WHS HE

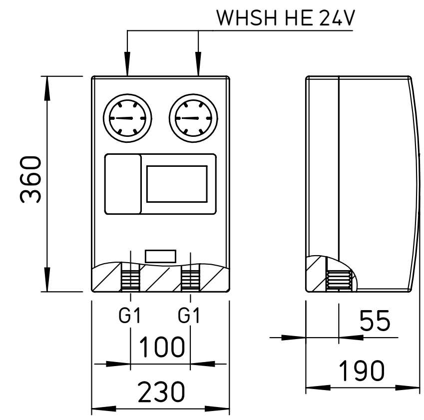
Hydraulic unit WHSH HE 24 V

Electronic control unit WHSE

Room temp. sensor TFR

Rect. duct temp. sensor TFK

Dimensions WHS HE



Other dim. in mm see table

Air temperature control WHS HE for warm water heating elements

- For the air heating control of warm water heating elements with a maximum output of approx. 70 kW and a flow rate between 200 and 2200 l/h.
- Compatible with the Helios heating elements WHR-R 250 – 400 and WHR-K up to 2200 l/h.
- Complete system with multiple control options and matched components.

Application

- Connection to existing heating circuits to supply e.g. a separate section. For creating a separate heating circuit using the integrated pump.
- The hydraulic assembly WHSH HE 24 V is used to operate a heating circuit in combination with Helios warm water heating elements. The flow temperature to the heating element is controlled using a 3-way valve, which is operated by a 24 V electric servomotor.
- Delivered as a ready-to-connect, easy-to-install set. With premounted, thermally insulated hydraulic unit.

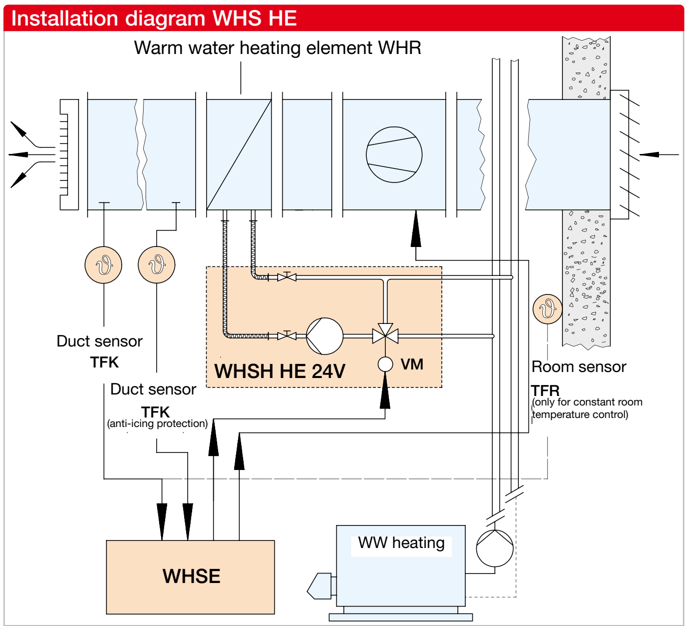
Control options

- Constant supply air temperature control using duct sensor TFK.
- Constant room temperature control using external room sensor TFR.
- Constant room temperature control with minimum limit for supply air temperature through the room and duct sensors.
- Frost protection for all three variants by using a second duct sensor TFK.
- WHS HE also offers the option of setpoint control e.g. for night and weekend deactivation as well as the connection of additional sensors or setpoint adjusters.

Scope of delivery/Description

- Hydraulic unit WHSH HE 24 V with:
  – Electronic circulating pump with automatic ventilation function, 2 m connection cable.
  – Flow/return shut-off valves with integrated temperature display.
  – 24 Volt servomotor with end switch, manual operation possible. Connection cable (2.2 m).
  – Three-way valve.
  – Thermal cladding made of EPP foam.
  – Sealing kit and two flexible reinforced hoses DN 25 (stainl. steel, 50 cm long) for element-side connection.
  – Reduction nipple, 3/4" – 1".
- Electronic control unit WHSE, for switch cabinet installation. Functions:
  – Setpoint temp. specification for operation with constant supply air temperature.
  – Cascade factor setting.
  – Minimum limit.
  – Setting/selection of control modes.
  – Operating display.
  – Frost protection: Alarm and reset.
  – Servomotor operating display.
  – Potential-free output for alarm 24 V and 230 V circuit.
- Two temperature sensors TFK for rectangular duct installation.
- One room temperature sensor TFR.

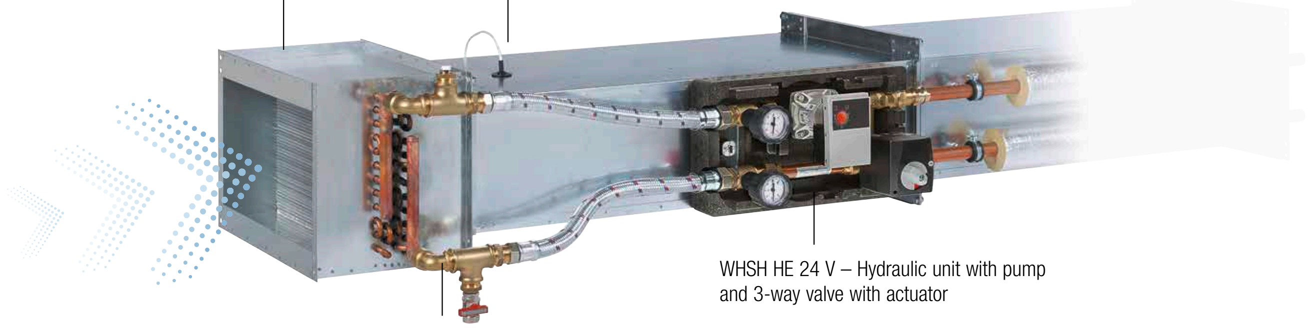
Installation diagram WHS HE



Type		WHS HE
Ref. no		08319
Max. operating pressure		6 bar
Max. operating temperature		120 °C
KVS value		5.1
Min. / Max. flow rate		200 [1] – 2200 l/h
Differential pressure influence		0.1 – 0.7 K / 0.5 bar
Setpoint range (thermostat)		7 – 28 °C
Ambient temperature (control electronics)		0 – 50 °C
Protection category (control electronics)		IP20
Power consumption	– Pump	3 ... 45 W
	– Servomotor	2.5 W
	– Control electronics	5 W
Voltage	– Pump / control electronics	230~ V / 50 Hz
	– Servomotor	24~ V / 50/60 Hz
Wiring diagram no.		953
Dimensions in mm	– Hydraulic unit [3]	See dimensional drawing
	– Control electronics 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] Low water flow rates can cause control problems. [2] Length internal/external.
[3] One-off orders of WHS HE system components upon request.

Application example



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

WHSE – Electronic control unit (external)

Installation instructions

The heating element WHR and duct sensor TFK must be attached on the air-side in the duct system downstream of the fan.
The hydraulic unit WHSH HE 24 V must be fixed independently and securely. Expansion forces or the dead weight of the duct system must not burden the connections.
The vent valve must be attached at the highest point and the drain valve must be attached at the lowest point of the circuit.
The electronic control unit WHSE (IP 20) can be installed in the switch cabinet on DIN profile rails.

Design

① Selection of the desired PWW heating element using the air volume flow, the design (duct dimensions) and the required heat output
– WHR-R, round ducts p. 490
– WHR-K, rect. ducts p. 489

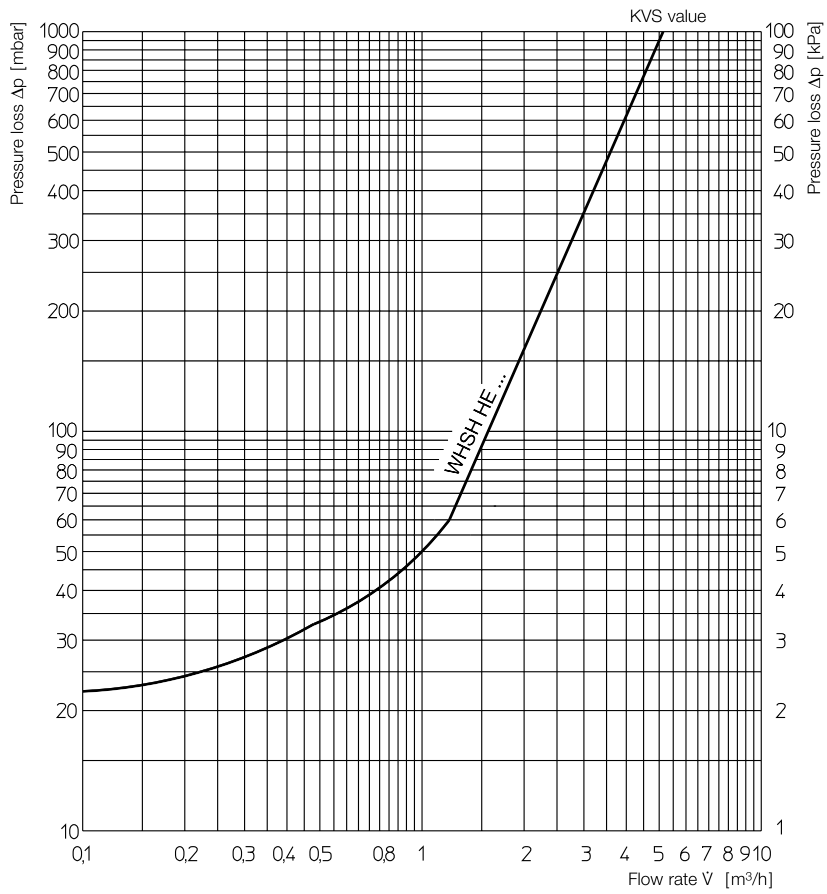
② Determination of the pressure loss of the on-site duct system.

③ Addition of losses from all components:
Δp Total =
Δp heating element
+ Δp duct system
+ Δp WHSH HE

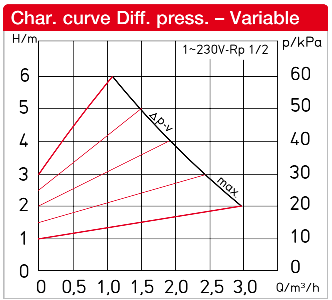
④ Setting the required differential pressure Δp Total at the rotary knob on the circulating pump.

Diagram

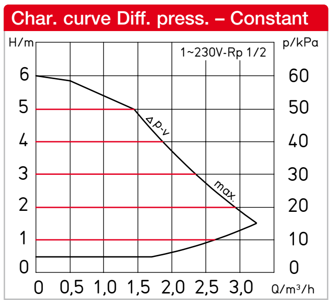
Pressure loss Hydraulic unit incl. flexible pipe



Char. curve Diff. press. – Variable



Char. curve Diff. press. – Constant



Reference

Other hydraulic units

– for KWL units with PWW post-heater 171
WHSH HE 24 V (0-10 V)
Ref. no.08318

– for ALB EC WW 351 ff.
WHSH HE 24 V (0-10 V)
Ref. no.08318

Air treatment

General information

- If the fan noise emission exceeds an acceptable level, passive noise reduction measures must be taken. For this purpose, silencers can be used according to the absorption principle. This silencer type ensures good sound insulation with low pressure losses.

  Helios offers silencers which are optimally adapted to the Helios fans. Round duct and rectangular duct silencers are available in corresponding casing shapes. Of course, all silencer types can also be used with fans of other brands.

  Helios silencers have casings made of galvanised steel sheet and they are provided with baffles made of high-quality mineral wool, which are covered with an abrasion-resistant fleece against the air flow.

Technical information
Sound insulation

- The measure for sound insulation is insertion loss according to DIN EN ISO 14163. It shows the reduction in noise level in a round duct or rectangular duct piece with and without silencers determined by a comparison measurement.

  For the measurement without silencers, a sound-reflecting piece is used instead. This determines the insertion loss:

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

Since the effects of a silencer are highly dependent on the frequency, the insertion loss depending on frequency is specified.
The damping of low frequency noises requires more damper volume than the damping of high frequency noises and is therefore associated with higher costs.

For these reasons, a knowledge of the fan noise spectrum (octave and third octave spectrum) is required for the selection of a silencer. When acoustically assessing a ventilation system, it should be noted that other system components, such as bends, cross-section changes and branches also have a sound-insulating effect.

More detailed information can be found in VDI Guideline 2081 – noise generation and noise reduction in air-conditioning systems.
The lower limit for system noise emission is determined by the generation of flow noise in the silencer and in the system components. These increase significantly with increasing flow velocity. Therefore, the flow velocities should be kept as low as possible.

- **Quick selection of a silencer**

  An average insulation measurement is specified in the type table (red column far right) for the simple selection of round duct and rectangular duct silencers. This value should be deducted from the fan sound power level (L_{WA} tot.).
  The result is the fan sound power level reduced by the sound insulation (L_{WA} reduc.).

  This selection method, which shows differences compared to the frequency band calculation, is based on rounding.
  A calculation according to the octave band (see adjacent example) produces more accurate values.

- **Example:**
  Available:
  Fan type VARD 225/2
  Selected:
  Duct silencer RSD 225/600 (installation length = 600 mm)

  Fan sound power level
  L_{WA} tot. = 81 dB(A)
  Average silencer insulation measurement
  minus = 15 dB(A)
  = Reduced sound power level
  L_{WA} reduc. = 66 dB(A)

- **Terms**
  L_{WA} tot. = Fan sound power level in dB(A) (from table above performance diagram).

  Average insulation measurement = Derived damping capacity of the silencer in dB(A) (from red column in silencer type table).

  L_{WA} reduc. = Sound power level reduced by silencer insertion in dB(A).

Sound level calculation

- In order to calculate the sound level after insertion of a silencer, the insulation loss by frequency band must be deducted from the fan band level and the total sound level can then be calculated. This is normally done in octave bands. Multiple silencers with the same diameter can be arranged one behind the other for larger insertion losses.
  The example below explains the procedure. Given task: Noise reduction of fan type VARD 225/2 (2800 min^{-1}) using silencers RSD 225/600 (basic length 2).

	Octave mid-frequency Hz							
	125	250	500	1000	2000	4000	8000	
A-weighted octave level $L_{WA, Oct}$ 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 loss of silencer D_e RSD 225/600 (2 x basic length)	4	10	17	27	25	17	14	dB
A-weighted octave level $L_{WA, Oct}$ of fan with silencer	47	52	57	49	51	55	49	dB(A)
A-weighted total sound power level L_{WA}* of fan with silencer	$L_{WA}^* = 10 \cdot \lg (10^{47 \cdot 0.1} + 10^{52 \cdot 0.1} + 10^{57 \cdot 0.1} + 10^{49 \cdot 0.1} + 10^{51 \cdot 0.1} + 10^{55 \cdot 0.1} + 10^{49 \cdot 0.1}) = 61$ dB(A)							
Associated A-weighted sound pressure level at 1 m distance	L_{pA}^* = 53 dB(A)							