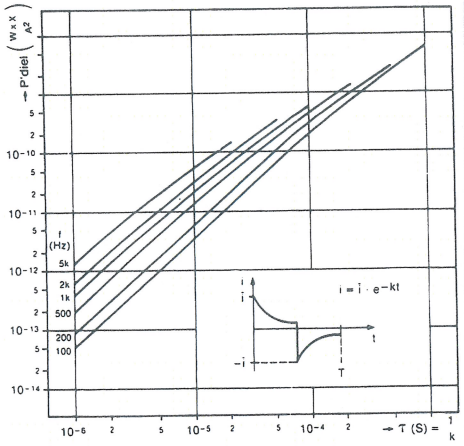
Double sinusodial



Square



Exponential



Quality and test data

All capacitors are subjected to 100% screening inspection in respect to voltage between terminals and case as well as capacitance, tanδ (1000 Hz) and insulation resistance between terminals.

Each lot is sampled to establish the function of the screening inspection. The quality of the product is continuosly followed by periodic tests, were the data of the product specification are established to be kept in the current production.

Test	IEC-publ	Procedure	Requirements
Voltage proof	384-1, clause 4.6		No flashover or permament breakdown
Type test: between terminals		60 s 480 VDC (U_R 220 V) 750 VDC (U_R 350 V) 1000 VDC (U_R 450 V)	
Routine test: between terminals		2 s 480 VDC (U_R 220 V) 750 VDC (U_R 350 V) 1000 VDC (U_R 450 V)	
Between terminals and case		2.5 k VAC 50 Hz >1 s	
Insulation resistance between terminals	384-1, clause 4.5	Measured at 500 VDC 100 VDC (U_R 220 V, 350 V)	>1 × 10^4 ΩF
between terminals and case		500 VDC (U_R 450 V) after 60 s, T_{amb} 23°C	>1 × 10^4 MΩ
tanδ	384-1, clause 4.8	50 Hz, 23 °C	L ≤73 mm <10^{-3} L >73 mm <5 × 10^{-3}
Damp heat, steady state	68-2-3 (1969)	56 days	
Bump	68-2-29 test Eb	4000 bumps, 245 m/s² all directions	No visible damage No open or short circuit