Flexible in planning and installation.

Helios air treatment components ensure clean, warm and smooth air – regardless of whether they were located in ducting or duct ventilation systems. The extensive range includes all sizes and powers, perfectly coordinated to Helios fans. This allows the necessary flexibility in terms of planning and installation.

PURE

Air filters
For wall and ceiling installation in filter classes G4 and F7. For installation in ducts with connection flanges on both sides and air filter boxes with common standard duct diameters.

422on

PREHEATED

Heater batteries and temperature control systems
For room air at a pleasant temperature, in finely graduated power ranges.
Choose from electrical or warm water design.

425on

LOW-NOISE

Attenuators
Available in all sizes and designs, for installation in ducts or pipelines.
Made from galvanised sheet steel or flexible aluminium ducting.

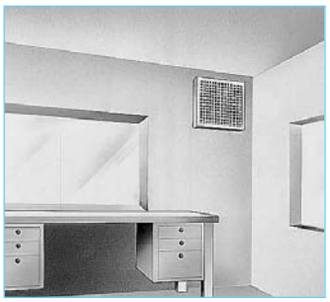
434on

■ **Simple to install components for effective solutions.**
The controlled intake of outside air is essential for creating a good ventilation system and meeting the regulations in most cases. The purification of supply air is a must nowadays.
For this purpose, Helios offers simple and effective components for various installation conditions.

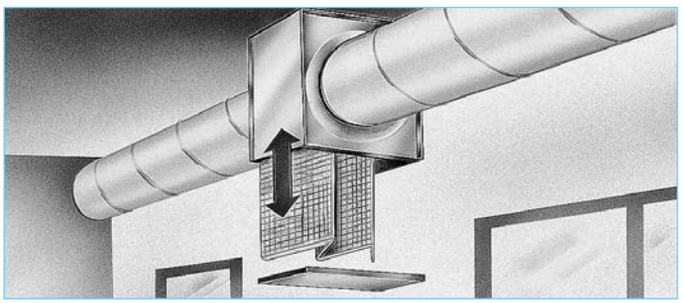
■ **Accessories for air filters**
Complete kit to monitor the pressure drop and thus the contamination of air filters. The gold coated connector makes it suitable for BMS applications.
Pressure range 50 – 500 Pa, ambient temperature from –20 to +85 °C and air flow temperature from –20 to +85 °C.

Differential pressure switch
Type DDS Ref. no. 0445

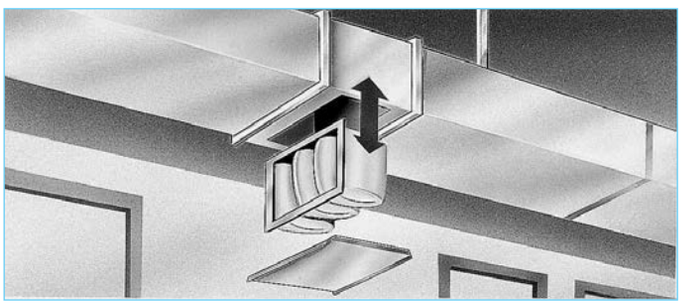
■ **Series LF, for wall and ceiling installation**
Stylish design to cover ventilation openings. Air flow volumes from 200 to 4000 m^3/h.



■ **LFBR, filter box for duct connection**
For in-line installation of circular ducting with dimensions from 100 to 400 mm Ø and air flow volumes from 100 to 4000 m^3/h.



■ **KLF, rectangular air filter**
for direct installation into ducting. Dimensions fit rectangular fan range. Air flow volumes up to 5000 m^3/h.



■ **Air filter LF**
for wall and ceiling installation
Specifically designed to cover internal ventilation and duct openings on the wall and ceiling. Egg crate grilles superimposed on frames are made of high quality, light grey polymer. Complete flow through of filter mat. Large cross section area of filter reduces the pressure drop and increases the dust storing capacity.

☐ **Filter mat** made of washable synthetic fibre, class G 2, thermally bonded, 100 g/m^2, fire resistant to DIN 53438: F1. 67% particle separation, dust storage capacity: 380 g/m^2.

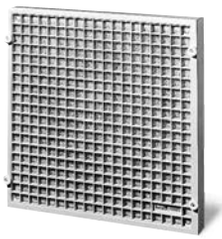
☐ **Installation** via four concealed holes in the frame, can be doweled in any position.

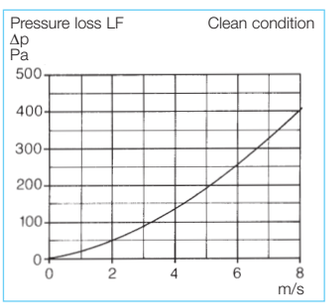
☐ **Cleaning** Depending on the system a filter replacement is necessary if the pressure drop exceeds approximately 1,5 – 2 times of the original value. Remove the filter mat after loosening the egg crate grille and clean both parts in soapy water. Afterwards reinsert it and fix with the four plastic nuts.

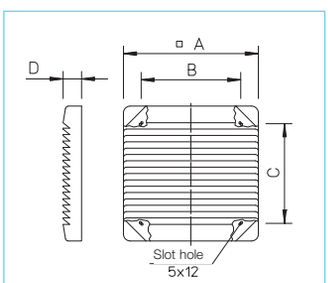
☐ **Spare filter mats** Due to decay, the mat may need to be replaced after several times of cleaning. See the chart for ordering information of spare filters. Contents: 5 pieces.

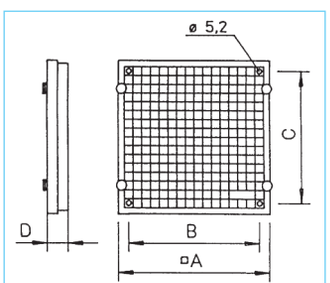
LF 200 – 250

LF 315 – 500









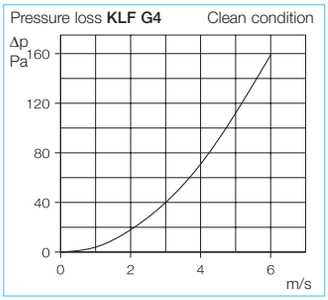
☐ **Pressure loss**
Air filters generate a resistance, as shown on the curve above, which must be considered when designing the system.

Type	Ref. no.	fits nominal fan size	maximum dimensions of opening	Dimensions A	B	C	D	Weight approx.	Spare filter mats (Contents = 5 pieces) Type	Ref. no.
		mm	mm	mm	mm	mm	mm	kg		
LF 200	0743	200	Ø 200	287	210	210	39.0	0.80	**ELF 200**	0737
LF 250	0744	250/280	Ø 300	337	240	240	39.0	1.00	**ELF 250**	0738
LF 315	0745	315	330 x 300	390	343	317	39,0	0.85	**ELF 315**	0739
LF 355	0746	355	380 x 350	440	393	367	39.0	0.95	**ELF 355**	0740
LF 400	0747	400	355 x 400	490	443	417	31.5	1.85	**ELF 400**	0741
LF 500	0748	450/500	475 x 450	540	493	467	31.5	2.25	**ELF 500**	0742

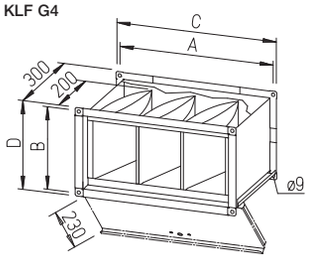
KLF G4, filter class G4

KLF F7, filter class F7

Pressure loss **KLF G4** Clean condition

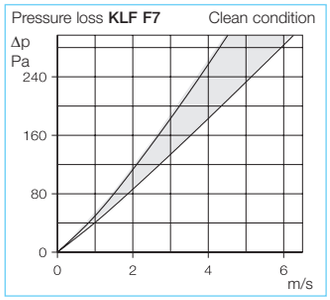


KLF G4

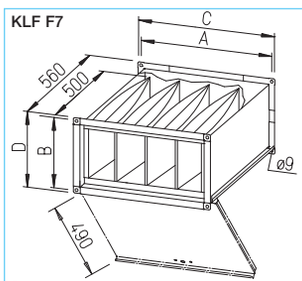


Dim. in mm see table

Pressure loss **KLF F7** Clean condition



KLF F7



Dim. in mm see table

■ Rectangular air filter KLF

Air filter with flanges at both ends for in-duct installation.

☐ Casing

Made of galvanised steel. The cover is detachable in order to remove filters by means of quick release fasteners.

☐ Bag filter cassette

Held in a frame that is made of galvanised steel. Filter bags with a large cross section area for high dust storage capacity.

Types KLF G4 with filter class G4, made of washable synthetic fibre, highly strengthened, 190 g/m^2.
DIN 53438 F1, self extinguishing. 91.3% particle separation, dust storage capacity: 354 g/m^2.

Types KLF F7 with filter class F7, made of synthetic fibre, DIN 53438 F1, self extinguishing. Particle separation rate: approx. 98%. Dust storage capacity: 88.6 g/m^2.

☐ Note

The integration of the filter with F7 filter class and differential pressure switch DDS (Ref. no. 0445) in external air systems comply with the requirements of VDI 6022.

☐ Installation

Horizontal and vertical (topdown air flow direction) in-duct installation. A free space must be allowed for easy removal of the filter. For areas with restricted space the cover can be detached without tools by an opening angle of more than 45°.

☐ Cleaning

Depending on the system a filter replacement is necessary if the pressure drop exceeds approximately 1.5 – 2 times of the original value.

The filter cassette can be easily removed through the opening on the casing cover. After cleaning or replacement, the filter cassette should be reinserted; by closing the cover the filter cassette is pinched automatically to the casing gaskets.

☐ Spare filter cassettes

Due to decay, the filter cassette may need to be replaced after several times of cleaning. See the chart for ordering information.

☐ Pressure loss

Air filters generate a resistance as shown on the curve above; the grey coloured area demonstrates the air filter resistance of different sizes that must be considered when designing the system.

■ Accessories

Differential pressure switch

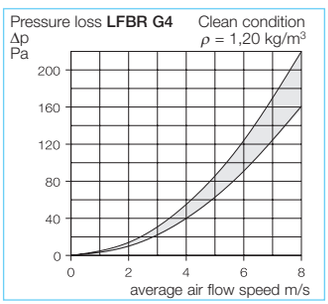
Type DDS Ref. no. 0445

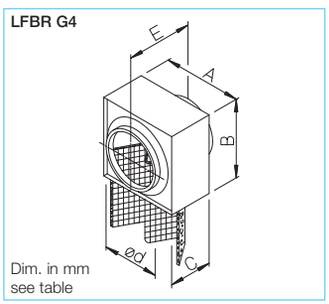
Complete kit to monitor air filters. Pressure range: 50 – 500 Pa.

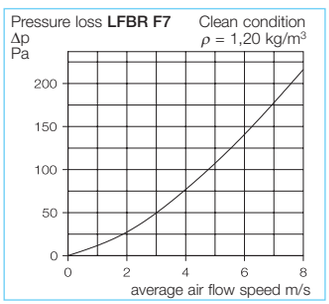
Type	Ref. no.	fits rectangular fan nominal size cm	Dimensions in mm A	B	C	D	Weight approx. kg	Spare filter cassettes (Contents = 2 pieces) Type	Ref. no.
Rectangular air filter KLF G4, filter class G4									
KLF 40/20 G4	8720	40/20	420	220	440	240	4.5	**EKLF 40/20 G4**	8724
KLF 50/25-30 G4	8721	50/25-30	520	270/320	540	340	6.0	**EKLF 50/25-30 G4**	8725
KLF 60/30-35 G4	8722	60/30-35	620	320/370	640	390	7.0	**EKLF 60/30-35 G4**	8726
KLF 70/40 G4	8723	70/40	720	420	740	440	8.5	**EKLF 70/40 G4**	8727
KLF 80/50 G4	8670	80/50	820	520	840	540	13.0	**EKLF 80/50 G4**	8673
KLF 100/50 G4	8671	100/50	1020	520	1040	540	15.0	**EKLF 100/50 G4**	8674
Rectangular air filter KLF F7, filter class F7									
KLF 40/20 F7	8644	40/20	420	220	440	240	6.5	**EKLF 40/20 F7**	8635
KLF 50/25-30 F7	8645	50/25-30	520	270/320	540	340	8.5	**EKLF 50/25-30 F7**	8636
KLF 60/30-35 F7	8646	60/30-35	620	320/370	640	390	10.5	**EKLF 60/30-35 F7**	8637
KLF 70/40 F7	8647	70/40	720	420	740	440	13.5	**EKLF 70/40 F7**	8638
KLF 80/50 F7	8654	80/50	820	520	840	540	20.5	**EKLF 80/50 F7**	8639
KLF 100/50 F7	8655	100/50	1020	520	1040	540	24.0	**EKLF 100/50 F7**	8659

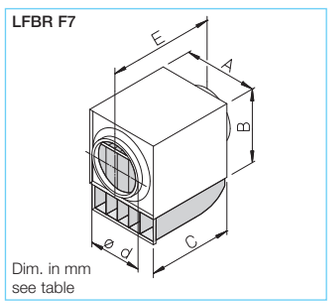
LFBR G4, filter class G4

LFBR F7, filter class F7









Air filter box LFBR

For in-line installation with circular ducting. Spigots on both ends are fitted with double lip rubber seals, matching nominal size ducting.

Casing

Made of galvanised sheet steel. Access panel fitted with clamp for easy filter change.

Filter

For types LFBR G4 made of washable plastic fibre, class G4. Temperature resistant up to +100 °C. Fire resistant to DIN 53438 F1, self extinguishing, can be regenerated 10–15 times. 93.8% particle separation, dust storage capacity: 122 g/m².

For types LFBR F7 bag filter, class F7, made of synthetic polymer, 64 g/m². 98% particle separation, dust storage capacity: 88.6 g/m².

Installation

Suitable for installation in any position. A free space for a size of B must be allowed for easy removal of the filter.

Cleaning

Depending on the system a filter replacement is necessary if the pressure drop exceeds approximately 1.5 – 2 times of the original value. After removing the casing-cover pull out the filter element.

Spare filter mats

Due to decay, the mat may need to be replaced after cleaning several times.

Pressure loss

Air filters generate a resistance as shown on the curve above; the grey coloured area demonstrates the air filter resistance of different sizes that must be considered when designing the system.

Type	Ref. no.	Dimensions in mm Connection Ø d	A	B	C	E	Weight approx. kg	Spare filter (Contents = 5 pieces) Type	Ref. no.
Air filter box LFBR G4, filter class G4									
LFBR 100 G4	8576	100	205	170	120	227	1.5	**ELFBR 100 G4**	8585
LFBR 125 G4	8577	125	215	205	140	252	1.8	**ELFBR 125 G4**	8586
LFBR 160 G4	8578	160	265	235	155	267	2.4	**ELFBR 160 G4**	8587
LFBR 200 G4	8579	200	315	275	180	302	3.0	**ELFBR 200 G4**	8588
LFBR 250 G4	8580	250	365	325	230	352	4.2	**ELFBR 250 G4**	8589
LFBR 315 G4	8581	315	425	390	330	452	7.5	**ELFBR 315 G4**	8590
LFBR 355 G4	8583	355	515	495	455	587	12.0	**ELFBR 355 G4**	8592
LFBR 400 G4	8582	400	515	495	455	587	12.0	**ELFBR 400 G4**	8591
Air filter box LFBR F7, filter class F7								(Contents = 2 pieces)	
LFBR 100 F7	8530	100	204	204	400	480	3.5	**ELFBR 100 F7**	8300
LFBR 125 F7	8531	125	204	204	400	480	3.5	**ELFBR 125 F7**	8301
LFBR 160 F7	8532	160	294	295	400	480	4.3	**ELFBR 160 F7**	8302
LFBR 200 F7	8533	200	294	295	400	480	4.3	**ELFBR 200 F7**	8303
LFBR 250 F7	8534	250	424	385	480	600	5.2	**ELFBR 250 F7**	8304
LFBR 315 F7	8535	315	424	385	480	600	5.2	**ELFBR 315 F7**	8305
LFBR 355 F7	8536	355	504	505	600	720	6.6	**ELFBR 355 F7**	8306
LFBR 400 F7	8537	400	504	505	600	720	6.6	**ELFBR 400 F7**	8307

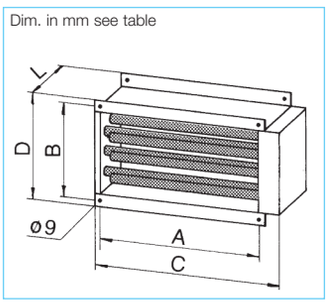
Accessories

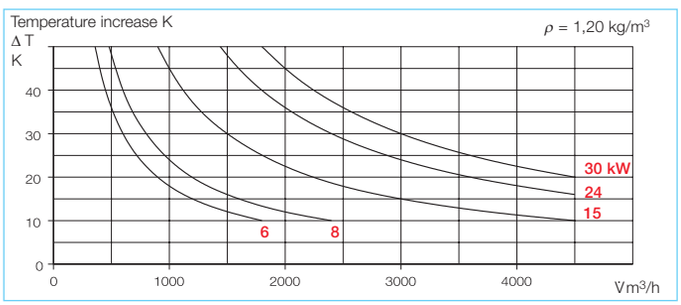
Differential pressure switch
Type DDS Ref. no. 0445
Complete kit to monitor air filters. Pressure range: 50 – 500 Pa.

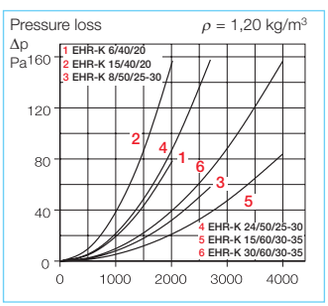
Note

The integration of the filter with F7 filter class and differential pressure switch DDS (Ref. no. 0445) in external air systems comply with the requirements of VDI 6022.

EHR-K







Electric heater battery EHR-K

Heating elements enclosed in a galvanised casing with MEZ flanges on both sides for in-duct installation.

Heating elements with low surface temperature are individually wired to the outer terminal box and coils can be wired in several groups.

Equipped with a thermal switch which opens at 90 °C and resets itself after cooling down. The other thermal switch opens at 120 °C and must be reset manually.

Note

DIN VDE 0100-420 must be observed on site; a proper air flow monitoring and electrical interlocking shall be provided.

Installation

The heater must be installed downstream of the fan. If installing it before the fan, make sure that the air flow temperature at the fan does not exceed the fan's maximum temperature. A rectangular duct with a length of at least 1 metre must be installed between fan and heater. The heater should not be used below the minimum air flow volume of the heater battery. The electrical connection must be interlocked so that the heater cannot operate if the fan is not running. If the thermal switch releases, the heater battery must cut off automatically. The coils can be wired in groups so that the heat output can be reduced arbitrarily.

Selection and operation

The heater batteries generate an additional resistance that must be considered when designing the system.
The temperature increase depends on air flow volume and heat output (see diagrams above).
In order to prevent an unwanted thermal cut out, the air flow volume must be higher than the minimum figure shown in the chart.

Accessories	Page
Electronic temperature control system EHS	427

Accessories

Electronic temperature control system

Type EHS see table below

Controls the heat output of the heating element by monitoring difference between the supply air temperature and the required temperature.

Duct sensor (accessory for EHS)

Type TFK Ref. no. 5005

Temperature sensor for detecting the air temperature in ducting.

Room sensor (accessory for EHS)

Type TFR Ref. no. 5006

Temperature sensor with integrated "desired value encoder" for surface mounting. Can also be used as temperature sensor or as desired value encoder only.

Type	Ref. no.	Motor power	Switching groups no.	Current	Minimum air flow volume	fits rectangular fan	Wiring diagram[1]	Dimensions in mm A	B	C	D	L	Weight approx.	Suitable temperature control system Type	Ref. no.
		kW	x kW	A	m³/h	nom. size cm	no.						kg		
3~, 400															
EHR-K 6/40/20	8702	6	2 x 3	8.7	430	40/20	361.4	423	223	550	250	200	7.3	**EHSD 16**	5003
EHR-K 15/40/20	8703	15	5 x 3	21.7	430	40/20	366.4	423	223	550	250	320	13.3	**EHSD 16**	5003
EHR-K 8/50/25-30	8704	8	2 x 4	11.3	680	50/25-30	362.4	523	273/323	650	350	200	9.2	**EHSD 16**	5003
EHR-K 24/50/25-30	8705	24	6 x 4	33.9	680	50/25-30	364.4	523	273/323	650	350	250	17.2	**EHSD 30**	5004
EHR-K 15/60/30-35	8706	15	3 x 5	20.9	980	60/30-35	365.4	623	323/373	750	400	200	12.9	**EHSD 16**	5003
EHR-K 30/60/30-35	8707	30	6 x 5	41.7	980	60/30-35	363.4	623	323/373	750	400	200	19.3	**EHSD 30**	5004

[1] Principal wiring for all types no. 476.2

Electric heater battery EHR-R

Heating elements with low surface temperature made of stainless high-grade steel and are totally enclosed in a galvanised casing with terminal box for commercial in-duct installations.

Equipped with a thermal switch which opens at 50 °C and resets itself after cooling down. The other thermal switch opens at 120 °C and must be reset manually.

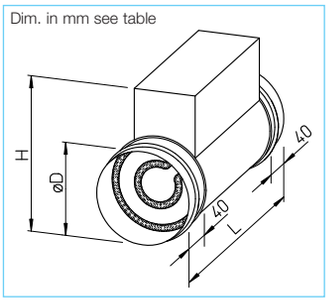
Installation

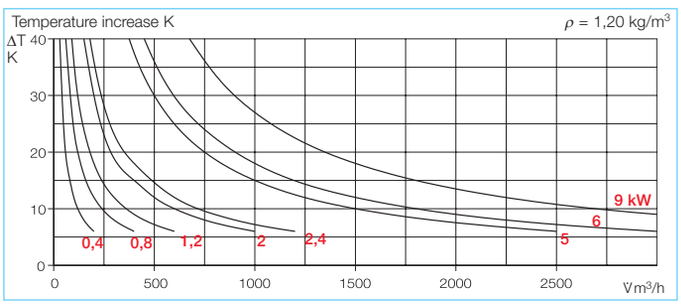
The heater must be installed downstream of the fan. If installing it before the fan, make sure that the air flow temperature at the fan does not exceed the fan's maximum temperature. A circular duct with a length of at least 1 metre must be installed between fan and heater. The heater should not be used below the minimum air flow volume of the heater battery. The electrical connection must be interlocked so that the heater cannot operate if the fan is not running. If the thermal switch releases, the heater battery must cut off automatically. The coils can be wired in groups so that the heat output can be reduced arbitrarily.

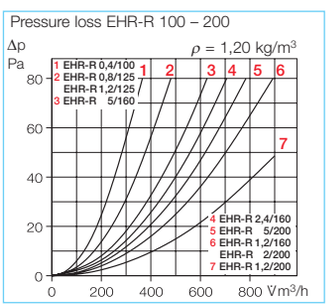
Selection and operation

The heater batteries generate an additional resistance that must be considered when designing the system. The temperature increase depends on air flow volume and heat output (see diagrams above). In order to prevent an unwanted thermal cut out, the air flow volume must be higher than the minimum figure shown in the chart.

EHR-R







Accessories

Electronic temperature control system

Type EHS see table below

Controls the heat output of the heating element by monitoring difference between the supply air temperature and the required temperature.

Duct sensor (accessory for EHS)

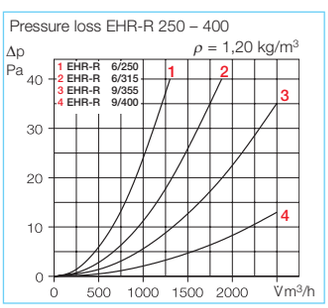
Type TFK Ref. no. 5005

Temperature sensor for detecting the air temperature in ducting.

Room sensor (accessory for EHS)

Type TFR Ref. no. 5006

Temperature sensor with integrated "desired value encoder" for surface mounting. Can also be used as temperature sensor or as desired value encoder only.



Type	Ref. no.	Motor power	Switching groups no.	Current	Minimum air flow volume	Fits fan nominal size	Wiring diagram[1]	Dimensions Ø D	H	L	Weight approx.	Suitable temperature control system	
		kW	x kW	A	m³/h	mm	No.	mm	mm	mm	kg	Type	Ref. no.
1~, 230 V													
EHR-R 0,4/100	8708	0.4	1 x 0.4	1.7	45	100	813	100	185	325	2.0	**EHS**	5002
EHR-R 0,8/125	8709	0.8	1 x 0.8	3.5	70	125	813	125	225	325	2.3	**EHS**	5002
EHR-R 1,2/125	9433	1.2	1 x 1.2	5.2	70	125	813	125	225	325	2.4	**EHS**	5002
EHR-R 1,2/160	9434	1.2	1 x 1.2	5.2	110	160	813	160	260	380	2.6	**EHS**	5002
EHR-R 2,4/160	9435	2.4	1 x 2.4	10.4	110	160	814	160	260	380	3.0	**EHS**	5002
EHR-R 1,2/200	9436	1.2	1 x 1.2	5.2	180	200	813	200	300	380	2.8	**EHS**	5002
EHR-R 2/200	9437	2.0	1 x 2.0	8.7	180	200	813	200	300	380	3.2	**EHS**	5002
2~, 400 V													
EHR-R 5/160	8710	5.0	1 x 5.0 parallel	12,5	110	160	815	160	260	380	4.0	**EHS**	5002
EHR-R 5/200	8711	5.0	1 x 5.0 parallel	12,5	180	200	815	200	300	380	4.6	**EHS**	5002
EHR-R 6/250	8712	6.0	1 x 6.0 parallel	15,0	270	250	815	250	350	380	7.3	**EHS**	5002
EHR-R 6/315	8713	6.0	1 x 6.0 parallel	15,0	420	315	815	315	415	380	9.2	**EHS**	5002
3~, 400 V													
EHR-R 9/355	8656	9.0	1 x 9,0 im Δ	13,0	550	355	816	355	455	380	12.5	**EHSD 16**	5003
EHR-R 9/400	8657	9.0	1 x 9,0 im Δ	13,0	680	400	816	400	500	380	13.1	**EHSD 16**	5003

[1] Principal wiring for all types No. 476.2

Note

DIN VDE 0100-420 must be observed on site; a proper air flow monitoring and electrical interlocking shall be provided.

Accessories

Page

Electronic temperature control system EHS 427

■ Electronic temperature control system EHS for electric heater batteries

☐ Electronic controller for electric heater batteries installed in circular or rectangular ventilation systems. Controls the heat output of heating element by monitoring the supply air temperature against the required temperature.

■ Continuous control is achieved by a proportional timer which allocates power in time intervals. The relation between on and off time periods is adjusted to the required heat. Switching sequence in compliance with electricity boards can be obtained even with high switching power.

■ Power regulation without contacts through electronic power switch.

■ Control via desired value encoder (internal or external, room sensor TFR) or via remote signal 0 – 10 V DC (only in EHSD models).

■ Application

☐ The controllers are designed to maintain a constant supply air temperature and a constant room temperature. With rapid change in supply air temperature the unit first gives a considered response whilst checking whether the change is going to be sustained and then goes to full proportional response. All models feature a night set-back facility which can be activated using a time clock (to be supplied on site externally).

☐ For safety reasons an additional air flow sensor is required to monitor the air flow.

Air flow sensor, – electronic
Type SWE Ref. no. 0065
– mechanical, from NW 315
Type SWT Ref. no. 0080
see product page.

EHS

Electronic temperature controller for electric heater batteries up to 3.5 kW (230 V)/6.4 kW (400 V)

Type EHS Ref. no. 5002

Temperature sensitive semi conductor controller. Attractive white polymer casing suitable for wall mounting. Constant supply air or room air control via built-in temperature sensor for temperature detection on installation site. Switchable on remote duct sensor or room sensor (TFK or TFR, accessory). Automatic detection of supply voltage 230 V 1 ph. or 400 V 2 ph.

Voltage	230 V, 1~ / 400 V, 2~ (automatic detection)
Loading capacity (current)	16 A
Protection to	IP 30
Dim. in mm	H 153 x W 93 x D 40
Weight	approx. 0.3 kg
Wiring diagram no.	531

EHSD

Electronic temperature controller for electric heater batteries up to 17 kW

Type EHSD 16 Ref. no. 5003

Temperature sensitive semi conductor controller. Robust aluminium casing suitable for wall and switchboard mounting. Constant supply air or room air control via external duct sensor or room sensor (TFK/TFKB or TFR, accessory). Remote control via external desired value encoder TFR or external control voltage 0 – 10 V DC.

Voltage	400 V, 3~
Loading capacity (current)	25 A
Protection to	IP 40
Dim. in mm	H 207 x W 160 x D 95
Weight	approx. 1.7 kg
Wiring diagram no.	550.2

☐ Other accessories for EHSD

In-duct temperature sensor for limiting functions.
Type TFKB Ref. no. 5009

☐ Note

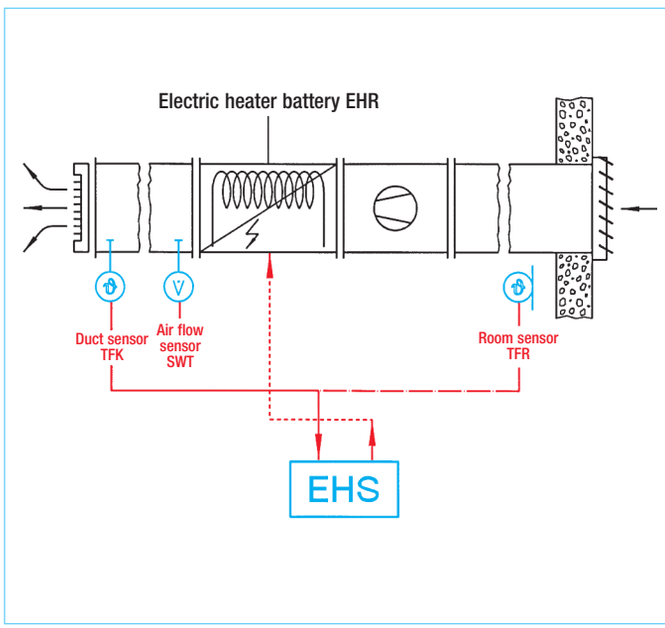
The on-site required system control which corresponds to the wiring diagrams shall be provided.

Electronic temperature controller for electric heater batteries up to 34 kW

Type EHSD 30 Ref. no. 5004

As EHSD 16 but with a maximum output of 34 kW. The total output is split into a controlled output (max. 17 kW) and an uncontrolled basic output (17 kW). If the required power exceeds approx. 17 kW the basic output of 17 kW will be activated permanently via an internal contactor. The remaining output will be temperature controlled.

Voltage	400 V, 3~
Loading capacity (current)	25 A
Protection to	IP 40
Dim. in mm	H 207 x W 160 x D 95
Weight	approx. 1.7 kg
Switch relay	Voltage 230 V~
Current	max. 5 A
Switch relay	Voltage 400 V, 3~
Current	max. 25 A
Wiring diagram no.	550.2



Duct sensor (accessory for EHS)

Type TFK Ref. no. 5005

Temperature sensor to detect the airflow temperature in ducting. Includes mounting plate to fit on duct wall.

Temperature range	0 – 30 °C
Protection to	IP 20
Length inner/outer	130 / 50 mm Ø 10 mm
Weight	approx. 0.1 kg

Room sensor (accessory for EHS)

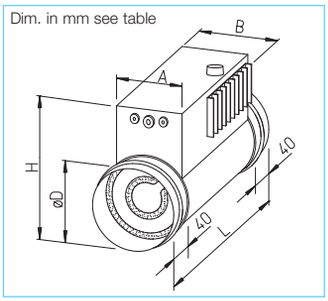
Type TFR Ref. no. 5006

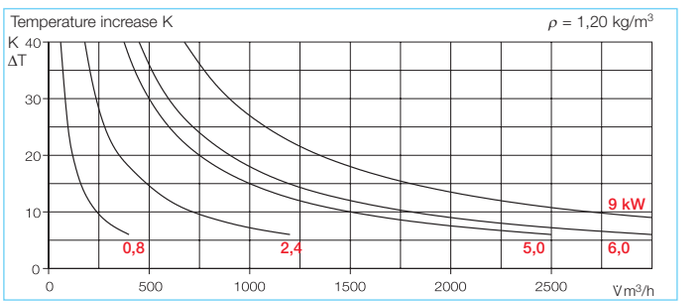
value encoder for surface mounting. Also suitable as desired value encoder or sensor only. Attractive casing made of polymer.

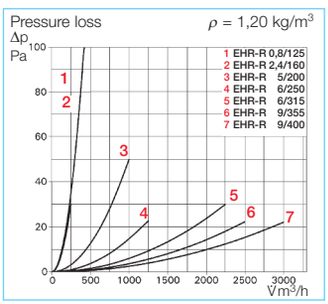
Temperature range	0 – 30 °C
Protection to	IP 20
Dim. in mm	H 86 x W 86 x D 30
Weight	approx. 0.1 kg

Electric heater battery EHR-R TR with integrated temperature control.
A convenient and easy-to-install solution for all areas where a constant room or supply air temperature is required.
Electric heater batteries EHR-R TR are equipped with an integrated temperature controller and can be mounted in the ducting in any position.
The installation is remarkably easy and space saving.

EHR-R TR







Heater battery

Enclosed, high-grade stainless steel heating elements with low surface temperature.
Casing with terminal box made from galvanised sheet steel and integrated temperature controller for installation in commercial ducting systems.
Equipped with an automatically resetting temperature limiter (activation temperature 50 °C) and a manually resettable temperature limiter (activation temperature 120 °C).

Temperature control

☐ Constant supply air control by connecting a duct sensor (TFK, accessories). Setpoint specification (0 – 30 °C) via potentiometer on outside of unit.
Room air temperature control by connecting a room sensor (TFR, accessories); Optional setpoint specification via room sensor TFR or potentiometer.
Automatic detection of supply voltage 230 V or 400 V.
Load capacity 16 A
Protection class IP 20

☐ Stepless control is achieved by pulse/pause technology, which allocates power in time intervals. The ratio between on and off time periods is adjusted to the required performance. The max. switching cycles per time unit specified by the electricity suppliers are also observed for large switching applications.

Application

☐ EHR-R TR are suitable for constant supply air temperature or for constant room temperature control. In case of rapid temperature changes in the supply air, PI control behaviour is achieved; in case of slow changes in room air, the control behaviour corresponds to a P controller.

☐ Air flow monitoring is required for safety reasons.

Flow monitors

– electronic
Type SWE Ref. no. 0065
– mechanical, over nom. size 315
Type SWT Ref. no. 0080
see product page

Installation

See description EHR-R, page 426.

Selection and operation

Heater batteries create additional pressure loss, which must be considered with regard to the dimensioning of the entire system. The temperture increase depends on power output and air flow volume (see diagram on right).
In order to prevent the unintentional disconnection of the temperature monitor, the air flow rate must be higher than the minimum figure (see table).

Accessories

Duct sensor

Type TFK Ref. no. 5005
Temperature sensor for detecting the air temperature in ducting.

Room sensor

Type TFR Ref. no. 5006
Temperature sensor with integrated setpoint device for surface installation. Also suitable purely as a temperature sensor or setpoint device.

Type	Ref. no.	Power	Switch. group no.	Current	Minimum air flow volume	fits fan nominal size	Wiring diagram	Dimensions					Weight approx.
								Ø D	H	L	A	B	
		kW	x kW	A	m³/h	mm	No.	mm	mm	mm	mm	mm	kg
1~, 230 V													
EHR-R 0,8/125 TR	5293	0.8	1 x 0.8	3.5	70	125	799.1	125	225	325	125	145	2.6
EHR-R 2,4/160 TR	5294	2.4	2 x 1.2	10.4	110	160	799.1	160	260	380	150	170	3.4
2~, 400 V													
EHR-R 5/200 TR	5295	5.0	2 x 2.5	12.5	180	200	800.1	200	300	380	150	170	4.4
EHR-R 6/250 TR	5296	6.0	2 x 3.0	15	270	250	800.1	250	350	380	150	170	4.8
EHR-R 6/315 TR	5301	6.0	2 x 3.0	15	420	315	800.1	315	415	380	150	170	6.4
3~, 400 V													
EHR-R 9/355 TR	5297	9.0	3 x 3.0	13	550	355	801.1	355	455	380	150	182	8.5
EHR-R 9/400 TR	5299	9.0	3 x 3.0	13	680	400	801.1	400	500	380	150	182	8.9

Warm water heater battery for rectangular duct connection.

Casing made of galvanised sheet steel, flanges on both sides to fit the Helios rectangular fan range.
Air heater with Al fins, with staggered copper ducting.
Operating temp. $t_{max.}$ 120 °C.
Operating pressure max. 8 bar.
Water pipes with male thread.
Equipped with water and air outlets.

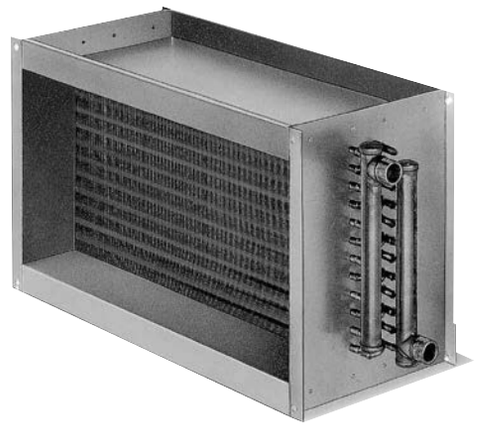
Installation

The heater must be installed downstream of the fan. If installing it before the fan, make sure that the air flow temperature at the fan does not exceed the fan's max. temperature.
To protect the heater from dirt and to prevent it from being clogged (reducing air flow and heat output) we recommend the use of the air filter KLF.
A rectangular duct with a length of at least 1 metre must be installed between fan and heater in order to ensure a balanced air flow. An air bleed valve and a water drain valve must be provided for releasing air and water from the unit.
Attention: Frost protection must be provided on-site.

Selection

The effective temperature increase depends on the variables: Air flow volume, heater output and flow temperature.
This can be determined using the following diagrams (steps ⓐ – ⓒ).
The heater outputs are also specified in the table below for some volume parameters.
When selecting a fan (volume determination), the pressure loss of the heater battery must be considered (section ⓓ), which is shown in the diagrams.

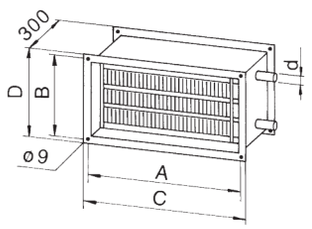
WHR Duct



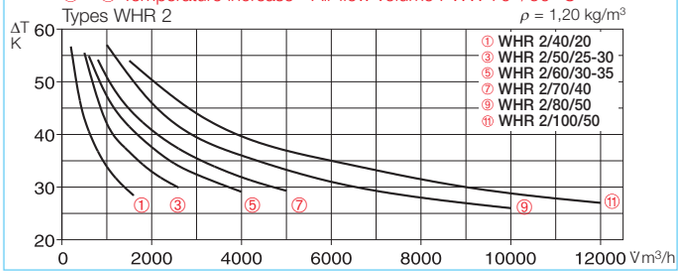
Accessories — **Page**

Temperature control system WHS HE — 432

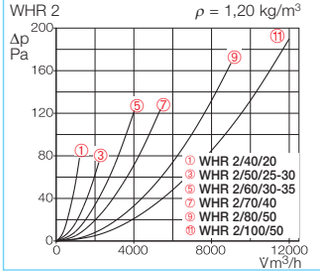
Dim. in mm see table



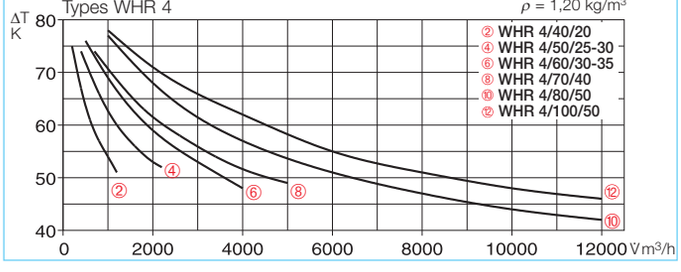
ⓐ – ⓒ Temperature increase - Air flow volume PWW 70 °/50 °C
Types WHR 2 — ρ = 1,20 kg/m³



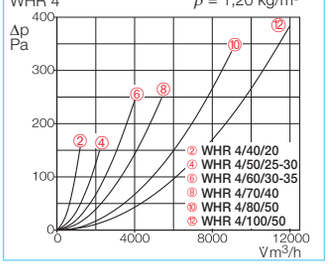
ⓓ Pressure loss - Air flow volume
WHR 2 — ρ = 1,20 kg/m³



ⓐ – ⓒ Temperature increase - Air flow volume PWW 70 °/50 °C
Types WHR 4 — ρ = 1,20 kg/m³



ⓓ Pressure loss - Air flow volume
WHR 4 — ρ = 1,20 kg/m³



ⓐ Temperature increase

Definition: $\Delta T = \vartheta_i - \vartheta_a$ [K]
ΔT: Air temperature difference [K]
ϑ_i: Air temp., outlet air heater [°C]
ϑ_a: Air temp., inlet air heater [°C]

ⓑ Air flow volume

Shown on the performance curve whereby the total resistance of the system and heater pressure loss (section ⓓ) must be considered.

ⓒ Determination heat output

$$Q_H = \frac{\dot{V} \cdot \Delta T \cdot c_{PL} \cdot \rho_L}{3600} \text{ [kW]}$$

V: Air flow volume [m³/h]
ΔT: Air temperature difference [K]
c_{PL}: Specific heat capacity of the air (1.0) [KJ/kg K]
ρ_L: Air density (1.2) [kg/m³]

ⓓ Determination pressure loss

The pressure loss in relation to air flow volume is shown in the diagrams above for the respective heater battery.

Type	Ref. no.	fits fan nominal size	Air data: Heat output		Air data: Δ T Air		Air data: at V̇	Water data[1]: pressure loss	Water data[1]: at water flow rate	Dimensions: A	B	C	D	Connection d" [3]	Weight approx.	Suitable temperature control system: Type	Ref. no.
		cm	kW[1]	kW[2]	K[1]	K[2]	m³/h	Δp$_w$ kPa	l/h	mm	mm	mm	mm	Ø"	kg		
WHR 2/40/20	8782	40/20	14	7,7	32	18	1200	10	610	420	220	450	250	3/4	7.0	**WHS HE**	8319
WHR 4/40/20	8783	40/20	22	12,6	51	29	1200	7	980	420	220	450	250	3/4	7.3	**WHS HE**	8319
WHR 2/50/25-30	8784	50/25-30	24	14	33	18	2200	7	1050	520	270/320	550	350	3/4	9.3	**WHS HE**	8319
WHR 4/50/25-30	8785	50/25-30	38	21	52	28	2200	5	1680	520	270/320	550	350	1	11.1	**WHS HE**	8319
WHR 2/60/30-35	8786	60/30-35	32	18	34	19	2600	8	1420	620	320/370	650	400	3/4	11.2	**WHS HE**	8319
WHR 4/60/30-35	8787	60/30-35	51	30	55	32	2600	7	2270	620	320/370	650	400	1	14.0	**WHS HE**[4]	8319
WHR 2/70/40	8788	70/40	50	28	30	17	4500	6	2200	720	420	750	450	1	17.0	**WHS HE**	8319
WHR 4/70/40	8789	70/40	81	44	50	27	4500	4	3570	720	420	750	450	1	17.0	—	—
WHR 2/80/50	8795	80/50	82	46	28	16	8000	11	3630	820	520	850	550	1	15.0	—	—
WHR 4/80/50	8796	80/50	138	80	48	28	8000	15	6110	820	520	850	550	1	20.0	—	—
WHR 2/100/50	8797	100/50	104	59	29	18	10000	19	4630	1020	520	1050	550	1	18.0	—	—
WHR 4/100/50	8798	100/50	172	99	48	28	10000	14	7640	1020	520	1050	550	1	24.0	—	—

The values apply for supply air temp. 0 °C and flow/return temperatures: [1] 90/70 °C, [2] 60/40 °C [3] 3/4"= 19.05 mm, 1"= 25.4 mm, male thread [4] for reduced heat output to approx. 2200 l/h

Warm water heater battery for installation in ducting.

Casing made of galvanised sheet steel, fits the Helios rectangular fan range. Spigots have double lip rubber seals on both sides to fit the nominal duct size. Air heater with Al fins moulded to copper ducting.
Operating temp. $t_{max.}$ 100 °C.
Operating pressure max. 8 bar.
Water connection pipe with male thread. Two inspection openings on water connection side for easy cleaning. With drain/vent valve.

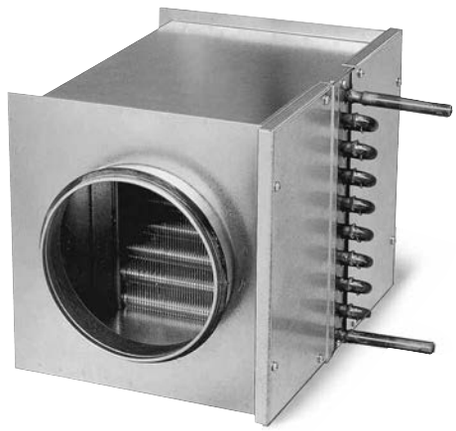
Installation

The heater must be installed downstream of the fan. If installing it before the fan, make sure that the air flow temperature at the fan does not exceed the fan's max. temperature.
To protect the heater from dirt and to prevent it from being clogged, we recommend the use of the air filter KLF.
A circular duct with a length of at least 1 metre must be installed between fan and heater in order to ensure a balanced air flow. An air bleed valve and a water drain valve must be provided for releasing air and water from the unit.
Attention: Frost protection must be provided on-site.

Selection

The effective temperature increase depends on the variables: Air flow volume, heater output and flow temperature.
This can be determined using the following diagrams (steps ⓐ–ⓒ).
The heater outputs are also specified in the table below for some volume parameters.
When selecting a fan (volume determination), the pressure loss of the heater battery must be considered (section ⓓ), which is shown in the diagrams.

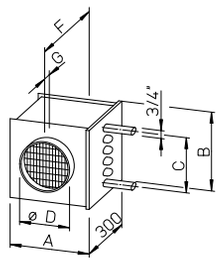
WHR Duct



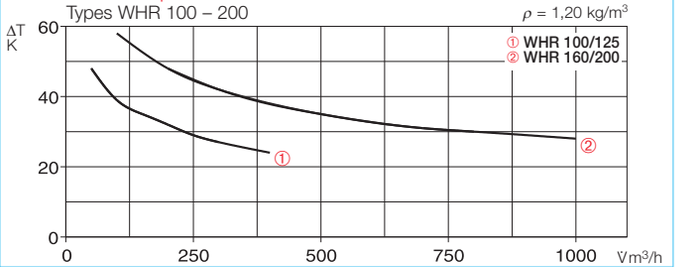
Accessories **Page**

Temperature control systems
WHST, WHS HE 431 on

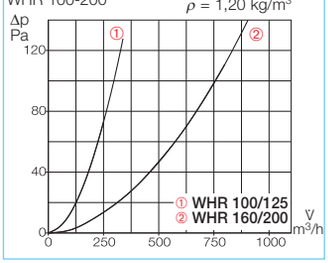
Dim. in mm see tables



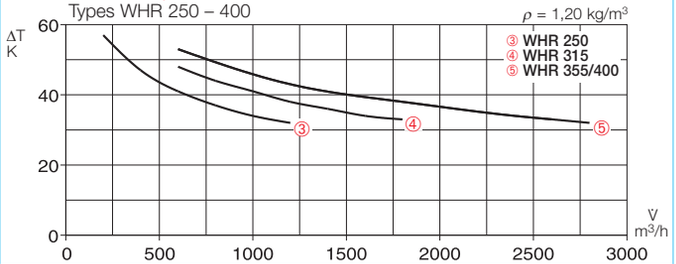
ⓐ – ⓒ Temperature increase - Air flow volume PWW 80 °/60 °C
Types WHR 100 – 200



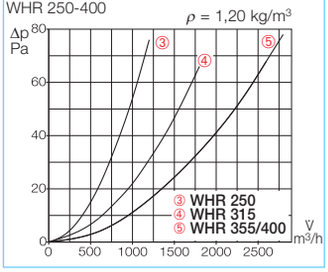
ⓓ Pressure loss - Air flow volume
WHR 100-200



ⓐ – ⓒ Temperature increase - Air flow volume PWW 80 °/60 °C
Types WHR 250 – 400



ⓓ Pressure loss - Air flow volume
WHR 250-400



ⓐ Temperature increase

Definition: $\Delta T = \vartheta_i - \vartheta_a$ [K]
ΔT: Air temperature difference [K]
ϑ_i: Air temp., outlet air heater [°C]
ϑ_a: Air temp., inlet air heater [°C]

ⓑ Air flow volume

Shown on the performance curve whereby the total resistance of the system and heater pressure loss (section ⓓ) must be considered.

ⓒ Determination heat output

$$Q_H = \frac{\dot{V} \cdot \Delta T \cdot c_{PL} \cdot \rho_L}{3600} \text{ [kW]}$$

V̇: Air flow volume [m³/h]
ΔT: Air temperature difference [K]
c_{PL}: Specific heat capacity of the air (1.0) [KJ/kg K]
ρ_L: Air density (1.2) [kg/m³]

ⓓ Determination pressure loss

The pressure loss in relation to air flow volume is shown in the diagrams above for the respective heater battery.

Type	Ref. no.	fits duct diameters	Air data: Heat output		Δ T Air		at V̇	Water data[1]: Pressure loss	at water flow rate	Dimensions: A	B	C	Ø D	G	F	Connection d" [3]	Weight approx.	suitable temperature control system: Type	Ref. no.
		Ø mm	kW[1]	kW[2]	K[1]	K[2]	m³/h	Δp_w kPa	l/h	mm	mm	mm	mm	mm	mm	Ø"	kg		
WHR 100	9479	100	1.9	0.9	35	17	150	1	84	161	180	140	100	45	387	3/4	3.2	**WHST 300 T38**[4]	8817
WHR 125	9480	125	2.6	1.1	29	13	250	2	115	161	180	140	125	45	387	3/4	3.2	**WHST 300 T38**[4]	8817
WHR 160	9481	160	5,5	3.1	38	22	400	11	245	236	255	215	160	45	387	3/4	4.9	**WHST 300 T38**[4]	8817
WHR 200	9482	200	7.2	4.1	33	19	600	17	317	236	255	215	200	45	387	3/4	4.9	**WHST 300 T38**[4]	8817
WHR 250	9483	250	10.7	6	37	21	800	8	470	311	330	290	250	65	427	3/4	6.9	**WHS HE**	8319
WHR 315	9484	315	18.3	10.4	36.2	21	1400	9	810	396	405	365	315	56	410	3/4	9.0	**WHS HE**	8319
WHR 355	8790	355	24.5	14	38	21.6	1800	9	1080	461	480	420	355	56	410	3/4	12.5	**WHS HE**	8319
WHR 400	9524	400	26.2	15	36	21	2000	11	1060	461	480	420	400	66	430	3/4	12.5	**WHS HE**	8319

The values apply for supply air temp. 0 °C and flow/return temperatures: [1] 90/70 °C [2] 60/40 °C [3] 3/4"= 19.05 mm, 1"= 25.4 mm, male thread [4] alternative WHST 300 T50, see page 137 (Ref. no. 8820)

WHST 300 T38

Note
Air temperature control for warm water heater batteries WHR. For constant supply air temperature between 20 – 50 °C, we recommend **Type WHST 300 T50** (see page 137) Ref. no. 8820

Air temperature control WHST 300 T38 for warm water heater batteries

- To control air heating of the warm water heater batteries for lower output to 5.5 kW and flow rate to 300 l/h.
- An ideal supplement for ventilation units with heat recovery and PWW auxiliary heating, as well as for warm water heater batteries WHR 100 to WHR 200.
- A simple, cost effective and easy-to-install solution.

Specification / Application

WHST 300 T38 consists of a thermostat with remote control and remote sensor and is suitable for systems in which the water pressure of the heating circuit can provide this application.
The proportional controller, which operates as a conventional heating valve without electrical supply energy, is continuously adjustable and changes the temperature through variation of hot water flows.

Control options

Control options through modification of the hot water flow:
- **Constant supply air temperature control** by positioning the capillary tube sensor in the air flow.
- **Constant room tempera ture control** by positioning the capillary tube sensor in the room.
- **Arbitrary limitation of the temperature range** by defining the minimum and maximum values.
- **Frost protection** activated at +8 °C.

Product contents

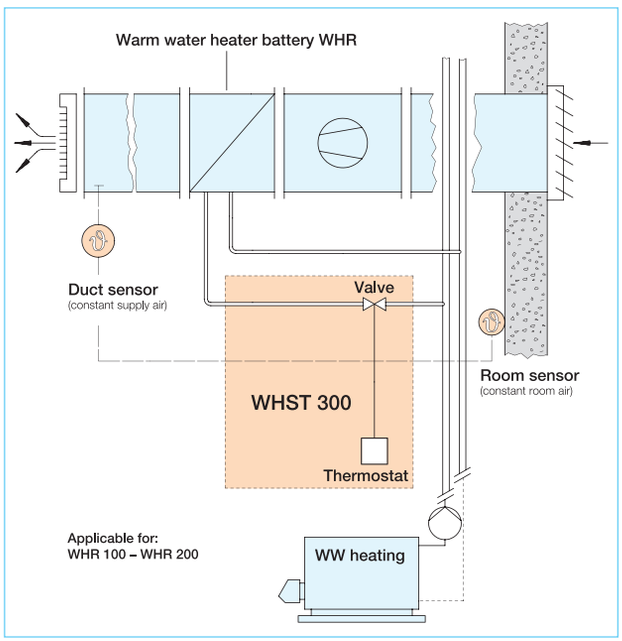
Complete set, including
– Thermostat for room installation,
– Straight way valve
– Set piston
– Capillary tube remote sensor
– Fittings

Installation

The capillary tube must be located in a position so that it s not buckled or flattened.
To keep the room temperature constant the remote sensor should be installed in the room where the predetermined temperature conditions are present.

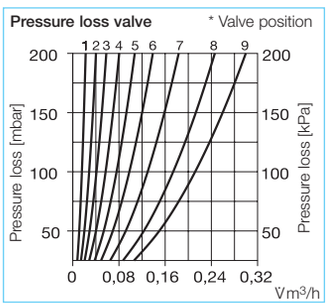
Design

The WHST 300 T38 control can be used in heater batteries up to 300 l/h water flow rate. The pressure drop, which must be overcome by an on site pump, appears as the sum of Δp heater battery Δp valve (see diagram) and Δp ducting.



Technical data

Type	WHST 300 T38
Ref. no.	8817
Max. operating pressure	10 bar
Max. operating temperature	120 °C
Connection DN 20	3/4"
Max. air flow	300 l/h
Differential pressure	0.4 K / 0.5 bar
Setpoint range (Thermostat)	8–38 °C
Dimensions in mm	
– Thermostat	W 80 x H 80 x D 50
– Remote sensor	W 35 x H 85 x D 30
Mounting thread DN 20	G 3/4"
Capillary tube length	5 m
Weight (complete)	0.5 kg



* Note: The valve is factory-adjusted to position 9. For lower volumes of water it can be adjusted between 1 and 9 in order to optimise the control mode.

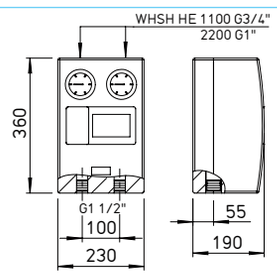
WHS HE

Hydraulic unit WHSH HE 24 V

Electronic control unit WHSE

Room temperature sensor TFR

Duct temperature sensor TFK



Other dim. in mm see table

Air temperature controller WHS HE for warm water heater batteries

- To control air heating of the warm water heater batteries for a maximum output of 70 kW and a flow rate of between 200 and 2200 l/h.
- Fits to Helios heater batteries WHR-R 250 – 400 and WHR-K up to 2200 l/h.
- Complete system with various control options where all the components are compatible with each other.

Application

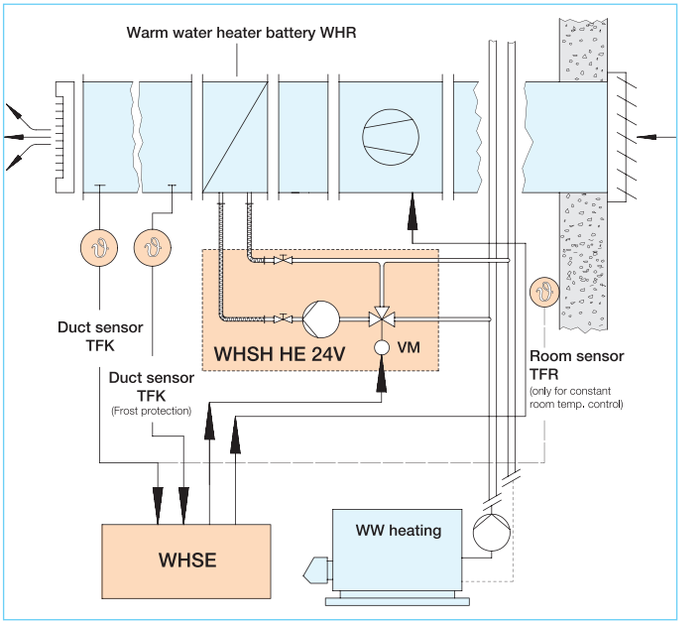
- Connection on existing heating circuit to supply e.g. a separate cord. A separate heating circuit creation is achieved by means of an integrated pump.
- The hydraulic component WHSH HE 24 V is used to operate heating circuit in connection with Helios warm water heater batteries. The flow temperature to the heater battery is controlled using a 3-way-valve, which is operated by an electric servo motor 24 V.
- Delivered as a fully wired and easy-to-install set with preinstalled, thermally insulated hydraulic unit.

Control options

- Constant supply air temperature control by means of duct sensor TFK.
- Constant room temperature control by means of external room sensor TFR.
- Constant room temperature control with minimum limitation of the supply temperature through use of room and duct sensors.
- Frost protection for all the three versions by using a second duct sensor TFK.
- WHS HE also offers the possibility of setpoint control e.g. for night and weekend cutout as well as the connection of other sensors or setpoint devices.

Scope of delivery / Specification

- Hydraulic unit WHSH HE 24 V with
  - Electronic circulating pump with automatic ventilation function, 2 m connection cable.
  - Flow/return stop valve with integrated temperature display.
  - 24 V servo motor with limit switch, manual operation possible. Connection cable (2.2 m).
  - Three-way-valve.
  - Thermal jacket made of EPP foam.
  - Gasket set and two flexible hoses DN 25 (stainless steel, 50 cm long) for battery-side connection.
  - Reducer nipple, 3/4" – 1".
- Electronic control unit WHSE, for installation in switch cabinet. Functions:
  - Pre-set temperature specification for operation with constant supply air temperature.
  - Adjustment of cascade factors.
  - Minimum limitation.
  - Adjustment/selection of the control mode.
  - Operating display.
  - Frost protection: alarm and reset.
  - Operating display servo motor.
  - Potential-free output for alarm 24 V and 230 V circuit.
- Two temperature sensors TFK for in-duct installation.
- One room temperature sensor TFR.



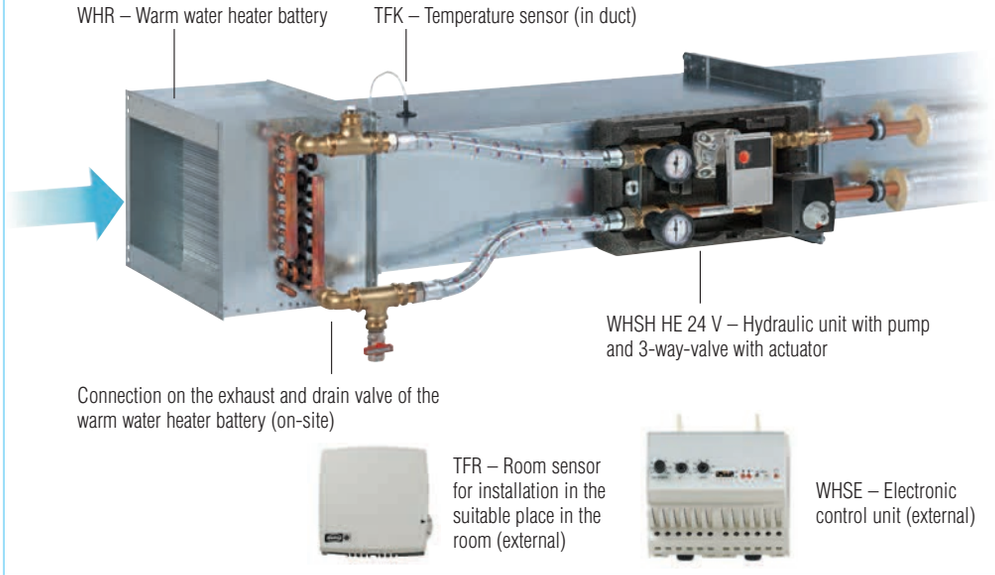
Type		WHS HE
Ref. no.		8319
Max. operating pressure		6 bar
Max. operating temperature		120 °C
KVS value		5.1
Min. / Max. air flow		200[1] – 2200 l/h
Differential pressure		0.1 – 0.7 K / 0.5 bar
Setpoint range (Thermostat)		7 – 28 °C
Ambient temperature (electronic control system)		0 – 50 °C
Protection class (electronic control system)		IP 20
Power consumption	– Pump	3 ... 45 W
	– Servo motor	2.5 W
	– Electronic control system	5 W
Voltage	– Pump / electronic control system	230~ V / 50 Hz
	– Servo motor	24~ V / 50/60 Hz
Wiring diagram no.		953
Dim. in mm	– Hydraulic unit[3]	see dimensional drawing
	– Electronic control system WHSE[3]	H 80 x W 100 x D 85
	– Room sensor TFR	H 80 x W 85 x D 30
	– Duct sensor TFK	130/50[2], Ø 10
Weight approx. kg		9.0

[1] Control problems may occur at lower water flow volumes
[2] Length inside/outside
[3] Single order of WHS HE system components by request.

Installation

The heater battery WHR and the duct sensor TFK must be installed downstream of the fan in ducting.
The hydraulic unit WHSH HE 24 V must be fixed independently and safely.
The expansion forces or the dead weight of ducting must not burden the connections.
The exhaust valve shall be installed at the highest position whereas the drain valve shall be installed at the lowest position of the circuit
The electronic control unit WHSE (IP 20) can be mounted on the DIN-profile rail in the switch cabinet.

Application example



TFR – Room sensor for installation in the suitable place in the room (external)

WHSE – Electronic control unit (external)

Design

① Selection of the requested PWW heater batteries based on the air flow volume, design (duct dimensions) and required heat output.
– WHR-R, circular p. 430
– WHR-K, rectangular p. 429

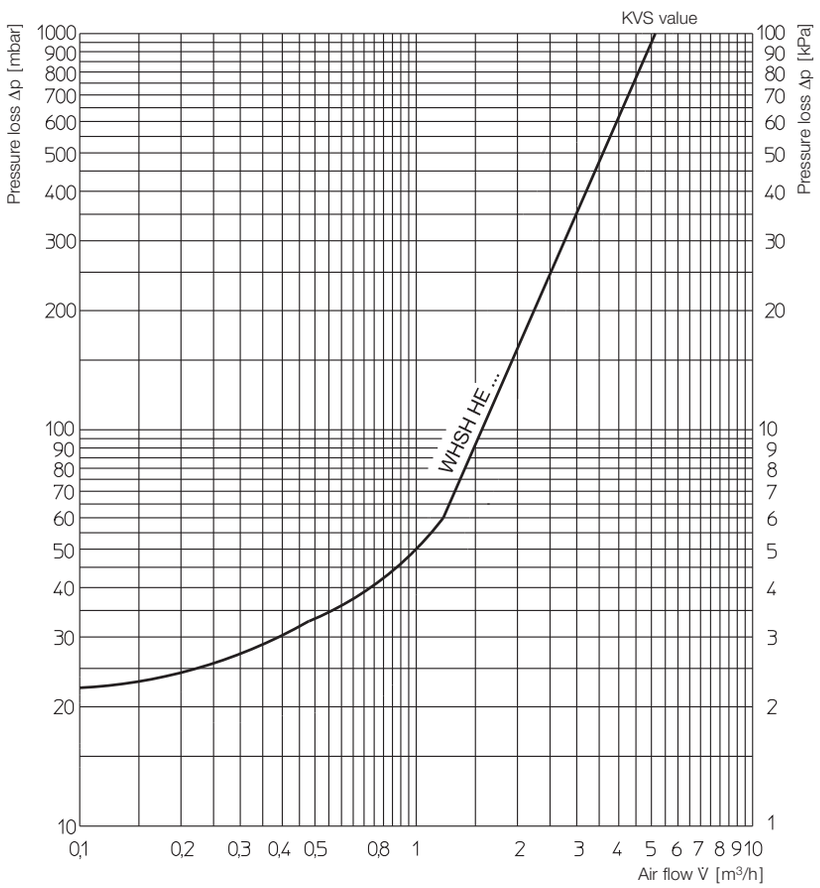
② Determination of pressure loss of the on-site ducting system.

③ Sum of losses of all components:
Δp total =
Δp heater battery
+ Δp ducting system
+ Δp WHSH HE

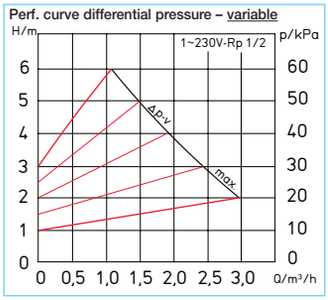
④ Adjustment of required differential pressure Δp total on circulating pump control knob.

Diagram

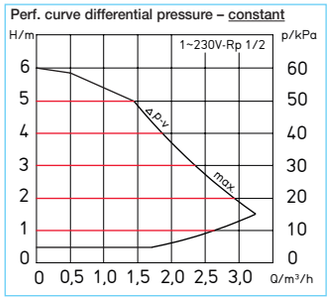
Pressure loss hydraulic unit incl. flexduct



Perf. curve differential pressure – variable



Perf. curve differential pressure – constant



Information	Page
Other WHSH hydraulic units	
– for KWL® units with PWW auxiliary heating	**137**
WHSH HE 24 V (0-10 V) No. 8318	
– for ALB WW	**291 on**
WHSH HE 24 V (0-10 V) No. 8318	

General information

If the noise emissions of a fan exceed the permitted level, passive measures must be taken to reduce noise. The use of attenuators according to the absorption principle is a good option here. This type of attenuator guarantees noise insulation with low pressure losses.

Helios offers attenuators that are perfectly suited to Helios fans. Pipeline and duct attenuators with corresponding housing forms are available. Of course, all types of attenuators can also be used with fans from other companies.

Helios attenuators have a coating of galvanised sheet steel and splitters of high-quality mineral wool, which are covered from the air flow by abrasion-resistant fleece.

Technical information Sound absorption

The benchmark for sound absorption is the insertion attenuation according to DIN EN ISO 14163. It constitutes the sound level reduction in a pipeline or duct section with and without an attenuator calculated by way of a comparative measurement.

When performing the measurement without an attenuator, an acoustically hard spacer is used in its place. Thus the insertion attenuation is calculated:

$D_e = L_o - L_m$ dB
L_o: Level without attenuator
L_m: Level with attenuator

However, as the effectiveness of an attenuator is heavily dependent on the frequency, the insertion attenuation is stated as a function of the frequency range. The insulation of low-frequency noise requires a greater damper volume than the insulation of higher-frequency noise and is therefore associated with greater effort.

For this reason, knowledge of the noise spectrum (octave and one-third octave spectrum) of the fan is necessary when selecting an attenuator. When performing an acoustic assessment of a ventilation system, it should be noted that other system components, such as manifolds, changing cross sections and branches, also have a sound-insulating effect.

More exact information on this is found in the VDI Directive 2081 – Sound generation and noise reduction in air conditioning systems.
The lower limit of the sound emissions of a system is formed by the generation of flow noise in the attenuator and system components. These are amplified considerably as the flow rate increases. Therefore the flow rates should be kept as low as possible.

Quick selection of an attenuator

An average insulation value is stated in the type table (column with the red background on the far right) for a quick selection of pipeline and duct attenuators. This value is to be deducted from the sound power level (L_{WA} total) of the fan. As a result, you get the sound power level of the fan reduced by the noise insulation (L_{WA} reduced).

This method of selection, which is different to the frequency band calculation, is based on rounding. A calculation according to the octavo (see adjacent example) produces more accurate values.

Example:

Available:
Fan type VARD 225/2
Selected: Duct insulator RSD 225/600 (construction length = 600 mm)

Sound power level of the fan
L_{WA} total = 81 dB(A)

Average sound absorption of the attenuator
minus = 15 dB(A)

= Reduced sound power level
L_{WA} reduced = 66 dB(A)

Designations

L_{WA} total = sound power level of the fan in dB(A) (from the table above the set of characteristic curves).

Average insulation value = derived damping capacity of the attenuator in dB(A) (from the column with the red background of the attenuator type table).

L_{WA} reduced = sound power level in dB(A) reduced by the use of an attenuator.

Sound level calculation

To determine the sound level after using an attenuator, the insertion attenuation is to be deducted from the level of the band of the fan using the frequency band and the total sound level calculated from this. As a rule, this is done in octavos. For larger insertion attenuations, multiple attenuators with the same diameter may be arranged one after another. The example below explains the method.
Task at hand: Reducing the noise from a fan type VARD 225/2 (2800 min^{-1}) using a RSD 225/600 attenuator (basic length 2).

	Octave medium frequency Hz							
	125	250	500	1000	2000	4000	8000	
A-weighted octave level $L_{WA, Okt}$ of fan VARD 225/2	51	62	74	76	76	72	63	dB(A)
A-weighted total sound power level L_{WA}	L_{WA} = 81 dB(A)							
Insertion insulation level of the attenuator D_e RSD 225/600 (2 x basic length)	4	10	17	27	25	17	14	dB
A-weighted octave level $L_{WA, Okt}$ of fan with attenuator	47	52	57	49	51	55	49	dB(A)
A-weighted total sound power level L_{WA}* of the fan with attenuator	L_{WA}* = $10 \cdot \lg(10^{47 \cdot 0,1} + 10^{52 \cdot 0,1} + 10^{57 \cdot 0,1} + 10^{49 \cdot 0,1} + 10^{51 \cdot 0,1} + 10^{55 \cdot 0,1} + 10^{49 \cdot 0,1})$ = 61 dB(A)							
Relevant A-weighted sound pressure level at 1 m distance	L_{pA}* = 53 dB(A)							

■ Rectangular attenuator KSD

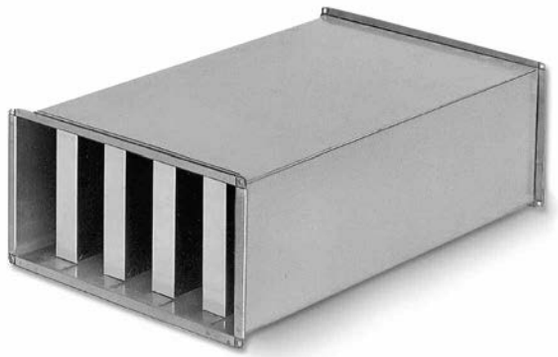
□ Design – Installation

Casing made from galvanised sheet steel, with flanges to fit the fan dimensions, door installation in-line with the ducting inlet or outlet. In order to reduce structure-borne sound transmission, a flexible connector (VS or VS Ex) should be installed between fan/attenuator and ducting.

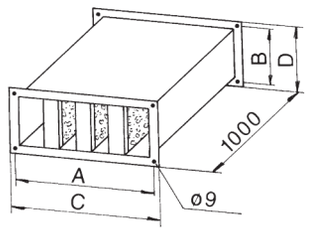
□ Pressure loss

The attenuator will add an additional resistance to the duct system (see diagram), which must be considered when selecting a fan. These values apply for equal inflows. In case of unequal flow (e.g. rectangular fan outflow), a 1 metre section of straight ducting can be fitted between fan and attenuator or allow for higher resistance.

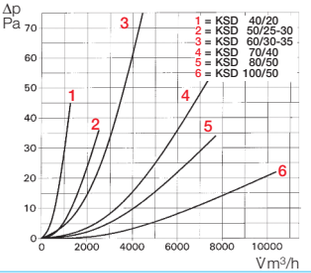
KSD



Dim. in mm see table



Pressure loss KSD



□ Information	Page
Selection acoustic calculation	434

Type	Ref. no.	Duct size in cm	No. inserts	Dimensions in mm A	B	C	D	Weight approx. kg	Insertion insulation level D_E dB at Hz 125	250	500	1000	2000	4000	8000	average insulation
KSD 40/20	8728	40/20	3	420	220	443	240	13	8	11	23	31	31	26	18	17
KSD 50/25-30	8729	50/25-30	3	520	270/320	540	340	16.5	6	9	19	25	25	20	15	14
KSD 60/30-35	8730	60/30-35	4	620	320/370	640	390	20	7	10	21	28	28	23	16	12
KSD 70/40	8731	70/40	4	720	420	740	440	25	6	8	18	24	24	20	14	12
KSD 80/50	8732	80/50	5	820	520	840	540	31	7	9	19	26	26	21	15	14
KSD 100/50	8733	100/50	5	1020	520	1040	540	35	5	7	16	21	21	17	12	11

■ Flexible circular attenuator FSD

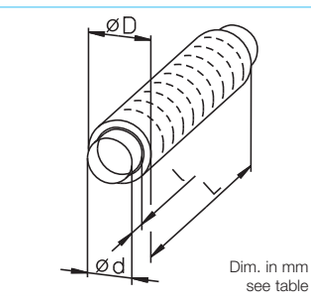
□ Design – Installation

Robust flexible aluminium ducting with inner perforated face retaining the resin bounded attenuation packing of 50 mm thickness. Spigotted on both ends to fit into nominal size ducting or to be fixed with pipe clamp connectors BM on fan or ducting. The flexible body allows easy installation.

□ Pressure loss

The pressure loss is 4 times the friction resistance.

FSD



Dim. in mm see table

□ Information	Page
Selection acoustic calculation	434

Type	Ref. no.	Dimensions in mm L	Ø D	Ø d	l	Insertion insulation level dB at Hz 250	500	1000	2000	Weight approx. kg	average insulation
FSD 100	0676	1000	210	99,5	60	17	33	48	40	1.1	25
FSD 125	0677	1000	240	124,5	60	13	27	47	22	1.5	20
FSD 160	0678	1000	262	159,5	60	12	26	45	20	2.0	19
FSD 200	0679	1000	313	199,5	60	10	22	31	10	2.5	16
FSD 250	0680	1000	363	249,5	85	8	15	26	8	3.2	12
FSD 315	0681	1000	418	314,5	85	7	15	25	8	4.2	11
FSD 355	0682	1000	464	354,5	85	5	13	19	8	4.7	9
FSD 400	0683	1000	514	399,5	90	5	13	19	8	5.3	9

Design – Installation

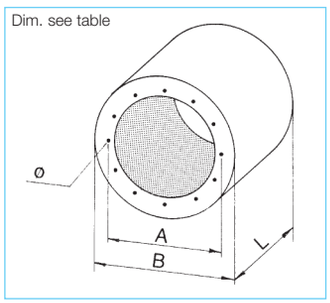
Casing made of galvanised sheet steel. Cladding with high-quality mineral wool covered with fleece to prevent abrasion. Dimensions and fixing holes of all sizes fit the nominal diameter of the fan (R 20). Fixing holes according to DIN 24155, Pt. 2.

Insertion insulation

For larger insertion insulation, several attenuators with the same diameter can be installed in-line.

Pressure loss

The resistance of the RSD attenuators is very low. When designing the system, twice the friction resistance should be into account.



RSD

Information	Page
Selection acoustic calculation	434

Type Nominal Ø	Ref. no	Basic length	Dimensions in mm L	A	B	Hole Ø	Weight approx. kg	Insertion insulation level D_e dB 125	250	500	1000	2000	4000	8000	average insulation
RSD 225/ 300	8734	1	300	259	404	6 x M 6	7	2	5	9	14	13	8	6	8
RSD 225/ 600	8735	2	600	259	404	6 x M 6	12	4	10	17	27	25	17	14	15
RSD 225/ 900	8736	3	900	259	404	6 x M 6	17	7	13	25	33	31	20	16	20
RSD 250/ 300	8737	1	300	286	404	6 x M 6	7	3	5	8	8	9	7	5	8
RSD 250/ 600	8738	2	600	286	404	6 x M 6	12	5	10	16	24	19	14	10	15
RSD 250/ 900	8739	3	900	286	404	6 x M 6	16	6	12	22	28	21	15	11	18
RSD 280/ 400	8740	1	400	322	454	8 x M 8	10	4	5	8	14	9	8	6	8
RSD 280/ 800	8741	2	800	322	454	8 x M 8	18	7	9	16	28	18	17	14	14
RSD 280/1200	8742	3	1200	322	454	8 x M 8	25	9	12	23	37	23	20	16	18
RSD 315/ 400	8743	1	400	356	504	8 x M 8	11	3	3	7	13	8	7	5	5
RSD 315/ 800	8744	2	800	356	504	8 x M 8	19	6	8	14	26	16	12	9	12
RSD 315/1200	8745	3	1200	356	504	8 x M 8	28	9	12	21	36	18	17	14	18
RSD 355/ 400	8746	1	400	395	564	8 x M 8	13	3	4	7	11	7	6	4	6
RSD 355/ 800	8747	2	800	395	564	8 x M 8	23	6	7	13	22	14	12	8	11
RSD 355/1200	8748	3	1200	395	564	8 x M 8	33	8	11	17	29	18	15	10	17
RSD 400/ 400	8749	1	400	438	564	12 x M 8	12	3	4	6	9	7	5	3	6
RSD 400/ 800	8750	2	800	438	564	12 x M 8	21	6	6	12	18	13	12	8	9
RSD 400/1200	8751	3	1200	438	564	12 x M 8	30	7	10	14	22	18	13	9	15
RSD 450/ 400	8752	1	400	487	634	12 x M 8	17	4	5	8	10	8	7	5	8
RSD 450/ 800	8753	2	800	487	634	12 x M 8	27	6	7	13	18	13	12	9	11
RSD 450/1200	8754	3	1200	487	634	12 x M 8	38	8	10	18	23	17	14	10	15
RSD 500/ 600	8755	1	600	541	714	12 x M 8	27	4	5	9	11	9	9	6	8
RSD 500/ 900	8756	2	900	541	714	12 x M 8	36	6	8	14	16	13	13	9	12
RSD 500/1200	8757	3	1200	541	714	12 x M 8	45	8	11	22	24	17	16	12	17
RSD 560/ 600	8758	1	600	605	804	8 x M 10	32	3	5	9	9	8	8	6	8
RSD 560/1200	8759	2	1200	605	804	8 x M 10	52	6	10	19	19	16	13	10	15
RSD 630/ 600	8760	1	600	674	900	8 x M 10	44	3	5	8	8	8	7	5	8
RSD 630/1200	8761	2	1200	674	900	8 x M 10	68	5	10	16	15	15	11	8	15
RSD 710/ 600	8762	1	600	751	1000	8 x M 10	51	3	5	7	7	7	6	4	8
RSD 710/1200	8763	2	1200	751	1000	8 x M 10	80	5	10	14	13	13	10	7	15
RSD 800/ 600	8764	1	600	837	1100	12 x M 10	57	2	5	7	6	6	5	4	8
RSD 800/1200	8765	2	1200	837	1100	12 x M 10	88	5	9	13	11	11	9	6	14
RSD 900/ 900	8766	1	900	934	1220	12 x M 10	82	2	4	10	9	6	5	4	6
RSD 900/1800	8767	2	1800	934	1220	12 x M 10	135	4	9	21	17	13	9	8	14
RSD 1000/ 900	8768	1	900	1043	1350	12 x M 10	96	2	4	8	7	5	4	3	6
RSD 1000/1800	8769	2	1800	1043	1350	12 x M 10	157	4	7	16	14	10	7	6	11
RSD 1120/ 900	8770	1	900	1174	1350	12 x M 10	81	2	3	7	6	4	3	3	5
RSD 1120/1800	8771	2	1800	1174	1350	12 x M 10	136	3	6	14	11	8	6	5	9
RSD 1250/ 900	8772	1	900	1311	1460	12 x M 10	86	1	2	5	4	3	2	2	3
RSD 1250/1800	8773	2	1800	1311	1460	12 x M 10	146	2	4	11	9	7	5	4	6