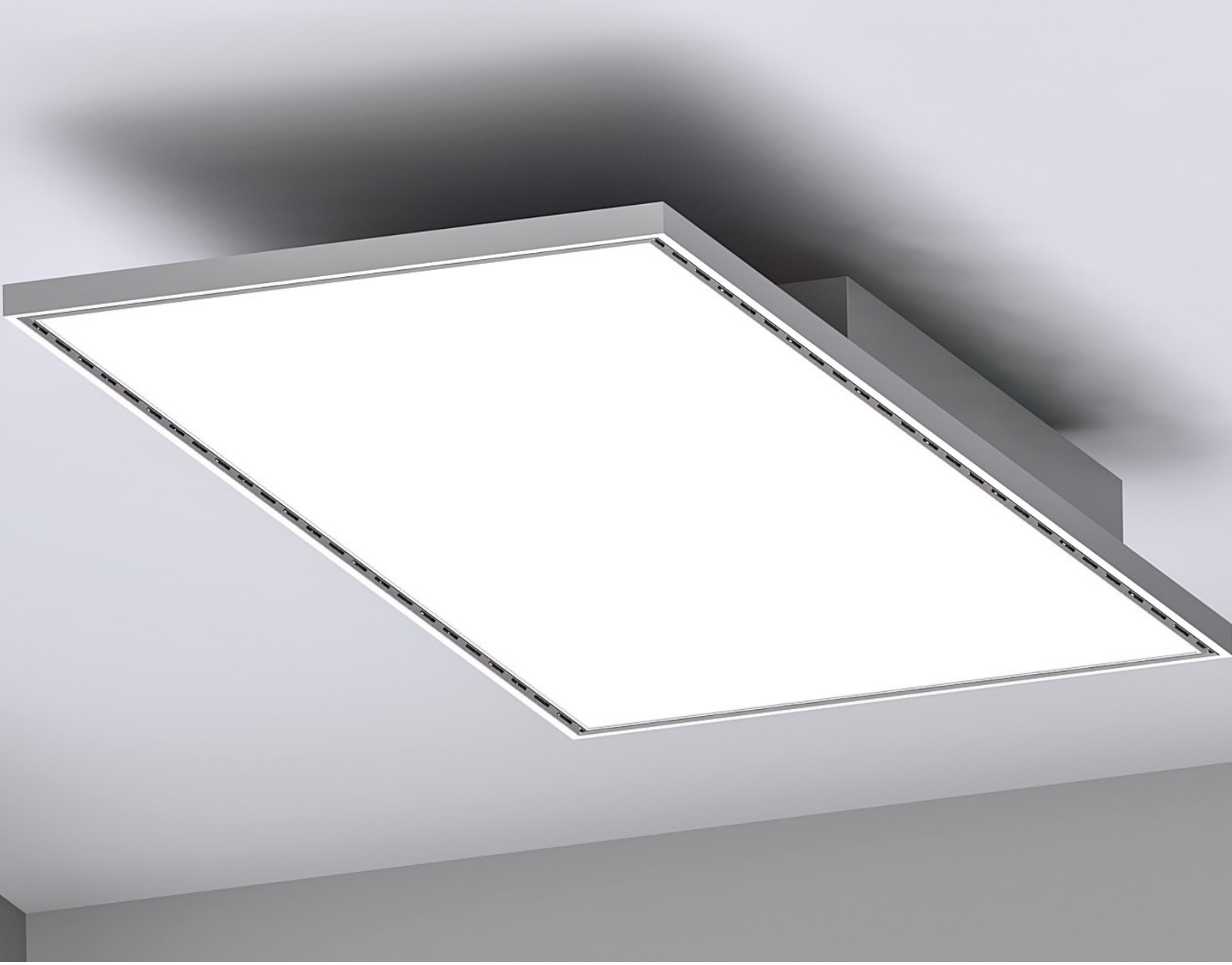


TECHNICAL INFORMATION

ACTIVE ACOUSTIC SAIL SYSTEM
INDUSAIL SONIC

Kiefer
Klimatechnik

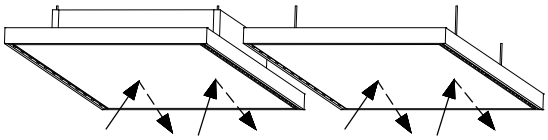
CONTENTS

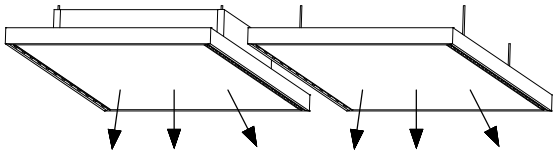
PART I – TECHNICAL INFORMATION

PART II – INSTALLATION INFORMATION

INDUSAIL SYSTEM

ONE SYSTEM – MANY POSSIBILITIES





INDUSAIL SONIC	INDUSAIL LUMINOUS
ACOUSTICS High sound absorption	**ACOUSTICS** High sound absorption
AIR Draught-free supply of fresh air	**AIR** Draught-free supply of fresh air
COOLING Comfortable air conditioning	**COOLING** Comfortable air conditioning
LIGHT REFLECTANCE Supports the lighting	**LIGHT** Intelligent room lighting

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

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

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

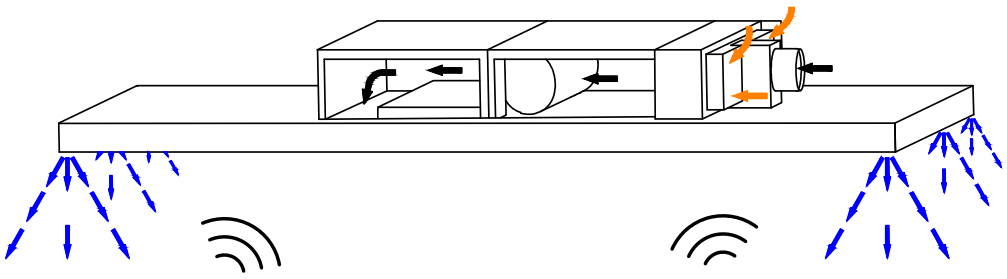
*No lighting; very good light reflectance

THE FLEXIBLE ACOUSTIC SAIL SYSTEM INDUSAIL SONIC
ACOUSTICS – COOLING – AIR – LIGHT REFLECTANCE

INDUSAIL SONIC is a flexible acoustic sail with integral fan coil for ambient air conditioning. It supports the most common types of lighting thanks to its high light reflectance value > 90 %. The recirculation air or mixed air is induced via highly inductive linear diffusers, with an optional fresh air intake to improve the ambient air quality. By combining active and inactive components, the requirements of different office concepts can be fulfilled, even in the event of future changes.

INDUSAIL SONIC 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.



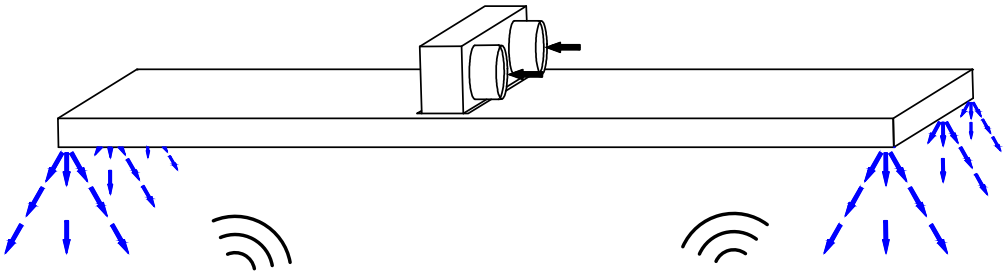
As an option, it is possible to feed preconditioned outdoor air into the sail via an air connection (DN 125). This outdoor air is used to maintain the intended minimum outdoor air flow rate for the room (DIN EN ISO 15251).
The air flow rate, sound power and caloric output are important considerations 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.

THE FLEXIBLE ACOUSTIC SAIL SYSTEM
INDUSAIL SONIC
ACOUSTICS – COOLING – AIR – LIGHT REFLECTANCE

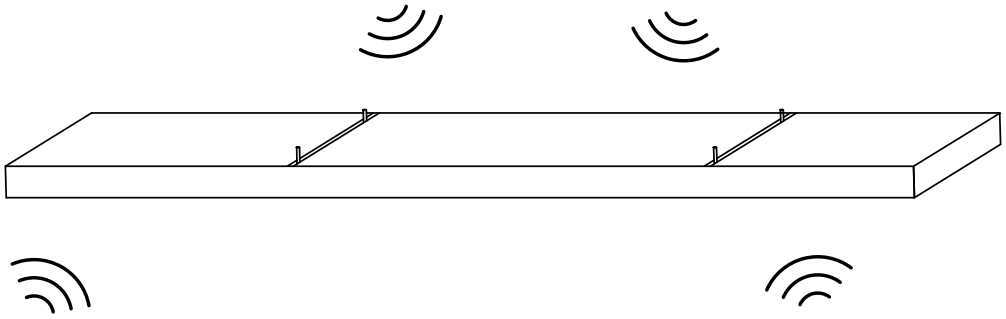
INDUSAIL SONIC air function description

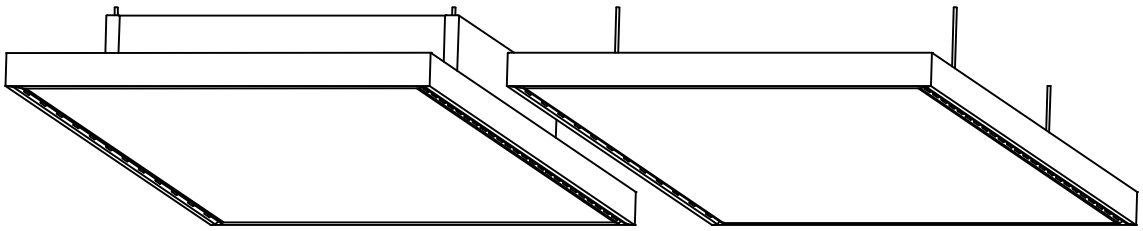
INDUSAIL SONIC air works without an air cooler and has been designed to introduce preconditioned outdoor air only. Thanks to the low supply air temperatures that can be achieved with this design, high cooling capacities are also possible while maximising interior comfort.



INDUSAIL SONIC 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.



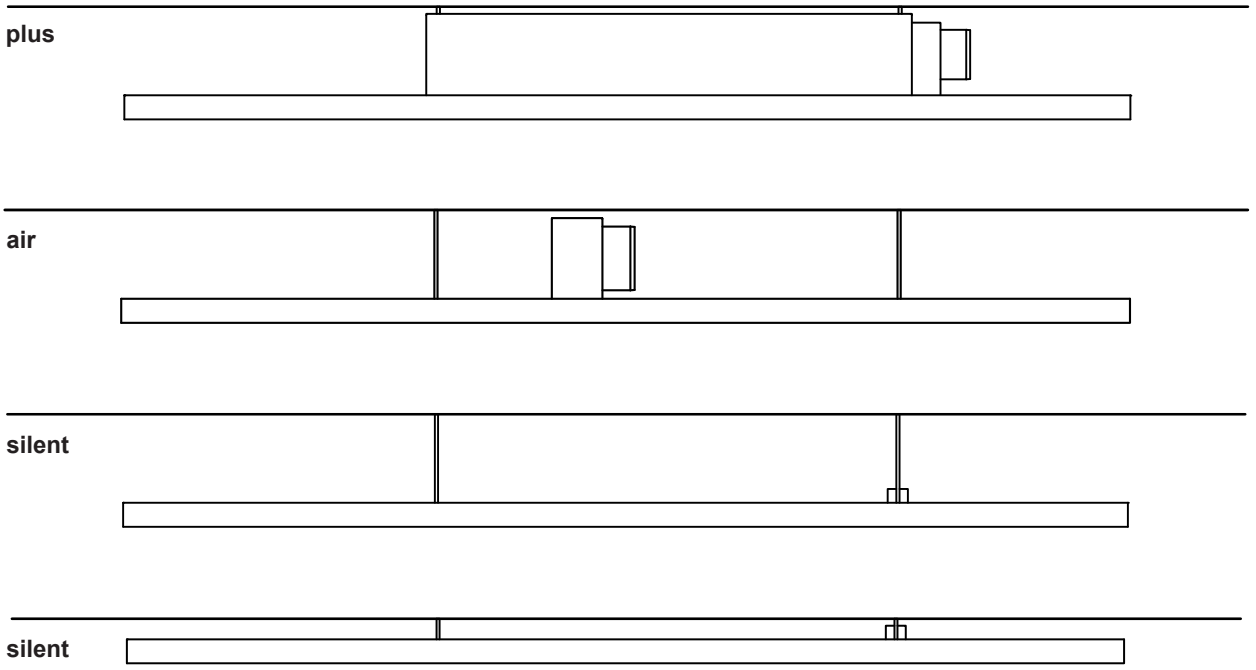


INDUSAIL SONIC

	plus	air	silent
Light reflectance	●●●	●●●	●●●
Ventilation	●	●●●	-
Cooling	●●●	●	-
Sound absorption	●●	●●	●●●

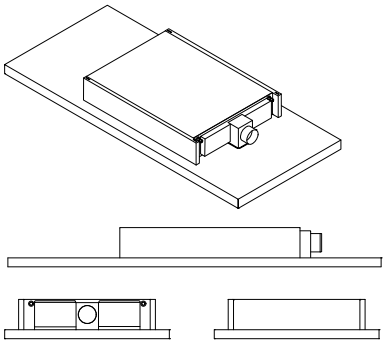
Installation situation

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

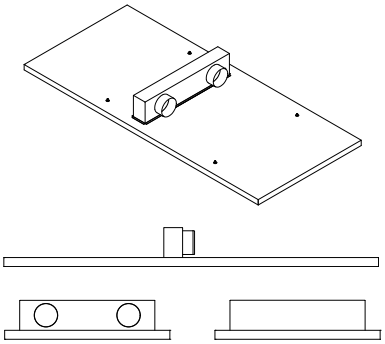


INDUSAIL SONIC

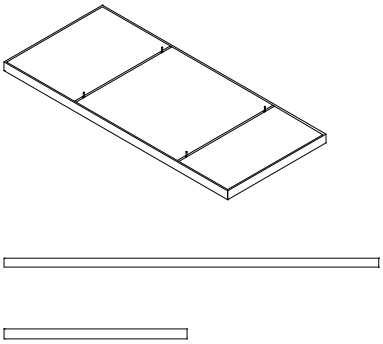
plus



air



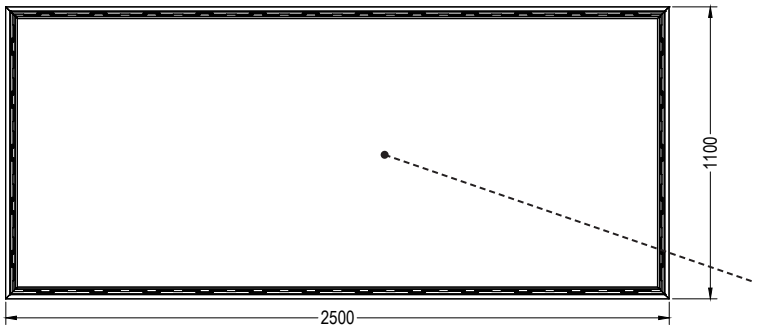
silent



INDUSAIL SONIC

		plus	air	silent
Dimensions L x W x H		2500 x 1100 x 255	2500 x 1100 x 250	2500 x 1100 x 50
Max. ventilation (outdoor air)	**m³/h**	120	500	-
Max. total cooling capacity	**W**	1600	1600	-
Assessed sound abs. αw	**-**	0.6	0.6	0.9

INDUSAIL SONIC plus



Bottom view

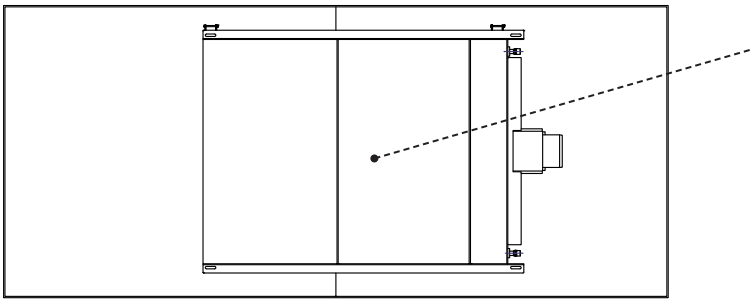
	Length	Width	Height
mm	2500	1100	255

Acoustic ceiling sail with a secondary air cooling unit for comfortable ventilation and ambient air conditioning.

Acoustic panel

Acoustic sail equipped with sound-absorbing diffuser material

- Sound-absorbing material (100 % polyester)
- Integrated inductive air diffusers
- Light reflectance > 90 %

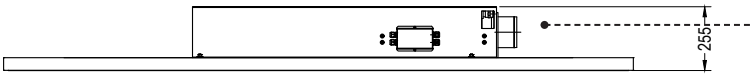


Top view

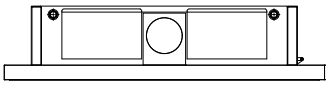
Cooling unit

Modular secondary air cooling unit

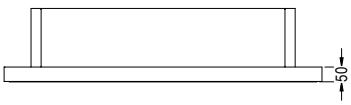
- Electrical connection (230 V)
- Controllable EC fan with reliable start-up, stable performance curve and low noise level
- Heat exchanger with cold water connection for conditioning the ambient air
- Pleated filter for secondary air
- Plenum box with sound insulation



Side view – long side



Side view – R – broad side



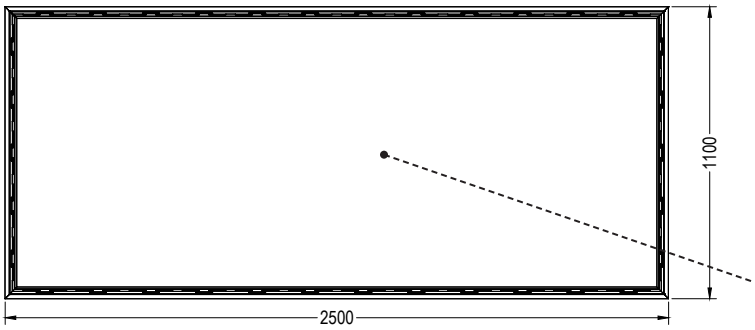
Side view – L – broad side

Ventilation

Outdoor air connection (DN125) 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



Bottom view

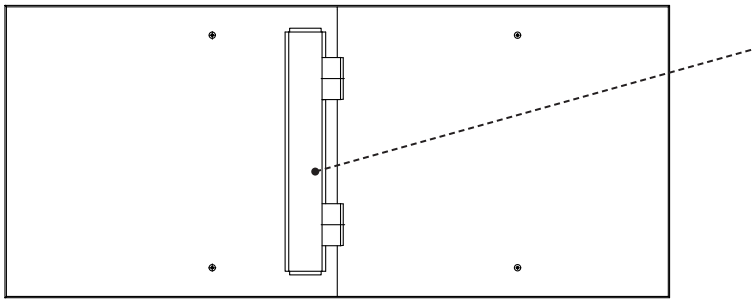
	Length	Width	Height
mm	2500	1100	250

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

Acoustic panel

Acoustic sail equipped with sound-absorbing diffuser material

- Sound-absorbing material (100 % polyester)
- Integrated inductive air diffusers
- Light reflectance > 90 %



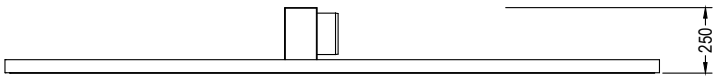
Top view

Ventilation

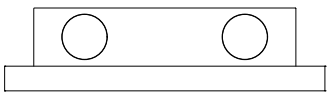
Outdoor air connection (2x DN160) and optimum air distribution in the occupied zone through highly inductive air diffusers (INDUL P18)

Suspension

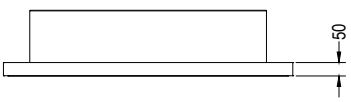
Straightforward installation via 4-point suspension with threaded rods



Side view – long side

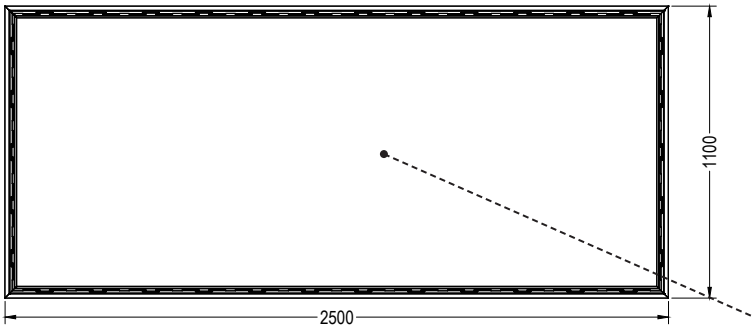


Side view – R – broad side



Side view – L – broad side

INDUSAIL SONIC silent



Bottom view

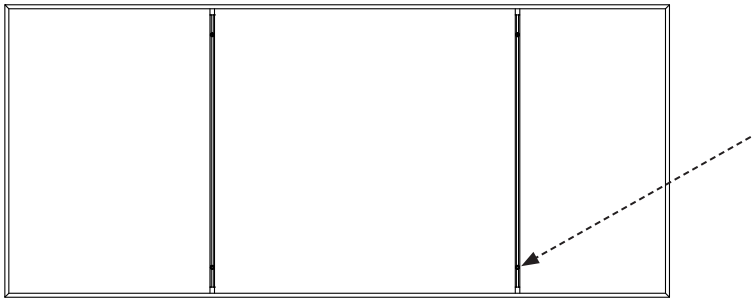
	Length	Width	Height
mm	2500	1100	50

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

Acoustic panel

Acoustic sail equipped with sound-absorbing diffuser material

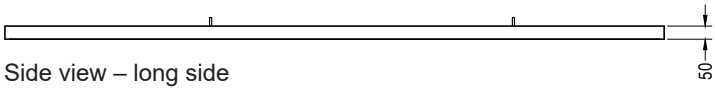
- Sound-absorbing material (100% polyester)
- Frame profiles have INDUL air diffuser profiles which are identical in appearance to the INDUSAIL SONIC plus and INDUSAIL SONIC air
- Light reflectance > 90 %



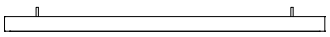
Top view

Suspension

Straightforward installation via 4-point suspension with threaded rods



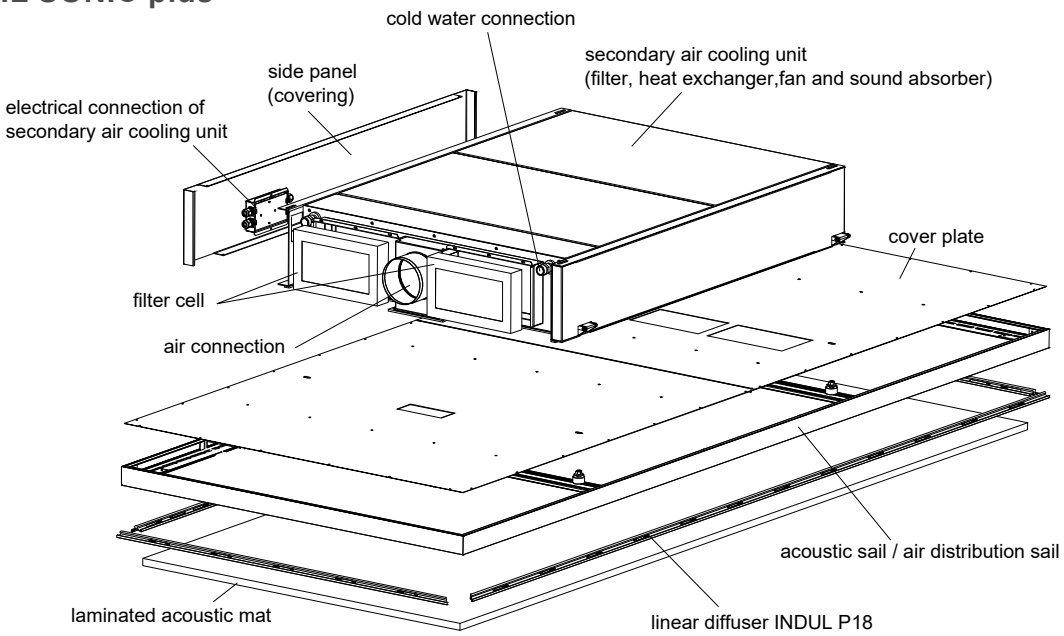
Side view – long side



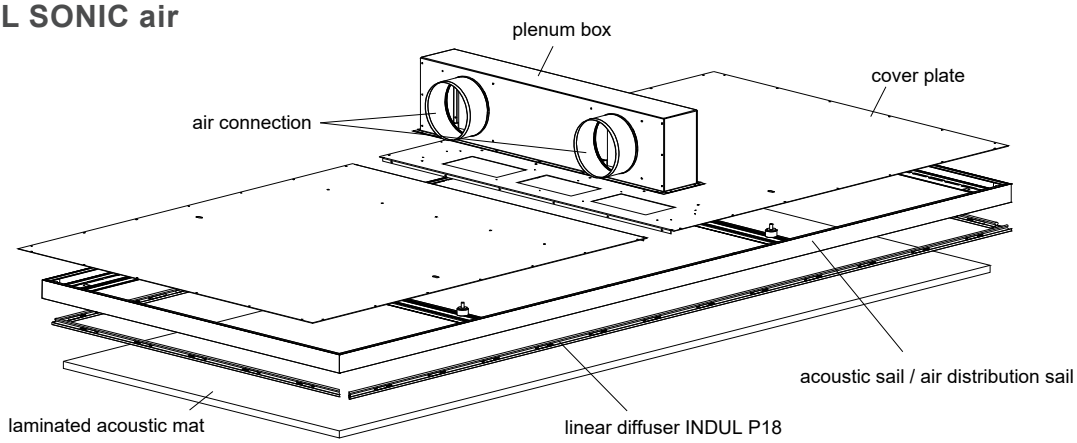
Side view – broad side

EXPLODED VIEW

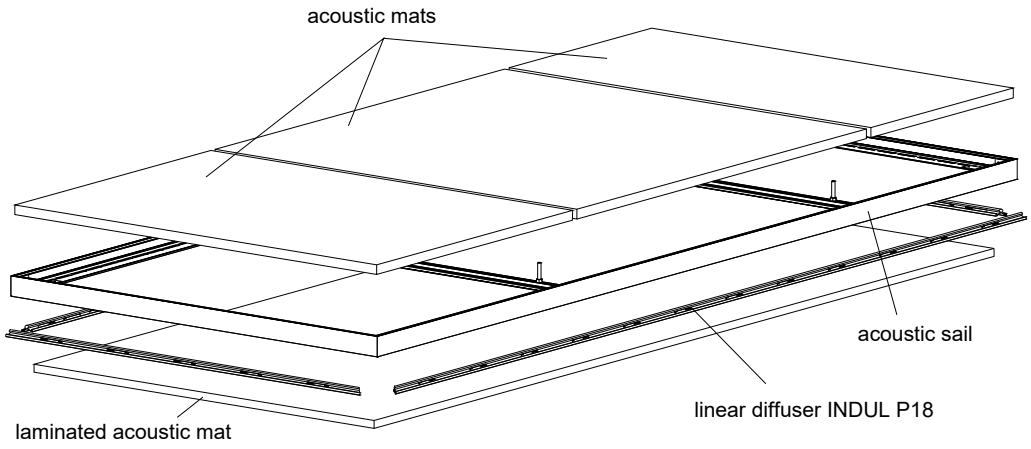
INDUSAIL SONIC plus



INDUSAIL SONIC air



INDUSAIL SONIC silent

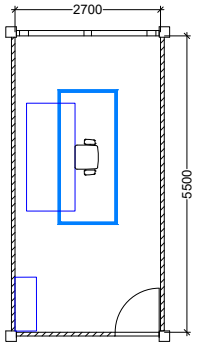


INDUSAIL SONIC TECHNICAL DATA

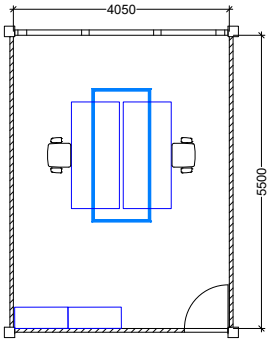
INDUSAIL SONIC - types		plus	air	silent
DIMENSIONS				
Standard - L x W x H	mm	2500 x 1100 x 255	2500 x 1100 x 250	2500 x 1100 x 50
Total weight in operation	kg	74	50	30
acoustic surface area	mm	2400 x 1000	2400 x 1000	2400 x 1000
Connector diameter	mm	1 x DN125	2 x DN160	-
SAIL				
Acoustic mat	-	100 % 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	
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)	-	C	C	A
Assessed sound absorption level α_w (DIN EN ISO 354; DIN EN ISO 11654)	-	0.6	0.6	0.9
Recommended suspension height for optimum effect	mm	200 to 300	200 to 300	100 to 400
ELECTROTECHNICAL DATA				
Mains connection	V/Hz	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	-	-
CONTROL				
Control voltage of fan DC	V	0–10	-	-
Control voltage of optional actuator for heat exchanger DC	V	0–10	-	-

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

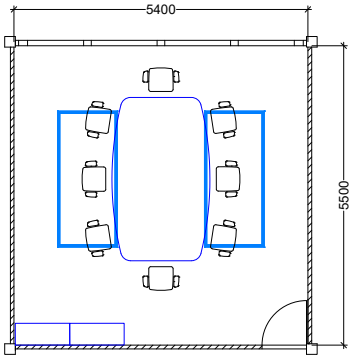
SINGLE OFFICE
2 axes; 15 m²; 1 person



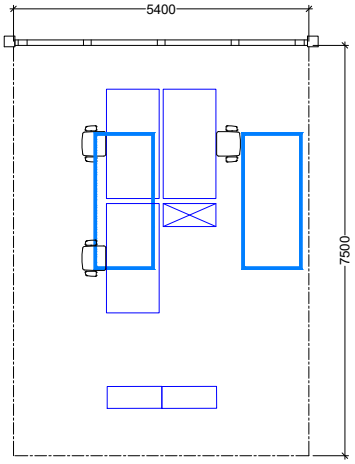
OFFICE
3 axes; 22 m²; 2 people



MEETING ROOM
4 axes; 30 m²; 8 people



OPEN-PLAN OFFICE
4 axes; 41 m²; 3 people



	INDUSAIL SONIC plus number of sails	Room area (1)	Outdoor air (2)	Sound pressure level (1, 3)	Cooling capacity
		m²/Person	m³/h/m²	dB(A)	W/m²
Single office	1	15 (10)	4.3 (4.2)	35 (35)	69
Office	1	11 (10)	6.3 (4.8)	35 (35)	55
Meeting room	2	4 (3)	9.4 (9.3)	40 (40)	91
Open-plan office	2	14 (12)	5.9 (4.4)	40 (40)	65

( ) 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 m²/person (seated)

INDUSAIL SONIC plus

Mass flow [kg/h]		50	100	150	200	250	300
Δp_{Water} [kPa]		1	4	7	12	17	23

U [V]	P_{el} [W]	L_{WA} [dB(A)]	Qk [W]	Qk [W]	Qk [W]	Qk [W]	Qk [W]	Qk [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

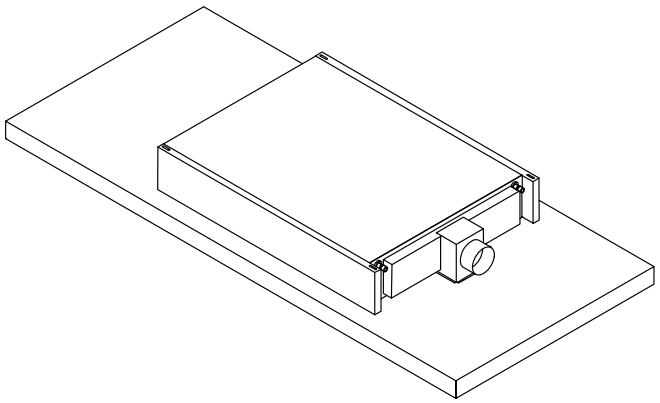
Outdoor air flow rate: 0 m³/h

U [V]	P_{el} [W]	L_{WA} [dB(A)]	Qk [W]	Qk [W]	Qk [W]	Qk [W]	Qk [W]	Qk [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_{el} [W]	L_{WA} [dB(A)]	Qk [W]	Qk [W]	Qk [W]	Qk [W]	Qk [W]	Qk [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 SONIC plus

Mass flow [kg/h]		50	100	150	200	250	300
Δp_{Water} [kPa]		1	4	7	12	17	23

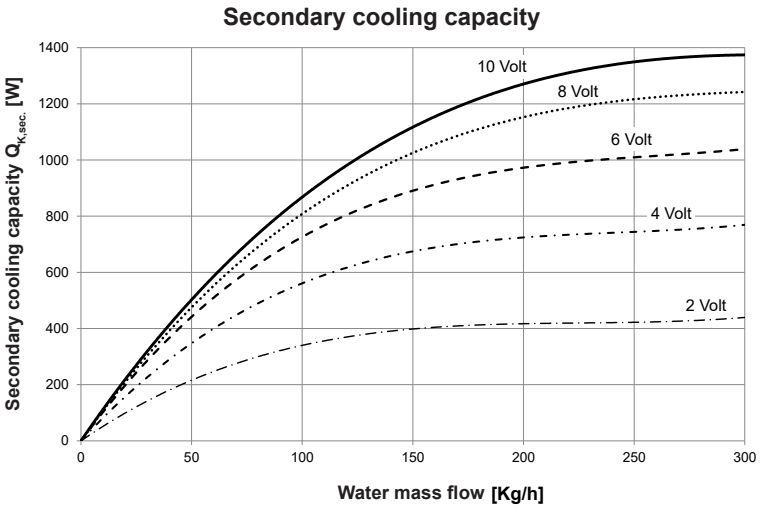
U [V]	Pel [W]	LWA [dB(A)]	Qk [W]	Qk [W]	Qk [W]	Qk [W]	Qk [W]	Qk [W]
2.0	4	< 28	503	600	647	663	669	677
4.0	10	37	640	828	927	969	984	1011
6.0	22	46	742	1004	1156	1232	1266	1294
8.0	37	52	781	1095	1299	1419	1479	1505
10.0	45	55	804	1146	1380	1524	1598	1623

Outdoor air flow rate: 100 m³/h

U [V]	Pel [W]	LWA [dB(A)]	Qk [W]	Qk [W]	Qk [W]	Qk [W]	Qk [W]	Qk [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 m³/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_k – Total cooling capacity
L_{WA} – A-sound power level (± 3 dB(A))
P_{el} – 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:

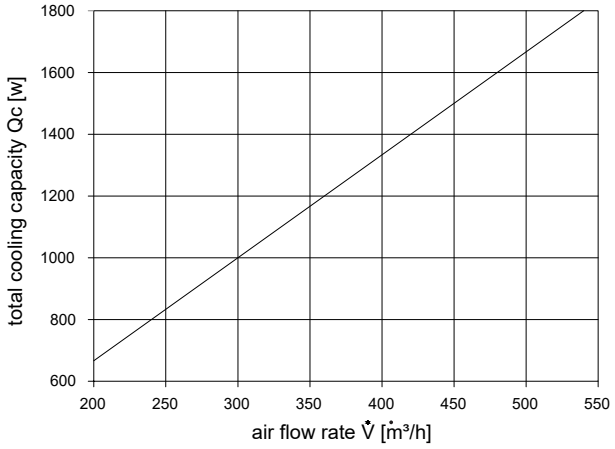
- Stationary state during measurements
- No heat exchanger condensation
- Cold water without additives

INDUSAIL SONIC air

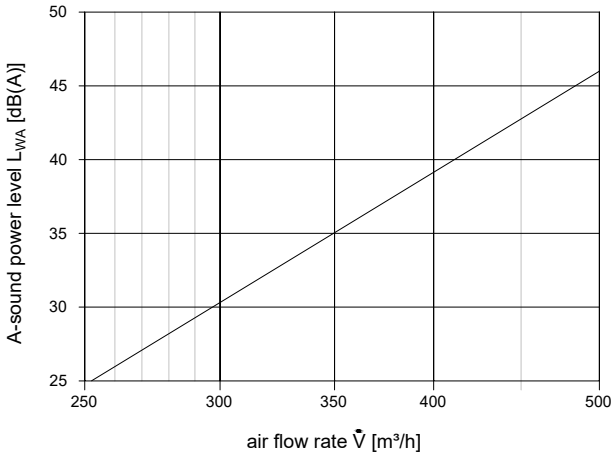
$\dot{V}$ [m³/h]	L_{WA} [dB(A)]	Q_K [W]	ΔP [Pa]
250	25	833	10
300	30	1000	14
350	35	1167	18
400	39	1333	23
450	43	1500	29
500	46	1667	35

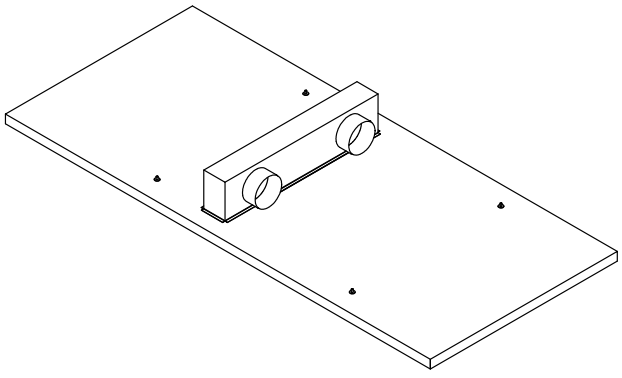
Q_k Total cooling capacity
L_{WA} A-sound power level (+ 3 dB(A))
$\dot{V}$ Air flow rate
Δp Pressure drop
Supply air temperature 16 °C
Intake temperature 26 °C

cooling capacity

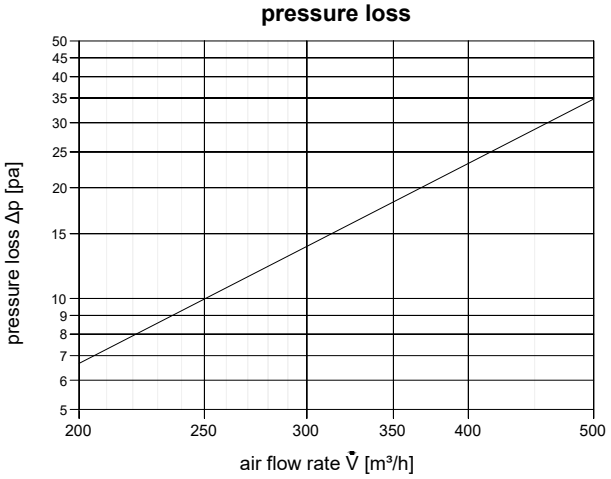


sound power level - L_{WA}





pressure loss



ACOUSTIC SAIL SYSTEM COMPLEMENTED BY COOLING AND VENTILATION

INDUSAIL SONIC 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 sail types are equipped with sound-absorbing acoustic fleece on the room side. 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 INDUSAIL SONIC silent sail is additionally equipped with a highly absorbent insulating material made of polyester, which achieves a particularly high sound absorption at different ceiling distances.

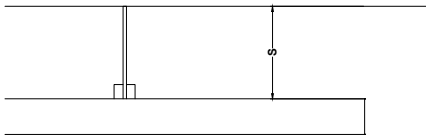
- Flexible design of office spaces coupled with complex acoustic requirements can be implemented using the SONIC range. Kiefer Klimatechnik supports you in producing an optimal system design.

Optimising the interior acoustics

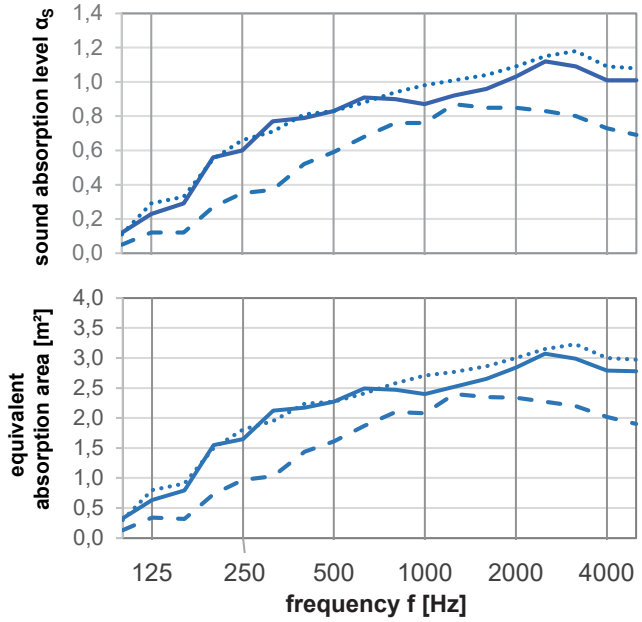
Acoustic sails can reduce nuisances such as noise in interiors. This improves working conditions and performance. In open-plan offices in particular, it can often be hard to concentrate when others are talking loudly. Audibility in the room, increased speech intelligibility and low reverberation times 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 SONIC 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.

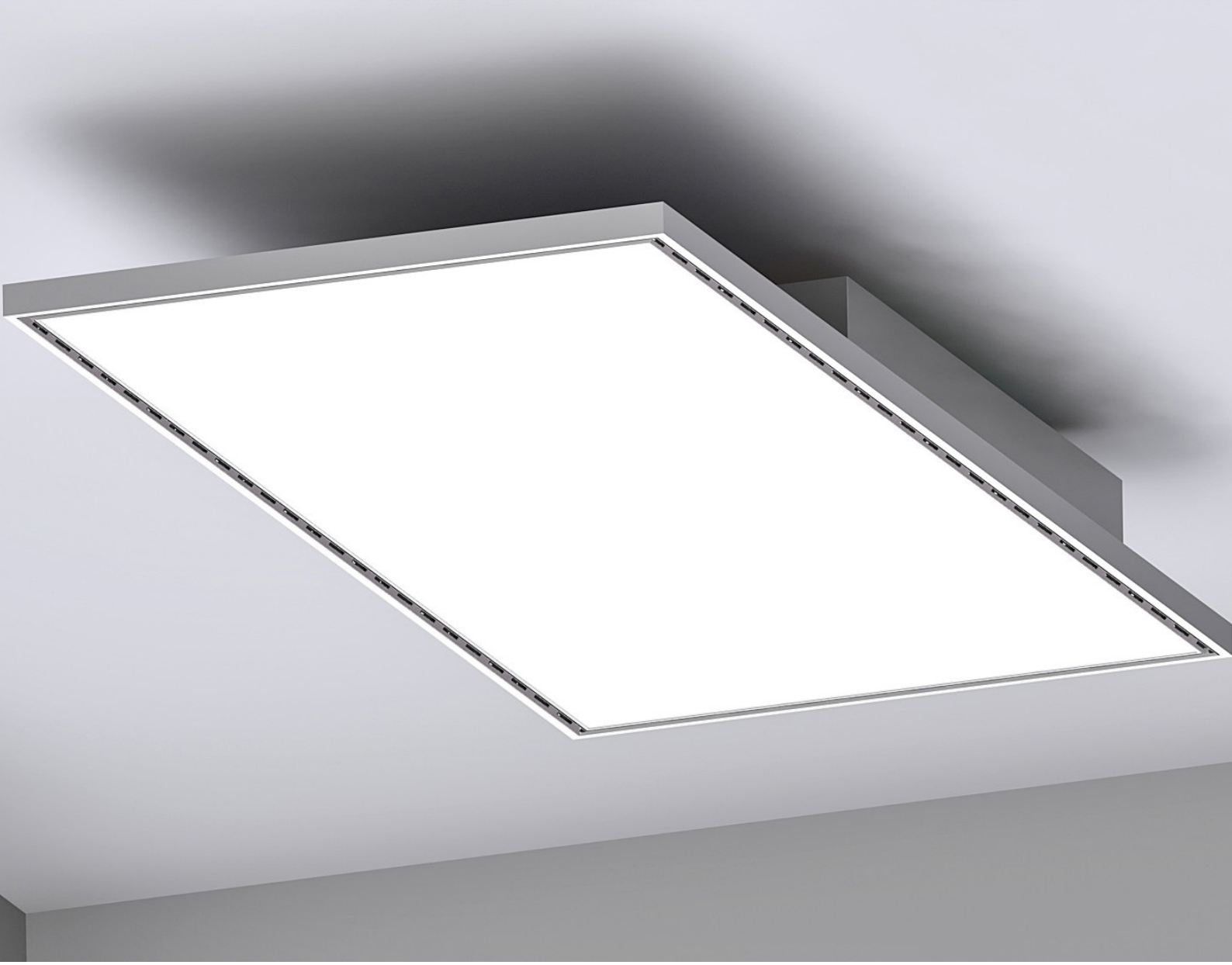


The INDUSAIL LUMINOUS “plus” and “air” achieve the same sound absorption, as the surface area of the acoustically effective material is identical.



INDUSAIL SONIC

	air / plus s = 200 mm		**silent** s = 200 mm		s = 100 mm	
Frequency	Absorption	Area	Absorption	Area	Absorption	Area
[Hz]	αS [-]	Equivalent [m²]	αS [-]	Equivalent [m²]	αS [-]	Equivalent [m²]
100	0.05	0.13	0.11	0.30	0.12	0.33
125	0.12	0.34	0.29	0.80	0.23	0.63
160	0.12	0.32	0.33	0.91	0.29	0.79
200	0.27	0.73	0.55	1.50	0.56	1.55
250	0.35	0.97	0.66	1.81	0.60	1.65
315	0.37	1.03	0.71	1.95	0.77	2.12
400	0.52	1.44	0.81	2.24	0.79	2.17
500	0.59	1.61	0.83	2.27	0.83	2.27
630	0.68	1.87	0.88	2.41	0.91	2.49
800	0.76	2.10	0.94	2.58	0.90	2.47
1000	0.76	2.08	0.98	2.71	0.87	2.40
1250	0.87	2.40	1.01	2.77	0.92	2.52
1600	0.85	2.35	1.04	2.86	0.96	2.65
2000	0.85	2.34	1.09	3.00	1,03	2.84
2500	0.83	2.27	1.15	3.15	1.12	3.07
3150	0.80	2.20	1.18	3.23	1.09	2.99
4000	0.73	2.02	1.09	3.00	1.01	2.79
5000	0.69	1.90	1.08	2.97	1.01	2.78
Assessed sound abs. αW	0.60		0.90		0.90	
“Absorption class DIN EN ISO 11654”	C		A		A	
"Fire protection class of acoustic mat DIN EN 13501-01"	B-s1, d0		B-s2, d0		B-s2, d0	



INSTALLATION INFORMATION

ACTIVE ACOUSTIC SAIL SYSTEM
INDUSAIL SONIC

Kiefer
Klimatechnik

CONTENT

PART I – TECHNICAL INFORMATION

PART II – INSTALLATION INFORMATION

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!

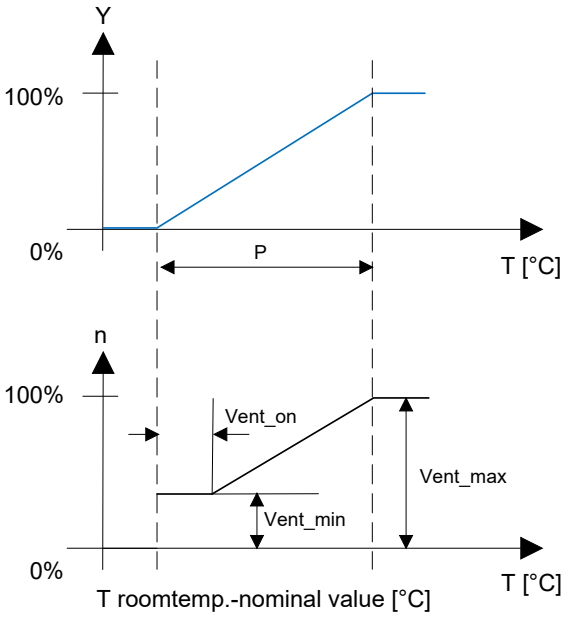
When using a room thermostat:

- 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.

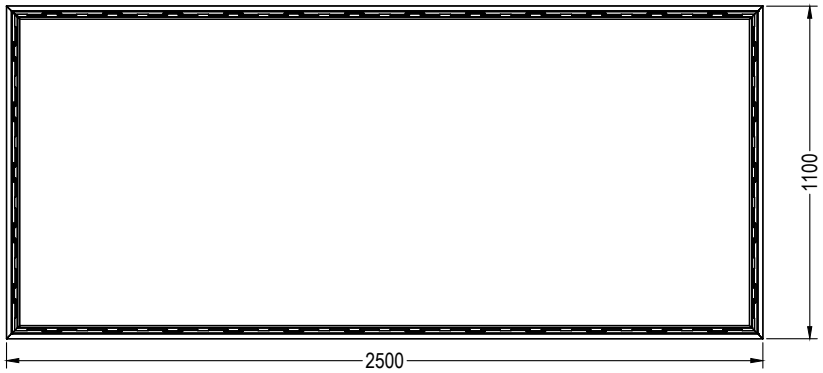
The controller must ensure that the coolant supply is shut off when the unit is not running.

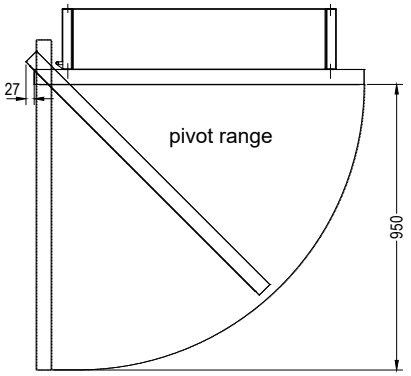
Example of control diagram



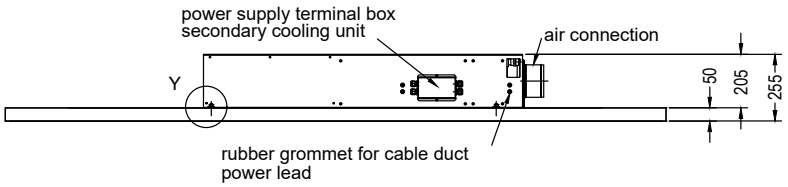
Y	"Cooling valve" control command
n	Fan speed
P	Proportional "cooling" zone
Vent_max	Max. fan speed
Vent_min	Min. fan speed
Vent_on	Fan start point

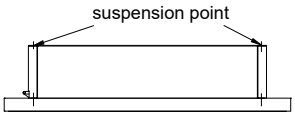
INDUSAIL SONIC plus

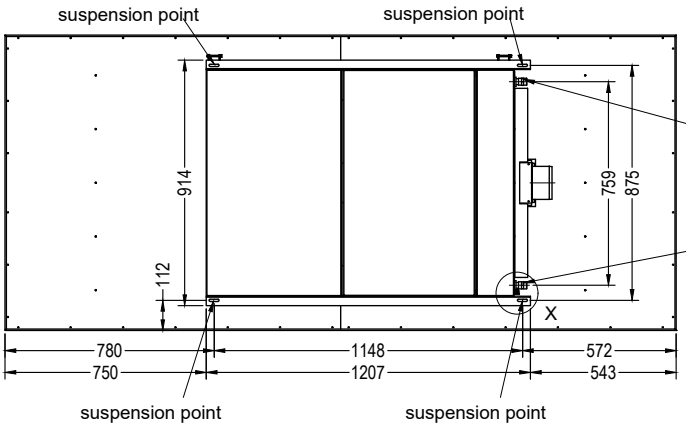


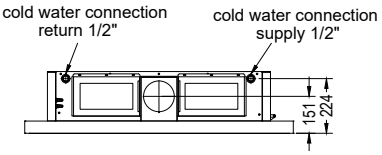


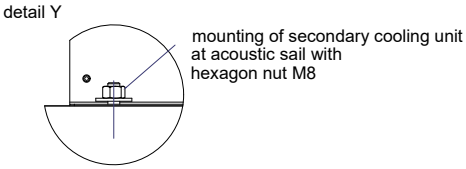
view with hidden side panel

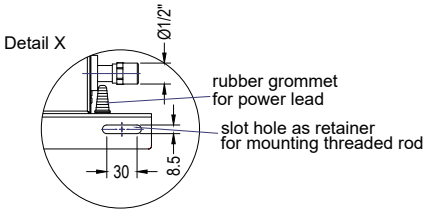


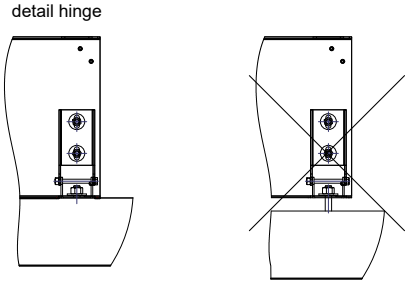






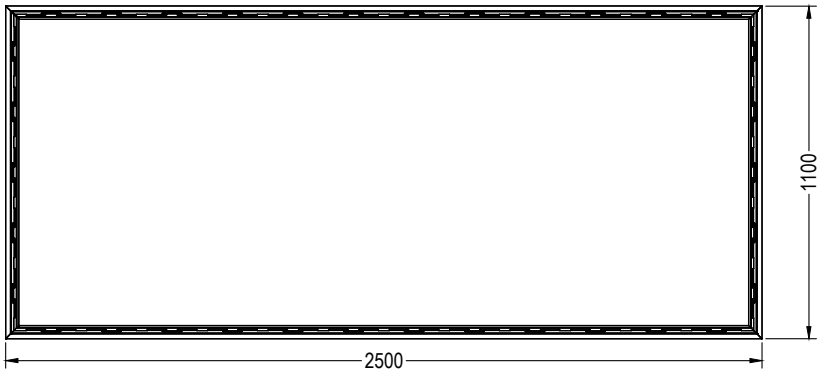


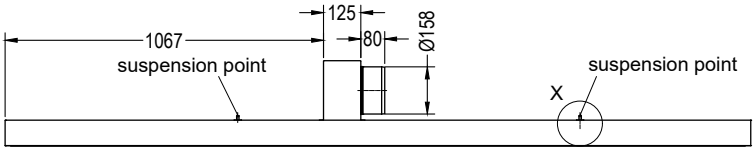


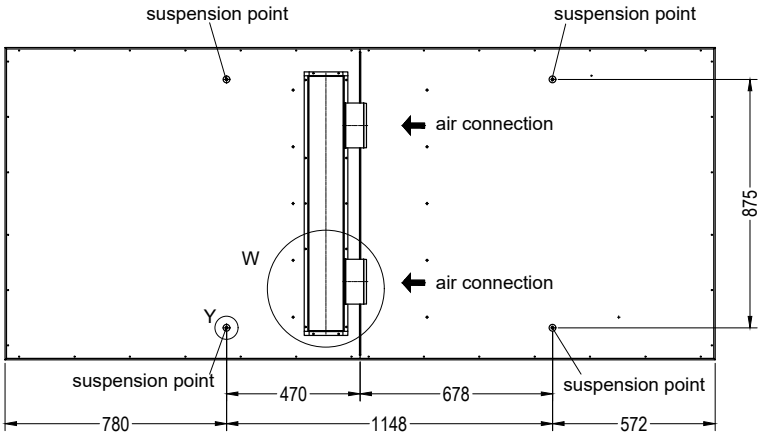


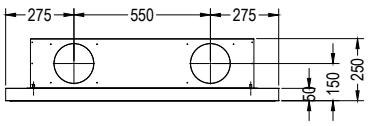
height setting hinge:
sail has to be air tight on the basic device
see Installation Information PART II-8

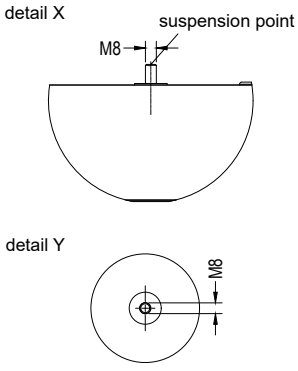
INDUSAIL SONIC air

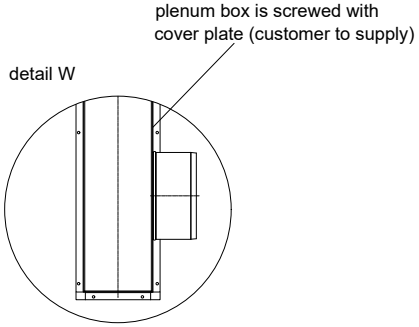






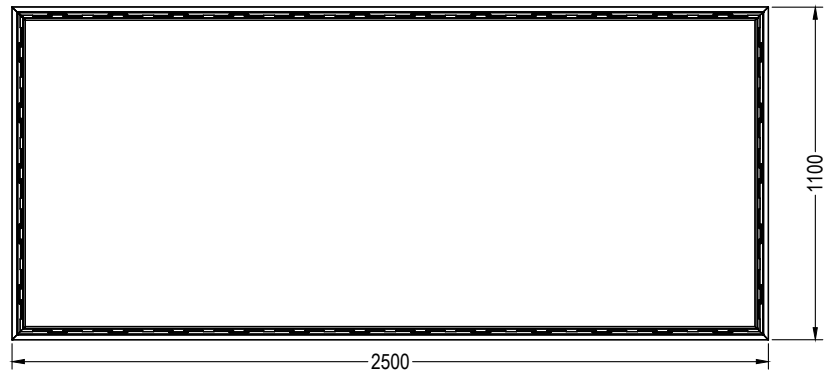


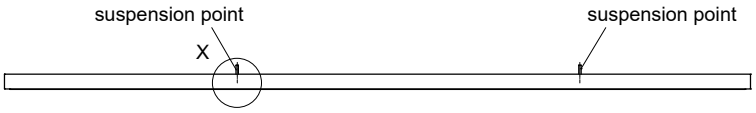


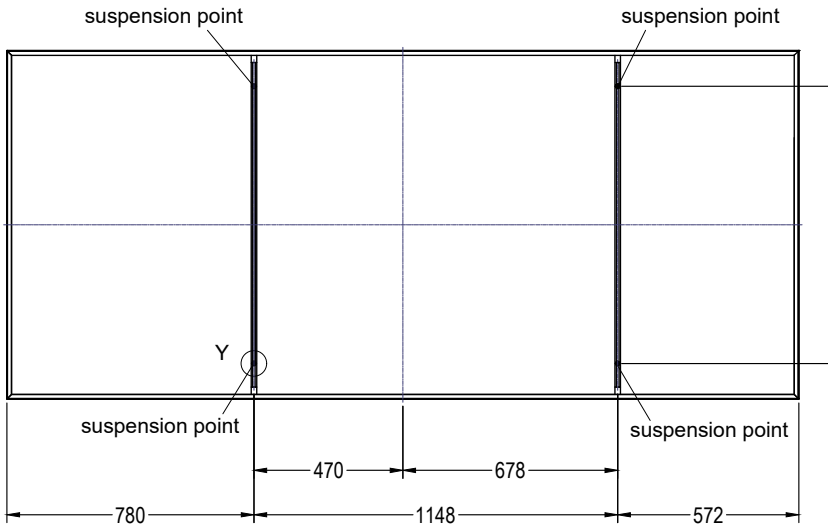


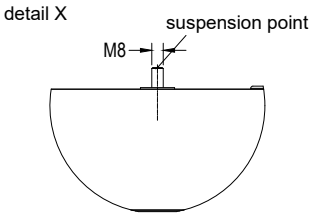
Important!
Note the air direction when installing the plenum box.

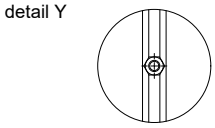
INDUSAIL SONIC silent

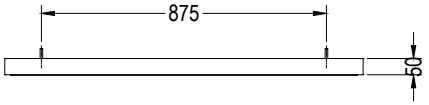




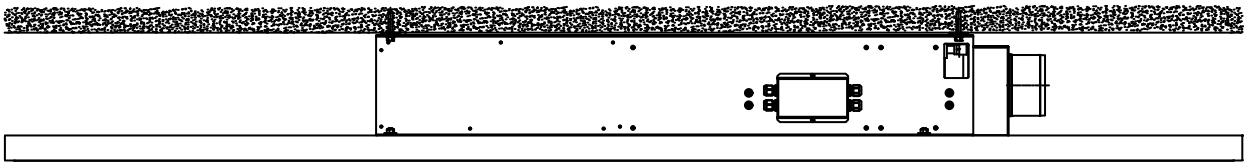


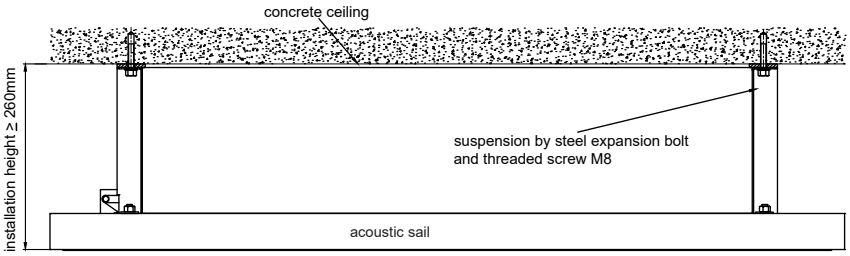




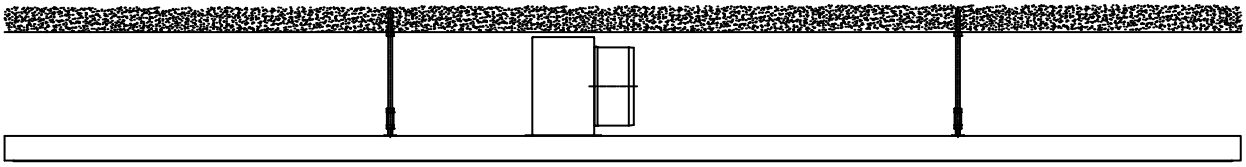


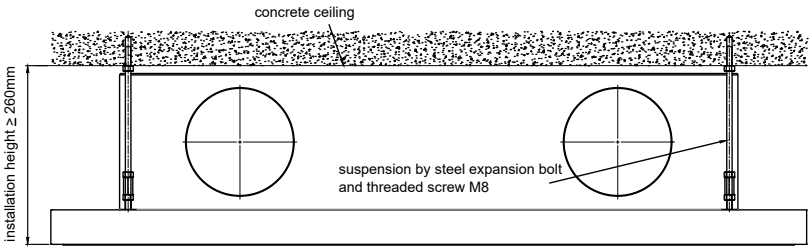
Suspension of INDUSAIL SONIC plus



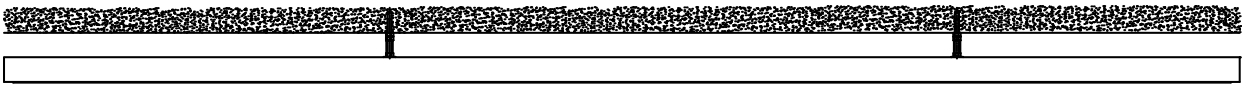


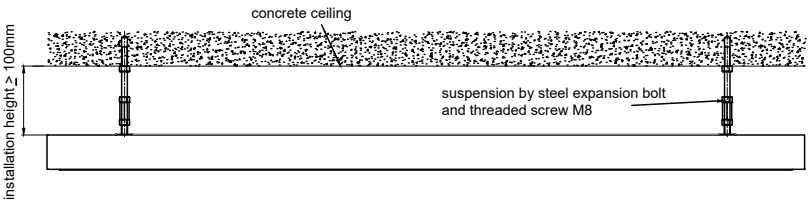
Suspension of INDUSAIL SONIC air





Suspension of INDUSAIL SONIC silent





Installation information, unit suspension and installation

- The property class of bolts, nuts, threaded rods and similar 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 acoustic sail. Due to the risk of contamination, the acoustic sail must be fitted in the final step. The acoustic sail may 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.

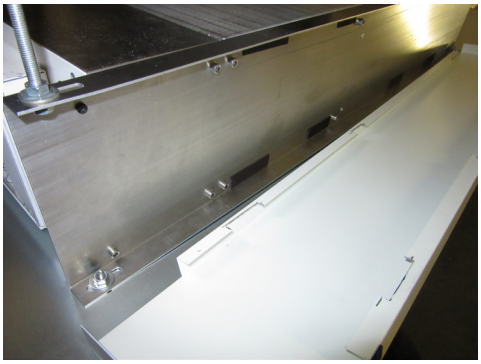
Risk of falling parts and tools from work being carried out overhead.
Risk from falling parts!
The threaded rods must be fitted securely. Nuts and locking rings must be tightened firmly. The threaded rods must not be bent or distorted in any way.

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

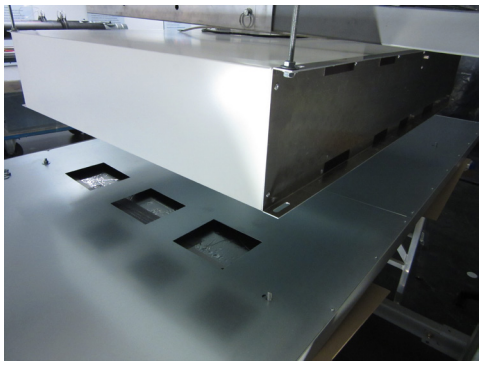
1. Remove the left and right-hand side covers of the secondary air cooling unit.



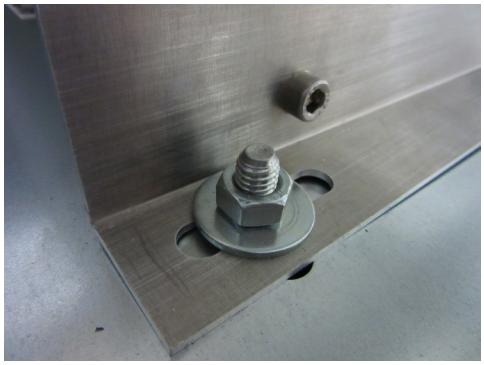
2. Insert M8 threaded rods into the four slots on top of the secondary air cooling unit and secure them with plain washers and M8 nuts.

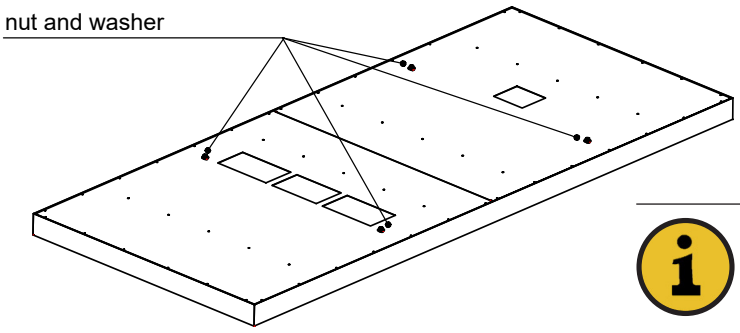
Mounting the acoustic sail on the secondary air cooling unit

1. Remove the protective film from the bottom of the secondary air cooling unit after mounting on the ceiling and before installing the acoustic sail.
2. Remove the supplied hexagon nuts (4x) and plain washers (4x) on the fitting side (sheet metal side) of the acoustic sail after opening the transport packaging.
3. Remove the acoustic sail carefully from the packaging.
4. Lift the acoustic sail (e.g. using a lifting device) and align it with the secondary air cooling unit as shown in the technical drawing (PART II-4). The cut-out sections in the cover panel of the acoustic sail must be situated below the respective openings of the fan and the supply air connector.
5. Insert the four M8 bolts of the acoustic 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 acoustic sail.

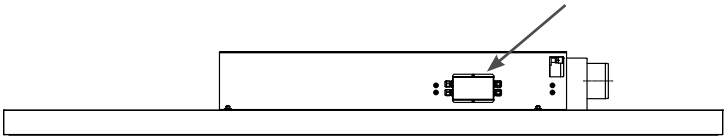


6. The two hinges can be aligned and adjusted to reduce the size of the gap. The M8 nuts must be loosened slightly for this purpose.



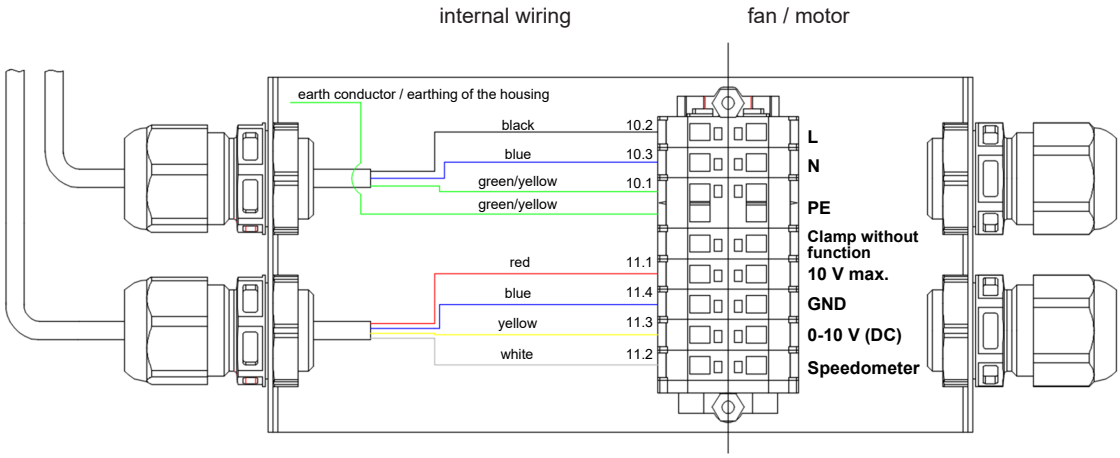


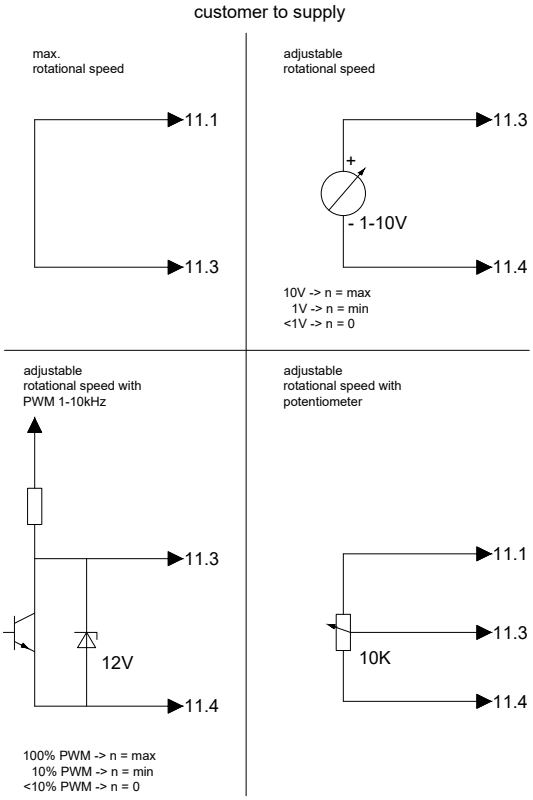
In order to prevent soiling of the white covering material, the acoustic sail must only be handled and touched at the outer frame profile. Failure to observe this point can result in damage to or soiling of the material.



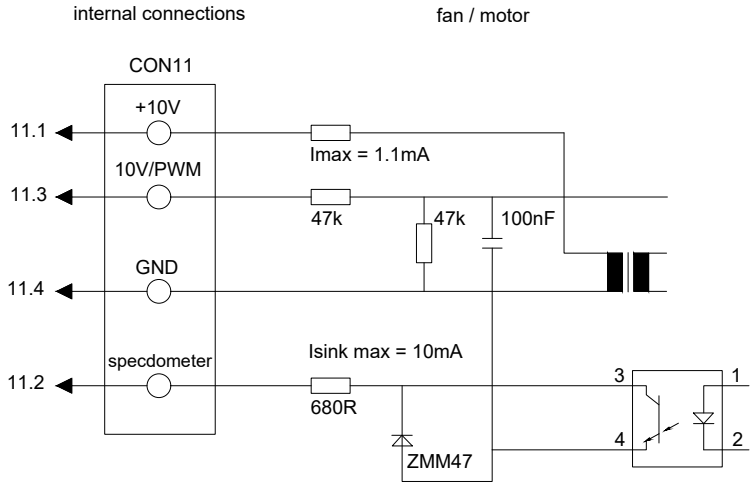
Electrical connection – secondary air cooling unit

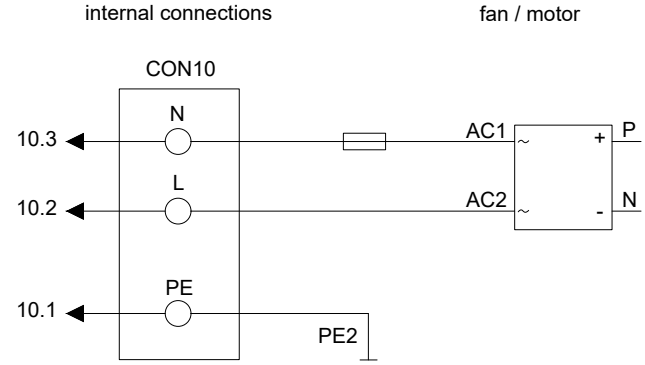
- The unit is intended for permanent connection to fixed lines.
- The INDUSAIL SONIC plus secondary air cooling unit must be safeguarded with a circuit breaker, tripping characteristic "C", for the switch-on process.
- With a control signal of 10 V, the maximum power consumption of each unit during operation 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 Ri = 94 kOhm
Tacho	11.2	White	Speed output: Open Collector, 1 pulse per revolution, galv. isolated, Isink max = 10 mA





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 (PART II-11).
- 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 acoustic sail ensures ease of access for maintaining and inspecting the unit (VDI 6022).

Figure 3: Undoing the nuts (M8).

Opening the acoustic sail

(Applies only to the INDUSAIL SONIC plus)

Overhead hazard!
A risk of personal injury and damage to equipment directly below the acoustic 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 acoustic 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 acoustic sail. To do this, remove the side cover and undo the M8 nuts (optionally with an eccentric lever with inside thread). The acoustic 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 acoustic 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 dismounting 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.

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.

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.

Danger due to electric current! Indicator of a risk of electric shock, 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.

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.

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.

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

Wear a safety helmet.

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.

Safety instructions

Please read the following operating instructions carefully before commissioning the INDUSAIL SONIC! 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 SONIC plus and INDUSAIL SONIC 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 SONIC 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" (PART II-3). 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 SONIC 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.

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.

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

Relevant EC directives and regulations:

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)

Applicable harmonised standards, in particular:

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

Other national standards, guidelines and technical specifications:

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.

Kiefer Klimatechnik GmbH
Heilbronner Straße 380-388
70469 Stuttgart

Telephone +49 (0)711 / 81 09-0
Email: info@kieferklima.de
www.kieferklima.de/en

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