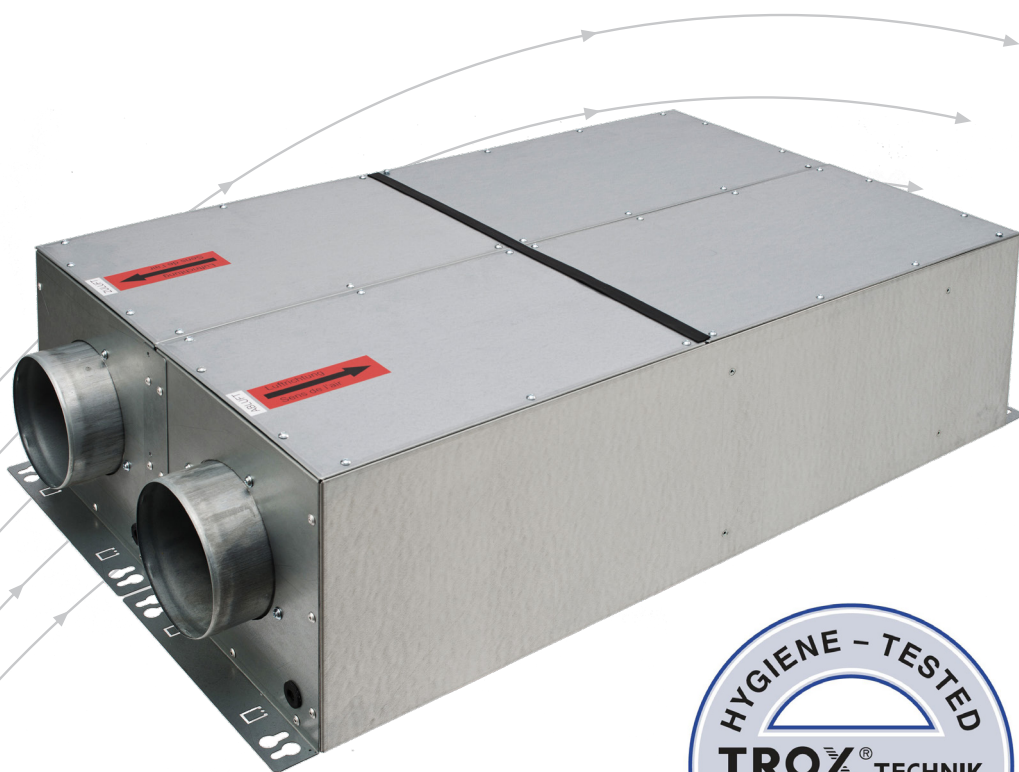


Comfort Residential Air Control Unit

Type TH-WLB-C



TROX® TECHNIK



The art of handling air

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Contents · Safety instructions

Contents

Safety instructions	2
Application · Description · Principle diagram	3
Dimensions and installation	4
Volume flow controller TCO · Definitions	5
Description of the functions	6 and 7
Technical data	8 and 9
Loss of pressure · Electronic components	10
Texts for tenders · Standard times	11
Order details	12

Application

The TROX HESCO residential air control unit (TH-WLB-C) is a compact air control unit for distributing centrally prepared air as required in any residence. Built-in supply air and extracted air controllers achieve the required volume flows in any living area and moreover, reduce the noise level.

The simple operating concept essentially offers three keys for the three functional levels <MIN>, <MID> and <MAX>. Other keys for the functions <AUTO> and/ or <CLOSED> (further information under functional description) are available as options. For integration into higher-level BUS systems, the TH-WLB-C is fitted with ModBus or can be controlled via analogue signals.

In order to guarantee long-term operation of the home ventilation box, it is necessary to provide filtering of the supply air and extract air (minimum filter class ISO coarse > 60 %) in the air direction directly in front of the TH-WLB-C on site.

Functions of the TH-WLB-C control

- 3-stage operation <MIN>, <MID> and <MAX>
- Party function <MAX> as <MAX timer> (time-controlled reset to previous operating mode)
- <AUTO> - operation with integrated air quality sensor or time switch (internal / external)
- <CLOSED> with ventilation interval (1 hour's "ventilation" in 24 hours)
- Separate supply air and extract air control, e.g. via integration of the kitchen extracted air
- An external fire alarm can be integrated to close the residential ventilation in the event of fire

The advantages

- Compact device
- Minimal installation costs
- Optimum cost/benefit ratio
- Variable ventilation, adjustable
- Simple operation / maintenance
- Guaranteed sound level values
- High quality

The benefits

- Defined unit – simple to plan
- Cost-effective solution – reduction of costs
- Compact design – space-saving – more room for living
- Very good performance and low noise level values
- Simple to operate – no training costs
- Simple electrical wiring – low installation effort
- "Party function" – maximum volume flow with automatic revert (MAX Timer)
- Energy-saving – intensity controlled by auto-function (day / night operation or air quality sensor)
- Sound insulation – no noise interference
- Can be combined with vapour extraction in the kitchen or with bathroom / WC or other sensor

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Characteristics

- Electronic volume flow control
- Volume flow control range at DN160 15:1 and DN125 10:1
- Minimum volume flow, 20m³/h
- Flow-resistant control
- Operating temperature, 10 to 50° C
- Tested according to VDI 6022

Application · Description · Principle diagram

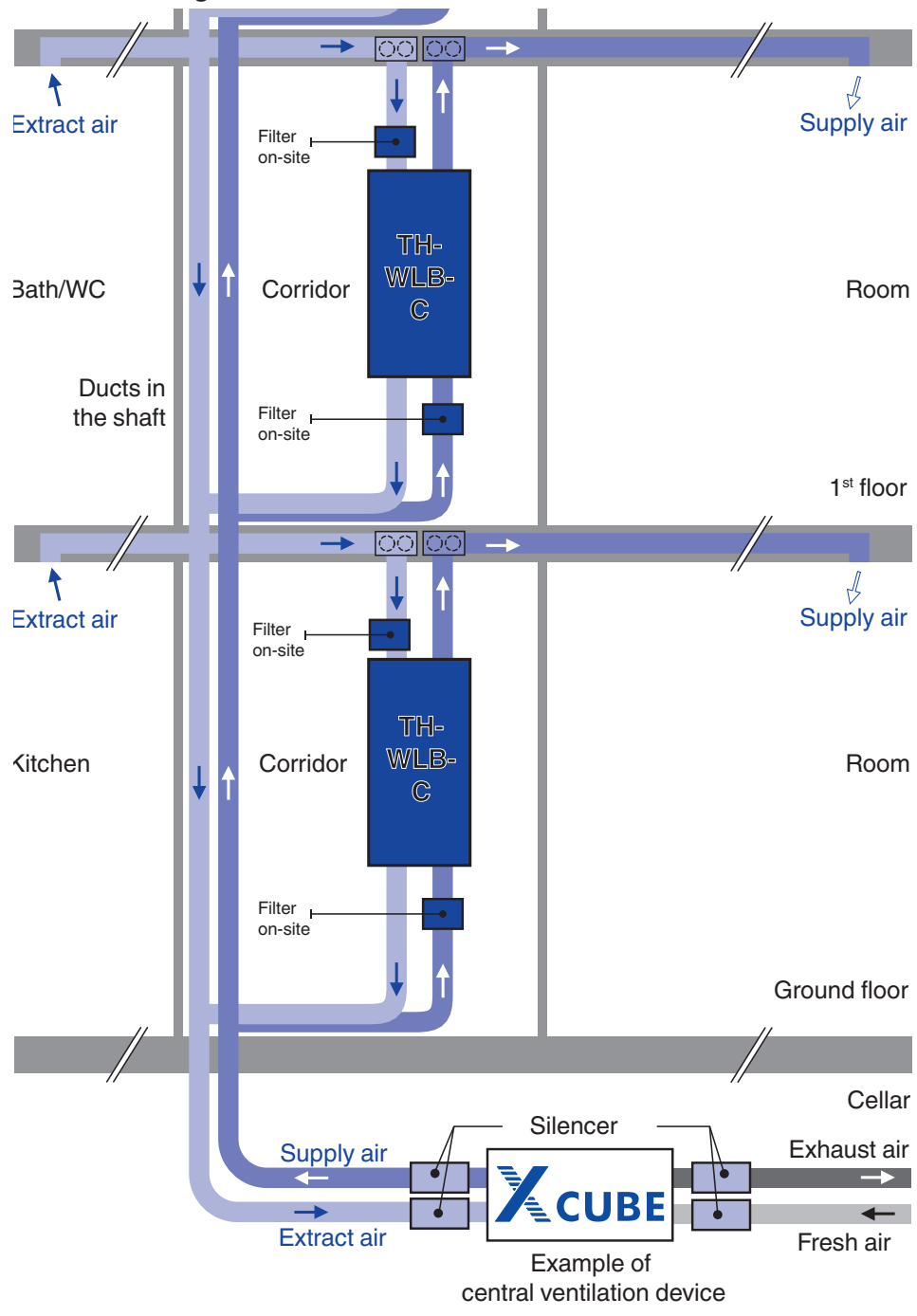
Design features

- DN160 or DN125 connection on both sides
- Casing leakage air flow according to DIN EN 1751 class A
- Casing made of galvanised sheet steel
- Fixing brackets, top and bottom
- Weight: 20 kg

Dimensions:

W × H × D = 486 × 896 × 232 mm

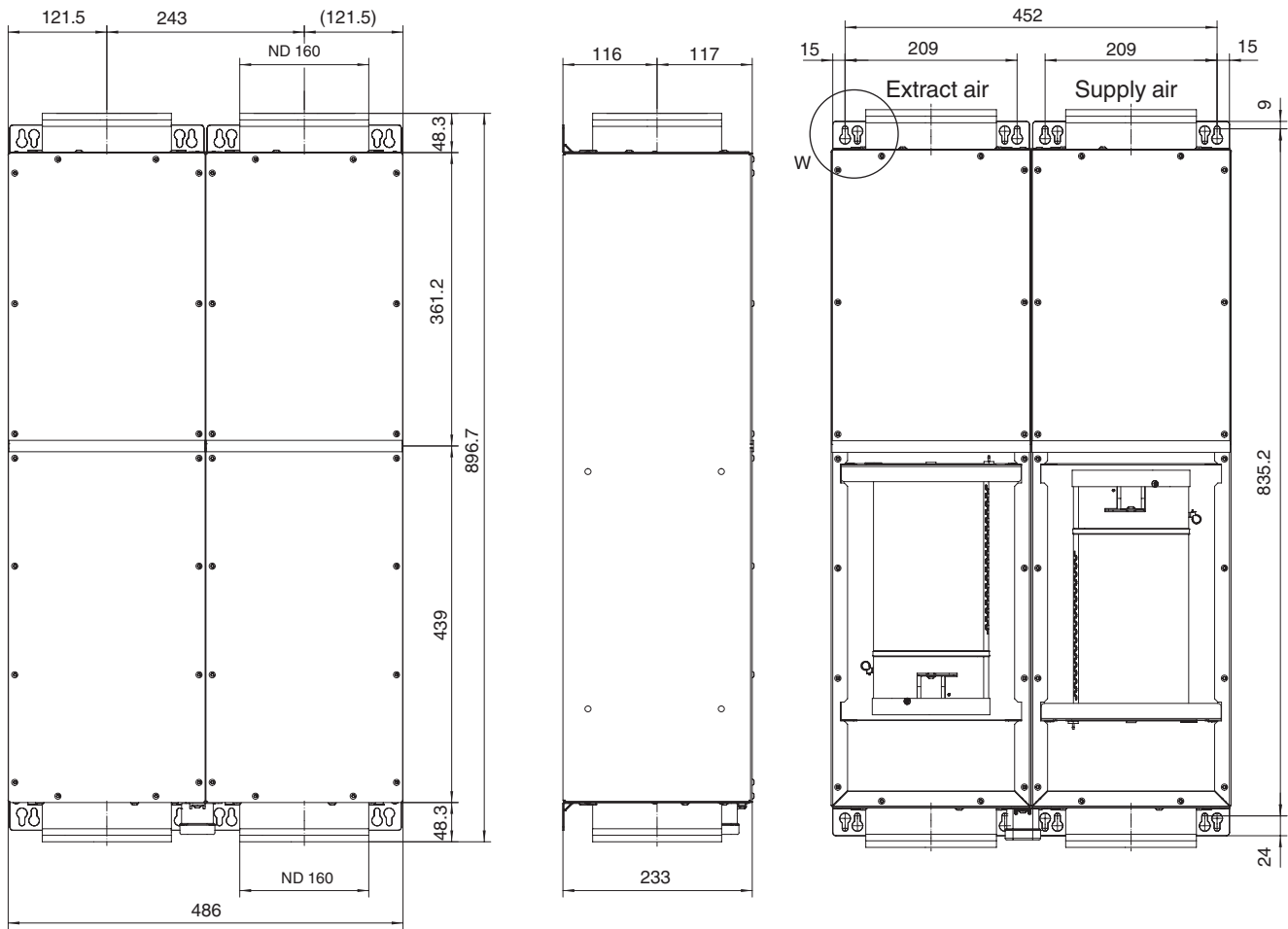
Schematic diagram for controlled residential ventilation in an apartment building



Dimensions and installation

Dimensions and installation

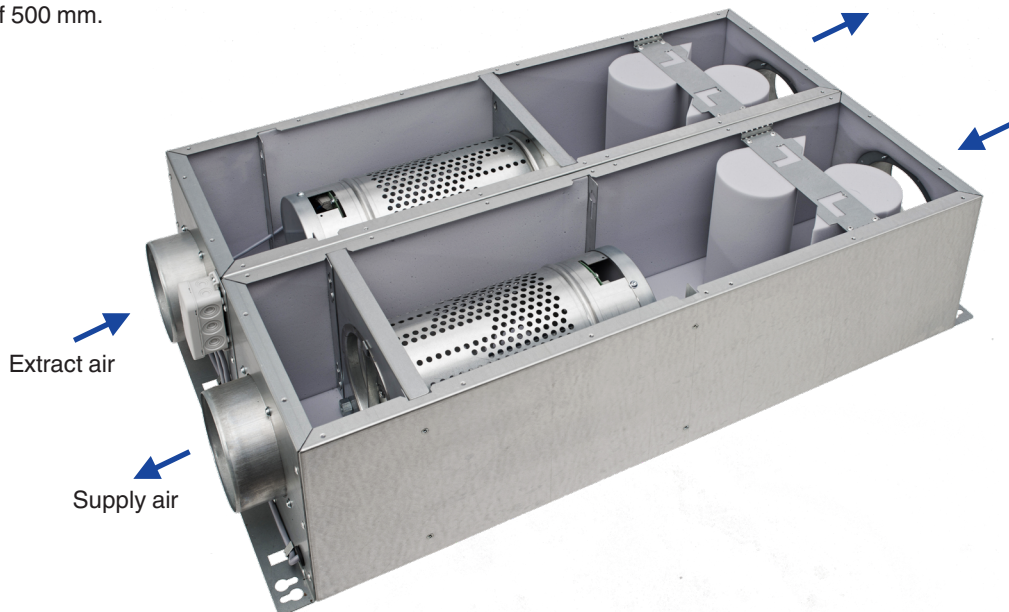
1



The complete device fits into a wall cabinet with centre-to-centre dimensions of 500 mm.

Nominal size 125

Nominal size 160



The installation should be carried out with structure-borne sound insulation. The detailed installation instructions are supplied.

Volume flow controller TC0 · Definitions

Volume flow controller TC0

Acoustically optimised variable volume flow controller for supply air or extract air.

Consisting of casing with connecting plate, static differential pressure sensor and control components.

Connecting plate airtight according to DIN EN 1751, class 4.

Special characteristics:

- Static differential pressure sensor is flow-resistant.
- Factory setting or programming and ventilation testing of each device at a special test bench, and documentation of the data with inspection plate on the device.
- Actual value signal related to $V_{nominal}$, ensuring easier commissioning or subsequent volume flow adjustment.
- Leakage air flow according to DIN EN 1751, class A.
- Volume flow range 15:1 (DN 160) or 10 : 1 (DN 125).

Control:

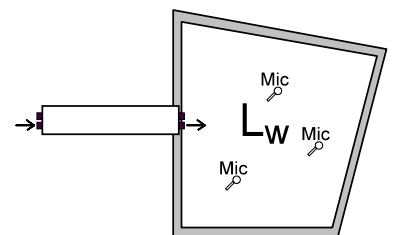
- Connection of a command variable, 0-10 V, related to $V_{nominal}$ (volume flow < 20 m³/h closes)
- Actual value signal 0-10 V related to $V_{nominal}$
- Two digital inputs for override control (V_{min} / V_{mid} / V_{max} / VAV closed)
- ModBus RTU interface
- Supply voltage, 24 V DC

Material:

- Casing made of galvanised sheet steel, and connecting plate with seal

Definitions

D	mm	Diameter
f_m	Hz	Octave band centre frequency
L_{W1}	dB(A)	Sound power level of the flow noise
L_{W2}	dB(A)	Sound power level of the case-radiated noise
ΔL_{W1}	dB	Differential values for calculating the linear sound power level in the octave band (flow noise) $L_{W\text{ Okt.}} = L_{W1} + \Delta L_{W1}$
ΔL_{W2}	dB	Differential values for calculating the linear sound power level in the octave band (case-radiated) $L_{W\text{ Okt.}} = L_{W2} + \Delta L_{W2}$
Δp_g	Pa	Pressure differential across the entire residential air control unit
MIN	m ³ /h bzw. l/s	Minimum volume flow
MID	m ³ /h bzw. l/s	Medium volume flow (comfort ventilation)
MAX	m ³ /h bzw. l/s	Maximum volume flow without timed switching
NOM	m ³ /h bzw. l/s	Nominal volume flow (maximum that can be set)
AUTO		MID to MIN switching according to day / night-time switch with air quality sensor
CLOSED		Connecting plate position closed
MAX timer		Maximal volume flow with revert after x minutes
Vapour extraction		External switch, supply air MAX, extract air MIN



Description of the functions

Functions – TH-WLB-C control

3-stage operation (<MIN>, <MID>, <MAX>)

When activating the operating stages <MIN>, <MID> or <MAX> the TH-WLB-C will operate constantly until the user selects another operating option via the keys. Normal operation is the <MID> stage. For temporary absences or reduced operation, the <MIN> stage is recommended. For increased requirements, the <MAX> stage is recommended – so-called “party ventilation”. The air handling unit is to be planned on the basis of the summed Vmax. The MAX stage is selected in two variations:

<MAX> as constant operating stage, volume flow remains at MAX, until another key is pressed.

<MAX-Timer> with time-controlled revert from MAX to previous operating mode

(can be set between 30 and 240 minutes, standard = 60 minutes). Only possible with TH-WLB-C control.

These options can be selected via the key layout. When ordering <MAX timer> without time input, the control is supplied ex-factory with a revert time of 60 minutes.

Operating mode <CLOSED> including sequential ventilation

For the selected function <CLOSED> the extract air and supply air controls close. Ventilation is carried out for 60 minutes every 24 hours in the <MIN> operating stage. Therefore, stale air is avoided in a holiday apartment that is unused for a long period, for example, without unnecessary energy wastage.

<AUTO> operating mode

In addition to the manual functions <MIN>, <MID>, <MAX> and <CLOSED> the TH-WLB-C can also be optionally controlled automatically. The <AUTO> function can either be operated via the air quality sensor or the time-switch. Both options offer energy-saving.

<AUTO> - Operation with air quality sensor (VOC)

The air quality sensor is installed in the extracted air duct of the TH-WLB-C, to record an average value for the air load of the entire residence. Ventilation is thereby delivered according to requirements. The sensor measures VOCs (volatile organic compounds), as the room ventilation thereby responds immediately and as required, not only to CO₂, but also to all crucial air pollutants.

(Dip switch no. 2 = ON, see electrical diagram)

<AUTO> - time-switch operation

An individual daily program can be set with the integrated time-switch. Depending on the time of day, the volume flows MID or MIN are switched automatically. Without any specification, the standard times of day are pre-set ex-factory

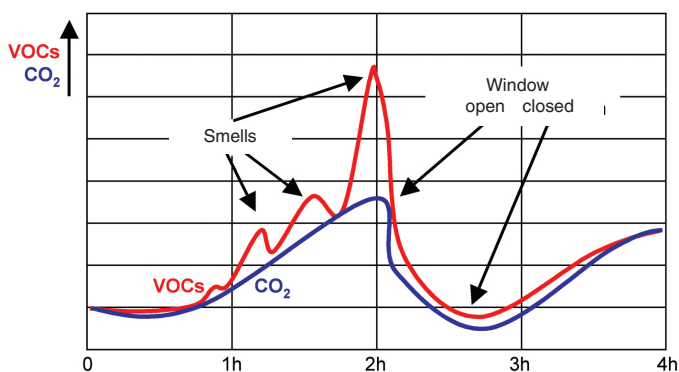
(MID 8:00 a.m.-10:00 p.m. / MIN 10:00 p.m.-8:00 a.m.).

Alternatively any external time-switch (supplied from on-site) can be connected.

Note: switching from summer to wintertime can be done manually.

(Dip switch no. 2 = OFF, see electrical drawing)

The VOC level corresponds to the human perception of room air quality. The sensor converts these values into an equivalent CO level. The higher the equivalent CO values the more air is supplied from the volume flow controllers. This volume flow is controlled between the setting values MIN and MID. The standard limit value ex-factory is set at 600 ppm (±25). For living areas with ODA 3 quality or worse, the limit value can be raised.



CO₂ and VOCs plotted during a meeting

Assessment table for interpreting the air quality recorded

Sensor CO ₂ [ppm]	Air Quality	
100%	2100	Bad
	2000	
	1900	
	1800	
	1700	
	1600	Ventilation required
	1500	Mediocre
	1400	
	1300	
	1200	Contaminated indoor air
	1100	
	1000	Ventilation recommended
	900	Satisfactory
	800	
	700	Good
	600	
	500	Excellent
0%	400	

Description of the functions

External contacts / detectors / sensors, with electrical TH-WLB-C control

There is the option to connect the TH-WLB-C control unit with various kinds of contacts / detectors. Simple potential-free contacts combined with the on/off switch of the external components will suffice to activate the functions. The following potential-free contacts are available for separate supply and extract air control:

Separate supply and extract air control:

- 1 x “supply air > extract air” contact
- Supply air = MAX / extract air = MIN

- 1 x “supply air = extract air” contact
- supply air = MID / extract air = MID (Dip switch no. 3 = ON)
 - supply air = MAX / extract air = MAX (Dip switch no. 3 = OFF)

Integration into an external fire alarm:

- 1 x “fire” contact
- supply air = CLOSED / extract air = CLOSED

Example 1 – kitchen or bathroom / WC: “supply air > extract air” contact

A vapour extractor fan in a kitchen usually aspirates a relatively high volume flow from the residence. This exhaust air must either be compensated via a damper or via a simple window aperture with fresh air. If residential ventilation is available it is obvious that at least part of the supply air from the residential ventilation should be used. The function automatically sets the supply air flow to MAX and at the same time the extract air flow to MIN. This has the effect of improving the negative volume flow balance and thereby helps to save energy. It should be noted that complete compensation is not possible. Therefore, it should be considered from case to case, whether or not this additional switch can be used expediently.

In a bathroom / WC, an extracted air ventilator is often started via the light switch. In this case too, the supply air can be automatically switched to MAX and the extract air to MIN. The difference between the supply air and the extract air is usually sufficient to make the replacement air available.

Example 2 – wet cell: contact “supply air = extract air”

When closing the contact, the supply and extract air volume flow is either set to MID or MAX in each operating condition.

Example 3 – fire alarm: “fire” contact

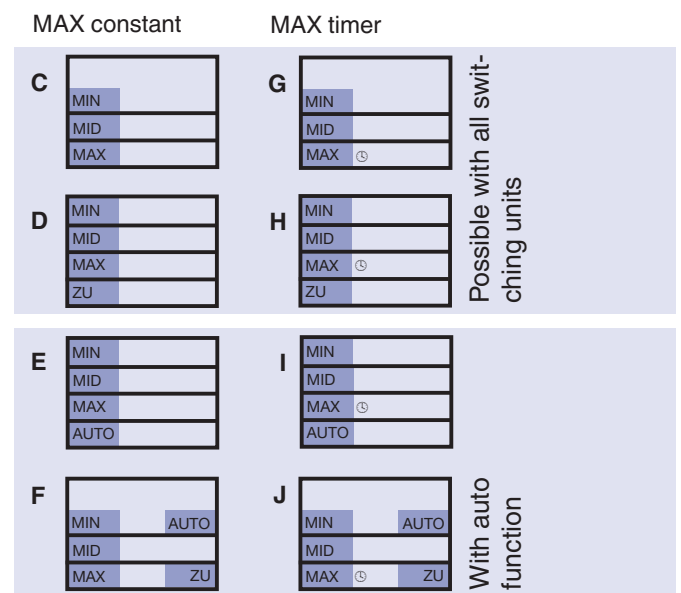
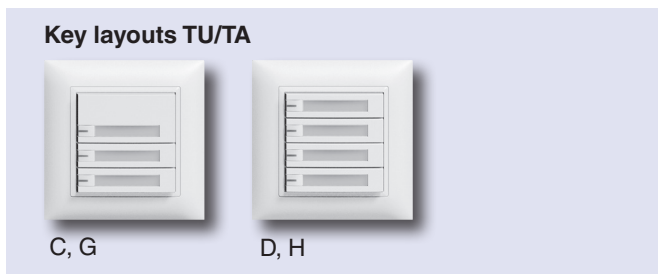
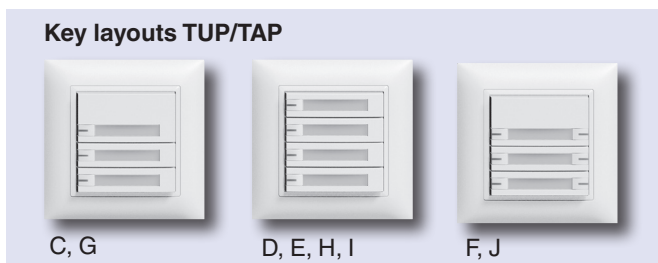
When opening the fire contact, both volume flow controls are closed.

Keypad (delivered loose), to be combined with the TH-WLB-C control

Depending on the range of functions selected, the associated key layout may vary. A switching unit with three, four or six impulse keys is required. The adjacent image shows the possible variants for the key layout depending on the functions to be carried out.

When delivered by TROX HESCO Schweiz AG the keypad will be lettered and supplied loose. The wiring for the residential air control unit is to be set up on site.

Key layouts depending on function

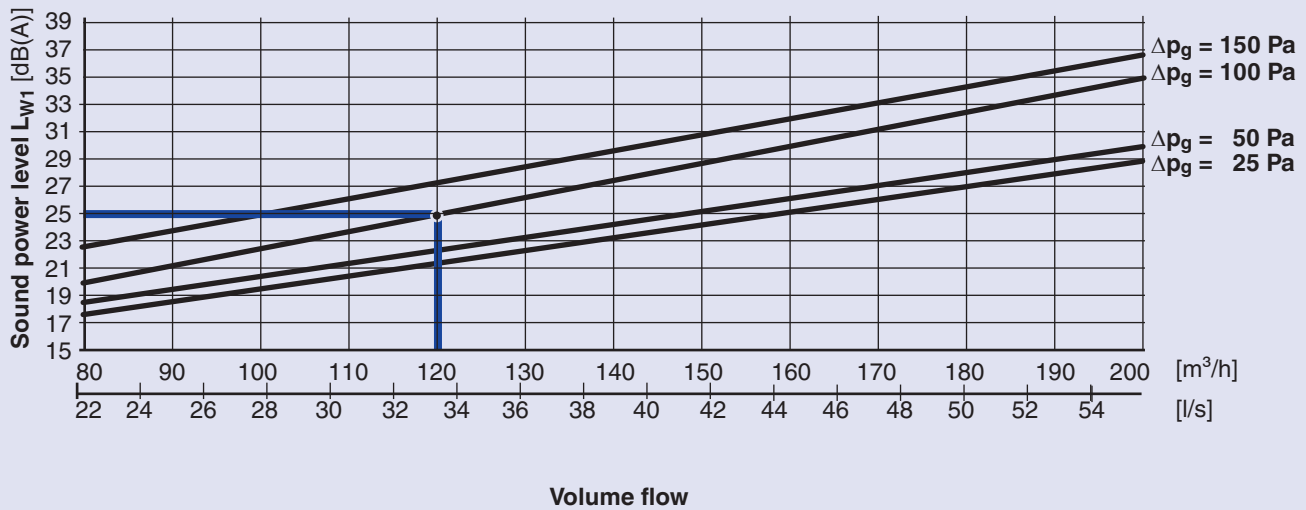


Technical data

Acoustic nominal size 125

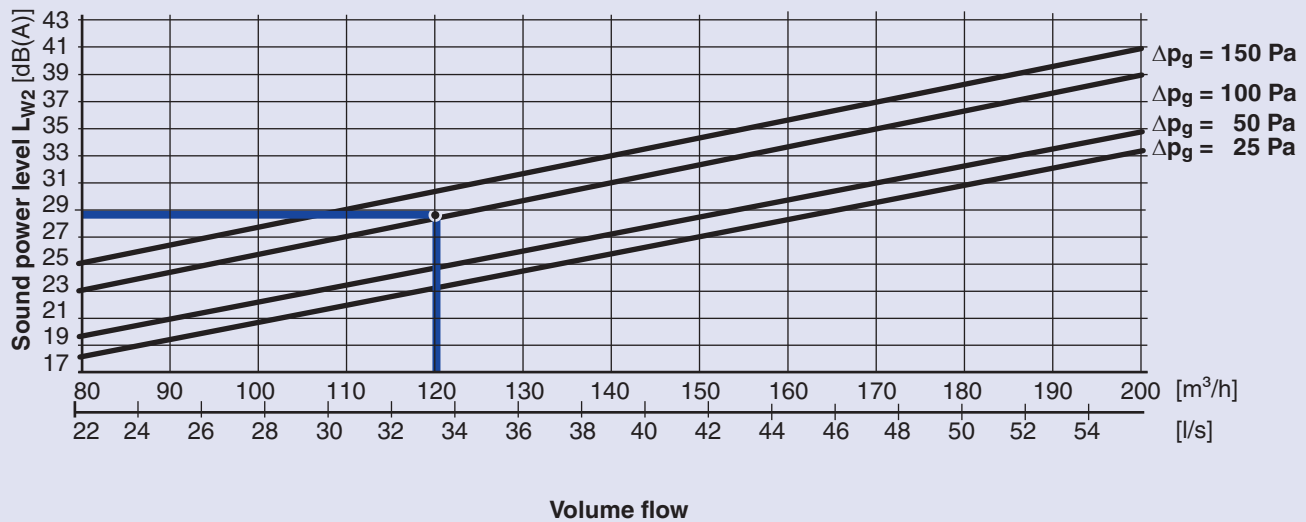
Flow noises - nominal size 125

L_{W1} measured in echo chamber according to EN ISO 3741



Correction values for octave band values								
		Frequency f [Hz]						
		125	250	500	1000	2000	4000	8000
ΔL_{W1}	[dB]	+4	+7	-2	-13	-16	-18	-15
Tolerance [dB]		± 2	± 2	± 2	± 4	± 5	± 5	± 6

Case-radiated noise – nominal size 125



Correction values for octave band values								
		Frequency f [Hz]						
		125	250	500	1000	2000	4000	8000
ΔL_{W2}	[dB]	13	1	-6	-11	-16	-15	-13
Tolerance [dB]		± 3	± 2	± 3	± 5	± 6	± 6	± 6

Calculation example

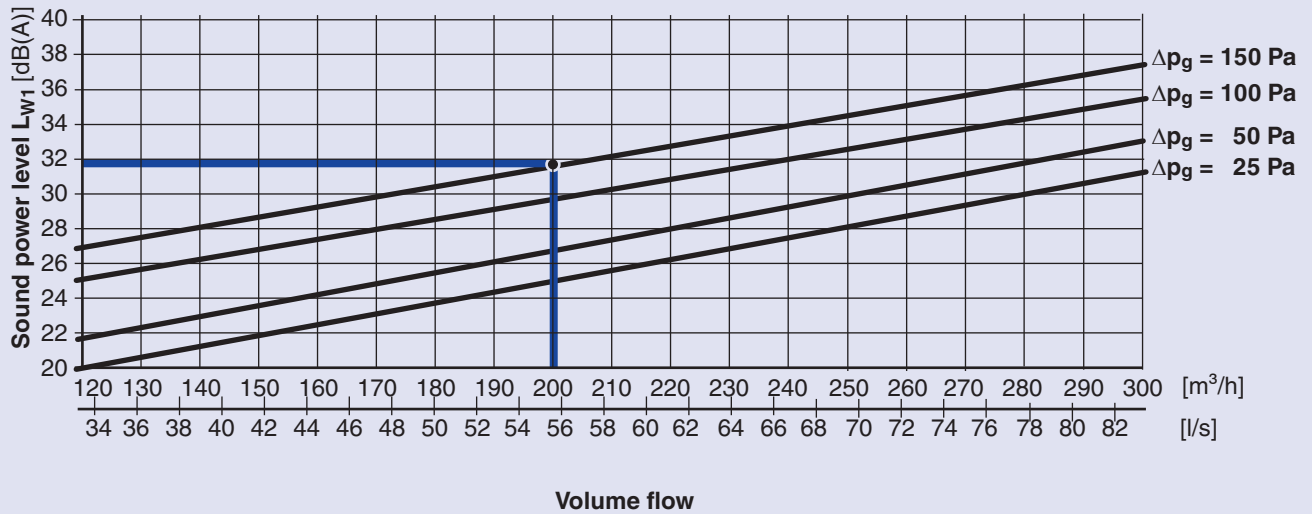
Sought: sound power level at 120 m³/h and a total pressure loss of $\Delta p_g = 100$ Pa

Solution: L_{W1} (flow noises) according to diagram, 25 dB(A)

L_{W2} (case-radiated noise) according to diagram, 28 dB(A)

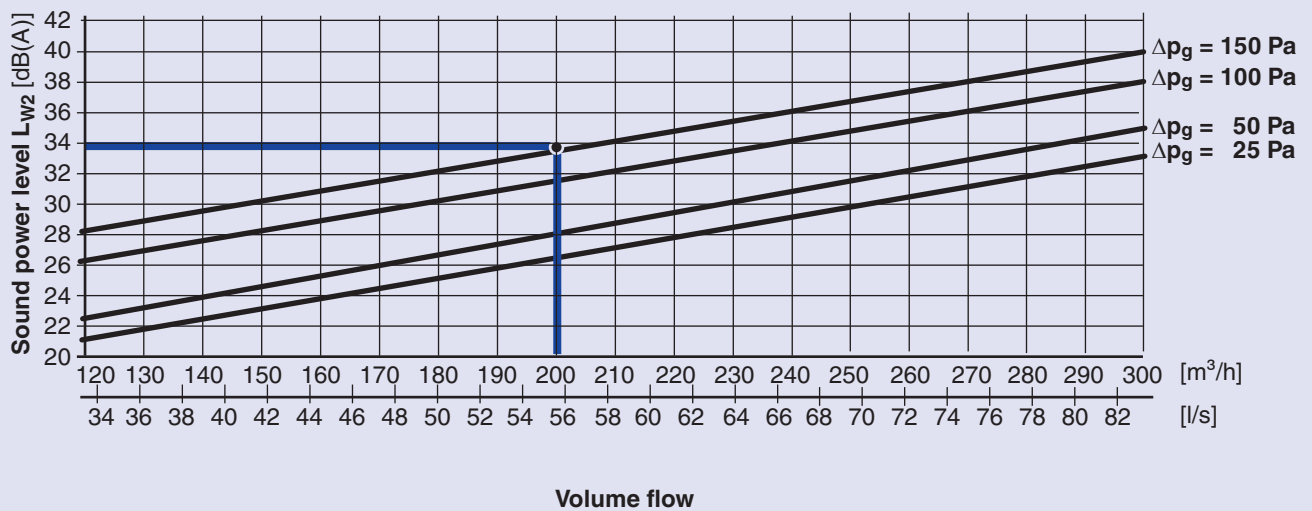
Flow noises – nominal size 160

L_w measured in echo chamber according to EN ISO 3741



Correction values for octave band values							
	Frequency f [Hz]						
	125	250	500	1000	2000	4000	8000
ΔL_{W1} [dB]	+4	+7	-2	-13	-16	-18	-15
Tolerance [dB]	± 2	± 2	± 2	± 4	± 5	± 5	± 6

Case-radiated noise – nominal size 160



Correction values for octave band values							
	Frequency f [Hz]						
	125	250	500	1000	2000	4000	8000
ΔL_{W2} [dB]	12	1	-4	-8	-14	-15	-18
Tolerance [dB]	± 3	± 4	± 3	± 4	± 5	± 5	± 5

Calculation example

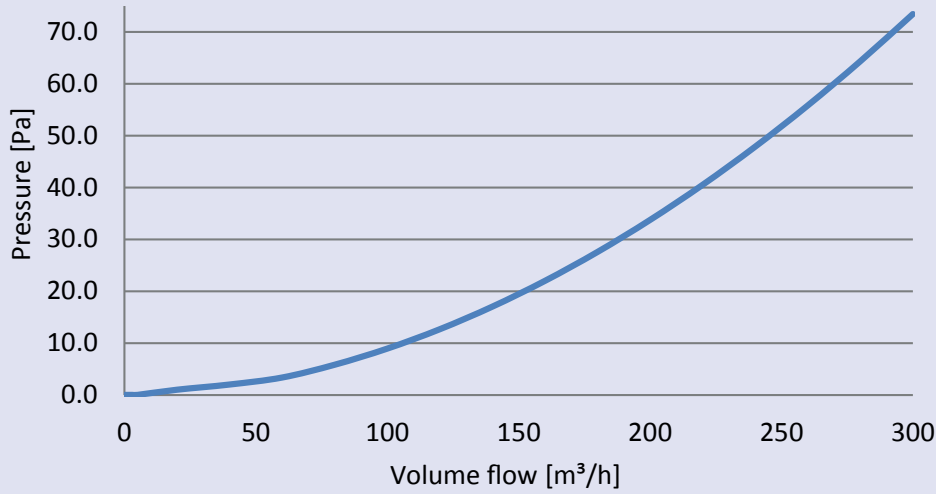
Sought: sound power level at 120 m³/h and a total pressure loss of $\Delta p_g = 150$ Pa

Solution: L_{W1} (flow noises) according to diagram, 32 dB(A)

L_{W2} (case-radiated noise) according to diagram, 34 dB(A)

Loss of pressure · Electronic components

Loss of pressure TH-WLB-C



Electronic components

Touch display for types TSP



Key unit for types TU/TA/TUP/TAP



Control unit for types TUP/TAP/TSP



= TU/TA



+



= TSP



+



= TUP/TAP



Three-stage switch (on site)
e.g. AWAG A230



Two-stage switch including „CLOSED“
(on site); e.g. Feller 7411-2.FMI.61



Three-stage switch including „CLOSED“
(on site); e.g. Feller 7411-5.FMI.61

Please find the wiring diagram under the document “Electrical drawing TH-WLB-C” on our website.

Tender text TH-WLB-C

Combined supply air and extract air controllers for volume flow control as required, for use in controlled residential ventilation with central air preparation. Designed as a compact unit with built-in volume flow controller and integrated sound damper. The entire unit is suitable for wall or ceiling installation. There are fixing rails at the top and bottom of the casing. In order to guarantee long-term operation of the home ventilation box, it is necessary to provide filtering of the supply air and extract air (minimum filter class ISO coarse > 60 %) in the air direction

directly in front of the TH-WLB-C on site. The unit is wired ready for connection (230 V AC) and fitted with customer-specific pre-settings. The length of the connection cable is 1.5 m. Supply and extract air volume flow controllers can be completely de-installed. All setting values can be changed subsequently. Casing made of sheet steel, sendzimir galvanised, with two Ø125 mm or Ø160 mm air connection pipes above and two below for connecting the supply air und extract air.

Design WITH built-in control

Built-in control unit for changing the volume flows for automatic or constant operating stages, (AUTO, MIN, MID, MAX and CLOSED). MAX stage with automatic revert. "CLOSED" operating mode with built-in sequential ventilation function. In automatic operation, there is regulation of the supply and extract air volume flows depending on the mix gas concentration with integrated VOC sensor, or with built-in time-switch. Two potential-free contacts for integration / combination of the kitchen extractor hood or the bathroom ventilation. An additional potential-free contact closes the supply and extract air controllers in the event of fire.

The unit is fitted with customer-specific pre-settings at the factory. <MIN>, <MID> and <MAX> can be changed within the control unit.

Design WITHOUT integrated control (for communication direct with volume flow control TC0)

The processing of the communications signals is carried out via an interface of connection terminals. Volume flow controllers and supply transformers are fully wired including interface.

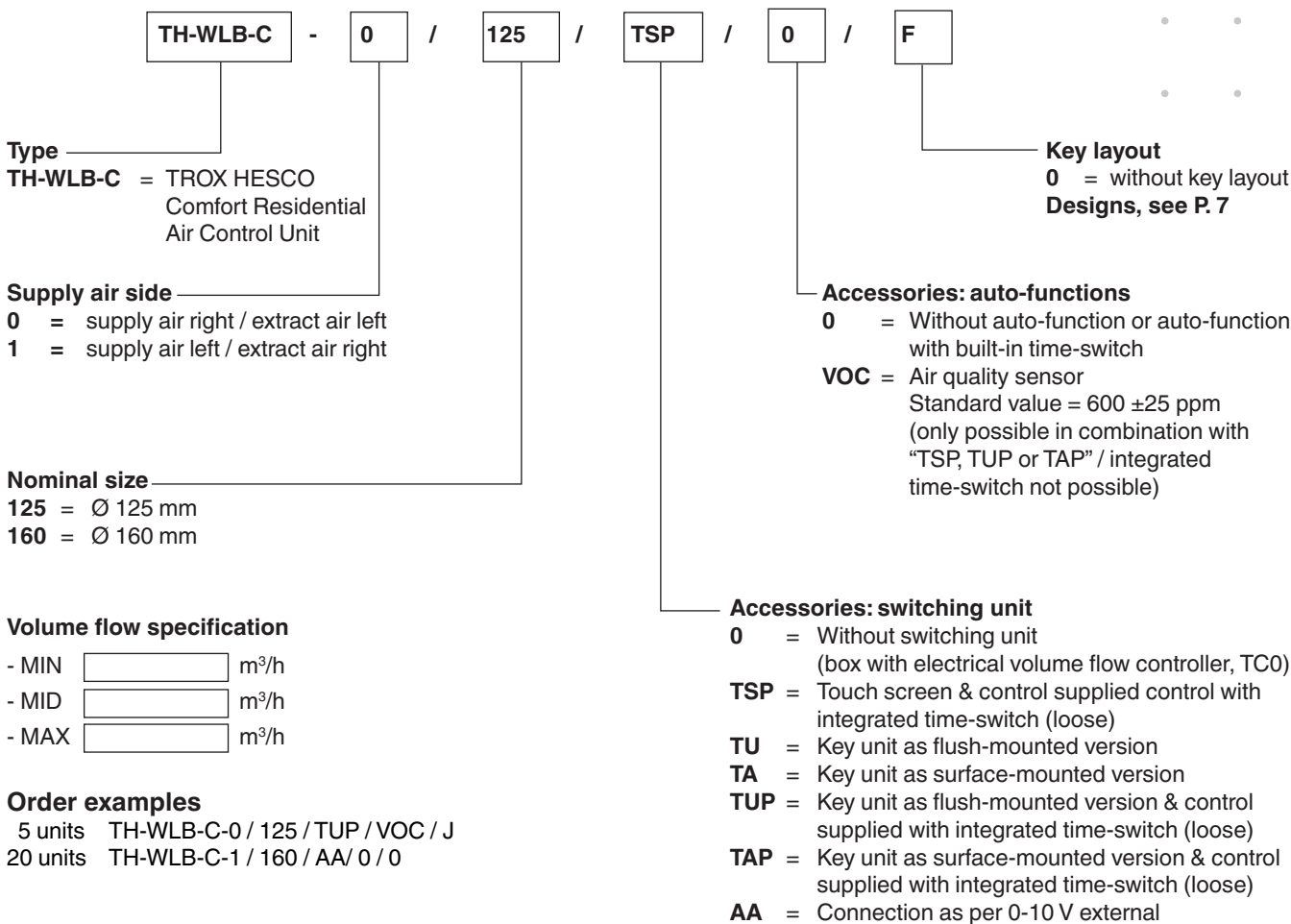
All volume target values are provided on-site from a higher-level system. <MIN>, <MID> and <MAX> volume flows are set specifically for the customer in the factory.

Standard times / controller with TH-WLB-C control

- **AUTO clock function** (time-switch)
based on customer specification or standard
 - Day operation, MID 8:00 a.m. - 10:00 p.m.
 - Night operation, MIN 10:00 p.m. - 8:00 a.m.
 - No automatic summer / winter switching
- **MAX function** ⌚ (MAX timer)
based on customer specifications or standard
 - Duration MAX 60 minutes
(can be set from 30 to 240 minutes)
- **Ventilating function when CLOSED**
 - Duration MIN 60 minutes per 24 hours

Order details

Order codes



Accessories: switching unit

TU / TA



TSP



TUP / TAP



0: A rotary switch can be installed on site (e.g. Feller E-Nr. 547041000).