

Planning manual part 3.2.1

emcovent decentralised window and sound insulating ventilation systems

Facade ventilation module model ECO50

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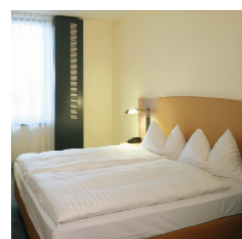
decentralised window and sound insulating ventilation systems

emco Klima started out more than 40 years ago, manufacturing a range of sturdy air diffusers that reflected the requirements of the time. Specific developments relating to various air ducting systems, flexibility in terms of devising bespoke solutions and on-time delivery are the factors that have enabled emco Klima to build a relationship of trust with its specialist partners. Today, emco provides a comprehensive range of air

and water ducting systems, and services such as calculations involving proprietary computer programs and laboratory testing. Comfort and well-being are fundamental to ensuring efficiency, safety and good health.

Any air conditioning solution for enclosed spaces within residential and office buildings and industrial premises calls for a concept that is perfectly geared towards the needs

of the users concerned and the conditions that are specific to the building in question. Decentralised ventilation systems provide architects and planners with a whole range of options for combining centralised and decentralised air conditioning systems. Innovative control technology makes it possible to control the various systems in a coordinated manner.



emcovent **decentralised window and sound insulating ventilation systems**

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 Ventilation (supply air/exhaust air/heat recovery)

emcovent ECO50

Decentralised facade ventilation module with heat recovery

The emcovent ECO50 is a ventilation module intended for installation in breastwork and facades that offers the following functions:

- Supply air (SUP)
- Exhaust air (ETA)
- Heat recovery

Thanks to its extremely compact design, the emcovent ECO50 can be integrated into a variety of settings: the window, the breastwork, the wall or the ceiling. The modular structure means that the length and depth of the module can be tailored to requirements (minimum dimensions - W x H x D: 1200 x 190 x 370 mm). The high-quality Resopal housing creates thermal separation between the external and internal sections. The heat recovery unit reduces the amount of additional energy required for room temperature control to the absolute minimum.

There is an integrated bypass system so that rooms can be pre-cooled overnight. The cooling effect thus achieved, which costs virtually nothing, dramatically reduces primary energy consumption. If you are working with the heat recovery

unit and there is a large difference in temperature between the external air (ODA) and the air in the room (IDA), a stainless steel condensate trough is used to catch any condensate. If required, this can then be discharged via a condensate drain.

All the components, along with the structural design, meet the requirements of the VDI 6022 directive. The external air (ODA) is filtered using an F7 filter (optionally available with activated carbon filter). The air flow of up to 120 m³/h (supply air [SUP] and exhaust air [ETA]) is achieved by means of two radial fans that are linked from a control perspective. The module can either be controlled via two integrated switches on the front or via an emcovent ST (Standard) control component (used as a functional control element that is located on the device itself or mounted externally). Alternatively, a comfort control (emcovent C_{„Comfort“}) can even be installed externally. The option of activation via the building management system is also supported. Another option - a CO₂ sensor - ensures

highly energy efficient operation that enables specific requirements to be met (please refer to page 15 onwards for more detailed information).

Applications:

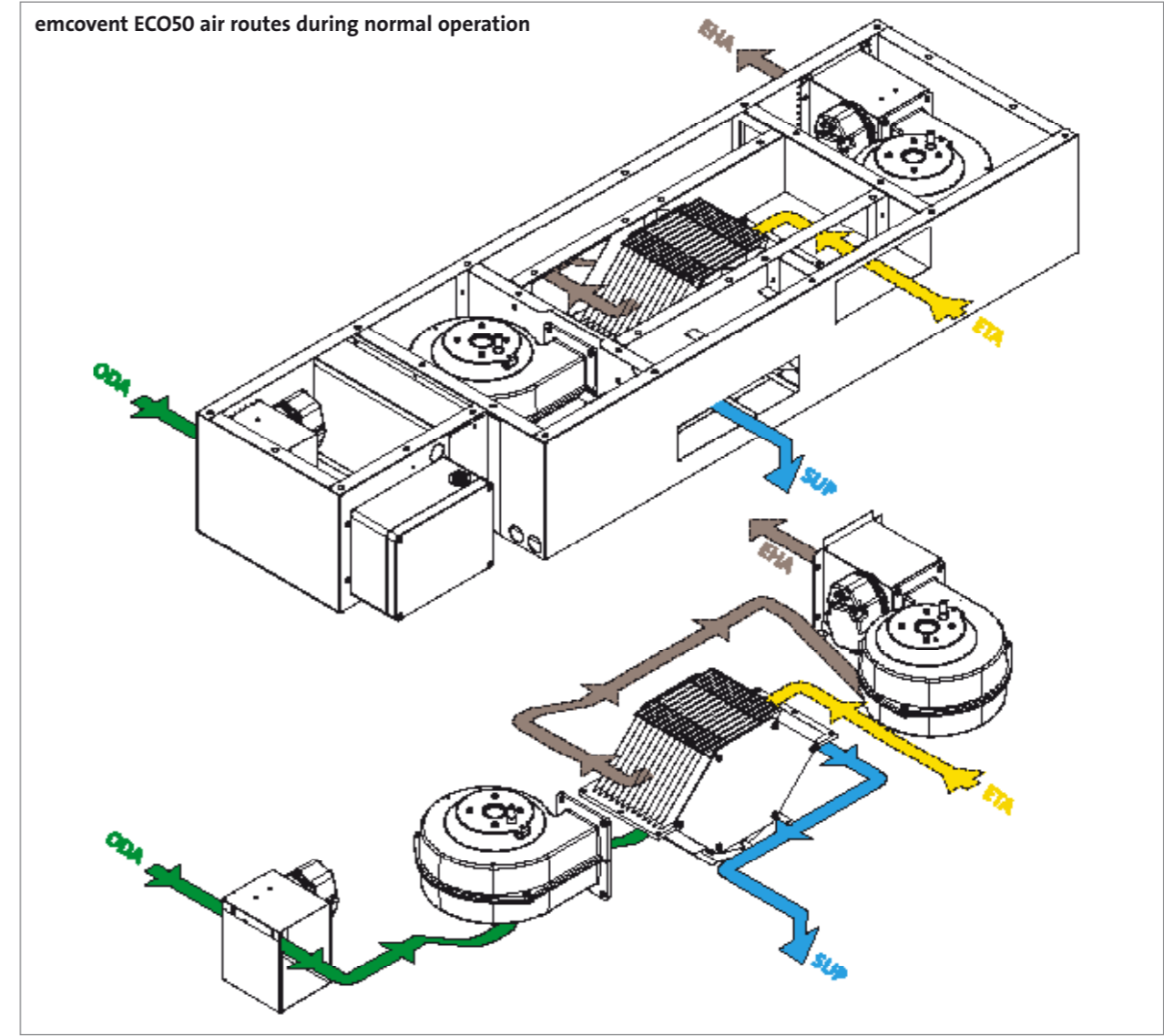
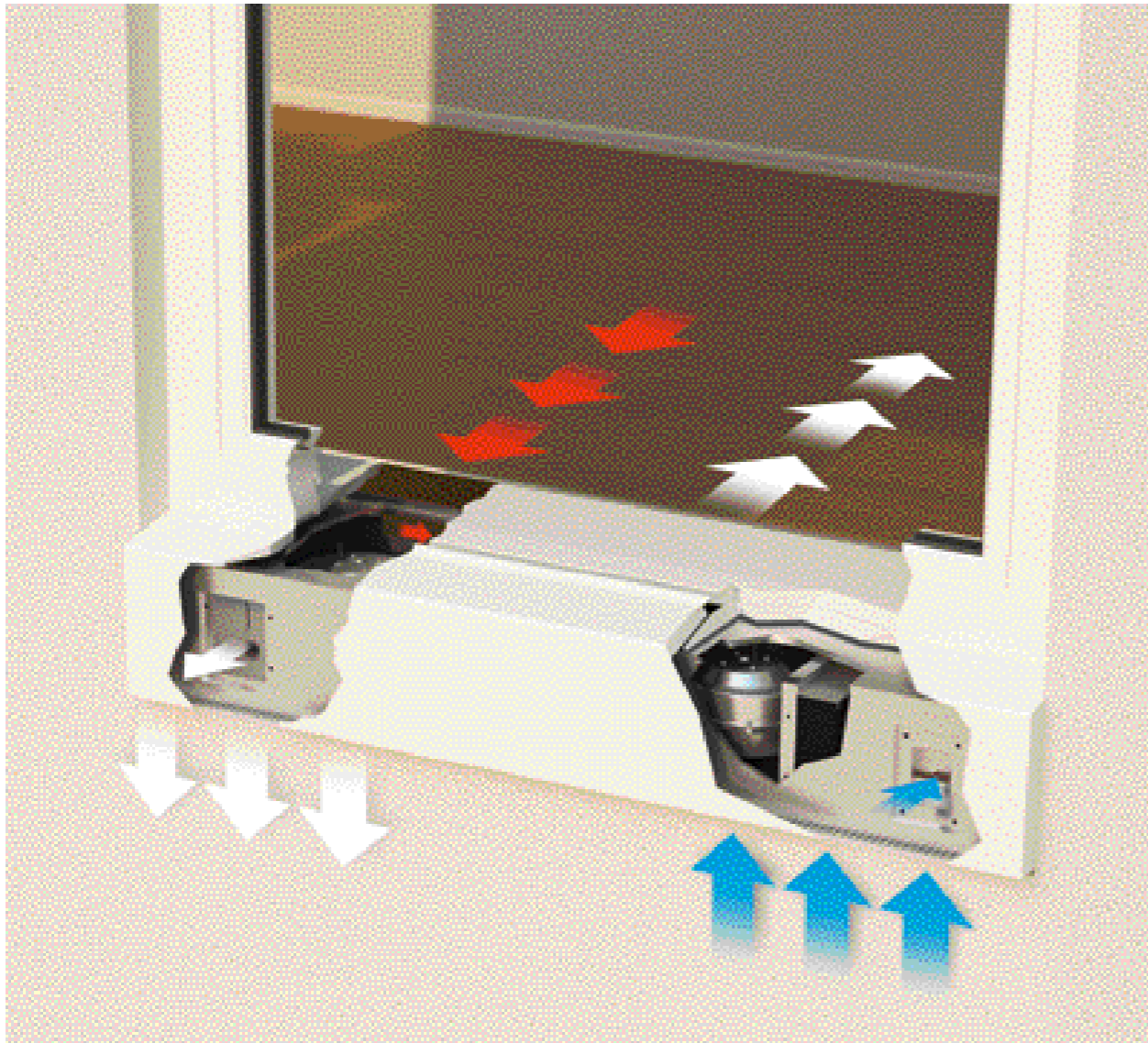
- Decentralised facade modules are the preferred solution for situations where natural ventilation via a window is not an option due to external factors, but energy efficient ventilation is still required.
- Offices and administration rooms
 - Business rooms
 - Exhibition rooms
 - Rooms requiring external air
 - Rooms with permanently closed windows
 - Living rooms and bedrooms

Product benefits

- Different sizes available in terms of depth and length
- Modular design
- Low-maintenance and hygienic in accordance with VDI 6022
- Good sound insulation properties
- Thermal separation of internal and external sections
- Easily incorporated into the structure of buildings



Building: Boarding House, Munich (Germany)



Method of operation

The external air (ODA) is sucked in directly through the facade and into an opening in the module. It then passes through a filter element (F7). The opening for the supply air is closed automatically by a return spring motor when the module is switched off (normally closed). There is an integrated non-return flap to prevent air flowing back into the room in the event of

facade underpressure. There is a heat recovery unit located downstream of the supply air fan units, which is responsible for energy exchange between the supply and exhaust air (heat recovery ratio of up to 70%).

If required, the heat recovery unit can be bypassed during summer operation or to allow natural night-time cooling. When there is a risk of frost, the heat recovery

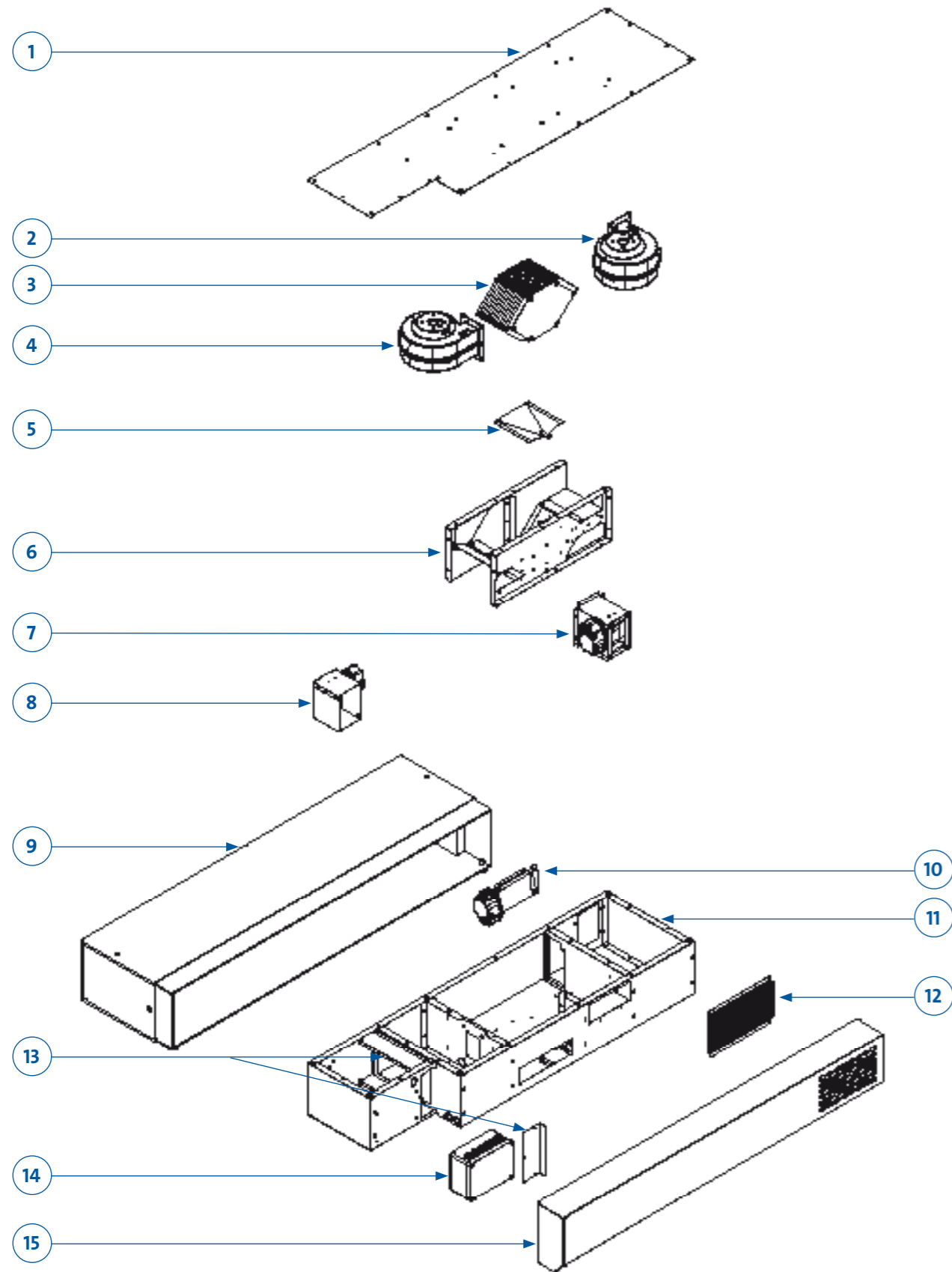
unit is again bypassed and warm exhaust air is used for defrosting purposes.

The exhaust air is extracted from the room in accordance with the installation scenario (e.g. below the windowsill) and cleaned using a coarse particulate air filter. Once the exhaust air has passed through the heat recovery unit, it is conveyed outdoors via an outgoing air opening (with flap). The ex-

ternal air flap performs the same functions as the supply air flap.

Air routes/air types key

-  = External air (ODA)
-  = Supply air (SUP)
-  = Exhaust air (ETA)
-  = Outgoing air (EHA)



Structure and description of emcovent ECO50

- 1. Housing cover for function box**
(galvanised sheet steel)
- 2. Exhaust air fan**
EC radial fan regulating AC or air flow. Automatic compensation of external static pressure differences. Activation via emcovent ST control (on module or external) using emcovent control component models ST or Comfort.
- 3. Heat recovery unit**
Cross flow heat exchanger with heat recovery ratio of up to 70%.
- 4. Supply air fan** (structurally the same as 2)
- 5. Condensate trough**
(made from stainless steel with condensate drainage connection)
- 6. Partitioning unit** (for air feed)
- 7. Outgoing air flap**
with integrated non-return flap and servo motor. Self-actuating lock at facade underpressure.
- 8. External air flap**
(structurally the same as 7)
- 9. Empty frame housing**
made from Resopal; statically durable and provides thermal separation.
- 10. Bypass valve** (with servo motor)
- 11. Function box** (galvanised sheet steel)
- 12. Exhaust air unit** (filter class G3). Can be easily serviced via the front of the module.
- 13. Supply air unit**
as plissé filter cartridge; can be easily serviced via the front of the module (filter class F7 in accordance with VDI 6022, with option of activated carbon filter)
- 14. Junction box**
can be activated via control components
- 15. Module edging** (made from stainless steel). Standard RAL 9016 coating (selection of other RAL colours also available).



Building: Conservatoire, Munich (Germany)

Model/Installation requirements	Unit	emcovent ECO50		
Construction height	[mm]	190		
Construction width	[mm]	ab 1200		
Construction depth	[mm]	ab 370		
Sound insulation open in acc. with EN ISO 717-1, 140-10	[dB]	D _{n,e,w} 54, R _w 38		
Operating voltage	[V, Hz]	230, 50		
Protection class		IP40		
Air flow	[m³/h]	60	90	120
Sound pressure level at 8 dB room attenuation	[dB(A)]	25	34	41
Energy recovery	[%]	50 - 70		
Electrical outer lock		ja		
Manual outer lock		nein		
Reversible		ja		
Surface (standard)	RAL	9016		

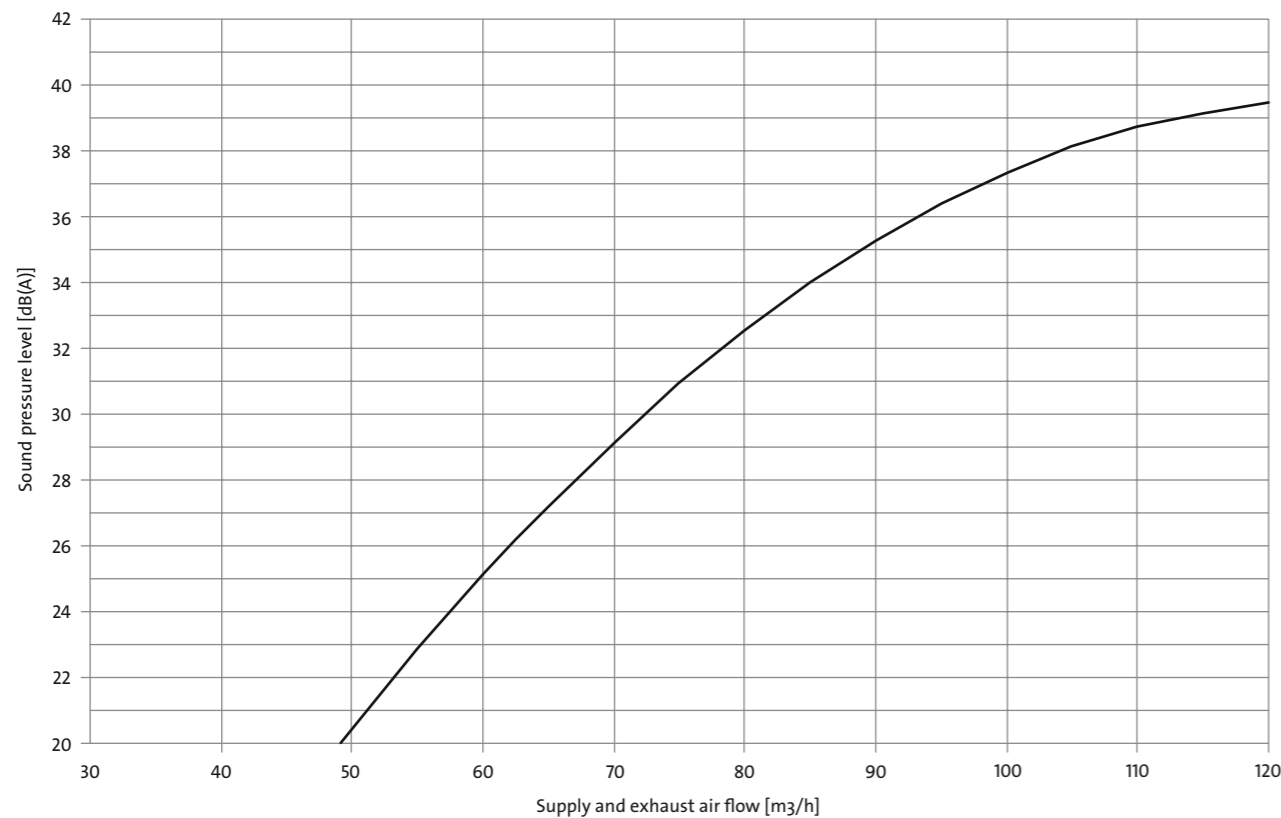
EC fan technology

One of the greatest sources of potential electrical energy savings lies in electrical drives. The split-pole or capacitor motors frequently used in modern-day air conditioning technology only achieve a low level of efficiency: in the case of smaller motors that are commonly found in air conditioning technology, this ranges between 30 and 60%. What is more, controlling fan units is often a challenging task and infinitely variable activation of fan motors requires a great deal of effort.

But thanks to the option of using emco's EC (electrical commutation) fan units in ECO50 modules, all that has changed. The technology employed in these enables a fan efficiency level of up to 90%. Thanks to integrated electronics that ensure a constant air flow, motors can be activated with a simple 0 - 10 V signal, minimising the amount of work involved in control whilst enabling consistent speed sampling.

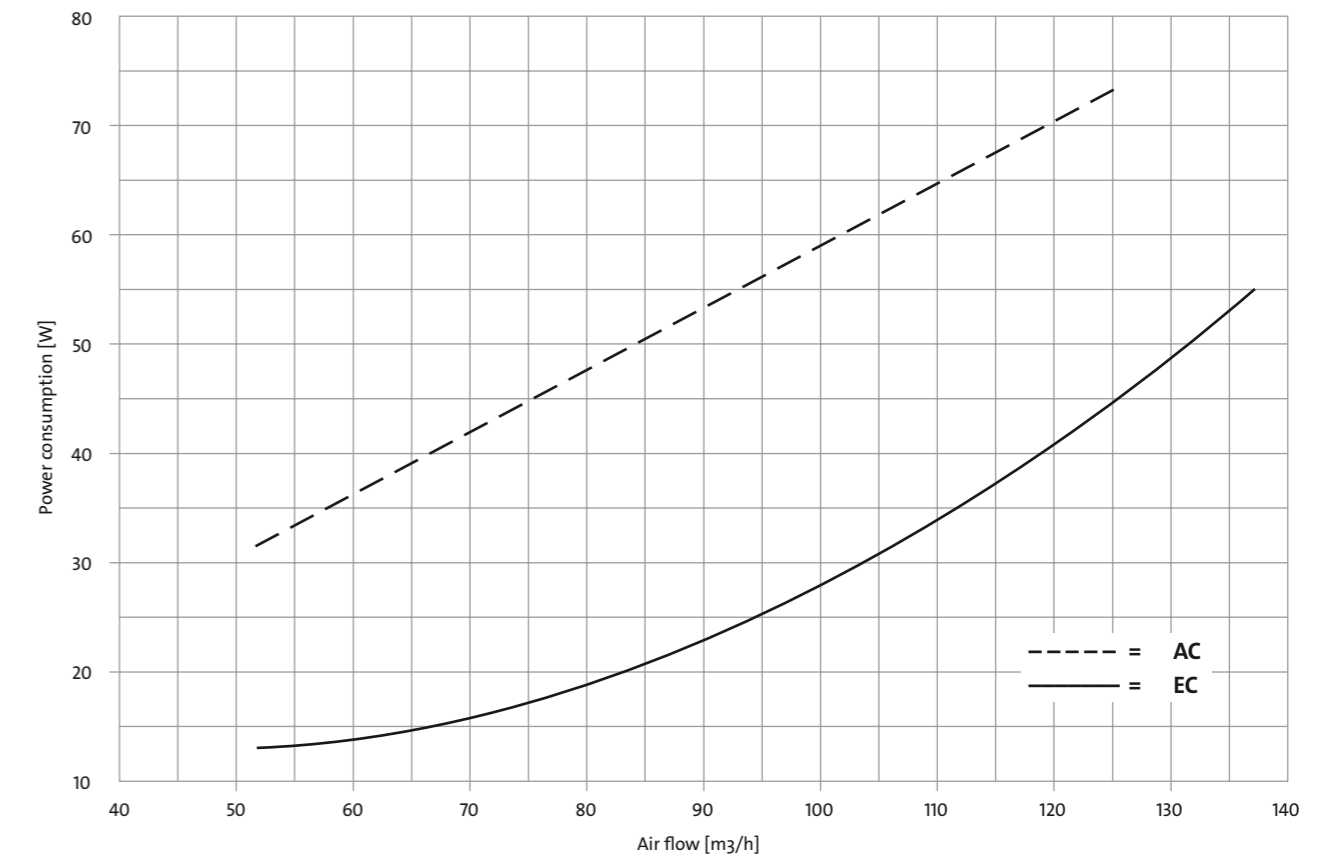
The comparison - shown here in the form of a diagram - illustrates that EC fans offer a very high potential for energy savings. With versions requiring an air volume flow of 90 m³/h, using EC fans enables energy savings of up to 60%.

Diagram for determining ECO50 sound pressure level with an assumed room attenuation level of 8 dB(A)

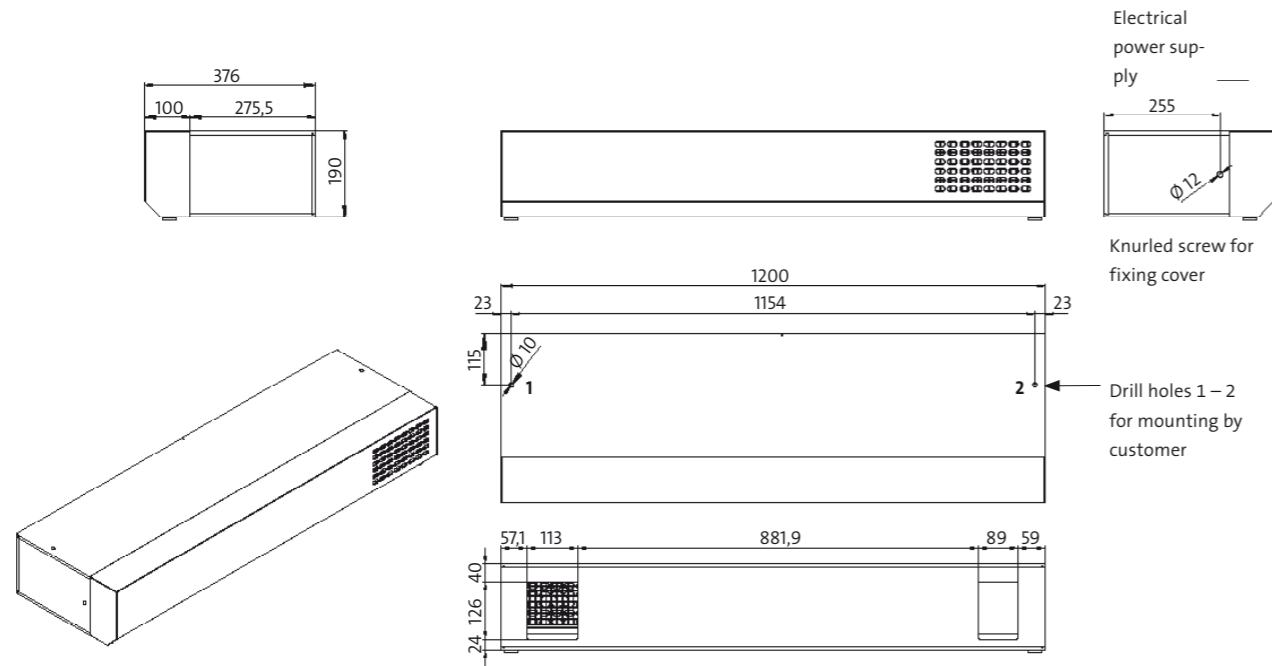


Comparative power consumption diagram

emcovent ECO50 with AC fans and emcovent ECO50 with EC fans



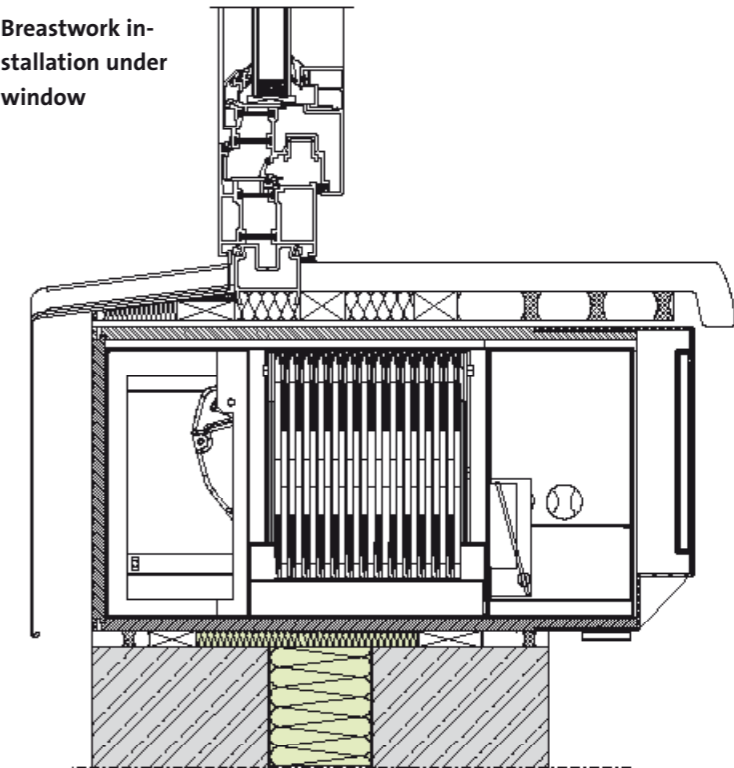
Dimensions



Types of installation

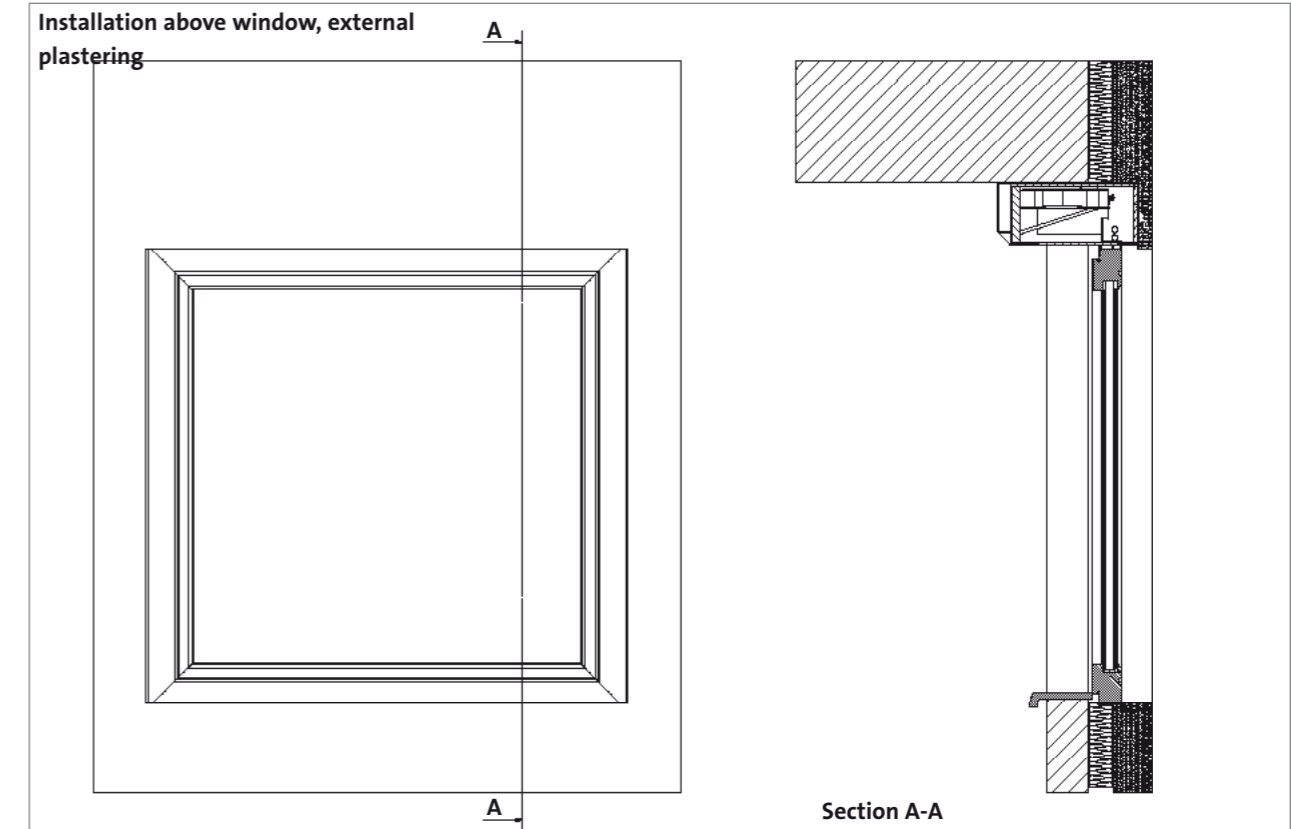
The emcovent ECO50 can be used in both the ceiling area and the breastwork underneath the windowsill. Thanks to the variable housing depth and flexible connection options, the emcovent ECO50 can be integrated into virtually any facade. In addition, there is a multitude of options for the design of the outer facade intake, which can incorporate rain shielding covers, plaster fixing angles and weather protection grilles, to name but a few. Front wall installation in the visible area is also possible with the use of a C profile, which can be included in the scope of delivery. For specific adaptations to your design, please get in touch with us.

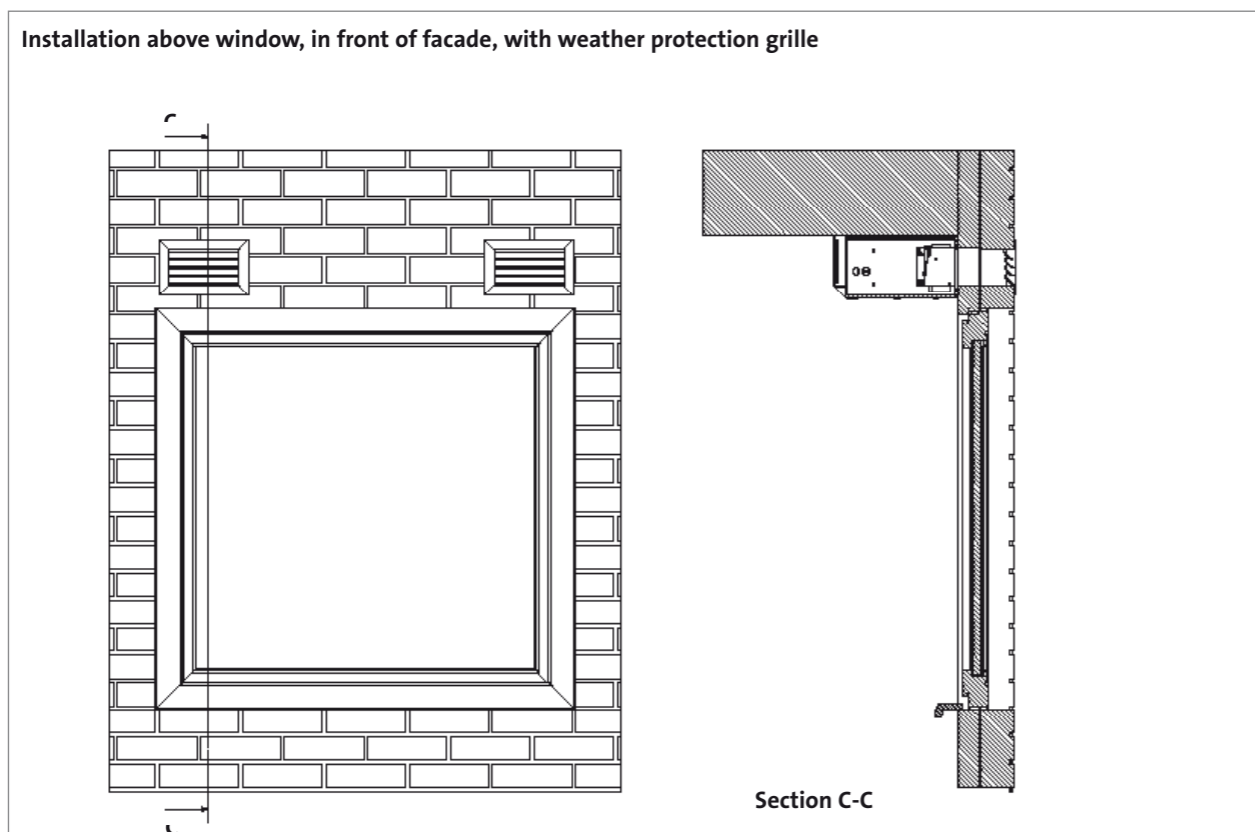
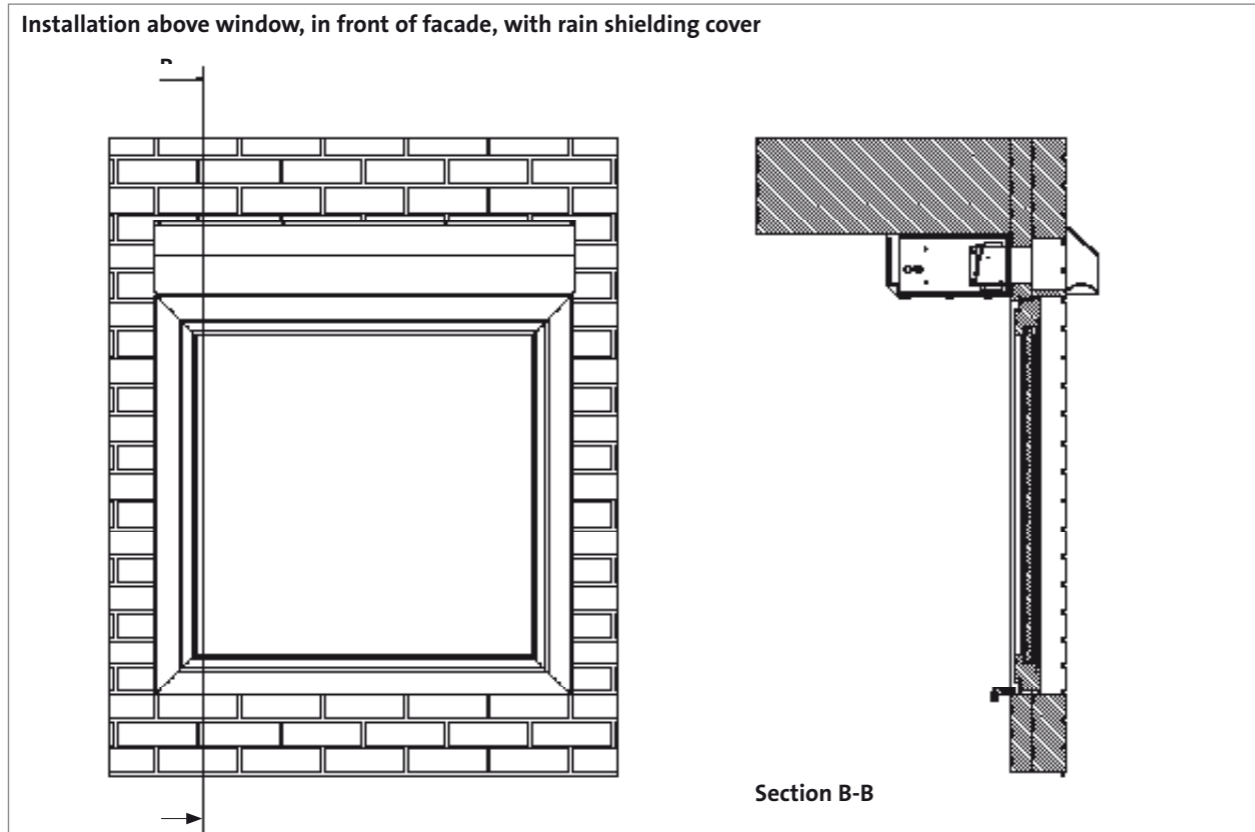
Breastwork installation under window



Building: Conservatoire, Munich (Germany)

Installation above window, external plastering





Control with switch on module

Straightforward operation (can only be provided with modules using AC fans)



Straightforward control of ECO50 functions via two multi-function switches located on the front of the module.

The left switch element is used to switch the functions ON and OFF, whilst the bottom switch setting activates the bypass flap.

The second switch can be used to select fan stages 0-1-2-3.

Control with emcovent S4

Straightforward operation (can only be provided with modules using AC fans)



The emcovent S4 switch combination enables straightforward control of the emcovent ECO50. The fan units used can be switched in 4 stages (0-1-2-3).

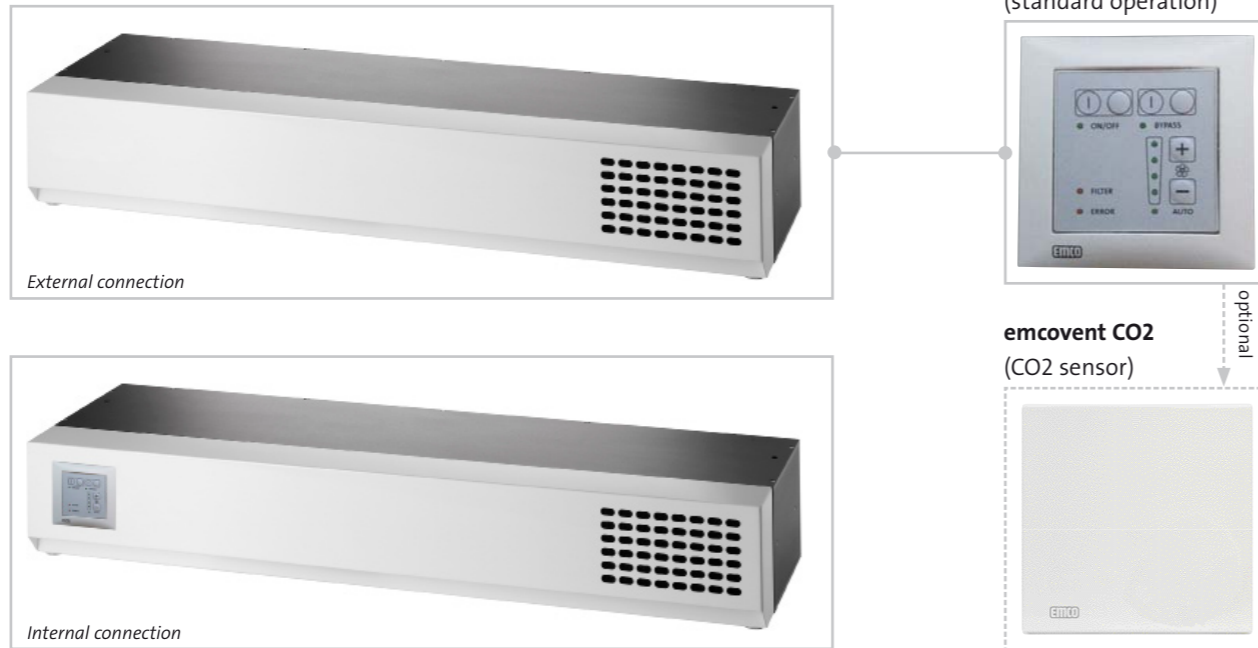
The rocker switches that are also provided in a dual frame enable the module to be switched on and off, as well as the bypass function to be activated.

NOTE!

In addition to the control components listed here, there is the option of controlling the modules using a building management system (BMS).

Control with emcovent ST (Standard)

Standard operation (can be provided with modules using EC fans)

**Beschreibung**

The emcovent ST control enables all emcovent ECO50 functions to be activated via an attractive, intuitive user interface.

Integrated LEDs signal the current status of the module. Lenticular keys can be used to put the ECO50 into operation, whilst elements labelled + and - allow manual access to the fan stages: you have the option of selecting air flows of 0, 60, 90 and 120 m³/h. An additional CO₂ sensor offers the option of automatically adapting the fan stages to the air quality in the room; an additional automatic operating mode is available for this purpose.

Furthermore, servicing signals indicate if a filter change is required, whether the frost protection function is active, and general faults. The automatic frost protection function activates the bypass function

(„bypass“ LED lights up) if there is a risk of frost on the heat recovery unit: this ensures that only warm air in the room flows through the heat recovery unit, allowing it to defrost. Normal operation is resumed following a programmed time interval. The emcovent ST control unit can be integrated into the front panel of the module, as well as at an external location in the room. The control system enables several slave modules to be activated. As an option (subject to an additional charge), the modules can also be activated by means of a LON/EIB bus.

Functions

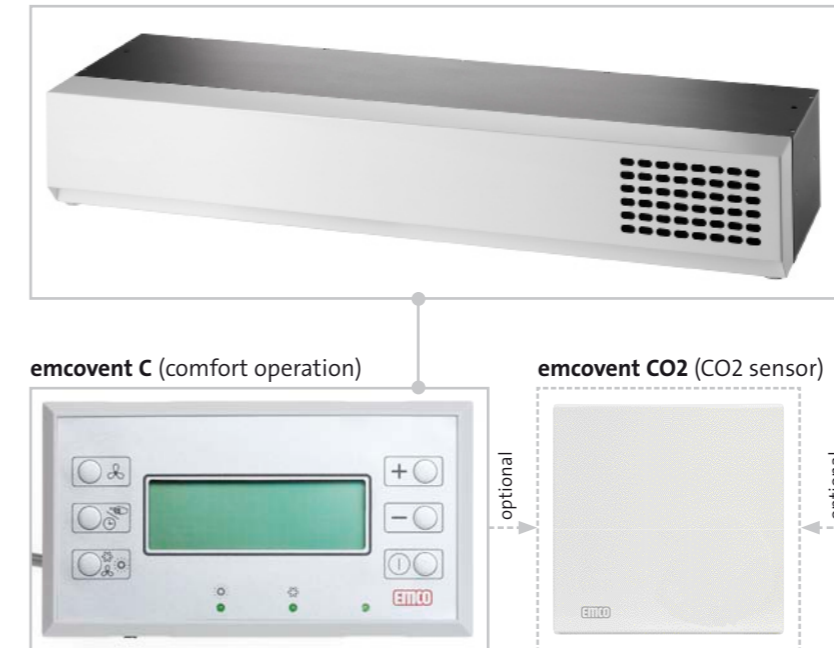
- ON/OFF display with LED
- Fan speed display +/- with LEDs for the four fan stages
- ON/OFF bypass display using LED
- „Filter change“ display using LED
- „Fault“ display using LED

emcovent CO2
CO2 sensor

- Ensures automatic adjustment of the air flow to the quality of air in the room and, therefore, air quality that meets requirements, with a high level of energy efficiency

Control with emcovent C (Comfort)

Comfort operation (can be provided with modules using EC fans)

**Description**

The emcovent type C (Comfort) control unit controls and regulates the module functions on the basis of a customised time program. You have the option of controlling the fan stages manually.

The control element must be connected to the power supply using a 4-wire telephone line (max. length 150 m). The system is bus-capable and allows several components to be connected; any commercially available flush box can be used for installation purposes.

Additionally, a PC interface is provided for the purposes of parameterisation and using various functions.

Functions

- Manual setting of fan stages 1 to 4
- Automatic setting of fan stages via a time program, with CO₂ sensor as an option
- Manual activation of bypass function for bypassing the HRU
- Automatic switching between summer and winter operation
- Manual switching on/off
- Time-dependent switching of fan stages by means of 7-day timer
- Intelligent bypass control (night-time cooling)
- Possibility of setting target room temperatures as reference
- LCD display: 4 lines with 20 characters each
- Option of interface for LON BUS system (subject to an additional charge)

All the key parameters can be read directly from the 4-line display. With the default settings, the following data can be taken from the display:

- Date
- Time
- Control system switching state (manual or automatic operation)
- Switching stages of fan (0-I-II-III); alternatively, air quality can be displayed during activation by means of a CO₂ sensor (normal – increased – high)
- Room temperature

The room operating unit can be used for direct manual operation at just the touch of a button.

This type of operation enables you to control both fan stages 1 to 4 and the bypass flap. Additionally, you have the option of switching the module off altogether.

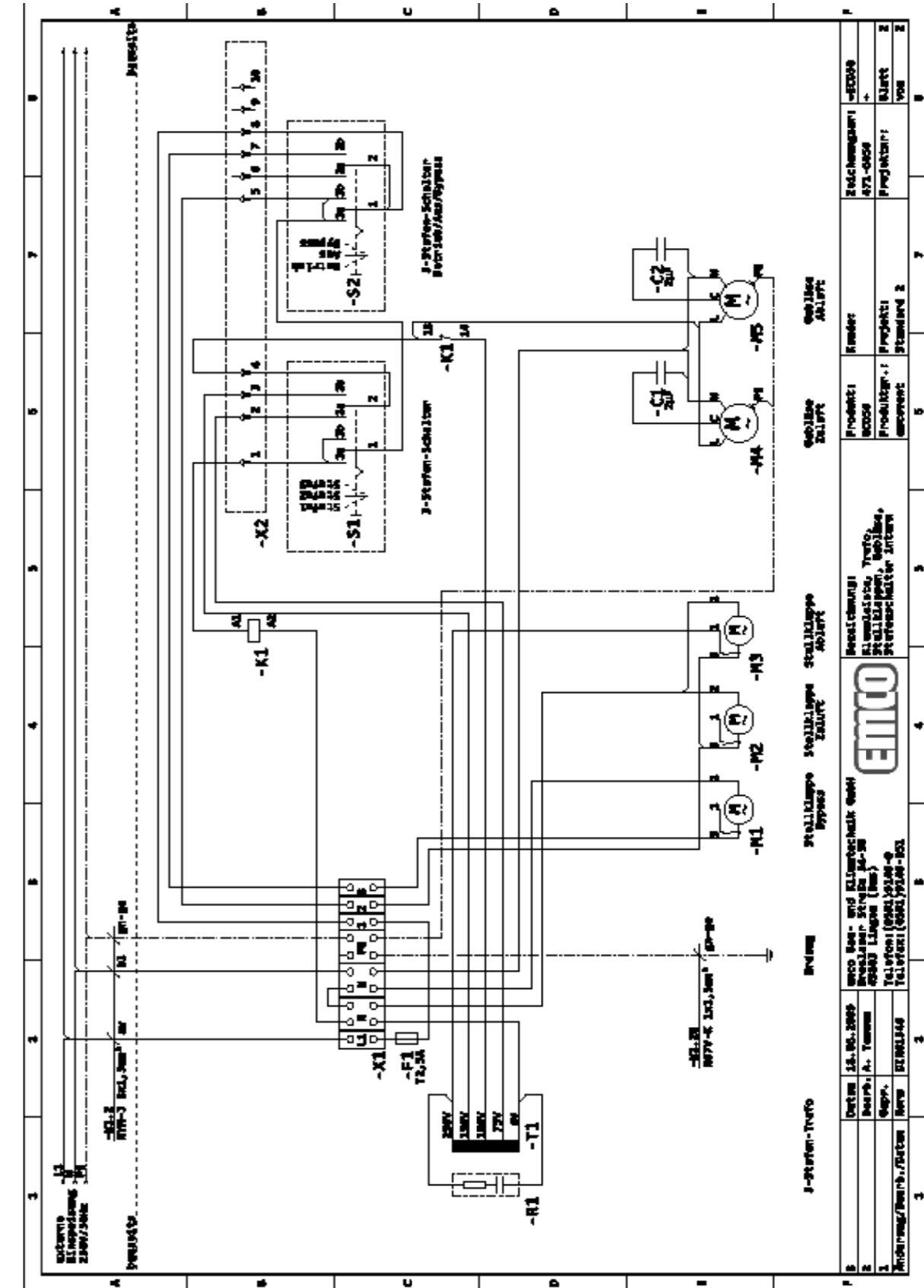
In automatic mode, you can choose

between summer and winter operation. During winter operation, the bypass is closed and the heat recovery unit is permanently active. The frost protection function constitutes an exception here: in this case, the bypass is activated if the heat recovery unit is up. Circulating the room air through the heat recovery unit enables it to defrost. The module switches back to its standard mode of functioning after a period of time. During summer operation, the bypass is controlled automatically, meaning that where possible the supply air is maintained in accordance with the required room temperature. In both operating modes, you have the option of programming 3 blocks of time for the day, enabling automatic night-time cooling to take effect. What's more, faults or maintenance intervals are shown on the display in plain text. If several modules are activated using an emcovent Comfort room operating unit, the address of the module with the fault is shown, enabling you to identify precisely which one requires servicing. If a CO2 sensor is being used, the operating unit detects it automatically.

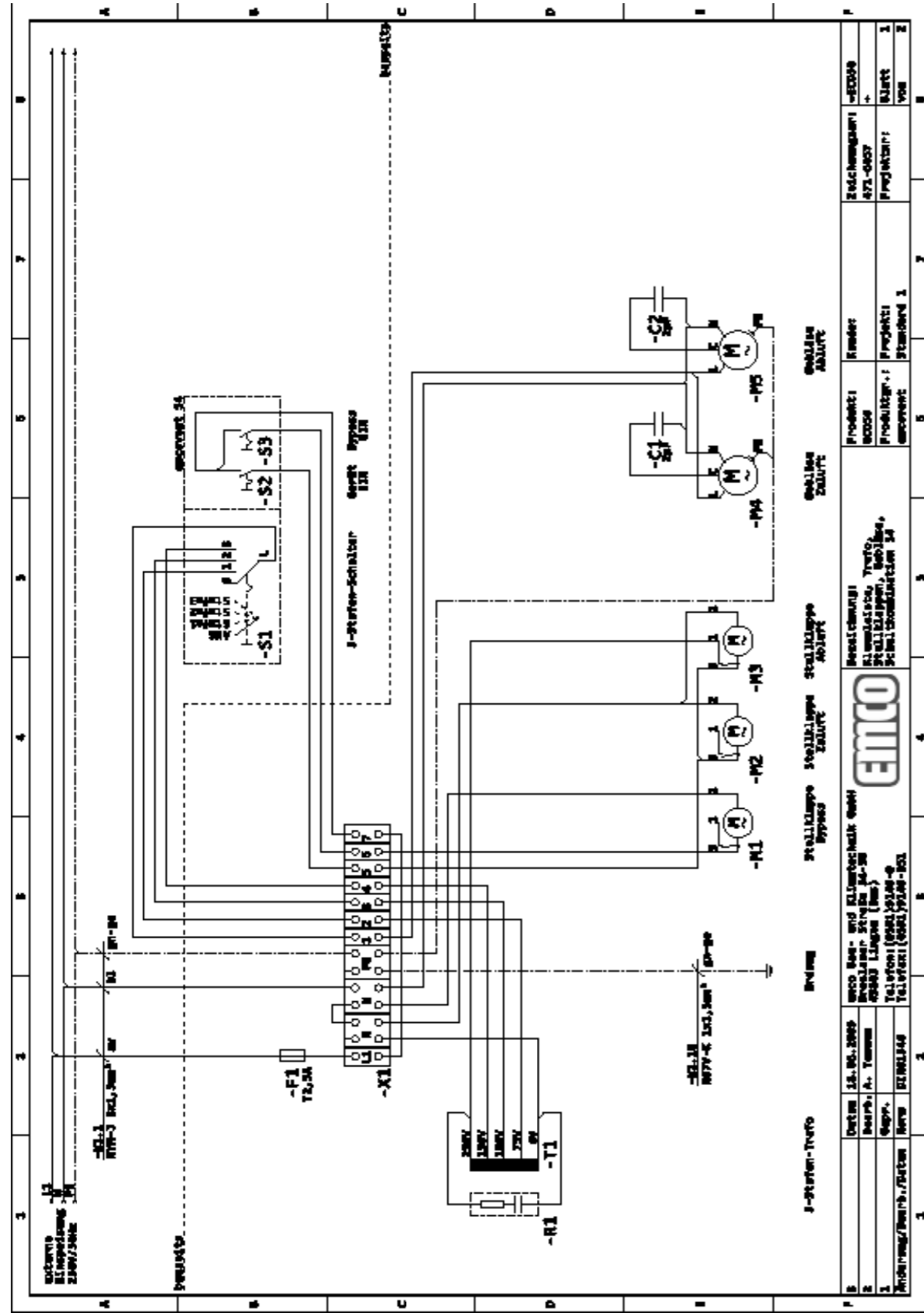


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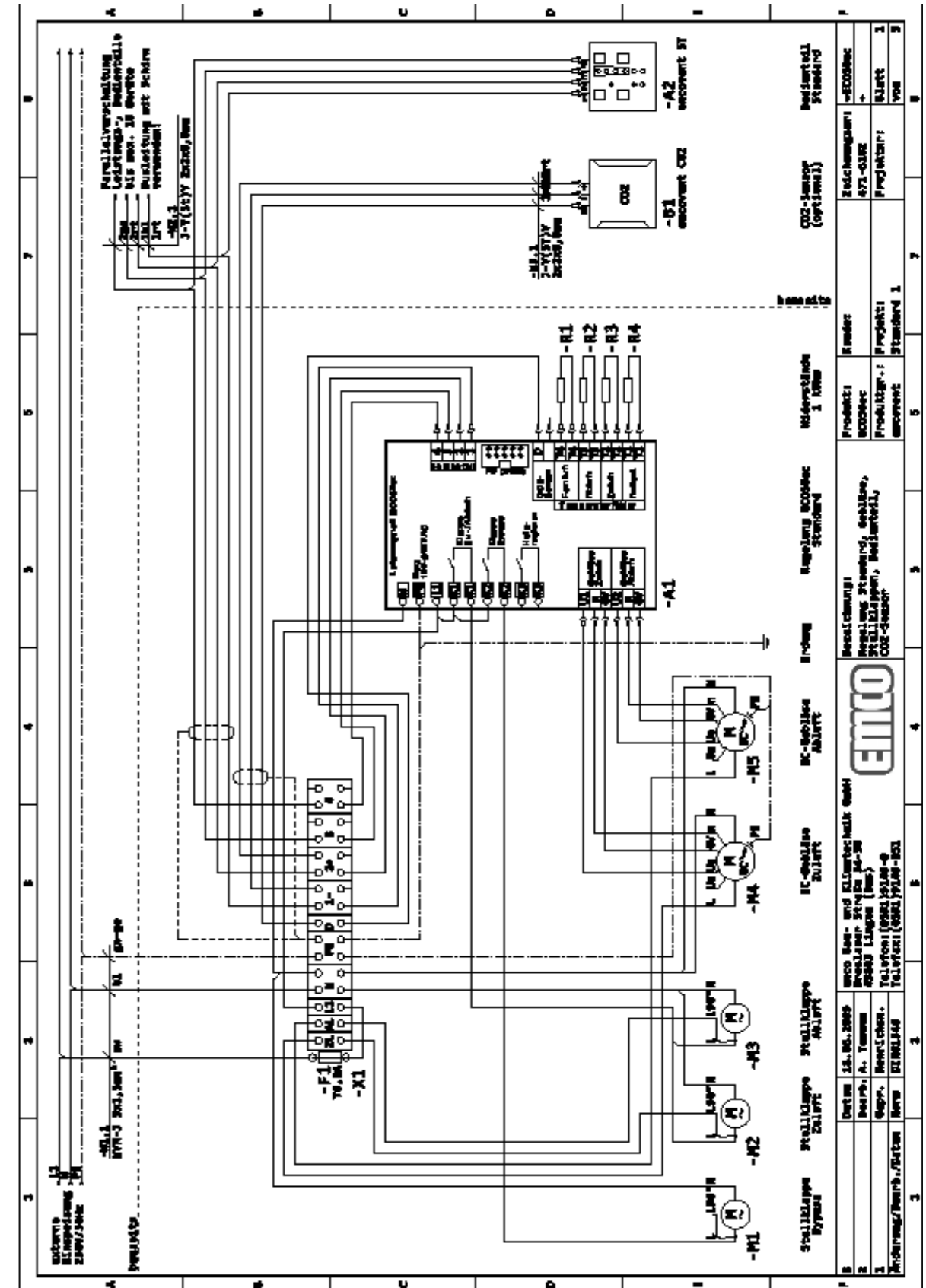
Switching with switch - internal (in front panel) - electrical circuit diagram



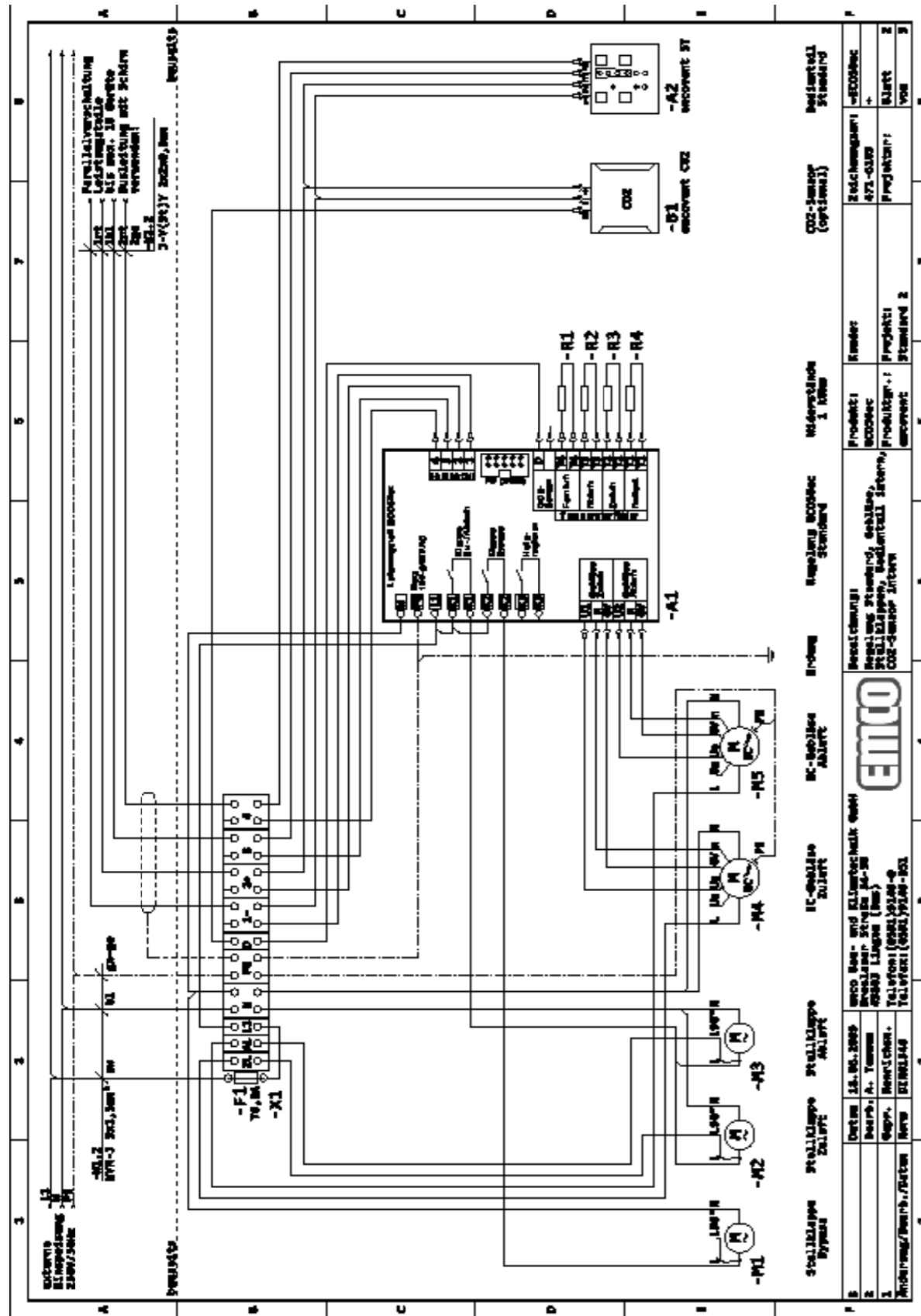
Switching with external switch - electrical circuit diagram



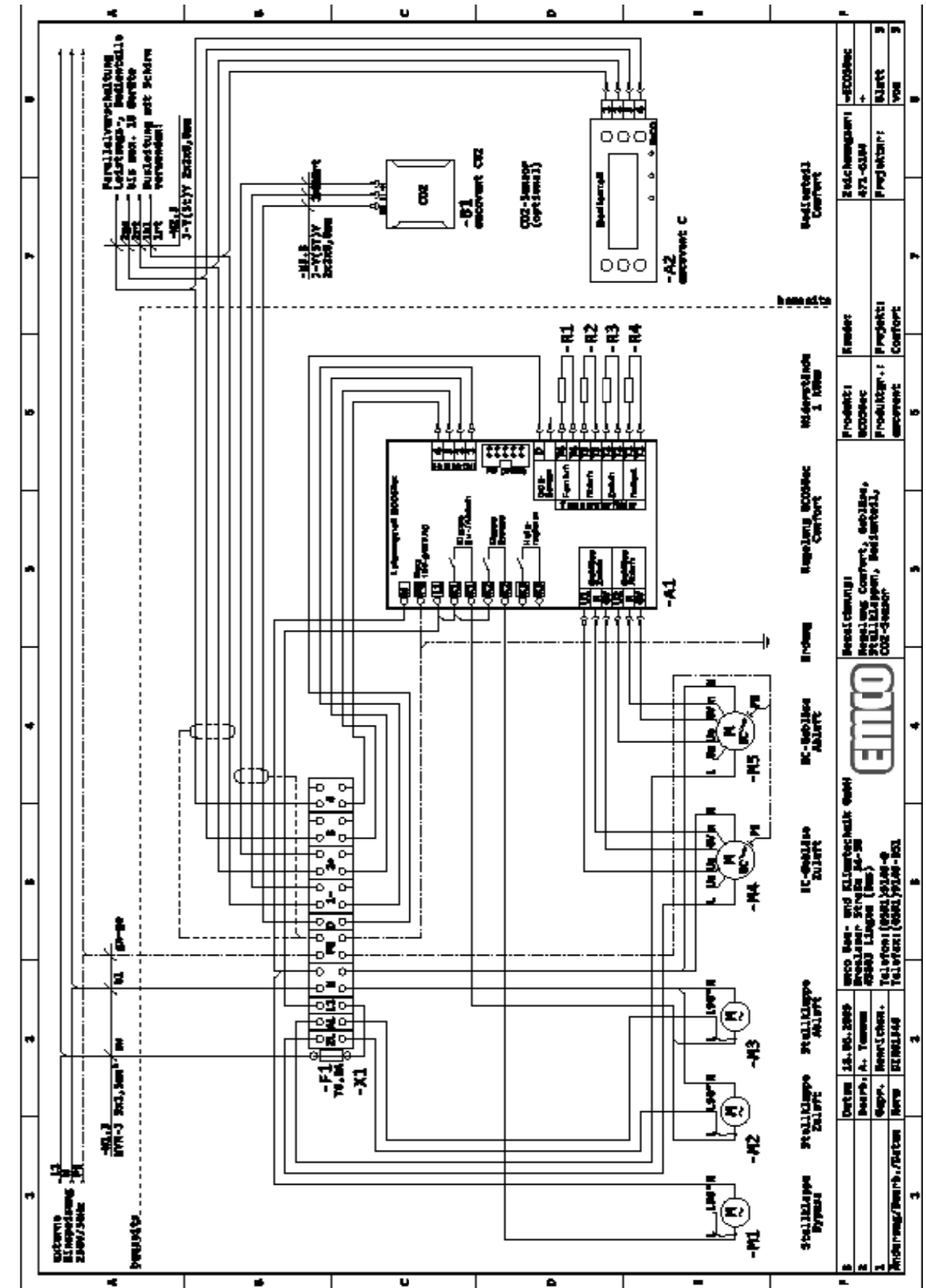
Switching with emcovent ST - external - electrical circuit diagram



Switching with emcovent ST - internal (in front panel) - electrical circuit diagram



Switching with emcovent C - only external - electrical circuit diagram



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