

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

APPLICATION

The MKSP-I18 capacitors for motor run applications are designed to use in single-phase electric motors as running capacitors. They provide the reliable and safe operation. Due to their very low loss level, they can also be used for applications in energy electronics, provided the specified operating conditions and permissible loads are not exceeded.

TECHNICAL DATA

The technical data are given in the sheets enclosed for particular capacitor versions. The detailed technical requirements are specified in the Technical Specifications WT-04/MIFLEX/MKSP-I18. All capacitor versions have the application class A for the service life of 30000 hours and the safety class S2. The safety class S2 means that capacitor is equipped with overpressure protection (break-action mechanism) which disconnects the capacitor from the mains in case of its failure. The MKSP-I18 capacitors meet the requirements of Low Voltage Directive 73/23/EWG and EN 60252-1. They have been approved by the VDE Testing and Certification Institute in Germany (VDE approval mark - Certificate no 40010043).

CAPACITOR VERSIONS

The MKSP-I18 capacitors are made of self-healing metallized polypropylene film having low dielectric loss. The winding element is placed into an aluminium case, filled with polyurethane resin and sealed with special terminal cover. The capacitors can be fixed by an M8 bottom stud or special quick-fixing stud.

The basic versions of capacitor are as follow:

VERSION 1:

- Sub-version 0 - aluminium case equipped with M8 stud
- solder terminals; 3x0,8mm
- Sub-version 1 - aluminium case equipped with M8 stud
- tab connectors; 6,3x0,8mm
- Sub-version 2 - aluminium case equipped with M8 stud
- tab connectors dubs; 2x(6,3x0,8)mm
- Sub-version 3 - aluminium case without M8 stud
- tab connectors; 6,3x0,8mm

VERSION 2:

- Sub-version 0 - aluminium case equipped with M8 stud
- twin cable equipped with receptacles 6,3 or 4,8 mm
- Sub-version 1 - aluminium case equipped with M8 stud
- twin cable equipped

VERSION 3:

- Sub-version 0 - aluminium case equipped with quick-fixing stud
- tab connector 6,3x0,8mm
- Sub-version 1 - aluminium case equipped with quick-fixing stud
- tab connectors dubs; 2x(6,3x0,8)mm

Note:

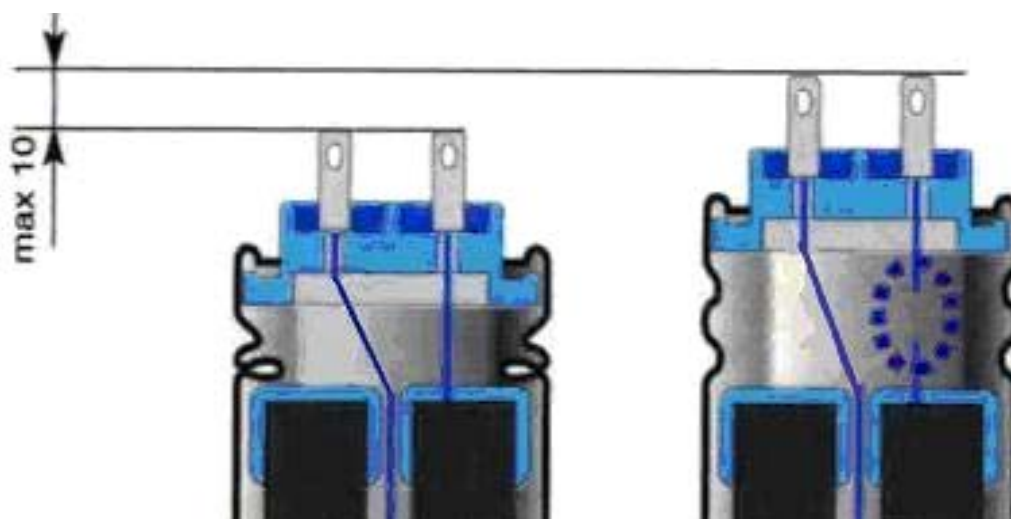
The MKSP-I18 capacitors do not contain PCB or any other toxic impregnating material.



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MOUNTING INSTRUCTIONS

All capacitor versions can be mounted without restrictions in any position. In order to ensure proper operation of break-action mechanism, a clearance of at least 10mm must be provided above the terminals as shown in the figure below:



In case of permanent short-circuit or ageing at the end of the capacitor's useful service life, an increasing number of self-healing breakdowns may cause rising pressure inside the capacitor. With rising pressure the case begins to expand by opening the fold crimp. As a result, the connecting wires are separated at the attenuated spots and the current path is interrupted irreversibly.

Note:

The connection cables or leads used for these capacitors should have the appropriate length and flexibility so as not to impede the expanding of the break-action mechanism.

OPERATING CONDITIONS

The MKSP-I18 capacitors have been designed for continuous operation at the rated voltage, temperature and humidity according to climatic category.

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SERVICE LIFE

In accordance with EN 60252-1, the capacitors are subjected to endurance test with the test voltage of 573,75VAC and the test temperature of +85°C for 3000h. The above mentioned endurance test is equivalent to the service life expectancy of 30000h at the rated voltage of 425VAC and the temperature of +85°C in accordance with the following relation:

$$L_2 = L_1 \left(\frac{U_1}{U_2} \right)^9 \cdot 2^x$$

where: L_2 - service life expectancy (hours)
 L_1 - test duration acc. to EN 60252-1
 U_1 - test voltage eg.: 1,35 U_R for $L_1 = 3000h$
 U_2 - working voltage eg.: rated voltage $U_R = 425VAC$

$$X = \frac{T_1 - T_2}{10}$$

where: T_1 - endurance test temperature (eg. +85°C)
 T_2 - working temperature (temperature of capacitor case eg. +85°C)

In accordance with the above relation, the service life of capacitors increase markedly as a result of temperature and voltage decrease.

Example

In case of the rated voltage of 425VAC and the capacitor case temperature of +70°C, the designed service life shall be 90000 hours and is equivalent to the capacitor lifetime of about 10 years.

Notes:

1. The excessive temperatures, overvoltages and harmonic distortions may reduce the service life expectancy or increase the failure rate.
2. No vapour condensation on the capacitor surface is allowed. The limit value of temperature and humidity shall not be exceeded even during storage.



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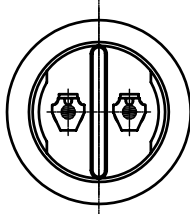
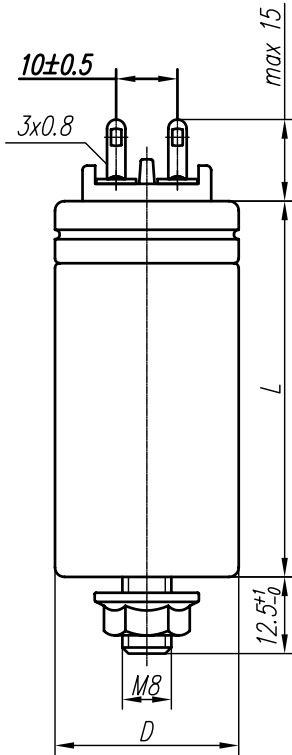
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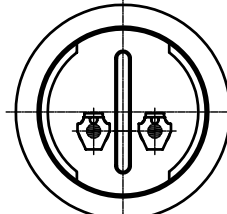
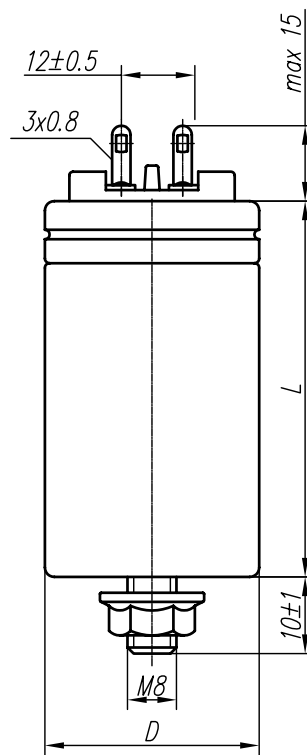
Page
3/11

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 1 Sub-version 0



D=30



D=35

Capacitor dimensions

Capacitance	Dimensions	
	D ₀ ⁺¹	L±2
μF	mm	mm
2	30	62
2,5		
3		
3,5		
4		
4,5		
5	35	62
5,5		
6		
7	30	76
8		
7,5		

TECHNICAL DATA:

- Capacitance tolerance: - ± 5% or ± 10%,
- Rated voltage U_R: - 425V / 50Hz,
- Climatic category: - 40/085/56 acc. to EN 60068-1,
- Tangent of the loss angle: - ≤0,0010 / U_R - 50Hz,
- Dielectric strength:
 - between terminals - 2 U_R - 60s,
 - between terminals connected together and case - 2kV / 50Hz - 60s,
- Case: - aluminium,
- Specifications: - WT-04/MIFLEX/MKSP-I18,
- Application class: - 425VAC - A (30000h),
- Safety class: - S2,
- Protection degree: - IP00,
- The capacitors meet the requirements of: - EN 60252-1, VDE 0560 part 8,
- Approval mark: - VDE.

This product fulfils the requirements of the RoHS Directive (2011/65/EC).

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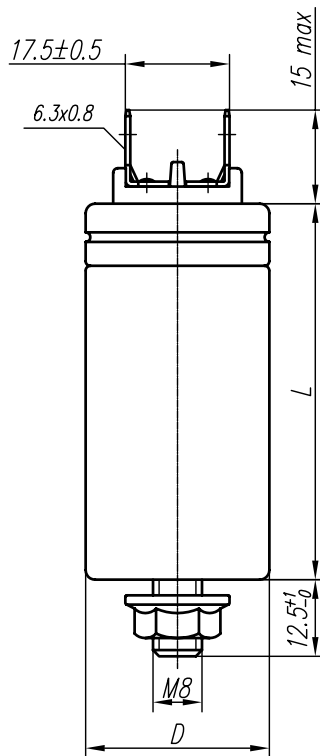
Index- I180V...-A00

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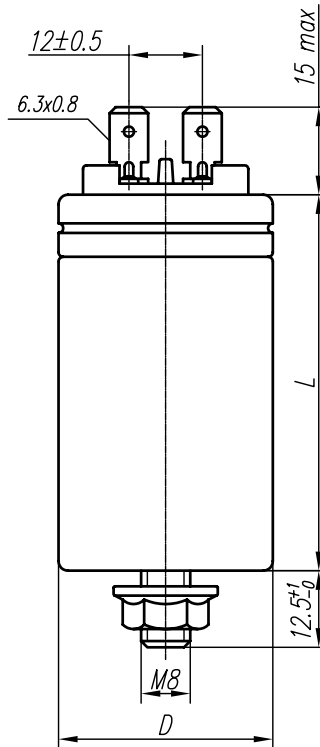
Page
4/11

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 1
Sub-version 1



$D=30$



$D=35$

Capacitor dimensions

Capacitance μF	Capacitor dimensions	
	D_{-0}^{+1} mm	$L_{\pm 2}$ mm
1	30	62
1,5		
2		
2,5		
3		
3,5		
4		
4,5		
5		
5,5		
6	35	76
7		
7,5		
8	30	76
7,5		

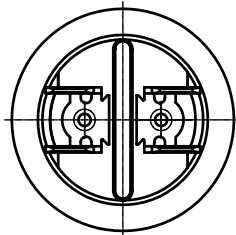
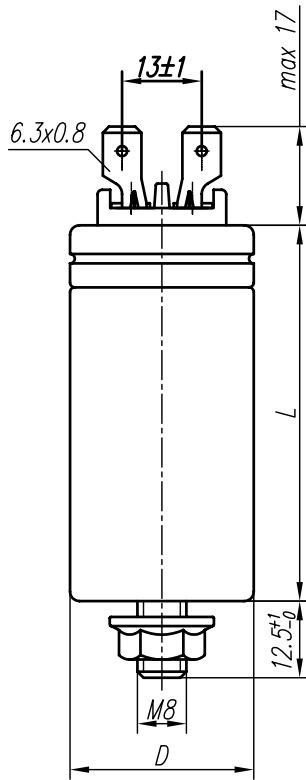
TECHNICAL DATA:

- Capacitance tolerance: $\pm 5\%$ or $\pm 10\%$,
- Rated voltage U_R : 425V / 50Hz,
- Climatic category: 40/085/56 acc. to EN 60068-1,
- Tangent of the loss angle: $\leq 0,0010 / U_R - 50\text{Hz}$,
- Dielectric strength:
 - between terminals
 - between terminals connected together and case
- Case: 2 $U_R - 60\text{s}$,
- Specifications: 2kV / 50Hz - 60s,
- Application class: aluminium,
- Safety class: WT-04/MIFLEX/MKSP-I18,
- Protection degree: 425VAC - A (30000h),
- The capacitors meet the requirements of: S2,
- Approval mark: IP00,
- This product fulfils the requirements of the RoHS Directive (2011/65/EC).

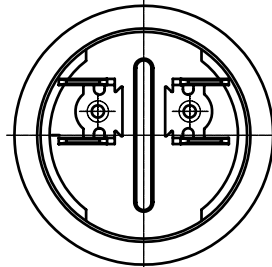
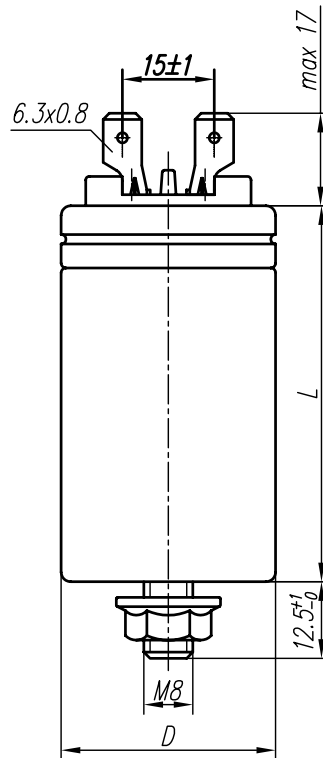
Upon customer's request these capacitors may be delivered without the hexagonal teathed flange nut.

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 1
Sub-version 2



D=30



D=35

Capacitor dimensions

Capacitance	Dimensions	
	D_0^{+1}	$L \pm 2$
μF	mm	mm
2	30	62
2,5		
3		
3,5		
4		
4,5		
5	35	76
5,5		
6		
7	30	76
7,5		
8		
7,5	30	76

TECHNICAL DATA:

- Capacitance tolerance: $\pm 5\%$ or $\pm 10\%$,
 - Rated voltage U_R : 425V / 50Hz,
 - Climatic category: 40/085/56 acc. to EN 60068-1,
 - Tangent of the loss angle: $\leq 0,0010 / U_R - 50\text{Hz}$,
 - Dielectric strength:
 - between terminals - $2 U_R - 60\text{s}$,
 - between terminals connected together and case - $2\text{kV} / 50\text{Hz} - 60\text{s}$,
 - Case: aluminium,
 - Specifications: WT-04/MIFLEX/MKSP-I18,
 - Application class: 425VAC - A (30000h),
 - Safety class: S2,
 - Protection degree: IP00,
 - The capacitors meet the requirements of: EN 60252-1, VDE 0560 part 8,
 - Approval mark: VDE.
- This product fulfils the requirements of the RoHS Directive (2011/65/EC).

Upon customer's request these capacitors may be delivered without the hexagonal teathed flange nut.

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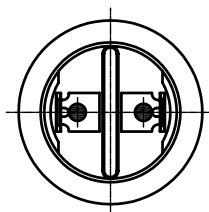
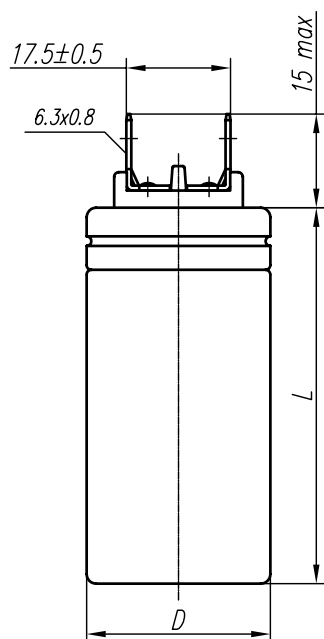
Index- I180V...-A2

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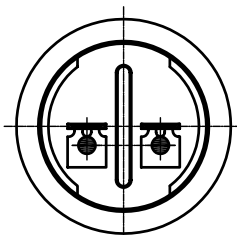
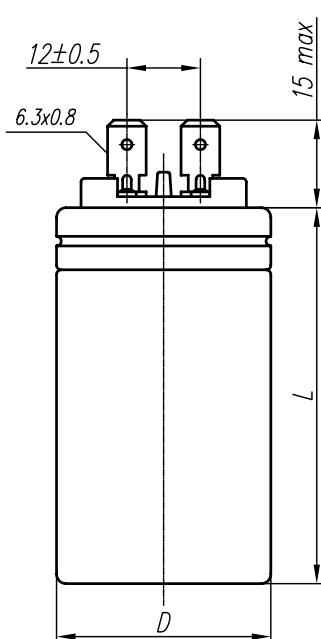
Page
6/11

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 1
Sub-version 3



D=30



D=35

Capacitor dimensions

Capacitance	Dimensions	
	D ₀ ⁺¹	L±2
μF	mm	mm
1	30	62
1,5		
2		
2,5		
3		
3,5		
4		
4,5		
5		
5,5		
6	35	76
7		
7,5		
8	30	76
7,5		

TECHNICAL DATA:

- Capacitance tolerance: - ± 5% or ± 10%,
- Rated voltage U_R: - 425V / 50Hz,
- Climatic category: - 40/085/56 acc. to EN 60068-1,
- Tangent of the loss angle: - ≤0,0010 / U_R - 50Hz,
- Dielectric strength:
 - between terminals - 2 U_R - 60s,
 - between terminals connected together and case - 2kV / 50Hz - 60s,
- Case: - aluminium,
- Specifications: - WT-04/MIFLEX/MKSP-I18,
- Application class: - 425VAC - A (30000h),
- Safety class: - S2,
- Protection degree: - IP00,
- The capacitors meet the requirements of: - EN 60252-1, VDE 0560 part 8,
- Approval mark: - VDE (besides 1μF and 1,5μF)

This product fulfils the requirements of the RoHS Directive (2011/65/UE).

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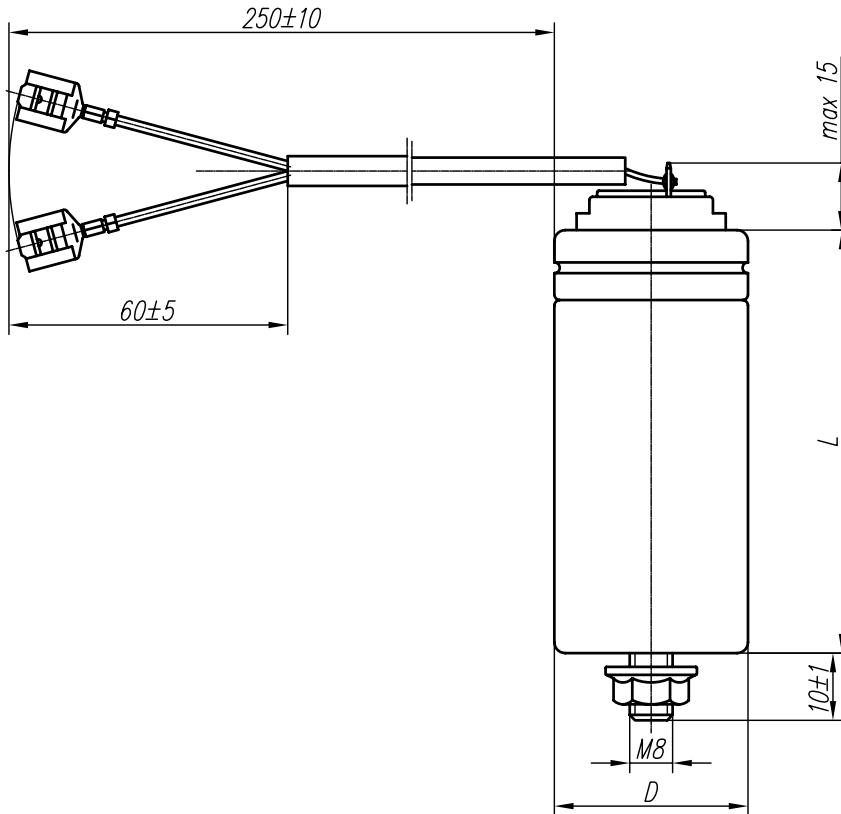
Index- I180V...-A3

Revision date
15.07.2020

Page
7/11

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 2 Sub-version 0



Capacitor dimensions

Capacitance	Dimensions	
	D ₀ ⁺¹	L±2
μF	mm	mm
2	30	62
2,5		
3		
3,5		
4		
4,5		
5	35	76
5,5		
6		
7	30	76
7,5		
8		
7,5	30	76

TECHNICAL DATA:

- Capacitance tolerance:
 - ± 5% or ± 10%,
- Rated voltage U_R:
 - 425V / 50Hz,
- Climatic category:
 - 40/085/56 acc. to EN 60068-1,
- Tangent of the loss angle:
 - ≤0,0010 / U_R - 50Hz,
- Dielectric strength:
 - between terminals
 - 2 U_R - 60s,
 - between terminals connected together and case
 - 2kV / 50Hz - 60s,
- Case:
 - aluminium,
- Specifications:
 - WT-04/MIFLEX/MKSP-I18,
- Application class:
 - 425VAC - A (30000h),
- Safety class:
 - S2,
- Protection degree:
 - IP00,
- The capacitors meet the requirements of:
 - EN 60252-1, VDE 0560 part 8,
- Approval mark:
 - VDE,
- Terminals:
 - twin cable 2x0,75mm² having the VDE and HAR approvals for increased rated voltage of 300/500V, 90°C and receptacles 6,3x0,8 or 4,8x0,8 acc. to IEC 760, DIN 46249 and DIN 46247.

This product fulfils the requirements of the RoHS Directive (2011/65/UE).

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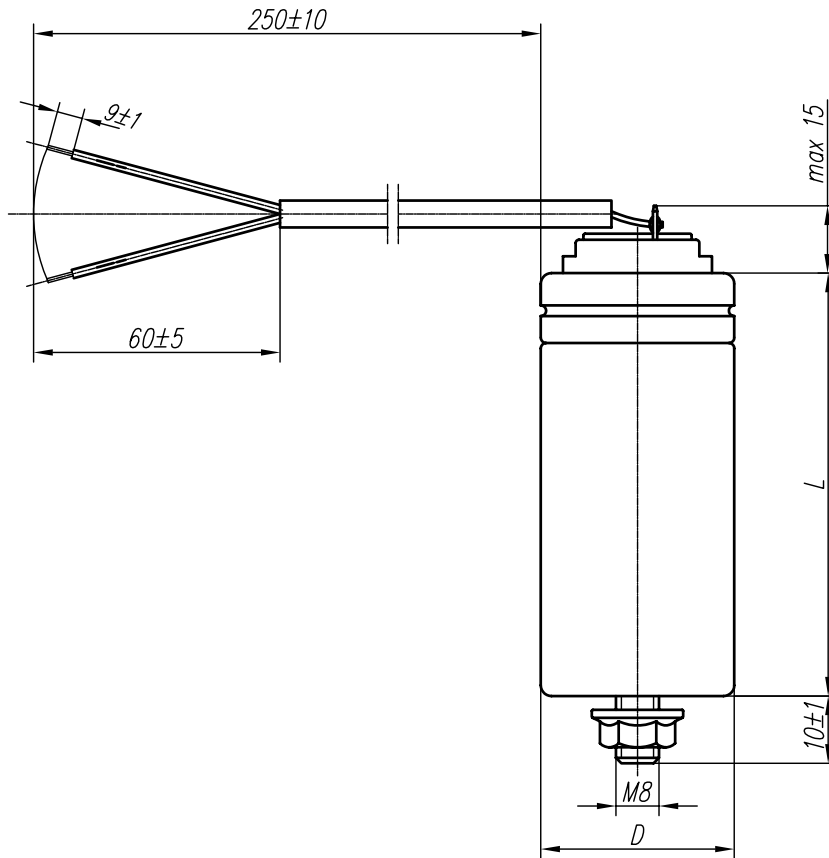
Index- I180V...-B00

Revision date
15.07.2020

Page
8/11

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 2 Sub-version 1



Capacitor dimensions

Capacitance	Dimensions	
	D_0^{+1}	$L \pm 2$
μF	mm	mm
2	30	62
2,5		
3		
3,5		
4		
4,5		
5	35	76
5,5		
6		
7	30	76
7,5		
8		
7,5	30	76

TECHNICAL DATA:

- Capacitance tolerance: $\pm 5\%$ or $\pm 10\%$,
- Rated voltage U_R : 425V / 50Hz,
- Climatic category: 40/085/56 acc. to EN 60068-1,
- Tangent of the loss angle: $\leq 0,0010 / U_R - 50\text{Hz}$,
- Dielectric strength:
 - between terminals - $2 U_R - 60\text{s}$,
 - between terminals connected together and case - $2\text{kV} / 50\text{Hz} - 60\text{s}$,
- Case: aluminium,
- Specifications: WT-04/MIFLEX/MKSP-I18,
- Application class: 425VAC - A (30000h),
- Safety class: S2,
- Protection degree: IP00,
- The capacitors meet the requirements of: EN 60252-1, VDE 0560 part 8,
- Approval mark: VDE and CE,
- Terminals: twin cable $2 \times 0,75\text{mm}^2$ having the VDE and HAR approvals for increased rated voltage of 300/500V, 90°C .

This product fulfils the requirements of the RoHS Directive (2011/65/UE).

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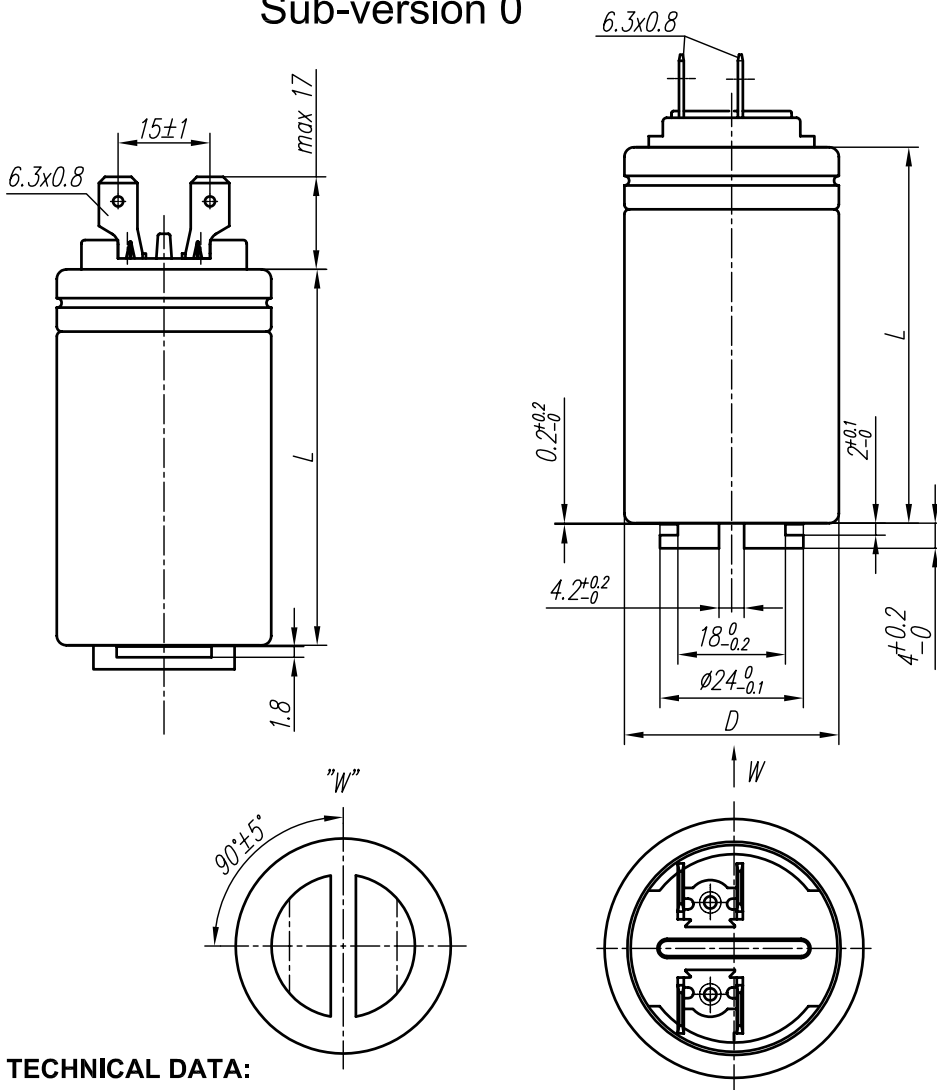
Index- I180V...-B1

Revision date
15.07.2020

Page
9/11

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 3
Sub-version 0



Capacitor dimensions

Capacitance μF	Dimensions	
	$D^{+0.5}_{-0.5}$ mm	$L \pm 2$ mm
2	35.5	62
2,5		
3		
3,5		
4		
4,5		
5		
5,5		
6		
7		
7,5		
8		

TECHNICAL DATA:

- Capacitance tolerance: $\pm 5\%$ or $\pm 10\%$,
- Rated voltage U_R : 425V / 50Hz,
- Climatic category: 40/085/56 acc. to EN 60068-1,
- Tangent of the loss angle: $\leq 0,0010 / U_R - 50\text{Hz}$,
- Dielectric strength:
 - between terminals: $2 U_R - 60\text{s}$,
 - between terminals connected together and case: $2\text{kV} / 50\text{Hz} - 60\text{s}$,
- Case: aluminium,
- Specifications: WT-04/MIFLEX/MKSP-I18,
- Application class: 425VAC - A (30000h),
- Safety class: -S2,
- Protection degree: -IP00,
- The capacitors meet the requirements of: -EN 60252-1, VDE 0560 part 8,
- Approval mark: -VDE.

This product fulfils the requirements of the RoHS Directive (2011/65/UE).

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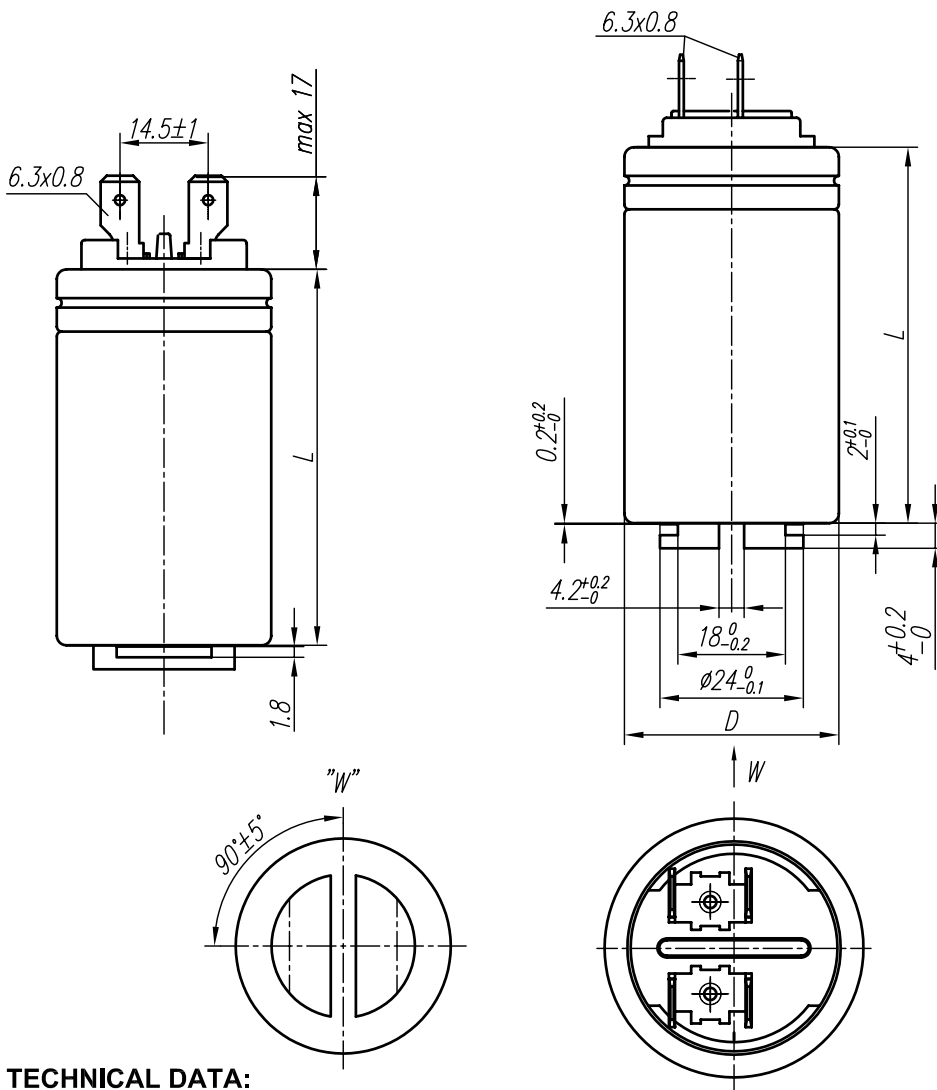
Index- I180V...-C00

Revision date
15.07.2020

Page
10/11

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 3
Sub-version 1



Capacitor dimensions

Capacitance μF	Dimensions	
	$D_{-0.5}^{+0.5}$ mm	$L \pm 2$ mm
2	35.5	62
2,5		
3		
3,5		
4		
4,5		
5		
5,5		
6		
7		
7,5		
8		

TECHNICAL DATA:

- Capacitance tolerance: $\pm 5\%$ or $\pm 10\%$,
- Rated voltage U_R : 425V / 50Hz,
- Climatic category: 40/085/56 acc. to EN 60068-1,
- Tangent of the loss angle: $\leq 0,0010 / U_R - 50\text{Hz}$,
- Dielectric strength:
 - between terminals
 - between terminals connected together and case
- Case: 2 $U_R - 60\text{s}$,
- Specifications: 2kV / 50Hz - 60s,
- Application class: aluminium,
- Safety class: WT-04/MIFLEX/MKSP-I18,
- Protection degree: 425VAC - A (30000h),
- The capacitors meet the requirements of: S2,
- Approval mark: IP00,
- EN 60252-1, VDE 0560 part 8,
- VDE.

This product fulfils the requirements of the RoHS Directive (2011/65/UE).

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Index- I180V...-C3

Revision date
15.07.2020

Page
11/11

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

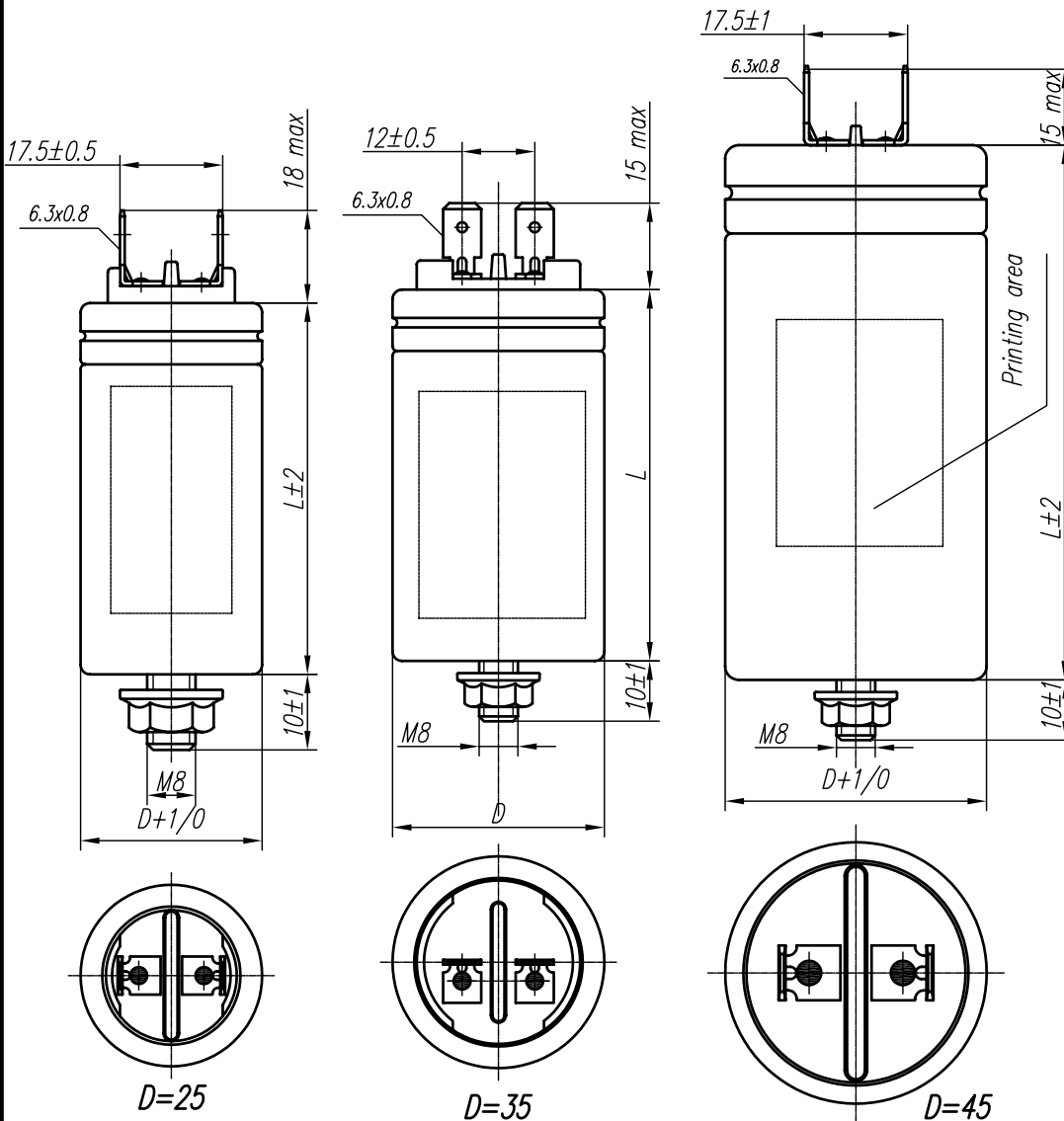
Version 1
Sub-version 01

Printing

MIFLEX
MKSP-I18
30µF±5%
400V~ kl.B
450V~ kl.C
50-60Hz
40/85/21 **30**
P2
EN 60252-1
VDE 560-8
H3

Capacitor dimensions

Capacitance	Capacitor dimensions	
	D ₀ ⁺¹	L±2
µF	mm	mm
2,5	25	62
15	35	75
25	45	88
30		
40		



TECHNICAL DATA:

Capacitance :

- Capacitance tolerance:

- Rated voltage U_R :

- Climatic category:

- Tangent of the loss angle:

- Dielectric strength:

between terminals

between terminals connected together and case

- Case:

- Specifications:

- Application class:

- Safety class:

- Protection degree:

- The capacitors meet the requirements of:

- This product fulfils the requirements of the RoHS Directive (2011/65/UE).

- acc. table

- ± 5% ,

- 400V / 450V -50Hz,

- 40/85/21 acc. to EN 60068-1,

- ≤0,0015 / U_R - 50Hz,

- 2 U_R - 2s,

- 2,5kV / 50Hz - 2s,

- aluminium,

- WT-04/MIFLEX/MKSP-I18,

- 400VAC -kl.B (10000h),450VAC -kl.C (3000h),

- S2,

- IP00,

- EN 60252-1, VDE 0560 part 8,

Upon customer's request these capacitors may be delivered without the hexagonal teathed flange nut.

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Index- I18UV...I-A1

Revision date

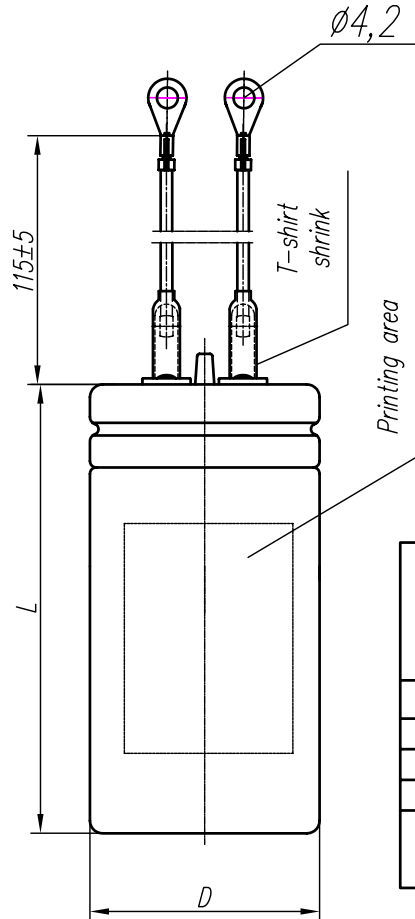
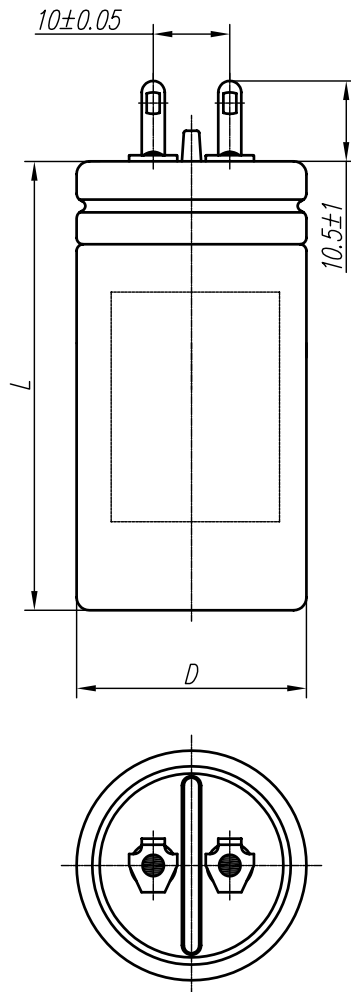
15.07.2020

Page

12

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 1
Sub-version 03



Printing

MIFLEX
MKSP-I18
14µF±5%
425V~ kI.A
450V~ kI.B
500V~ kI.C
50-60Hz 14
40/100/21
S2
EN 60252-1
VDE 560-8
J3

Capacitor dimensions

Capacitance µF	Capacitor dimensions		Rated voltage, class V~
	D ₀ ⁺¹ mm	L mm	
10	40	62±2	425V~, A
14	40	75±1	450V~, B
30	45	110±2	500V~, C
30	45	88±2	425V~, B
			450V~, C 500V~, D

TECHNICAL DATA:

- Capacitance :
- Capacitance tolerance: - acc. table
- Rated voltage U_R: - ± 5% ,
- Climatic category: - 425V / 450V / 500V / 50Hz,
- Tangent of the loss angle: - 40/100/21 acc. to EN 60068-1,
- Dielectric strength: - ≤0,0015 / U_R - 50Hz,
- between terminals
- between terminals connected together and case
- Case: - 2 U_R - 2s,
- Specifications: - 2 kV / 50Hz - 2s,
- Application class: - aluminium,
- Safety class: - WT-04/MIFLEX/MKSP-I18,
- Protection degree: - A(30000)h, B(10000h), C(3000h), D(1000h)
- The capacitors meet the requirements of: - S2,
- This product fulfils the requirements of the RoHS Directive (2011/65/UE). - IP00,
- EN 60252-1, VDE 0560 part 8,

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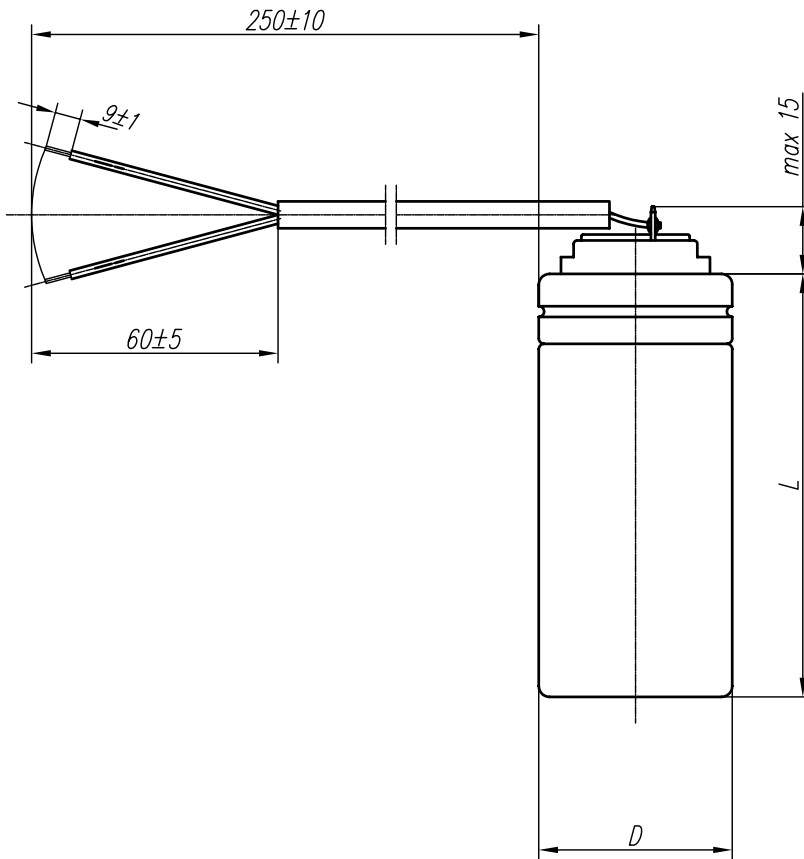
Index- I180V...I-A32

Revision date
15.07.2020

Page
13

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 2
Sub-version 0



Capacitor dimensions

Capacitance	Dimensions		Approval mark
	D _{±0} ⁺¹	L±2	
μF	mm	mm	VDE, CE
5	30	62	
6	35		
7			
8			
10			CE

TECHNICAL DATA:

- Capacitance tolerance:
 - ± 5% or ± 10%,
- Rated voltage U_R:
 - 425V / 50Hz,
- Climatic category:
 - 40/085/56 acc. to EN 60068-1,
- Tangent of the loss angle:
 - ≤0,0010 / U_R - 50Hz,
- Dielectric strength:
 - between terminals
 - between terminals connected together and case
 - 2 U_R - 60s,
 - 2kV / 50Hz - 60s,
- Case:
 - aluminium,
- Specifications:
 - WT-04/MIFLEX/MKSP-I18,
- Application class:
 - 425VAC - A (30000h),
- Safety class:
 - S2,
- Protection degree:
 - IP00,
- The capacitors meet the requirements of:
 - EN 60252-1, VDE 0560 part 8,
- Approval mark:
 - VDE and CE,
- Terminals:
 - twin cable 2x0,75mm² having the VDE and HAR approvals for increased rated voltage of 300/500V, 90°C.

This product fulfils the requirements of the RoHS Directive (2011/65/UE).

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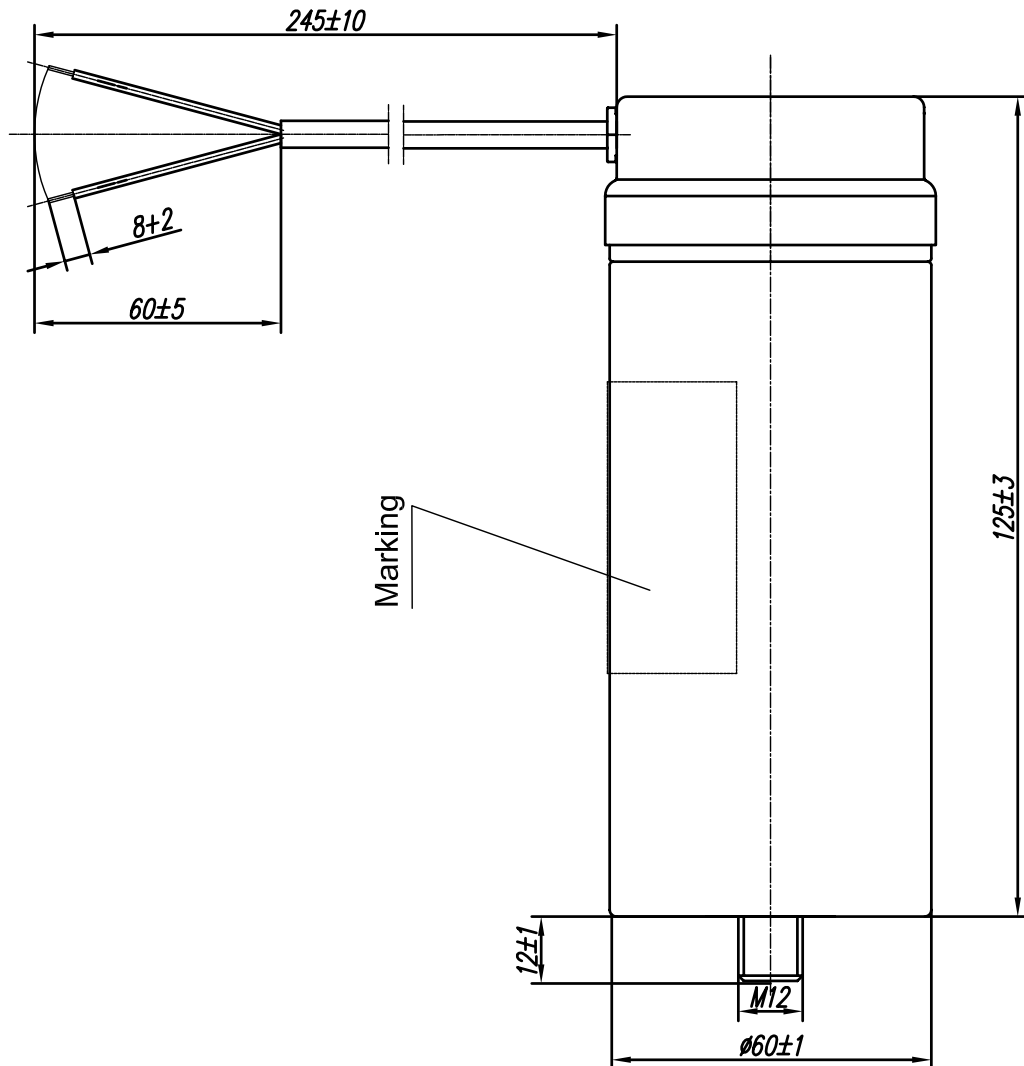
Index- I180V...I-B

Revision date
15.07.2020

Page
14

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 2
Sub-version 0



TECHNICAL DATA:

- Rated capacitance: - 45uF
- Capacitance tolerance: - $\pm 5\%$
- Rated voltage U_R : - 470V or 450V/ 50Hz,
- Climatic category: - 25/085/21 acc. to EN 60068-1,
- Tangent of the loss angle: - $\leq 0,0030 / U_R - 50\text{Hz}$,
- Dielectric strength:
 - between terminals - $2 U_R - 60\text{s}$,
 - between terminals connected together and case - $2\text{kV} / 50\text{Hz} - 60\text{s}$,
- Case: - aluminium,
- Application class: - 470VAC-B(10 000h) 450VAC - A(30 000h),
- Safety class: - S2,
- Protection degree: - IP64,
- The capacitors meet the requirements of: - EN 60252-1, VDE 0560 part 8,
- Terminals: - twin cable $2 \times 0,75\text{mm}^2$ having the VDE and HAR approvals for increased rated voltage of 300/500V, 90°C

This product fulfils the requirements of the RoHS Directive (2011/65/UE).

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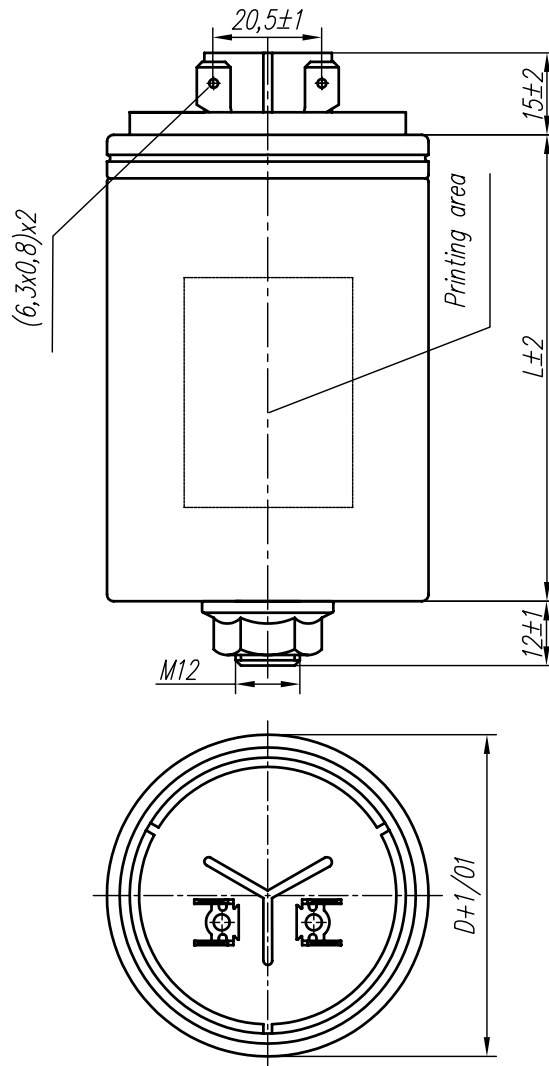
Index- I180V...I-B00

Revision date
15.07.2020

Page
15

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS

Version 1
Sub-version 02



Printing

MIFLEX	
MKSP-I18	
40µF±5%	
400V~ kl.B	
450V~ kl.C	
50-60Hz	
40/85/21 40	
S2	
EN 60252-1	
VDE 0560-8	
J3	

Capacitor dimensions

Capacitance	Capacitor dimensions	
	D ₀ ⁺¹	L±2
µF	mm	mm
40	60	74
55		125
60		
65		

TECHNICAL DATA:

- Capacitance : - acc. table
- Capacitance tolerance: - ± 5% ,
- Rated voltage U_R: - 400V / 450V -50Hz,
- Climatic category: - 40/085/21 acc. to EN 60068-1,
- Tangent of the loss angle: - ≤0,0015 / U_R - 50Hz,
- Dielectric strength:
 - between terminals - 2 U_R - 2s,
 - between terminals connected together and case - 2,5kV / 50Hz - 2s,
- Case: - aluminium,
- Specifications: - WT-04/MIFLEX/MKSP-I18,
- Application class: - 400VAC -cl.B (10000h),450VAC -cl.C (3000h),
- Safety class: - S2,
- Protection degree: - IP00,
- The capacitors meet the requirements of: - EN 60252-1, VDE 0560 part 8,
- This product fulfils the requirements of the RoHS Directive (2011/65/UE).

Upon customer's request these capacitors may be delivered without the hexagonal teathed flange nut.

 **MIFLEX S.A.**

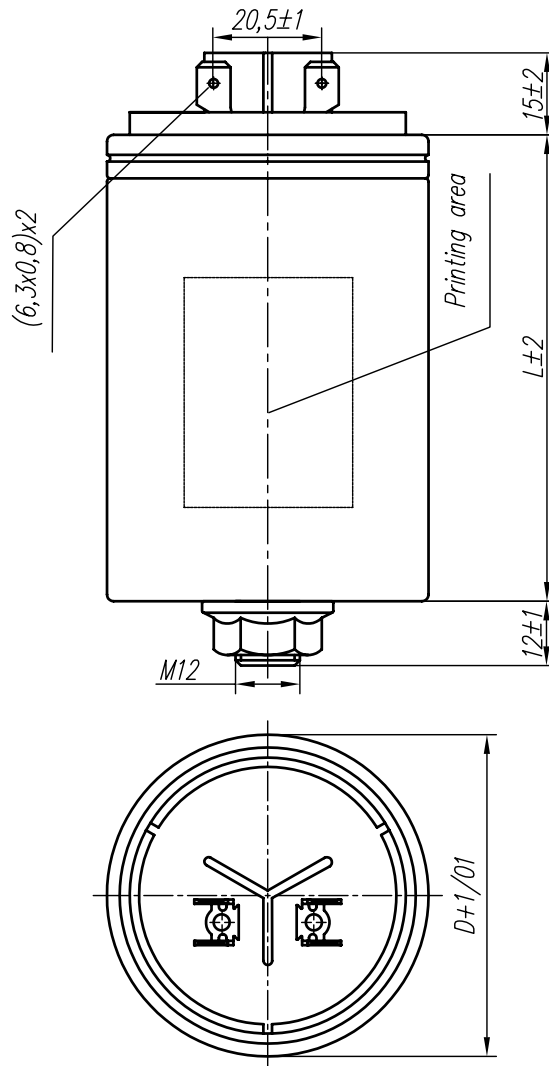
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Index- I18UV...I-A1

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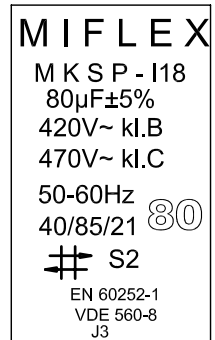
Page
16

AC METALLIZED POLYPROPYLENE FILM CAPACITORS FOR MOTOR APPLICATIONS



Version1
Sub-version 02

Printing



Capacitor dimensions

Capacitance	Capacitor dimensions	
	D ₀ ⁺¹	L±3
µF	mm	mm
80	60	125

TECHNICAL DATA:

- | | |
|--|---|
| Capacitance : | - acc. table |
| - Capacitance tolerance: | - ± 5% , |
| - Rated voltage U _R : | - 420V / 470V -50Hz, |
| - Climatic category: | - 40/085/21 acc. to EN 60068-1, |
| - Tangent of the loss angle: | - ≤0,0025 / U _R - 50Hz, |
| - Dielectric strength: | |
| between terminals | - 2 U _R - 2s, |
| between terminals connected together and case | - 2,5kV / 50Hz - 2s, |
| - Case: | - aluminium, |
| - Specifications: | - WT-04/MIFLEX/MKSP-I18, |
| - Application class: | - 420VAC -kl.B (10000h),470VAC -kl.C (3000h), |
| - Safety class: | - S2, |
| - Protection degree: | - IP00, |
| - The capacitors meet the requirements of: | - EN 60252-1, VDE 0560 part 8, |
| -This product fulfils the requirements of the RoHS Directive (2011/65/UE). | |

Upon customer's request these capacitors may be delivered without the hexagonal teathed flange nut.

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Index- I180V...I-A1

Revision date
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Page
17