4118N/2H8P

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GENERAL 12

Attention!
In order to achieve the specified life time figure and emission, it is necessary, depending on the customer application and requirements, to connect additionally protective circuits and elements.

Special features according to QMH 2-5.4.7 and company standard 1-23.00 have the following definitions:

"A" : Product features or process parameters which influence the safety of a product or the compliance of legal requirements. (Must not necessary verified and documented 100%. Standards and legal requirements must be considered.)

"FK" : Product features or process parameters which influence the fit and function of a product or which have to be controlled or documented for some other reasons (e.g. Customer requirements).

General

Fan type	Fan	
Rotational direction looking at rotor	clockwise	**FK**
Airflow direction	Air intake over struts	**FK**
Bearing system	Ball bearing	
Mounting position Tolerance	any	
Balancing grade	6,3	**FK**
Impeller weight	122,0 g	

Mechanics

General

Width	119,0 mm	
Height	119,0 mm	
Depth	38,0 mm	
Diameter	0,0 mm	
Weight	0,425 kg	
Housing material	Metal	
Impeller material	Plastic	
Max. torque when mounted across both mounting flanges Screw size	wire outlet corner: 420 Ncm remaining corners: 600 Ncm ISO 4762 - M4 degreased, without an additional brace and without washer	

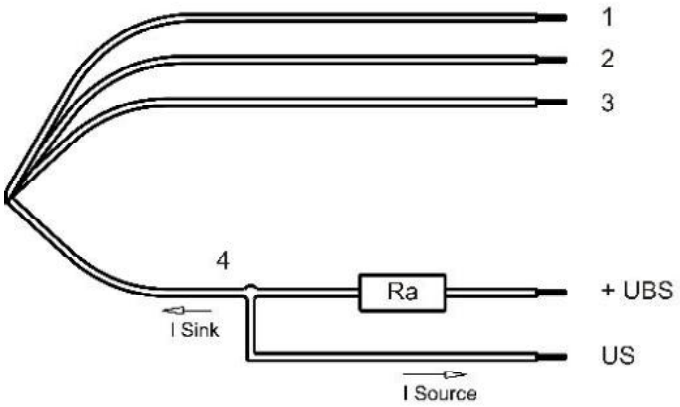
Motor

Type of motor	Electronically commutated external rotor	
Diameter of the motor	43,0 mm	
Height of the motor	14,0 mm	
Number of phases	3	
Number of windings	3	
Operating mode	Continuous duty	
Insulation material class	E	

Connections

Electrical connection	Wires	
Length of lead wire Tolerance	310 mm +- 10,0 mm	
Length of tube Tolerance	--	
Wire gauge (AWG)	AWG20 (+48VDC, GND) AWG22 (Tacho Output, PWM Control Input)	
Insulation diameter	1,70 mm 2,05 mm	
Plug	no	
Contact	no	





	Colour	Operation
Wire 1	red	+ UB
Wire 2	blue	- GND
Wire 3	violet	PWM
Wire 4	white	Tacho

The auxilliaries shown on the schematic diagram (which are required for the intended use) are not part of our delivery.

Lead wire 1 - 2: AWG20
Lead wire 3 - 4: AWG22 (Insulation diameter 2,05mm)

Operating Data

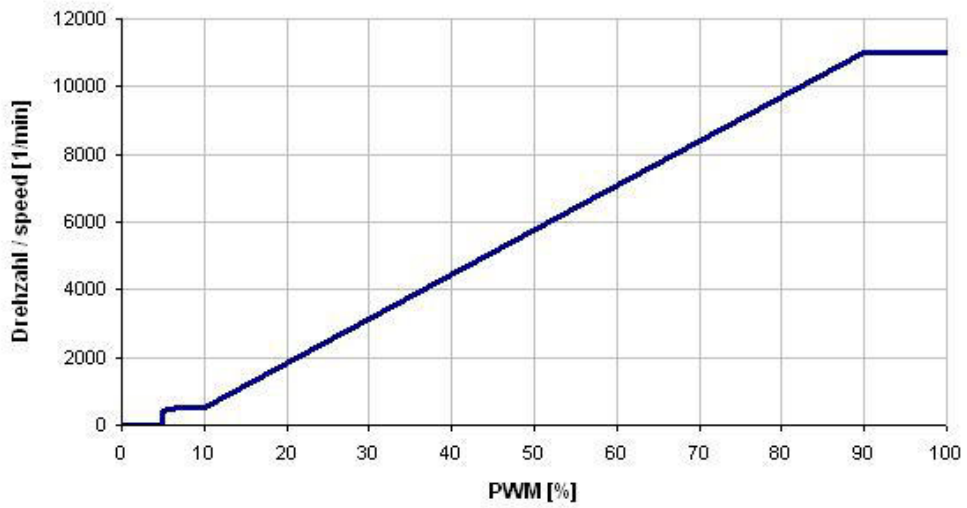
Operating Data - Electrical Interface - Input

Control input	PWM

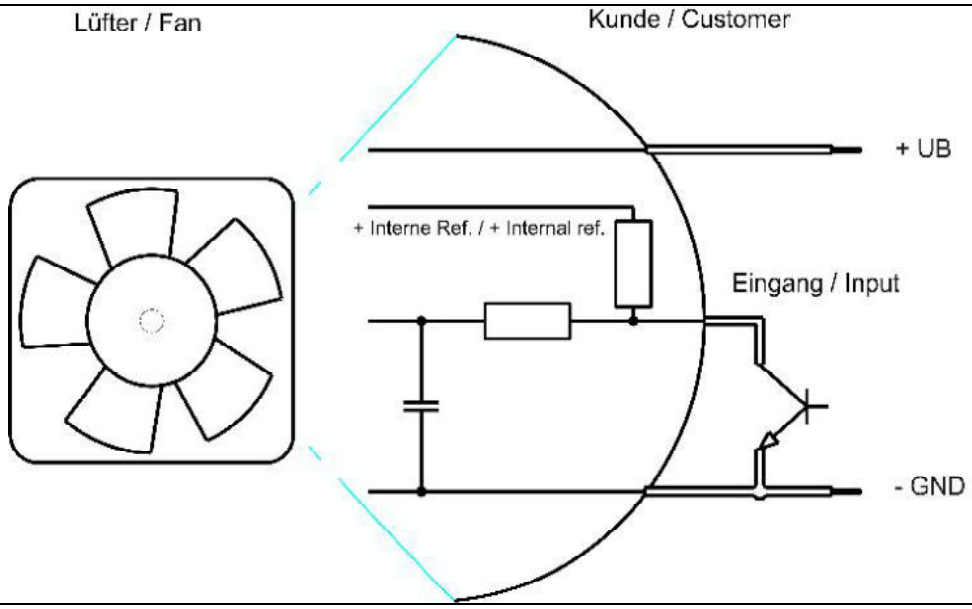
Features

Inpute type	Open collector	
PWM - Frequency		1 kHz - 20 kHz

Characteristics



Schematics



Speed control:
PWM = 0... 100 %; f = 1... 20 kHz; n = 500... 11.000 1/min.

Its possible to run the fan by a control voltage of 0... 5 V. (5 V corresponding 100 % PWM).

Please note:
The power supply must be able to "sink" and work together with an internal pull-up resistor (10 kOhm).

Electrical Operating Data

Measurement conditions:	Normal air density = 1,2 kg/m3; Temperature 23°C +/- 3°C; Motor axis horizontal;warm-up time before measuring 5 minutes (unless otherwise specified).In the intake and outlet area should not be any solid obstruction within 0,5 m.

Δp = 0: corresp. to free air flow (see section 3.5)
I: corresp. to arithm. mean current value

Name	Condition		
PWM 0001		PWM min.: 91 %; f: 1 kHz	PWM max.: 100 %; f: 20 kHz

Features	Condition	Symbol	Values		
Voltage range	Δp = 0	U	36,0 V		60,0 V
Nominal voltage	Δp = 0	U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0001	P	71,0 W +- 10,0 %	125,0 W +- 10,0 %	127,0 W +- 10,0 %
Current consumption Tolerance	Δp = 0 PWM 0001	I	2.000 mA +- 10,0 %	2.600 mA*) +- 10,0 %	2.100 mA +- 10,0 %
Speed Tolerance	Δp = 0 PWM 0001	n	9.100 1/min +- 7,5 %	11.000 1/min*) +- 7,5 %	11.000 1/min +- 7,5 %
Typical current curve (A = least and B = largest current curve in a revolution) A and B = neighboring current curves MPE 891001				0,9 <= A B <= 1,1	

Please note:
The inrush current depends on the cpacitor and resistance of the lead wire. By using an external capaitor the inrush current rises.

In the fan is an additionally under- and overvoltage control build-in. This switches the power stage and the fan off.
At U < 28 V and / or U > 76 V is n= 0 1/min

Starting:

At U: > 30 V or U < 74 V is n > 0 1/min

Name	Condition		
PWM 0002		PWM min.: 9 %; f: 1 kHz	PWM max.: 10 %; f: 20 kHz

Features	Condition	Symbol	Values		
Voltage range	Δp = 0	U	36,0 V		60,0 V
Nominal voltage	Δp = 0	U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0002	P	0,6 W +- 20,0 %	0,8 W +- 20,0 %	0,9 W +- 20,0 %
Current consumption Tolerance	Δp = 0 PWM 0002	I	17 mA +- 20,0 %	16 mA*) +- 20,0 %	15 mA +- 20,0 %
Speed Tolerance	Δp = 0 PWM 0002	n	500 1/min +- 12,5 %	500 1/min*) +- 12,5 %	500 1/min +- 12,5 %

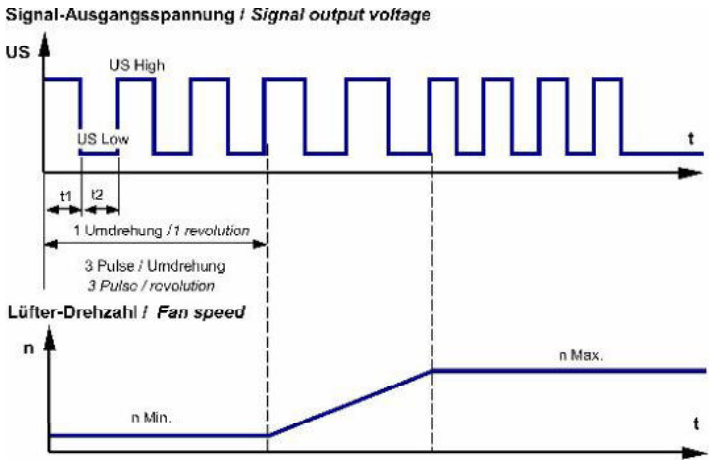
Name	Condition		
PWM 0003	PWM: < 5 %;	f: 1 kHz	f: 20 kHz

Features	Condition	Symbol	Values		
Voltage range	Δp = 0	U	36,0 V		60,0 V
Nominal voltage	Δp = 0	U_N		48,0 V	
Power consumption Tolerance	Δp = 0 PWM 0003	P	0,3 W +- 20,0 %	0,4 W +- 20,0 %	0,6 W +- 20,0 %
Current consumption Tolerance	Δp = 0 PWM 0003	I	8 mA +- 20,0 %	9 mA*) +- 20,0 %	10 mA +- 20,0 %
Speed Tolerance	Δp = 0 PWM 0003	n	0 1/min	0 1/min*)	0 1/min

*) Attention: Marked values are "FK" features

Operating Data - Electrical Interface -Output

Tacho type	/2 (Open collector)



$$Ra = \frac{UBS - US\ Low}{I\ Sink}$$

Features	Note	Values
Tacho operating voltage (UBS)		<= 60,0 V
Tacho signal Low *)	I sink: 2 mA	<= 0,4 V
Tacho signal High *)	I source: 0 mA	<= 60,0 V
Maximum sink current		<= 20 mA
External resistor	External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency *)	(3 x n) / 60	
Tacho isolated from motor	No	
Slew rate		=> 0,5 V/us

Note to the tacho frequency: 3 Pulses per revolution!

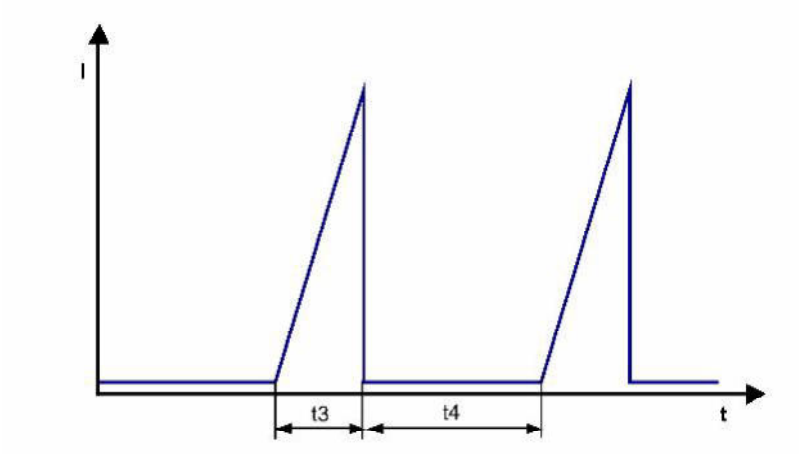
When the fan starts up or the rotor is locked the tacho is off. When the fan works normally the tacho signal output is on.

*) Attention: Marked values are "FK" features

Alarm type	None

Electrical Features

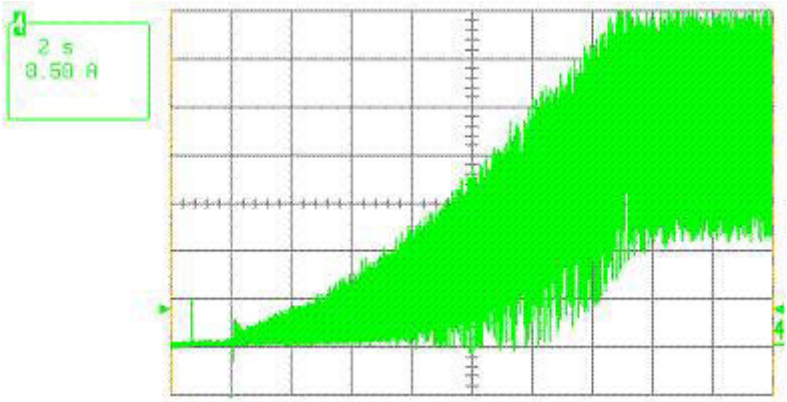
Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at Un	N-CH FET IF <= 1 mA	**A**
Locked rotor protection	Auto restart	**A**
Locked rotor current at Un	approx. 2.000 mA	
Clock signal t3/t4 at locked rotor	Typical: 1,7 s / 5,2 s t3: 1,5 s... 1,9 s t4: 5,0 s... 5,4 s	



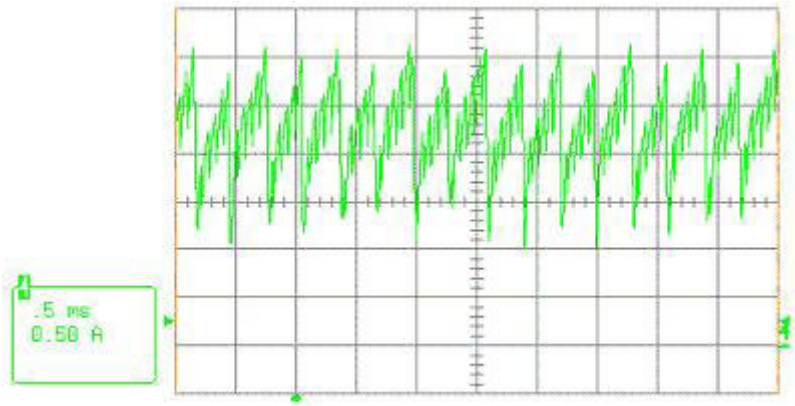
After 5 failed start-ups there is an extended timeout of 30 s.

When several fans are operated together (in a fan tray) and one fan starts after the other and the starting current is eventually limited, it can happen that the not yet operated fan is driven in reverse by the counter pressure. This can lead to a failure of the first start-up. The fan detects this and makes another start with an increased current.

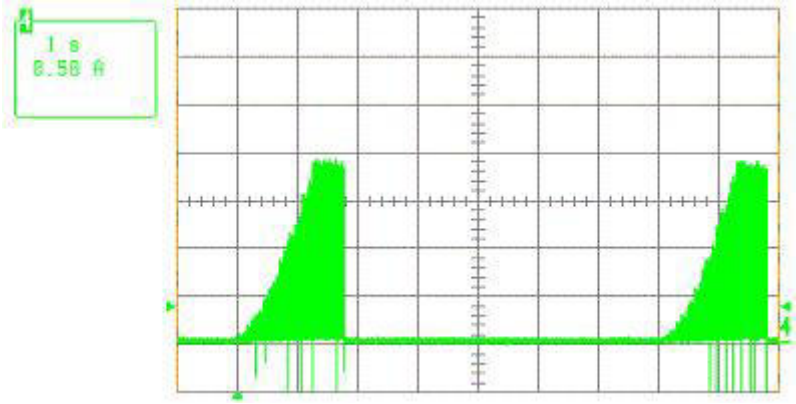
The locked rotor current is denoted as peak-current at nominal voltage.



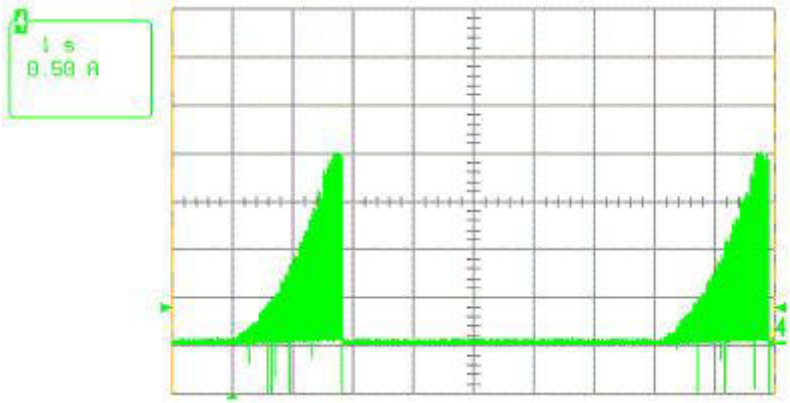
Start-up current at 48,0 V; 0 - 11.000 1/min



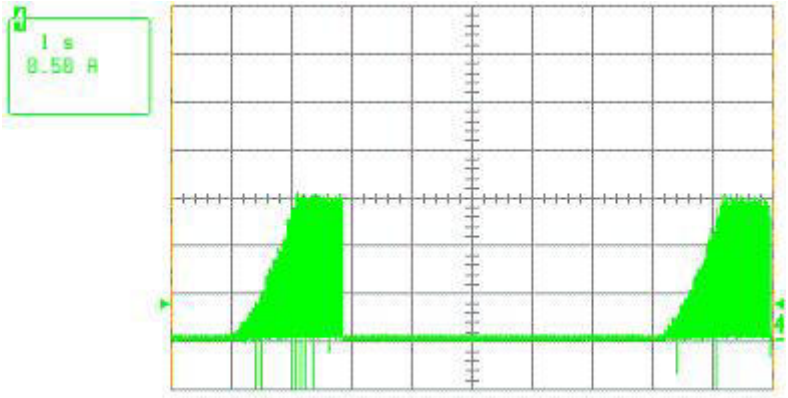
Typical running current; 48,0 V free air out; 11.000 1/min



Locked rotor current at 48,0 V



Locked rotor current at 36,0 V



Locked rotor current at 60,0 V

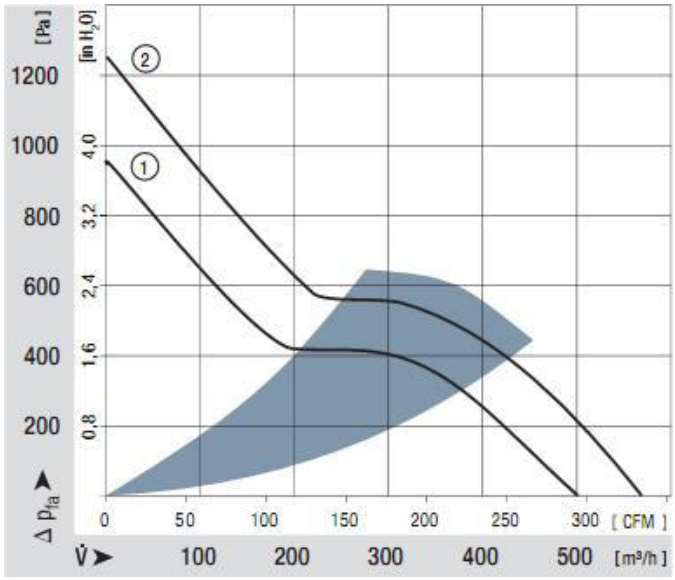
Aerodynamic

Measurement conditions:	Measured with a double chamber intake rig acc. to DIN EN ISO 5801. Normal air density = 1,2 kg/m3; Temperature 23°C +/- 3°C; In the intake and outlet area should not be any solid obstruction within 0,5 m.

a.) Operation condition:

11.000 1/min at free air flow		PWM min.: 91 %; f: 1 kHz	PWM max.:100 %; f: 20 kHz

Max. free-air flow (Δp = 0 / $\dot{V}$ = max.)	570,0 m3/h **(curve 2)**	**FK**
Max. static pressure (Δp = max. / $\dot{V}$ =0)	1.340 Pa	**FK**



Sound Data

Measurement conditions:	Sound pressure level: 1 Meter distance between microphone and the air intake. Sound power level: Acc. to DIN 45635 part 38 (ISO 10302) Measured in a semianchoic chamber with a background noise level of Lp(A) < 5 dB(A) For further measurement conditions see section 3.5

a.) Operation condition:

11.000 1/min at free air flow	PWM	PWM min.: 91 %; f: 1 kHz	PWM max.:100 %; f: 20 kHz

Optimal operating point	390,0 m3/h @ 485 Pa	
Sound power level at the optimal operating point	8,8 bel(A)	
Sound pressure level at free air flow, measured in rubber bands	78,0 dB(A)	

Environment

General

Min. permitted ambient temperature TU min.	-20 °C	
Max. permitted ambient temperature TU max.	75 °C	
Min. permitted storage temperature TL min.	-40 °C	
Max. permitted storage temperature TL max.	80 °C	

Climatic requirements*)

Humidity requirements	humid heat, constant; according to DIN EN 60068-2-78, 14 days	
Water exposure	None	
Radiation exposure	None	
Dust requirements	None	
Salt fog requirements	None	
Harmful gas requirements	None	

*) Permittet application area:
The product is intended for use in sheltered rooms with controlled temperature and controlled humidity. Directly exposure to water must be avoided.

Pollution degree 1 (according DIN EN 60664-1)
There is either no pollution or it occurs only dry, non-conductive pollution. The pollution has no negative impact.

Mechanical requirements

See drawing # 9294314033.

EMC

Attention!
In order to observe special requirements relating to emission and electromagnetic field are additional filter components necessary.
Complexity, connection, components and configuration must be checked at the project.

Safety

Electrical Safety

Dielectric strength DIN EN 60950 (VDE 0805) and DIN EN 60335 (VDE 0700) A.) Type test Measuring conditions: After 48h of storage at 95% R.H. and 25°C. No arcing or breakdown is allowed! All connections together to ground. B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	500 VAC / 1 Min. 500 VAC / 1 Sec.	**A**
Isolation resistance Measuring conditions: After 48h of storage at 95% R.H. and 25°C measured with U=500 VDC for 1 min.	RI > 10 MOhm	
Air and leakage distances	1,0 mm / 1,5 mm	
Protection class	III	

Approval Tests

CE	No
UL	Yes / UL507, Electric Fans
VDE	Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment - Part 1 Safety - Connection to a SELV circuit.
CSA	Yes / C22.2 No. 113-M1984 Fans and Ventilators
CCC	Yes / GB 12350-2000 Safety Requirements for small Power Motors

The approval tests are observed to:
U approval max.:60,0 V @ TU approval max.: 75,0 °C

Reliability

General

Attention!
In order to achieve the specified life time figure, it is necessary to connect an external capacitor.

Complexity, connection, components and configuration must be checked at the project.

As a basis a capacitor of 220... 1000 uF to the supply voltage between plus and minus can be used. Max. lead length between fan and capacitor: 300 mm.

Service Life L10 at TU = 40 °C	55.000 h	
Service Life L10 at TU max.	22.500 h	
Life expectancy L10 Delta (40 °C)	110.000 h	