

# TECHNICAL INFORMATION

ACTIVE LIGHTING SAIL SYSTEM  
INDUSAIL LUMINOUS

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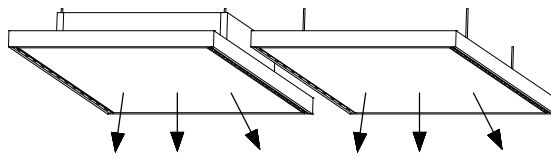
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# INDUSAIL SYSTEM

## ONE SYSTEM – MANY POSSIBILITIES



### INDUSAIL LUMINOUS



#### LIGHT

Intelligent room lighting



#### AIR

Draught-free supply of fresh air



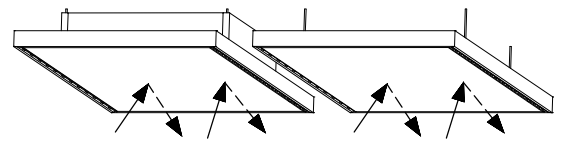
#### COOLING

Comfortable air conditioning



#### ACOUSTICS

High sound absorption



### INDUSAIL SONIC



#### LIGHT REFLECTANCE

Supports the lighting



#### AIR

Draught-free supply of fresh air



#### COOLING

Comfortable air conditioning



#### ACOUSTICS

Very high sound absorption

## The right option for every room – two INDUSAIL ranges in three designs

The intelligent combination of lighting, air conditioning, acoustics and ventilation for an optimal workplace design, all in one unit. Flexible expansion and combination options.

	INDUSAIL LUMINOUS			INDUSAIL SONIC		
	plus	air	silent	plus	air	silent
Lighting	● ● ●	● ● ●	● ● ●	● *	● *	● *
Ventilation	●	● ● ●	-	●	● ● ●	-
Cooling	● ● ●	●	-	● ● ●	●	-
Acoustics	●	●	● ●	● ●	● ●	● ● ●

\*No lighting; very good light reflectance

# INDUSAIL LUMINOUS – THE ALL-ROUNDER

## LIGHT – AIR – COOLING – ACOUSTICS

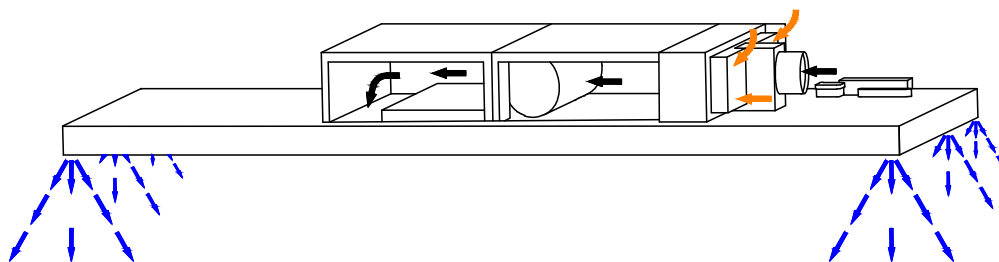
INDUSAIL LUMINOUS expands the tried and trusted INDUSAIL SONIC active acoustic sail system by adding active lighting, integrated into the sail surface. In these units, the acoustic mat is replaced by LED panels concealed behind a diffuser material. This results in glare-free lighting that meets all requirements. The light appearance as well as the brightness can be adjusted. In addition to lighting, the lighting sail offers cooling, ventilation and acoustics, ensuring the perfect level of comfort for office interiors.

The secondary air cooler cools the ambient air to a pleasant temperature with no risk of draughts. The integral, highly inductive linear diffusers with a specially developed air discharge geometry produce the finest individual jets of air, at the edges of which ambient air can be efficiently induced. An integrated supply air connection provides the option of additional fresh air. The highly absorbent coating ensures very good sound absorption and thus ideal acoustics of the room. Any number of sails, each measuring 2500 x 1100 mm, can be combined, including different versions. They can be used in isolation in individual rooms and offices or throughout open-plan setups. This makes them equally suitable for new build and modernisation projects.



### INDUSAIL LUMINOUS plus function description

The fan draws ambient air into the unit via a filter cell and channels it through the heat exchanger. The air is cooled by the cold water flowing within the heat exchanger. The cooled secondary air is then introduced into the room from four sides, in a highly inductive, draught-free manner, through Kiefer air diffusers, type INDUL P18. The filter cell protects the internal components from soiling.



As an option, it is possible to feed preconditioned outdoor air into the sail via an air connection (DN 125). This outdoor air is used to maintain the intended minimum outdoor air flow rate for the room (DIN EN ISO 15251).

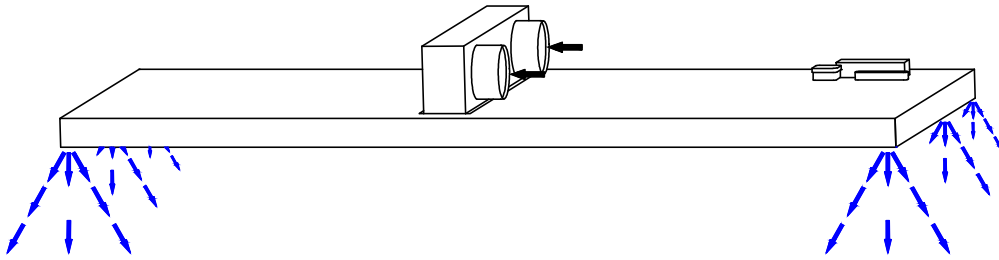
The air flow rate, sound power and caloric output are important considerations for the unit design. The caloric output of the units is determined by the amount of water – controlled, for example, by a water valve – and the speed of fan rotation. The fan speed is controlled by regulating an EC motor with a 0 to 10 V (DC) signal from a controller or the building management system. The sound power of the unit is determined by the speed of fan rotation and the air flow rate.

► The supply water temperature must be calculated to ensure that no condensation forms during correct operation.

# INDUSAIL LUMINOUS – THE ALL-ROUNDER LIGHT – AIR – COOLING – ACOUSTICS

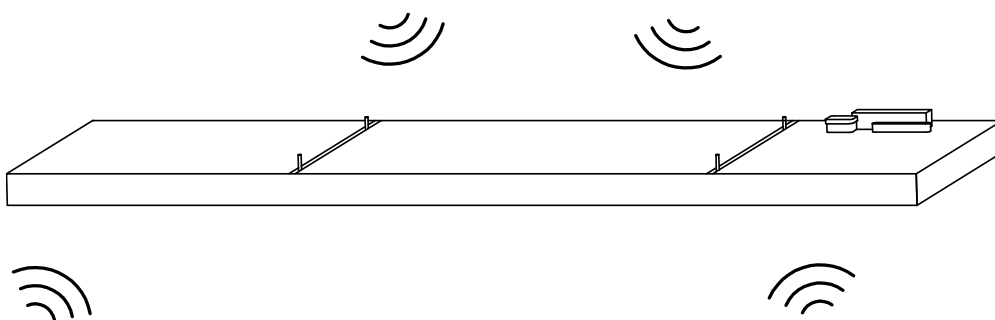
## INDUSAIL LUMINOUS air function description

The INDUSAIL LUMINOUS air works without an air cooler and has been designed to introduce preconditioned outdoor air only. Thanks to the low supply air temperatures that can be achieved with this design, high cooling capacities are also possible while maximising interior comfort.



## INDUSAIL LUMINOUS silent function description

Although this version does not have a ventilation function, its outer coating of highly absorbent insulating material achieves very good sound absorption and therefore improved interior acoustics. It also serves as an additional design element.



# AREA LIGHTING WITH VENTILATION, COOLING AND SOUND ABSORPTION

## INDUSAIL LUMINOUS

### Circadian workstation lighting



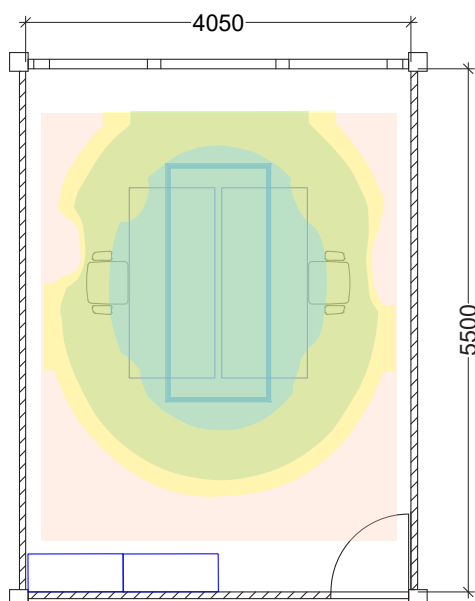
Frame	Aluminium
Colour	Natural anodised
Light appearance	Warm white (2700 K) Cool white (6500 K) Freely adjustable
Light source	LED (max. 160 watt) Dimmable, tunable white
CRI	> 80
Height	85 mm (excl. electronics)
Length x width	2500 x 1100 mm
Luminous flux (net)	Approx. 10,300 lm
Supply voltage	220 to 240 V (50/60 Hz)
IP rating	IP 20
Light source included	Yes

### Design example for compliance with DIN EN 12464-1 and ASR A3.4 (technical rules for German workplaces)

#### Arrangement with 1 INDUSAIL LUMINOUS plus

With one INDUSAIL LUMINOUS plus, up to 2 workstations can be provided with comfortable, compliant and circadian lighting.

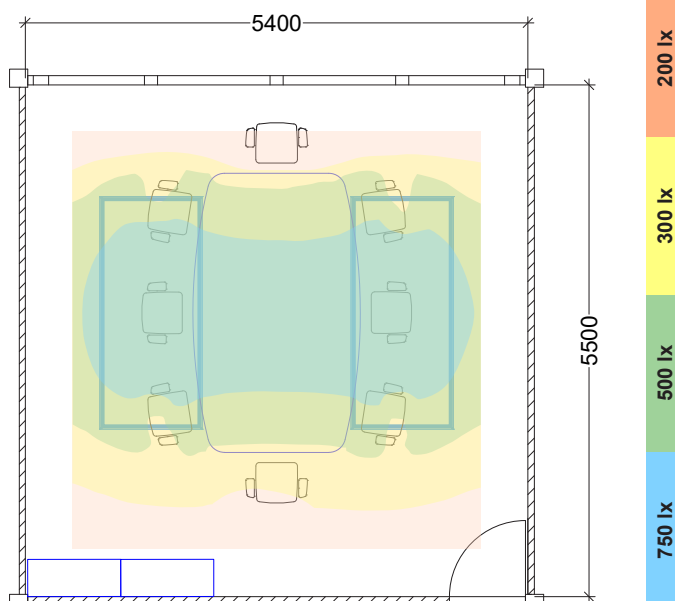
#### 3-axis space

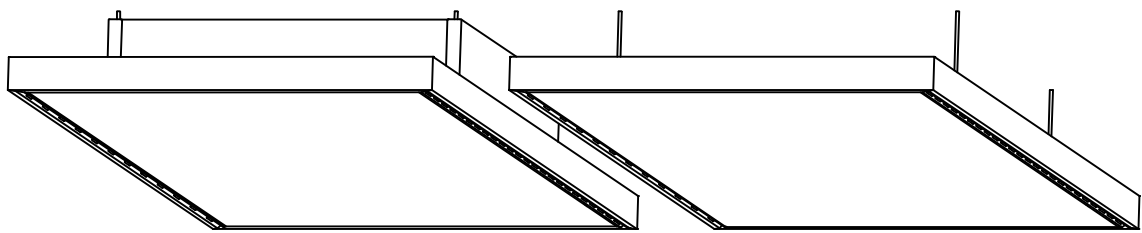


#### Arrangement with 2 INDUSAIL LUMINOUS plus

With two INDUSAIL LUMINOUS plus, up to 8 workstations (the example shows a meeting room) can be provided with comfortable, compliant and circadian lighting.

#### 4-axis space



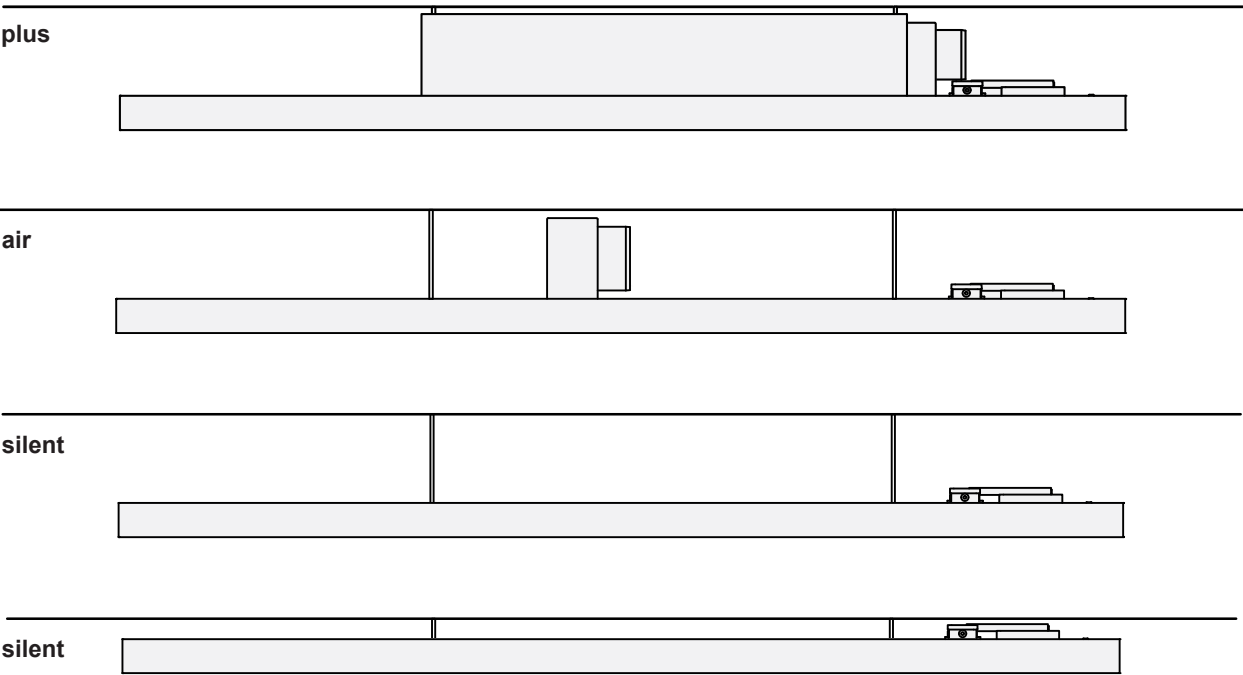


INDUSAIL LUMINOUS

	plus	air	silent
Lighting	●●●	●●●	●●●
Ventilation	●	●●●	-
Cooling	●●●	●	-
Sound absorption	●	●	●●

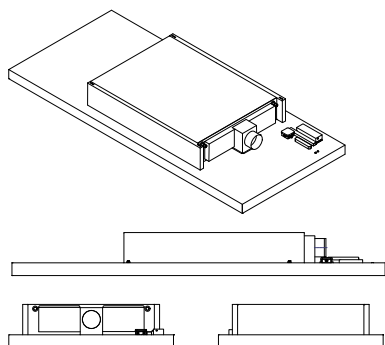
Installation situation

Open ceiling layouts; with and without ceiling cavity depending on the design

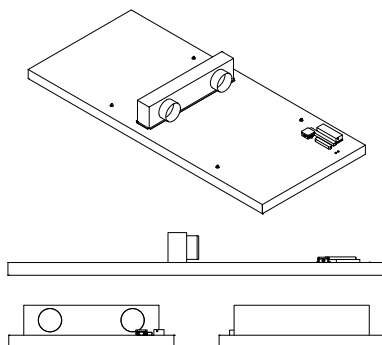


## INDUSAIL LUMINOUS

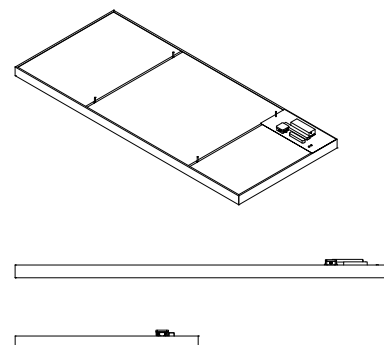
**plus**



**air**



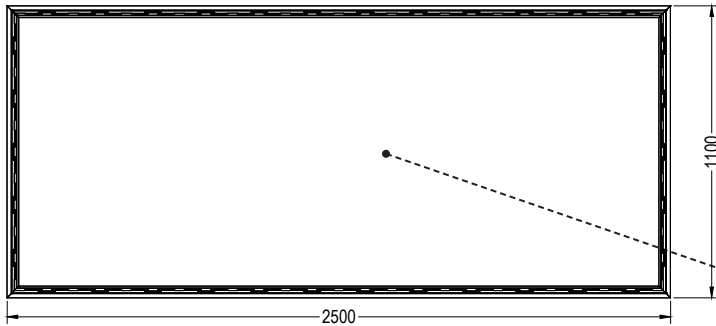
**silent**



## INDUSAIL LUMINOUS

		<b>plus</b>	<b>air</b>	<b>silent</b>
<b>Dimensions L x W x H</b>		2500 x 1100 x 290	2500 x 1100 x 285	2500 x 1100 x 85
<b>Lighting</b>				
Standard	-	LED, constant monochromatic white light (3000 K or 4000 K)		
Optional	-	LED, tunable white, adjustable from warm white 2700 K to cool white 6500 K		
Power consumption	W	max. 168		
Dimensions L x W		2400 x 1000		
<b>Max. ventilation (outdoor air)</b>	<b>m<sup>3</sup>/h</b>	120	500	-
<b>Max. total cooling capacity</b>	<b>W</b>	1600	1600	-
<b>Assessed sound abs. aw</b>	-	0.5	0.5	0.9





Bottom view

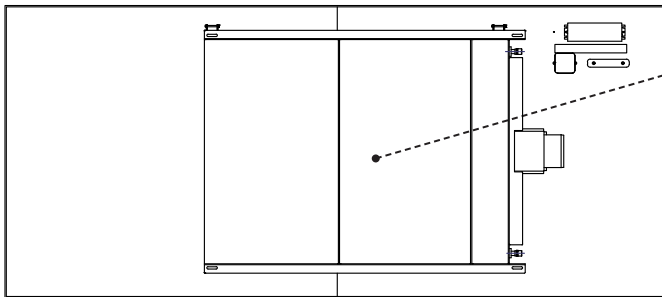
	Length	Width	Height
mm	2500	1100	290

Acoustic ceiling sail for an illuminated ceiling, supplemented with a secondary air cooling unit for comfortable ventilation and ambient air conditioning

## Lighting unit

Acoustic sail equipped with sound-absorbing diffuser material and integral LED lighting

- Electrical connection (230 V)
- Controllable LED lighting
- Covering made of translucent, sound-absorbing diffuser material
- Integrated inductive air diffusers

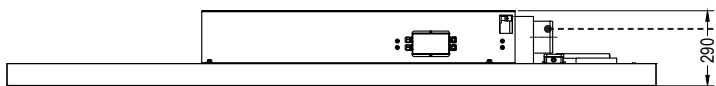


Top view

## Cooling unit

Modular secondary air cooling unit

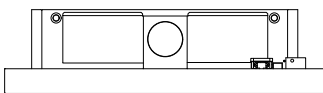
- Electrical connection (230 V)
- Controllable EC fan with reliable start-up, stable performance curve and low noise level
- Heat exchanger with cold water connection for conditioning the ambient air
- Pleated filter for secondary air
- Plenum box with sound insulation



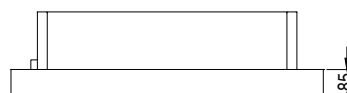
Side view – long side

## Ventilation

Outdoor air connection (DN125) and optimum air distribution in the occupied zone through highly inductive air diffusers (INDUL P18)



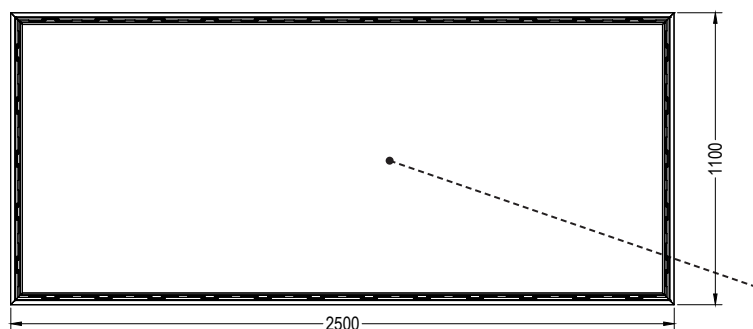
Side view – R – broad side



Side view – L – broad side

## Suspension

Straightforward installation via 4-point suspension with threaded rods



Bottom view

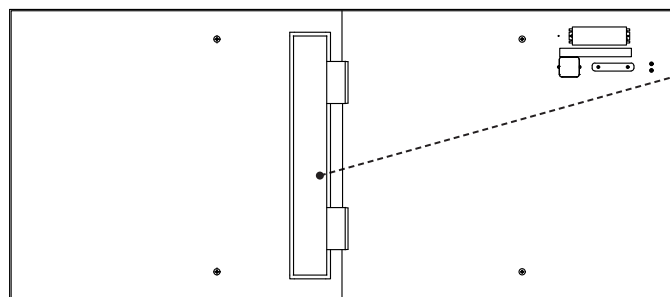
	Length	Width	Height
mm	2500	1100	285

Acoustic ceiling sail for an illuminated ceiling, for comfortable ventilation and air conditioning with outdoor air preconditioned centrally in the building

## Lighting unit

Acoustic sail equipped with sound-absorbing diffuser material and integral LED lighting

- Electrical connection (230 V)
- Controllable LED lighting
- Covering made of translucent, sound-absorbing diffuser material
- Integrated inductive air diffusers



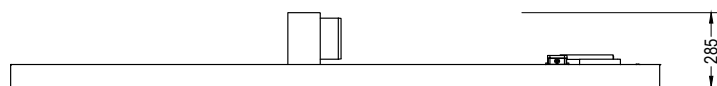
Top view

## Ventilation

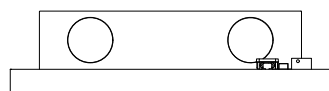
Outdoor air connection (2x DN160) and optimum air distribution in the occupied zone through highly inductive air diffusers (INDUL P18)

## Suspension

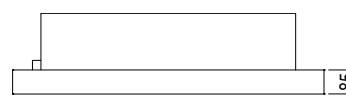
Straightforward installation via 4-point suspension with threaded rods



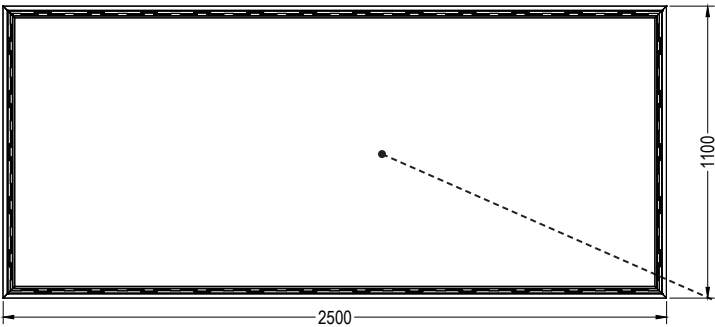
Side view – long side



Side view – R – broad side



Side view – L – broad side



Bottom view

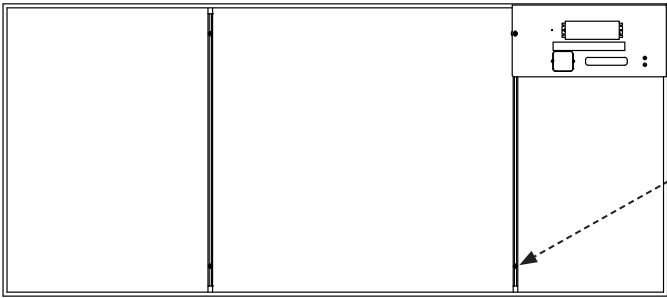
	Length	Width	Height
mm	2500	1100	85

Acoustic ceiling sail for an illuminated ceiling, without ventilation function for improved acoustics of the room. Can be extended or combined as required with the plus or air versions.

Lighting unit

Acoustic sail equipped with sound-absorbing diffuser material and integral LED lighting

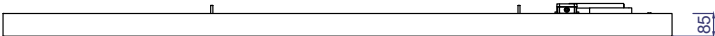
- Electrical connection (230 V)
- Controllable LED lighting
- Covering made of translucent, sound-absorbing diffuser material
- Frame profiles have INDUL air diffuser profiles which are identical in appearance to the INDUSAIL LUMINOUS plus and INDUSAIL LUMINOUS air



Top view

Suspension

Straightforward installation via 4-point suspension with threaded rods



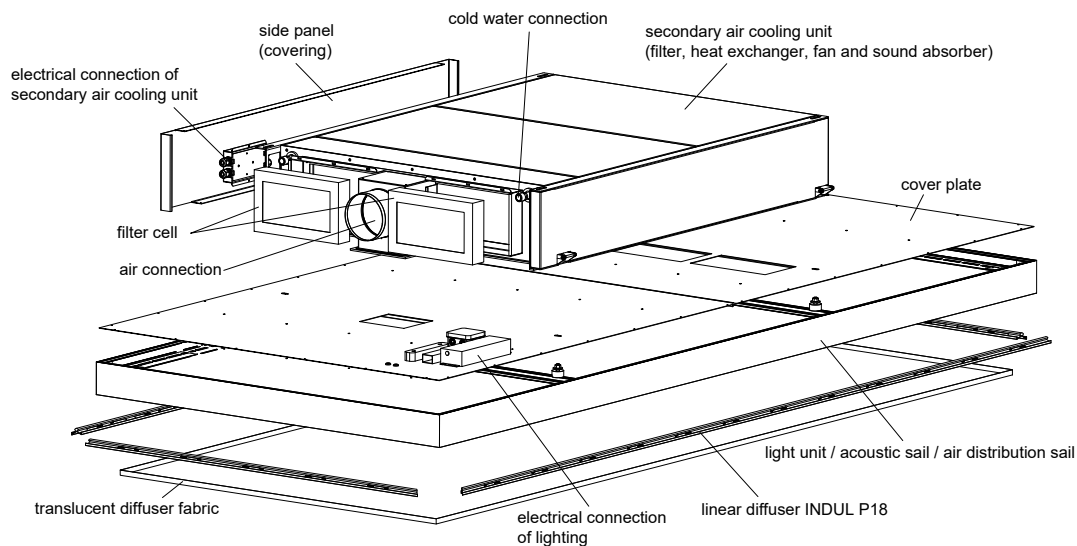
Side view – long side



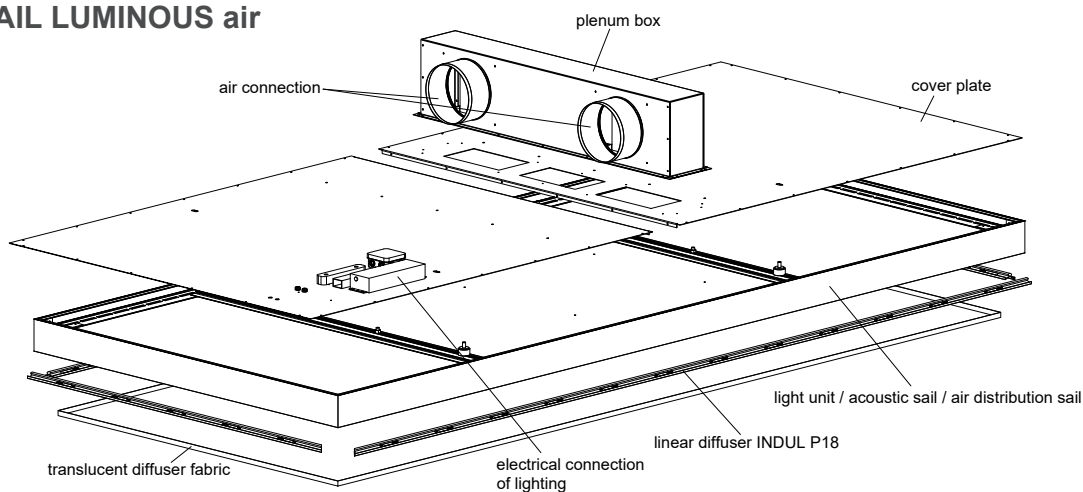
Side view – broad side

# EXPLODED VIEW

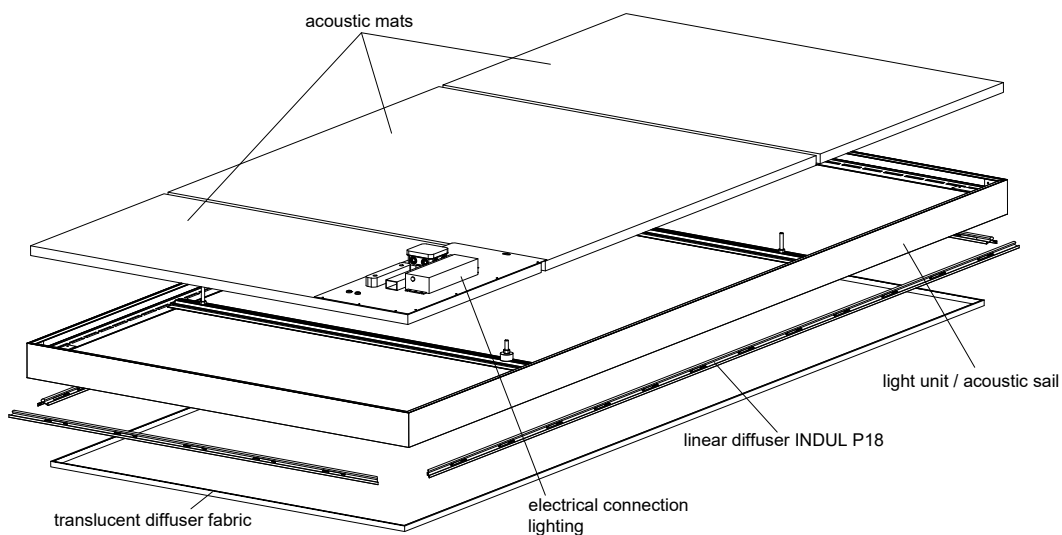
## INDUSAIL LUMINOUS plus



## INDUSAIL LUMINOUS air



## INDUSAIL LUMINOUS silent



# INDUSAIL LUMINOUS TECHNICAL DATA

## INDUSAIL LUMINOUS – types

### plus

### air

### silent

#### DIMENSIONS

Standard – L x W x H	mm	2500 x 1100 x 290	2500 x 1100 x 285	2500 x 1100 x 85
Total weight in operation	kg	74	50	30
Lighting/acoustic surface area	mm	2400 x 1000	2400 x 1000	2400 x 1000
Connector diameter	mm	1x DN125	2x DN160	-

#### SURFACE

Diffuser material	-	100 % polyester	100 % polyester	100 % polyester
Building material class (DIN EN 13501)	-	B-s1, d0	B-s1, d0	B-s2, d0
Colour of the circumferential profile	-	Natural anodised		
Air diffuser profile	-	Black powder coated		

#### LIGHTING

Lighting type	-	LED, dimmable, monochromatic or tunable white		
Colour temperature monochromatic	K	3000 or 4000		
Colour temperature tunable white	K	2700 - 6500 (freely adjustable)		
Rated luminous flux / lumen output (net)	lm	approx. 10,300 (average)		
CRI		> 80		

#### VENTILATION / AIR CONDITIONING

Secondary air – filter cell (DIN EN ISO 16890)	-	ISO Coarse 60%	-	-
Centrally preconditioned outdoor air flow rate	m³/h	0 to 120	0 to 500	-
Max. primary cooling capacity	W	400	1600	-
Max. secondary cooling capacity	W	1250	-	-
Max. total cooling capacity	W	1600	1600	-
Nominal water flow rate; pressure drop	kg/h; kPa	300; 21	-	-
Water connection	inch	½" male thread	-	-

#### ACOUSTIC ABSORBER

Sound absorption class (DIN EN ISO 354; DIN EN ISO 11654)	-	D	D	A to B
Assessed sound absorption level $\alpha_w$ (DIN EN ISO 354; DIN EN ISO 11654)	-	0.5	0.5	0.9 to 0.8
Recommended suspension height for optimum effect	mm	215	215	115 to 215

#### ELECTROTECHNICAL DATA

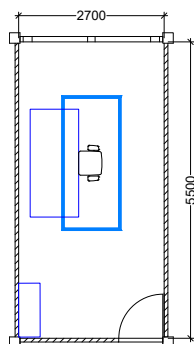
Mains connection	V / Hz	230 / 50	230 / 50	230 / 50
IP rating of secondary air cooling unit (motor/electronics)	-	IP 44 / 20	-	-
Nominal power consumption of the fan at control voltage 10 V/6 V	W	45 / 22	-	-
Power consumption of the lighting sail – monochromatic or tunable white (incl. power supply unit)	W	max. 168	max. 168	max. 168
IP rating (lighting sail)	-	IP 20	IP 20	IP 20

#### CONTROL

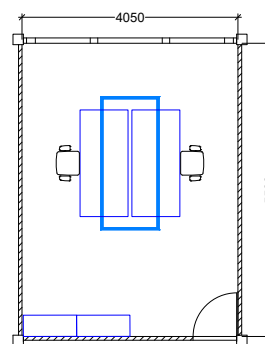
Control voltage of fan DC	V	0 - 10	-	-
Control voltage of optional actuator for heat exchanger DC	V	0 - 10	-	-
Lighting sail – monochromatic white	-	dimmable, DALI/DT6		
Lighting sail – tunable	-	dimmable, DALI/DT8, HCL daylight simulation possible		

Design example, taking into account the minimum office space per person, minimum outdoor air rate per person and room, cooling capacity, acoustics, lighting calculation and light distribution.

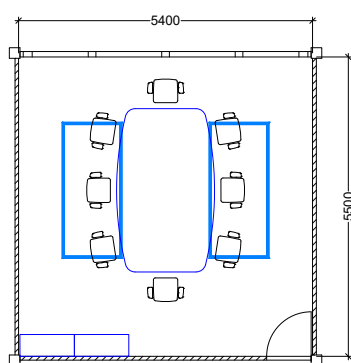
**SINGLE OFFICE**  
2 axes; 15 m<sup>2</sup>; 1 person



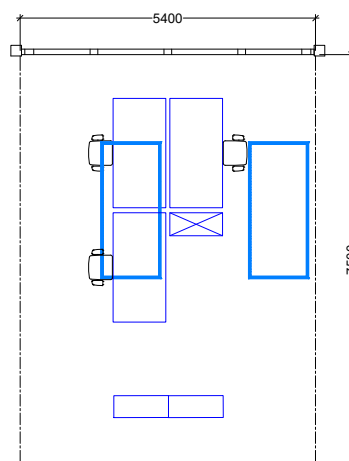
**OFFICE**  
3 axes; 22 m<sup>2</sup>; 2 people



**MEETING ROOM**  
4 axes; 30 m<sup>2</sup>; 8 people



**OPEN-PLAN OFFICE**  
4 axes; 41 m<sup>2</sup>; 3 people



	LUMINOUS plus number of sails	Room area <sup>(1)</sup>  m <sup>2</sup> / person	Outdoor <sup>(2)</sup> air  m <sup>3</sup> /h/m <sup>2</sup>	Sound <sup>(1, 3)</sup> pressure level  dB(A)	Cooling capacity  W/m <sup>2</sup>	Illumination <sup>(4, 5)</sup>  $\bar{E}_m$ lx	Illumination <sup>(5)</sup>  $\bar{E}_{surroundings}$ lx
Single office	1	15 (10)	4.3 (4.2)	35 (35)	68	717 (>500)	511
Office	1	11 (10)	6.3 (4.8)	35 (35)	55	635 (>500)	321
Meeting room	2	4 (3)	9.4 (9.3)	40 (40)	90	730 (>500)	333
Open-plan office	2	14 (12)	5.9 (4.4)	40 (40)	64	698 (>500)	555

(1) Numerical values in brackets indicate the minimum requirement or the standard values for the selected room examples according to DIN EN 16798-3:2017, DIN EN 16798-1:2021 and DIN EN 12464-1 calculated for the respective example.

(1) According to DIN EN 16798-3:2017

(2) Depending on the room area and number of people according to DIN EN 16798-1:2021 (cat. 2; low-polluting buildings)

(3) The following materials were assumed for calculating sound absorption (according to DIN 18041 Table B.1 and Table B.2)

Ceiling: stucco, unplastered concrete; floor: carpet (up to 6 mm pile height); walls: 9.5 mm thick plasterboard, 25 mm wall distance).

Additional surfaces: door (wood, painted), windows (insulated glass, box and composite windows), 6 m<sup>2</sup>/person (seated)

(4) Illuminance in the visual task area according to DIN EN 12464-1, vertical illuminance, height: 0.75 m

(5) Illuminance for 4000 K colour temperature (neutral white).

Design criteria according to DIN EN 12464-1:2011 (UGR < 19; Ra=80) and DIN EN 16798-1:2021

The INDUSAIL LUMINOUS offers an innovative, high quality lighting solution that meets the requirements for lighting for people in indoor workplaces (e.g. offices) and the conditions for high visual comfort and performance. The usual visual tasks undertaken in an office building are taken into account here. With the INDUSAIL LUMINOUS, various lighting solutions can be incorporated into the plans.

## Standardised principles and criteria for lighting plans with the INDUSAIL LUMINOUS

DIN EN ISO 15251:2012 specifies the indoor environmental input parameters for design and assessment of energy performance of buildings, addressing indoor air quality, temperature, lighting and acoustics. These aspects are taken into account in the INDUSAIL LUMINOUS.

The choice of light source has an impact on the building's energy demand. It is also important to assess the quality of the lighting in the energy calculations, especially with regard to glare (e.g. the UGR (unified glare rating) of the INDUSAIL LUMINOUS is < 19).

The European Standard EN 12464-1 describes in detail the criteria recommended for lighting. Some of the criteria contained in EN 12464-1 are included in Table D.1 of DIN EN ISO 15251.

Examples and recommended criteria for lighting or design lighting levels for some buildings and spaces:

Building type	Room	Reduced illuminance, $\bar{E}_m$ , at workstations lx	UGR	Ra	Notes
Office building	Single offices	500	19	80	at 0.8 m
	Office landscapes	500	19	80	at 0.8 m
	Meeting rooms	500	19	80	at 0.8 m

Source: DIN EN ISO 15251 – Table D.1

The INDUSAIL LUMINOUS meets the requirements with regard to illuminance  $\bar{E}$ , the UGR value (unified glare rating) and the colour rendering Ra, subject to the installation situation:

**$\bar{E}_m > 500$  lx in the visual task area, uniformity  $g1 > 0.7$ , UGR < 19 and Ra > 80**  
**Subject to the surrounding area  $\bar{E}_{\text{surroundings}} > 300$  lx, uniformity  $g1 > 0.5$**

The visual task area is defined as the area in which a visual task (specific activity) is performed.

To achieve good lighting, quantitative and qualitative requirements must be met in addition to the required illuminance.

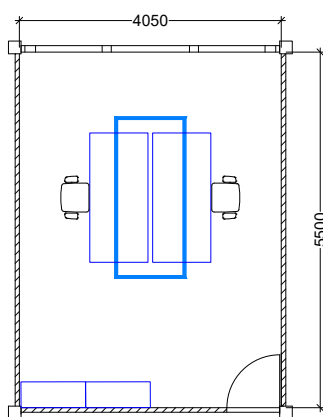
## EXAMPLE LIGHTING CALCULATION – 1

### Room conditions

Floor space: 23.85 m<sup>2</sup>  
 Reflectance: ceiling: 70 %,  
 walls: 50 %, floor: 20 %  
 Maintenance factor: 0.80  
 Room height: 2.800 m  
 Installation height: 2.385 m



### 2-PERSON OFFICE 3 axes; approx. 24 m<sup>2</sup>



### Data – INDUSAIL LUMINOUS luminaire

P	160.0 W
Φ Lamp	20952 lm
Φ Luminaire	10476 lm
η	50 %*
CCT	4000 K
CRI	80

\* Value results from the special diffuser material with the corresponding acoustic requirements.

### Result of lighting calculation for working plane

	Size	Calculated	Index
<b>2-person office surroundings</b>	$\bar{E}$	321 lx	S4
<b>Vertical illuminance</b>			
<b>Height: 0.75 m, marginal zone: 0.50 m</b>	$g_1^*$	0.31	S4
<b>Consumption figures</b>	Consumption	[220-360] kWh/a	
<b>Specific connected load</b>	Room	6.71 W/m <sup>2</sup>	
		2.09 W/m <sup>2</sup> /100 lx	
	Working plane	14.31 W/m <sup>2</sup>	
		4.46 W/m <sup>2</sup> /100 lx	

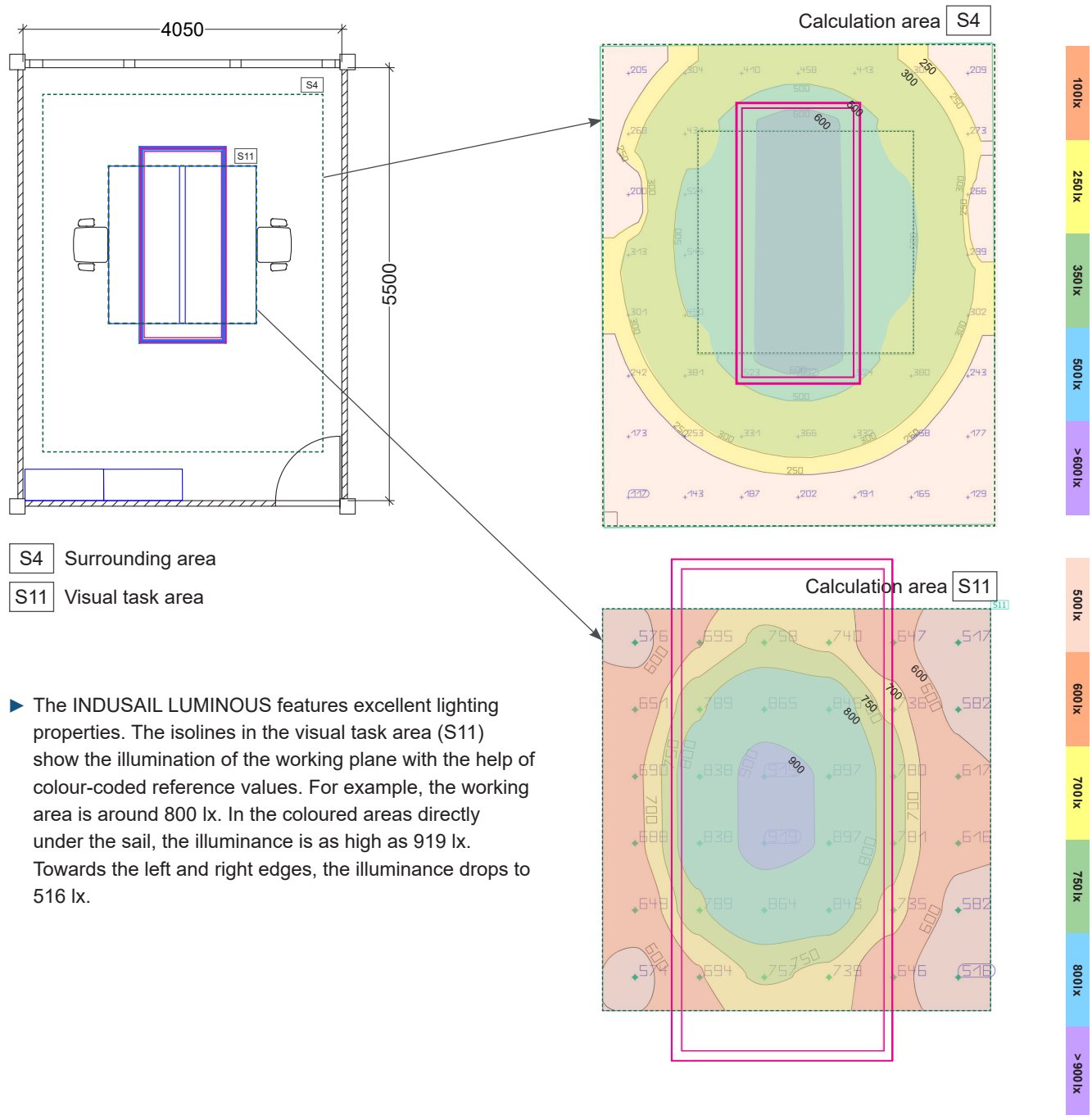
\* $g_1$  = Refers to the overall uniformity of illuminance on a surface.

► For project specific designs/lighting calculations, please contact our sales department or request the LDC.



## EXAMPLE LIGHTING CALCULATION – 2

### Detailed evaluation of the lighting calculation (isolines)



### Lighting calculation for the visual task area

Properties	$\bar{E}$	$\bar{E}_{min}$	$\bar{E}_{max}$	$g1$	Index
Visual task in a 2-person office	730 lx	516 lx	919 lx	0.71	S11
Vertical illuminance					
Height: 0.750 m					

## INDUSAIL SYSTEM LUMINOUS plus

Mass flow [kg/h]			50	100	150	200	250	300
$\Delta p_{\text{Water}}$ [kPa]			1	4	7	12	17	23
U [V]	P <sub>el</sub> [W]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]
2.0	4	< 28	210	346	400	411	426	439
4.0	10	37	344	565	676	720	747	769
6.0	22	45	442	726	891	973	1010	1039
8.0	37	50	485	798	1022	1164	1209	1244
10.0	45	54	518	852	1113	1289	1338	1377

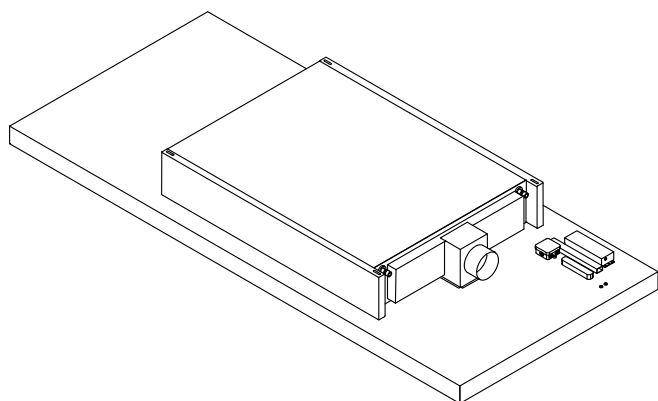
Outdoor air flow rate: 0 m³/h

U [V]	P <sub>el</sub> [W]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]
2.0	4	< 28	358	468	521	539	546	555
4.0	10	37	490	688	793	837	852	881
6.0	22	45	586	856	1012	1090	1125	1153
8.0	37	51	616	931	1136	1256	1316	1342
10.0	45	55	645	992	1229	1376	1451	1476

Outdoor air flow rate: 50 m³/h

U [V]	P <sub>el</sub> [W]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]
2.0	4	< 28	449	554	604	621	628	636
4.0	10	37	580	772	874	917	932	960
6.0	22	46	679	945	1098	1175	1209	1237
8.0	37	51	715	1029	1234	1354	1414	1441
10.0	45	55	741	1086	1322	1467	1542	1567

Outdoor air flow rate: 80 m³/h



## INDUSAIL SYSTEM LUMINOUS plus

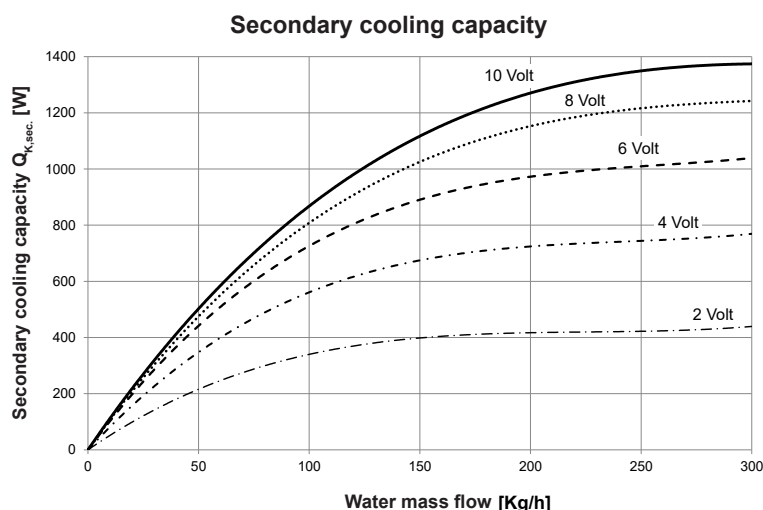
	Mass flow [kg/h]	50	100	150	200	250	300
	$\Delta p_{\text{Water}}$ [kPa]	1	4	7	12	17	23
U [V]	P <sub>el</sub> [W]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]
2.0	4	< 28	503	600	647	663	677
4.0	10	37	640	828	927	969	1011
6.0	22	46	742	1004	1156	1232	1294
8.0	37	52	781	1095	1299	1419	1505
10.0	45	55	804	1146	1380	1524	1623

Outdoor air flow rate: 100 m<sup>3</sup>/h

U [V]	P <sub>el</sub> [W]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]	Q <sub>k</sub> [W]
2.0	4	30	568	665	712	728	734	742
4.0	10	38	706	893	992	1034	1048	1076
6.0	22	46	809	1073	1225	1301	1335	1362
8.0	37	52	843	1153	1356	1474	1533	1560
10.0	45	56	860	1194	1422	1563	1635	1659

Outdoor air flow rate: 120 m<sup>3</sup>/h

\* The values apply to the unit at a supply water temperature of 16 °C, a supply air temperature (outdoor air) of 16 °C and an intake temperature of 26 °C (this value can differ from the ambient air temperature) in non-condensing operation.



U – Control voltage (DC)  
 Q<sub>k</sub> – Total cooling capacity  
 L<sub>WA</sub> – A-sound power level (± 3 dB(A))  
 P<sub>el</sub> – Fan power consumption

The cooling capacity largely depends on:

- The selected fan voltage
- The ambient air temperature
- The cold water supply temperature and the cold water mass flow rate

◀ Secondary cooling capacity as a function of the water flow rate; see graph to the left.

The caloric performance data was determined on a performance test rig in the company's own laboratory.

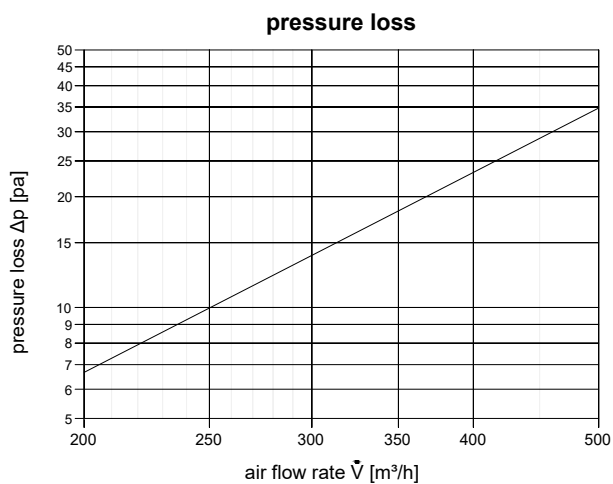
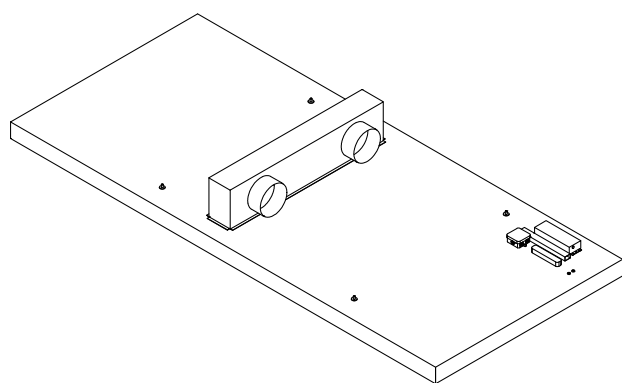
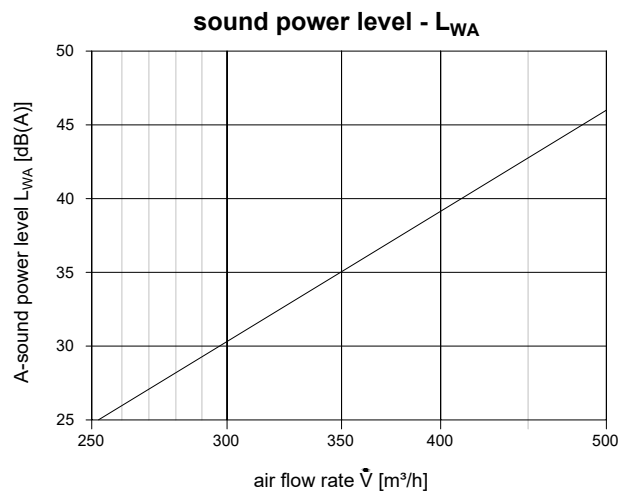
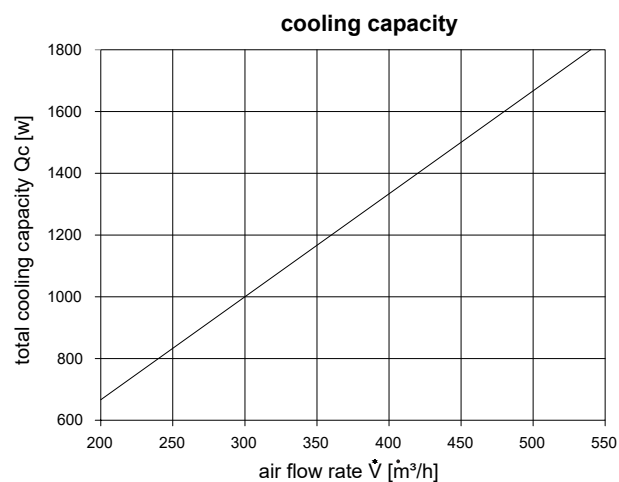
The data applies under the following conditions:

- Stationary state during measurements
- No heat exchanger condensation
- Cold water without additives

## INDUSAIL SYSTEM LUMINOUS air

$\dot{V}$ [m³/h]	$L_{WA}$ [dB(A)]	$Q_k$ [W]	$\Delta P$ [Pa]
250	25	833	10
300	30	1000	14
350	35	1167	18
400	39	1333	23
450	43	1500	29
500	46	1667	35

$Q_k$  Total cooling capacity  
 $L_{WA}$  A-sound power level (+ 3 dB(A))  
 $\dot{V}$  Air flow rate  
 $\Delta p$  Pressure drop  
 Supply air temperature 16 °C  
 Intake temperature 26 °C



# AREA LIGHTING WITH VENTILATION, COOLING AND SOUND ABSORPTION

## INDUSAIL LUMINOUS acoustic absorption

The high sound absorption values of the sails are achieved thanks to especially effective materials and their optimal arrangement in the sail. All three sails are covered with translucent, sound-absorbing diffuser material. The specified sound absorption values were determined in accordance with DIN EN ISO 354 and DIN EN ISO 11654 by an external institute for sound-related product optimisation. The results show that particularly high sound absorption is achieved in the speech area. INDUSAIL LUMINOUS silent sails are additionally equipped with a highly absorbent insulating material made of polyester, which puts the sound absorption values above a value of 1 in the frequency range 500 to 3000 Hz.

- Sophisticated room designs coupled with complex lighting and acoustic requirements can be implemented using the LUMINOUS range. Kiefer Klimatechnik supports you in producing an optimal system design.

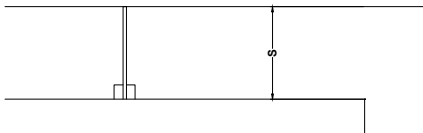


## Optimising the interior acoustics

Acoustic sails can reduce nuisances such as noise in interiors. This improves working conditions and performance. In open-plan offices in particular, it can often be hard to concentrate when others are talking loudly. Audibility in the room, increased speech intelligibility and low reverberation times are important room acoustic criteria that increase the acoustic quality of the room and thus the productivity of the users. The ceiling is the largest continuous surface in a room and can reduce sound propagation with sound-absorbing ceiling sails. This increases the wellbeing, satisfaction and performance of the people in the room.

# ACOUSTIC ABSORPTION ACCORDING TO DIN EN ISO 354

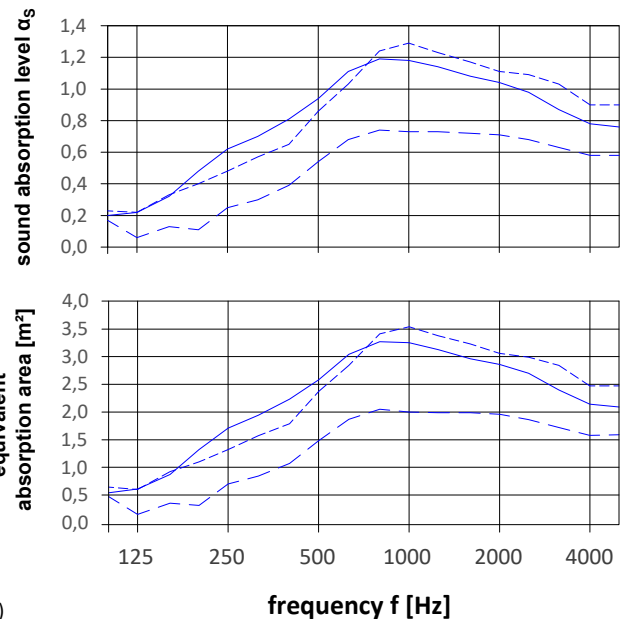
INDUSAIL LUMINOUS silent sails are additionally equipped with a highly absorbent polyester insulating material on the back. This results in particularly high sound absorption values. The sound absorption of the "plus" and "air" sails is independent of the distance to the ceiling, as there is no acoustically effective material on the back of these sails.



The INDUSAIL LUMINOUS "plus" and "air" achieve the same sound absorption, as the surface area of the acoustically effective material is identical.

frequency  $f$  [Hz]

- silent ( $s = 115$  mm)
- - - silent ( $s = 215$  mm)
- · - air / plus ( $s = 215$  mm)



## INDUSAIL LUMINOUS

air / plus  
 $s = 215$  mm

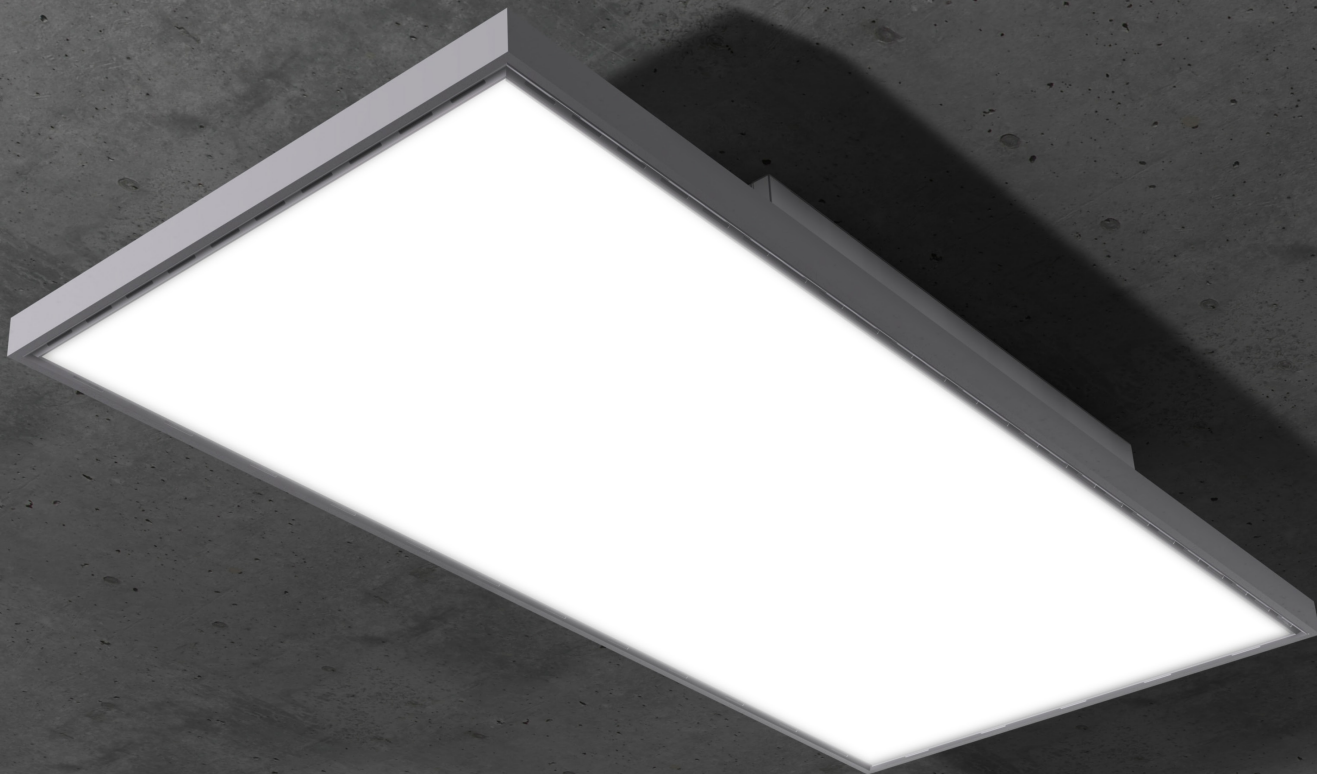
Frequency	Absorption	Area
[Hz]	$\alpha_S$ [-]	Equivalent [m²]
100	0.17	0.47
125	0.06	0.15
160	0.13	0.35
200	0.11	0.31
250	0.25	0.70
315	0.30	0.84
400	0.39	1.07
500	0.54	1.48
630	0.68	1.87
800	0.74	2.05
1000	0.73	2.00
1250	0.73	1.99
1600	0.72	1.99
2000	0.71	1.96
2500	0.68	1.86
3150	0.63	1.72
4000	0.58	1.58
5000	0.58	1.59
Assessed sound abs. $\alpha_W$	0.5 (M)	
"Absorption class DIN EN ISO 11654"	D	
"Fire protection class of diffuser material DIN EN 13501-01"	B-s1, d0	

## silent

$s = 215$  mm       $s = 115$  mm

Absorption	Area	Absorption	Area
$\alpha_S$ [-]	Equivalent [m²]	$\alpha_S$ [-]	Equivalent [m²]
0.23	0.64	0.20	0.54
0.22	0.60	0.22	0.61
0.33	0.92	0.32	0.87
0.40	1.10	0.48	1.32
0.48	1.32	0.62	1.71
0.57	1.57	0.70	1.94
0.65	1.79	0.81	2.23
0.86	2.37	0.94	2.58
1.03	2.84	1.11	3.04
1.24	3.41	1.19	3.27
1.29	3.54	1.18	3.25
1.23	3.38	1.14	3.13
1.17	3.23	1.08	2.96
1.11	3.06	1.04	2.86
1.09	2.99	0.98	2.70
1.03	2.84	0.87	2.40
0.90	2.47	0.78	2.14
0.90	2.47	0.76	2.09
0.80		0.9 (M,H)	
B		A	
B-s2, d0		B-s2, d0	





# INSTALLATION INFORMATION

ACTIVE LIGHTING SAIL SYSTEM  
INDUSAIL LUMINOUS

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## Application area

Operation in dry, interior rooms at ambient temperatures of 5 to 40 °C (non-condensing). The unit has been designed for use in locations where air qualities typical of offices prevail in terms of dust levels and corrosive/oily constituents.



Kiefer Klimatechnik GmbH accepts no liability for damage resulting from incorrect use. Deviating operating conditions require written approval from the manufacturer.

## Control and regulation of the secondary air

Application options: ventilation and conditioning of the ambient air using INDUSAIL LUMINOUS plus by secondary air intake from the room. The ambient air is cooled with a cooler connected to a cooling water circuit.

Control with variable volume flow rates and output control by a cooling valve on the water side: a fan coil controller (RDG 200 KN) captures the ambient temperature using a sensor integrated in the room thermostat and brings the room temperature to its set value by activating the water valve and the fan via a continuous control output (0-10 V DC). The cooling capacity depends mainly on the cooling water flow rate, the supply temperature and the air flow rate. The controller adjusts the fan speed and the position of the water valve so that the cooling capacity of the INDUSAIL LUMINOUS plus meets the current requirements. This allows energy costs to be minimised, while maximising comfort.



Important: always ensure that the unit is used as intended in non-condensing operating mode. Failure to observe this requirement can result in damage to the unit and cause hygiene hazards to occur!

When using a room thermostat:

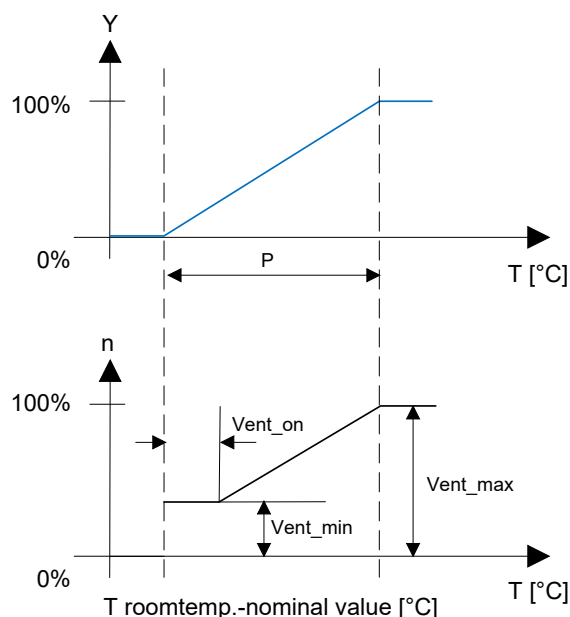
- ▶ The room thermostat is pre-configured at the factory with a Kiefer parameterisation set
- ▶ The controller and actuator are wired on site.
- ▶ The coolant can be regulated using a water valve, including a continuous actuator. The actuator (PWM) is controlled by the room controller.

If a continuous actuator is not required, we recommend that no coolant flows through the heat exchanger when the fan is idle. For this reason, we recommend a shut-off valve.

The controller must ensure that the coolant supply is shut off when the unit is not running.

Y	"Cooling valve" control command
n	Fan speed
P	Proportional "cooling" zone
Vent_max	Max. fan speed
Vent_min	Min. fan speed
Vent_on	Fan start point

Example of control diagram

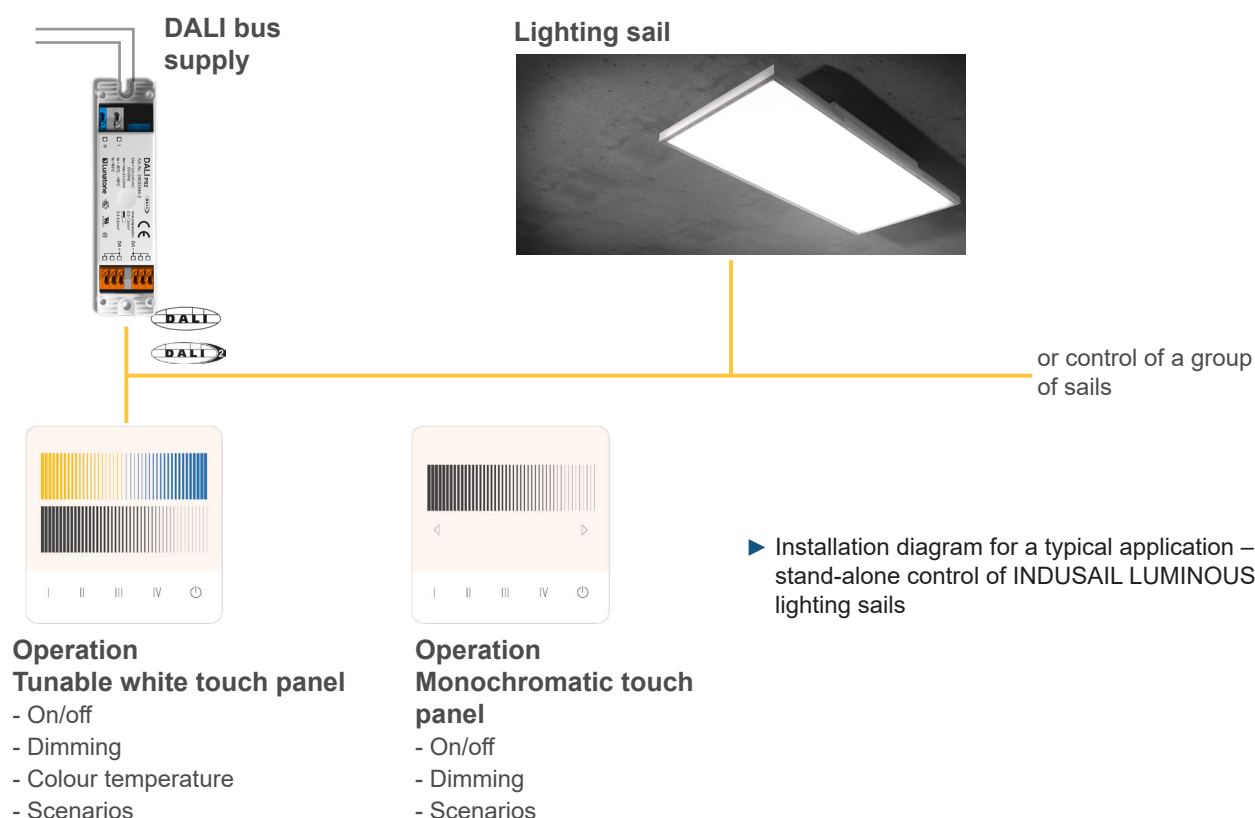


## System control and lighting control

For a standard application, we recommend a simple DALI installation. The components are selected and adapted by Kiefer. This allows intuitive control of the INDUSAIL LUMINOUS lighting sail.

### Typical application example

One office with one or more luminaires can be controlled manually via a DALI-2 touch panel. The DALI-2 touch panel is installed with the predefined factory settings and a simple user interface without configuration.



### Components and properties

**DALI-2 touch panel:** multifunctional control module for DALI and DALI-2 systems with a standard button layout for direct control of the lighting sails. Capacitive touch control surface. Glass control surface. Straightforward installation (mounting on a flush box). The touch panel is connected directly to and supplied by the DALI bus. A DALI bus voltage supply is assumed; no further voltage supply is required.

**DALI bus supply:** DALI PS128 ensures an output current of 128 mA, suitable for supplying a DALI circuit. Independent electronic device for ceiling installation and for integration in protection class II units.

Kiefer INDUSAIL LUMINOUS sails can be integrated with additional sensors, components and with different instrumentation and control systems:

- Light control of an open-plan office with several groups, sensors and HCL circadian daylight simulation (DALI sensor for light intensity measurement)
- Control of the lighting sails with mobile devices via Bluetooth (DALI Bluetooth interface)
- Lighting sail with a KNX bus system (DALI gateway)



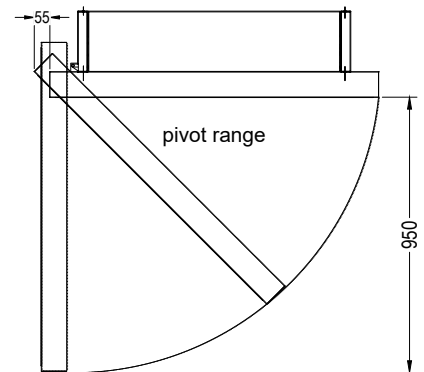
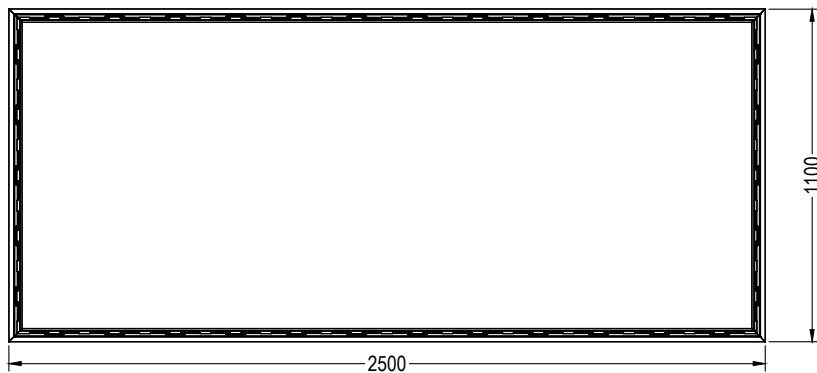
**Important!**  
For installation of the control components, please contact our sales department to request the data sheets with the specifications, installation information and key data of the components.  
[www.kieferklima.de/en/contact](http://www.kieferklima.de/en/contact)

### Recommendation:

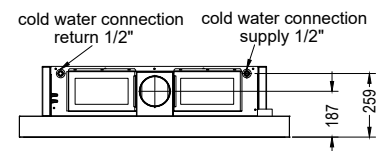
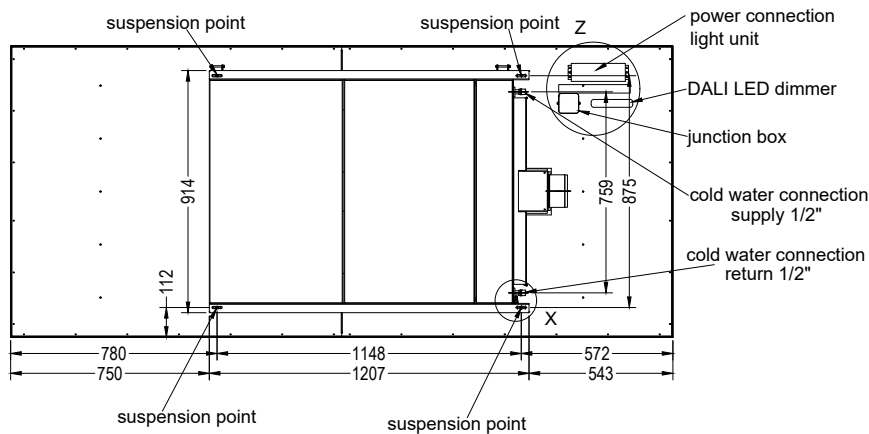
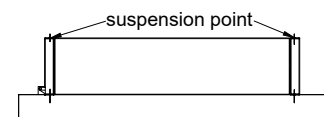
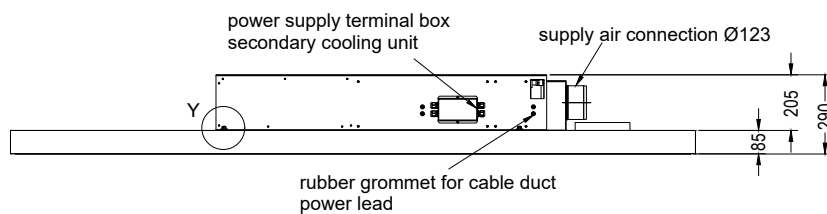
We recommend to use the components of the brand LUNATONE, if the light is on site regulated. Using the control components of an alternative manufacturer can cause communication problems, therefore the compatibility should be checked on site before installation. If you have any questions, please do not hesitate to contact your Kiefer representative.

# TECHNICAL DRAWINGS AND INSTALLATION INFORMATION

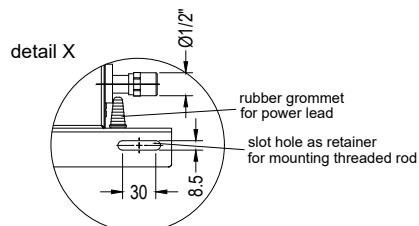
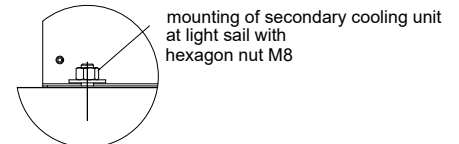
## INDUSAIL LUMINOUS plus



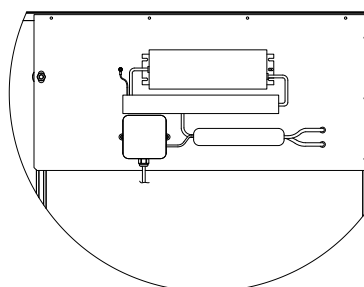
view with hidden side panel



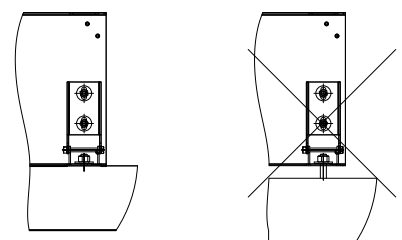
detail Y



detail Z input supply light unit



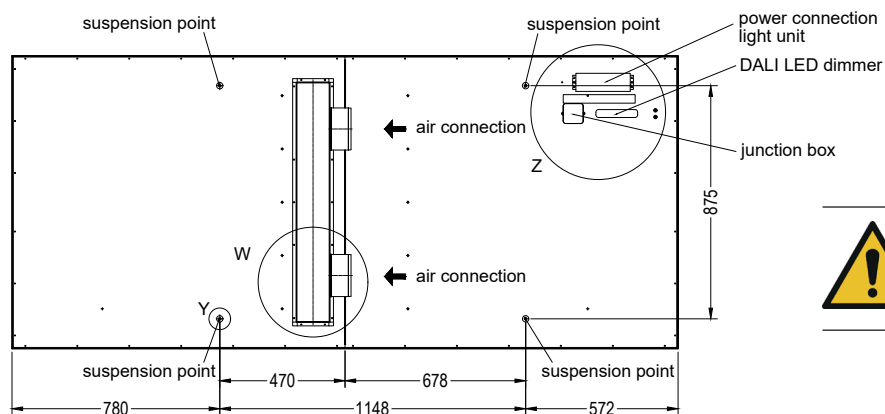
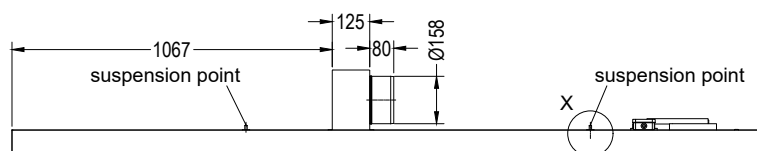
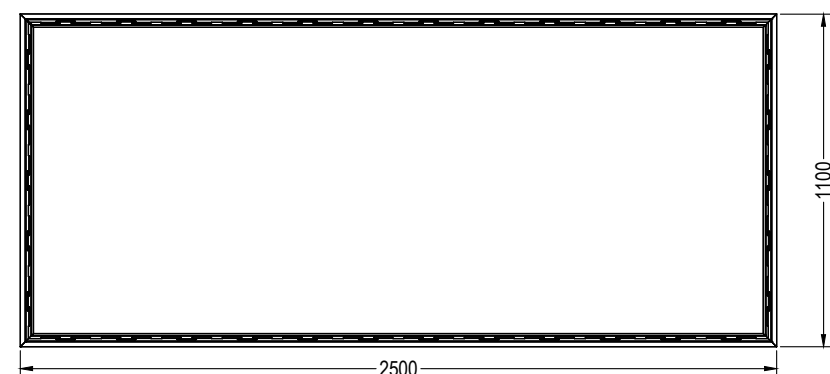
detail hinge



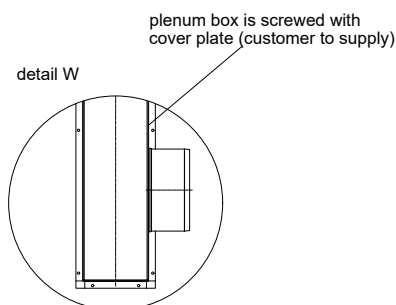
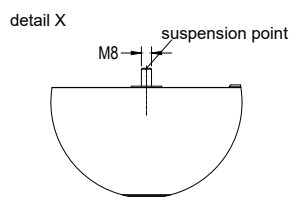
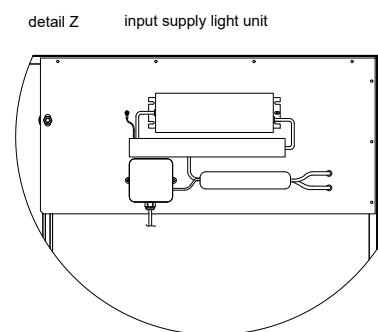
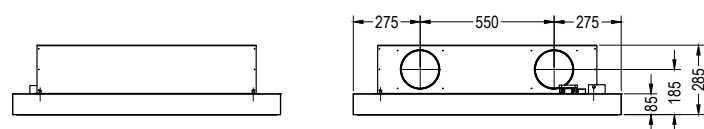
height setting hinge:  
sail has to be air tight on the basic device  
see point 6. instruction for installation

# TECHNICAL DRAWINGS AND INSTALLATION INFORMATION

## INDUSAIL LUMINOUS air

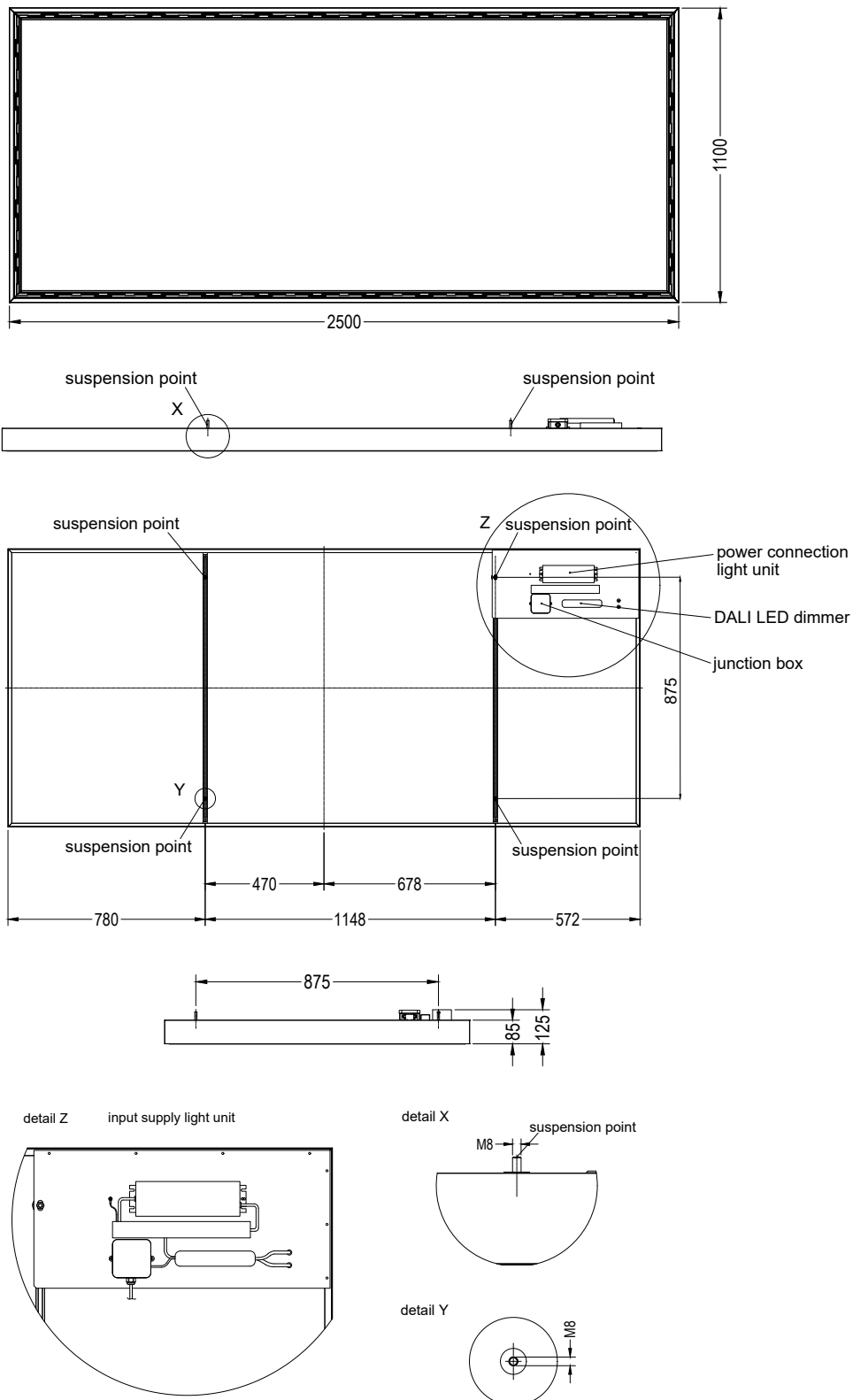


**Important!**  
Note the air direction when installing the plenum box.

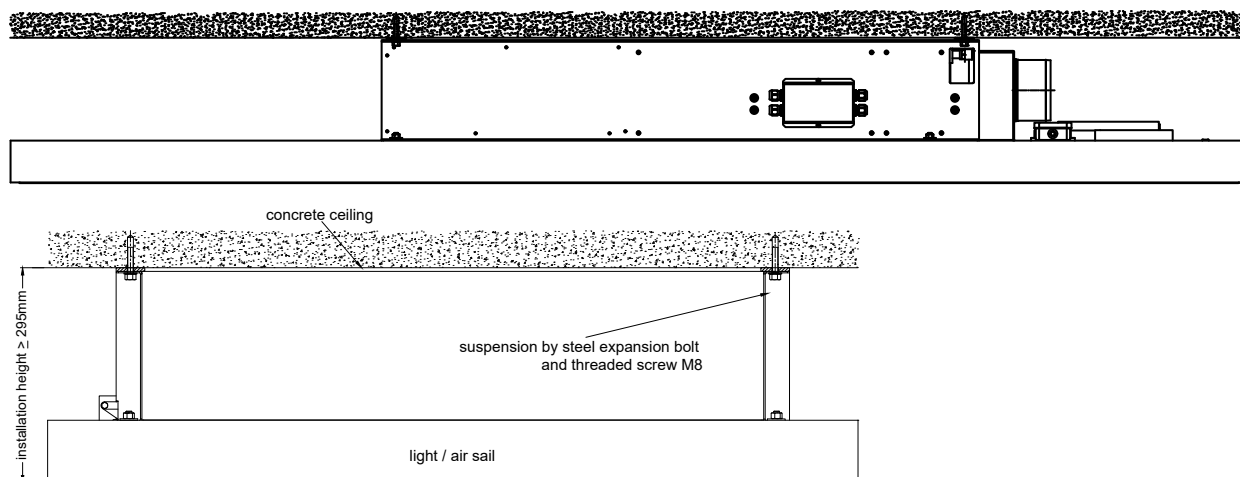


# TECHNICAL DRAWINGS AND INSTALLATION INFORMATION

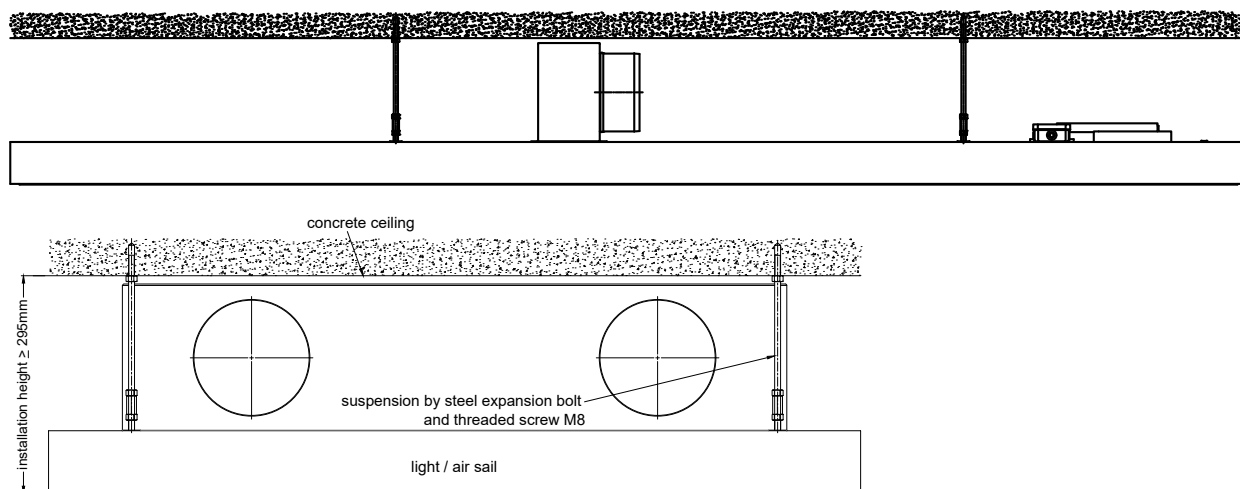
## INDUSAIL LUMINOUS silent



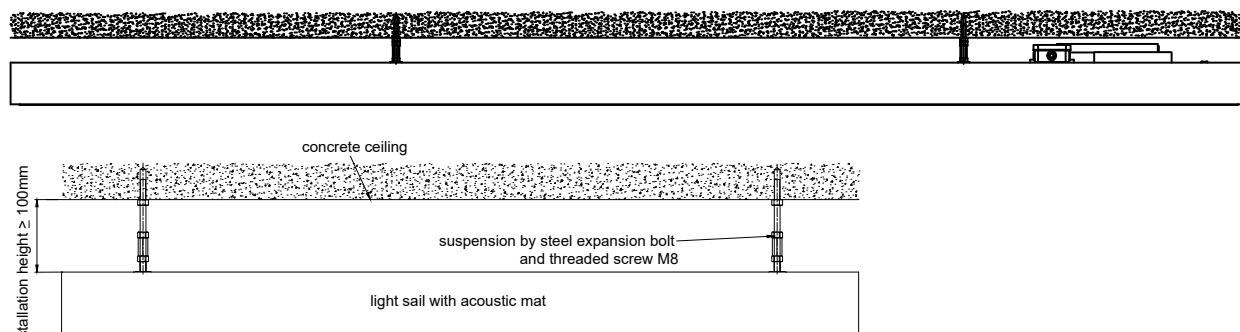
## Suspension of INDUSAIL LUMINOUS plus



## Suspension of INDUSAIL LUMINOUS air



## Suspension of INDUSAIL LUMINOUS silent



## Installation information, unit suspension and installation

- ▶ The property class of bolts, nuts, threaded rods, etc. must be considered when selecting the installation components. The necessary size of threaded rods is M8. Four threaded rods must be attached at the indicated positions. The fixing parts are not included in the standard delivery.
- ▶ Observe the installation sequence. The secondary air cooling unit must be installed first, followed by the lighting sail. Due to the risk of soiling, mounting the lighting sail is the final step. The lighting sail must only be handled when wearing clean, white gloves.
- ▶ The unit must be fitted in such a way as to be freely suspended and tension-free, with the possibility to compensate for thermally induced changes in size. The transmission of vibration and structure-borne noise to the building structure must be prevented, as this can lead to acoustic problems.
- ▶ The installed unit must not be used as a supporting element for other installations.
- ▶ The unit may only be installed and commissioned in a clean, dust-free, dry environment.



### **Risk of falling parts and tools from work being carried out overhead.**

Risk from falling parts!

The threaded rods must be fitted securely. Nuts and locking rings must be tightened firmly. The threaded rods must not be bent or distorted in any way.



### **Danger due to electric current!**

Isolate the unit from the power supply before carrying out any work. Ensure that the unit is secured against reconnection at a suitable point in the area of the on-site power supply.



### **Danger due to rotating parts!**

Isolate the unit from the power supply before carrying out any work.

### Mounting the secondary air cooling unit

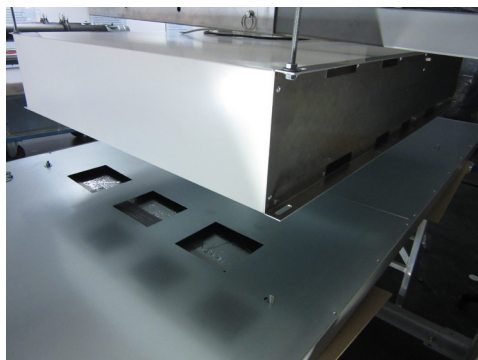
1. Remove the left and right-hand side covers of the secondary air cooling unit.



2. Insert M8 threaded rods into the four slots on top of the secondary air cooling unit and secure them with plain washers and M8 nuts.

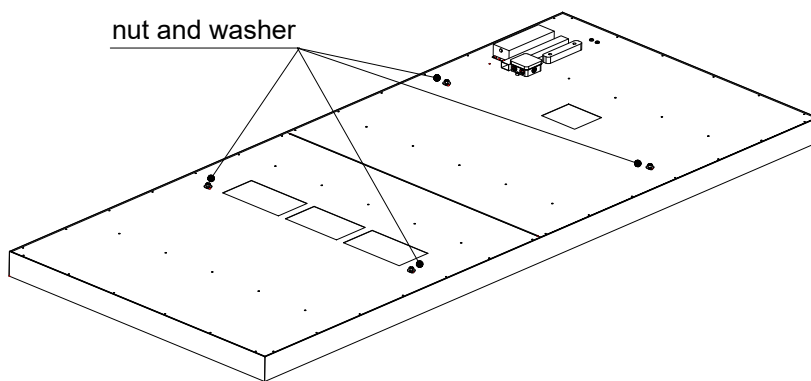
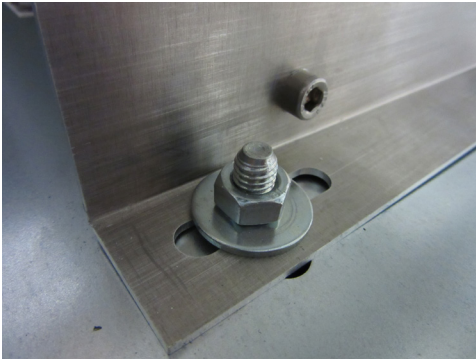
### Mounting the lighting sail on the secondary air cooling unit

1. Remove the protective film from the bottom of the secondary air cooling unit after mounting on the ceiling and before installing the lighting sail.
2. Remove the supplied hexagon nuts (4x) and plain washers (4x) on the fitting side (sheet metal side) of the lighting sail after opening the transport packaging.
3. Remove the lighting sail carefully from the packaging.
4. Lift the lighting sail (e.g. using a lifting device) and align it with the secondary air cooling unit as shown in the technical drawing (page 25). The cut-out sections in the cover panel of the lighting sail must be situated below the respective openings of the fan and the supply air connector.
5. Insert the four M8 bolts of the lighting sail into the slots in the frame profiles and the two hinges, then secure them with plain washers and M8 nuts. The nuts must be tightened such that no air gap is visible between the secondary air cooling unit and the lighting sail.

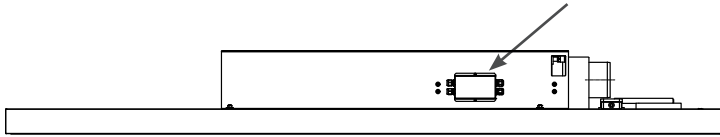




6. The two hinges can be aligned and adjusted to reduce the size of the gap. The M8 nuts must be loosened slightly for this purpose.

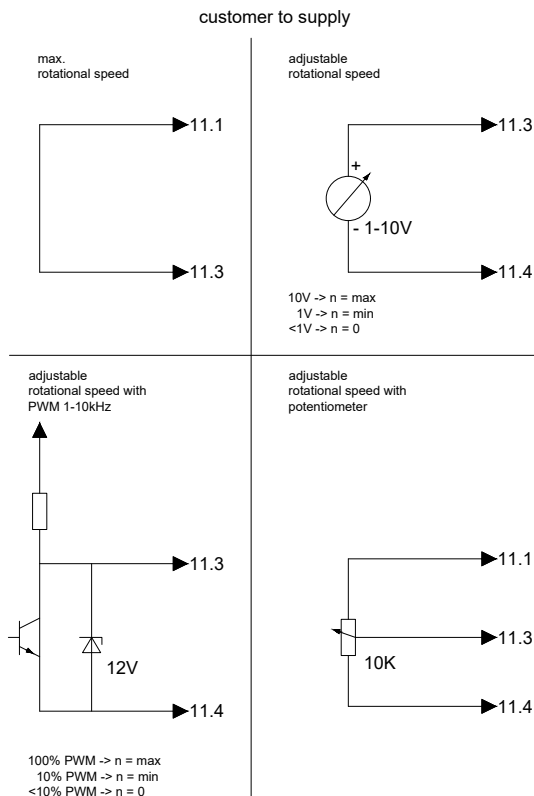
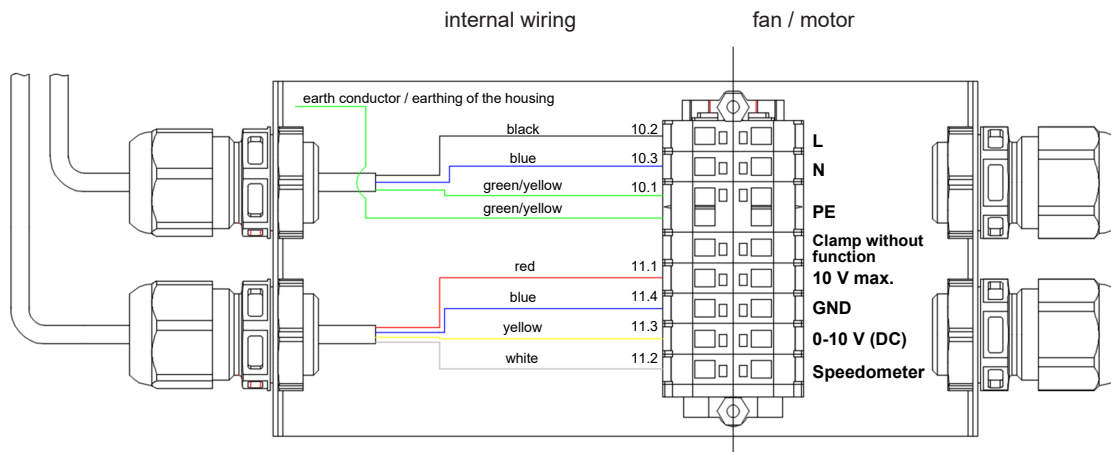


In order to prevent soiling of the white covering material, the lighting sail must only be handled and touched at the outer frame profile. Failure to observe this point can result in damage to or soiling of the material.

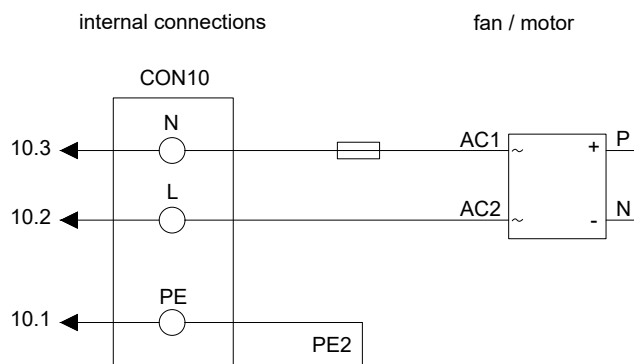
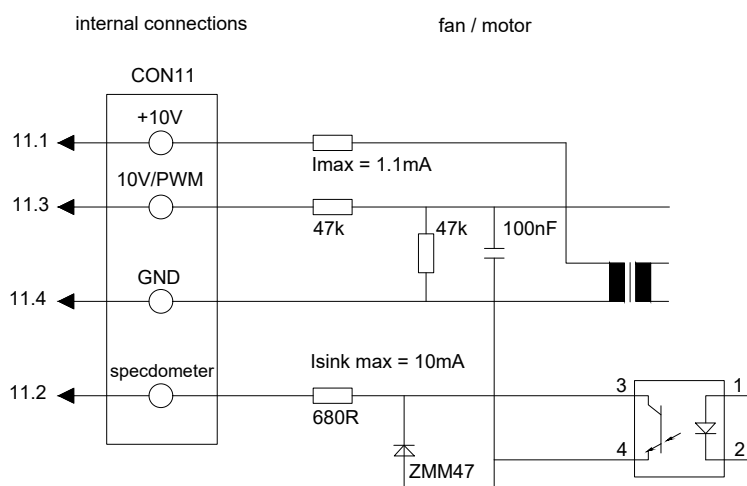


## Electrical connection – secondary air cooling unit

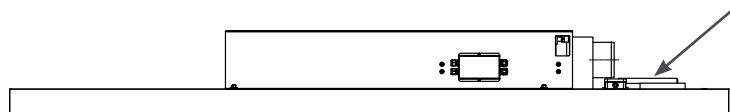
- ▶ The unit is intended for permanent connection to fixed lines.
- ▶ The INDUSAIL LUMINOUS plus secondary air cooling unit must be safeguarded with a circuit breaker, tripping characteristic "C", for the switch-on process.
- ▶ With a control signal of 10 V, the maximum power consumption of each unit during operation is 45 W.
- ▶ The cables used for switching the EC motor must be shielded.



Designation	Internal connection	Colour	Function / assignment
L	10.2	Black	Voltage supply: 230 VAC, 50-60 Hz; see type plate for voltage range
N	10.3	Blue	Neutral conductor
PE	10.1	Green/ Yellow	Earth conductor
10 V/max. 1.1 mA	11.1	Red	Voltage output: 10 V, 1.1 mA, galvanically isolated, not short-circuit proof
GND	11.4	Blue	Earth connection of the control interface
0-10V PWM	11.3	Yellow	Control input 0-10 V or PWM, galvanically isolated Input resistance $R_i = 94 \text{ k}\Omega$
Tacho	11.2	White	Speed output: Open Collector, 1 pulse per revolution, galv. isolated, $I_{\text{sink max}} = 10 \text{ mA}$

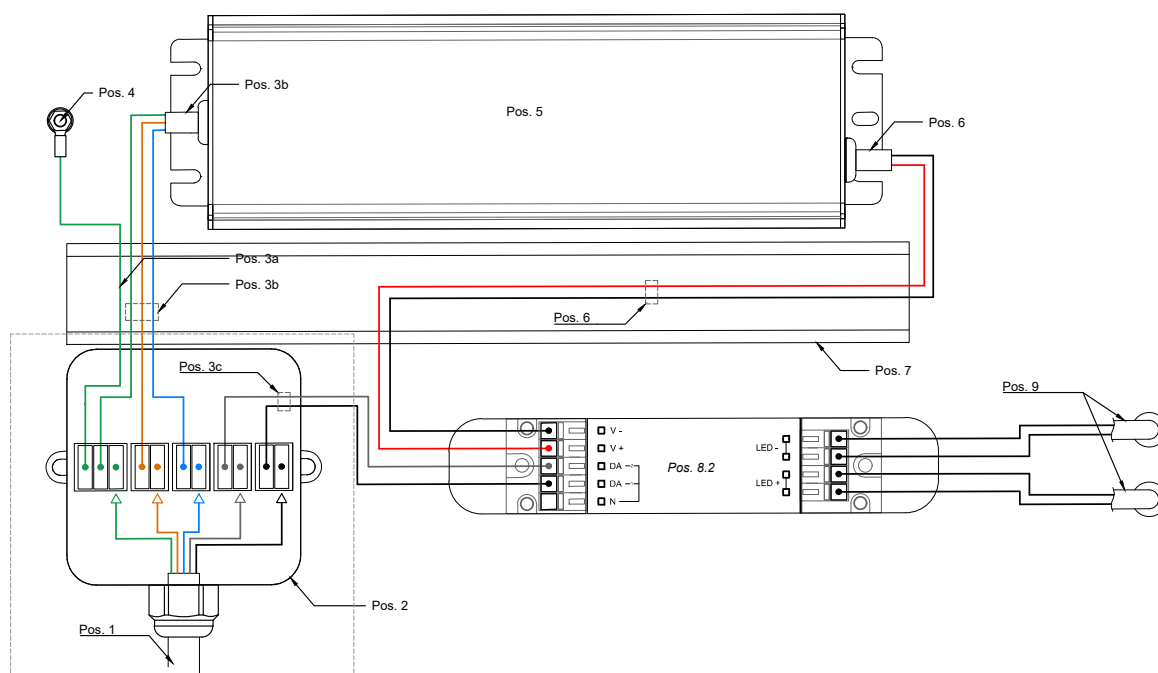


# LIGHTING SAIL ELECTRICAL CONNECTION



## Electrical connection – lighting sail

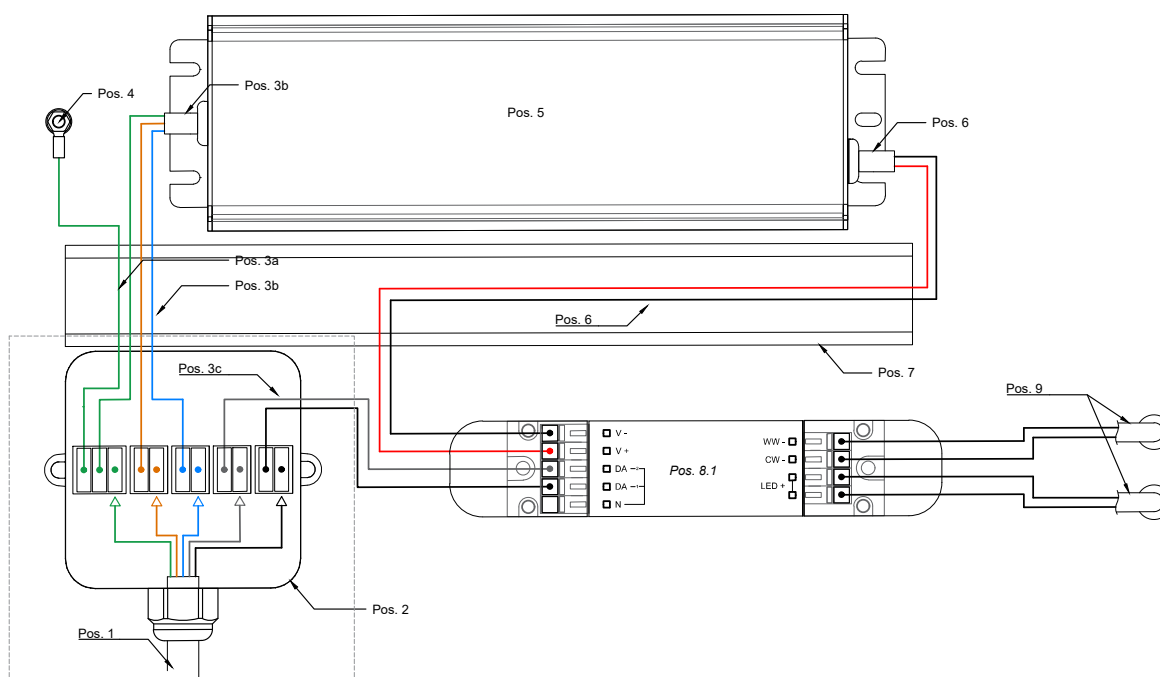
### Connection diagram for monochromatic – junction box in detail



#### positioning list

- pos. 1 supply line (customer to supply) (z.B. NYM-J 5 x 1,5 mm<sup>2</sup>; L, N, PE, DA, DA)
- pos. 2 junction box – *details for internal cabling see separate drawing*
- pos. 3a connecting line ground point lamp (PE)
- pos. 3b connecting line power supply (L, N, PE)
- pos. 3c connecting line DALI-controller (DA, DA)
- pos. 4 ground point/protective conductor terminal lamp
- pos. 5 power supply Meanwell HLG-185H-24
- pos. 6 connecting line DALI-controller (V+, V-)
- pos. 7 cable duct, flat
- pos. 8.2 DALI-Controller 'Lunatone DALI 1Ch LED Dimmer CV', DT6, 10A
- pos. 9 connecting line LED-module with bulkhead receptacle

## Connection diagram for tunable white – junction box in detail



### positioning list

- pos. 1 supply line (customer to supply) (z.B. NYM-J 5 x 1,5 mm<sup>2</sup>; L, N, PE, DA, DA)
- pos. 2 junction box – details for internal cabling see separate drawing
- pos. 3a connecting line ground point light (PE)
- pos. 3b connecting line power supply (L, N, PE)
- pos. 3c connecting line DALI-controller (DA, DA)
- pos. 4 ground point/protective conductor terminal light
- pos. 5 power supply Meanwell HLG-185H-24
- pos. 6 connecting line DALI-controller (V+, V-)
- pos. 7 cable duct, flat
- pos. 8.1 DALI-controller 'Lunatone DALI CW-WW LED-Dimmer', DT8, 10A
- pos. 9 connecting line LED modules with bulkhead receptacle

## Electrotechnical data (tunable white and monochromatic)

Input voltage (50-60 Hz)	V	230
Input power (max., approx.)	W	168
Inrush current (twidth = 445 µs, I <sub>peak</sub> = 50 %, 230 VAC)	A	65
Number of luminaires		
max., circuit breaker B16A, 230 VAC	pce	4
max., circuit breaker C16A, 230 VAC	pce	7



It must be possible to isolate the units from the power supply across all poles!  
All work must be carried out in accordance with national requirements and safety regulations.  
Wiring, fusing and earthing of the fan must comply with local regulations.



Working on live electrical equipment of the unit is not permissible. Operating the unit when open or dismantled is not permissible.

The mains connection is made on site according to the supplied wiring diagram and may only be carried out by technical personnel.

## Water connection



The hoses and connections of the heat exchanger must be checked for damage before connecting it to the water network.  
Work may only be carried out on water connections when the unit is isolated from the power supply.  
After proper connection and before water is introduced, the connecting points must be tested for leaks.



Note! Before water is routed into the unit, it is essential to check the flexible water connection hoses for a correct and tight fit.



Sharp-edged heat exchanger fins and housing parts.



## Installation test and commissioning



The test run and operation are only permissible following correct installation in compliance with all safety regulations and installation information.



Risk from falling parts!  
The threaded rods must be fitted securely. Nuts and locking rings must be tightened firmly. The threaded rods must not be bent or distorted in any way.

Even after the unit has been properly installed, it must still be checked for various faults.

Requirements for commissioning:

- ▶ The unit must be inspected to verify that it is correctly mounted on the ceiling. This includes checking all threaded connections, such as threaded rods, nuts and locking rings. Threaded rods must not be damaged or soiled in any way.
- ▶ The media connections must be securely fastened.
- ▶ The connections must not exhibit any mechanical damage or leaks. The connections must be tested for leaks before commissioning.
- ▶ All electrical connections must be established based on the enclosed wiring diagram (page 32).
- ▶ The filter cells are attached to the unit and do not exhibit any soiling or damage.
- ▶ The mains voltage, control voltage and frequency must comply with the specifications on the type plate.
- ▶ The starting voltage for the fan must be sufficient.
- ▶ The discharge profile must not be blocked.
- ▶ The unit as a whole must be installed horizontally.
- ▶ The media connections must be laid in such a way as to be tension-free and sufficiently long.
- ▶ The supply media must be available in sufficient quantities on site.



## Note!

A distinction is made between different qualification levels in the maintenance and cleaning work specified below. Technical maintenance work on the unit may only be carried out by appropriately qualified and trained technical personnel. Cleaning work may be carried out by trained cleaning personnel if all safety measures and precautions are assured by technical personnel with appropriate qualifications. Local and company safety regulations must be observed, together with the specifications in this operating manual, when carrying out any work on the unit and in its vicinity.



## Danger due to electric current!

Isolate the unit from the power supply before carrying out any work. Ensure that the unit is secured against reconnection at a suitable point in the area of the on-site power supply.



## Danger due to rotating parts!

There is a risk of injury from the rotating fan impellers. Isolate the unit from the power supply before carrying out any work. Ensure that the unit is secured against reconnection at a suitable point in the area of the on-site power supply.

## Maintenance intervals

The maintenance intervals specified below are scheduled as per VDI 6022. The maintenance interval must be shortened if the level of soiling is particularly high.

Performed by	No.	Task	Action if required	Interval – no. of months		
				3	12	24
Trained cleaning personnel	A	Spot-check units for soiling	Clean and repair unit (housing, front plate, fan)		X	
	B	Change filter			X	
	C	Clean heat exchanger	Clean and repair	X		
	D	Spot-check all other components through which secondary air flows	Clean and repair		X	
Qualified personnel only	E	Hygiene inspection				X
	F	Check unit for damage and corrosion	Clean and replace		X	
	G	Check fan for soiling, damage and corrosion				X

## Technical maintenance

Regular technical maintenance work



The following technical and hygienic maintenance work must be carried out by trained cleaning personnel or qualified technical personnel.

### Filter cell (ISO Coarse 60 %)

The filter cell must be replaced at regular intervals – at least every 12 months. The cell is replaced by hand from the side of the unit. The filter cell is available as a spare part. If filter media from other manufacturers are used, reductions in caloric output and increases in sound power may occur.



Figure 1: Inserting the filter cell (available as a spare part).



Figure 2: Pivoting of the lighting sail ensures ease of access for maintaining and inspecting the unit (VDI 6022).



Figure 3: Undoing the nuts (M8).

## Opening the lighting sail

(Applies only to the INDUSAIL LUMINOUS plus)



### Overhead hazard!

A risk of personal injury and damage to equipment directly below the lighting sail may occur when pivoting open the sail. Consequently, a safety area extending one metre to the sides of the unit and 1.2 m below the unit must be cleared before maintenance. The lighting sail must be supported manually as it is pivoted open. Clean, white gloves must be worn when carrying out all work, in order not to contaminate or damage the sail.

In line with VDI 6022, the unit sections through which air flows are easy to clean. The fan and heat exchanger are maintained in this case by pivoting open the lighting sail. To do this, remove the side cover and undo the M8 nuts (optionally with an eccentric lever with inside thread). The lighting sail can then be carefully pivoted down.



## Heat exchanger

The secondary air drawn in is filtered before flowing through the heat exchanger, so no significant soiling should occur if the filter is changed regularly. Clean the heat exchanger carefully with a brush if it does become soiled. Ensure that the aluminium fins are not bent out of shape during cleaning!

## Fan

The fan is maintenance-free. If you nonetheless detect any soiling of the fan impeller surface during the visual inspection, you can wipe it with a damp cloth. The fan must be replaced in the event of damage.



Figure 4: Opening the lighting sail.



Figure 5: Access hatch for fan and heat exchanger.

## Repairs



Replacement and repairs may only be performed by authorised personnel. We recommend that you contact our customer service department before replacing individual defective or damaged components.



If any damage is detected on the housing or other supporting components, the defective unit must be replaced completely. The unit must be isolated from the power supply across all poles for this purpose.

Assembly, installation, maintenance and dismantling may only be carried out by trained personnel. It must be ensured that all such work is performed reliably and safely.

## Explanation of symbols and notes



This symbol can be found in all occupational safety instructions in this operating manual where there is a danger to life and limb. These instructions must be observed and require that work be performed with utmost caution. Occupational safety instructions must be passed on to users. Apart from the instructions in this operating manual, the generally applicable safety and accident prevention regulations must also be observed.



### **Risk of overhead hazard!**

Indicator of a risk due to an overhead hazard, which can result – for example during maintenance work – in personal injury, including death, and in material damage.



Topics in the operating manual which are particularly relevant and require special attention for reasons of safety and service life of the unit. Directives, regulations and instructions must be complied with here. Examples of such topics include damage to the unit or building services.



### **Risk of cuts!**

Here you will find special information, instructions and prohibitions designed to prevent personal injury from cuts on metal panels. Indicator of a danger due to sharp edges.



General mandatory action sign for occupational safety and accident prevention. Compliance is compulsory due to various residual risks. Examples include wearing protective gloves, protective goggles and safety helmets.



Risk of falling parts and tools from work being carried out overhead.



Wear a safety helmet.



**Danger due to electric current!** Indicator of a risk of electric shock, which can result in personal injury, including death, and in material damage.



### **Danger due to rotating parts!**

Indicator of a danger due to rotating parts of the unit, which can result in personal injury, including death, and in material damage.



### **Risk due to hot surfaces!**

Indicator of a danger due to hot surfaces which can cause burns.

## Safety instructions

Please read the following operating instructions carefully before commissioning the INDUSAIL LUMINOUS! Failure to observe the instructions can endanger people and the environment, and void any potential claims. The unit meets all relevant safety regulations.



In continuous operation, the motor can heat up to approx. 70 °C. The motor must be left to cool sufficiently before it is touched.



Installation, servicing, maintenance work and repairs may only be carried out by trained and qualified personnel. In the event of damage, parts of the unit in and on the housing may be live. In line with local safety regulations, only authorised people with appropriate training and qualifications are permitted to establish, disconnect and remove or change electrical connections. All safety instructions and mandatory action signs in the operating manual and on the unit must be observed. The access hatch may only be opened for cleaning, maintenance or repairs after electrical isolation. The power connection and control voltage connection must be established in accordance with the wiring diagram. It is forbidden to operate the unit in a partially fitted or partially opened state, as earth connections may have been interrupted.



### **Danger due to sharp edges!**

Risk of cuts from sheet metal.

Sharp-edged heat exchanger fins and housing parts.



Objects and dirt must not be allowed to enter the fan impeller. A damaged impeller and the ejection of objects by the impeller can endanger people and shorten the service life of the unit.



To protect the motor, the access hatch must not be opened during operation. The units and suspension brackets must not be subjected to any additional load, as they may not be strong enough for this. The lighting sail acts as protection for the internal parts of the machine and may only be removed or pivoted down for maintenance purposes in accordance with the safety regulations. If any damage caused by liquids, mechanical effects, corrosion, fire or similar is detected, the unit may only be restarted after adequate inspection by appropriate technical personnel. If any damage is detected, a specialist technician must immediately isolate the unit from the power supply across all poles and shut off the water supply to the unit. If any damage or soiling is present, this must be reported immediately to the responsible department. This also applies to unusual operating noises and odours.

## Intended use

The INDUSAIL LUMINOUS plus and INDUSAIL LUMINOUS air lighting sails are used for cooling indoor spaces. The unit is designed for non-condensing operation. Consequently, the cold water supply temperature must be selected depending on the temperature and humidity of the air drawn into the unit.

The supply air should not fall below the dew point temperature, to prevent condensation on the surfaces of the outdoor air plenum box and/or sail. The INDUSAIL LUMINOUS must not be used as a safety-related component or for performing any safety-relevant function.

Observe the permissible operating and environmental conditions specified in section "Application area" (page 24). All information contained in these operating and maintenance instructions is based on the currently applicable standards and regulations, as well as the latest engineering standards. The manufacturer accepts no liability for damage caused by:

- ▶ Incorrect use
- ▶ Failure to observe these instructions
- ▶ Installation and operation by untrained technical personnel
- ▶ Technical changes to/manipulation of the unit
- ▶ Failure to observe the maintenance intervals
- ▶ Use of non-approved spare parts



### Prevent condensation!

Condensation can occur on the heat exchanger if the cold water temperature is below the dew point of the ambient air. The Kiefer INDUSAIL plus is not designed for condensing operation. Consequently, it must be ensured that the setting for the supply water temperature prevents it from falling below the dew point. If necessary, the water temperature must be modulated according to the room air humidity. The design engineer must take account of this as early as the project planning stage.

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The following instructions must be observed:

- ▶ In the case of window ventilation or ventilation without dehumidification, outdoor air with high humidity can enter the room when the window is opened, causing the temperature to fall below the dew point of the air. It must be ensured that the central cold water controller induces a weather-dependent increase of the cold water supply temperature.
- ▶ It is important to ensure that water pipes and fittings are insulated.



Installation of an on-site dew point and condensation monitoring system is recommended for hygiene and safety reasons. It must be ensured that the temperature does not fall below the dew point at any time.

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# TRANSPORT INSTRUCTIONS, DELIVERY AND STORAGE

## Transport instructions and delivery

The secondary air cooling unit and lighting sail are supplied separately in sturdy transport packaging, i.e. shrink-wrapped on one-way pallets and secured with plastic or metal bands. The installation and/or control accessories are supplied in a separate cardboard box.

## Storage / inbound delivery

The recipient at the delivery location must check the units and sails for damage immediately on arrival. Any damage found must be recorded on the delivery note. The haulier and the relevant contractual partner must be notified immediately if any damage is discovered or any parts on the delivery note are missing. Subsequent complaints cannot be considered.

Packaged products must be transported and stored as follows:

- ▶ Fully protected from weather conditions and humidity/moisture, i.e. do not keep or store products outdoors
- ▶ Transport and store products in dry, dust-free ambient conditions
- ▶ Do not expose products to corrosive or aggressive media
- ▶ Protect products from direct sunlight
- ▶ Storage temperature: 5 °C to 50 °C

In order to prevent contamination of and damage to the unit, the packaging and protective film (if present) must not be removed until immediately before commissioning.

### ▶ Note:

Moisture and temperature effects can cause the dimensions of the material to change. We recommend storing the cardboard boxes for 2 to 3 days in the room where they will be used, before proceeding further.





The cardboard packaging and protective films serve to protect the unit from dirt and damage and must not be removed during the construction phase!  
The manufacturer accepts no liability for soiling of or damage to the unit.

## Disposal, environmental protection and recycling

All products are packaged carefully in environmentally friendly materials. The packaging material must be disposed of in accordance with local regulations.

## Declaration of conformity

EC/EU declaration of conformity		
according to the Machinery Directive 2006/42/EC of 17 May 2006, Annex II, Part 1, Section A and the EU Directive 2014/30/EU (electromagnetic compatibility) of 26 February 2014.		
We hereby declare that the machine designated below meets the relevant provisions of the EC Machinery Directive 2006/42/EC and the EMC Directive.		
Manufacturer:	Kiefer Klimatechnik GmbH Heilbronner Straße 380 - 388 70469 Stuttgart	
Machine:	Ventilation unit, large area luminaire	
Type:	INDUSAIL SYSTEM SONIC plus INDUSAIL SYSTEM LUMINOUS plus, air, silent	
<b>Relevant EC directives and regulations:</b> Directive 2006/42/EC, OJ L 157/24 of 17.05.2006 (Machinery Directive) Directive 2014/30/EU, OJ L 96/79 of 26.2.2014 (EMC Directive)		
<b>Applicable harmonised standards, in particular:</b> DIN EN ISO 12100:2011-03; DIN EN ISO 13857:2020-04; DIN EN 61000-6-2:2016-05; DIN EN 61000-6-3:2011-09; DIN EN 60335-1:2020-08; DIN EN 349:2008-09; EN IEC 55015:2019/A11:2020; EN 61000-3-3:2013; EN 61000-3-2:2014; EN 61547:2009		
<b>Other national standards, guidelines and technical specifications:</b> DIN EN 82079-1 VDI 6022 Part 1: 2018-01 RLT-Guideline 03; August 2016		
Manufacturer's signature		
	Clemens Kiefer Managing Director	
	i. V. Daniel Nack Head of Research and Development Department	
Stuttgart, 26.04.2021		
Place, date	Signature	Signature

## Product range

### Components:

Linear diffusers, wall passages, ceiling diffusers and displacement outlets, chilled ceilings, fan coil units, transfer grilles, concrete core cooling with supply air. Axial and radial fans, hot gas fans, plastic fans.

### Systems:

Ventilation systems of all kinds for comfort (in offices, department stores, hospitals, libraries, museums, etc.) and industry (mechanical engineering, high-tech, textiles, plastics, chemicals, automotive, beverages, food industry, etc.).

## Services

### Consulting and planning:

We advise on all questions regarding the use of our systems and prepare system studies and cost estimates with calculations of the cooling load / piping networks / energy costs / economic efficiency. Preparation of structural proposals for air distribution, lighting and ceiling systems. Lighting calculations using state of the art software tools. Development and implementation of control concepts in our own ICE (instrumentation & control engineering) department. We apply the knowledge we have gained from numerous construction projects to product innovations and new projects.

### Air conditioning laboratory:

Expert reports; ambient air flow analyses in the laboratory in 1:1 tests. Acoustic and aerodynamic investigation of ventilation components. Development of innovative air conditioning components. Caloric output measurement of air or water components on the test bench. On-site comfort measurements to assess thermal comfort and ambient air quality.

### Maintenance and servicing

of all types of ventilation and air conditioning systems within the framework of maintenance service contracts.



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All earlier versions of this technical Information lose their validity with the publication of this document.