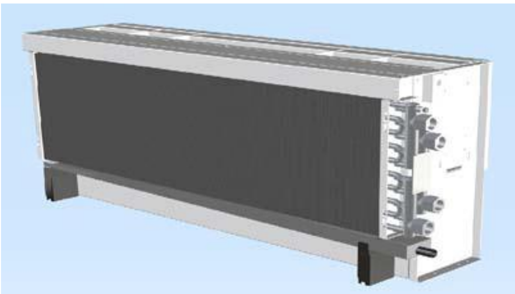
Technical brochure

LTG Air-Water Systems

LTG Induction

Induction unit type HFVsf
System SmartFlow

smart flow



Installation in parapets

Technical leaflet - Induction units HFVsf System SmartFlow

Content Page

Notes

The dimensions in this technical brochure are given in mm.

The general tolerances according to DIN ISO 2768-vL apply to the dimensions given in this brochure.
The special tolerances indicated on the drawing apply to the discharge grille.

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

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

The current tender texts are available in Word format from your responsible branch office or at ww w.LTG.de.

Technical leaflet - Induction units HFVsf System SmartFlow

LTG Induction

Induction devices

Induction technology - convenient and efficient

Since the first patent application for an induction unit in 1915 by the company founder Dr. Albert Klein, the induction units have been of the LTG is constantly evolving.

The induction principle

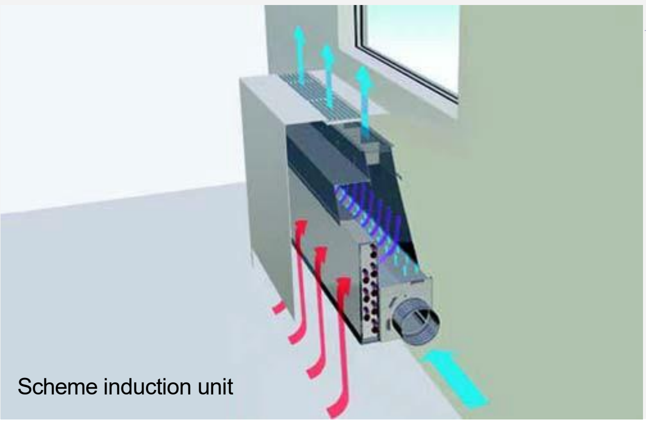
Air flowing through a nozzle forms a free jet. This entrains the surrounding air layer at its edges and thus increases the flowing air volume. In induction units, this so-called "induction" takes place inside the unit. Due to a special design, room air (secondary air) is entrained through a heat exchanger and thereby cooled or heated. Together with the fresh air (primary air), the supply air then flows back into the room and thus provides for Feel-good climate.

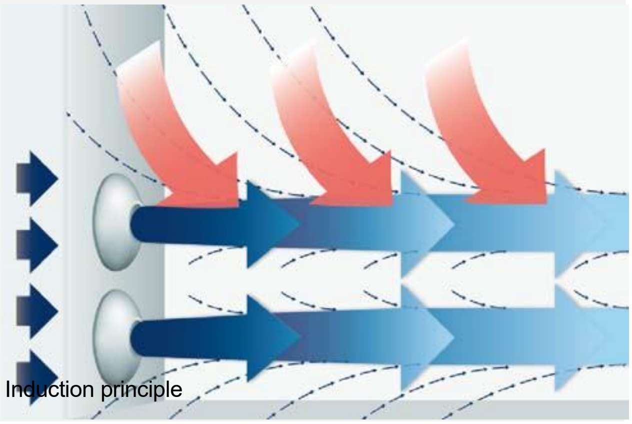
LTG induction units of the latest generation are energy-efficient and can be operated on demand thanks to LTG SmartFlow technology.

Advantages

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

The evolution of induction


Scheme induction unit

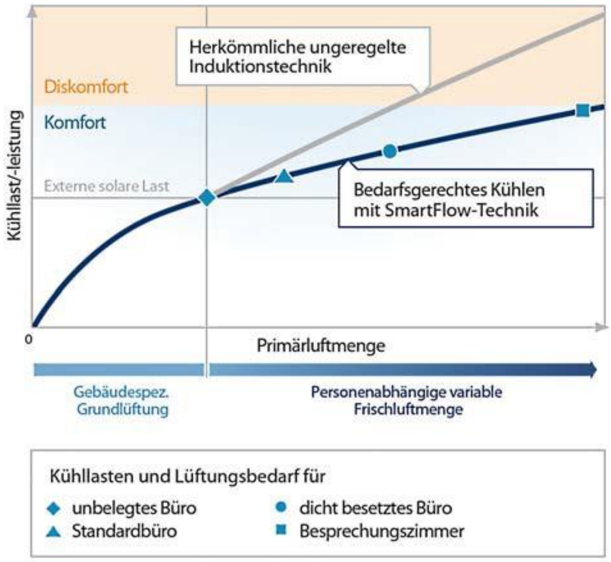

Induction principle

Technical leaflet - Induction units HFVsf System SmartFlow

The SmartFlow system

Induction technology redefined - air conditioning on demand

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 controlling chilled water valves. This means that the best possible comfort, acoustics and energy efficiency can be achieved with one unit for each load situation. The control can be manual (room utilisation) or automatic (presence- or CO_2-guided). In contrast to conventional induction technology, cooling capacity and fresh air supply can be adapted to the specific requirements.



With SmartFlow technology, unnecessary ventilation is a thing of the past! The HFVsf adjusts the amount of fresh air and the cooling capacity to the current requirements. This means minimum energy costs with maximum comfort. An investment that pays off!

Advantages

- Highest possible energy efficiency through low primary pressures
- Demand-controlled ventilation for all uses; simple change of use possible
- Good acceptance through individual user influence
- Economical even with a refurbishment
- High user comfort: fresh air and cooling capacity adjustable, extremely quiet operation
- Variable installation in existing or new parapet possible

Comparison of conventional induction technology and SmartFlow technology

Technical leaflet - Induction units HFVsf System SmartFlow

Device view

Installation, placement

Installation in parapets. Installation example with perforated sheet panelling, intake from below, discharge as mixed displacement flow to the top plus displacement flow to the front.

Insert

Comfortable ventilation and temperature control of small, large or meeting rooms as required,

Product overview

Functions	• Cooling, heating
	• Fresh air supply
	• Demand ventilation (e.g. CO_2, presence, switch)
Variable volume flow	• Manual override (type HFV…/H)
	• Motorised adjustment 2-stage (type HFV…/M2)
	• Motorised adjustment stepless (type HFV…/MS)
Installation designs, flow patterns	• Discharge upwards, mixed source flow, intake on façade side
	• Discharge upwards, mixed source flow, intake from room side
	• Discharge upwards, mixed displacement flow + additional displacement flow, intake on façade side
Sizes	• BG 630 (volume flows up to 70 m³/h at 120 Pa)
	• BG 800 (volume flows up to 115 m³/h at 120 Pa)
	• BG 1000 (volume flows up to 143 m³/h at 120 Pa)

Technical leaflet - Induction units HFVsf System SmartFlow

Functionality HFVsf-MQQ

For energy-saving use, LTG Aktienge sellschaft has developed the HFVsf-MQQ system with complete control.

Through a combination of induction unit and displacement air diffuser, the ventilation is largely decoupled from the room temperature control and the flow field is adapted to the load in the room. The control system detects the CO_2 content and room temperature, selects the ideal flow pattern, continuously opens the appropriate air nozzles and controls hot/cold water valves.

With a low material load, the room is heated or cooled with a small primary air flow solely by the induction principle. Low-pulse supply air jets on the façade create a mixed/source flow characterised by low air velocities and good ventilation effectiveness.

If the primary air demand increases, a displacement flow diffuser is switched on continuously. The associated additional cooling capacity is sufficient to adequately ventilate and cool a densely occupied office room. Acoustic and thermal comfort are maintained.

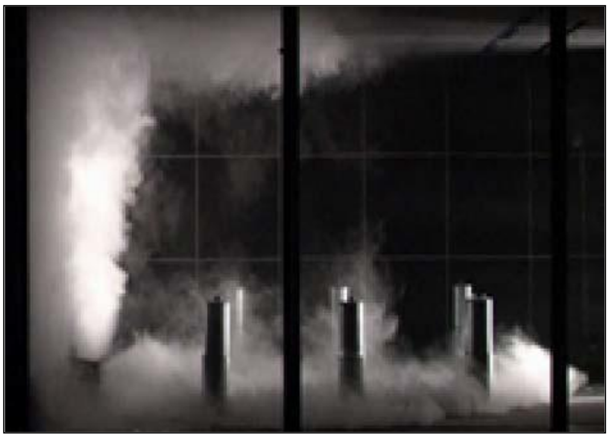
Without occupancy, the primary air can be switched off or regulated back to an air exchange rate adapted to the building emissions. If necessary, an excessive primary air volume flow can be activated with a rapid cooling function.

In order to enable a demand-oriented adjustment of the volume flows in a utilisation zone, a pressure control in the system is required.

Room flow

The guide grille in the discharge throat generates low-pulse supply air jets whose velocities and temperature differences are reduced in a limited mixing zone. The subsequent displacement flow is characterised by low room air velocities and low vertical temperature stratification.

HFVsf-MQQ in cooling mode: Comfortable room flow even at 100 m³/h primary air volume flow.
Mixed/source flow Source flow



Heating case: screening of the cold façade (mixed/source flow) Fresh air distribution in large room depths (displacement flow)

Technical leaflet - Induction units HFVsf System SmartFlow Type HFVsf-MQ/../4, 4-wire system

Specification

One heat exchanger and two separate water circuits for cooling and heating the secondary air.
Water-side flow control by two valves. Primary air connections with DN 125 mm laterally on the left and/or right, optionally from below.
Loop-through of a second induction unit possible. Vertical installation. Water connections on the right or left. Air control elements create a mixed/source flow with low room air velocities for high comfort. Metal nozzles.
Intake from the rear or front, discharge upwards. Primary air adjustment manual or motorised.
Engine on the right (looking at the heat exchanger).
Without filter.

Dimensions, weight

BG	A	B	D	E	Weight
	[mm]				[kg]
630	627	597	900	830	18
800	857	827	1130	1060	22
1000	1057	1027	1330	1260	28

All dimensions ± 2 mm

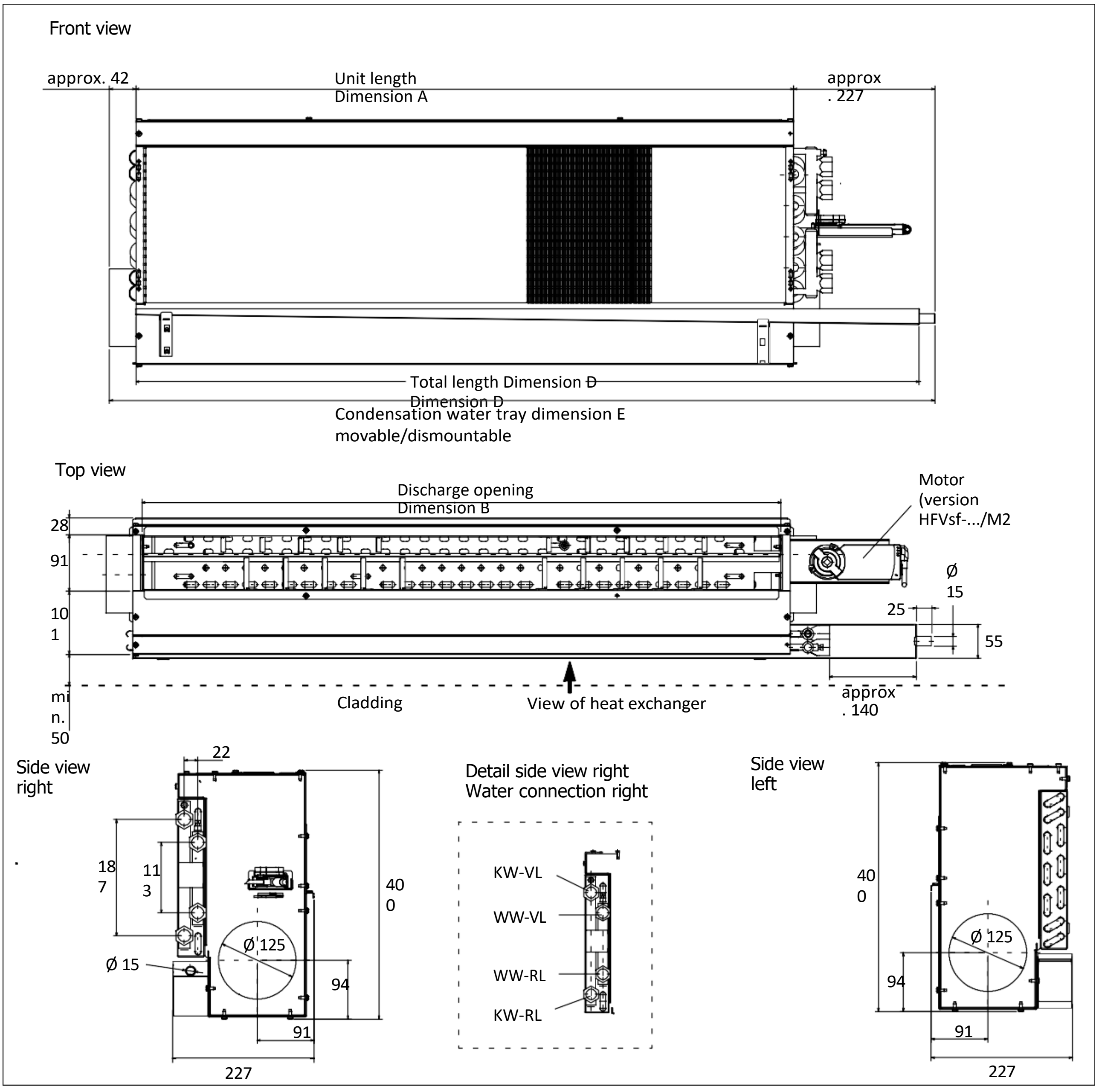


Illustration: Discharge upwards, motor right, air connection left/right, without suspension, without CO2 sensor

Technical leaflet - Induction units HFVsf System SmartFlow Type HFVsf-MQQ/../4, 4-wire system

Specification

One heat exchanger and two separate water circuits for cooling and heating the secondary air.
Water-side flow control by two valves. Primary air connections with DN 125 mm laterally on the left and/or right, optionally from below.
Loop-through of a second induction unit possible. vertical installation. Water connections on the right or left.
Mixed/source flow and additional source flow. Intake from below and front, discharge to the front via the sill (displacement flow) and to the top via a discharge grille (mixed displacement flow).
Primary air adjustment manual or motorised.

Engine on the right (looking at the heat exchanger).
Without filter.

Dimensions, weight

BG	A	B	D	E	Weight
	[mm]				[kg]
630	627	597	900	830	18
800	857	827	1130	1060	22
1000	1057	1027	1330	1260	28

All dimensions ± 2 mm.

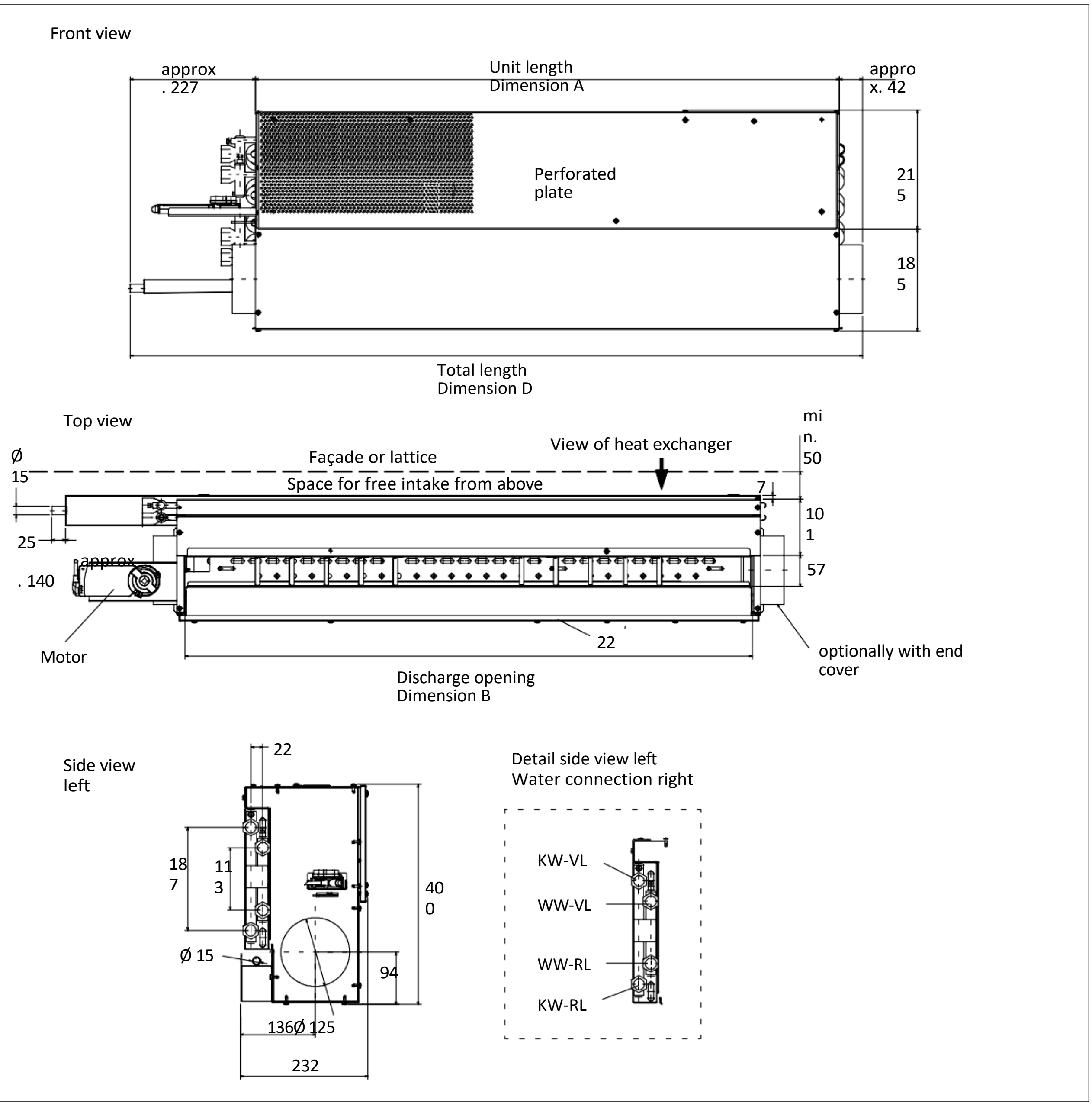
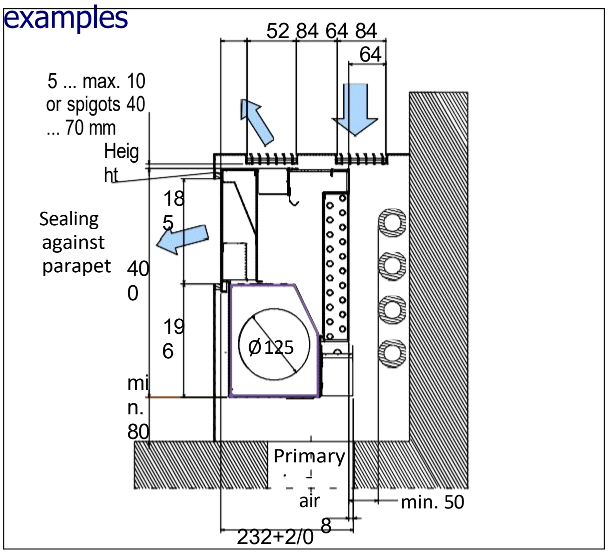


Illustration: Discharge to the front and top, motor on the right, air connection left/right, without suspension, without CO2 sensor

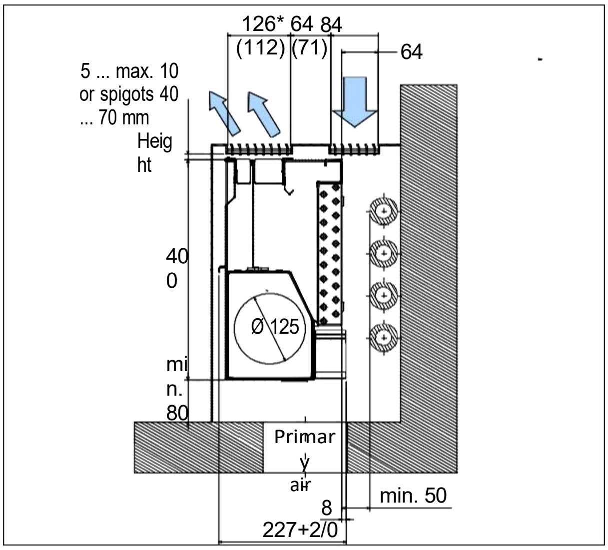
Installation examples



Intake at the rear of the façade,
mixing/source flow to the top,
source flow to the front.

The displacement flow diffuser must be sealed to the cladding to prevent short circuits.

Type HFVsf-MQQ/./F

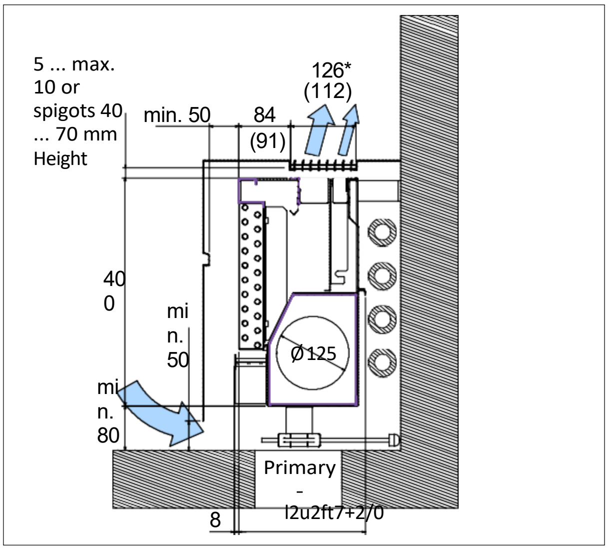


Intake at the rear of the façade,
mixing/source flow upwards,
source flow upwards.

* With a grille width of 126 mm, the air control blades can be adjusted through the grille opening (see Technical leaflet Accessories for LTG air-water systems, LDC discharge grille, installation example).

With a grille width of 112 mm (minimum width), the sill cladding must be removed in order to adjust the air guide elements.

Type HFVsf-MQ/./F



Intake at the front from the room,
mixing/source flow upwards.

* With a grille width of 126 mm, the air control blades can be adjusted through the grille opening (see Technical leaflet Accessories for LTG air-water systems, LDC discharge grille, installation example).

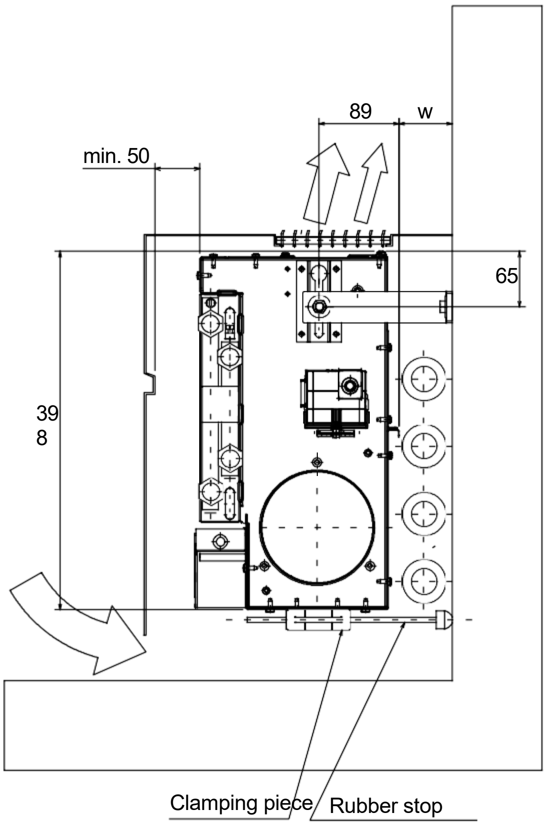
With a grille width of 112 mm (minimum width), the sill cladding must be removed in order to adjust the air guide elements.

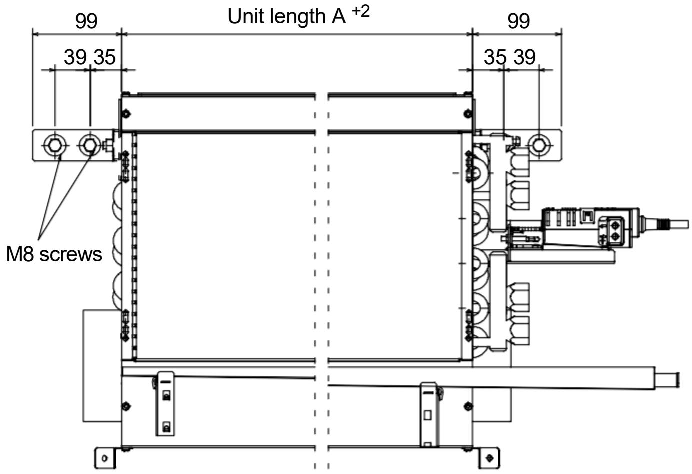
Type HFVsf-MQ/./R

Technical leaflet - Induction units HFVsf System SmartFlow

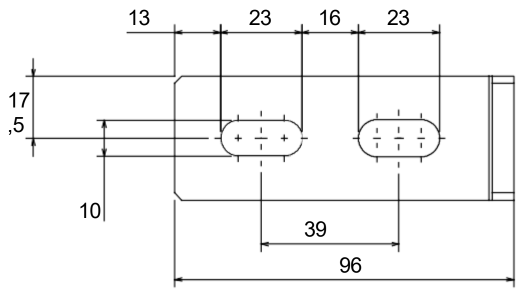
Mounting with lateral wall bracket, for intake from the front

Side view left

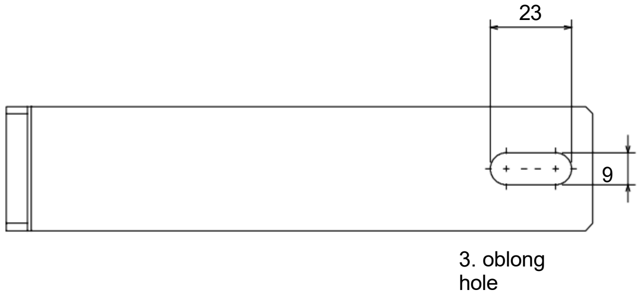




Front view



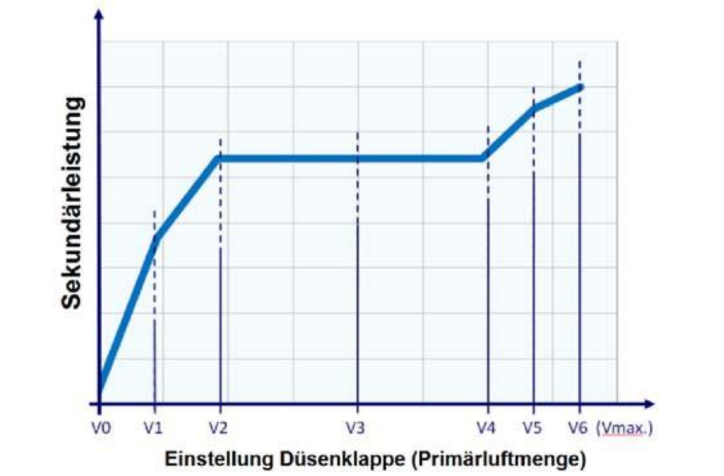
Side view left



3. oblong hole

Technical leaflet - Induction units HFVsf System SmartFlow 4-pipe system - cooling and heating

Operating states (setting nozzle flap)



Volume flow control manual or motorised, in 7 operating levels.

V0 - closed Secondary power 0
Primary air volume = 5

V1 - low primary air volume 1, low induction V2 -

low primary air volume 2, medium induction V3

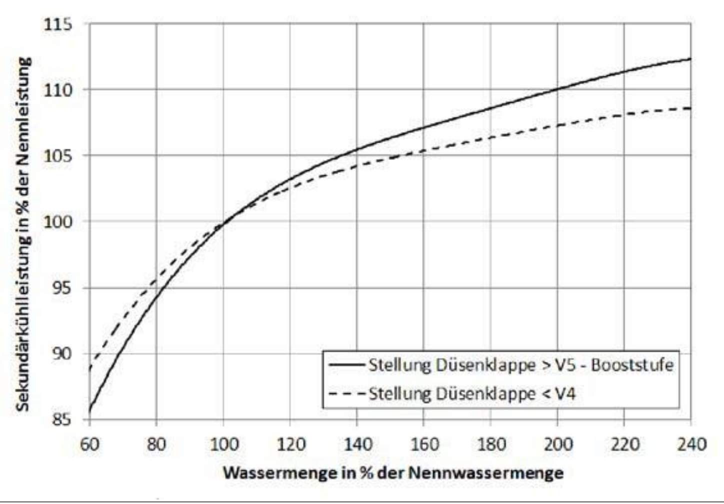
medium primary air volume 1, medium induction

V4 - medium primary air volume 2, medium

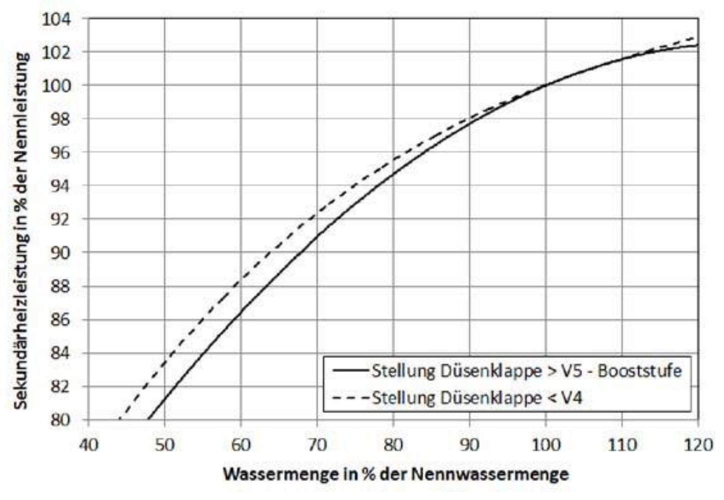
induction V5 - boost level 1, high induction

V6 - Boost level 2, high induction

Cooling capacity with different amounts of water



Heating capacity with different water quantities



Technical leaflet - Induction units HFVsf System SmartFlow 4-pipe system - cooling and heating

Technical data cooling Size 630

Adjusting the nozzle flap		V0	V1	V2	V3	V4	V5	V6
Vp	[m^3/h]	5	14	22	40	58	64	70
QP	[W]	14	36	59	106	155	171	187
Qk	[W]		146	218	218	218	254	274
tKWR	[°C]	16	17	17,6	17,6	17,6	17,8	18
ΔpW	[kPa]				6			
Qk_{ges}	[W]	14	183	277	324	372	425	461
LWA_{MQ}	[dB(A)	<28	<28	<28	30	33	33	33
LWA_{MQQ}	[dB(A)	<28	<28	<28	31	36	35	35

Technical data heating Size 630

Adjusting the nozzle flap		V0	V1	V2	V3	V4	V5	V6
Vp	[m^3/h]	5	14	22	40	58	64	70
QP	[W]	8	23	37	66	97	107	117
Qh	[W]	144	427	561	561	561	628	665
tKWR	[°C]	53,8	51,3	50,2	50,2	50,2	49,6	49,3
ΔpW	[kPa]				1,6			
Qh_{ges}	[W]	136	405	525	495	465	521	548
LWA_{MQ}	[dB(A)	<28	<28	<28	30	33	33	33
LWA_{MQQ}	[dB(A)	<28	<28	<28	31	36	35	35

Technical data cooling Size 800

Adjusting the nozzle flap		V0	V1	V2	V3	V4	V5	V6
Vp	[m^3/h]	8	22	36	64	93	105	115
QP	[W]	22	60	95	170	247	280	307
Qk	[W]		222	331	331	331	386	416
tKWR	[°C]	16	17,6	18,4	18,4	18,4	18,8	19,0
ΔpW	[kPa]				7,6			
Qk_{ges}	[W]	22	282	426	501	578	666	724
LWA_{MQ}	[dB(A)	30	29	29	32	35	35	35
LWA_{MQQ}	[dB(A)	30	29	29	33	38	37	37

Technical data heating Size 800

Adjusting the nozzle flap		V0	V1	V2	V3	V4	V5	V6
Vp	[m^3/h]	8	22	36	64	93	105	115
QP	[W]	-14	-37	-59	-106	-155	-175	-192
Qh	[W]	219	649	853	853	853	954	1010
tKWR	[°C]	53,1	49,4	47,4	47,4	47,4	46,8	46,3
ΔpW	[kPa]				2,2			
Qh_{ges}	[W]	205	612	793	746	698	779	818
LWA_{MQ}	[dB(A)	30	29	29	32	35	35	35
LWA_{MQQ}	[dB(A)	30	29	29	33	38	37	37

Technical data cooling Size 1000

Adjusting the nozzle flap		V0	V1	V2	V3	V4	V5	V6
Vp	[m^3/h]	10	28	44	79	115	131	143
QP	[W]	28	74	118	210	305	348	382
Qk	[W]		274	408	408	408	476	514
tKWR	[°C]	16	18,0	18,9	18,9	18,9	19,4	19,7
ΔpW	[kPa]				8,9			
Qk_{ges}	[W]	28	348	525	618	713	824	896
LWA_{MQ}	[dB(A)	31	30	30	33	36	36	36
LWA_{MQQ}	[dB(A)	31	30	30	34	39	38	38

Technical data heating size 1000

Adjusting the nozzle flap		V0	V1	V2	V3	V4	V5	V6
Vp	[m^3/h]	10	28	44	79	115	131	143
QP	[W]	-17	-46	-74	-131	-191	-218	-239
Qh	[W]	271	800	1052	1052	1052	1177	1246
tKWR	[°C]	52,7	48,1	46	46	46	44,9	44,3
ΔpW	[kPa]				2,6			
Qhges	[W]	253	754	978	920	861	959	1007
LWA_{MQ}	[dB(A)	31	30	30	33	36	36	36
LWA_{MQQ}	[dB(A)	31	30	30	34	39	38	38

Legend

VP	- Primary air flow rate (± 10 %)
QP	- Primary cooling capacity (fresh air component) (± 5 %)
Qk	- Secondary cooling capacity (via heat) (± 5 %)
Qh	- Heating power secondary (± 5 %)
tKWR	- Temperature cold water return
Qk_{ges}	- Total cooling capacity
tWWR	- Hot water return temperature
Qh_{ges}	- Total heating capacity
ΔpW	- Water-side pressure drop
LWA_{MQ}	- Sound power level MQ unit (± 3 dB)
LWA_{MQQ}	- Sound power level MQQ unit (± 3 dB)

Design conditions

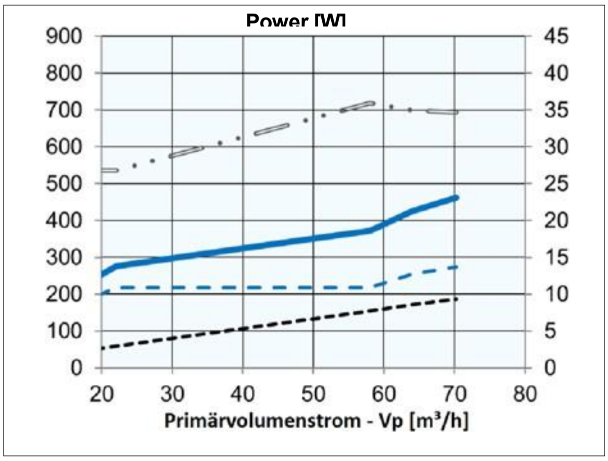
		Cooling	Heating
Room air temperature	[°C]	26	23
relative humidity	[%]	50	-
Primary pressure	[Pa]	120	120
Primary air temperature	[°C]	18	18
Water flow temperature	[°C]	16	55
Water mass flow	[kg/h]	120	100

The caloric values apply to units

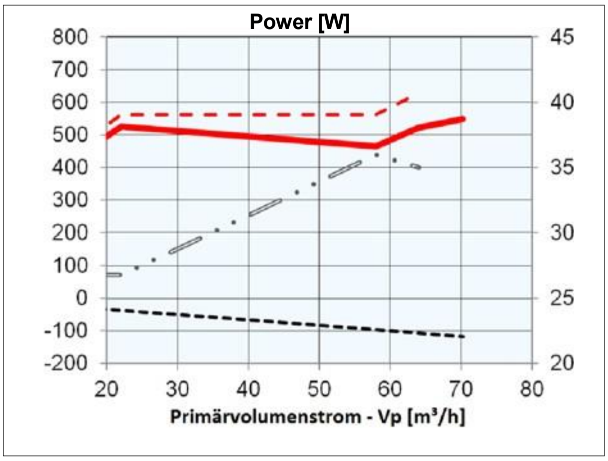
- with fan insert standard (mixed-source air grille)
- with an LTG air outlet grille LDC
- with 50 mm distance (suction area) to facade/wall
- Without filter

Technical leaflet - Induction units HFVsf System SmartFlow 4-pipe system - cooling and heating

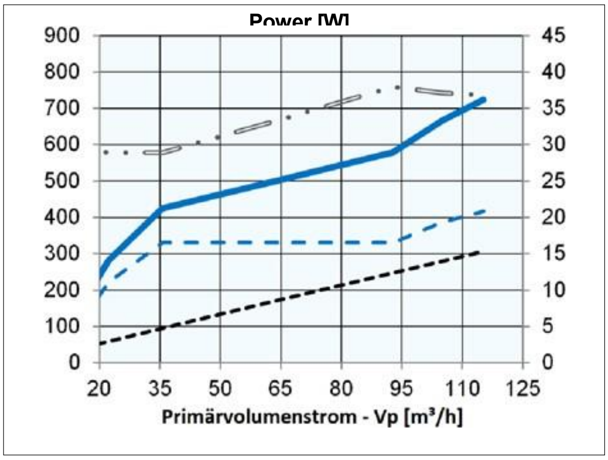
Cooling capacity and acoustics Size 630



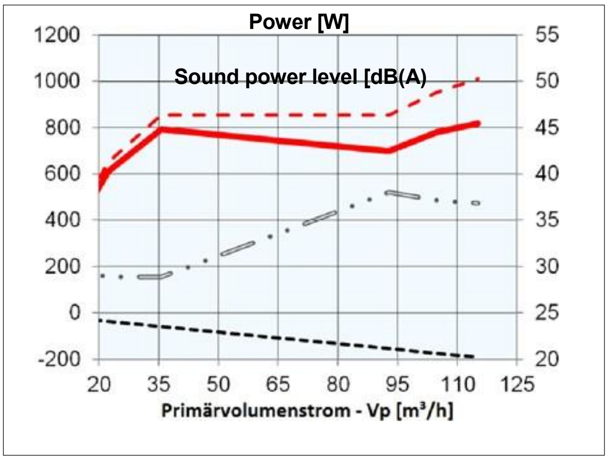
Heating capacity and acoustics Size 630



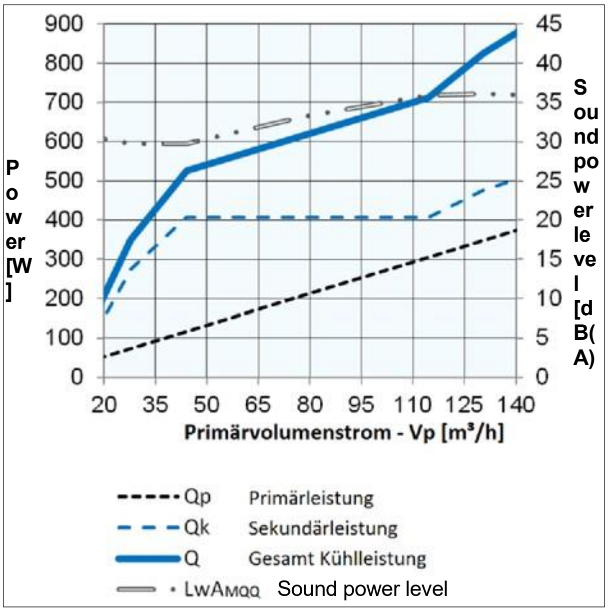
Cooling capacity and acoustics Size 800



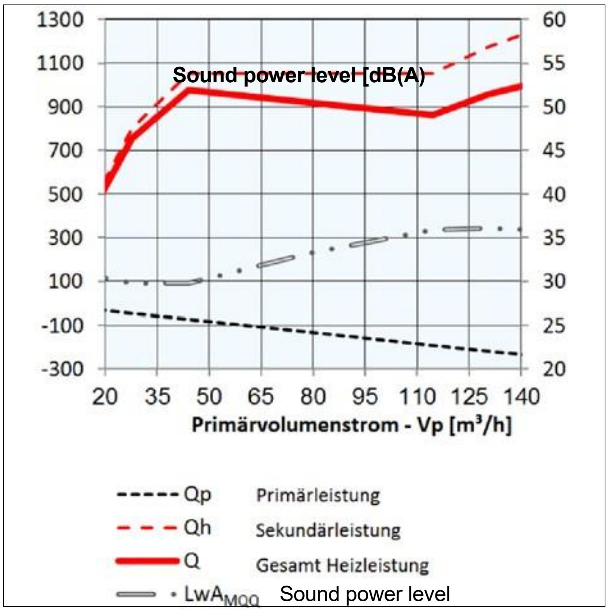
Heating capacity and acoustics Size 800



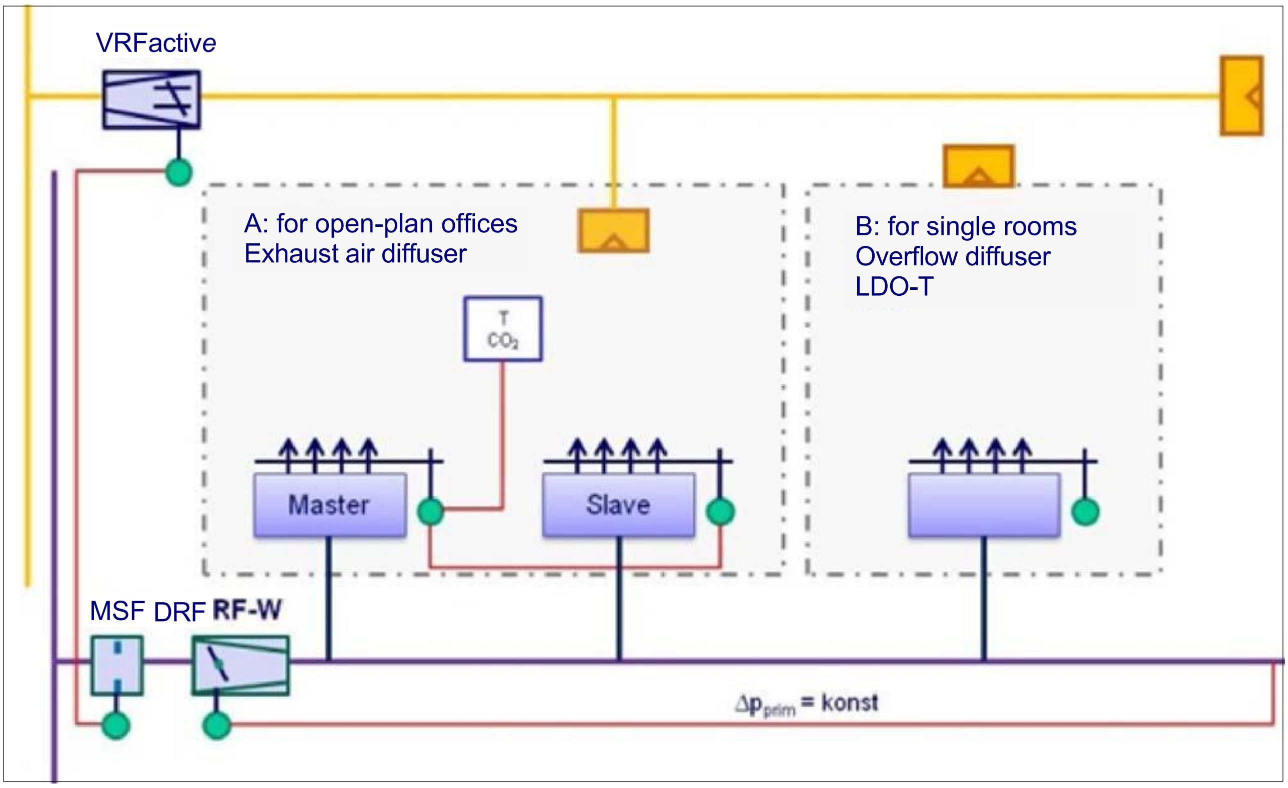
Cooling capacity and acoustics Size 1000



Heating capacity and acoustics Size 1000



Example of a control scheme for supply and exhaust air



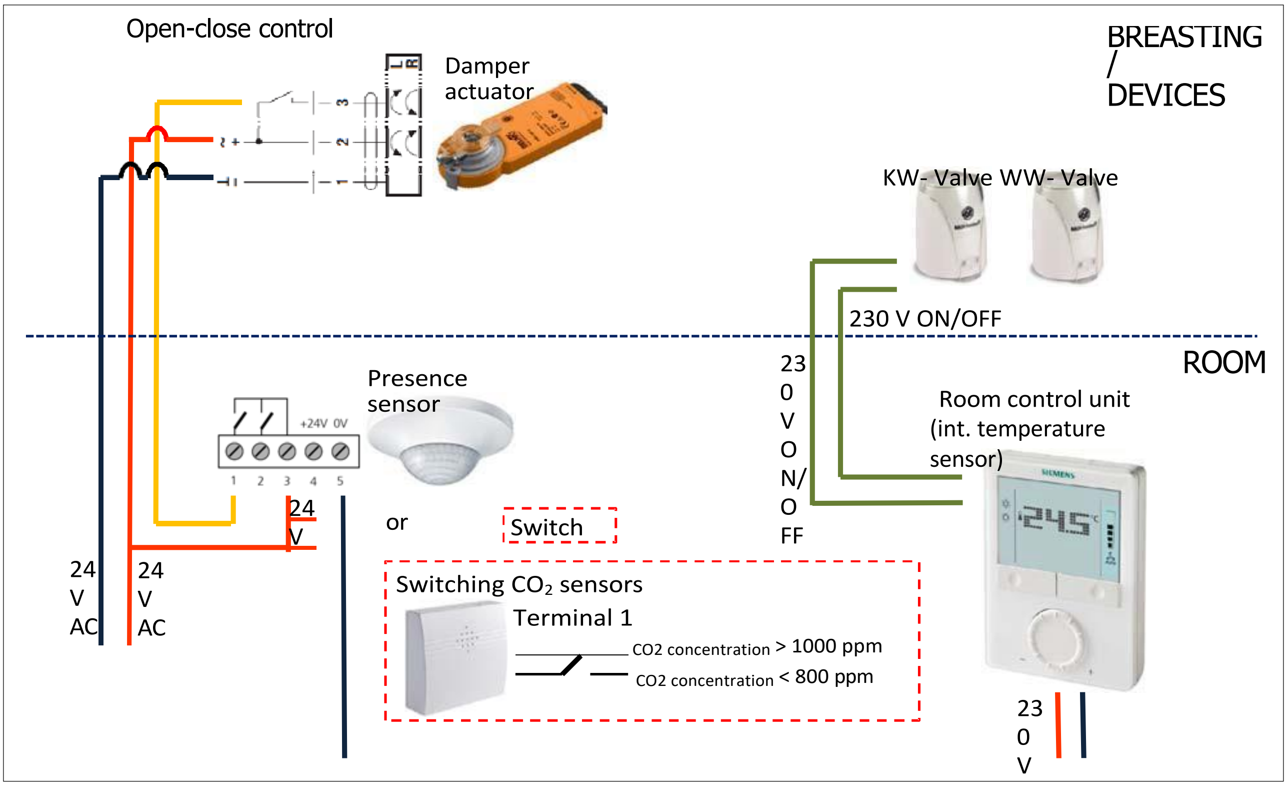
Balanced supply and extract air of a utilisation zone by pressure control in the supply air and tracking extract air volume flow control via setpoint of the supply air

The DRF pressure regulator keeps the pressure within a line constant at the design point.

Due to the variable control option of the supply air volume flow, the extract air volume flow should follow the supply air volume flow. The supply air volume flow is passed on by the measuring unit (MSE) and in the form of a 0...10 V signal to the variable volume flow controller (e.g. VRFactive).

In this way, the exhaust air volume flow follows the supply air volume flow. The required components can be obtained from LTG.

Example of a control scheme with RDG 100, with presence or CO_2 sensor

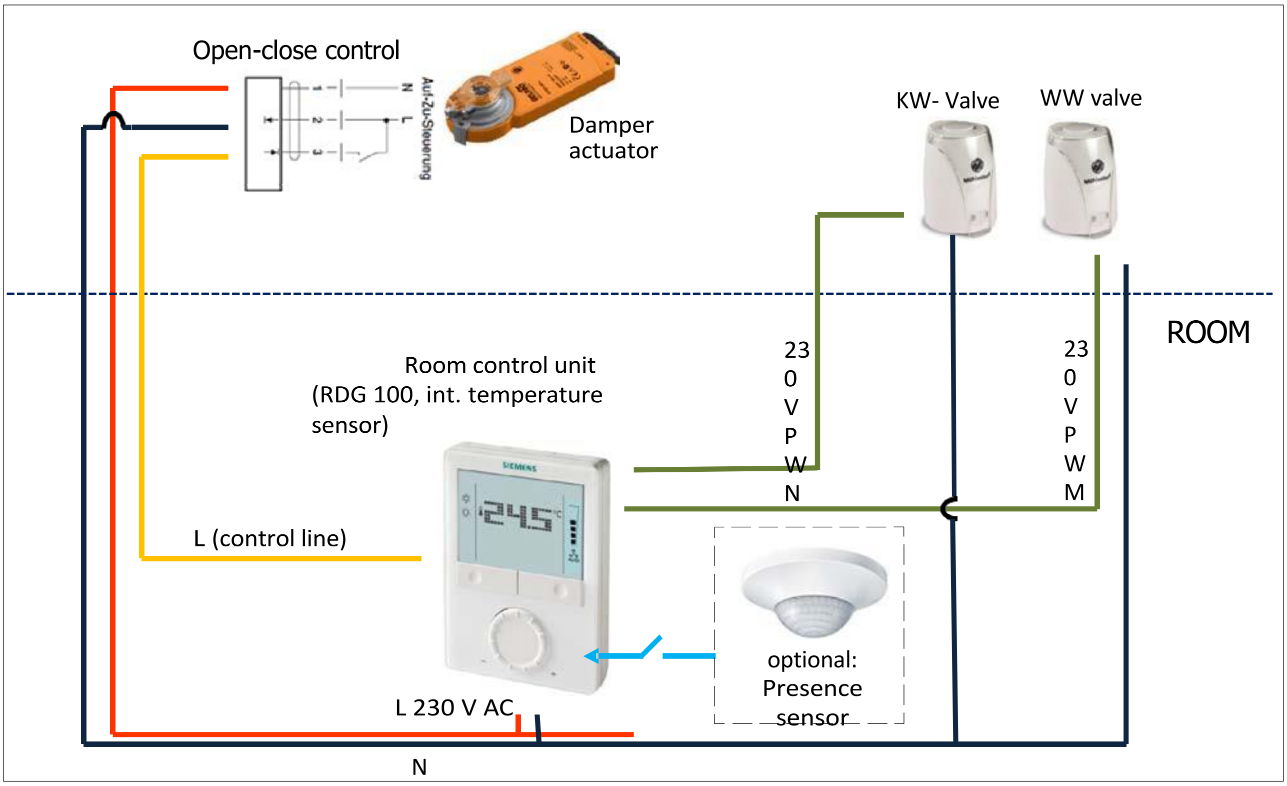


Individual room control with "CO_2 -dependent" air-side 2-point control

Air-side regulation:
If, for example, the CO2 concentration rises above 1000 ppm, Vmax is activated.
If the CO2 concentration falls below 800 ppm, Vmin is activated again.

The control of the water-side through valves is carried out by a room temperature controller.

Example of a 2-point control scheme with RDG 100



The air-side volume flow and the water-side flow rate are controlled directly by the RDG 100 room temperature controller.

In automatic mode, the volume flow is controlled depending on the "cooling" or "heating" demand.

In the event of an increased power requirement, for example, "Vmax" is activated. In addition, the user has the option of manually controlling the high air volume in the "manual" operating mode.

A presence sensor is also optionally available here, with which the room thermostat can be switched to an "economy mode", for example.

For further information on control, see the technical brochure "Control for induction units and fan coil units".

Nomenclature, ordering code

HFVsf MQ / M2 / 4 / F / 630 / WR / 125xR / G... / S / OW

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

(1)	Series	HFVsf	=	HFVsf
(2)	Type	MQ	=	Mixed source flow
		MQQ	=	MixedSourceFlow + SourceFlow
(3)	Drive	H	=	manual
		M2	=	motor 2point
		MS	=	motor/electric continuous
(4)	Heat exchanger	2	=	2leaders
		4	=	4Ladder
(5)	Heat exchanger arrangement	F	=	Facade side
		R	=	Room side
(7)	Size	630	=	630
		800	=	800
		1000	=	1000
(6)	Water connection	WR	=	right
		WL	=	left
(8)	Primary air spigot	125xR	=	DN x side (R, L, U)
(9)	Outlet nozzle	OA	=	Without spigot
		G...	=	With spigot, straight, specify height
		S1570	=	With nozzle, inclined
(10)	Suspension	OH	=	without holder
		S0-50	=	Lateral for foot bracket or wall - Distance foot bracket or wall
		S-50	=	Lateral - distance wall
		FK	=	Foot bracket 800 mm
		BK-K	=	Floor console with tilting mechanism
		BK-H	=	Floor console with height adjustment
(11)	Condensate tray	OW	=	Without drain
		MW	=	With drain

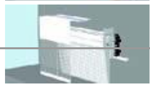
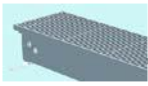
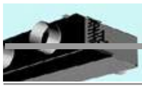
AIR TECH SYSTEMS

Product overview
LTG Air-Water Systems

LTG **Induction** -- Induction devices

Ceiling		Parapet		Floor	
	HFFsuite SilentSuite		HFV / HFVsf SmartFlow system		HFB / HFBsf SmartFlow system
	LHG System Indivent™		HFG		
	HDF/ HDFsf SmartFlow system		QHG		
	HDC				

LTG **FanPower** fan coil units

Ceiling		Parapet		Floor	
	LVC System Indivent™		VFC		VKB
	VKH		QVC		SKB
	VKE				
	KFA cool wave™				

LTG Decentral - Decentralised ventilation units

Ceiling		Parapet		Floor	
	FVS Univent™		FVM		FVD
					FVPpulse PulseVentilation system

Engineering services

LTG Engineering Services Indoor Air Technology

AIR TECH
SYSTEMS

Room air technology

Air-water systems
Air diffusers Air distribution

Process air technology

Fans
Filter technology
Humidification technology

Engineering services

Fluid mechanics
Thermodynamics
Acoustics/Comfort
Customised solutions

LTG public limited company
Grenzstraße 7
70435 Stuttgart
Germany
Tel.: +49 (711) 8201-0
Fax: +49 (711) 8201-720
E-mail: info@LTG.de
www.LTG.de

LTG Incorporated
105 Corporate Drive, Suite E
Spartanburg, SC 29303
USA
Tel.: +1 (864) 599-6340
Fax: +1 (864) 599-6344
E-mail: info@LTG-INC.net
www.LTG-INC.net

HFVsf-deu-TP (01/15) 416-124