AIR TECH SYSTEMS

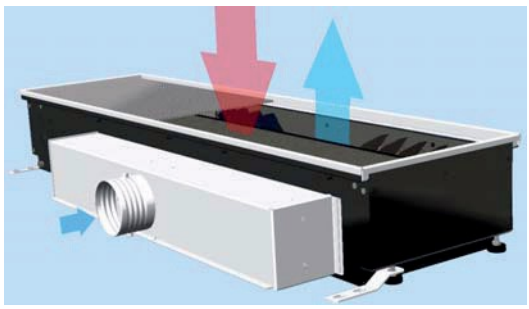
Technical brochure

LTG air-water systems

LTG Induction

HFB / HFBsf induction units (SmartFlow system)

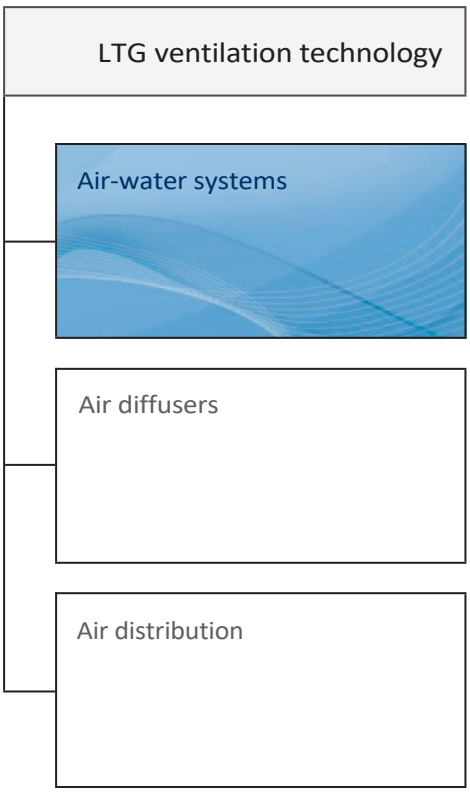
smart flow



Installation in raised floors

www.LTG.de

Technical brochure - HFB induction units, installation in raised floors



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Notes

The dimensions in this technical brochure are given in mm.

The general tolerances in accordance with DIN ISO 2768-vl apply to the dimensions specified in this technical brochure. The special tolerances specified on the drawing apply to the air outlet grille.

Straightness and torsion tolerances for aluminium extrusions press profiles - according to DIN EN 12020-2.

The surface finish was designed for use in buildings - indoor climate in accordance with DIN 1946 Part 2. Other requirements on request.

The current tender texts are available in Word format from your local branch or at www.LTG.de.

LTG planner tools - we support you!

Visit our homepage www.LTG.de and find helpful tools such as design programmes, flow videos and all product information!

LTG Induction

Induction devices

Induction technology - convenient and efficient

Since the first patent application for an induction system was filed in 1915 by company founder Dr Albert Klein, LTG's induction units have been continuously developed further.

The induction principle

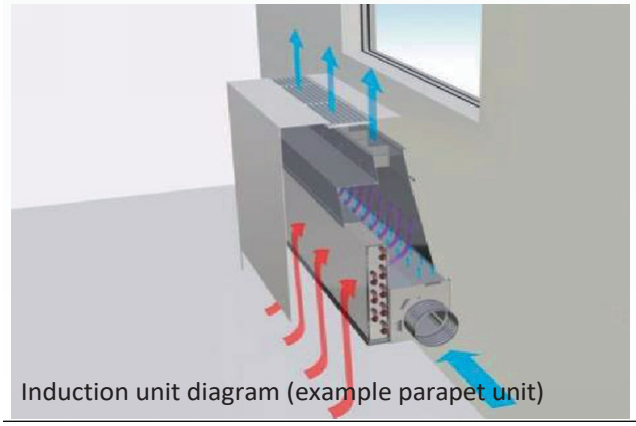
Air flowing through a nozzle forms a free jet. This tears the surrounding layer of air along with it at its edges and thus increases the size of the jet. the flowing air volume. This so-called
With induction appliances, "induction" takes place inside the appliance. Thanks to a special design, room air (secondary air) is entrained by a heat exchanger and cooled or heated in the process. Together with the fresh air (primary air), the supply air then flows back into the room and thus ensures a comfortable climate.

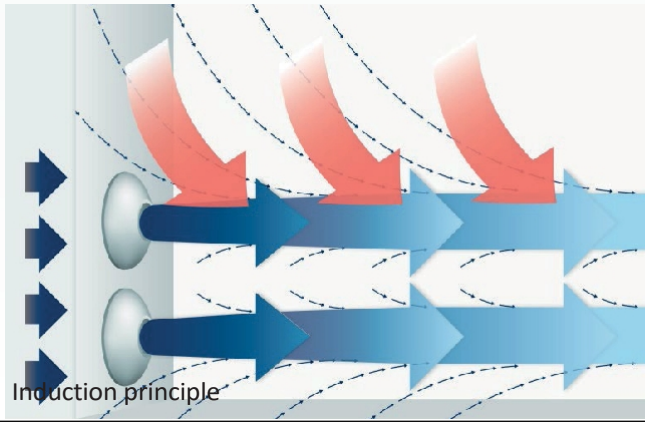
The latest generation of LTG induction units are energy-efficient and can be operated on demand thanks to LTG SmartFlow technology.

Advantages

- Whisper quiet
- No additional fan required in the appliance
- Sustainable: durable and low-maintenance
- Low energy costs / variable ventilation
- High cooling and heating capacities
- Cooling / heating and fresh air supply in one Device

The evolution of induction


Induction unit diagram (example parapet unit)


Induction principle

Technical brochure - HFB induction units, installation in raised floors
Room air flow

The HFB induction unit blows the air upwards from the floor grille parallel to the façade. At a distance of one metre from the façade, a mixing zone is created in which the supply air temperatures and air velocities are quickly reduced and mixed with the room air. At the same time, a thermal curtain is created which, for example, shields window glass surfaces from external loads. After the mixing zone, a large layer of supply air is created, which is effectively distributed throughout the room while maintaining a high level of thermal comfort.

In cooling mode, the supply air flow after the mixing zone moves through the room as displacement ventilation.

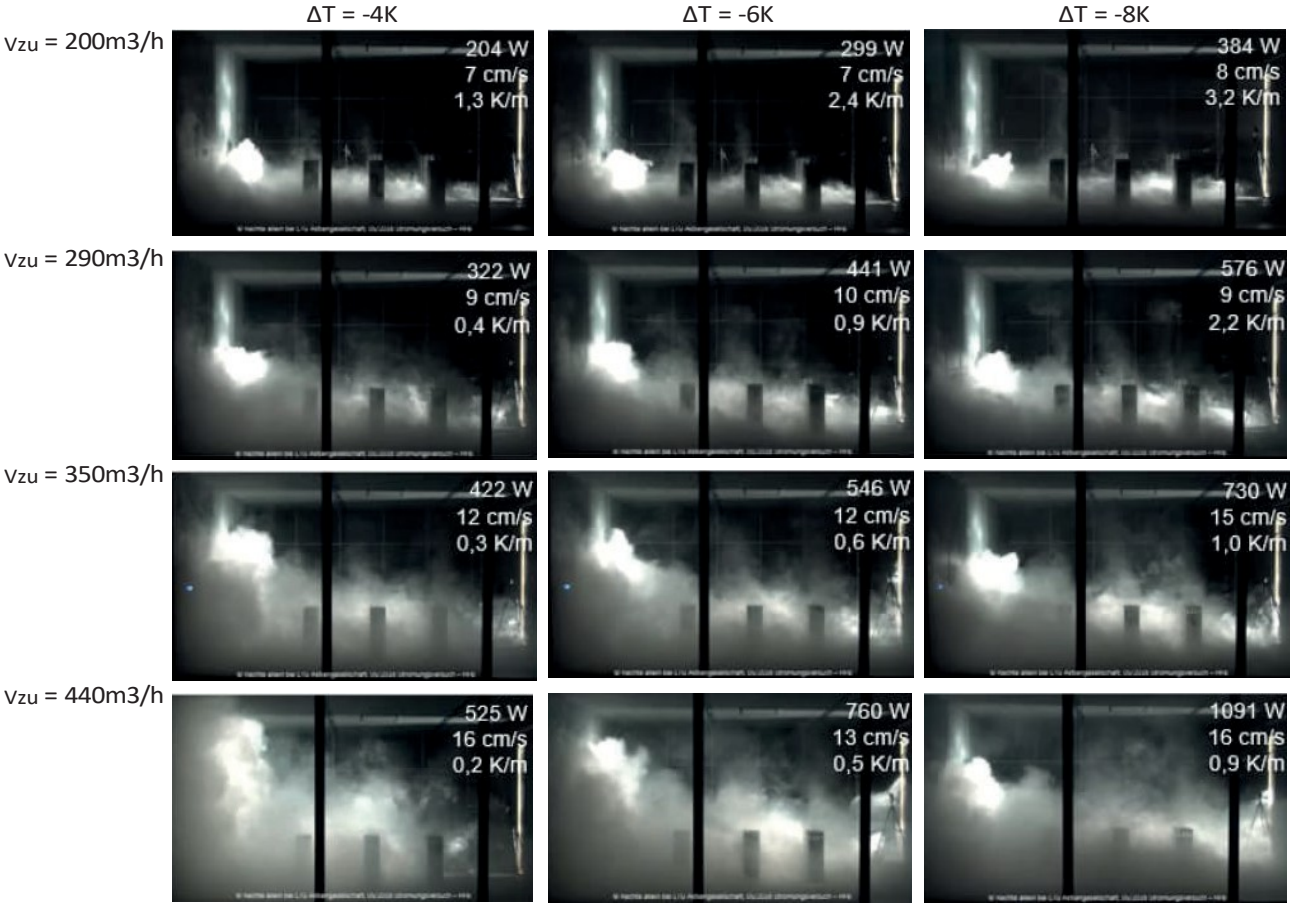
This effect can be further enhanced with the optional mixed displacement air fan (MQ). This can also be adapted to individual room requirements on site at a later date.

Designs

Two-wire system
The induction appliance has only one heat exchanger, through which cold water flows in the cooling mode and hot water in the heating mode. It can therefore be either heated or cooled in a water circuit.

Four-wire system
The induction appliance has two separate water systems, one of which is only used for heating and the other only for cooling. Hot and cold water therefore always remain separate. The four-pipe system can meet all requirements for fluctuating loads and small control zones.

Valve control (water-side control)
The heating or cooling capacity emitted by the heat exchanger is regulated by changing the water flow.



Room air flow of an HFB 800 with different air volumes and supply air temperatures in cooling mode (60 s)

Technical brochure - HFB induction units, installation in raised floors
Type HFB-0

Device view

With aluminium linear grille

Use

Energy-efficient ventilation, heating and/or cooling of rooms in buildings with induction systems, e.g. office buildings.

Comfortable air conditioning also for occupied areas (outdoor zones) with different and time-varying room loads.

Installation, placement

Installation in raised floors with a recommended clear floor height of 191...200 mm.

As all components are below floor level, the HFB induction units can also be used in rooms with fully glazed facades.

Functionality

The primary air, the treated outside air from the mechanical ventilation system, is fed through a removable primary air box.

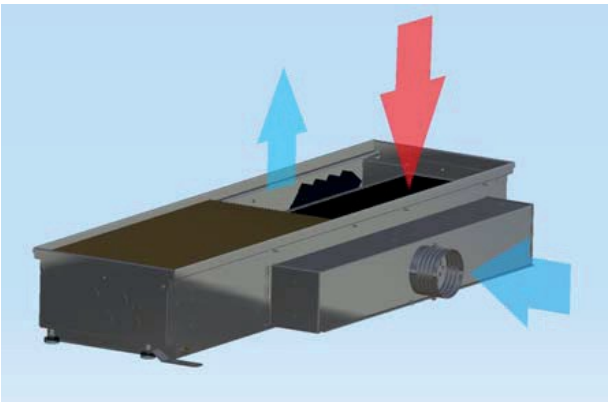
The primary air jets generated in this way induce a secondary air flow that is several times higher, consisting of room air that has previously been drawn in via a flat heat exchanger.

After a 90° deflection, the resulting mixed air flow is fed vertically upwards into the room via a floor grille close to the facade.

This supply air flow mixes there in summer with the warm room air in front of the façade and in winter with the falling cold air in front of the window (mixed flow close to the façade).

In cooling mode, the supply air flow after the mixing zone moves through the room as displacement ventilation.

The appliance can be used for room heating when the AHU can be operated as an underfloor convector.



Air duct

Advantages

- Low energy consumption
- Low air delivery costs due to operation at low inlet pressure
- Large-surface heat exchanger enables high self-convection performance when heating

- High comfort
- High level of comfort in cooling mode thanks to combined mixed displacement ventilation
- Good shielding of floor-to-ceiling glass surfaces in the Winter

- Acoustics
- Very low sound power level
- No telephone sound transmission via raised floor into the neighbouring room

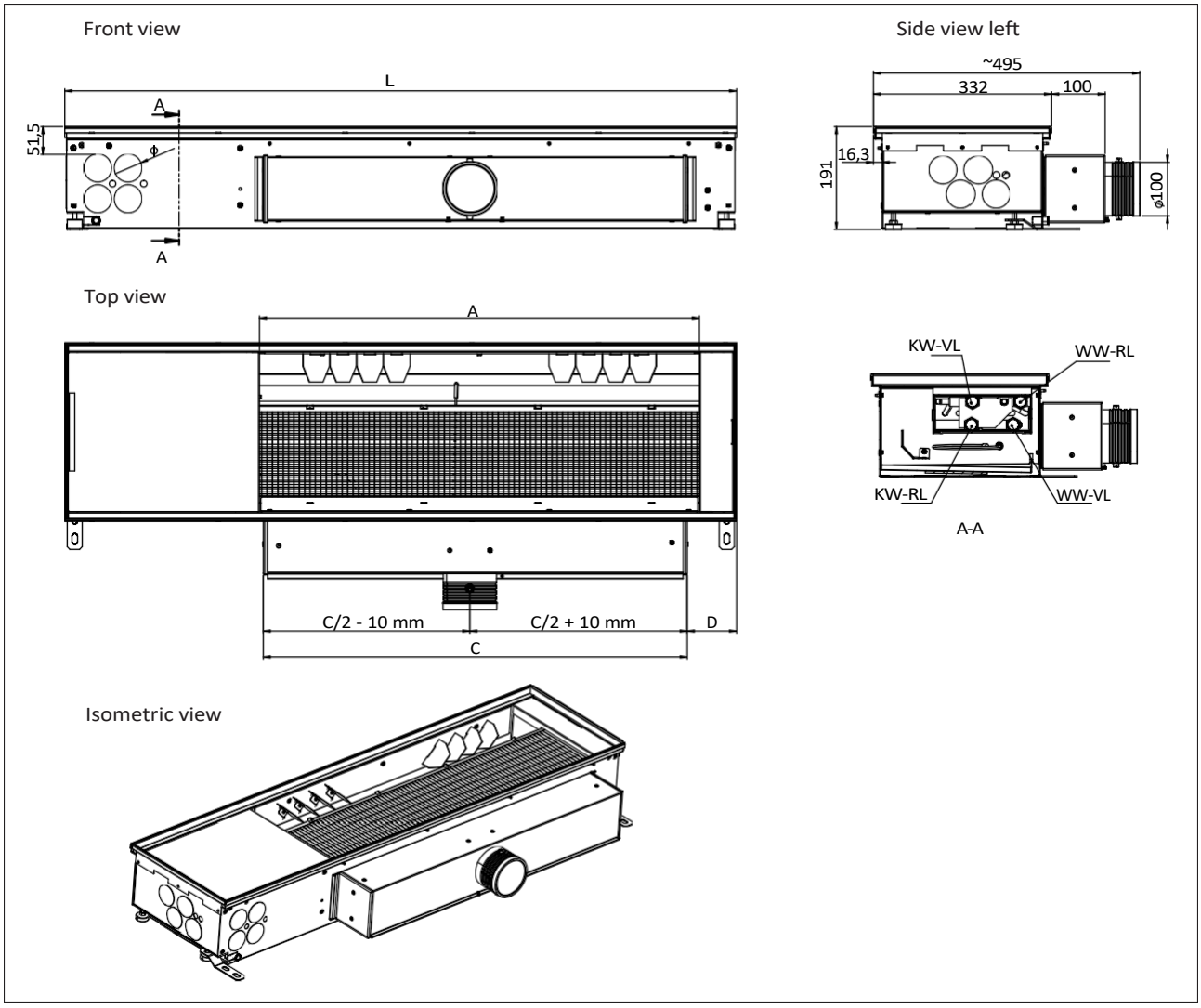
- Flexible use
- The modular design allows for a step-by-step, user-dependent conversion from a pure floor convector for heating via mechanical ventilation to a 4-pipe induction unit including cooling.

- Maintenance
- Easy maintenance and cleaning thanks to good accessibility and avoidance of moving parts

- Assembly
- Separate installation of air conditioning unit, façade and raised floor
- Fast, flexible retrofitting and conversion through modular structure

Technical brochure - HFB induction units, installation in raised floors
Type HFB-0

Dimensions



Size (BG)	Total length L [mm]	Blow-out width A [mm]	Length of primary air box C [mm]	Distance air box D [mm]	Water content of heat exchanger 4-wire Cooling circuit [l]	4-wire Heating circuit [l]	2-wire [l]
630	1020	590	590	85	0,6	0,16	0,8
800	1250	820	820	92	0,9	0,21	1,1
1000	1450	1020	1020	92	1,1	0,26	1,4

Technical brochure - HFB induction units, installation in raised floors
Type HFB-0

Technical data size 630

Nozzle equipped.	V_P [m³/h]	Δp [Pa]	LwA [dB(A)]	LA18 [dB(A)]	qPk [W/k]	qSk [W/k]	qKges [W/k]	Q_{total} 1) [W]	Q_{SK} 1) [W]	Q_{Kges} 1) [W]	qPh [W/k]	qSh [W/k]	qh total [W/k]	Q_{EK} 2) [W]
S	37	150	30	23	-12,5	-22,5	-35	-675	-432	-532	10	19,7	29,7	126
	47	250	37	31	-16,3	-29,5	-45,8	-854	-555	-685	15	23,2	38,2	
M	46	150	32	25	-15	-25,7	-40,7	-761	-490	-610	15	20,1	35,1	
	58	250	39	32	-20	-33,1	-53,1	-943	-617	-777	20	23,6	43,6	
L	57	150	33	27	-18,8	-27,1	-45,9	-798	-515	-665	20	20,9	40,9	
	72	250	40	34	-23,8	-34,1	-57,9	-965	-633	-823	25	24,2	49,2	
XL	66	150	34	28	-22,5	-27,4	-49,9	-802	-518	-698	20	21,9	41,9	
	84	250	41	35	-28,8	-34,7	-63,5	-975	-641	-871	30	25,1	55,1	

w_{ok} = 200 [kg/h] w_{oh} = 100 [kg/h] Δp_k = 22 [kPa] Δp_h = 2 [kPa]

Technical data size 800

Nozzle equipped.	V_P [m³/h]	Δp [Pa]	LwA [dB(A)]	LA18 [dB(A)]	qPk [W/k]	qSk [W/k]	qKges [W/k]	Q_{total} 1) [W]	Q_{SK} 1) [W]	Q_{Kges} 1) [W]	qPh [W/k]	qSh [W/k]	qh total [W/k]	Q_{EK} 2) [W]
S	51	150	31	25	-39,4	-45,5	-84,9	-945	-604	-744	15	26,0	41,0	175
	64	250	38	32	-51,3	-58	-109,3	-1188	-772	-942	20	30,7	50,7	
M	64	150	33	27	-45,3	-53,2	-98,5	-1071	-690	-860	20	26,6	46,6	
	82	250	40	34	-57,9	-68,3	-126,2	-1315	-861	-1081	25	31,3	56,3	
L	79	150	35	28	-47,6	-59,1	-106,7	-1118	-723	-933	25	27,6	52,6	
	101	250	42	35	-59,4	-74,5	-133,9	-1340	-880	-1150	35	32,2	67,2	
XL	92	150	36	29	-48	-63,4	-111,4	-1124	-727	-977	30	29,0	59,0	
	118	250	43	36	-60,4	-79,3	-139,7	-1357	-893	-1203	40	33,6	73,6	

w_{ok} = 200 [kg/h] w_{oh} = 100 [kg/h] Δp_k = 28 [kPa] Δp_h = 3 [kPa]

1) 6°C water supply temperature
18°C primary air temperature
and
26°C intake temperature before heat exchanger
(may differ from room temperature)
50% relative humidity

2) 55°C Water supply temperature
20°C Intake temperature before heat exchanger,
(may deviate from room temperature) Nominal water volume

Note: All specifications apply to appliances without filters.

V_p - Primary air volume flow (±10 %)
Δp - Static pressure at the primary air connection
L_{WA} - Sound power level ±3 dB(A) (with plastic nozzles)
L_{A18} - Sound pressure level at 18 m² Sabine Room absorption
Q_{Pk} - Primary air cooling capacity Q_{Sk} - Secondary air cooling capacity $Q_{k\,ges}$ - Total cooling capacity
Q_{total} - sensible and latent cooling capacity secondary (via heat exchanger)
Q_{Ph} - Primary air heat output
Q_{Sh} - Secondary air heat output $Q_{h\,ges}$ - Total heat output
w_{ok} - Nominal water volume at cooling capacity w_{oh} - Nominal water volume at heating capacity Q_{Ek} - Intrinsic convection heating capacity
Δp_h - water-side pressure loss heating
Δp_k - water-side pressure loss cooling
q_{Pk} - specific cooling capacity primary air
q_{Sk} - specific cooling capacity secondary air q_{Ph} - specific heating capacity primary air q_{Sh} - specific heating capacity secondary air

Technical brochure - HFB induction units, installation in raised floors
Type HFB-0

Technical data size 1000

Nozzle equipped.	V_P [m³/h]	Δp [Pa]	LwA [dB(A)]	LA18 [dB(A)]	qPk [W/k]	qSk [W/k]	qKges [W/k]	Q_{total} 1) [W]	Q_{SK} 1) [W]	Q_{Kges} 1) [W]	qPh [W/k]	qSh [W/k]	qh total [W/k]	Q_{EK} 2) [W]
S	63	150	32	26	-21,3	-39,2	-60,5	-1177	-753	-923	20	31,3	51,3	218
	80	250	39	33	-26,3	-50,7	-77,0	-1471	-956	-1166	25	37,1	62,1	
M	79	150	34	27	-26,3	-44,9	-71,2	-1330	-856	-1066	25	32,0	57,0	
	101	250	41	35	-33,8	-57,0	-90,8	-1622	1061	-1331	35	37,8	72,8	
L	99	150	36	29	-33,8	-47,3	-81,1	-1388	-897	-1167	35	33,3	68,3	
	127	250	43	36	-42,5	-58,6	-101,1	-1652	-1085	-1425	40	38,9	78,9	
XL	115	150	37	30	-38,8	-47,7	-86,5	-1396	-903	-1213	40	35,1	75,1	
	147	250	44	37	-48,8	-59,6	-108,4	-1675	-1102	-1492	50	40,5	90,5	

w_{ok} = 200 [kg/h] w_{oh} = 100 [kg/h] Δp_k = 33 [kPa] Δp_h = 3 [kPa]

1) 6°C water supply temperature
18°C primary air temperature
and
26°C intake temperature before heat exchanger
(may differ from room temperature)
50% relative humidity

2) 55°C Water supply temperature
20°C Intake temperature before heat exchanger,
(may deviate from room temperature) Nominal
water volume

Note: All specifications apply to appliances without filters.

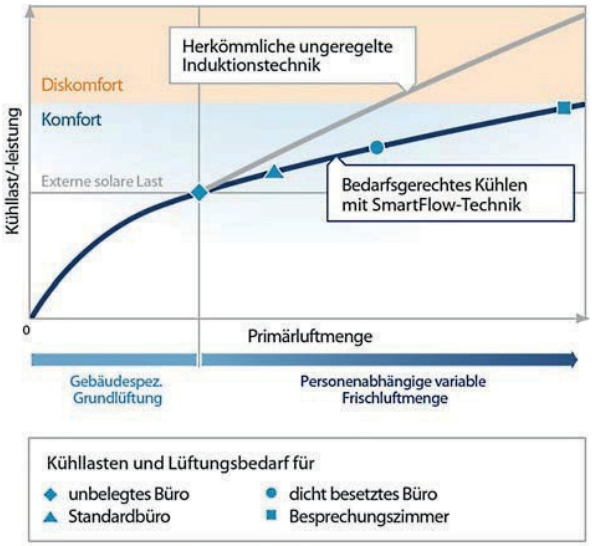
V_p - Primary air volume flow (±10 %)
Δp - Static pressure at the primary air connection
L_{WA} - Sound power level ±3 dB(A) (with plastic nozzles)
L_{A18} - Sound pressure level at 18 m² Sabine Room absorption
Q_{Pk} - Primary air cooling capacity Q_{Sk} - Secondary air cooling capacity $Q_{k\,ges}$ - Total cooling capacity
Q_{total} - sensible and latent cooling capacity secondary (via heat exchanger)
Q_{Ph} - Primary air heat output
Q_{Sh} - Secondary air heat output $Q_{h\,ges}$ - Total heat output
w_{ok} - Nominal water volume at cooling capacity w_{oh} - Nominal water volume at heating capacity Q_{Ek} - Inherent convection heating capacity
Δp_h - water-side pressure loss heating
Δp_k - water-side pressure loss cooling
q_{Pk} - specific cooling capacity primary air
q_{Sk} - specific cooling capacity secondary air q_{Ph} - specific heating capacity primary air q_{Sh} - specific heating capacity secondary air

Technical brochure - HFB induction units, installation in raised floors
Type *HFBsf* SmartFlow

LTG System SmartFlow

Induction technology redefined - customised air-conditioning

The LTG SmartFlow system offers optimum comfort and energy consumption even in changing load situations. The ideal flow pattern is selected depending on the required cooling capacity and fresh air volume by opening air nozzles and regulating chilled water valves. This means that the best possible comfort, acoustics and energy efficiency can be achieved for every load case with one device. Control can be manual (room re-utilisation) or automatic (presence or CO_2 - controlled). In contrast to conventional induction technology, this allows the cooling capacity and fresh air supply to be adapted to the specific requirements.



Comparison of conventional induction technology and SmartFlow technology

With SmartFlow technology, unnecessary ventilation is a thing of the past! The *HFBsf* adapts the amount of fresh air and cooling capacity to the current requirements. This minimises energy costs while maximising comfort. An investment that pays off!

Use

Ventilation, heating and/or cooling of occupied areas (outdoor zones) with different and time-varying room loads.

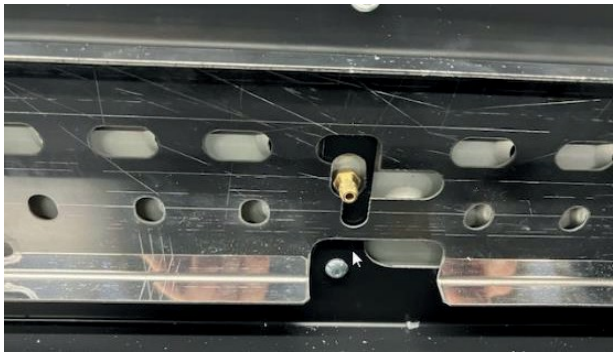
Installation, placement

Installation in raised floors with a recommended clear floor height of 191-200 mm.

As all components are below floor level, the *HFBsf* induction units can also be used in rooms with fully glazed facades.

Functionality

In the Smart Flow version of the HFB unit, the primary air from the central ventilation system is also routed via a removable primary air box.
The difference to the standard unit is that the supply air volume flow can be reduced as required using an integrated SmartFlow damper plate.



SmartFlow slider

Presence or CO_2 sensors can continuously monitor the room parameters. If less supply air is required, the control system moves the SmartFlow damper via a servomotor and adjusts the supply air volume flow in an acoustically neutral manner.

Ideally, a constant inlet pressure is maintained in the duct via a line pressure regulator (e.g. LTG pressure regulator *DREactive* / *DRFactive*). This ensures that the discharge velocity remains constant even under partial load, thus maintaining the induction effect and effective air distribution.

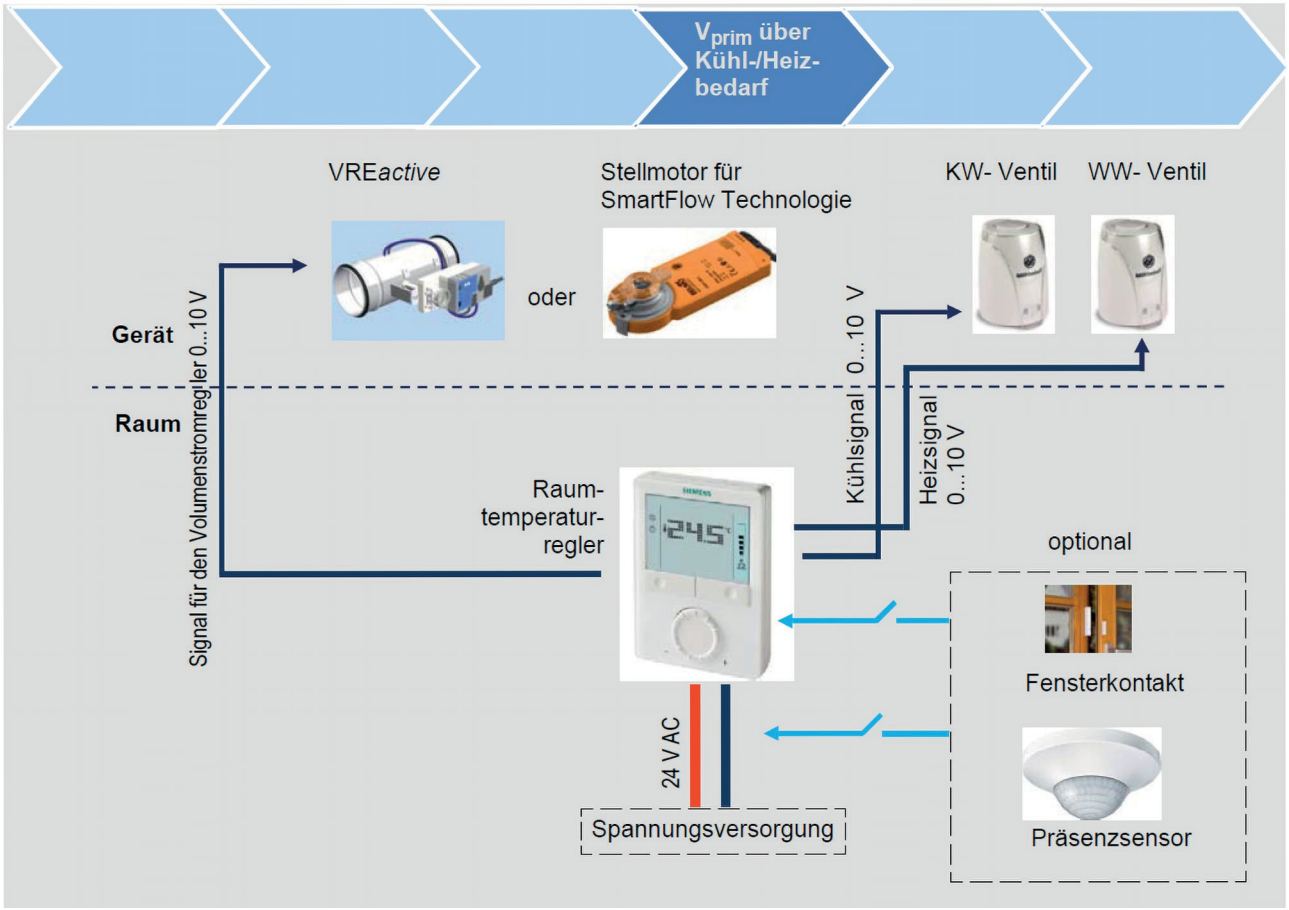
Advantages

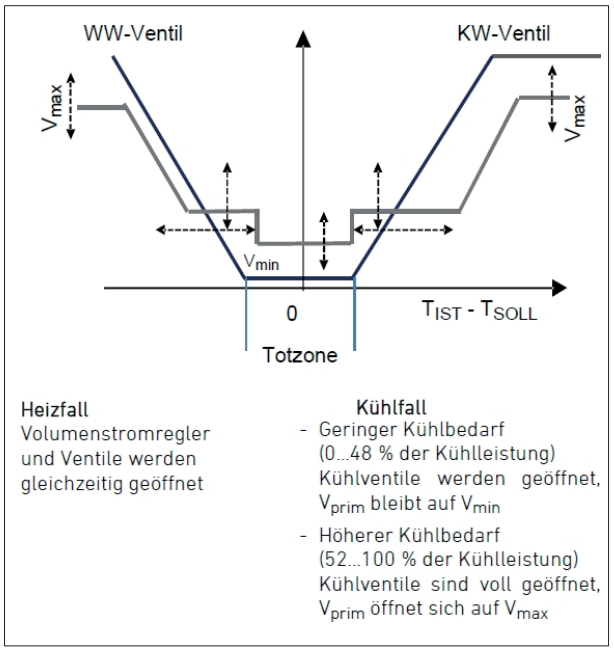
Additional features thanks to SmartFlow technology:

- Energy efficiency
  - Demand-controlled ventilation for all uses; single change of use possible
  - Maximum energy efficiency thanks to low primary pressures
- Thermal comfort
  - Controlled temperature stratification ensures more pleasant indoor climate
  - Users benefit from even temperature distribution and minimised draughts
- Acoustics
  - A reduced volume flow results in even lower noise levels, which is particularly advantageous in offices and living rooms
- Optimised cooling capacity
  - Thanks to the targeted control, the room temperature remains at the desired level even with reduced air movement, while energy consumption is reduced at the same time.

Technical brochure - HFB induction units, installation in raised floors
Type *HFBsf* SmartFlow

Volume flow control depending on the cooling/heating requirement, continuous





Example of regulation

Function

With this control system, the output of the induction unit can be controlled not only on the water side, but also on the air side. Thanks to the extreme flexibility, individual parameters can also be configured and thus adapted to individual applications (e.g. V_{min} or V_{max}).

Heating case

If heating is required, for example, the primary pressure and the volume flow are increased in parallel with the increase in output on the water side. This ensures an optimised flow pattern.

Use

For particularly high thermal and acoustic comfort requirements, e.g. in office buildings.

Features

- Less energy consumption
- Improved thermal and acoustic comfort
- Air volume reduction
- Continuous valves required
- Digital room thermostats required

Technical brochure - HFB induction units, installation in raised floors
Type *HFBsf* SmartFlow

Technical data size 630

Slider position	V_P [m³/h]	Δp [Pa]	LWA [dB(A)]	LA18 [dB(A)]	qPk [W/k]	qSk [W/k]	qKges [W/k]	Q_{total} 1) [W]	Q_{Sk} 1) [W]	Q_{Kges} 1) [W]	qPh [W/k]	qSh [W/k]	qh total [W/k]	Q_{Ek} 2) [W]
5	53	100	24	18	-17,5	-26,9	-44,4	-778	-505	-645	55,0	14,7	69,7	126
	65	150	30	24	-21,3	-33,5	-54,8	-927	-617	-787	65,0	17,3	82,3	
4	40	100	23	16	-13,8	-17,2	-31,0	-522	-331	-441	40,0	10,1	50,1	
	49	150	29	22	-16,3	-21,6	-37,9	-641	-410	-540	50,0	12,3	62,3	
3	26	100	24	18	-8,8	-14,1	-22,9	-430	-271	-341	25,0	8,4	33,4	
	32	150	30	23	-11,3	-18	-29,3	-541	-344	-434	35,0	10,4	45,4	
2	13	100	<20		-3,8	-8,3	-12,1	-256	-160	-190	15,0	5,0	20,0	
	16	150	23	17	-5,0	-10,4	-15,4	-318	-200	-240	15,0	6,2	21,2	

w_{ok} = 200 [kg/h] w_{oh} = 100 [kg/h] Δp_k = 23 [kPa] Δp_h = 1 [kPa]

Technical data size 800

Slider position	V_P [m³/h]	Δp [Pa]	LWA [dB(A)]	LA18 [dB(A)]	qPk [W/k]	qSk [W/k]	qKges [W/k]	Q_{total} 1) [W]	Q_{Sk} 1) [W]	Q_{Kges} 1) [W]	qPh [W/k]	qSh [W/k]	qh total [W/k]	Q_{Ek} 2) [W]
5	74	100	25	19	-25	-36,9	-61,9	-1069	-693	-893	75,0	20,5	95,5	126
	90	150	32	25	-30,0	-46,0	-76,0	-1274	-848	-1088	90,0	23,8	113,8	
4	55	100	24	18	-18,8	-23,6	-42,4	-713	-451	-601	55,0	14,4	69,4	
	68	150	30	24	-22,5	-29,6	-52,1	-877	-562	-742	70,0	17,2	87,2	
3	36	100	26	19	-12,5	-19,2	-31,7	-587	-370	-470	35,0	12,0	47,0	
	45	150	31	25	-15,0	-24,6	-39,6	-739	-470	-590	45,0	14,7	59,7	
2	18	100	<20		-6,3	-11,2	-17,5	-347	-217	-267	20,0	7,3	27,3	
	22	150	25	18	-7,5	-14,1	-21,6	-432	-272	-332	20,0	8,9	28,9	

w_{ok} = 200 [kg/h] w_{oh} = 100 [kg/h] Δp_k = 28 [kPa] Δp_h = 2 [kPa]

1) Cooling case:
6°C water supply temperature
18°C primary air temperature
and
26°C intake temperature before heat exchanger (may differ from room temperature)
50% relative humidity

2) Heating case:
55°C Water supply temperature
20°C Intake temperature before heat exchanger, (may deviate from room temperature) Nominal water mass flow rate

Note: All specifications apply to appliances without filters.

V_p - Primary air volume flow (±10 %)
Δp - Static pressure at the primary air connection
L_{WA} - Sound power level ±3 dB(A) (with plastic nozzles)
L_{A18} - Sound pressure level at 18 m² Sabine Room absorption
Q_{Pk} - Primary air cooling capacity Q_{Sk} - Secondary air cooling capacity $Q_{k\ ges}$ - Total cooling capacity
Q_{total} - sensible and latent cooling capacity secondary (via heat exchanger)
Q_{Ph} - Primary air heat output
Q_{Sh} - Secondary air heat output $Q_{h\ ges}$ - Total heat output
w_{ok} - Nominal water mass flow rate at cooling capacity w_{oh} - Nominal water mass flow rate at heating capacity Q_{Ek} - Intrinsic convection heating capacity
Δp_h - water-side pressure loss heating
Δp_k - water-side pressure loss cooling
q_{Pk} - specific cooling capacity primary air
q_{Sk} - specific cooling capacity secondary air q_{Ph} - specific heating capacity primary air q_{Sh} - specific heating capacity secondary air

Technical brochure - HFB induction units, installation in raised floors
Type *HFBsf* SmartFlow

Technical data size 1000

Slider position	V_P [m³/h]	Δp [Pa]	LWA [dB(A)]	LA18 [dB(A)]	qPk [W/k]	qSk [W/k]	qKges [W/k]	Q_{total} 1) [W]	Q_{Sk} 1) [W]	Q_{Kges} 1) [W]	qPh [W/k]	qSh [W/k]	qh total [W/k]	Q_{Ek} 2) [W]
5	88	100	26	20	-30,0	-45,8	-75,8	-1326	-860	-1100	90,0	25,5	115,5	126
	108	150	33	26	-36,3	-56,8	-93,1	-1573	-1046	-1336	110,0	29,5	139,5	
4	66	100	25	18	-22,5	-29,4	-51,9	-890	-563	-743	65,0	18,3	83,3	
	82	150	31	25	-27,5	-36,9	-64,4	-1092	-699	-919	80,0	21,6	101,6	
3	43	100	27	20	-15,0	-24,0	-39,0	-732	-461	-581	45,0	15,3	60,3	
	54	150	32	26	-17,5	-30,7	-48,2	-921	-586	-726	55,0	18,6	73,6	
2	21	100	<20		-7,5	-14,0	-21,5	-433	-271	-331	20,0	9,3	29,3	
	27	150	25	19	-8,8	-17,6	-26,4	-540	-339	-409	25,0	11,4	36,4	

w_{ok} = 200 [kg/h] w_{oh} = 100 [kg/h] Δp_k = 33 [kPa] Δp_h = 2 [kPa]

1) Cooling case:
6°C water supply temperature
18°C primary air temperature
and
26°C intake temperature before heat exchanger (may differ from room temperature)
50% relative humidity

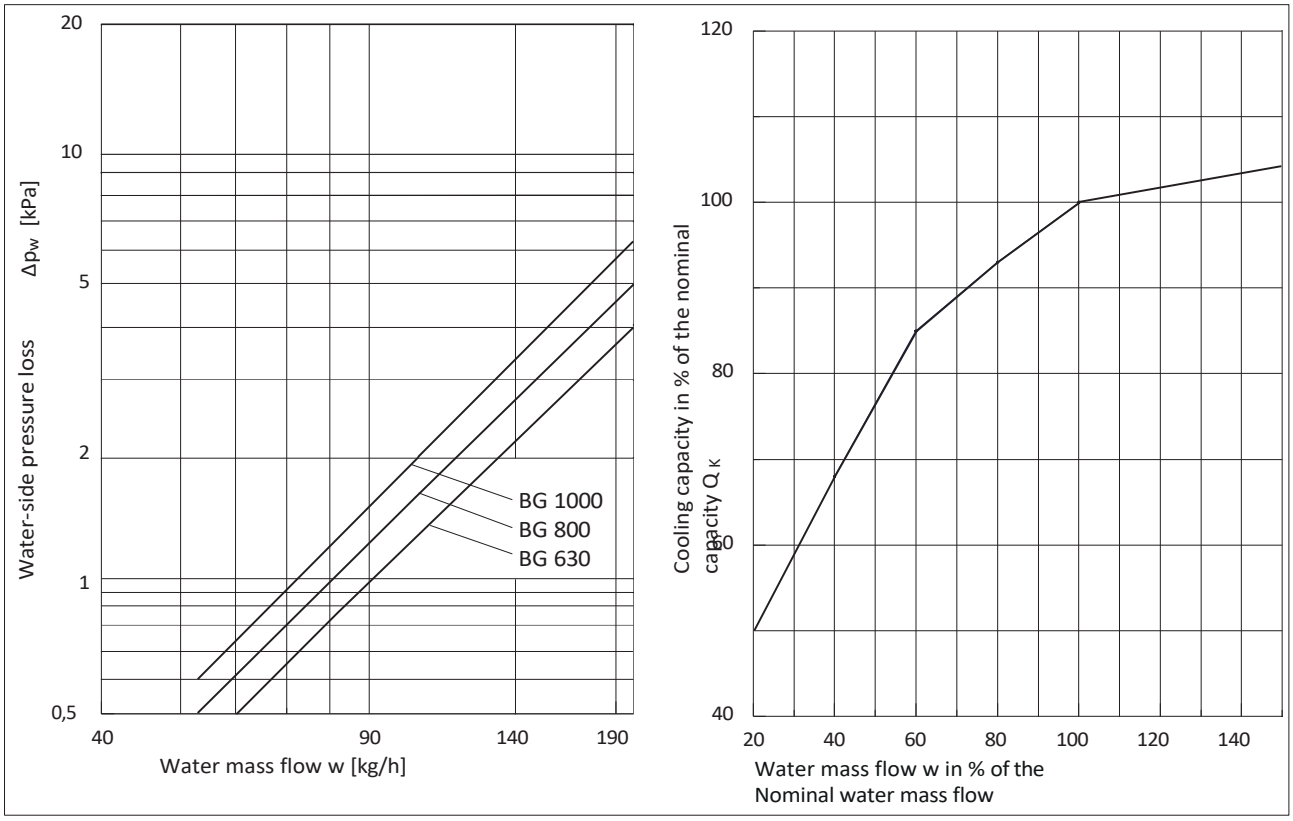
2) Heating case:
55°C Water supply temperature
20°C Intake temperature before heat exchanger, (may deviate from room temperature) Nominal water mass flow rate

Note: All specifications apply to appliances without filters.

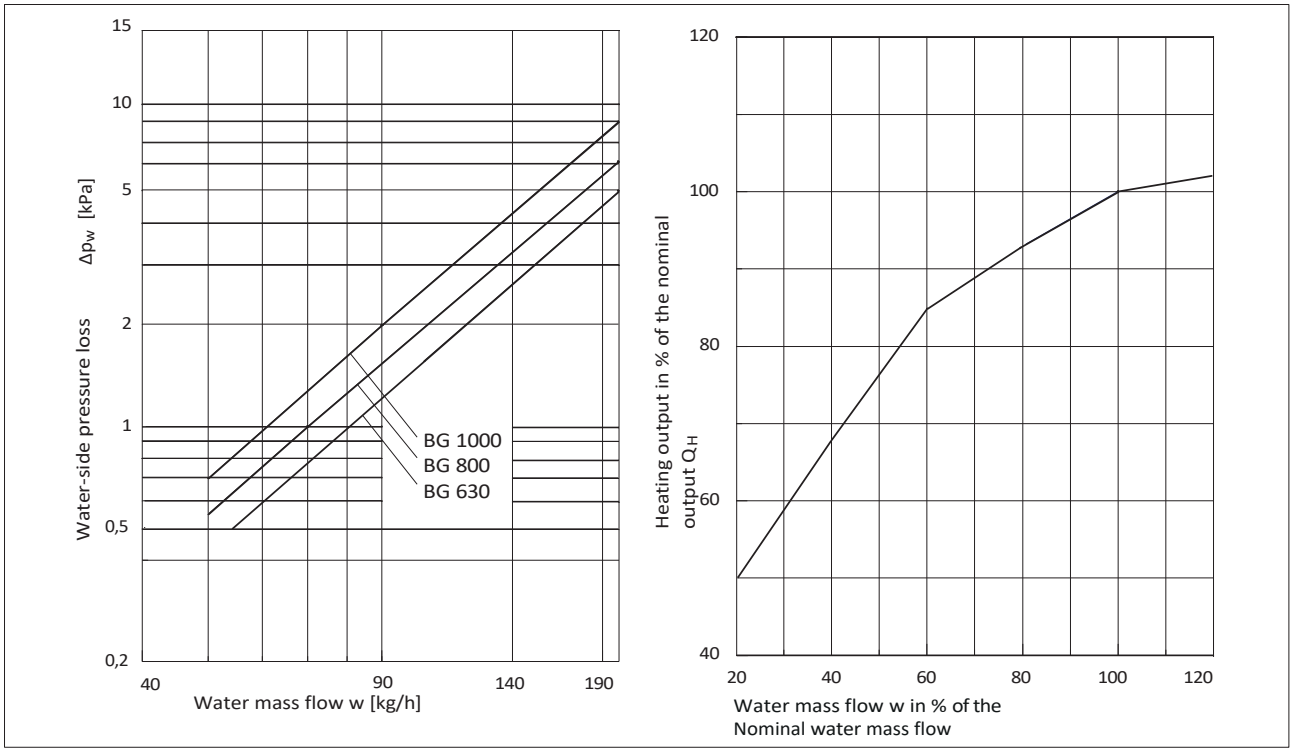
V_p - Primary air volume flow (±10 %)
Δp - Static pressure at the primary air connection
L_{WA} - Sound power level ±3 dB(A) (with plastic nozzles)
L_{A18} - Sound pressure level at 18 m² Sabine Room absorption
Q_{Pk} - Primary air cooling capacity Q_{Sk} - Secondary air cooling capacity $Q_{k\,ges}$ - Total cooling capacity
Q_{total} - sensible and latent cooling capacity secondary (via heat exchanger)
Q_{Ph} - Primary air heat output
Q_{Sh} - Secondary air heat output $Q_{h\,ges}$ - Total heat output
w_{ok} - Nominal water mass flow rate at cooling capacity w_{oh} - Nominal water mass flow rate at heating capacity Q_{Ek} - Inherent convection heating capacity
Δp_h - water-side pressure loss heating
Δp_k - water-side pressure loss cooling
q_{Pk} - specific cooling capacity primary air
q_{Sk} - specific cooling capacity secondary air q_{Ph} - specific heating capacity primary air q_{Sh} - specific heating capacity secondary air

Technical brochure - HFB induction units, installation in raised floors
Type HFB-0, Type *HFBsf* SmartFlow

Water-side pressure loss and cooling capacity with different water mass flows



Water-side pressure loss and heat output with different water mass flows



Note: The minimum water mass flow must not be less than 20% of the nominal water volume in cooling mode and 40% in heating mode, taking into account the water-side pressure equalisation.

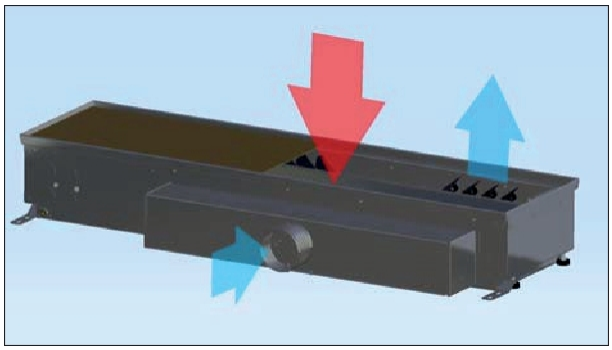
Technical brochure - HFB induction units, installation in raised floors Assembly, accessories, maintenance

Assembly

The compact design allows the appliance to be positioned between the raised floor supports. The appliance is precisely aligned using height-adjustable appliance feet.

The air connection is made as standard to one of the two connection pieces on the rear of the appliance. The control valve connection compartment and therefore the water connection are located on the left-hand side of the appliance. The feed-throughs for the water connection hoses can be provided on the left-hand side of the rear panel.

The floor grille must be installed flush with the floor. It is can be walked on without additional supporting beams.



Assembly sequence

- Place the appliance with insulation strips directly against the façade.
- Align the appliance and adjust the height using the adjustable appliance feet.
- If necessary, fix the appliance feet to prevent slipping, e.g. with PU adhesive.
- Regulate pressure via throttle valve and pressure measurement.
- Set up raised floor supports for floor panels and mount floor panels directly adjacent to the appliance.
- Install electrical and water-side connections. The connections must be flexible and de-energised.

Special versions/accessories

- Control valves optionally with continuous, thermal or 3-point actuators
- Flexible hoses, optionally with/without insulation, optional connections AGK ½" or union nut ½"
- Stable floor grille that can be walked on without additional crossbars, with slats parallel to the façade; either aluminium or stainless steel, inserted into the floor trough from above. If grilles from other manufacturers are used, these must be approved by LTG Aktiengesell- schaft in order to ensure that the overall system functions properly.
- Primary air volume flow restrictor for air flow equalisation in a ratio of up to approx. 1:1.5

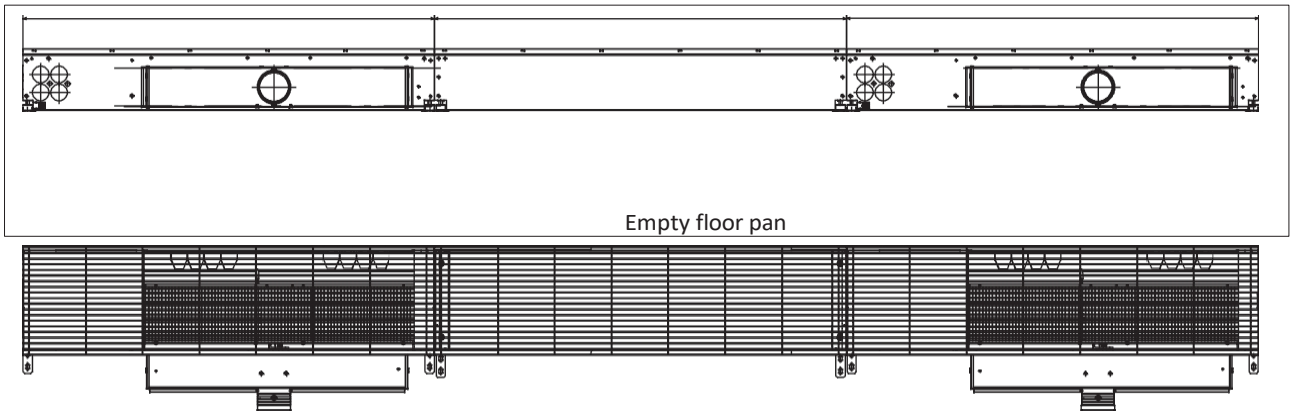
Regulation

Control is carried out on the water side via control valves. With *HFBsf* SmartFlow appliances, the fresh air volume is also adjusted via a servomotor.

Maintenance

All components are located inside a sheet steel tray. They are easily accessible from above for maintenance, inspection and cleaning purposes.

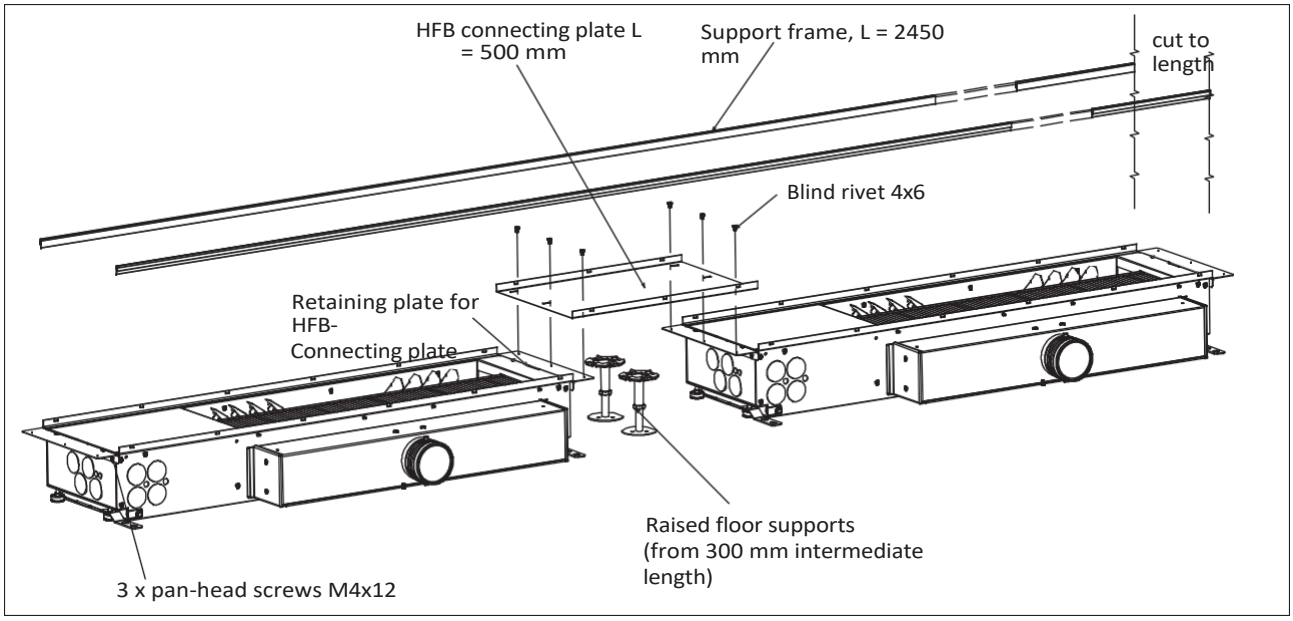
Belt mounting with empty tray



Empty floor pan

Technical brochure - HFB induction units, installation in raised floors Assembly, accessories

Belt mounting with separator plate



Installation example: Continuous floor grille on the façade

Notes for tape mounting

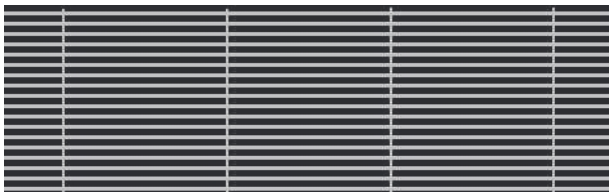
If it is desired to realise a visually continuous floor grid on the façade, matching black-coated spacer plates are screwed between the devices.

If there is a gap of more than 300 mm or for end pieces, additional double floor supports must be fitted for stabilisation.

From a distance of 600 mm, the use of an empty base tray is recommended for stability reasons.

With the LTG floor grid, it is also possible to produce cut-outs for columns or mitre corners.

LTG stainless steel linear grille



LTG aluminium linear grille

Load capacity of the floor grilles

The variants of the tread-resistant LTG floor grids have the following static load capacity:

- Stainless steel linear grid: 750 kg/m2
- Aluminium linear grid 2000 kg/m2

Other loads on request.

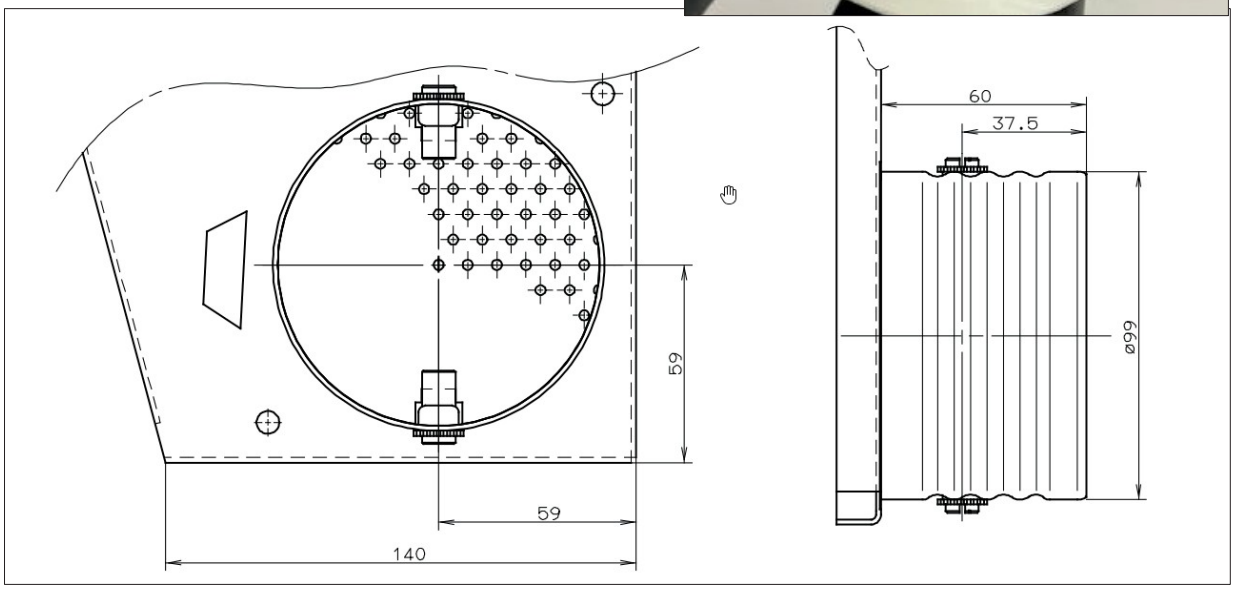
Technical brochure - HFB induction units, installation in raised floors
Assembly, throttle element

KLI throttle element for primary air

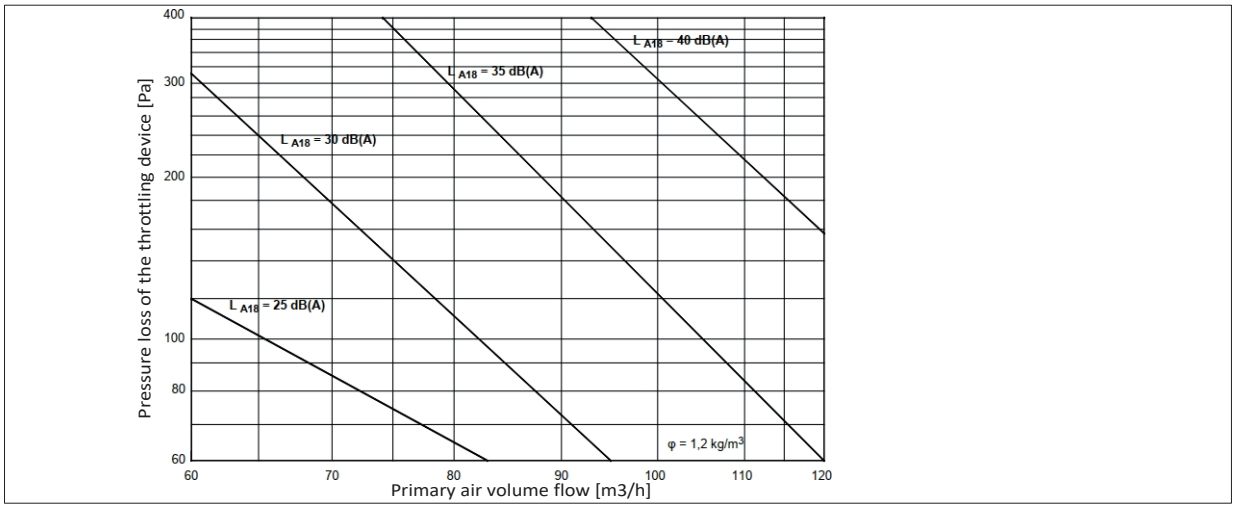
An integrated throttle element (KLI) is fitted to the inlet nozzle of the HFB and the *HFBsf* SmartFlow to adjust the primary air volume. The KLI can be used to achieve pressure equalisation between several devices.

The dimensions of the KLI are shown below. The free cross-section is 10.7 %. The diagram below shows the throttle range and the sound level generated at the throttle.

Important: The angle position of the KLI can be adjusted from the room with the device installed using a special lever (available from LTG Aktiengesellschaft).



Dimensions throttle element KLI



Sound level of the throttle element at 18 m² Sabine room attenuation

Technical brochure - HFB induction units, installation in raised floors
Nomenclature, order code

HFG- 0 / - / 2 / 630 / T / OF / S / MQ / OR / - / AL / N E

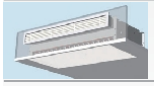
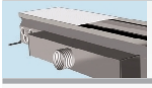
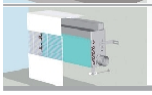
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)

(1)	Series	HFG	=	HFG
(2)	Type	0	=	Standard
		Sf	=	SmartFlow system
(3)	Drive	-	=	Without (for standard type)
		H	=	Manual (only type sf with SmartFlow slider) Motorised/electric
		MS	=	continuous (only type sf with SmartFlow slider) 2-pipe system
(4)	Heat exchanger	2	=	
		4	=	4-wire system
(5)	Size, length	630	=	630 mm
		800	=	800 mm
		1000	=	1000 mm
(6)	Condensate tray	T E	=	Without condensate tray (non-condensing)
		OF	=	With condensate tray and drain (condensing, not with (3) MS
(7)	Filters	MF	=	Without filter (standard, recommended)
		S	=	With filter
(8)	Nozzle assembly	M	=	Low volume flow Medium
		L	=	volume flow Large volume
		XL	=	flow Maximum volume flow
		-	=	SmartFlow
		MQ	=	With
(9)	Mixed displacement flow fan	-	=	witho
		OR	=	ut
		2R	=	Without frame Frame
(10)	Frame	4R	=	on long side Frame all
		-		round
		CI	=	Without Connected Intelligence
(11)	Control board	CI-T	=	With Connected Intelligence (CI factory-wired, without 24V)
		AL	=	With Connected Intelligence (CI and transformer 230/24V wired at the
		E	=	factory)
(12)	Grille	H	=	Aluminium linear
		NE	=	Stainless steel
		RAL...	=	Wood (aluminium frame)
(13)	Grille surface, frame		=	Natural anodised
				Coated similar to RAL, specify RAL colour
		SE	=	Special anodised

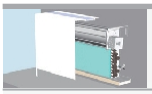
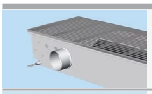
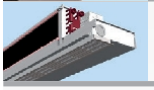
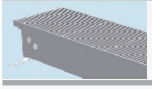
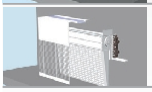
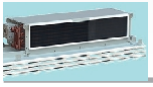
AIR TECH SYSTEMS

Product overview - LTG air-water systems

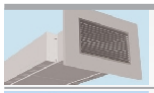
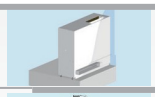
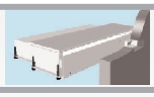
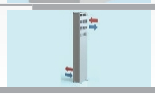
LTG Induction - Induction devices

Ceiling	Parapet	Floor
 *HFFsuite* SilentSuite	*HFVsf* SmartFlow system	 HFB / *HFBsf* SmartFlow system
HFG-0/D	 HFG	

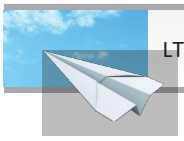
LTG FanPower - Fan coil units

Ceiling	Parapet	Floor
VKE	 VFC	 VKB
 VKL	VFC-N	 SKB
	 QVC	
	 VKL-W	

LTG Decentral - Decentralised ventilation units

Ceiling / wall	Parapet / facade	Floor
 *FVSEco$_2$ School*	 FVPpulse-V *PulseVentilation system*	 FVPpulse-B PulseVentilation system
FVPpulse-D PulseVentilation system	 FVPpulse-S PulseVentilation system	

Engineering services



LTG Engineering Services Ventilation Technology

AIR TECH SYSTEMS

Ventilation technology

Air-water systems Air diffusers Air distribution

Process air technology

Fans Filter technology Humidification technology

Engineering services

Laboratory test / experiment Field measurement / optimisation Simulation / analysis Development / commissioning

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