

Zehnder Silvertop



Technical specification for air handling units

always the best climate

General

The compact ventilation solutions in the Zehnder Silvertop product range are equipped with highly efficient heat recovery and are suitable for installation in various properties such as offices, schools, nurseries, shopping centres, apartment buildings, restaurants, etc. Thanks to their top-mounted duct connections, the Zehnder Silvertop ventilation units are also ideal for installation in confined spaces.

The pre-installed, pre-configured ventilation unit allows for easy plug-and-play installation, and the control unit mounted on the ventilation unit ensures easy installation, configuration and operation of the unit.

The Zehnder Silvertop product range is available in 6 sizes and with 5 different operating modes.



User benefits

- There are 5 different unit sizes available with volume flows from 100 m³/h to 5,500 m³/h. This means that the optimum unit size can always be selected.
- Thanks to the arrangement of the duct connections on the top, installation in plant room is feasible without any problems. The Zehnder Silvertop ventilation units can also be easily integrated in hallways, storage rooms, warehouse areas, cloakrooms, etc. due to their small footprint.
- Different climate comfort options can be configured, such as electric pre-heating coil and/ or optionally electric or water-based post-heating coils. In addition, external heating coils and cooling coils are available. The ventilation unit can therefore be specifically adapted to the requirements of the building project.
- Aluminium counterflow heat exchangers with high thermal efficiency up to 90 % (EN308) ensure extremely efficient system operation.
- Direct-driven, backwards-curved fans with very low energy consumption, equipped with EC motors and overheating protection, allow for affordable and safe operation.



Features and functions

The wide range of unit versions allows for targeted adaptation to object-specific requirements. Depending on the selected configuration, the required components are factory-fitted in the ventilation unit.

Bypass

The Zehnder Silvertop unit series has a modulating by-pass with the functionality to offer free cooling and night cooling with increased air performance and frost protection. In the SEASON version, the bypass provides summer/winter control in on/off mode using integrated thermostats.

Control

5 choices of air flow modulations for optimized energy consumption (RT2012, EN15232).

ECO: Fans speed adjustment though 2 airflow settings (LS-HS) in the EASY control.

LOBBY: Air flow modulation with constant pressure mode, adjustable for each fan.

DIVA: Proportional modulation of each fan airflow depending on the CO2 rate. CO2 sensor integrated in the exhaust air inlet.

MAC2: Modulation in constant airflow for each fan (LS and HS) (except sizes 06 and 08). Pressure transmitters integrated inside the unit.

QUATTRO: Proportional modulation in constant airflow for each fan depending on the CO2 rate (except sizes 06 and 08). Pressure transmitters and CO2 sensor (exhaust air inlet) integrated in the unit. Settings of the LS, the HS and the CO2 minimum rate (ppm) adjustable on site directly on the EASY control.

Components integrated in the unit ensure energy-efficient and safe system operation:

- Four integrated temperature sensors for recording the temperature of the supply air, extract air and outside air and for controlling the bypass. In the SMART and INFINITE unit versions with an additional temperature sensor for controlling the electric pre-heating coil.
- Integrated frost protection thermostat (THA) to protect the heating coil/coil in the PREMIUM and INFINITE BC unit versions.
- Safety thermostat with integrated manual reset (THS) to protect the electric pre- and post-heating coil in the SMART, PREMIUM and INFINITE unit versions.
- Time programmes for operation with two different volume flows, which can be programmed project-specifically (except SEASON).
- Time programmes for weeks, holidays and public holidays (except SEASON).

More User benefits

- Optimum air quality thanks to factory-installed high-quality filters (outdoor air ePM1 55 % (F7) / extract air ePM10 50 % (M5)). Second filter stage possible as an option in the outdoor air.
- A number of interfaces are already factory-fitted as standard, enabling flexible integration into the building management system (Modbus, BACnet and Web).
- Low-noise operation thanks to double-walled, insulated panels with high-density thermal insulation (mineral wool 50 mm for models 15 to 52). Unit class T2 according to EN1886 and leakage classification L1.
- Fully certified as the entire Zehnder Silvertop unit series is Eurovent-certified and complies with the ErP2018 requirements.

- The outdoor air filter is monitored via a differential pressure box. The differential pressure is displayed on the control unit (potential-free contact for SEASON).
- Pressure sensor for system operation with constant airflow and display on the main control panel (potential-free contact for SEASON).
- Lockable main switch on the front.
- Potential-free input for smoke detectors / fire dampers / central fire alarm systems to switch off the ventilation unit. "Fire alarm" is displayed on the control unit.
- The ventilation unit has an "External shut-off" digital input that has priority over all set operating modes.
 EASY control (except SEASON) manages the optimal operating point and performance of the Zehnder Silvertop using the integrated temperature sensors:
 - Outdoor air sensor
 - Building ambient air sensor (on exhaust outlet)
 - Supplied fresh air sensor
 - Bypass defrost sensor
 - Defrost coil sensor (SMART and INFINITE versions)
- The EASY control unit optimises the energy supply of the supply air and provides the following ECO functions:
- FREE COOLING: If the outdoor temperature is below the room setpoint temperature in summer, the summer bypass opens gradually until it is completely open. Thus, cool outdoor air is directed into the building past the heat exchanger. If this function is not sufficient to reach the setpoint temperature, the optional cooling coil is enabled.
- FREE HEATING: Mainly during the transition period, when the outdoor temperature is higher than the room temperature, the summer bypass opens gradually until it is completely open and the warm outdoor air can be supplied into the building. If this function is not sufficient to reach the setpoint temperature, the optional heating coil/coil is enabled.
- Cold recovery: If the outdoor temperature is higher than the room temperature in summer or in the transitional period and the Zehnder Silvertop ventilation unit requires cool air, the bypass closes gradually until it is completely closed and the warm outdoor air cannot flow in directly. If this cold recovery is not sufficient to reach the setpoint temperature, the optional cooling coil is enabled.
- Heat recovery: If the outdoor temperature is below the room temperature in winter or in the transitional period and the Zehnder Silvertop ventilation unit requires warm air, the bypass closes gradually until it is completely closed and the cold outdoor air cannot flow in directly. If this function is not sufficient to reach the setpoint temperature, the optional heating coil/coil is enabled.
- NIGHT COOLING: With the Night Cooling function, the room temperature of the building can be lowered depending on the weather conditions of the last 24 hours. Between midnight and 7 a.m. (configurable

- period), the Night Cooling function is switched on if the outdoor temperature rises above 22 °C (configurable value) during the day (between 6 a.m. and 10 p.m.). The Night Cooling function operates at outdoor temperatures between 10 and 18 °C (configurable) and extract air temperatures above 18 °C (configurable). In addition, for the FIRST and PREMIUM unit versions equipped with the EASY controller, this function provides a specific volume flow setpoint for the selected operating mode.
- Fire safety: Zehnder Silvertop ventilation units have a fire protection system as standard, which controls the supply and extract fans in 5 modes available in the control parameters (function must be activated on site).
 - "Stop": Complete stop of the ventilation unit "Continuous work": Starts the unit or runs it at high speed. The fire protection function takes priority over any other alarm.
 - "No specific reaction, runs automatically": Keeps the unit running with the settings entered locally (Stop/LS/HS).
 - "Supply fan only": Starts or keeps the supply fan at high speed (extract air off).
 - "Extract fan only": Starts the extract fan or keeps it at high speed (supply air off).
 - The Zehnder Silvertop ventilation unit also has a digital "Remote run/stop" input that enables connection to a manual controller. In this case, the external controller takes precedence over the fire protection, which may be activated in one of the five modes described above. Regardless of the selected mode, "Fire alarm" is displayed on the EASY control unit screen when this function is activated.

Dehumidification

In combination with the Zehnder Silvertop ventilation units, an external Combibox Concept module can be installed, equipped with a cooling coil (water or refrigerant) followed by a heating coil/coil (water or electric) (not possible for SEASON). In this case, the controller automatically controls the supply of heat and cold necessary for dehumidification while maintaining an optimum supply air temperature. The cooling control unit has priority over the dehumidification control unit.

Series

The Zehnder Silvertop series, which is available in 6 unit sizes, covers volume flow rates from 100 m³/h to 5,500 m³/h. The supply air is always on the right-hand side. Depending on the selected operating mode, the ventilation units can be controlled in 2-stages or with modulating/demand control, with constant volume flow or pressure.

The Zehnder Silvertop series is available in 5 unit versions:

SEASON: Ventilation unit for use in moderate climate zones, for continuous air exchange in buildings, with heat recovery, summer/winter bypass, and volume flow control by potentiometer.

FIRST: Ventilation unit without integrated coils/coils. **SMART**: Ventilation unit with integrated electric preheating coil.

PREMIUM: Ventilation unit with integrated electric or water-based post-heating coil/coil.

INFINITE: Ventilation unit with integrated electric pre-heating coil and integrated electric or water-based post-heating coil/coil.

Set-up

- The construction consists of double-walled aluminium panels.
- Outer sheet in RAL7035, inside galvanised sheet
- The housing meets class T3 according to EN1886 and air tightness L2 for models 06 and 08 (mineral wool 25 mm).
- The housing classes according to EN1886 correspond to T2 and air tightness L2 for models 15 to 52 (mineral wool 50 mm).
- Round unit connectors with lip seals to ensure tightness of air distribution (ATEC CSTB No. 13-224-12), square unit connectors on Zehnder Silvertop 52.
- Feet built into the construction for secure installation on the floor.
- Control cabinet integrated in the ventilation unit with the electrical components and the control unit.
 Access via 2-part hinged door with main control panel integrated from the outside and lockable main switch.
- Removable condensate tray including drain.
- Integrated, motorised and self-regulating bypass 100 %.

Filters

The Zehnder Silvertop ventilation unit is factory-fitted with the Clearmotion device, which ensures high indoor air quality. The built-in filters have a low pressure loss and thus ensure high system efficiency.

Outdoor air

An ePM1 55 % (F7) filter is installed in the outdoor air as standard. Via the factory-installed double insert with profile seal, a double filter stage is possible if required, e.g. the combination of

- ePM10 50 % (M5) + ePM1 55 % (F7)
- ePM1 55 % (F7) + ePM1 80 % (F9)

Extract air

An ePM10 50 % (M5) filter is factory-fitted in the extract air.

Installation

The ventilation units of the Zehnder Silvertop series are designed for floor-standing installation and can be ideally installed in confined spaces due to the top-mounted duct connections. The supply air is always on the right-hand side.

Air temperation

The Zehnder Silvertop ventilation unit in the FIRST and SEASON unit versions can be operated in winter at outdoor temperatures as low as -5 °C. The unit versions PREMIUM BC (water post-heating coil) and PREMUIM BE (electric post-heating coil) ensure optimum winter operation at temperatures down to -10 °C. And finally, the unit versions SMART (electric pre-heating coil), INFINITE BC (electric pre-heating coil and water post-heating coil) and INFINITE BE (electric pre-heating coil and electric post-heating coil) ensure optimum winter operation at temperatures down to -20 °C. These functions are automatically managed via the "EASY" controller.

For optimum climate comfort in any season and in any weather, the Zehnder Silvertop ventilation unit can additionally be connected to a water cooling or direct evaporation module (except SEASON) or to a dehumidification module (FIRST or SMART).

Fans

The built-in freewheel fans with EC motor are powered directly. The fans are speed-controlled and have built-in overheating protection. EC technology is an efficient solution that ensures low energy consumption for regulation and monitoring and control of the operating point (regulation of discharge capacities from 10 to 100 %). Low noise level for improved acoustic comfort.

Heat exchanger

Static, high-performance aluminium plate counterflow heat exchanger with a high level of efficiency and Eurovent certification.

- Efficiency above 90 % (EN 308).
- Automatic defrosting in several phases by modulating by-pass' (except Season, standby) and by selfregulated electric pre-heating coil in the SMART and INFINITE unit versions and, if necessary, by modulating the supply air volume.

Unit versions with different coils and coils

Zehnder Silvertop	Integrated	heat coil/o	oil (S)	External coil/coil module									
	Pre-heating coil	Post-he	•	Heat	ing	Cod	oling	Dehum	idification (cooling + h	eating)		
	Electric	Electric	Water	Electric	Water	Water	R410A	Water/ Water	Water/ Electric	R410A/ Water	R410A/ Electric		
SEASON	-	-	-	-	-	CBX-BF	CBX-DX	-	-	-	-		
FIRST	-	-	-	CBX-BE+ CBX-CBE	CBX-BC	CBX-BF	CBX-DX	CBX-CH	CBX-BE+ CBX-CBE	CBX-DXH	CBX-DXE+ CBX-CBE		
SMART	•	-	-	CBX-BE+ CBX-CBE	CBX-BC	CBX-BF	CBX-DX	CBX-CH	CBX-BE+ CBX-CBE	CBX-DXH	CBX-DXE+ CBX-CBE		
PREMIUM BE	-	•	-	-	-	CBX-BF	CBX-DX	-	-	-	-		
PREMIUM BC	-	-		-	-	CBX-BF	CBX-DX	-	-	-	-		
INFINITE BE	-	•	-	-	-	CBX-BF	CBX-DX	-	-	-	-		
INFINITE BC	•	-		-	-	CBX-BF	CBX-DX	-	-	-	-		

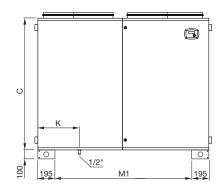
The dehumidification function (can be activated on site) consists of coupling the Zehnder Silvertop ventilation unit with a Combibox Concept combination module with cooling (water or R410A) + heating (water or electric) for the FIRST or SMART unit version. In this case, the supply of the amount of warm or cold air required for dehumidification is automatically adjusted via the controller, while maintaining the optimum operating temperature. Within the period with cooling demand, temperature control is prioritised over dehumidification.

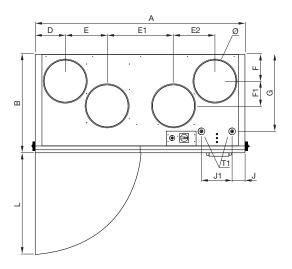
Dimensions

Zehnder Silvertop	_	A	В	С	D	D1	D2	E	E1	E2	F	F1	G	J	J1	K	L	M1	M2	МЗ	T1	SEASON SMART	PREMIUM SMART INFINITE	PREMIUM INFINITE
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	kg	kg
06	200	1105	570	1040	145	-	-	225	365	225	135	150	385	75	130	265	545	720	-	-	1/2"	175	180	185
08	250	1265	700	1150	170	-	-	235	415	270	160	225	485	75	180	275	625	880	-	-	1/2"	250	255	260
15	15	1590	750	1200	230	-	-	315	500	315	210	190	585	100	230	435	770	1200	-	-	1/2"	320	330	335
23	400	1735	1065	1340	270	-	-	330	535	330	250	420	755	100	230	440	855	1350	-	-	1/2"	490	500	510
35	450	1950	1210	1495	295	-	-	340	615	405	280	515	805	100	305	475	960	-	685	685	1/2"	635	650	660
52	-	2185	1520	1625	85	405	960	120	140	120	50	260	1115	100	380	525	1120	-	810	810	1"	875	890	905

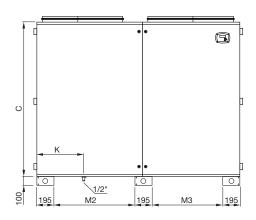
G - J - J1 - T1 for water coil (PREMIUM BC / INFINITE BC) (T1 = diameter of the threaded steel gas pipe)

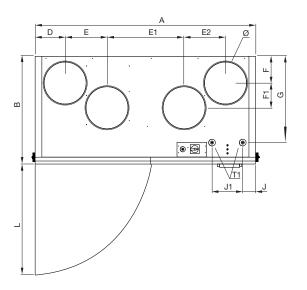
Zehnder Silvertop 06 to 23



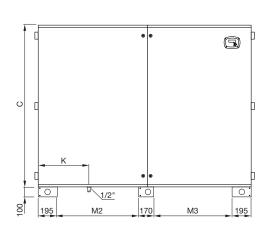


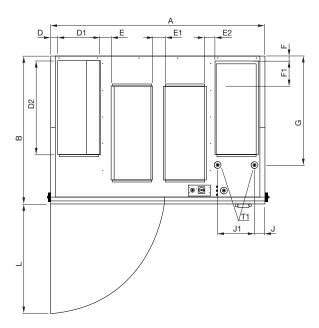
Zehnder Silvertop 35





Zehnder Silvertop 52

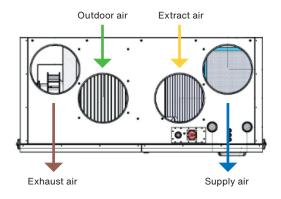




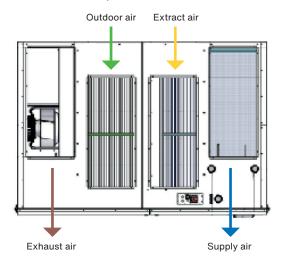
Installation and unit versions

The supply air is always on the right-hand side of the unit.

Zehnder Silvertop 06 to 35



Zehnder Silvertop 52



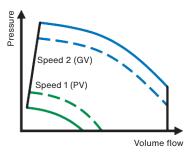
Electrical data

					FIRST, PREMIUM INFINITE BC, BC, SEASON SMART		PREMIUM BE			INFINITE BE				
Model Zehnder Silvertop	Output Electric motor (W)	Operating temp.	Degree of protection	Thermal protection class	Supply voltage (V/Ph/Hz)	Current draw (A)	Supply voltage (V/Ph/Hz)	Current draw	Supply voltage (V/Ph/Hz)	Model	Current draw (A)	Supply voltage (V/Ph/Hz)	Model	Current draw
06	2 x 169	-20 / 60	IP54/B	*	230/1/50	3.4	230/1/50	8.8	230/1/50	-	8.8	230/1/50	-	14.2
08	2 x 170	-20 / 60	IP54/B	*	230/1/50	4.0	230/1/50	14.8	230/1/50	-	14.8	230/1/50	-	25.7
15	2 x 480	-20 / 40	IP54/B	*	230/1/50	4.9	400/3+N/50	9.7	230/1/50	-	21.2	400/3+N/50	-	15.1
23	2 x 750	-20 / 40	IP54/B	*	230/1/50	7.2	400/3+N/50	13.0	400/3+N/50	-	13.0	400/3+N/50	-	22.8
35	2 x 1000	-20 / 50	IP54/B	*	400/3+N/50	3.8	400/3+N/50	21.2	400/3+N/50	-	19.0	400/3+N/50	-	36.3
52	2 x 1700	-20 / 40	IP54/B	*	400/3+N/50	5.8	400/3+N/50	27.4	400/3+N/50	-	23.1	400/3+N/50	-	44.7

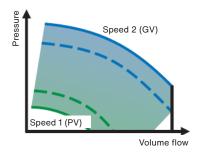
^{*} IPT: Integrated Thermal Protection

Operating modes

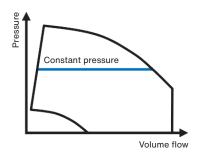
The Zehnder Silvertop ventilation unit has a factory-programmable controller as standard for configuring the operating modes described below:



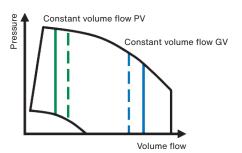
How Zehnder Silvertop ECO works 2 speeds (PV/GV) can be set per fan, except for SEASON (one speed adjustable via potentiometer)



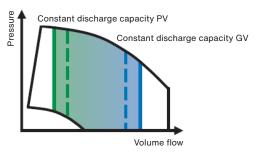
How Zehnder Silvertop DIVA works Demand-dependent speed control per fan



How Zehnder Silvertop LOBBY EC works Constant pressure control per fan



How Zehnder Silvertop MAC2 EC works 2 constant volume flows can be set per fan



How Zehnder Silvertop QUATTRO works Demand-dependent constant volume flow control per fan



Touch screen remote control (up to 100 m), not compatible with SEASON

Integrated components

Equipment	SEASON	FIRST	SMART	PREMIUM BE	PREMIUM BC	INFINITE BE	INFINITE BC
EC fans with low consumption	•	•	•	•	•	•	•
Supply air filter, ePM1 55 % (F7)	•	•	•	•	•	•	•
Extract air filter, ePM10 50 % (M5)	•	•	•	•	•	•	•
Counterflow plate heat exchanger with high efficiency (>90 %), Eurovent certified	•	•	•	•	•	•	•
Internal bypass 100 %	•	•	•	•	•	•	•
Inclined and removable condensate tray under the counterflow heat exchanger	•	•	•	•	•	•	•
Double-walled 50 mm, RAL7035 (except sizes 06 and 08 in 25 mm)	•	•	•	•	•	•	•
Round unit connectors with lip seals (ATEC CSTB No. 13-224-12), except 52, rectangular connectors	•	•	•	•	•	•	•
Front LCD display IP65	-	•	•	•	•	•	•
Control with communication via Modbus or BACnet in RS485 or TCP/IP or WEB (selection in menu)	-	•	•	•	•	•	•
Speed control (PV - GV) of the fans via the EASY controller	-	•	•	•	•	•	•
Potentiometer for speed control of the fans	•	-	-	-	-	-	-
Supply air temperature sensor	-	•	•	•	•	•	•
Extract air temperature sensor	-	•	•	•	•	•	•
External temperature sensor	•	•	•	•	•	•	•
Bypass defrost temperature sensor	-	•	•	•	•	•	•
Pre-heating coil/coil sensor	-	-	•	-	-	•	•
Frost protection thermostat, hot water coil	-	-	-	-	-	•	•
Safety thermostat, electric pre-heating coil	-	-	•	-	-	•	•
Safety thermostat, electric post-heating coil	-	-	-	•	-	•	-
Lockable main switch	•	•	•	•	•	•	•
Power cable feed-through	•	•	•	•	•	•	•

- \bullet : Standard equipment or functions
- \blacksquare : Optional equipment or functions. Supplied factory assembled and wired
- ◆: Optional equipment or functions. Supplied unassembled

Unit functions

Functions	SEASON	FIRST	SMART	PREMIUM BE	PREMIUM BC	INFINITE BE	INFINITE BC
Defrosting through bypass	•	-	-	-	-	-	-
Defrosting in several phases: Bypass + coil/coil (SMART/INFINITE) + modulation of the supply air volume	-	•	•	•	•	•	•
Self-regulated electric pre-heating coil	-	-	•	-	-	•	•
Self-regulated electric heating coil	-	-	-	•	-	•	-
Self-regulating hot water coil	-	-	-	-	•	-	•
Internal bypass 100 %, switching, automatic summer/winter controller	•	-	-	-	-	-	-
Internal bypass 100%, self-regulating and modulating (0-100 %)	-	•	•	•	•	•	•
Optimum free cooling controller	-	•	•	•	•	•	•
Optimum free heating controller	-	•	•	•	•	•	•
Night cooling controller (night-time ventilation)	-	•	•	•	•	•	•
Optimum cold recovery	-	•	•	•	•	•	•
Control of cold recovery by thermostat	•	-	-	-	-	-	-
Optimum heat recovery	-	•	•	•	•	•	•
Control of heat recovery by thermostat	•	-	-	-	-	-	-
Blower temperature control (thermal protection control)	-	•	•	•	•	•	•
Room temperature control (air outlet)	-	•	•	•	•	•	•
Weekly time switch	-	•	•	•	•	•	•
Holiday and public holiday time switch	-	•	•	•	•	•	•
Pressure box for monitoring the outdoor air filter	•	•	•	•	•	•	•
Pressure sensor for airflow control (supply air and extract air)	•	•	•	•	•	•	•
Fire protection according to 5 available modes	-	•	•	•	•	•	•
Heating module control (electric or water) Combibox Concept	-	•	•	-	-	-	-
Cooling module control (water or R410A) Combibox Concept	-	•	•	•	•	•	•
Dehumidification control Combibox Concept	-	•	•	-	-	-	-

Unit functions

Factory-installed control options	SEASON	FIRST	SMART	PREMIUM BE	PREMIUM BC	INFINITE BE	INFINITE BC
LOBBY EC: Constant pressure controller	-	•	•	•	•	•	•
DIVA EC: Demand-driven CO ₂ controller	-	•	•	•	•	•	•
MAC2 EC: Constant airflow control (two-stage)	-	•	•	•	•	•	
QUATRO EC: Demand-driven constant airflow control	-	•	•	•	•	•	•

Additional options	SEASON	FIRST	SMART	PREMIUM BE	PREMIUM BC	INFINITE BE	INFINITE BC
BC cooling module (water or R410A) Combibox Concept	-	•	•	•	•	•	•
Heating module (electric or water) Combibox Concept	-	•	•	-	-	-	-
Dehumidification module Combibox Concept	-	•	•	-	-	-	-
Changeover valve for changeover unit versions	-	•	•	-	-	-	-
Touch remote control (up to 100 m)	-	•	*	•	•	•	•
Room temperature control via touch remote control	-	•	•	•	•	•	•
Wonderroom, connection box that communicates automatically with Zehnder Silvertop	-	•	•	•	•	•	•
Pressure regulator for extract air filter dirt	•	•	•	•	•	•	•
Supply air prefilter, gravimetric or opacimetric ePM10 50% (M5) or ePM1 55% (F7)	•	•	•	•	•	•	•
Supply air filter, ePM1 80% (F9)	•	•	•	•	•	•	•
Extract air filter, ePM10 50% (M5)	•	•	•	•	•	•	•

- : Standard equipment or functions
- \blacksquare : Optional equipment or functions. Supplied factory assembled and wired
- ◆: Optional equipment or functions. Supplied unassembled

Sound specifications

The Lp4m dB(A) measurement curves on the following pages correspond to the sound pressure level at a distance of 4 m in a semi-circular free field above a reflecting plane. The sound pressure applies to connected ducts on the supply air and extract air side.

The sound pressure Lp dB(A) for deviating distances can be determined using the distance factors below.

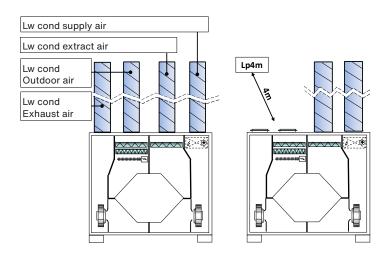
Distance (m)	1.5	3	4	5	7	10
Distance factor dB(A)	9	3	0	-2	-5	-8

The "Lw cond supply air" curves shown on the following pages indicate the total sound power radiated into the duct on the supply air and exhaust air side. To determine the sound power in the frequency band, the values listed in the table must be taken into account.

Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Zehnder Silvertop 06 dB(A)	-23	-14	-10	-6	-6	-8	-12	-12
Zehnder Silvertop 08 dB(A)	-18	-9	-5	-5	-8	-13	-18	-23
Zehnder Silvertop 15 dB(A)	-21	-11	-6	-8	-6	-9	-14	-19
Zehnder Silvertop 23 dB(A)	-20	-15	-9	-8	-6	-6	-12	-16
Zehnder Silvertop 35 dB(A)	-24	-15	-11	-9	-4	-7	-11	-15
Zehnder Silvertop 52 dB(A)	-26	-17	-11	-7	-4	-7	-12	-15

The "Lw cond extract air" curves shown on the following pages indicate the total sound power radiated into the duct on the extract air and outdoor air side. To determine the sound power in the frequency band, the factors listed in the table must be taken into account.

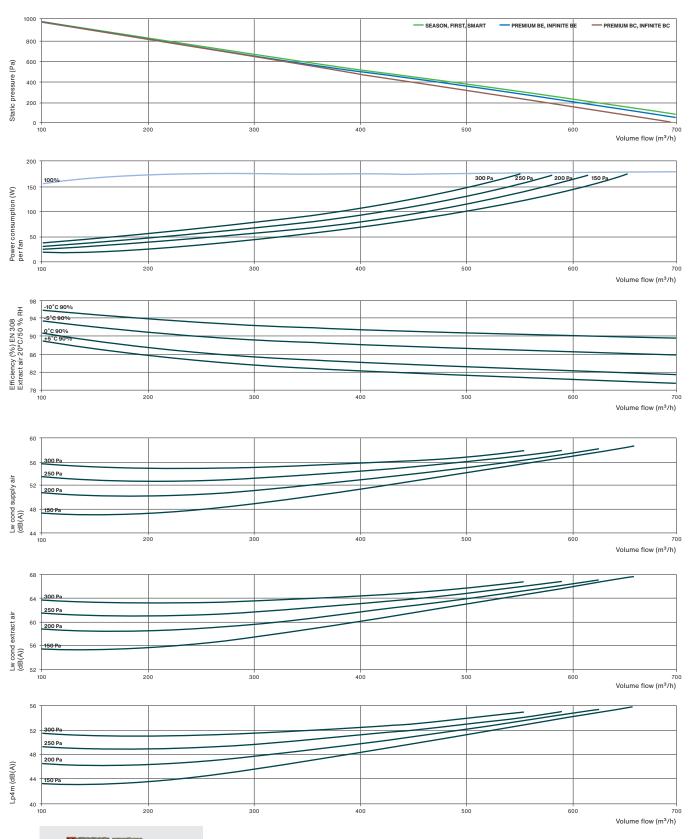
Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Zehnder Silvertop 06 dB(A)	-32	-23	-13	-6	-5	-6	-12	-15
Zehnder Silvertop 08 dB(A)	-28	-17	-7	-6	-5	-8	-16	-25
Zehnder Silvertop 15 dB(A)	-20	-14	-7	-6	-6	-8	-14	-22
Zehnder Silvertop 23 dB(A)	-24	-18	-8	-6	-6	-8	-12	-18
Zehnder Silvertop 35 dB(A)	-25	-16	-8	-6	-8	-6	-12	-17
Zehnder Silvertop 52 dB(A)	-25	-17	-7	-5	-8	-6	-12	-17



Note:

Tolerance = general values +/- 3 dB(A)
Acoustic spectrum +/- 5 dB(A)

Technical data for Zehnder Silvertop 06 ventilation unit



For your constant pressure projects, use our Wonderroom connection box (max. 31 zones) for optimal climate comfort with minimum energy consumption.

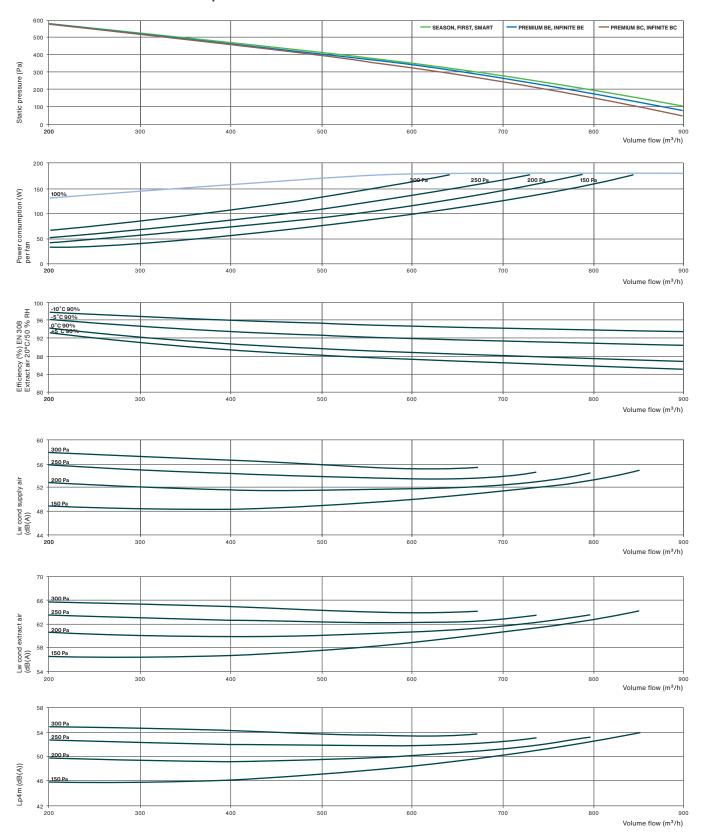
Performance data for Zehnder Silvertop 06 heating coil

BC for PRE	MIUM and INFIN	ITE unit versions					Н	ot water coil
Water temp.	Air inlet temperature °C	Volume flow m ^s /h	100	200	300	400	500	600
		Performance (kW) / supply air (°C)	1.6 / 56.7	2.6 / 48.7	3.4 / 43.9	4.0 / 40.5	4.6 / 38.0	5.1 / 36.0
80 / 60	11	Water quantity (I/h) / water pressure loss (kPa)	69 / 1.3	113 / 3.2	148 / 5.2	177 / 7.3	202 / 9.2	225 / 11.2
80700		Performance (kW) / supply air (°C)	1.5 / 57.6	2.4 / 50.0	3.1 / 45.6	3.8 / 42.4	4.3 / 40.1	4.8 / 38.2
	15	Water quantity (I/h) / water pressure loss (kPa)	64 / 1.2	105 / 2.8	137 / 4.6	164 / 6.4	188 / 8.1	209 / 9.8
		Performance (kW) / supply air (°C)	1.2 / 45.0	1.9 / 39.2	2.5 / 35.7	3.0 / 33.3	3.5 / 31.4	3.9 / 29.9
60 / 50	11	Water quantity (I/h) / water pressure loss (kPa)	101 / 2.8	168 / 6.9	220 / 11.4	265 / 15.8	303 / 20.2	337 / 24.5
60750		Performance (kW) / supply air (°C)	1.1 / 45.9	1.8 / 40.6	2.3 / 37.4	2.8 / 35.2	3.2 / 33.5	3.5 / 32.1
	15	Water quantity (I/h) / water pressure loss (kPa)	92 / 2.3	152 / 5.8	200 / 9.5	240 / 13.2	275 / 16.9	306 / 20.5
		Performance (kW) / supply air (°C)	0.8 / 35.2	1.4 / 31.2	1.8 / 28.8	2.2 / 27.0	2.5 / 25.7	2.8 / 24.7
45 / 40	45 / 40 15	Water quantity (I/h) / water pressure loss (kPa)	143 / 5.4	239 / 13.7	315 / 22.6	379 / 31.7	435 / 40.6	485 / 49.4
43740		Performance (kW) / supply air (°C)	0.7 / 36.1	1.2 / 32.6	1.6 / 30.5	1.9 / 21.3	2.2 / 27.8	2.4 / 26.9
		Water quantity (I/h) / water pressure loss (kPa)	125 / 4.3	208 / 10.7	274 / 17.6	330 / 24.6	378 / 31.5	421 / 38.3

					BE for	unit vers	ions SM <i>A</i>	ART, PREM	/IIUM and	INFINITE	BE elect	rical coil	
Outdoor air	0°C	-5 °C	-10 °C	-15 °C	-15 °C*	0°C	-5 °C	-10 °C	-10 °C*	-10 °C	-15 °C	-15 °C*	
(m³/h)	60	00		600			60	00		600			
Unit version	FIRST, S	SEASON	Pre	SMART e-heating	coil		PREMIUM BE Heating coil				NFINITE B	E eating coil	
Performance (kW)		-		1.25			1.25				1.25 + 1.2	5	
Temperature on output from the unit (°C)	16.5	16.2	16.6	16.6 13.5 18.2		22.7	22.4	18.6	25.7	22.8	19.7	26.1	

 $^{^{\}star}$ If the volume flow is reduced by 20 %

Technical data for Zehnder Silvertop 08 ventilation unit



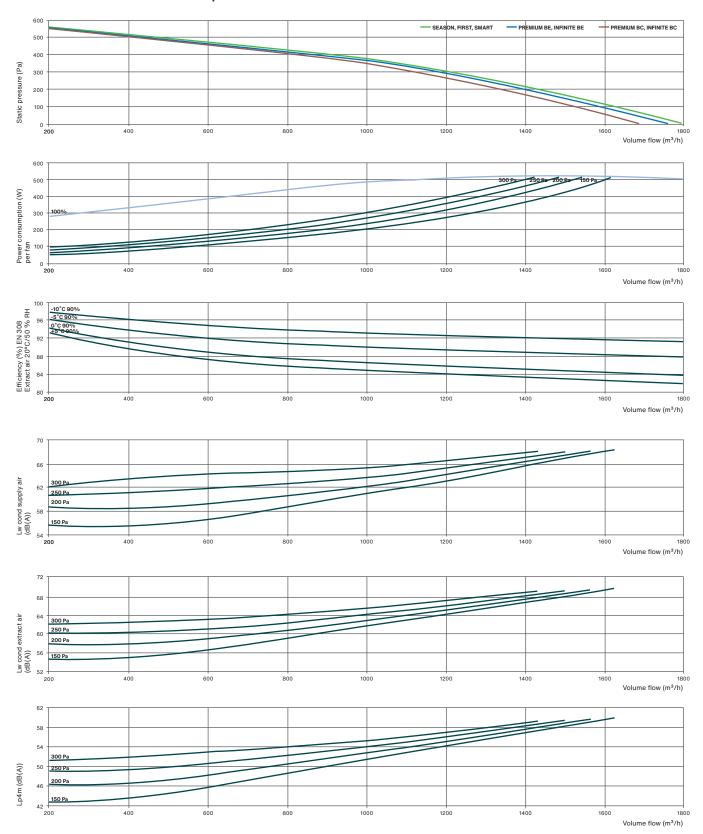
Performance data for Zehnder Silvertop 08 heating coil

BC for PRE	MIUM and INFIN	ITE unit versions						Hot	water coil
Water temp. °C / °C	Air inlet temperature °C	Volume flow m ^s /h	200	300	400	500	600	700	800
		Performance (kW) / supply air (°C)	3.0 / 54.8	4.0 / 50.0	4.9 / 46.7	5.6 / 44.0	6.3 / 41.9	7.0 / 40.1	7.6 / 38.6
80 / 60	11	Water quantity (I/h) / water pressure loss (kPa)	131 / 1.0	175 / 1.6	214 / 2.3	247 / 3.0	278 / 3.8	306 / 4.5	331 / 5.2
80 / 60		Performance (kW) / supply air (°C)	2.8 / 55.7	3.7 / 51.3	4.5 / 48.2	5.2 / 45.7	5.9 / 43.7	6.5 / 42.1	7.0 / 40.7
	15	Water quantity (I/h) / water pressure loss (kPa)	122 / 0.8	163 / 1.4	199 / 2.0	230 / 2.7	258 / 3.3	284 / 3.9	307 / 4.5
	11	Performance (kW) / supply air (°C)	2.2 / 43.6	3.0 / 40.3	3.7 / 37.8	4.3 / 35.9	4.8 / 34.3	5.3 / 33.0	5.7 / 31.9
60 / 50	11	Water quantity (I/h) / water pressure loss (kPa)	194 / 2.1	261 / 3.5	319 / 5.1	370 / 6.6	416 / 8.2	459 / 9.8	498 / 11.4
60 / 50		Performance (kW) / supply air (°C)	2.0 / 44.6	2.7 / 41.5	3.3 / 39.3	3.9 / 37.6	4.3 / 36.1	4.8 / 35.0	5.2 / 33.9
	15	Water quantity (I/h) / water pressure loss (kPa)	176 / 1.7	237 / 2.9	289 / 4.2	335 / 5.5	377 / 6.9	415 / 8.2	450 / 9.5
		Performance (kW) / supply air (°C)	1.6 / 34.3	2.2 / 32.0	2.6 / 30.3	3.1 / 28.9	3.5 / 27.8	3.8 / 26.9	4.1 / 26.1
45 / 40	11	Water quantity (I/h) / water pressure loss (kPa)	276 / 4.1	372 / 7.0	456 / 10.1	530 / 13.3	597 / 16.5	659 / 19.8	715 / 23.0
45 / 40		Performance (kW) / supply air (°C)	1.4 / 35.3	1.9 / 33.3	2.3 / 31.8	2.7 / 30.6	3.0 / 29.6	3.3 / 28.8	3.6 / 28.1
	15	Performance (kW) / supply air (°C) 3.0 / 54.8 4.0 / 50.0 4.9 / 46.7 5.6 / 44.0 6.3 / Water quantity (l/h) / water pressure loss (kPa) 131 / 1.0 175 / 1.6 214 / 2.3 247 / 3.0 278 /	519 / 12.8	572 / 15.3	621 / 17.8				

	BE for unit versions SMART, PREMIUM and INFINITE BE electrical coi												
Outdoor air	0°C	-5 °C	-10 °C	-15 °C	-15 °C*	0 °C	-5 °C	-10 °C	-10 °C*	-10 °C	-15 °C	-15 °C*	
(m³/h)	80	800		800			80	00		800			
Unit version	FIRST, S	FIRST, SEASON		SMART Pre-heating coil				UM BE ng coil		INFINITE BE Pre-heating coil + heating of			
Performance (kW)		-	2.5			2.5				2.5 + 2.5			
Temperature on output from the unit (°C)	17.5	17.2	17.5	16.8	19.0	26.9	26.6	22.3	30.4	26.9	26.2	30.7	

^{*} If the volume flow is reduced by 20 %

Technical data for Zehnder Silvertop 15 ventilation unit



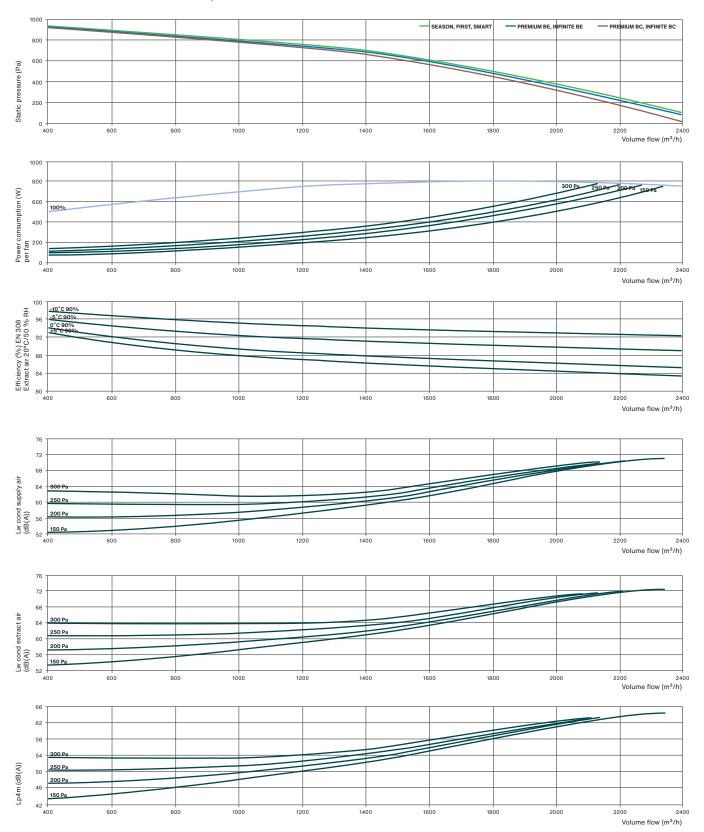
Performance data for Zehnder Silvertop 15 heating coil

C for PRE	MIUM and INFIN	ITE unit versions						Hot	water coi
Water temp. °C / °C	Air inlet temperature °C	Volume flow m³/h	500	700	900	500	1100	1500	1700
		Performance (kW) / supply air (°C)	6.4 / 48.6	8.0 / 44.6	9.4 / 41.7	10.7 / 39.4	11.8 / 37.5	12.8 / 36.0	13.7 / 34.6
80 / 60	11	Water quantity (I/h) / water pressure loss (kPa)	281 / 1.9	352 / 2.9	413 / 3.9	467 / 4.9	516 / 5.8	561 / 6.8	601 / 7.7
80 / 60		Performance (kW) / supply air (°C)	6.0 / 49.9	7.5 / 46.2	8.8 / 43.5	9.9 / 41.3	10.9 / 39.6	11.9 / 38.1	12.7 / 36.9
	15	Water quantity (I/h) / water pressure loss (kPa)	261 / 1.7	327 / 2.5	384 / 3.4	434 / 4.2	479 / 5.1	520 / 5.9	558 / 6.7
		Performance (kW) / supply air (°C)	4.8 / 39.2	6.1 / 36.3	7.1 / 34.2	8.1 / 32.5	8.9 / 31.1	9.7 / 29.9	10.4 / 29.0
60 / 50	11	Water quantity (I/h) / water pressure loss (kPa)	419 / 4.1	527 / 6.3	620 / 8.5	702 / 10.7	777 / 12.9	845 / 15.1	907 / 17.2
60 / 50		Performance (kW) / supply air (°C)	4.4 / 40.6	5.5 / 37.9	6.5 / 36.0	7.3 / 34.4	8.1 / 33.2	8.8 / 32.1	9.4 / 31.2
	15	Water quantity (I/h) / water pressure loss (kPa)	380 / 3.5	477 / 5.3	561 / 7.1	636 / 8.9	703 / 10.7	764 / 12.5	821 / 14.3
		Performance (kW) / supply air (°C)	3.5 / 31.2	4.4 / 29.2	5.1 / 27.7	5.8 / 26.5	6.5 / 25.5	7.0 / 24.7	7.6 / 24.0
45 / 40	11	Water quantity (I/h) / water pressure loss (kPa)	599 / 8.3	755 / 12.7	889 / 17.2	1009 / 21.7	1118 / 26.2	1217 / 30.6	1308 / 35.0
43 / 40		Performance (kW) / supply air (°C)	3.0 / 32.6	3.8 / 30.8	4.5 / 29.5	5.1 / 28.5	5.6 / 27.6	6.1 / 26.9	6.6 / 26.3
	15	Water quantity (I/h) / water pressure loss (kPa)	521 / 6.4	656 / 9.8	773 / 13.3	876 / 16.7	970 / 20.2	1056 / 23.6	1134 / 26.9

	BE for unit versions SMART, PREMIUM and INFINITE BE electrical coi													
Outdoor air	0°C	-5 °C	-10 °C	-15 °C	-15 °C*	0°C	-5 °C	-10 °C	-10 °C*	-10 °C	-15 °C	-15 °C*		
(m³/h)	15	1500		1500			15	00		1500				
Unit version	FIRST, S	SEASON	Pre	SMART Pre-heating coil				UM BE ng coil		INFINITE BE Pre-heating coil + heating				
Performance (kW)		-		5.25			3.75				5.25 + 3.75			
Temperature on output from the unit (°C)	16.9	16.6	16.9	17.1	18.3	24.1	24.1	20.1	27.6	24.4	24.6	27.7		

^{*} If the volume flow is reduced by 20 %

Technical data for Zehnder Silvertop 23 ventilation unit



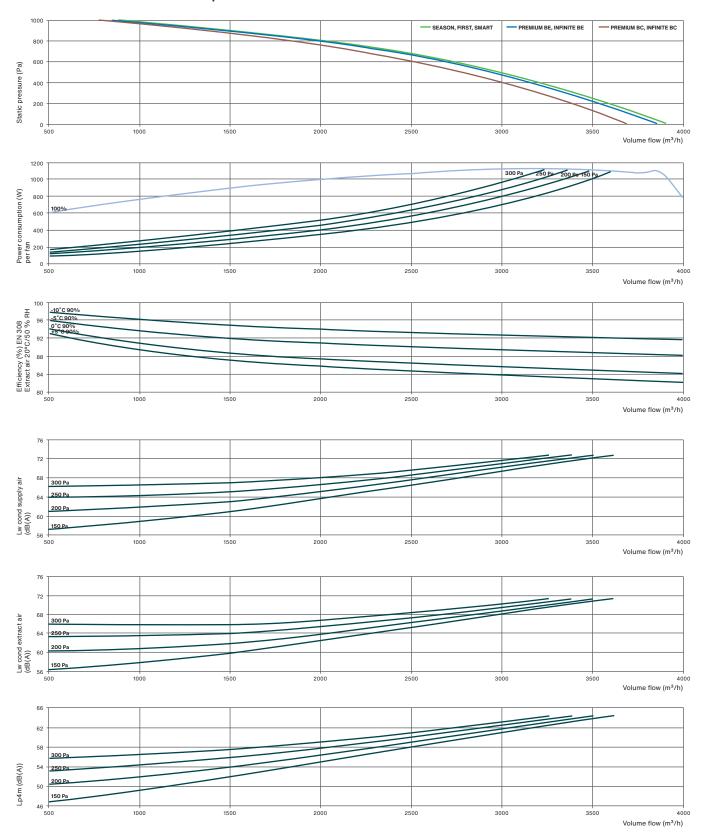
Performance data for Zehnder Silvertop 23 heating coil

BC for PRE	MIUM and INFIN	ITE unit versions						Hot	water coil
Water temp. °C / °C	Air inlet temperature °C	Volume flow m³/h	600	1000	1400	1800	2200	2600	3000
		Performance (kW) / supply air (°C)	8.1 / 50.5	11.4 / 44.5	14.1 / 40.5	16.4 / 37.7	18.4 / 35.5	20.2 / 33.8	21.8 / 32.3
80 / 60	11	Water quantity (I/h) / water pressure loss (kPa)	355 / 1.9	501 / 3.7	620 / 5.5	720 / 7.2	808 / 9.0	887 / 10.6	957 / 12.3
80 / 60		Performance (kW) / supply air (°C)	7.5 / 51.7	10.6 / 46.1	13.1 / 42.4	15.3 / 39.8	17.1 / 37.8	18.8 / 36.1	20.3 / 34.8
	15	Water quantity (I/h) / water pressure loss (kPa)	330 / 1.7	466 / 3.2	575 / 4.8	669 / 6.3	750 / 7.8	823 / 9.3	888 / 10.7
	11	Performance (kW) / supply air (°C)	6.1 / 40.6	8.6 / 36.2	10.7 / 33.3	12.4 / 31.2	14.0 / 29.6	15.4 / 28.3	16.6 / 27.2
60 / 50	11	Water quantity (I/h) / water pressure loss (kPa)	527 / 4.2	749 / 8.1	929 / 12.0	1083 / 16.0	1218 / 19.9	1338 / 23.8	1446 / 27.5
60 / 50		Performance (kW) / supply air (°C)	5.5 / 41.8	7.8 / 37.8	9.7 / 35.2	11.3 / 33.3	12.7 / 31.9	13.9 / 30.7	15.0 / 29.7
	15	Water quantity (I/h) / water pressure loss (kPa)	478 / 3.5	679 / 6.7	841 / 10.0	980 / 13.3	1102 / 16.5	1210 / 19.7	1308 / 22.8
		Performance (kW) / supply air (°C)	4.4 / 32.2	6.2 / 29.1	7.7 / 27.1	9.0 / 25.6	10.1 / 24.5	11.1 / 23.5	12.1 / 22.8
45 / 40	11	Water quantity (I/h) / water pressure loss (kPa)	752 / 8.4	1072 / 16.3	1334 / 24.4	1557 / 32.6	1753 / 40.6	1928 / 48.5	2086 / 56.2
45 / 40		Performance (kW) / supply air (°C)	3.8 / 33.4	5.4 / 30.8	6.7 / 29.0	7.8 / 27.7	8.8 / 26.7	9.7 / 25.9	10.5 / 25.2
	15	Water quantity (I/h) / water pressure loss (kPa)	654 / 6.5	932 / 12.5	1158 / 18.8	1352 / 25	1521 / 31.2	1673 / 37.2	1809 / 43.1

	BE for unit versions SMART, PREMIUM and INFINITE BE electrical co												
Outdoor air	0 °C	-5 °C	-10 °C	-15 °C	-15 °C*	0 °C	-5 °C	-10 °C	-10 °C*	-10 °C	-15 °C	-15 °C*	
(m³/h)	23	300		2300			23	00		2300			
Unit version	FIRST, S	SEASON	Pre	SMART Pre-heating coil				UM BE ng coil			NFINITE B	E eating coil	
Performance (kW)		-		6.75			6.75			6.75 + 6.75			
Temperature on output from the unit (°C)	17.1	16.9	17.1	16.1	18.6	25.9	25.7	21.5	29.4	25.9	24.9	29.6	

^{*} If the volume flow is reduced by 20 %

Technical data for Zehnder Silvertop 35 ventilation unit



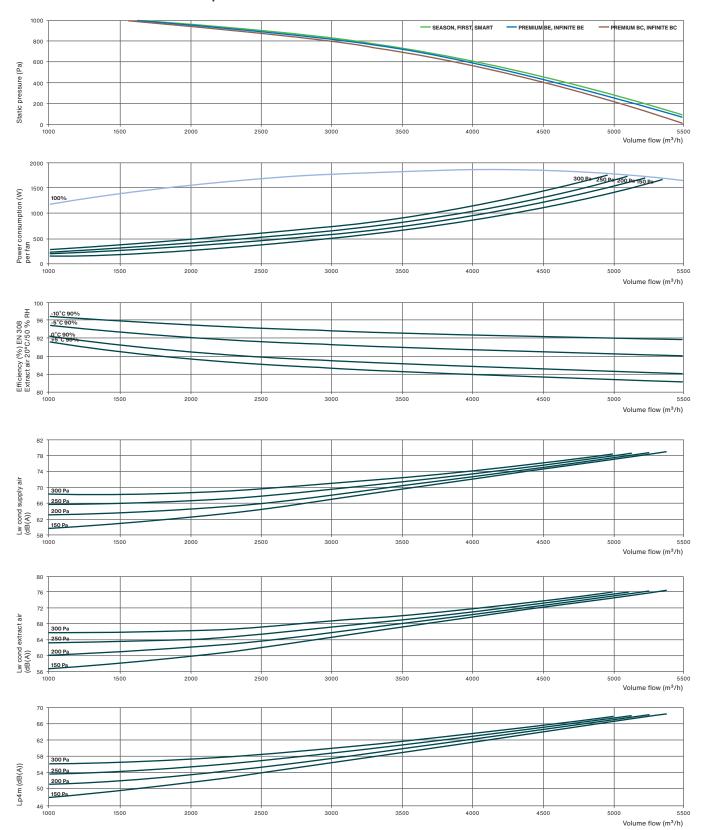
Performance data for Zehnder Silvertop 35 heating coil

BC for PRE	MIUM and INFIN	ITE unit versions						Hot	water coil
Water temp. °C / °C	Air inlet temperature °C	Volume flow m³/h	1000	1400	1800	2200	2600	3000	3400
		Performance (kW) / supply air (°C)	12.7 / 48.3	15.9 / 44.3	18.7 / 41.4	21.1 / 39.1	23.3 / 37.2	25.3 / 35.7	27.1 / 34.3
80 / 60	11	Water quantity (I/h) / water pressure loss (kPa)	558 / 2.5	683 / 3.7	819 / 5.0	925 / 6.2	1021 / 7.4	1108 / 8.6	1188 / 9.8
80 / 60		Performance (kW) / supply air (°C)	11.9 / 49.7	14.8 / 45.9	17.4 / 43.2	19.6 / 41.1	21.6 / 39.6	23.5 / 37.9	25.2 / 36.7
	15	Water quantity (I/h) / water pressure loss (kPa)	519 / 2.2	649 / 3.2	761 / 4.3	859 / 5.4	948 / 6.5	1029 / 7.5	1103 / 8.6
		Performance (kW) / supply air (°C)	9.6 / 38.9	12.0 / 36.0	14.1 / 33.9	15.9 / 32.2	17.6 / 30.8	19.2 / 29.7	20.6 / 28.7
60 / 50	11	Water quantity (I/h) / water pressure loss (kPa)	830 / 5.3	1042 / 8.1	1225 / 10.9	1387 / 13.6	1533 / 16.4	1666 / 19.1	1788 / 21.8
60 / 50		Performance (kW) / supply air (°C)	8.7 / 40.3	10.9 / 37.7	12.8 / 35.7	14.4 / 34.2	16.0 / 33.0	17.3 / 31.9	18.6 / 31.0
	15	Water quantity (I/h) / water pressure loss (kPa)	753 / 4.5	945 / 6.7	1110 / 9.1	1256 / 11.4	1388 / 13.7	1508 / 15.9	1619 / 18.1
		Performance (kW) / supply air (°C)	6.9 / 31.0	8.6 / 29.0	10.2 / 27.5	11.5 / 26.3	12.7 / 25.3	13.8 / 24.5	14.9 / 23.8
45 / 40	11	Water quantity (I/h) / water pressure loss (kPa)	1185 / 10.6	1491 / 16.2	1756 / 21.8	1991 / 27.5	2203 / 33.1	2396 / 38.7	2574 / 44.1
45 / 40		Performance (kW) / supply air (°C)	6.0 / 32.5	7.5 / 30.7	8.8 / 29.3	10.0 / 28.3	11.1 / 27.4	12.0 / 26.7	12.9 / 26.1
	15	Water quantity (I/h) / water pressure loss (kPa)	1032 / 8.2	1297 / 12.5	1527 / 16.9	1730 / 21.2	1914 / 25.6	2081 / 29.8	2235 / 34.0

	BE for unit versions SMART, PREMIUM and INFINITE BE electrical co												
Outdoor air	0 °C	-5 °C	-10 °C	-15 °C	-15 °C*	0 °C	-5 °C	-10 °C	-10 °C*	-10 °C	-15 °C	-15 °C*	
(m³/h)	35	00	3500				35	00		3500			
Unit version	FIRST, S	SEASON	Pre	SMART Pre-heating coil				UM BE ng coil		INFINITE BE Pre-heating coil + heating co			
Performance (kW)		-		12.0			10.5			12.0 + 10.5			
Temperature on output from the unit (°C)	17.0	16.7	17.0	17.1	18.4	26.0	25.7	21.6	29.6	26.0	26.1	29.6	

^{*} If the volume flow is reduced by 20 %

Technical data for Zehnder Silvertop 52 ventilation unit



Performance data for Zehnder Silvertop 52 heating coil

BC for PRE	MIUM and INFIN	ITE unit versions					Н	ot water coil
Water temp. °C / °C	Air inlet temperature °C	Volume flow m ^s /h	1200	2000	2800	3600	4400	5200
		Performance (kW) / supply air (°C)	17.1 / 52.7	24.4 / 46.7	30.3 / 42.7	35.4 / 39.8	39.9 / 37.5	43.9 / 35.7
80 / 60	11	Water quantity (I/h) / water pressure loss (kPa)	749 / 1.3	1068 / 2.6	1326 / 3.8	1552 / 5.1	1749 / 6.4	1925 / 7.6
80700		Performance (kW) / supply air (°C)	15.9 / 53.8	22.7 / 48.2	28.2 / 44.4	32.9 / 41.7	37.1 / 39.6	40.8 / 38.0
	15	Water quantity (I/h) / water pressure loss (kPa)	697 / 1.2	993 / 2.2	1235 / 3.4	1442 / 4.5	1624 / 5.5	1787 / 6.6
	11	Performance (kW) / supply air (°C)	12.8 / 42.1	18.3 / 37.8	22.8 / 34.9	26.8 / 32.8	30.2 / 31.1	33.3 / 29.7
60 / 50	11	Water quantity (I/h) / water pressure loss (kPa)	1109 / 2.9	1592 / 5.6	1987 / 8.4	2327 / 11.2	2627 / 14.0	2896 / 16.8
00730		Performance (kW) / supply air (°C)	11.6 / 43.2	16.6 / 39.3	20.7 / 36.6	24.2 / 34.7	27.4 / 33.2	30.1 / 32.0
	15	Water quantity (I/h) / water pressure loss (kPa)	1007 / 2.4	1443 7 4.7	1801 / 7.0	2108 / 9.3	2379 / 11.7	2622 / 14.0
		Performance (kW) / supply air (°C)	9.1 / 33.3	13.1 / 30.2	16.5 / 28.2	19.3 / 26.7	21.8 / 25.5	24.1 / 24.6
45 / 40	11	Water quantity (I/h) / water pressure loss (kPa)	1579 / 5.7	2275 / 11.1	2847 / 16.9	3340 / 22.6	3775 / 28.3	4167 / 34.0
43740		Performance (kW) / supply air (°C)	8.0 / 34.4	11.4 / 31.7	14.3 / 30.0	16.8 / 28.6	19.0 / 27.6	20.9 / 26.8
	15	Water quantity (I/h) / water pressure loss (kPa)	1376 / 4.4	1979 / 8.6	2475 / 13.0	2902 / 17.5	3279 / 21.9	3618 / 26.2

	BE for unit versions SMART, PREMIUM and INFINITE BE electrical co												
Outdoor air	0 °C	-5 °C	-10 °C	-15 °C	-15 °C*	0 °C	-5 °C	-10 °C	-10 °C*	-10 °C	-15 °C	-15 °C*	
(m³/h)	52	00		5200			52	00		5200			
Unit version	FIRST, S	SEASON	Pre	SMART Pre-heating coil			PREMI Heatir				NFINITE B ng coil + h	E eating coil	
Performance (kW)		-		15.0			12.0				15.0 + 12.0		
Temperature on output from the unit (°C)	16.9	16.6	16.9	15.7	18.4	23.8	23.5	19.5	26.9	23.8	22.7	27.1	

^{*} If the volume flow is reduced by 20 %

Options

Climate



SUMMER/WINTER reversing thermostat

For FIRST and SMART unit versions in conjunction with a Combibox Concept external module



Humidity sensor for duct installation

Signal 0-10 V (Not compatible with SEASON unit)



Humidity sensor for room installation

Signal 0-10 V (Not compatible with SEASON unit)



Dehumidification module

Duct installation (see Combibox Concept documentation). Not compatible with SEASON unit



Heating register

Frost protection. Leakage classification 4



Magnetic valve set

Unit versions PREMIUM BC and INFINITE BC Type DN15/1.6 - 1/2"F with Zehnder Silvertop 06/08 Type DN15/2.5 - 1/2"F with Zehnder Silvertop 15/23 Type DN15/4 - 1/2"F with Zehnder Silvertop 35

Type DN20/6.3 - 3/4"F with Zehnder Silvertop 52

Safety and control



Pressure boxes for filter monitoring

Extract air filter (IP54)

Liquid manometer





Smoke detector

(IP54)

Trigger box

TBTS 24 or 48Vcc housing (IP67)

Airflow control



External control unit

Potentiometer only with SEASON (IP54)



Comfort remote control STOPP/PV/GV 2 fans housing (IP54)

.



Comfort remote control

PV/GV 2 fans housing (IP54)



Presence detector

ON/OFF or PV/GV (Not compatible with SEASON unit)



Comfort remote control

START/STOPP 2 fans housing (IP54)

Control



Monofunctional connection box

On/off connection box to be connected to the LOBBY discharge capacity modulation unit versions (constant pressure).



Monofunctional connection box

Modulating connection box to be connected with LOBBY discharge capacity modulation unit versions (constant pressure).



Multifunctional connection box

For combination with the LOBBY discharge capacity modulation unit versions (constant pressure). In addition to controlling the distribution, the controller communicates with the Zehnder Silvertop ventilation unit (except SEASON), especially for the free cooling / night cooling functions.



TOUCH control unit

Not compatible with SEASON unit. Max. 100 m

Installation



Flanged collar

Notes

