

# **Specification**

# Radial Blower U51D4-024KX-6







### **General Information**

#### Item

Product type	Radial blower
Part no.	U51D4-024KX-6
Customer	N/A
Project no.	N/A
Modification	Standard product

## **Description**

This low-profile, two-stage, 100% oxygen resistant blower provides highest pressures for medical respiration.





# **Features**

- Static pressure: 84 hPa, freeflow: 590 l/min
- ullet 24  $V_{DC}$  brushless DC-motor
- Small dimensions through slim design
- O<sub>2</sub> resistant material



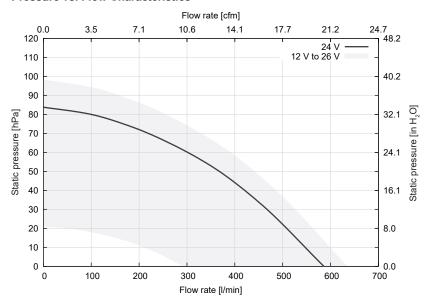
#### **General Conditions**

Unless otherwise stated all data are measured at nominal voltage and are valid at 20 °C ambient temperature and 1.2 kg/m³ standard air density. Values listed are nominal and can vary depending on the installation conditions and due to component tolerances. Test setup according to ISO 5801 with standardized inlet and outlet chambers. Tolerances based on specified speed data according to ISO 13348, grade 4: pressure +/-10 %, power +16 %. Tolerances based on constant voltage: speed +/-10 %, pressure +/-21 %, power +33 %. For continuous blower operation please refer to specified maximum ratings. Performance data outside normal operating range plotted for information only.

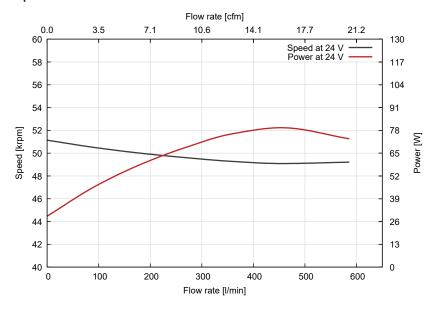


## **Performance**

### **Pressure vs. Flow Characteristics**



### Speed and Power vs. Flow Characteristics



Shut-Off in Pressure Operation (Zero Flow Rate)	Unit	Value	
Static pressure	[hPa]	84	
Power consumption	[W]	29	
Speed	[rpm]	51 100	
Shut-Off in Vacuum Operation (Zero Flow Rate)			
Static pressure	[hPa]	76	
Power consumption	[W]	37	
Speed	[rpm]	50900	
Free-Air (Zero Static Pressure)			
Flow rate	[l/min]	590	
Power consumption	[W]	73	
Speed	[rpm]	49 200	



#### **Technical Data**

Nominal supply voltage         IV <sub>xc</sub> !         24           Supply voltage range         IV <sub>xc</sub> !         12 to 26           Maximum Ratings for Continuous Operation         Windle of the provided in t	Electrical	Unit	Value
Name Natings for Continuous Operation           Maximum Ratings for Continuous Operation         Illuminal         50           Maximum speed         (rpm)         51100           Maximum speed         (rpm)         51100           Maximum power consumption         (IVI)         80           Maximum housing surface temperature         (°C1         65           Maximum NTC temperature         (°C1         20 to 60           Maximum NTC temperature (operating)         (°C1         20 to 60           Ambient temperature (storage)         (°C1         20 to 60           Relative humidity (non-condensing)         (%RH)         10 to 95           Ingress protection (EN60529)         (%RH)         10 to 95           Maximum oxygen concentration         (%SH)         100           Motor           Vinding insulation class         (%)         100           Motor         (%)         118           Phase to phase inductane         (Ω)         0.18           Phase to phase inductane         (Irm)         0.25           Phase to phase inductane         (Irm)         0.25           NTC type         (Irm)         (Irm)         0.24           NTC type         (Irm)	Nominal supply voltage	$[V_{pc}]$	24
Minimum flow rate   Il/min   50     Maximum speed   Irpm   51100     Maximum speed   Irpm   51100     Maximum power consumption   Irpm/ms   N/A     Maximum power consumption   Irpm   80     Maximum housing surface temperature   I*C    65     Maximum NTC temperature   I*C    N/A     Maximum NTC temperature   I*C    -20 to 60     Maximum NTC temperature (storage)   I*C    -20 to 60     Maximum temperature (storage)   I*C    -20 to 60     Relative humidity (non-condensing)   I%RH    10 to 95     Ingress protection (IEN80529)   IP40     Maximum oxygen concentration   I%s    100     Motor	Supply voltage range		12 to 26
Maximum speed   Irpm    51100   Maximum acceleration   Irpm/ms  N/A   N/A   Maximum acceleration   Irpm/ms  N/A   Maximum prover consumption   IW  80   Maximum housing surface temperature   I°C  65   Maximum NTC temperature   I°C  N/A   Maximum NTC temperature   I°C  N/A   Maximum NTC temperature   I°C  20 to 60	Maximum Ratings for Continuous Operation		
Maximum speed   Irpm    51100   Maximum acceleration   Irpm/ms  N/A   N/A   Maximum acceleration   Irpm/ms  N/A   Maximum prover consumption   IW  80   Maximum housing surface temperature   I°C  65   Maximum NTC temperature   I°C  N/A   Maximum NTC temperature   I°C  N/A   Maximum NTC temperature   I°C  20 to 60	Minimum flow rate	[l/min]	50
Maximum power consumption         [W]         80           Maximum housing surface temperature         [°C]         65           Maximum NTC temperature         [°C]         N/A           Environmental           Environmental           Environmental           C			
Maximum power consumption         [W]         80           Maximum housing surface temperature         [°C]         65           Maximum NTC temperature         [°C]         N/A           Environmental           Environmental           Environmental           C	Maximum acceleration	[rpm/ms]	N/A
Maximum NTC temperature   [°C]   N/A	Maximum power consumption		80
Environmental	Maximum housing surface temperature	[°C]	65
Ambient temperature (operating)         [°C]         -20 to 60           Ambient temperature (storage)         [°C]         -20 to 60           Relative humidity (non-condensing)         [%RH]         10 to 95           Ingress protection (EN60529)         IP40           Maximum oxygen concentration         [%]         100           Motor           Winding insulation class         F, 155 °C           Phase to phase resistance         [Ω]         0.18           Phase to phase inductance         [mH]         0.025           Speed constant         [rpm/V]         2124           Torque constant         [mNm/A]         4.49           Number of pole pairs         1         4.49           Hall sensor type         Melexis US 2881         4.5 · 24 V <sub>pc</sub> NTC type         TOK RS7421V2103J062 EPCOS         R25 = 10 kc v, 4 · 5%         B25/100 = 4000 K v/ - 3%           Lifetime         L         L10 at 25 °C ambient temperature <sup>(m)</sup> (h]         10000           Lekt Tightness           Maximum leak flow rate         [[/min]         N/A           Mechanical         [g]         52	Maximum NTC temperature	[°C]	N/A
Ambient temperature (storage)         (°C)         -20 to 60           Relative humidity (non-condensing)         (%RH)         10 to 95           Ingress protection (EN60529)         IP40           Maximum oxygen concentration         (%)         100           Motor           Type         Brushless direct current motor           Winding insulation class         F, 155 °C           Phase to phase resistance         [Ω]         0.18           Phase to phase inductance         [mH]         0.025           Speed constant         [rpm/V]         2124           Torque constant         [mNm/A]         4.49           Number of pole pairs         1           Hall sensor type         Melexis US2881           4.5-24 V <sub>IC</sub> TDK B57421V2103J062 EPCOS           R25 = 10 kit xł - 5%         R25 = 10 kit xł - 5%           R25 = 10 kit xł - 5%         B25/100 - 4000 k +/- 3%           -55 °C to 125 °C         -55 °C to 125 °C           Lifetime           L10 at 25 °C ambient temperature <sup>(1)</sup> [h]         10000           Acoustics           Sound pressure level <sup>(2)</sup> [dB(A)]         70           Leak Tightness           Maxim	Environmental		
Relative humidity (non-condensing)         [%RH]         10 to 95           Ingress protection (EN60529)         [P40]           Maximum oxygen concentration         [%]         100           Motor           Motor           Type         Brushless direct current motor           Winding insulation class         F, 155 °C           Phase to phase resistance         [Ω]         0.18           Phase to phase inductance         [mH]         0.025           Speed constant         [rpm/V]         2124           Torque constant         [mNm/A]         4.49           Number of pole pairs         1         1           Hall sensor type         Melaxis US 2881         4.5-24 V <sub>pc</sub> NTC type         TDK B57421V2103J062 EPCOS R25 = 10 KΩ +/.5% B25/100 = 4000 K +/.2% B25/100 = 4000 K +/.2% B25/100 = 4000 K +/.2 S% B25/100 = 40	Ambient temperature (operating)	[°C]	-20 to 60
Ingress protection (EN60529)         IP40           Maximum oxygen concentration         [%]         100           Motor         Work         Stushless direct current motor           Type         Brushless direct current motor           Winding insulation class         F, 155 °C           Phase to phase resistance         [Ω]         0.18           Phase to phase inductance         [mH]         0.025           Speed constant         [rpm/V]         2124           Torque constant         [mNm/A]         4.49           Number of pole pairs         1           Hall sensor type         Messi US 2881           4.5-24 V <sub>oc</sub> TDK 857421V2103J062 EPCOS           R25 = 10 kΩ + /, 5%         825/100 = 4000 K + /- 5%           R25/100 = 4000 K + /- 3%         -55 °C to 125 °C           Lifetime           L10 at 25 °C ambient temperature <sup>(1)</sup> [h]         10000           Acoustics           Sound pressure level <sup>(2)</sup> [dB(A)]         70           Leak Tightness           Maximum leak flow rate         [l/min]         N/A           Mechanical         [g]         340           Blower weight         [g]         340	Ambient temperature (storage)	[°C]	-20 to 60
Maximum oxygen concentration         [%]         100           Motor         F. 155 °C           Type         Brushless direct current motor           Winding insulation class         F, 155 °C           Phase to phase resistance         [Ω]         0.18           Phase to phase inductance         [mH]         0.025           Speed constant         [rpm/V]         2124           Torque constant         [mNm/A]         4.49           Number of pole pairs         1           Hall sensor type         Melexis US2881           4.5-24 V <sub>DC</sub> 4.5-24 V <sub>DC</sub> R25 = 10 kΩ + 1.5%         R25 = 10 kΩ + 1.5%           R25 = 10 kΩ + 1.5%         R25 = 10 kΩ + 1.5%           B25/100 = 4000 k + 1/- 3%         -55 °C to 125 °C           Lifetime           L10 at 25 °C ambient temperature <sup>(1)</sup> [h]         10000           Acoustics           Sound pressure level <sup>(2)</sup> [dB(A)]         70           Leak Tightness           Maximum leak flow rate         [l/min]         N/A           Mechanical         [g]         340           Blower weight         [g]         52	Relative humidity (non-condensing)	[%RH]	10 to 95
Motor         Brushless direct current motor           Type         Brushless direct current motor           Winding insulation class         F, 155 °C           Phase to phase resistance         [□]         0.18           Phase to phase inductance         [mH]         0.025           Speed constant         [rpm/V]         2 124           Torque constant         [mNm/A]         4.49           Number of pole pairs         1           Hall sensor type         Melexis US2881           M5-24 V <sub>0c</sub> TDK B57421V2103J062 EPCOS R25 = 10 kΩ + 1.5% B25/100 = 4000 K +/-3% e.55 °C to 125 °C           NTC type         E35 °C ambient temperature <sup>(1)</sup> [h]         10000           Acoustics         Sound pressure level <sup>(2)</sup> [dB(A)]         70           Leak Tightness         Maximum leak flow rate         [l/min]         N/A           Mechanical         [g]         340           Blower weight         [g]         340           Rotor weight         [g]         52	Ingress protection (EN60529)		IP40
Type         Brushless direct current motor           Winding insulation class         F, 155 °C           Phase to phase resistance         [Ω]         0.18           Phase to phase inductance         [mH]         0.025           Speed constant         [rpm/V]         2124           Torque constant         [mNm/A]         4.49           Number of pole pairs         1           Hall sensor type         Melexis US 2881 4.5·24 V <sub>ac</sub> NTC type         TDK B57421V2103J062 EPCOS R25 = 10 kΩ +/.5% B25/100 = 4000 K +/·.3% -55 °C to 125 °C           NTC type         B25 °C ambient temperature <sup>(1)</sup> [h]         10000           Acoustics         Sound pressure level <sup>(2)</sup> [dB(A)]         70           Leak Tightness         Maximum leak flow rate         [l/min]         N/A           Mechanical         [g]         340           Blower weight         [g]         340           Rotor weight         [g]         52	Maximum oxygen concentration	[%]	100
Winding insulation class         F, 155 °C           Phase to phase resistance         [Ω]         0.18           Phase to phase inductance         [mH]         0.025           Speed constant         [rpm/V]         2124           Torque constant         [mNm/A]         4.49           Number of pole pairs         1           Hall sensor type         Melexis US 2881 4.5-24 V <sub>pc</sub> TDK B57421V2103J062 EPCOS R25 = 10 kΩ + /= 5% B25/100 = 4000 K +/- 3% -55 °C to 125 °C           NTC type         R25 = 10 kΩ +/- 5% B25/100 = 4000 K +/- 3% -55 °C to 125 °C           Lifetime         L10 at 25 °C ambient temperature <sup>(1)</sup> [h]         10000           Acoustics         Sound pressure level <sup>(2)</sup> [dB(A)]         70           Leak Tightness         [l/min]         N/A           Maximum leak flow rate         [l/min]         N/A           Mechanical         [g]         340           Blower weight         [g]         340           Rotor weight         [g]         52	Motor		
Phase to phase resistance         [Ω]         0.18           Phase to phase inductance         [mH]         0.025           Speed constant         [rpm/V]         2 124           Torque constant         [mNm/A]         4.49           Number of pole pairs         1           Hall sensor type         Melexis US 2881 4.5 · 24 V <sub>pc</sub> NTC type         TDK B57421V2103J062 EPCOS R25 = 10 kΩ +/ 5% B25/100 = 4000 K +/ 3% E25/100 = 4000 K E25 C           Lifetime           L10 at 25 °C ambient temperature <sup>(1)</sup> [h]         10000           Acoustics           Sound pressure level <sup>(2)</sup> [dB(A)]         70           Leak Tightness           Maximum leak flow rate         [l/min]         N/A           Mechanical         [g]         340           Blower weight         [g]         340           Rotor weight         [g]         52	Type		Brushless direct current motor
Phase to phase inductance         [mH]         0.025           Speed constant         [rpm/V]         2124           Torque constant         [mNm/A]         4.49           Number of pole pairs         1           Hall sensor type         Melexis US 2881 4.5-24 V <sub>DC</sub> TDK B57421V2103J062 EPCOS R25 = 10 kΩ +/_5% B25/100 = 4000 K +/- 3% -55 °C to 125 °C           R25 = 10 kΩ +/_5% B25/100 = 4000 K +/- 3% -55 °C to 125 °C           Lifetime           L10 at 25 °C ambient temperature <sup>(1)</sup> [h]         10000           Acoustics           Sound pressure level <sup>(2)</sup> [dB(A)]         70           Leak Tightness           Maximum leak flow rate         [l/min]         N/A           Mechanical           Blower weight         [g]         340           Rotor weight         [g]         52	Winding insulation class		F, 155 °C
Speed constant   Erpm/V   2124	Phase to phase resistance	[Ω]	0.18
Torque constant   mNm/A    4.49	Phase to phase inductance	[mH]	0.025
Number of pole pairs   1	Speed constant	[rpm/V]	2124
Hall sensor type    Melexis US 2881   4.5-24 V   70     TDK B57421V2103J062 EPCOS   R25 = 10 kΩ 1 / .5%   B25/100 = 4000 K +/- 3%   -55 °C to 125 °C     Lifetime	Torque constant	[mNm/A]	4.49
A.5-24 V   DC	Number of pole pairs		1
NTC type       R25 = 10 kΩ +/_5% B25/100 = 4000 K +/- 3% -55 °C to 125 °C         Lifetime       Lifetime         L10 at 25 °C ambient temperature <sup>(1)</sup> [h]       10000         Acoustics         Sound pressure level <sup>(2)</sup> [dB(A)]       70         Leak Tightness         Maximum leak flow rate       [l/min]       N/A         Mechanical         Blower weight       [g]       340         Rotor weight       [g]       52	Hall sensor type		
L10 at 25 °C ambient temperature(1)	NTC type		R25 = 10 k $\Omega$ +/_5% B25/100 = 4000 K +/- 3%
Acoustics         [dB(A)]         70           Leak Tightness         [I/min]         N/A           Mechanical         [g]         340           Rotor weight         [g]         52	Lifetime		
Sound pressure level   2   [dB(A)]   70	L10 at 25 °C ambient temperature <sup>(1)</sup>	[h]	10 000
Leak Tightness           Maximum leak flow rate         [l/min]         N/A           Mechanical         [g]         340           Rotor weight         [g]         52	Acoustics		
Maximum leak flow rate         [I/min]         N/A           Mechanical         [g]         340           Blower weight         [g]         52	Sound pressure level(2)	[dB(A)]	70
Mechanical[g]340Blower weight[g]52	Leak Tightness		
Blower weight [g] 340 Rotor weight [g] 52	Maximum leak flow rate	[l/min]	N/A
Rotor weight [g] 52	Mechanical		
	Blower weight	[g]	340
Rotor moment of inertia [g/cm²] N/A	Rotor weight	[g]	52
	Rotor moment of inertia	[g/cm <sup>2</sup> ]	N/A

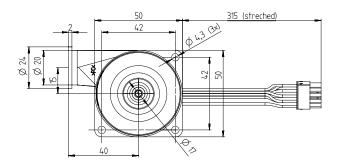
<sup>(1)</sup> Accelerated aging test at 45 °C ambient temperature, continuouse operation, normal cleanliness according to ISO 281. Temperature dependency of lifetime according to IPC-9591: factor 1.5 per 10 °C.

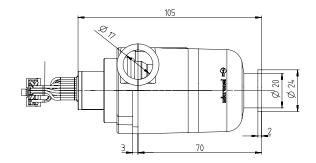
<sup>(2)</sup> Measured at distance of 1 meter from inlet, with open inlet, outlet connected to breathing tube and 4 mm orifice in sound cancellation box at 1 kPa.

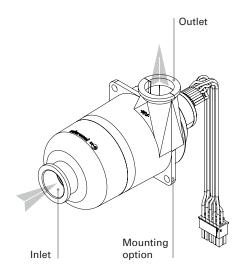


## **Drawings**

## Dimensions in mm







#### Orientations

Direction of rotation	G Counter-clockwise (view on inlet)
Mounting position	Any direction

### **Materials**

Components	Material	
Blower housing	Polycarbonate (PC), LEXAN HPS1	
	Flammability: 850 °C / 1 mm (IEC 60695-2-12)	
	Biocompatibility: Suitable for EtO, steam and gama sterili-	
	sation / FDA approved USP Class 6	
Impeller	Polyamide (PA 6)	
Impeller	Flammability: UL 94 VW1, biocompatible	
Hub	Brass	
Motor housing	Aluminum without anodization	
Label	Plastic	
Connector	Molex 43025-1000	
	Polyamid (PA6)	
	Flammability: UL 94 V-2	
Crimp terminal	N/A	
Lead wire	Silicone insulated cable	
	Flammability: UL 3132	



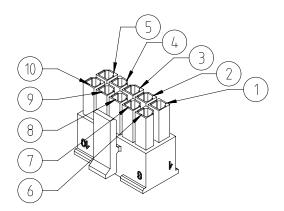
#### Identification

#### Label

esign		micronel  Micronel AG CH-8317 Tagelswangen	Identification number: • Year, calendar week (YYWW)
	Part number	Micronel Radial Blower U51D4-024KX-6 2221 999999 001	<ul><li>Fabrication number (6 digits)</li><li>Serial number (3 digits)</li></ul>
	Nominal voltage	MANUFACTURED CE	

### **Blower Pinout**

Pin	Color	Description	AWG
1	Blue	Hall Sensor 1	24
2	Black	Hall Sensor 2	24
3	Yellow	V <sub>Hall</sub>	24
4	Orange	Motor Winding W	24
5	White	NTC Sensor	24
6	Grey	Hall Sensor 3	24
7	Green	Ground	24
8	Brown	Motor Winding U	24
9	Red	Motor Winding V	24
10	White	NTC Sensor	24



## **Notice**



Handle in power-off conditions only! Read operating manual!



Please see separate accessories list or contact Micronel Sales for a full list of options and accessories.