



# Installation, Mounting and Maintenance

## DISA-360



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## Installation, Mounting and Maintenance DISA-360

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## Installation, Mounting and Maintenance DISA-360

### Safety instructions

Prior to installation and commissioning of this device, please read completely through this manual. Please observe in particular the regulations and operating instructions containing the hazard symbols and safety signs. Non-observance can result both in damage to the device and personal injuries. If, after reading through the manual, you have further questions, please contact the manufacturer or the local sales office.

### General information

- The inspection, installation, hydraulic connection and commissioning of the device must be carried out by qualified skilled personnel only in compliance with the current regulations.
- Electric and hydraulic connections and their correct functioning are the responsibility of the installer.
- Do not change any control or safety elements without prior approval by the manufacturer or the local sales office.

SCHAKO shall not give any warranty for damage resulting from:

- Improper use caused by ignoring the instructions given in this manual
- Non-observance of the operating conditions of the device.
- Installation and maintenance by personnel without proper qualification.
- Improper use of the device or operation under conditions not conforming to the manual.
- Use of spare parts that are not original spare parts.

### Warranty

The device warranty will be for two years starting from the handover date and shall apply to all production faults. Electric components are excluded from the device warranty. However, they are covered by the corresponding warranty of the relevant manufacturer

Also excluded from the warranty is damage to the device unit caused by components that are not part of the device itself.

The warranty only covers the return and replacement of defective materials.

### Recycling



It is recommended recycling the components of the device at the end of the device service life as completely as possible or use them for a different purpose.

Components that cannot be recycled must be properly disposed of by an authorized disposal company in accordance with current legal regulations.



Hazard warning



Important information



Safety information



Recycling



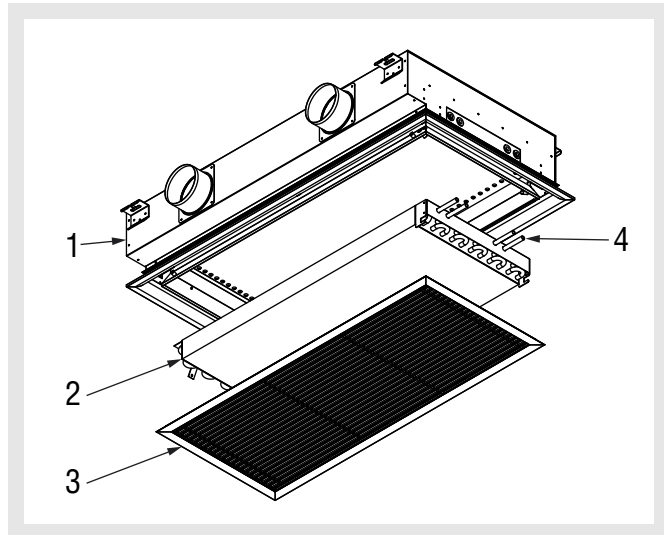
It is recommended keeping this manual at a safe location after installation and use it for future maintenance activities.

## Installation, Mounting and Maintenance DISA-360

### General information

#### Identification of the delivered model

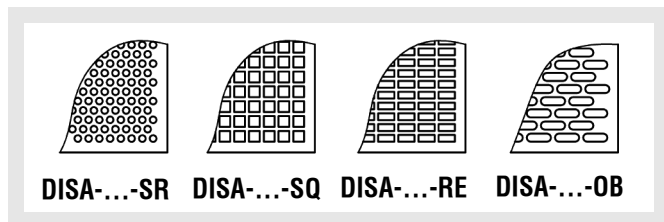
The ceiling induction diffuser type DISA-360 is available in four different nozzle configurations: **B, C, D** and **E**. The entire series is available in the following nominal lengths: **600** (592, 597, 617, 622 mm) and **1200** (1192, 1197, 1242, 1247 mm).



**Housing (1):** Galvanised sheet steel with 1 or 2 connection pipes DN 98 and 123 mm (standard). Connection pipe position horizontal (-H) or vertical (-V).

**Register (2):** 2-pipe system (cooling or heating) or optionally 4-pipe system (cooling and heating) The registers consist of copper pipes 12 mm in thickness, aluminium ribs and a steel frame.

**Grille (3):** Possible designs: perforated sheet grille made of galvanised sheet steel (perforated sheet grille models: **-SR, -SQ, -RE** and **-OB**) made of extruded aluminium profile (**-PA**). Both painted to RAL 9010 (white, standard).



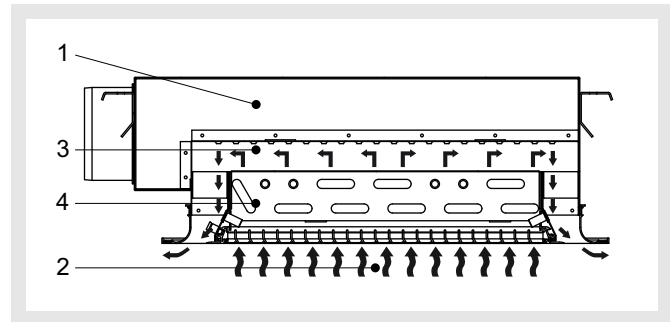
**Hydraulic connections (4):** Copper pipes  $\varnothing$  12 mm

### Function

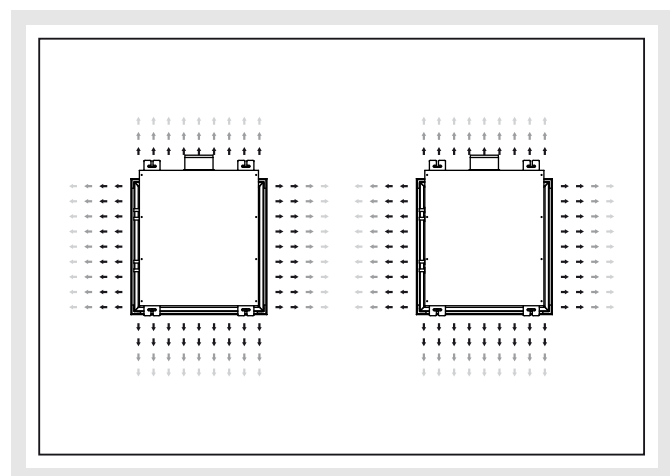
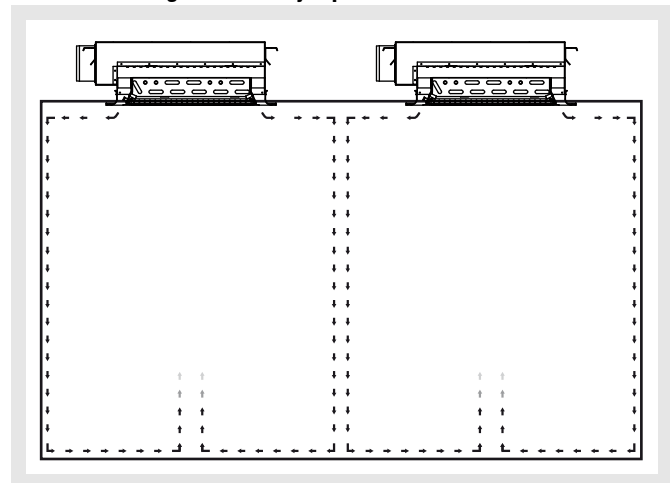
The primary air (1) supplied from the plenum box induces secondary air in the room (2), which is cooled or heated via the register (4).

The combined (3) primary (external) and secondary air (room air) flows are supplied to the room at low velocity via 4 linear supply air slots.

#### Schematic diagram of the mode of operation



#### Schematic diagram of the jet path



## Installation, Mounting and Maintenance DISA-360

### Installation and commissioning

#### Operating conditions

Prior to installation or commissioning of the device, the following operating conditions must be observed:

- Coolant or heating fluid: water or glycols (ethylene or propylene) at a concentration below 60%.
- Water inlet temperature: above the dew point up to 80°C (Please note that some connectors do not work at water temperatures above 65°C)
- Air inlet temperature: from 2 to 45°C
- Max. operating pressure: 8 bar / 125°C.







To prevent deposits and corrosion, the quality of the water for filling the registers must comply with regulations VDI 2035 and DIN 50930.

#### Material reception

Upon reception of the materials, the components must be carefully checked, in order to guarantee that no transport damage has taken place. Moreover, the dimensions, composition and number of the identification sticker must be checked as to whether they are as ordered.

#### Identification sticker:

<b>CE</b>	<b>SCHAKO</b> KLIMA-LUFT
Model / Modelo / Modell <b>DISA-360-H-OL-SR-B-592-592-WS1-H-AS1-123</b>	
Order nr. / Nº Pedido / Auftragsnr:	2198/09
Date / Fecha / Datum:	22/10/2013
Reference / Referencia / Referenz:	Sala 1 Hospital Clínico
Comments / Observaciones / Bemerkungen:	
 <b>Read manual of instructions</b> / Lea el manual de instrucciones / Betriebs- und Wartungsvorschriften beachten.	SCHAKO Iberia, S.L. - Pol. Ind. Rio Gallego, OB nave 3 - E-49040 San Mateo de Gallego.
 <b>Do not drill the machine</b> / Maschine nicht durchbohren / No taladrar la máquina	
 <b>Special attention in the connection nuts-coil</b> / Besondere Vorsicht an der Registerverschraubung/ Especial cuidado en la conexión tuercas-batería .	
 <b>Recycle or arrange the residues according to the current rules</b> / Recicle o gestione los residuos según la normativa vigente. Bitte, entsprechend der gültigen Gesetzgebung recyceln.	

- **H:** 2-pipe system
- **OL:** without air deflection blades
- **SR:** Foldable perforated sheet, perforation Ø 6 mm
- **B:** Nozzle configuration -B-
- **592:** total width -592 mm-
- **592:** total length -592 mm-
- **WS1:** Water connection -left-
- **H:** Connection -horizontal-
- **AS1:** Number of connecting pieces - -1 connection pipe arranged
- **123:** Diameter of the connection pipes -123 mm -

To prevent possible damage during transport, the devices will be delivered ex works on pallets (that correspond to the particular weight and dimensions) wrapped with tapes and transparent plastic film. It is recommended leaving this protection in place until the device is commissioned. The openings of the pipes should be closed with dust caps to avoid dust and entry of dirt.

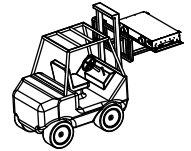


Should manufacture-related damage be detected on the device, please contact your local sales office prior to installation.

#### Transport, lifting and handling

Transport and handling of the unit shall take place in the position in which the unit is to be built in later on, unless expressly stated otherwise on the unit.

Transport, unloading and lifting of the unit shall take place with the necessary care and using tools that are appropriate for the weight and dimensions.



NL	600	1200
Weights <sup>(1)</sup> (kg)	14,5	28

<sup>(1)</sup> Standard unit: housing + slot + grille and heat exchanger (empty)



The unit shall only be held in position or moved by holding on to the housing. The weight must not rest on the water connections.



SCHAKO cannot be held liable for damage to the unit caused by improper handling or handling not mentioned here, loading or unloading.

#### Storage

If the device is not installed immediately after its reception, it must be stored according to the following instructions:

- The device must be stored at a dry, clean, safe location where no damage to the device can occur, i.e., outside corrosive atmospheric influences.
- Leave the protections attached ex works (film, tapes, pallets, etc.) on the device, unless they have already been removed beforehand.
- Cover the device with tarpaulins, in order to protect it from dust, moisture and extreme temperatures.
- Entries, openings and pipes must be hermetically sealed with dust caps.

## Installation, Mounting and Maintenance DISA-360

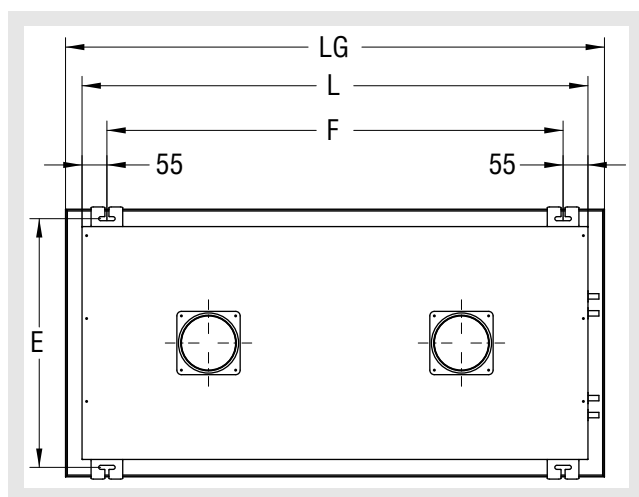
### Installation

The ceiling induction diffuser type DISA-360 is particularly suitable for horizontal installation in low false ceiling heights. The devices must not be installed in places with extreme moisture (e.g. laundries or swimming pools), aggressive media, with high dust formation, outdoors or in places subject to explosion hazards. For correct installation, the following instructions must be followed:

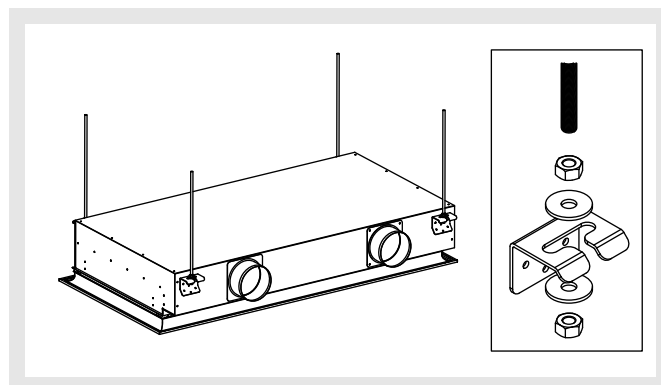
- Make sure that places that are intended as openings for air admission and air discharge are free of pipes, electric cables, crossbeams, stands, etc.
- Install the unit at a site that has good air quality.
- Make sure that wall and ceiling correspond to the weight of the device and also allow correct mounting of the fastening elements in the ceiling.
- The installation site must have sufficient space and the necessary resources for carrying out mounting and maintenance activities of all device components. Make sure that the valves are easily accessible.
- The hydraulic pipes should be attached above the device.
- If the hydraulic pipework is lower than the input of the device, a ventilation opening must be provided on site.

### Mounting

The induction diffusers are mounted to load-bearing ceiling constructions using threaded bars, nuts and M6 or M8 washers. Use only fastening material approved by the building supervisory authorities.



		BxLG							
		592	592	597	597	617	617	622	622
		X	X	X	X	X	X	X	X
		592	1192	597	1197	617	1242	622	1247
E	-H	625		630		625		630	
	-V	550		555		550		555	
F		409	1009	414	1014	409	1034	414	1039



During mounting the end of the register pipes must be sealed to protect them from dust and dirt.



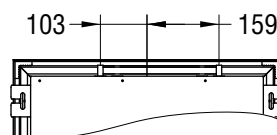
For the installation of the device, use adequate tools, devices and materials and observe the safety regulations and other current regulations.



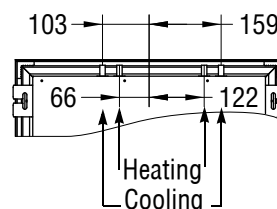
SCHAKO cannot be held liable for damage resulting from faulty installation or the use of unsuitable fastening devices.

### Hydraulic connections

DISA-360-H (2-pipe)



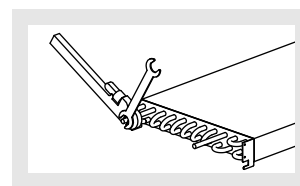
DISA-3604-pipe (-HT)



				Water capacity (litres)	
NL	DISA-360-HT		DISA-360-H		
	Heating	Cooling			
600	0,35	0,88	1,17		
1200	0,79	2,1	2,8		

The connection of the hydraulic connections can be done by soldering, pressing (in connection with supporting sleeves) or by means of flexible hoses resistant to oxygen diffusion and push-fit systems. The use of flexible hoses is subject to the manufacturer's specification.

When making the hydraulic connections, you have to use suitable tools to avoid excessive tightening or twisting of the register connections.



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In order to achieve a uniform cooling capacity, the ceiling induction diffusers type DISA-360 should be connected to the cold water distribution system in parallel.

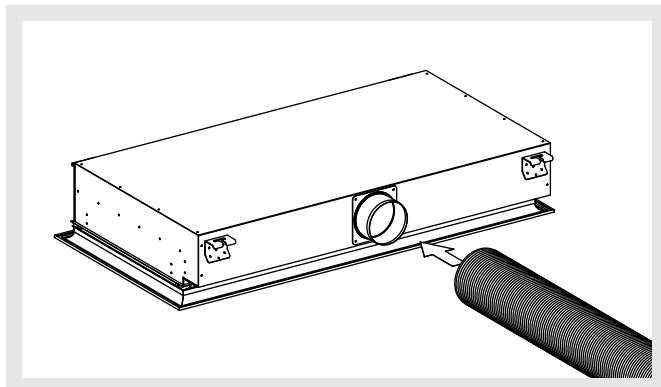
When charging the register, make sure by means of on-site ventilation devices that no air remains in the hydraulic circuit. If the unit is to be installed at a location having temperatures below zero degrees, glycol must be admixed to the coolant in a suitable ratio, to ensure that the freezing point of this liquid always stays below the minimum temperature of the operating site. Please note that the use of an antifreeze necessarily results in a loss in performance of the register.



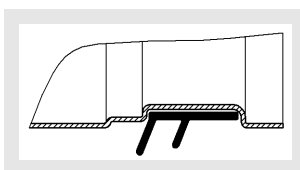
The ceiling induction diffusers type DISA-360 are induction devices for "dry cooling". To avoid condensates, the water inlet temperature should be higher than the dew point.

### Connecting the air ducts

The air ducts are attached by using pipe clamps, fixing lugs or the like.



Optionally, a rubber lip seal can be installed on the connection pipe, to ensure tightness between the device and the pipes.



### Mounting accessories

#### Valves and actuators

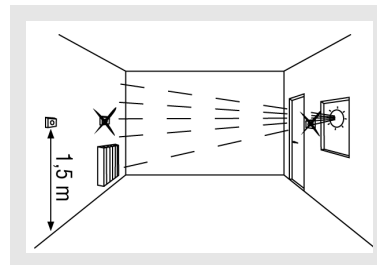
Valves and actuators shall not be installed ex works. During installation the manufacturer's specifications must be observed.

#### Temperature controls

The temperature controls are mounted in accordance with the selected model. This is why the instructions enclosed with each model must be followed. However, in order to achieve optimum measurement by the sensors, the following basic information

should be observed:

- Do not mount the temperature control close to or above a heat source (direct sunlight, lamps, television sets, radiators, etc.), in places with draught air or directly opposite to an air diffuser grille.



- Temperature controls must be mounted at least 1.5 metres above the floor.
- Mounting temperature controls on walls toward the outdoors should be avoided.



Before drilling, make sure that no electric cables are present in the wall where the temperature control is to be mounted. is attached no electric cables are present.

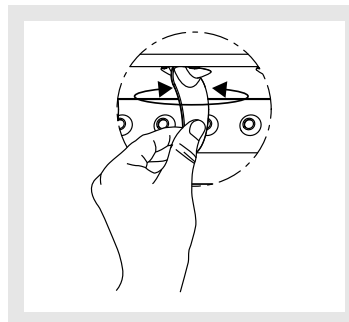
### Condensate monitor

The installation of a condensate monitor depends on the selected model. Please follow the instructions enclosed with each model.



Faulty mounting of the sub-assemblies and of the accessories of the unit can result in a substantial power loss of the unit.

### Adjustment of the air deflection blades



To regulate the air flow, rotate the air deflection blades manually.

With blockwise adjustable blades, 5 blades can be adjusted simultaneously.



The adjusting angle of the air deflection blades must not be more than  $\pm 45^\circ$ , in order to guarantee its function.



At an adjusting angle of the air deflection blades outside the straight air throw of up to  $45^\circ$ , the cooling capacity of the heat exchanger is reduced by up to 5%, and the horizontal throw is reduced.

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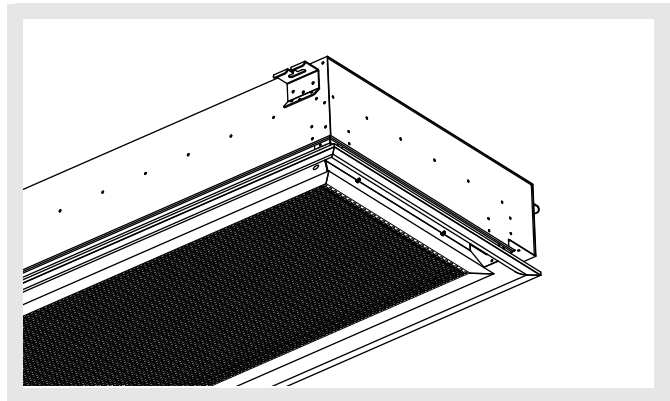
### Checks

Prior to commissioning, the following items must be checked or guaranteed:

- Hydraulic connections were tightened properly and exhibit no leaks.
- Connecting and fastening elements have been sufficiently tightened.
- Adequate access for carrying out the maintenance activities has been provided.
- Use the on-site ventilation devices to ensure that no air remains in the register and the water circuit.

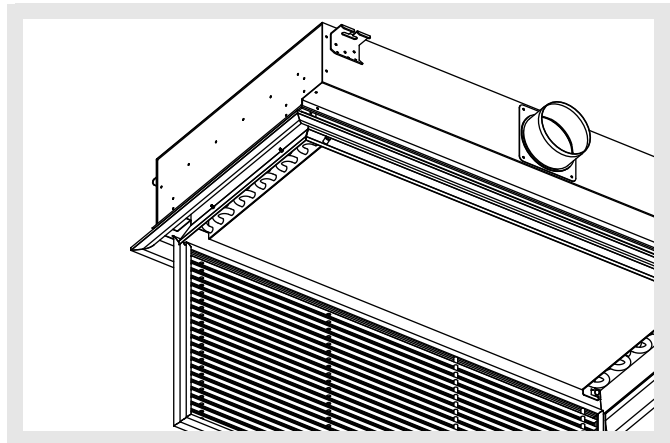


After these items have been taken care of, the correct fastening of the device must be



During commissioning itself, the following items must be guaranteed:

- The connecting and fastening elements have been sufficiently tightened.
- In heating mode, the temperature of the discharged supply air is not above 40°C.

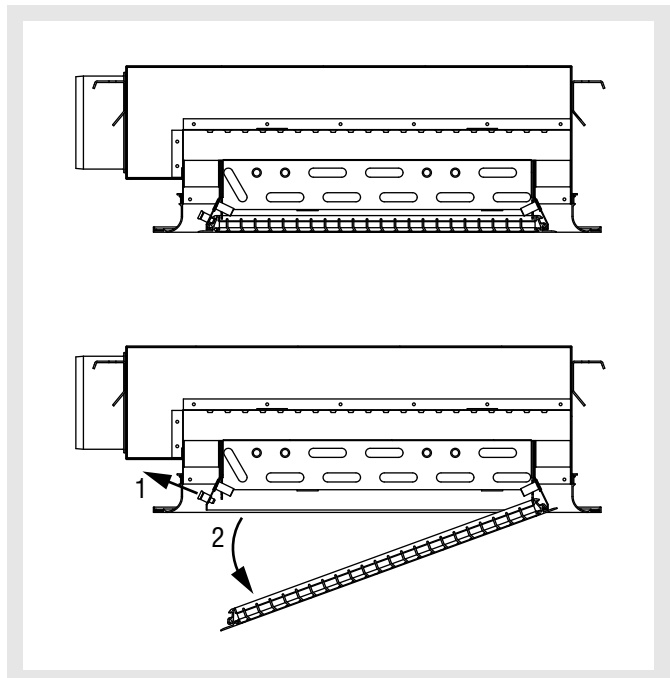


### Maintenance

For reasons of safety, the power supply and hydraulic circuit must be disconnected prior to any maintenance activity. If the unit was operated in heating mode, you have to wait until the register has cooled down.



When performing maintenance activities, it is recommended wearing personal protective equipment, in order to avoid cuts and other injuries produced by sharp and pointed parts.



### Folding down of the secondary air grille

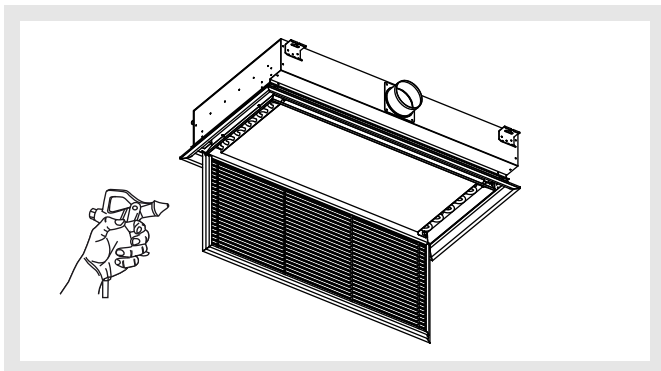
The entire DISA-360 is equipped with a series of safety locks, which allow the grille to be folded down via a rotating mechanism on one of the profiles for safe execution of maintenance. The secondary air grille is folded down as described below:

- Open the safety locks.
- Fold the grille down.
- This makes the grille and the registers freely accessible for cleaning purposes.
- After having carried out the maintenance work, the grille is placed again in its original work position. Make sure that the locks are engaged.

Clean them with an industrial vacuum cleaner or steam cleaner or by spraying it with a non-aggressive cleaner.



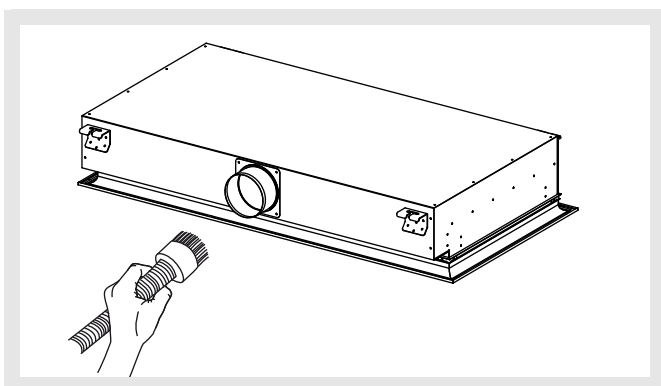
## Installation, Mounting and Maintenance DISA-360



- ⚠ To avoid accidental rotation or folding down of the grille, please check that the locks are properly closed.
- ⚠ For reasons of safety, the power supply and hydraulic circuit must be disconnected prior to any maintenance activity.

### Air ducts and plenum box

Clean them with an industrial vacuum cleaner or steam cleaner or by spraying it with a non-aggressive cleaner.



### Registers

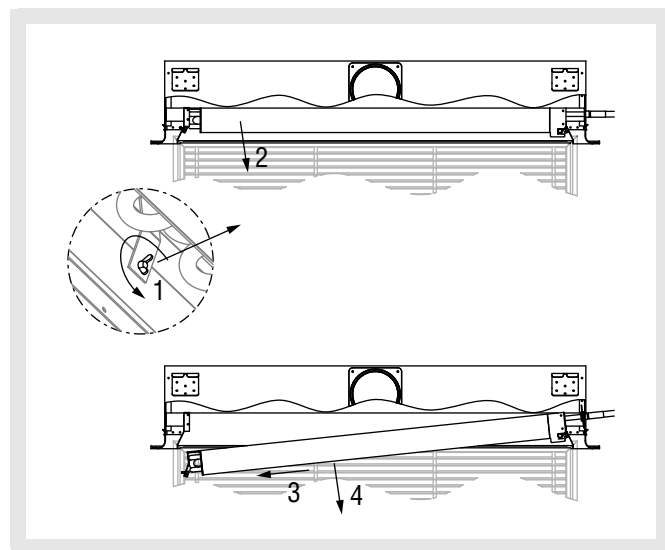
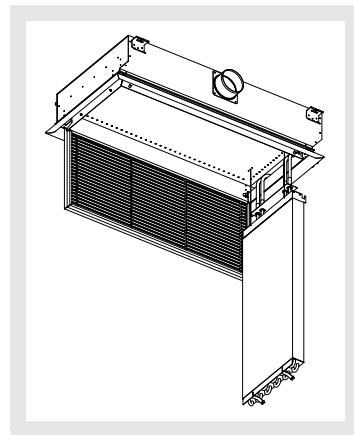
To guarantee the technical characteristics of the device, the registers and heat exchangers must be kept in good clean condition. To ensure this, the following maintenance activities must be carried out:

- The secondary air grille is folded down as described above:
- If the register is dirty, clean it by spraying it with water or compressed air or by evacuation.
- Please do not use any scouring agents for cleaning since these materials may impair or damage the DISA-360 (galvanised steel, aluminium and copper) and the surface coatings (paints and anodised surfaces).
- If there are larger differences in distance between the ribs, they must be aligned.

- Ventilate the hydraulic circuits of the register. In doing so, watch out for possible leaks of the hydraulic system.

If condensates are detected, interrupt the hydraulic circuit and find the possible cause of the problem.

In connection with sufficiently long connecting hoses, in order to facilitate the maintenance activities, the register can be completely removed. The register can be completely removed without requiring tools. Please follow the sequence shown in the following figures. After the folding down, the register remains suspended from the housing secured by two safety ropes.



- ⚠ When decommissioning the unit or shutting it down for a longer period in winter, the water must be drained from the unit, in order to avoid damage to the register due to the formation of ice. If you want to use antifreezes, you must first determine the freezing point.
- ⚠ After recharging the register, the installer has to make sure by means of on-site ventilation devices that no air remains in the hydraulic circuit.
- ⚠ While the register is hanging on the housing, it must not be subjected to any vigorous movements or additional stresses.

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### Checking the primary volumetric flow

The supplied primary volumetric flow can be simply checked by checking the static pressure with a Pa meter and the measuring tube available from us as accessory.

To this end, one end of the measuring tube fitted with a rubber cap is pressed against the air outlet of one of the nozzles at the primary air plenum box (see drawing) and the other end is connected to the hose connection of a Pa meter.

The values read on the meter and the following formula can be used to determine the volumetric flow:

$$V = K \sqrt{P_s}$$

V [l/s] = Primary air flow

Ps [Pa] = Static pressure

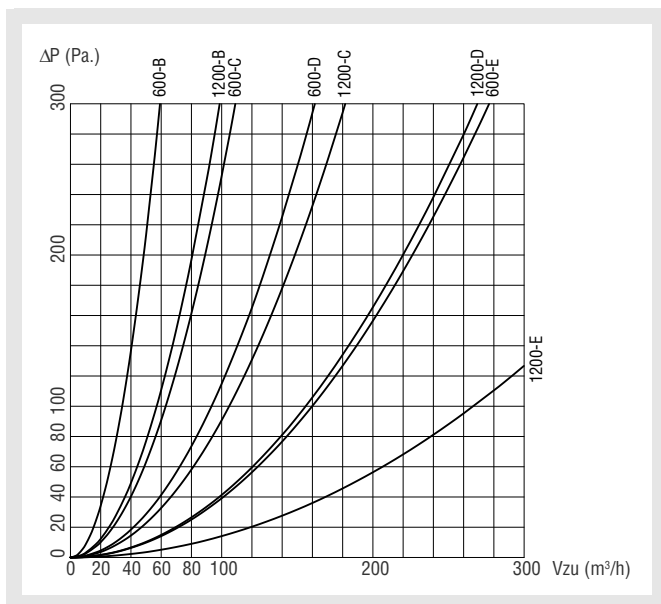
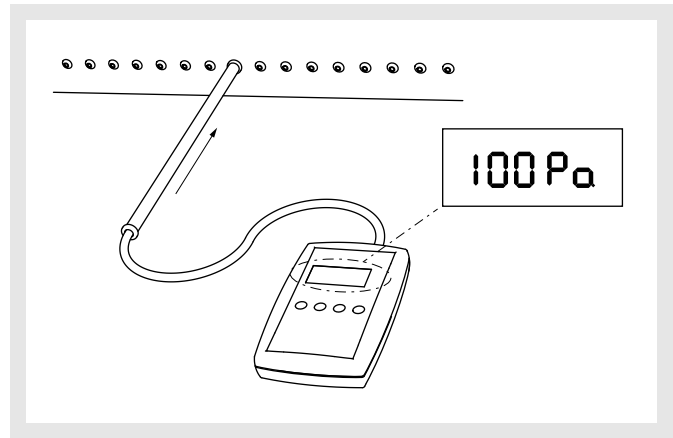
The K value is taken from the following table:

Nozzle configuration	NL (mm)	
	600	1200
<b>B</b>	0,95	1,58
<b>C</b>	1,75	2,91
<b>D</b>	2,59	4,32
<b>E</b>	4,44	7,40

Air density:  $\rho = 1.2 \text{ kg/m}^3$



The Pa meter is not included in the delivery.



$\Delta P$  [Pa] = Pressure loss /  $V_{ZU}$  [ $\text{m}^3/\text{h}$ ] = Supply air volume

## Installation, Mounting and Maintenance DISA-360

### Troubleshooting

Problem	Possible cause	Solution
The unit does not cool or heat sufficiently	Primary air volume not present or too low	Check primary air volume
	Air inlet and outlet of the inner unit clogged	Remove foreign material and clean the unit
	Air in the hydraulic system	Ventilation of the hydraulic system Please inform the installer
	Installed unfavourable or malfunctions at the temperature control or sensor	Install thermostat in a different place
	Clogging of the cooling/heating register	Clean the register in accordance with the maintenance instructions
The unit is losing water	Condensate in the register	Modify the register water inlet temperature
	The water circuit of the register is leaking	Please inform the installer
	Register damaged	
	Incorrect valve or hydraulic connection	
The unit is working with too much noise	The air intake or air blow openings or the lines are clogged.	Remove foreign material and clean the unit
	Loose screws and fastening elements	Tighten screws
	Foreign material or dirt on register surface	Remove foreign material by careful brushing
	Primary air volume too large for selected configuration.	Check primary air volume