

Comfort Ventilation System CVS[®]
robusto

Execution A and B

**Utilization guidance
and
construction guidance**

1.1

Comfort Ventilation System robusto[®]

Utilization and construction guidance

Version 1.5 July 2010

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CE-Compliance declaration

The described product agrees with the regulations of the following European guidelines:

89/336/EWG and 73/23/EWG - EMV and low voltage regulation

-Regulation of the council of the 3 may 1989 in order to adapt the legal regulations of the member states about the electromagnetic compatibility.

EN 50081-1 limited values and measurement methods for functional disorders

EN 50082-1:1992 Electromagnetic compability (EMV) generic standard stability part 1: living area, business area and trade area as well as small business.

EN 60335-1:1994+A11:1995 and VDE 0700:82, part 207 Security of electronic equipment for the domestic use and similar functions.

Labelling of the CE-marker: a) power supply label b) CVS case

This declaration of the company

GF-Sol-Air Gerhard Feustle , Raistinginger Str. 3 , D 86911 Diessen, certify the agreement with the mentioned regulations.

The security advice of this delivered product documentation must be considered.

Gerhard Feustle, company leader, date: 01.08.2010

Dear client,

We are happy that you have decided for a quality product of our house. Products like this, which amortise within a few years, are rare. After this time, thanks to our product, you will have money for other expenditures. It would be difficult to find another equipment in your house, which can be compared with CVS!

In a little while you will learn to esteem all other use which is not lying in the measureable but in the subjective area.

The CVSrobusto creates a durable well-being!

The handling and the use is simple. We recommend reading carefully this manual, before the first use of the **Comfort Ventilation System (CVSrobusto)**. In this manual you will find our advice for the correct installation, handling, use and attendance. We thank you for your attention and wish you a lot of fun with your new CVSrobusto.

Advantages for you and your environment!

Type certification:

A type certification for this version of the CVS is in work. But it is deplorable for the customers who call upon the public appropriations and they do not get it for a long time. But the conditions are given rarely and at this time there is unfortunately less money in the treasury in order to keep alive the market incentive programmes.

In comparison to the attainable savings the advantages of the subsidies are clearly lower, so that it is not necessary to insist on performance.

User Manual guidance

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Included in delivery

Each CVSRobusto packet should include the following construction groups or rather components:

Please control with the help of this packing note the completeness of the shipment.

The component parts are nearly stored in the equipment, remove these and store them at a safe place.

1 Comfort Ventilation System CVSRobusto

1 Power supply with connecting cable (according order if necessary other options)

2 plastic tubes with 2 foam sealing rings each

2 Face plates

4 dowels + 4 dowel screws

2 dust filter, fine G3

1 Instruction manual and construction instruction; type approval

1 drilling pattern on hard paper

Equipment parameters

Comfort Ventilation System CVSRobusto	Performance A	Performance B for relaxation rooms	
Supply voltage	12 V	12 V	
Nominal consumption capacity	2 up to max. 4 W	1 up to 1,8 W	
Volume grades	3 and out	3 and out	
Air flow max m ³ /h	> 20	14	
Air flow medium m ³ /h	14	10	
Air flow minimal m ³ /h	8	6	
Effectiveness of the heat exchanger	88% at max., 90% at min. air flow (af)	89-90%	
Warmth attendance degree	94-97%	95-98%	
Antifreeze	manual	manual	
Ventilation noise dBA	38 / 34/ 26 (max./ med./min. Lds)	31/25/22 (max./ med./min. Lds)	
Damping ration of the external noise dB	> 48	> 48	
Measure cm ³	44x28.5x11	44x28.5x11	
Weight kg	circa 2,5	circa 2,5	
Protection class	2	2	

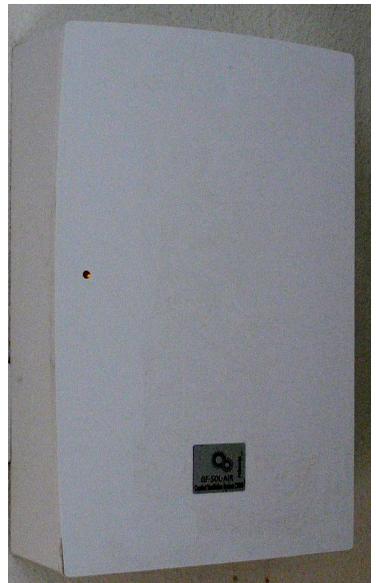
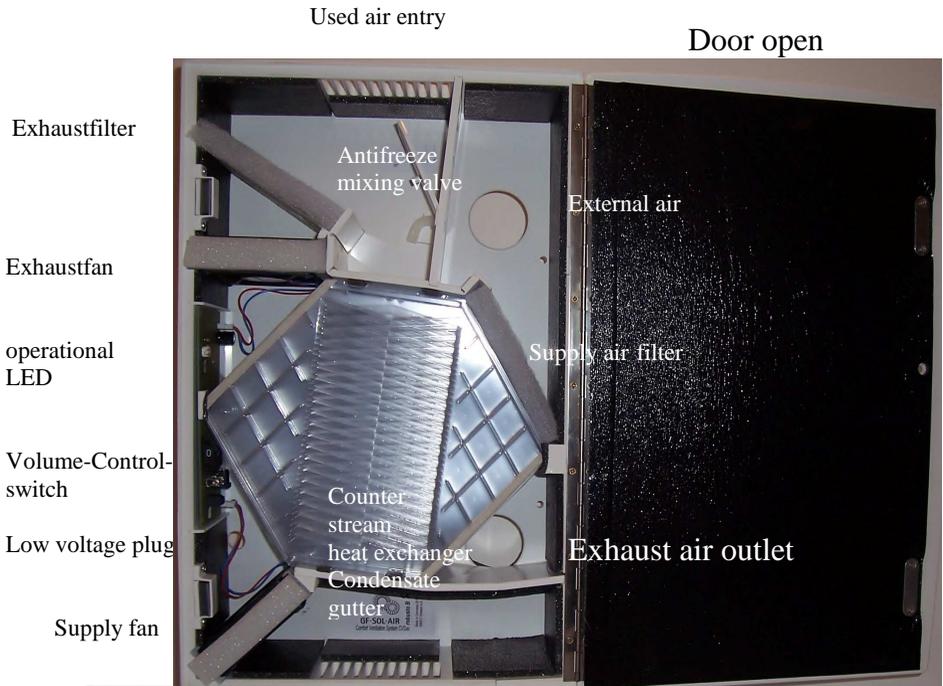
Status displays:

<i>LED-display</i>	<i>Functions</i>	<i>Meaning</i>
Off	none	Equipment plugged off/ power supply is missing
Orange yellow	active	Equipment works (Switch step. 1, 2 or. 3)
Green	ready	Ventilator off (Switch step. 0)

Air exchange/ Energy values/ Losses

Adjustments-	Air volume	Energy exchanges per hour in the circulated air. Sample calculation at a temperature difference of 21° inside/ outside				Controlled ventilation with CVS
		Energy content kJ/h	Energy demand in kWh	Ventilator energy usage in kWh	Residual losses in kWh	
Switch setting	Air flow at continuous operation in m ³ /h					
A 1	8	0,236	0,066	0,002	0,0066	
A 2	14	0,414	0,115	0,004	0,0115	
A 3	20	0,591	0,164	0,006	0,0164	
B 1	6	0,177	0,049	0,001	0,0049	
B 2	10	0,296	0,082	0,002	0,0082	
B 3	14	0,414	0,115	0,003	0,0115	

Equipment elements



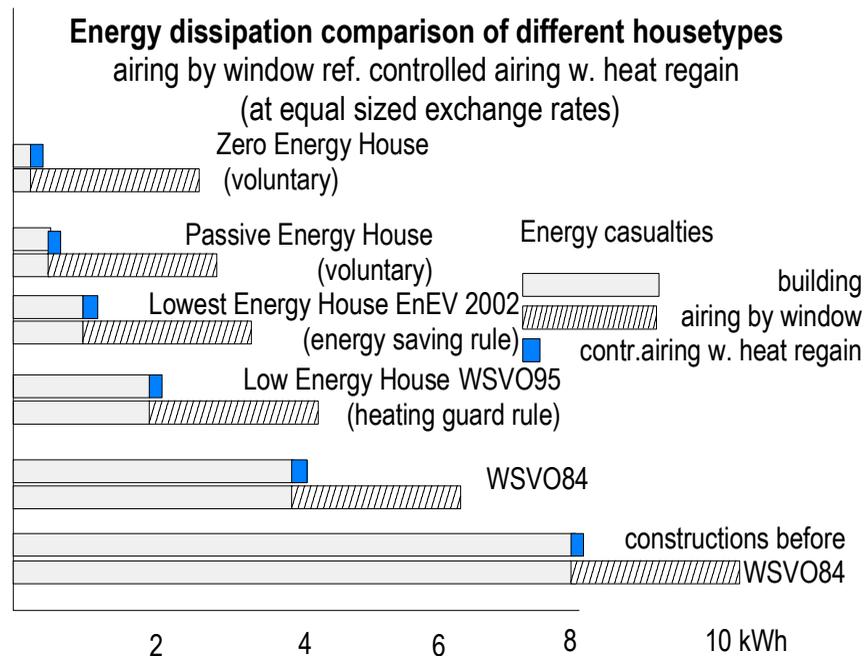
Security advices

General protective measures:

- You have to keep open the airing holes and you have to consider the creation of icicles in the winter
- Do not expose the equipment to exorbitant heat, humidity or dust.
- Do not expose the equipment to direct solar radiation
- Do not expose the equipment to electronic static discharges (possible charges due to walking on carpets must be discharged on the wall, before you touch the CVS).
- supplying the CVS with. Low voltage power, first connect with jack into the female plug on pcb, second connect PS with wallplug. If you want to disconnect, you have to do the contrary sequence.
- In the case of use of power packs without low voltage jacks, it is very important to consider the correct polarity and to use a terminal strip (DC-voltage)
- If you want to clean or to maintain the equipment, you must adjust the volume-switch to 0.

It is recommended to pull the plug of the power supply or to switch off the CVS in the case of a thunder storm.

For your own security you should only use accessories or original components of GF-SOL-AIR. GF-SOL-AIR is not responsible for arising damages or consequences in the case of nonadherence.



Correct airing

The flats of today are, thanks to the legal pressure and modern construction material, extremely sealed and for this reason there are often very economical concerning energy consumption. But the consequence of the density is rapidly used room air with an accumulation of carbon dioxide and different toxic elements, so that there is a bad atmosphere in the room. Disagreeable feelings are coming, you can not concentrate, you are getting tired and the well-being suffers. Fresh air is needed, it is necessary to open the windows. But airing by open windows isn't always responsible for your well being. Outside, it can be very hot or very cold; traffic noise and dust reduce the fun of fresh air. It is very difficult to adapt the ratio of fresh air to the given environment. Statistics show: in more than 85 % people air false, they air too less or too much. Opened windows let the warm air of inside go out and often people forget that the windows are open! The results are big energy losses in the winter, because the air in the room must be heated again and again due to the cold incoming air.

Here a little numeric example:

- Flat with a living space of 120 m², construction height of 2,50m
- Half air exchange per hours (0,5 point air change per hour after DIN 1946, Part 2 Room air technique, healthy demands)
- Outside temperature of 0° C and inside temperature of 21° C, this is a temperature difference of 21° C,

Additional energy effort for the heating of the fresh air in the case of airing:

$$0,5 \times 120 \times 2,5 \times 1,29 \times 21 = \underline{\underline{4,43 \text{ MJ/h}}}$$

Air exchange x surface x height x air mass x energy/kg°C x temperature difference

This corresponds a heating loss of 1,23 kWh per hour due to airing by the window. This is lost energy and the biggest part of the necessary heating energy amount of 7200 kWh/year (statistical mean) for a flat of 120 m² after low energy standard.

See for this the graphic of the previous page. The airing losses are absolutely equal (presumption the same WE and the same airing behaviour) but dependent of the house type the consequences are different. Right at a NEH (low energy house) the character of the next

With the help of the Comfort Ventilation Systems, you must not open the windows and you gain back (under the presumption that each room is equipped with the CVS) the biggest part of the heat energy, which is part of the waste air, even 85 % in the case of little air flows even 90 %, because the air flow warms the incoming fresh air to room temperature.

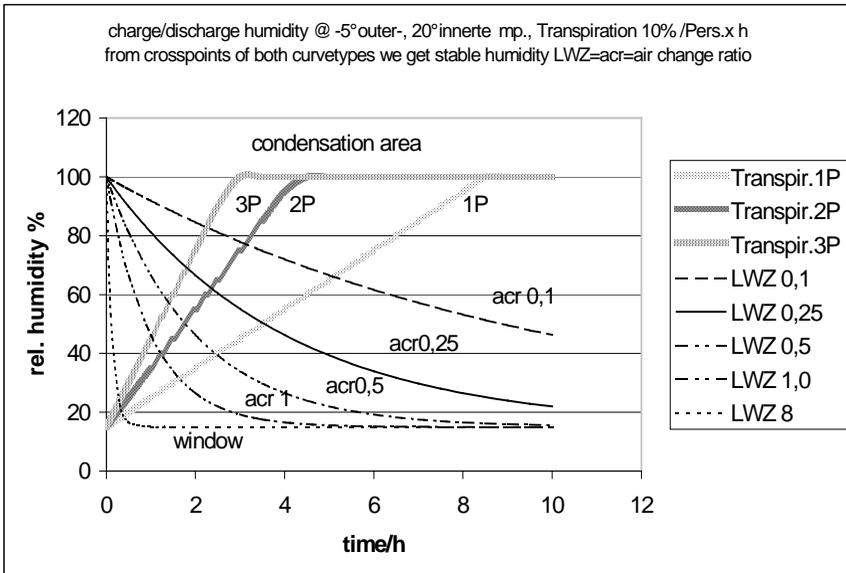
That means, you save at least 1, 0 kWh heating energy per hour, a non unimportant value for which CVS turns to account.

Window airing makes no sense!

Heat energy saving regulations and improved thermal resistance at construction materials, windows and doors are leading to a very lower energy effort during the heating period. But due to the thickness of the construction technique, surplus humidity values store in the inhabited rooms, because it is not possible to conduct the humidity by the masonry and leaky window scores. Per day and per inhabitant there are per average 1, 5 – 2 l evaporated water (transpiration, water consumption of cooking, showering), which must be deleted. If there are also animals and plants, the consumption of humidity in the air augmented. By an insufficient air exchange, condensation arises at the windows and outside walls, particularly behind furniture or in the corners of the ceilings, also at cold places on which the air has no chance to circulate.

Omni presented mould settle at this places, additionally there are ideal living conditions in order to spawn. Very fast, you will find ugly places with dark mould, which can be the reason for considerable construction damages.

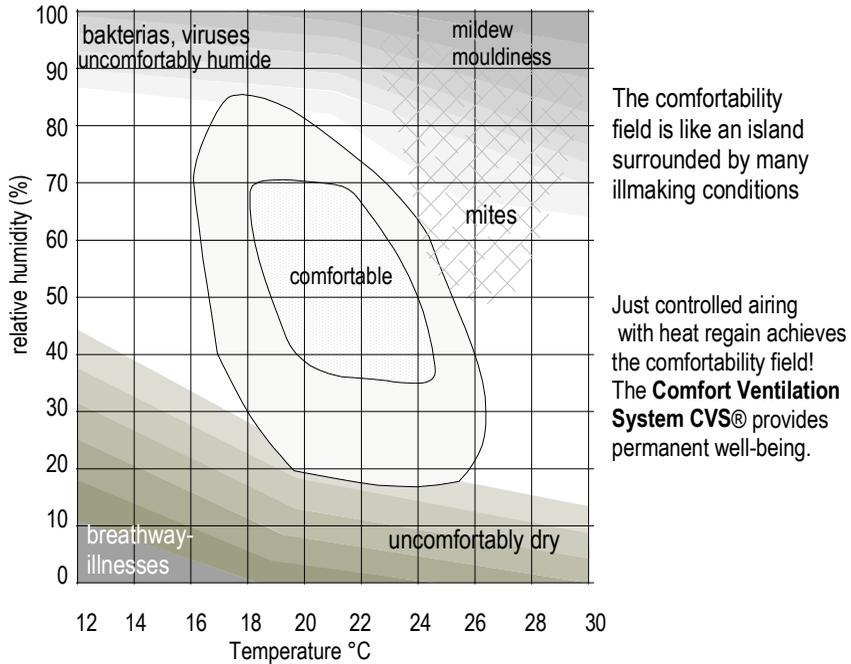
The spawning mould detaches spores in the air, for this reason you can find a high concentration of them in the interior room and they are the reason for different illnesses. The rooms smell unventilated and unhealthy. The insufficient airing aggravates the situation because the exterior walls cool down more and more and the condensation will be preferred.



Coherency well-being to temperature and humidity

Morbid substances in living rooms and working rooms

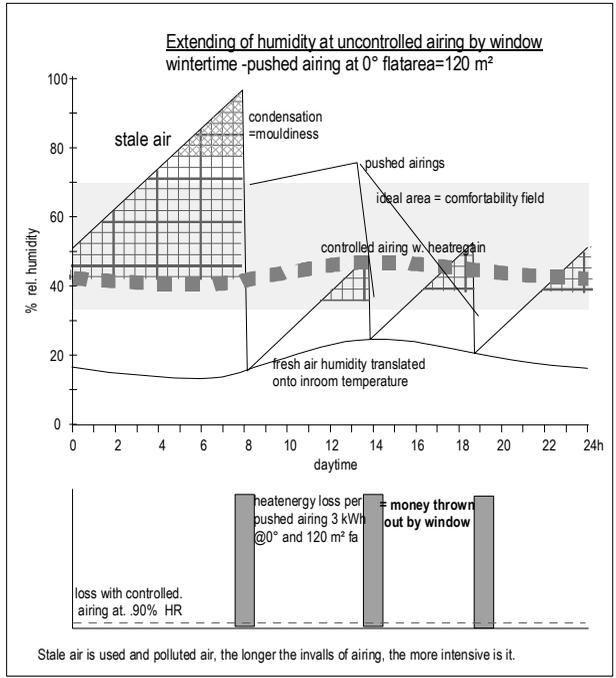
Relationship of comfortability in dependency of temperature and humidity
Illmaking substances in living-/working-rooms



With its airflow, the CVS transports continuously the waste humidity outside. You can say exactly that the dry fresh air is mixed with the room air, so that there is an ideal value of the rest humidity and that there is no condensation at cooler wall surfaces. There is no living basis for mould so that it disappears after a short time. The CVS offers not only advantages for rooms in which your are often, but also for rooms in which you stay not so often, where you air not so often. With its strong air flow, the CVS circulates the air all over (note less), so that there is a regular warming of all wall parts after a short time. Assumption is for a consistent warming is, that air circulation is not prevented by furniture which is standing too closed by the air.

During the airing in the winter the warm and humid air will be replaced immediately by very dry cold air. Cold air (0 degree) contains approx. 2, 5 g water per kg air. After the heating to 20 degree there is a relative humidity of approx. 15 %. Each hour plants and people will bring additional 1 -3 g water per kg air of the walls, this is an increase of approx. 3 – 10 % each hour. After 3 – 4 hours you have to air. The game begins again. In the night the relative humidity can increase to more than 100 % due to the long airing break. The result is condensation (at the windows and at cold walls). If the windows are continuously open or if the LWZ is adjusted too high, this brings a relative humidity of less than 35 % or even less than 20 %, this is to dry. Due to research it is known, that respiratory disorders, bacterium/virus and also allergen symptoms strongly increase in the case of dryness.

If the air exchange volume is adjusted (see diagram page 10) that the charge and discharge by the inhabitants are balanced, than you obtain ideal humidity for a long time, without the demand of additional moisturization equipment, which are often the basis for mould due to missing regularly cleaning.



Air exchange with the CVS helps not only to save heating energy it is also responsible for a consistent humidity value for a long time and practically you are in the well-being field at every time (s. page 11). In the case of humidity values of less than 40 %, you should select a program with a lower air exchange ratio (acr), in the case of values of more than 65 % you should select a program with a higher acr. The presented diagram shows the humidity development in the case of uncontrolled airing with a window in presence of 1 – 2 persons and of a controlled airing with a CVS. Here you can also reach a humidity value of up to 80 % with a low condensation, if the air flow value is adjusted to low.

Warm seasons

During hot and muggy summer days, there is the risk in the case of uncontrolled airing, that the humidity values increase too high in closed rooms, if the air outside contains a humidity of more than 60 %. The table shows the difference between uncontrolled airing with door and windows and controlled airing via heat exchanger.

Comparison uncontrolled/controlled airing during muggy weather (e.g. a room of 16 m²)

Parameter	Open windows	Controlled with CVS
Air quantity in m ³ /h	100-1000 (with light wind)	10
Warmth at 10° Over temperature inside/outside.	390-3900 Wh (only dry air part)	3,9 Wh air has only 1° more (WRG=90%) than room air
Water content at 60% r.F./35°	2,52 kg – 25,2 kg	0,252 kg
Condensation 10% presumed	0,252-2,52 kg at cooler places more	0,025 kg occurs more in WT
Condensation warmth	158 up to 1580 Wh	- (will be transferred to waste air)
Resulting humidity	>95%	50-65%
Determined for the living climate	Weather	Construction capacity, CVS

Window airing brings the heat and the closeness of the outside air in the rooms. If a part of the air cools down at the cubic capacity, a part of the surplus humidity will condensate (it can be some litres). It will be absorbed by the base, the walls, and the furniture and by the textiles (parquet will swell and peel off by the ground). If they are saturated, there will be wetness, which is the basis for mould and everything smells musty. The bad: Due to the cooling of the air, relative humidity of 60 % increases to more than 90 or 95 %. It is getting unsupportable, because there are no reserves for the transpiration of the sweat in order to absorb the sweat. It does not cool down, because nothing can evaporate. You sweat more and there is the risk of a circulatory collapse, because the body overheats.

How does cooling works in the summer without a cooling machine and without any costs?

In the case of controlled airing with the CVS the air exchange will be made slowly. There is only limited air quantity, enough to breath, but only with some water (only some gram and no kgs) in the air. The incoming air cools down in the WT to room temperature; the used air takes out their warmth. The humidity increases if it enters into the room, but it will be mixed with the existing air. This has a stable humidity of only 60 – 65 %.

Why? Because the plaster at the wall and at the ceiling can store the surplus humidity, but slowly. The saving process needs sufficient time which it gets from the controlled airing. (In the case of uncontrolled airing, plaster can not rapidly react; it would be too much water). Now there is the reserve in order to let evaporate the plaster and it cools fantastically. It feels agreeable also if the room temperature is 25° and more!

By controlled airing with the CVS the quantity of the incoming water will be strongly limited, so that the lower quantity of water can be dry in the cooler nights. For this reason you should use little air flow at the day in order to work in the night with a higher flow, because the outside temperature is mostly lower as the room temperatures.

For this reason you must consider the different airing demands in the winter and in the summer!

This kind of cooling costs no additional cent because the controlled airing should run everywhere at every time. A cooling machine is not necessary (energy devourer and climate killer), but only the assumption: A good insulated house, leak-proof and all air exchange will be made via the heat exchanger.

Function of the CVSrobusto

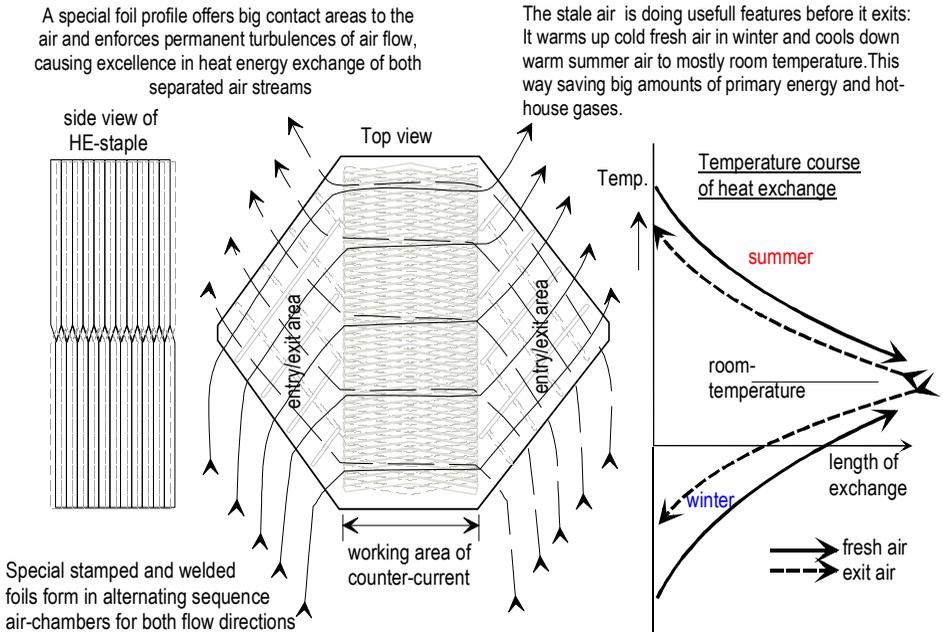
The Comfort Ventilation System CVSrobusto has not the function and of an air conditioner, a heater or a cooling machine in the normal sense.

The Comfort Ventilation System CVS robusto is an airing system for a controlled air exchange with a high effective heat recovery and operates with the lowest energy input and passively working methods a stabilization of the internal temperature in the winter and in the summer.

What does it mean?

Two ventilators with a step of your choice of different volume flows assure with a capacity of 8 up to 20 m³/h or 6-14 m³/h for a room air exchange of 0,15- up to 0,35-point (Version B) , or the 0,3- up to 0,7-point (Version A) each hour, in rooms up to 16 m² at a height of 2,50 m. With an own ventilator the used air will be blown from inside to the outside and the fresh air will be blown from the outside to the inside by the heat exchanger.

Functionality of Counter-Current Heat-Exchanger (produced from plastic foils)



Due to a special reverse flow heat exchanger, the CVrobuste is responsible that more than 85 – 95 % of the warmth or coolness of the used air will be transmitted to the incoming fresh air .With the help of this equipment, you must not open the windows in the summer and in the winter in order to air so you will never loss warmth in the winter and coolness in the summer. In the summer you will join long coolness without dedicate energy for cooling.

For the reason you will have for 24 hours daily fresh air by closed windows, this airing systems assures a regular air exchange and so the fresh air in your house will assure you a durable well-being.

Advantages and characteristics of the CVSrobusto

- – Fresh clean air at every time
- – High air flow up to 20m³/h
- – Agreeable temperatures at every time
- Heat recovery with a high efficiency (88 – 90 %)
- Saves a great part of heating costs
- Keeps off the heat in the summer
- Transports rapidly surplus humidity
- Supports the fast drying of new buildings
- Dust and pollen filter option at the heat exchanger
- Simple filter exchange
- Quiet table page 6
- High damp ratio of the external noise (>48dB)
- Lowest energy demand < 6 watt, security extra-low voltage
- Anti-freeze by room air mixing and condensate drain
- Outside cover plate with rain protection and fly screen
- Easy to clean
- Little construction size (45 x 28,5 x 11 cm³, immersible up to 6 m)
- Lowest room loss

Mode of operation

In operation it is possible to adjust 3 steps. Corresponding to the printed figures on the equipment, the equipment is switched off (0); it runs on the lowest level (1) on the centre position (2) or on the highest level (3).

For the cold seasons:

In the cold season you can see that the CVSrobusto is very economic concerning the heating costs. The used air – until now it was lost unused by airing – is also useful and heated the cold fresh air to room temperature. This is the reason why the equipment helps in order to save energy and it amortized itself after a few years, which is only know from some equipment in the house.

In the case of freezing temperatures you have to recon that a part of the humid outgoing air condensates in the heat exchanger and in the case of temperatures of less than – 5 degree it will be happen that it freezes partially. The condensations warmth and also the released warmth air during the freezing are also advantageous during the heat recovery. A counter action against the freezing of the condense water would be the

exit of the outgoing air of the WT and that ice will block it, at the same time the function would be stopped. The consequence would be that only cold air would come inside. By mixing of warm room air to fresh air, the risk can be deleted. Depending of the mix ratio, the incoming air is boosted on a level at the entry on the WT on which there is no freezing risk.

For this purpose stands the manual method, you can bring the butterfly in a position which corresponds to the outside temperature. These positions are marked and described at the internal side of the upper air entry hole. In the case of a weather change it is necessary to adapt the appointment. If there is ice on the right upper side of the geometry of the WT of more than 1 cm, you have to use temporarily the manual method. It is not advisable to let open the butterfly in advance, because the air exchange suffers and the equipment will not bring the expected work. The WT is constructed that condensate can drip off during the emission or that it can leak out by the horizontal coin profiles, because they are not weld but plugged into each other. The lower support of the WT is light horizontal and formed that the condense water will be conducted to the lower pipe emission. In the case of freezing temperatures a daily control of the butterfly is sufficient. For this you has the guarantee that the condense water emission does not freeze, and that the temperature of the outlet air stays in the positive area. During cold temperatures, icicles create outside of the house below the outside blind. Icicles fall down at any time, you must consider during the montage that persons are not in danger!

In order to secure the water drain you have to work carefully during the montage and we advise you to block the groove between the edge of the pipe and the hole of the equipment with silicon.

In the case of a strong inhabitation of a room the humidity entry is very high, for this reason it is possible that there is a lot of condense water. The outgoing air in the duct pipe should be controlled and it should be in the plus area.

In rooms with lower inhabitation it could be a problem that the air is too dry if it is very cold outside. This is not healthy. Some rivals offer a wetting. Due to our considerations it makes no sense.

If it is too dry, there is no condensate, which can evaporate.

Another limiting is that the quality of the condensate can suffer by the applied load of smoke or kitchen damp. For this reason the subject brings some problems.

For the warm seasons:

Also during the warmer seasons, particularly during very hot summer days, we recommend you to use the control mode 1 up to including 3 appropriate for the particular room, in order to have a constant temperature in closed rooms for the whole day. This can be made without any particularly measures, thanks to the high efficient heat exchanger in the CVS together with the construction dimension of the rooms which can be considered as a heat storage tank, particularly if there is an exterior insulation. The heat exchanger of the CVS does not receive 100 % but 85 – 90 % of the heat exchange rate, so that temperature in the house increases only a little bit. This increase is not due to imperfectness of the CVS but by the direct entry of sun energy via the windows and walls or by often opening of the windows and doors.

Inhabitants of houses, which dispose about a good outside isolation and with windows with lower thermal conductivity, are in advantage.

The entry of sun energy of outside is lower.

A simple example invoice should show you these coherencies:

- Room with enclosed room of 40 m^3 ,
- Internal temperature of 22° and external temperature of $32^\circ \Rightarrow$ Difference $=10^\circ$
- Effectiveness of the CVS 90% \Rightarrow Fresh air temperature after CVS $=23^\circ$
- Air flow rate with CVS each hour 20 m^3
- Mixture with room air $20 \text{ m}^3/40 \text{ m}^3 = 0,5$ leads to an increase of the internal temperature of $0,5^\circ/\text{h}$ (but you have to disregard the cooler walls)
- Energy supply by 10 m^3 fresh airs:
 $10 \text{ m}^3 \times 1,29 \text{ kg/m}^3 \times 1,09 \text{ kJ/}^\circ\text{kg} \times 1^\circ = 14 \text{ kJ} = 3,9 \text{ Wh}$
- Heat reservoir (walls, ceilings) pro rata: 15-24 t (depending of the construction material)
- Heat capacity (walls, ceilings) 3000-12000 kJ/°

The heating of the walls of 1° with energy by the fresh air would have duration of a lot of weeks. Given that it is cooler in the night the heating by cooling down will be balanced. The heating of external walls (without insulation) by the sun at a global solarisation of approx.

1 kW/m^2 is naturally very faster ($1\text{h}-4\text{h}/^\circ\text{C}$ depending of the material and fortitude) In crass cases we advise to use a jalousie and a blind in order to shadow.

The picture shows the air flow in the room. Given that the air flows vertical at the equipment, the whole room is achieved and the consequence is a complete ventilation of the room.

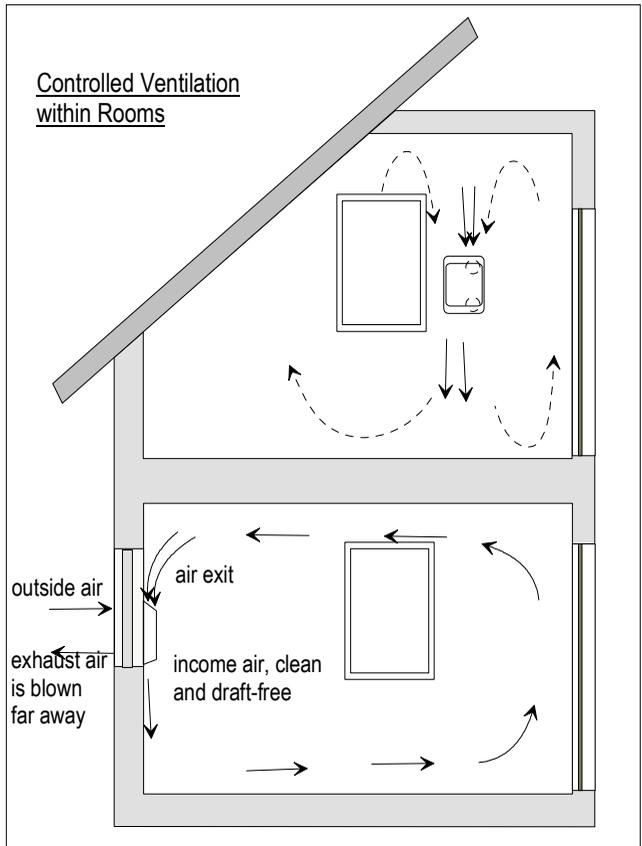
Dust and pollen filter

Filters are optional and must be placed on the right side or on the left side on the net of the WT. Please consider the manual at the end of the booklet. With delivery there are 2 CVS filter to your disposal. Filters slow down the air flow and change the effectiveness of the heat exchangers. If you only use one filter, the volume flows change and the efficiency of the WRT isn't still optional.

In a lot of cases the cold winter air and also the dust exposure of outside decreases and you can use the WRT

without the filter. This must be considered in individual cases. But without a filter the WT must be cleaned very faster. The filters are selected, that they can catch more than 70 or 85 % of the usual external air. It is only possible to filter partially extremely fine grit sizes. Here we have chosen a compromise in favour of a big air flow. With a simple method it is also possible to catch big parts of fine dust (PM10). For this you have to wet economically and steadily the filter matts with veg-oil.

You have to eliminate surplus oil with compressed air. Naturally, this method functions timely limited and you have to clean the filter matts before reuse (and to disinfect) or to replace them. You have also to consider, that the oil can dry up or to gum in the case of higher temperatures.



Noise emission

The CVS makes also noise, because the air flow is made by fast rapid running ventilators.

Dependent of the room equipment, there are some dB more if you measure the acoustic noise measure pressure values in acoustic death rooms (see table on p. 6). There is much more in bathrooms due to the strongly reflecting tiles.

Noise immission (of outside)

The small wall openings in low transversal sections are responsible that the noise of outside is immeasurable small. (damping lower than -48 dB). Inhabitants who suffer under noise pollution/flight pollution can close their windows, because ventilation is made with the help of the CVSrobusto equipment. If necessary, inhabitants can get government aid at the purchase of this equipment.

Maintenance and cleaning

It is an important advantage against other equipment that you do not have to dissipate this equipment. **By opening of the trap door you can reach the interior of the equipment. Before you clean or maintain the equipment, switch it off. The equipment and the ventilation slots must be clean at any time!** Depending of the dirt in the room you have to clean the CVSrobusto 4times a year or more with a hoover. If necessary you have to clean some places with a soft brush.

The heat exchanger (with condensate tank) can be taken out horizontal; you have to hover the 4 opening ranges, and if necessary please clean it with compressed air (carefully!). Fatty rests can be cleaned with flush water, but you must dry it ripely. **Do not give the equipment into the dish washer!** After you have to build together the heat exchanger! If you use a filter, you have to lay it on the WT or on the filter net (on the left side) and push it.

Look into the pipes in the wall holes and control the blinds concerning fluffs, if necessary open the window and take the blinds for cleaning. Consider the correct adjustment after the cleaning (see manual).

If the equipment do not work despite an accurate production and control process, you have to contact a client service of **GF-SOL-AIR, Gerhard Feustle** in order to let repair the equipment.

Guarantee

We guarantee you a correct running CVS equipment and a complete packing note of the packet regarding the list at the beginning of this book at the delivery. Please control at the receipt of the equipment the completeness and intactness.

If there are transport damages at the packing and at the content, you have to show them immediately to the transport company and to the sender, or you can refuse the receipt of the shipment, otherwise the security protection and the guarantee can decline. Assumed that a professional construction of the CVS is made, **GF-Sol-Air Gerhard Feustle** warrant a guarantee of 2 years under the condition, that there are no bratty or careless false applications, damages or not specified voltages which are expected to the equipment.

The guarantee is limited on the exchange of faulty functions elements. Transport costs and call-out charges won't be repaid. Excluded of the guarantee are the filter, the heat exchanger packet, condensate tank and other components which are damaged due to false and failed cleaning and maintenance circles.

Installation instruction

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Recommended tools and support

- Boring machine with rig for the Hoover for core drills
- Core drill Ø 62mm diamond-studded, Length: wall thick + 5cm,
- Alternative drill bit for socket outlets 65 Dm with extension 320mm
- Drill template 0901-000016 (you can buy it at GF-Sol-Air)
- Impact drill rock drill 4 and 6 mm
- Drip cup (bucket)

- Hoover + replacement filter, hose connection
- Protection foil (3-4 m²), floor cloths, adhesive strip
- Protective gloves, protective glasses
- Screwdriver
- Mounting Foam
- Handsaw finely serrated, saw guide
- Spray, chalk, pencil
- Cable finder, bubble level
- Measuring tape or yardstick

Security advice

Before you begin to install, please read carefully the construction advice.

You have to assure that the construction area is saved in the interior but also external.

That means nobody should be injured during the assembly work. Consider the security advice and instruction sheet of the equipment, tools and accessories you use for the construction of the CVSrobusto.

Make sure that there are no gas pipes, water pipes, heating pipes, power lines or other pipes at the wall at the construction place.

Please consider that the construction place is not situated above personal entries, foot walks, because in the winter you have to anticipate with the formation of icicles.

It is not allowed to soften supporting construction elements for this reason you should avoid them as construction place. If necessary please contact an architect or structural engineer. You have also to avoid wall parts of concrete, because it is very difficult to drill there, and boring bits has shorter durability's as in the case of other construction materials.

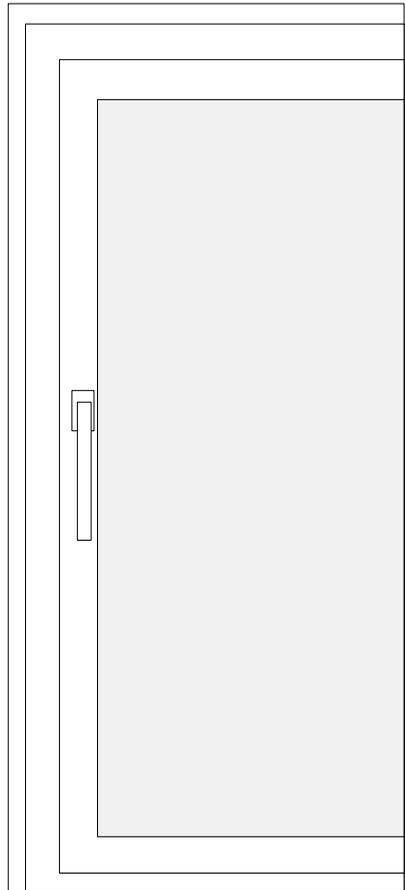
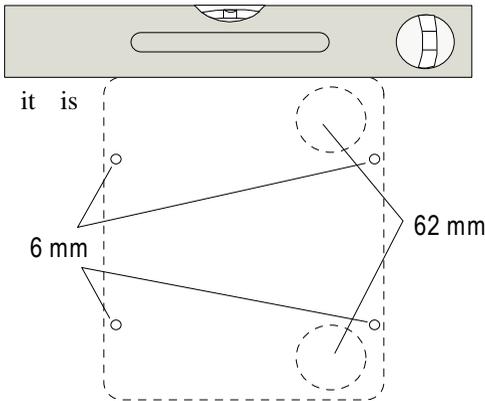
Selection of the kind of construction

It is possible to construct the CVSrobusto directly on the wall but also counterbored in the wall. In already existing buildings, people mostly choose the finery construction. In the case of our products, the room loss is very low, but by a party counter bore in the wall it can be reduced. In this case, there are only some centimetres out of the wall, which are absolutely necessary for the ventilation of the air. The construction will be made after the work of the plasterer and the painter. If the equipment will be sun, the deepening can be made during the structural work. Here the construction will be also made after the plasterer work. At the deepening should be always a power supply by an accessible under-ceiling-plug socket. The laying of the cable and the installation pipes will be naturally made before the plasterer work.

At the deepened construction it is also recommended to use plug screws in order to fix exactly the equipment. Use economically the foam during the foaming in pack of the holes behind and alongside the equipment. During the hardening are a lot of pressure which are able to adjust an unfixed equipment, additionally there must be enough place to fill the seams or for skim between the equipment and the top of the plaster. At the construction in prefabricated houses or post and beam structure, the installation should be made factory-made.

Choice of the construction place

Depending of the size of the room and arrangement of the furniture, the CVSrobusto should be constructed at eye level (not a must but comfortable) (0, 2 up to 0, 7 points is also ok) beside a window. Avoid the construction of the CVSrobusto at tight room corners. The closeness of big furniture can handicap the air flow. High cupboard should be moved away for some centimetres from the wall in order to guarantee ventilation at any place. Curtains should not cover the equipment. If you consider this information, the CVSrobusto has the best air exchange effect,



simple to construct and it is also easy to change the pollution filter. Please consider that an electrical socket should not be so far away, the equipment has a power pack for the energy supply. At the construction in the room, the air flow should be executed in the centre.

If you install multiple CVSrobusto, you should distribute them that they ventilate constantly the appropriate room.

Construction instruction in short form

If the construction of the CVS will be made by a company or by a craftsman with the appropriate equipment it is not necessary to consider the points 1 -5. It costs some money to let drill, but it is a guarantee for an exactly alignment of the drills.

1. Mark of the drill holes

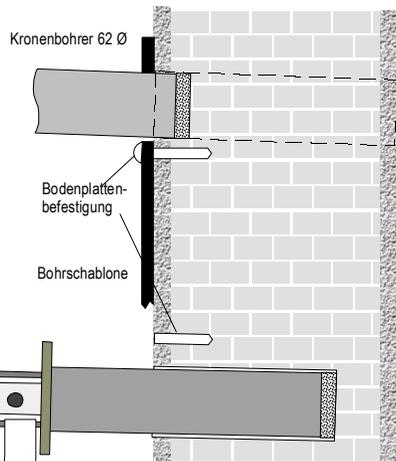
In order to mark the drill holes, please use the delivered hole pattern of carton as model, please consider that the holes for the outgoing and incoming air are on the right side and use a water level for an exactly alignment of the CVS. You have only to use one step in order to mark the holes for the pins and for drilling. Control again if the marked holes are aligned correctly with the water level and with the model.

GF-Sol-Air also offers a boring template made of steel panel you can use for all drillings. After you have made the pin holes and the delivered pins, you have to fix the steel plate with the screws at the wall. The big holes in the steel panel are a guidance for the core drill. Together with the simple support in order to adjust vertically and plum of the drilling equipment you are able to make precise openings. You can remove the model after you drilled some centimetres of both openings. With this, you extent their reuse duration.

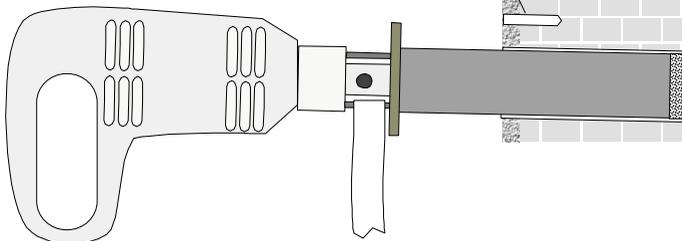
2. Drilling of the drilling lead-through

**Please consider the security advices!
Consider during the drilling a down-grade of 2 -5° outwards.**

In order to drill you use a core drill with a diameter of 62 mm and a appropriate drilling machine, most suitable one with a Hoover, this save much cleaning work.



If you do not possess the



appropriate tools, there are companies which rent the necessary products.

If the holes are correctly marked correctly, place on the core drill or at another visible mark the size of the wall with chalk. This mark serves for the estimation of the centimetres which must be drilled in the end. Now you can begin with the drilling. For this, a model (as described) or a changeable drill application will be helpful. If applicable you have to use implements for the adjustment, because it is very important that the perforation should be very exact due to the optic and the leakiness.

During the drilling you have to control permanently the guide of the drill. Draw off the pollution or empty the core drill. Breaking stonework is the reason of imbalances and blockages in the boring bit, which eliminates the cooling of the drilling segments with the diamonds.

You have to drill very careful and with low pressure the last centimetres, otherwise it could happen that plaster of the outside wall will crumble. Before the drilling, please control the quality of the outside plaster.

You have to consider particularly the fine outside plaster in the case of outside insulation.

If there is cladding with wood outside the drilling should be stopped if the wood is reached. The core drill is not appropriate for the cut through the wood. In such cases, please stop, the cut through the boarding with an appropriate tool of outside.

The same is valid in the case of breaks through wooden walls. For this you have to use only appropriate drilling/cutting tools. Better would be the execution of the work by a professional handicraftsman, because the walls are containing often nails and screws or the walls are filled with fluffily insulating material which can fall out. There is also the risk to damage the insulation.

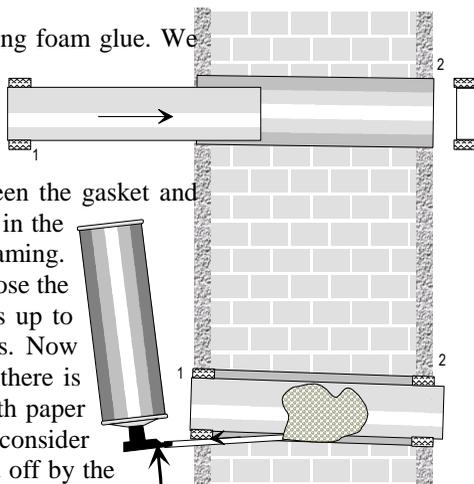
2a. Alternative drilling methods

In lieu of a core driller it is also possible to work with a drill bit for socket outlets with extension flagpole. In order to get straight openings you have to use a long stone drill for the drilling, which also shows a fall to outside. The drilling serves as guidance for the centring drill of the drill bit for socket outlets (dm up to 68 mm), which only allows a limited drill depth. Consequently you have to clear out more often the cuttings. You have to use appropriatemoil chisel, pinch bares and a steel ring as bearing, in order not to damage the bricks too much.

3. Foaming of the pipes

This is very important, in order to avoid thermal bridges and that there is no condense water in the winter near of the pipes, which will wet and damage the walls. Please clean carefully the drilling holes. Than you have to inject the drilling holes inside with water in order to improve the grip and the increase of the hardening of the fitting foam glue. Please saw the delivered plastic pipes on the measure of the wall opening plus 15 cm. (Use a saw with fine teeth). Edges must be clean and smooth. Place the gasket 1 at the pipe, so that there 7, 5 mm pipe length overlaps, push the pipe through the wall opening. The second gasket must be placed at the end of the pipe and must be pushed with the outside walled into the drilling hole. 7, 5 mm of the pipe should be overlapped inside and outside.

In order to foam use the normal fitting foam glue. We advice to wear protective gloves and to be prepared with a lot of paper towels. Shake the fitting foam glue. Consider the instruction of the product. Place the tube between the gasket and the drilling edge as deep as possible in the blank and press the blast pipe for foaming. Before their end passes the gasket, close the blast pile and wait for some seconds up to the moment where the pressure fails. Now you have to draw the small tube, if there is further foam you have to catch it with paper towels. Clean the small tube. Please consider that the small tube will not be ripped off by the blast pipe.



Foam the second room correspondingly. In the case of wall thickness of more than 24 cm foam also from outside. Attention! Secure against accidents! Use the foam economically but consider the total enclosure of the plastic pipe with the foam. Consider holes in bricks. After the foaming please adjust the gaskets! The outside gaskets must be places 1 cm deeper into the opening.

4. Fixing of the CVSrobusto

Before you fix the equipment at the wall, you have to determine the connection method of the supply of power. Depending if you ordered the standart-nt, the plugger-Nt or a floating-nt or a centre supply unit, the grommet of the cables will be made by a hole at the backside of the equipment.

Directly behind them you will find the adjustment of the inwall and by a nut to the equipment edge. This nut must be completed if the supply will be delivered via the flexible power supplies. This must be made if the supply will be made of the Under-ceiling-can. Please consider the advises in the chapter power supply. Now you can fix the CVSrobusto at the wall. Here it must be considered that the foamed pipes are laying on arrester on the appropriate openings on the base plate. It is also possible to push with a long bit hock, which will be carried through the pipe, to the deepening of the equipment bottom. It is important to execute this working during the curing process of the fitting foam glue, after it is not possible to adjust.

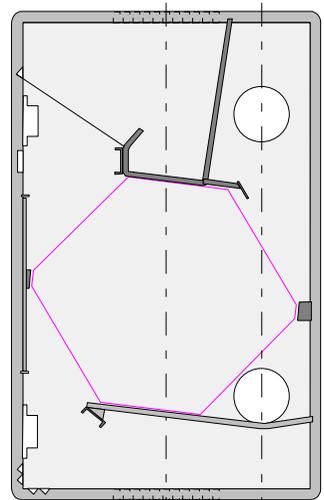
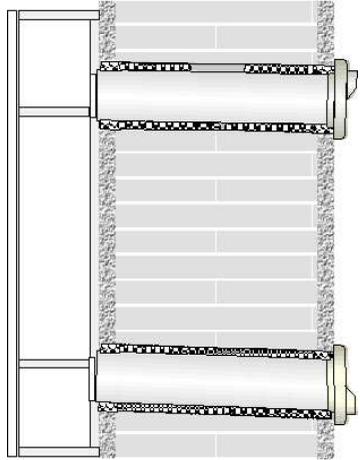
We advise an additional seal with silicon between the end of the pipe and the lower opening.

After a sufficient curing time you can eliminate the provisory fixing of the plastic tubes.

In the case of low wall thickness up to 24 cm it could be advantageous to fix and after to foam.

After you have fixed the CVS, stick the plugs into the jack in the near of the construction place. The free cables must be bind together in order to avoid tripping points.

The external blinds will be plugged on, if the fitting foam glue will be hard. It would be impossible that the plastic tubes must be shortened that only 7 – 8 mm jut out. For this work we recommend our pipe adjuster, which can be fixed in a drilling machine in order to fret the pipe up to the distance ring.



Use protection goggles, if you execute this kind of work! Secure yourself and the tools against dropping down.

After you have eliminated the distance ring and the dust, fix the blinds as shown. Please consider that the execution with the weather groove at one of the blinds comes to use at the lower pipe.

After the choice of one of the three volume adjustments and at the close of the door butterfly the well-being with the Comfort Ventilation System CVSrobusto begins for you and the other inhabitants.

Power supply

Standard-power supply: A plug, which contains at the end of the cable a phone jack adapter of the size 5, 5/2,5mm, will be delivered. Positive pole inside. In the case of the finery construction, the connection of the low voltage plug will be made through the hole in the backboard to the jack plug at the plate which is fixed sidewise. In the nut the cable will be lead through the lateral edge. The non-milled bar at the edge will be made free with a cutter.

Clocked wall power supply: Against a corresponding surcharge you can choose this NT (which will be delivered by a famous producer). It worked clocked at a high working frequency and possesses a good effectiveness of approx. 85 %; additionally it is equipped with an electronic short circuit fuse. The connection of the plug will be made as described at the Std-Nt.

Clocked in wall-NT: Against surcharge, same technology, has place under the base plat in an in wall tin. There must be a 2-landline circuit of 230 V to the tin. The low voltage side has only 15 – 20 cm. The Under-ceiling-tin should be adjusted midsymmetric to the lower wall hole besides the power supply opening. In the case of the sank construction of the CVS, the Under-ceiling-din should be adjusted on the left side in order to allow repairing/exchange. Before the montage of the equipment, the Under-ceiling-Nt will be constructed and connected with the net. The low voltage ends of the Nt will be fixed after the construction of the equipment at the corresponding screw-type terminals at the plate. For this you can draw the plate for a simple handling.

Central supply

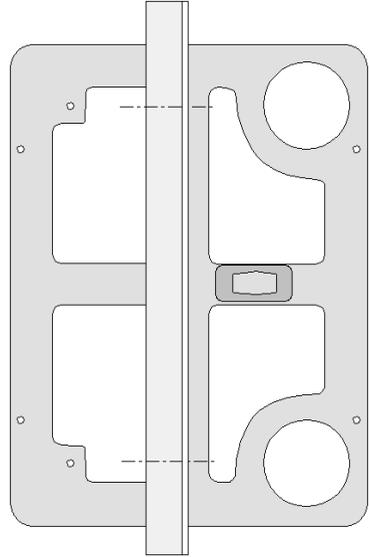
All CVS-equipment are connected at a combined 12V supply. Logically it has to be stored in a cut-out box. The clocked equipment should have the dimension for the max. sum power. The supply of low voltage to the equipment will be made via the under-ceiling-tin, which must be installed as for the Under-ceiling-Nt. The connection will be made pole correct at the screw-type terminals.

Drill template, drill rig, pipe adjuster:

For craftsmen there are tools, which simplify the installation of the CVS. The most craftsmen have routine with the work of core drills and their drive, so an accurate drill in two direction exactly trough the wall needs a high demand of force and concentration, which often can not be executed alone. For this reason GF-SOL-AIR worked out an aid which allows one craftsman to execute the work rapidly and precise.

Drill template:

First, it will be screwed at the place at the wall where the CVS will be fixed later. The measures of the holes of the dowels are identical with the measures of the base plate of the CVS. With the spirit level (you have to buy it in a building centre) it will be easy to adjust the moulding tool. First you have to drill the holes of the dowels with a little stone drill, than you must bring it to the basic size of the dowel. The vertical alum-angle-profile is the fixing place for the horizontal distance capping of the drill rig.



Drill rig:

Prime benefit of the rig is the release of the craftsmen from the weight of the machine and also the guarantee to receive an accurateness of the drill. In order to transport the equipment it is possible to fold it.

The bind rail has a downgrade to the wall (2 cm at the moulding tool less), it will be brought in position and it will be fixed at the end of the horizontal profile at the drill model. The fine adjustment in the high will be made by the movable centre part of the pedestal. The movable drill machine slide will be pushed on the horizontal arbour. The drill will be fixed on the slide. The slide stays locked in the outer end position during the adjustment of the machine and the construction of the draft tube. After the collaring of the core you have to unlatch the adjustment and you have to control if the core drill applies exactly under the opening of the drill mould. Otherwise you have to adjust again. Connect secure the extracting hose, before you have to cover the working place against dirt.

You have to prepare buckets for builders waste and than you have to begin. If you have routine you will feel if the drilling machine breaks bricks. The core bit is getting unbalanced and the dust obstructs the aspiration, which is also cooling for the core

drill diamond, does not work correctly. You have to stop the drilling. You pull out the drilling machine and you have to empty the core bit. By beating at the pipe of the core bit the rubbish dissolves and comes out. After you have to place the machine with the slide on the binding piece and you can drill.

For the second drilling the binding piece will be placed and fixed at the other side. If necessary you have to adjust the correct high, execute the drilling as before.

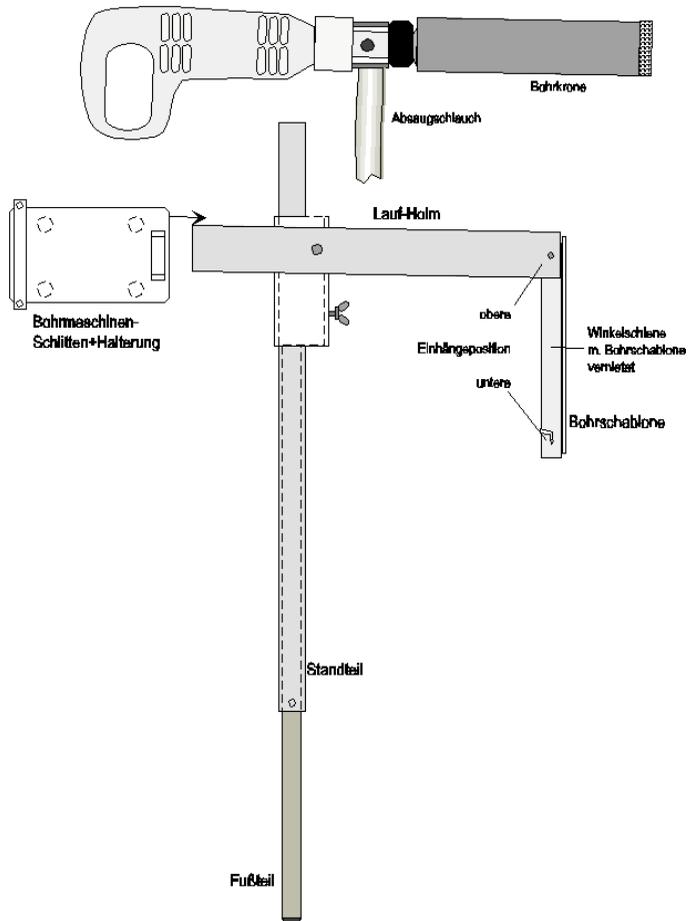
After the end of the workings, you have to separate the column of the drilling mould and you must bring it into transport appointment.

In the case of harder wall material you have to count with longer drilling times. In order to disburden the craftsmen of the difficult and long pressure work, there is a cable pull above the roll on which it is possible to hang a weight of 15 – 15 kg.

The plug screws of the drill mould should be so long in order to catch the trailing load of the mould! It must be considered that there is not

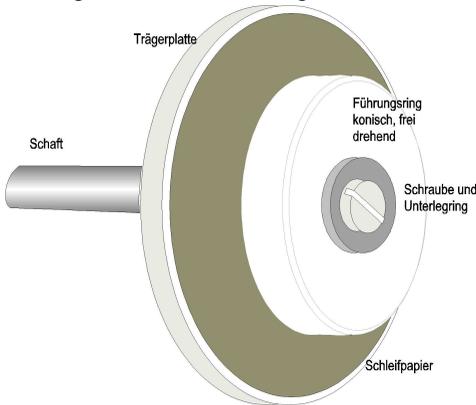
only a loading of the screws and plugs but also by shaking of the machine! For this you have to consider during the drill that the drill mould will not be dissolve from the wall.

Corresponding to the max. length of the drill (= thickness of the wall) the total break t has to be discharged if the length of the drill is received). Risk of damaging the outside insulation! Adapt the length of rope! The last 2 cm should be executed by hand!



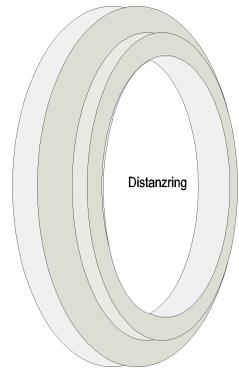
Pipe adapter:

First you have to cut the delivered plastic tube with a fine chain to a length – wall thickness + 15 mm. After the foaming and adaption to the base plate, it will be foamed from outside and the outer gaskets will be impressed if necessary. With the help of the pipe adapter, which should be operated with a drilling machine and a distance ring, the length of the pipe will be grinded exactly up to the touch of the contact bridge at the distance ring. After this activity you can clip on the outer blend. If there



is bur formation at the pipe edge you have to eliminate it before.

The sandpaper at the grinding wheel is a wear part and must be exchanged if necessary. For this you have to remove the forward part, than you have to change the disc and after you have to fix again the forward part.



Change or insertion of the dust and pollen filter

A filter mat will be applied on the right upper inclined place of the WT, the second filter mat will find place above the ventilator at the grid. It is important that the filter edges seal all air ways. The cleaning is very simple: If the white colour is covered with dust it is possible to remove it with a Hoover. For this you have to take out the filter in order to clean. It is advisable to wash them if the filters are getting very dirty. During the cleaning you should also disinfect the filter! Naturally you can buy new filters from your suppliers; the filters are not very expensive.

Spare parts list:

Front door	0901-000031	€ 24,-
Electronic board A or B	0901-000032	€ 55,-
Heat exchanger 88 mm, with condense tub	0901-000022	€ 99, 90
Fan motor 12 V for execution A	0901-000023	€ 22,50
Fan motor 12 V for execution B	0901-000024	€ 25,50
Outside blend	0901-000013	€ 9, 50

Power supplies, filters see price list

The mentioned prices are net plus purchase tax and necessary delivery costs and they are unbinding. The prices are only valid in Germany.

The other prices and construction/drill tools on enquiry or can be seen at or web page.

We demand you to order at the place where you have buy the CVS. In the case of an order directly at the producer the minimum order quantity (net) must be more than 25, 00 €. Delivery will be made after receipt of money.

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Please note your source of supply if you bought your equipment not directly from the producer. We advise to let execute the maintenance or repairing by this merchant.

Please store this guide at a secure place, like other manuals in order to have it to your disposal at any time. If you remove please give this manual to the new user.