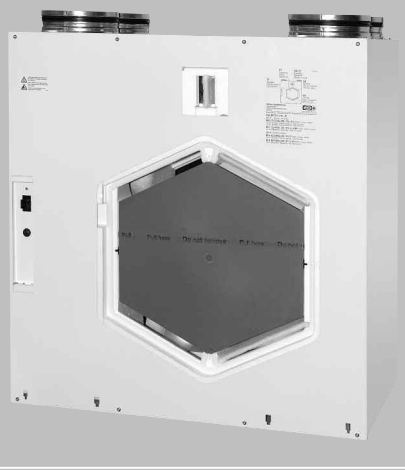
Helios Ventilatoren

INSTALLATION AND OPERATING INSTRUCTIONS **No 86 907** **UK**



CE

ECgreen® Vent

Passive-house compact units

KWL EC 270 Pro
KWL EC 370 Pro

- Ventilation with heat recovery and EC-technology

Helios

ENGLISH

Helios Ventilatoren

INSTALLATION AND OPERATING INSTRUCTIONS

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CHAPTER 1

GENERAL INFORMATION AND OPERATING INSTRUCTIONS

WARNING ⚠

1.0 Important information

To ensure safety and correct operation please read and observe the following instructions carefully before proceeding. In the maintenance part important information is specified over filter changes and necessary cleaning and maintenance activities. The user usually accomplishes maintenance work. The chapter „installation "with important installation tips and unit basic adjustments is addresses to the professional installer.

The electrical connection must be fully isolated from the supply up to the final assembly!

The planning office provides the planning documents necessary for the system calculation. Additional information can be requested ex works. Keep the installation and operating instructions as a reference at the device. After the final assembly the document must be handed out to the operator (tenant/owner).

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1.1 Warning and safety instructions

Accompanying symbol is a safety-relevant prominent warning label. All safety regulations and/or symbols must be absolutely adhered to, so that any danger situation is avoided.

1.2 Warranty – Exclusion of liability

If the preceding instructions are not observed all warranty claims and accommodation treatment are excluded. This also applies to any liability claims extended to the manufacturer.

The use of accessories not offered or recommended by Helios is not permitted. Potential damages are not liable for warranty.

1.3 Certificates

If the product is installed correctly and used to its intended purpose, it conforms to all applicable European Standards at its date of manufacture.

1.4 Receipt

The delivery contains the unit: KWL EC 270 Pro or KWL EC 370 Pro with controller KWL-BCU. Please check delivery immediately on receipt for accuracy and damage. If damaged, please notify carrier immediately. In case of delayed notification, any possible claim may be void.

1.5 Storage

When storing for a prolonged time the following steps are to be taken to avoid damaging influences:

Protection by dry, air-dustproof packing (plastic bags with drying agent and moisture indicators). The storage place must be water proof, vibration-free and free of temperature variations.

Damages due to improper transportation, storage or putting into operation are not liable for warranty.

1.6 Shipping

The unit is packed ex works in such a way that it is protected against normal transport strain. Carry out the shipping carefully. It is recommended to leave the unit until installation in the original packaging to avoid possible damages and soiling.

1.7 Application - Operation

Compact unit with heat recovery fo central ventilation of houses and apartments built upon passive-house standards (PHI) or as decentral solution for commercial and industrial applications. With high efficient cross counter flow heat exchanger with an efficiency of, see chart:

Unit	Rated air flow volume [m³/h]	121	168	251
KWL EC 270 Pro	Efficiency	89 % PHI	85 %	
KWL EC 370 Pro	Efficiency	90 % PHI	86 %	84 %

Equipped with latest EC motor technology with constant air flow regulation. This ensures that the adjusted air flow rate is preserved regardless of changing resistances e.g. dirty filters on each operating level.

The standard equipment permits the installation and the application in frost-free rooms > + to 5 °C.

If the unit is to be used in other applications where high humidity, excessive dust, temperature in excess of 40 °C or long periods at standstill (not running), please contact your local Helios dealer for advice. This also applies for special technical and electrical applications.

NOTE ☞

The fan may only be used according its intended purpose !

1.8 Mode of operation

The KWL EC 270/370 Eco is equipped with a cross counter flow heat exchanger. In this the heat of the extracted air is recovered and transferred through the plates to the incoming fresh external air, so both air flows remain separated. Through this procedure more than 90 % of the extract air heat is being transferred to the external air. The supply air is led by the duct system to the primary (supply air needing) areas. The used air is extracted from the secondary areas (like e.g. social rooms, toilets, showers etc.). It flows back through the ducting to the ventilation unit, transfers the heat and is discharged by the extract air duct to the atmosphere.

The efficiency depends on several factors. These are among other things humidity of the air and temperature difference of the outside air and exhaust air. The fan speed can be regulated by the controller (included in delivery), if desired, e.g. CO_2 or humidity sensors (accessories) stand to the selection, with which an automatic ventilation is practicable. The KWL-units have a power output. With this an upstream pre-heater battery (accessories EHR-R 1,2/160) can be controlled, which prevents at extremely cold outside temperatures the heat exchanger from icing up. The supply air temperature can be warmed up additionally by regulation of a power-controlled, external heater battery (accessories EHR-R 2,4/160). The summer bypass is the optimal solution for the warmer months of the year to lead cooler outdoor air into

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the building. The air is optimal pre-filtered by the built-in filters; this provides for a hygienic unit and at the same time the life span of the KWL-unit is guaranteed. Supply of cleaned outside air using a standard G4 filter (optional F7 pollen filter). Extract air passes through a standard G4 filter before entering the heat exchanger.

1.9 Performance

To achieve the given performance, the unit must be installed correctly. Varying from the design and installation requirements and also by incorrect operation can lead to a reduction in capacity or noise increase. Noise figures are stated in sound power levels LWA in dB(A) (conforms to DIN 45635, T.1). Sound pressure levels LPA depend on room specific conditions. These conditions may affect the measurement result on site and vary from the catalogue data.

1.10 Fire places

Fire and building regulations must be observed!

1.11 Technical data

KWL EC 270 Pro

Voltage/Frequency	**230 V~/50 Hz**	Wiring diagram	**SS-943**
Rated current – ventilation	**1,0 A**	Temperature operating range	**-20 °C to 40 °C**
Pre-heating battery (output)	**1,0 kW**	Weight approx	**49 kg**
Heating battery (output) kW	**2,0 kW**	Standby-losses	**< 1 W**
Electrical connection	**NYM-J 3 x 2,5 mm²**	Protection to	**IP 20**
Air flow rates Vm³/h (4 levels)	**285 / 230 / 170 / 110**		

KWL EC 370 Pro

Voltage/Frequency	**230 V~/50 Hz**	Wiring diagram	**SS-943**
Rated current – ventilation	**2,2 A**	Temperature operating range	**-20 °C to 40 °C**
Pre-heating battery (output)	**1,0 kW**	Weight approx	**52 kg**
Heating battery (output) kW	**2,0 kW**	Standby-losses	**< 1 W**
Electrical connection	**NYM-J 3 x 2,5 mm²**	Protection to	**IP 20**
Air flow rates Vm³/h (4 levels)	**350 / 280 / 200 / 140**		

CHAPTER 2

INSTALLATION

2.0 Installation

The KWL compact unit is suitable for „hanging“ arrangement, for installation on the wall or for installation in a cupboard and therefore for installation within a room of the dwelling. Due to operating noises which change according to system pressure it is recommended to install the KWL unit in the washing room, hall, utility rooms, storerooms or habitable rooms. Pay attention that in the installation area a waste water connection is available. Consider also tips on the page 4 "condensation outlet"!

The assembly should occur in such a way that preferably short ventilation ducts as well as their trouble-free connection with the unit are possible. Tight bends can lead to a high pressure loss and flow noise. The ventilation ducts may be folded under no circumstances. A secure and tight connection of the ductwork is required. For maintenance and installation work, the unit must be accessible.

NOTE ☞

Important information:

1. **Terminal box is for right-hand version on the left side accessible, for left-hand version on the right side.**
2. **If an electric pre-heater battery and/or additional heater battery is installed, the duct must be at least 1 m before and after the heater battery from not inflammable material (see functional layout Fig.11).**
3. **The heating must be installed in such a way that the electric box is easily accessible.**
4. **In order to avoid sound transmissions, a suitable acoustic insulation must be planned on site depending upon the structure.**

ATTENTION ⚠

5. **The installation of the KWL compact unit is permitted only in frost-protected areas, since the danger of freezing exists. The ambient temperature may not drop below +5 °C!**

2.1 Wall installation

For the wall connection the pre-assembled mounting rails (2 pcs. top; 1 pc. bottom) on the unit rear panel are to be used. Remove one of the upper rails (Fig.1) and mount this horizontally to the wall (Fig.2/3).


fig.1

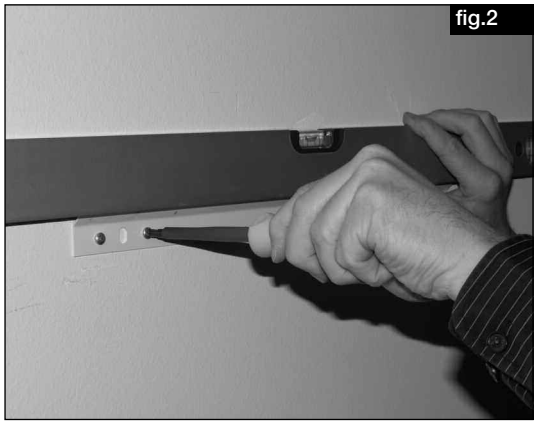
fig.2

Finally loosen the lower mounting rails, turn by 180° and screw this to the unit rear panel again. Fit compact unit onto upper wall rail (Fig.3) and screw together with lower mounting rail on the wall (Fig.4).

ATTENTION ⚠

It is to be guaranteed that the unit is mounted 100 % horizontally (absolutely necessary for normal condensate drainage).

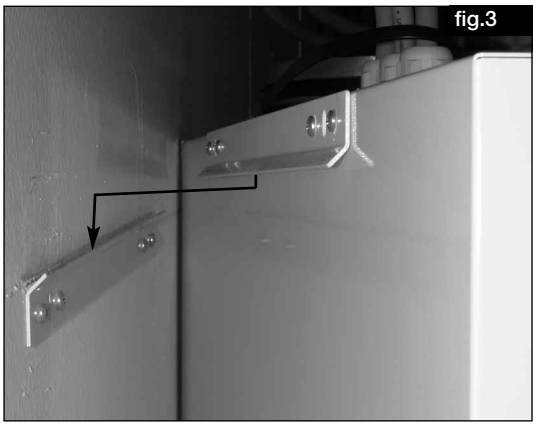
fig.3

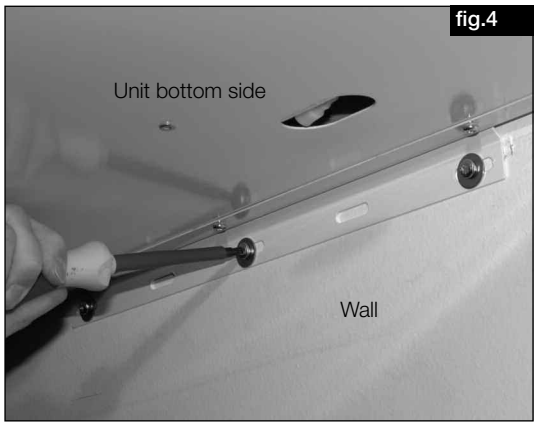

fig.4

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2.2 Condensation outlet

During the heating period the humidity of the exhaust air condenses to water. In new buildings or while having a bath or sauna as well as with laundry-drying, plenty of condensate can be formed. The condensation must be able to run off freely from the unit. The condensate is led to the outside by a PVC hose Ø 10 mm (included in delivery). For this must the connection to the local drainage system is to be guaranteed.

Assembly: Fold out condensate drain at the bottom side of the unit (Fig. 5) and attach PVC hose (Fig. 6).

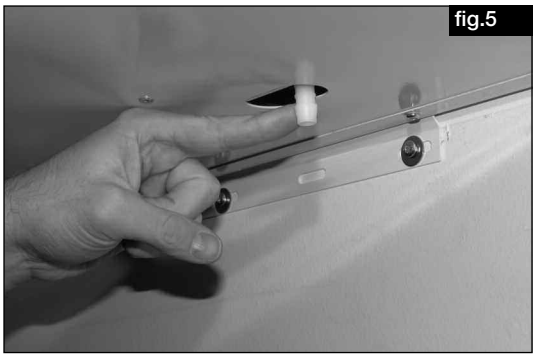
fig.5

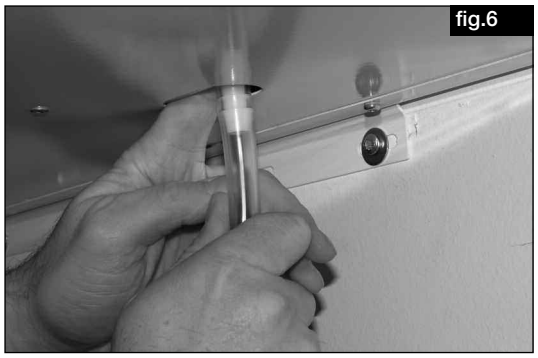
fig.6

The exhaust rivet for the pressure balance may not be locked or covered (Fig. 7/8). On account of the odour development with a dried out siphon, an open run-off should be covered (sketch Fig. 8). The condensate run-off runs over the drip tray of the unit and is connected to the drain pipe of the drainage system of the house. The removal of the condensate must end in the siphon.

ATTENTION ⚠

The condensate piping must ensure the effective gravity flow of the condensate!
The condensation outlet must be installed frost-proof!

fig.7

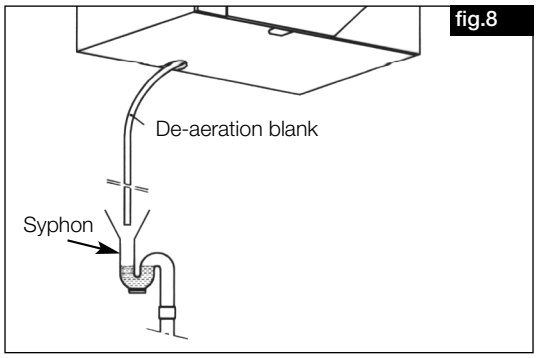

fig.8

2.3 Connecting spigots

The units are supplied with four connecting spigots (diameter 160 mm) with rubber lip-seals. A secure and tight connection to the spigots is required. The arrangement of the ventilation duct can be seen from the figures 9 and 10, depending upon the model.

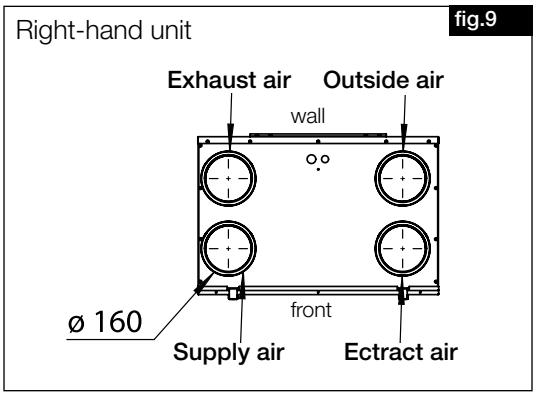

fig.9

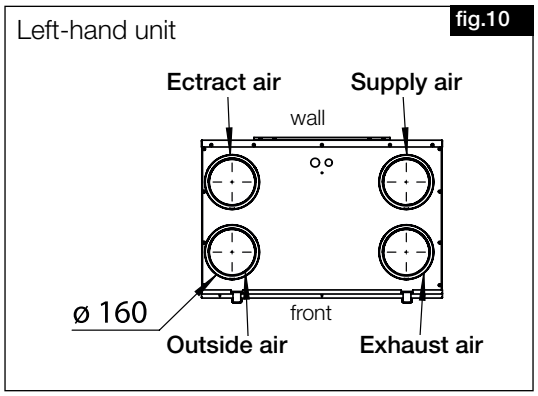

fig.10

2.4 Air ducting, ventilation circuit

When designing the ductwork, use the shortest possible runs. Airtight connections and changeovers must be ensured for the best possible heat recovery. To avoid pressure losses, dirt build-up and noise, use smooth ducts (plastic or rigid ducting). For main lines (outside, exhaust air, supply air distributor, extract collector) DN 160 mm is to be planned, for branch lines the ø is reduced accordingly.

To reduce condensation in the exhaust and outside air pipes these are to be insulated in an appropriate way. The minimum insulating thickness in accordance with German Institute for Standardization EN in 1946-6, 05/2010 are to be kept. If supply and extract air ductwork run through unheated rooms, insulation must be provided to reduce heat losses. Fresh air should be supplied into living and bedrooms, extraction takes place in bathrooms, toilets and kitchens. To balance the whole system, supply and extract openings should be provided with adjustable valves (accessories).
During extraction of polluted extract air a filter (accessories) is to be connected. It is not allowed to install kitchen hoods to the system (cause: dirt, fire danger, hygiene). To ensure air circulation within the room sufficient overflow openings (door gap, door grilles) are to be planned.

ATTENTION ⚠

Fire and building regulations must be observed.

2.5 Unit insulation

If installed in heated rooms and higher humidity condensation can occur at the outside of the unit in the outside and extract air area. In this case a water-vapour-tight insulation is to be attached laminar in this area. Furthermore the outside and exhaust air ductwork should be insulated sufficiently.
If installed in not heated areas (e.g. frost-protected attic) a sufficient insulation outside on the unit is to be installed all around. Otherwise condensate formation could occur on the casing sides. The condensate removal must be installed frost-protected, perhaps with a heating.

WARNING ⚠

2.6 ⚠ Electrical connection

All work must be carried out with the equipment fully isolated from the power supply. The electrical connection are to be carried out in accordance with the relevant wiring diagram and are only to be done by a certified electrician.

The electrical connection must be fully isolated from the supply up to the final assembly!
All relevant safety regulation, national standards and norms are to be adhered to. An appliance is required for cut off from the supply with a minimum of 3 mm contact opening of each pole.
The controller KWL BCU/BCA is connected with the unit by a 3 m connecting cable (optional available 10 or 20 m long).

Assembly of external connection box:
The length of the connecting cable to the external connection box (IP 44) is approx. 1,5 m. The connection box can be attached e.g. to the wall next to the unit.

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CHAPTER 3

OPERATIONAL DESCRIPTION

3.0 Functional layout

fig.11

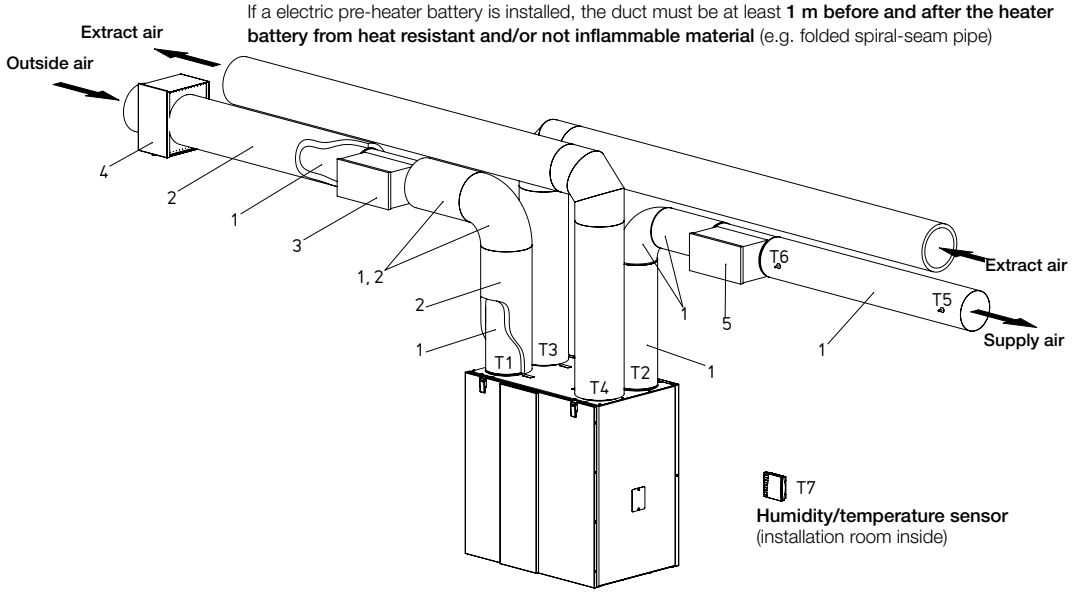


Fig. KWL EC 270/370 Pro, left-hand unit

Pos.	Description	Ref.No.
T1	Outside air sensor	-------
T2	Supply air sensor	-------
T3	Extract air sensor	-------
T4	Exhaust air sensor	-------
T5	Duct sensor Type: KWL-LTK (Accessory)	**09644**
T6	Frost protection sensor Type: KWL-LTK (Accessory)	**09644**
T7	Humitity/Temperatur sensor Type: KWL-FF (Accessory)	**09953**
1	Heat resistant and/or not inflammable pipe (e.g. folded spiral-seam pipe)	-------
2	Heat resistant and/or not inflammable insulation	-------
3	Electric pre-heater battery: EHR-R 1,2/160	**09434**
4	Filter box: LFBR 160 G4	**08578**
5	Electric heater battery: EHR-R 2,4/160	**09435**
Alternative	Warmwater heater Type: WHR-R 160 and Hydraulic unit Type: WHSH 1100 24V (0-10V)	**09481** **08819**

3.1 External connection components (see also wiring diagram SS-943)

3.1.1 Electric pre-heating

NOTE ☞

According to passive house criteria a preheating is compulsorily necessary, in order to avoid an icing up of the cross counter flow heat exchanger!

– Control by electric heater battery EHR-R 1,2/160

The electronics of the KWL compares the temperature set point (factory setting +3 °C) with the exhaust air temperature (sensor T4). In the case of a deviation the preheating is activated, in order to obtain a permanent extract air temperature.

The electronics of the KWL compares the comfort temperature (set point Passive House Institute: +16,5 °C) with the supply air temperature (sensor T2). In the case of a deviation the preheating is activated, in order to obtain a permanent supply air temperature. If an additional heater battery is connected, is not supply air sensor T2 but duct-/supply air sensor T5 activated and the heater battery is controlled according to the difference. The activation of the preheating occurs only, if no error messages are shown (see point 6,7) in the display of the controller and the supply air fan supports the minimum flow rate.

In order to protect the heating element of the electric heater battery from dust and to prevent it from being clogged, an air filter (accessories LFBR 160 Ref.No.: 8578) must be installed before the EHR-R.

3.1.2 External heater battery EH (accessories)

– Regulation via electric heater battery EHR-R 2,4/160

Recommended configuration: Heater battery plus duct sensor (T5) and humidity-/room sensor (T7) KWL-FF 270/370 (Ref.No.: 9953).

The electronics of the KWL compares the temperature set point (factory setting +20 °C) of the **supply air** with the temperature value at sensor T7. In the case of a deviation the heater battery is activated, in order to obtain a permanent supply air temperature. In order to avoid strong temperature fluctuations at the valves, a minimum supply air temperature (set point Passive House Institute: +16,5 °C) and a maximum supply air temperature (factory setting +40 °C) can be activated at the display. The supply air temperature is measured with sensor T5 and compared with the min/max. temperature. If the temperature drops below e.g. +16,5 °C , the heater battery is activated even if room has already reached the temperature set point. If the temperature is above e.g. +40 °C, the heating power is reduced even if the room has not reached the temperature set point.

Minimum configuration: (Heater battery plus duct sensor (T5) KWL-LTK (Ref.No.: 9644)

The electronics of the KWL compares the temperature set point (factory setting +20 °C) of the **supply air** with the temperature value at sensor T5. In the case of a deviation the heater battery is activated, in order to obtain a permanent supply air temperature.

3.1.3 External heater battery WW (accessories)

– Regulation via water heater battery WHR 160

Recommended configuration: Heater battery plus duct sensor (T5), frost protection sensor (T6) and humidity-/room sensor KWL-FF 270/370 (Ref.No.: 9953).

The electronics of the KWL compares the temperature set point (factory setting +20 °C) of the supply air with the temperature value at sensor T7. In the case of a deviation the heater battery is activated, in order to obtain a permanent supply air temperature. In order to avoid strong temperature fluctuations at the valves, a minimum supply air temperature (set point Passive House Institute: +16,5 °C) and a maximum supply air temperature (factory setting +40 °C) can be activated at the display. The supply air temperature is measured with sensor T5 and compared with the min/max. temperature. If the temperature drops below e.g. +16,5 °C , the heater battery is activated even if room has already reached the temperature set point. If the temperature is above e.g. +40 °C, the heating power is reduced even if the room has not reached the temperature set point.

A frost protection sensor (T6) has to be installed after the water heater battery (distance 0,2 m). If the temperature drops below +5 °C, the mixer is fully opened and the outside air shutter (to be provided on site) is closed.

NOTE ☞

Important information: If a water battery is used the external contact (KWL: terminal 23/24 see wiring diagram SS-943) must be connected with heating of the building (contact heater on).

Provided: Parameter setting E4.1 must be set to 1 to ensure that enough warm water is available.

General information on using electric pre-heater battery and heater battery

- Independently of the configuration the following is valid:

The heater battery is equipped with two thermal cut-outs, the automatic thermal cut-out (operating temperature +50 °C) is controlled by the electronics. If the temperature in the duct system rises more than +50 °C, the thermal cut-out opens, at the same time an error code E13 (see point 6.7) is displayed at the controller KWL-BCU/BCA and the supply air fan is running for 1 minute on the highest speed. The thermal cut-out with manual reset which opens at 120 °C is connected directly to the supply line of the heater battery, in order to guarantee a safe circuit breaking in the event of error. The installation and operating instruction (No. 91560) EHR-R models is to be adhered to. The wiring is carried out to wiring diagram SS-943.

ATTENTION ⚠

If a electric pre-heater battery is installed, the duct must be at least 1 m before and after the heater battery from heat resistant and/or not inflammable material (e.g. folded spiral-seam pipe).

3.1.4 Bypass function „Summer operation“

The bypass function allows a reduction of the supply air temperature and provides through bypassing the heat exchanger by means of two shutters, rotating in opposite directions, for a pleasant room climate.

Bypass closed: Outside air is led over heat exchangers into the room (heat recovery active)

Bypass open: Outside air is led directly into the room (heat recovery inactive), indirect cooling of ambient air

fig.12

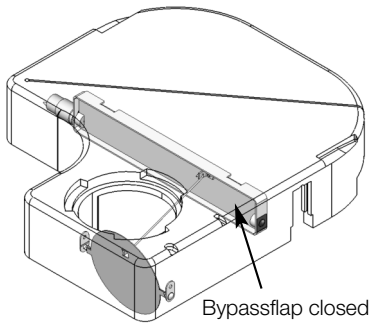
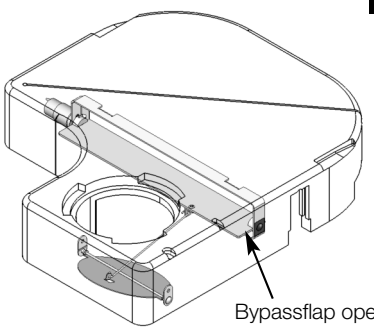


fig.13



– Operational description "Bypass":
If the KWL is supplied with mains voltage, the bypass cover closes completely (Fig.12)
The bypass is opened, if all conditions are fulfilled:
Condition 1: The extract air temperature (sensor T3) is higher than the bypass temperature (bypass temperature minimum +3° C higher than supply air temperature see heater battery, factory setting +23° C).
Condition 2: The outside air temperature (sensor T1) is lower than the extract air temperature (sensor T3)
Condition 3: The outside air temperature (sensor T1) is higher than the outside air temperature limitation (factory setting +15°)
The bypass is closed, if condition 4 and 5 or 6 and 7 is fulfilled:
Condition 4: The extract air temperature (sensor T3) is lower than the bypass temperature which is reduced by -2°.
Condition 5: The bypass is opened
or
Condition 6: The outside air temperature (sensor 1) is lower than the outside air temperature limitation, which is reduced by –2°C.
Condition 7: The bypass is opened.

3.1.5 Frost protection cross counter flow heat exchanger
The frost protection function prevents an icing up of the cross counter-current heat exchanger, if the preheating is not attached or the heating energy is not sufficient.

– Operational description:
The frost protection is active, if following conditions are fulfilled.
The effects depend on the respective unit configuration (Passive House or DIBt):
Condition I: The exhaust air temperature (sensor T4) is lower by 2 °C than the heat exchanger frost protection (factory setting +3 °C).
Condition II: Condition I is measured longer than 2 min..
Configuration Passive House: Preheating is switched off and the supply air fan is operated for safety reasons for 1 min. on highest ventilation level, afterwards the extract air fan is active. If the exhaust air temperature rises above the heat exchanger frost protection temperature the normal operating condition is activated.
Configuration DIBt: The air flow volume of the supply air fan is reduced by 50 % and the preheating is activated. If the exhaust air temperature does not rise within 5 min. above the heat exchanger frost protection temperature, the preheating is switched off and the supply air fan is operated for safety reasons for 1 min. on the highest ventilation level. The supply air fan remains switched off. The extract air fan remains active, in order to warm up the heat exchanger. If the exhaust air temperature rises above the heat exchanger frost protection temperature, the normal operating condition is restored.

NOTE ☞

Frost protection for downstream water heater battery
If the intake air temperature drops below +5 °C, the supply air fan is switched off. At the controller an error message is displayed.

3.1.6 Motorised back draught shutter, 230 V~ (to be provided on site)
The back draught shutter (on the outside/exhaust air side) prevents inflow of cold air when stopped. If a water heater battery is used shutters must be used to prevent a frost damage at the water heater battery.

3.1.7 Alarm Output
If an error at the unit is determined e.g. fan failure, frost protection heat exchanger open contact releases.

3.1.8 External signal (contact)
Function setting of different parameters (floating output!)

Menu E4	Function	Description of operation
1	**Unit Ventilation- / Stand-by mode**	If the contact remains open, the unit is in standby-mode, the safety function (e.g. heat exchanger frost protection) remains active. "External contact" is signaled in the display. If the contact is closed, the unit is put into the ventilation mode.
2	**Boost mode**	If the contact is closed the unit runs on the highest speed level. "External contact" is signaled in the display. If the contact remains open the mode activated before is applied.
3	**Supply air mode**	If the contact is closed the unit runs in the supply air mode."External contact" is signaled in the display. If the contact remains open the mode activated before is applied.
4	**Extract air mode**	If the contact is closed the unit runs in the extract air mode."External contact" is signaled in the display. If the contact remains open the mode activated before is applied.
5	**Activade Bypass**	If the contact is closed the bypass is opened."External contact" is signaled in the display. If the contact remains open the bypass is closed again.
6	**Lowering mode Temperature**	If the contact is closed the desired supply air temperature is lowered by 3° C (Lowering mode)."External contact" is signaled in the display. If the contact remains open the temperature lowered before is risen again.

3.1.9 Humidity control

The humidity control provides at too high room humidity (% RH.) an increased air change to prevent mould formation. On delivery the humidity function is activated (factory setting: humidity set point 60 % RH., switching step 10 % RH., run on time 2 hours). Up to 4 humidity sensors type: KWL-FF 270/370 Ref.No. 9953 can be plugged in (see wiring diagram SS-943).

Factory setting:

– Humidity set point:

Indicates the relative humidity, which is to be considered as normal room climate. The unit is operated at fan speed 1 e.g., 60 % RH

– Switching steps:

The humidity control reacts to humidity changes more sensitively for a low switching step (e.g. 5%), since the activation of the fan speeds is carried out faster (see example table).

Switching step	speed step (0)* /1	speed step 1	speed step 2	speed step 3	speed step 4
10 %	0 – 50 %	50 – **60** %	60 – 70 %	70 – 80 %	80 – 90 %
5 %	0 – 55 %	55 – **60** %	60 – 65 %	65 – 70 %	70 – 75 %

** If for parameter E3.1 minimum speed step 0 is activated.*

– Pause time:

If the set point isn't achieved within 2 hours, the unit operates in the minimum speed step (0)*/1 for the adjusted time (pause time 0 - 24 hours). This is to prevent that the unit does not stress the building with water vapour of saturated outside air (e.g. muggy weather) additionally with humidity.

Control

The humidity control can be carried out with and without controller KWL-BC.. . With controller, the automatic - mode must be active (symbol "water drop"). In manual - mode a warning is signalled (humidity alarm, rotary encoder flashing blue) in the display at a humidity of over 80 % RH. Furthermore, the activated fan speed is dependant of the weekly program and the CO_2 -control.

3.1.10 CO_2-Steuerung

The CO_2 -control provides at high CO_2 concentration (ppm) an increased air change in order to reduce high levels of CO_2 concentration and thus to prevent fatigue and lack of concentration and headaches.
On delivery the CO_2 - function is activated (factory setting: CO_2 -set point 800 ppm, switching stage 100 ppm, run on time 2 hours). Up to 4 CO_2 -sensors type: KWL-CO_2 Ref.No.: 9958 can be plugged in (see wiring diagram SS-943).

Factory setting:

– CO_2-set point:

Indicates the CO_2- concentration, which is to be considered as normal CO_2-value. The unit is operated at fan speed 1 e.g., 800 ppm.

– Switching steps:

The CO_2- control reacts to CO_2 changes more sensitively for a low switching step (e.g. 100 ppm), since the activation of the fan speeds is carried out faster (see example table).

Switching step	speed step (0)* /1	speed step 1	speed step 2	speed step 3	speed step 4
200 ppm	0 – 600 ppm	600 – **800** ppm	800 – 1000 ppm	1000 – 1200 ppm	1200 – 1400 ppm
100 ppm	0 – 700 ppm	700 – **800** ppm	800 – 900 ppm	900 – 1000 ppm	1000 – 1100 ppm

** If for parameter E3.1 minimum speed step 0 is activated.*

– Pause time:

If the set point isn't achieved within 2 hours, the unit operates in the minimum speed step (0)*/1 for the adjusted time (pause time 0 - 24 hours).

Control:

The CO_2- control can be carried out with and without controller KWL-BC.. . With controller, the automatic-mode must be active (symbol "CO_2"). In manual-mode a warning is signalled (CO_2- alarm, rotary encoder flashing blue) in the display at a CO_2-concentration of over 1600 ppm. Furthermore, the activated fan speed is dependant of the weekly program and the humidity control.

UK

CHAPTER 4

SPEED CONTROLLER KWL-BCU/KWL-BCA

4.0 Speed controller KWL-BC..

The passive-house compact unit is controlled via speed controller KWL-BUC/BCA (for flush/surface mounting). It allows a manual / automatic 4 speed operation. Controller includes 3 m connecting cable as standard with RJ 12 plugs on both sides for easy installation. Up to 4 controllers can be connected.
Every controller must get an "address" of its own which is queried once when switching on.

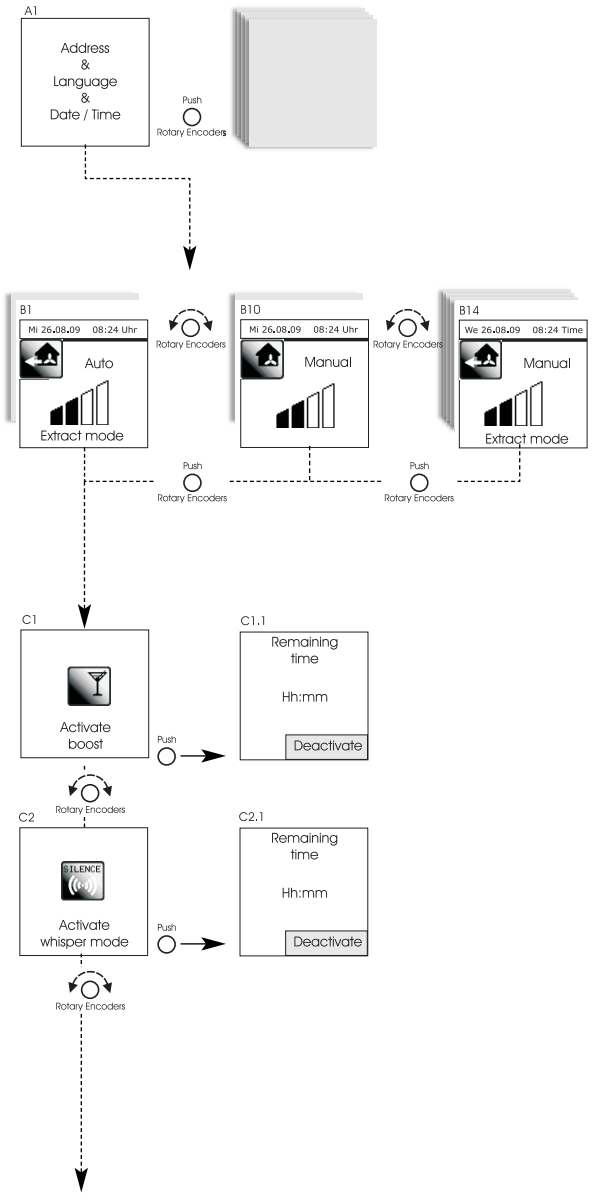
① **Display**
② **Rotary Encoders**
③ **Casing**

Software-Menu-Navigation
by turning left or right, you can navigate through the software-menu.
→ Rotary Encoders

Operation function
by pressing (Push), the display shows the activated/selected functions.
→ Push Rotary Encoders

MENU ☞

4.1 Operating menu / Parameter setting

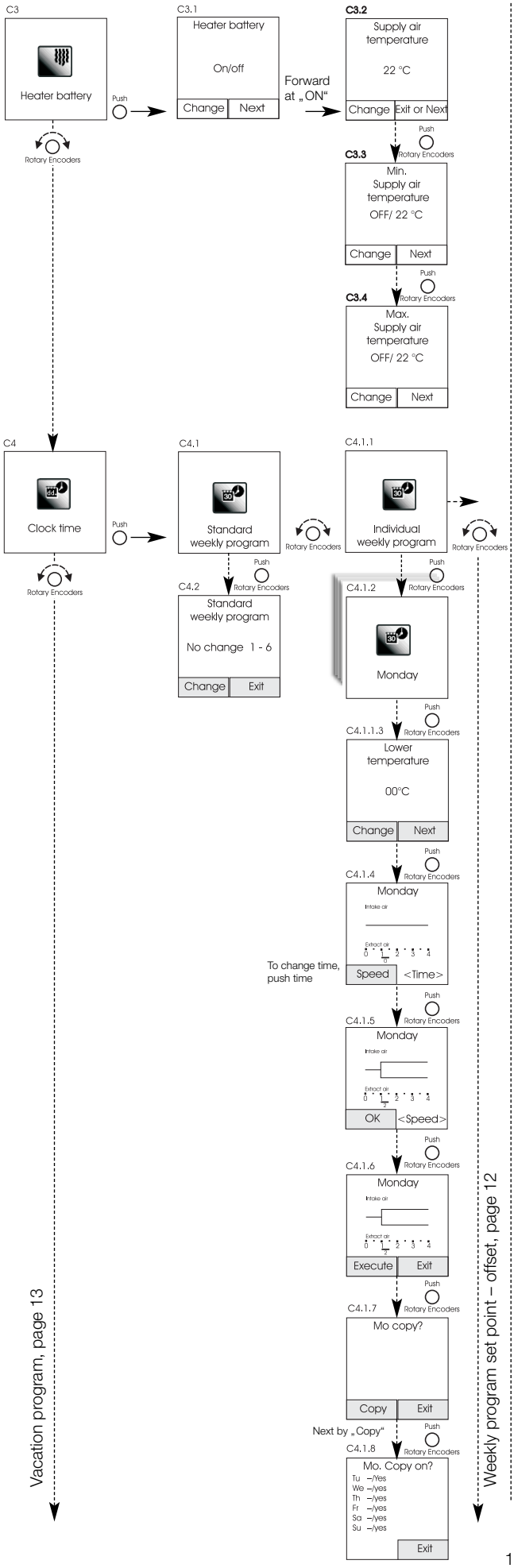


A1 = Initial start-up:
In the menu “initial start-up” the following information is requested:
1. Controller address: Up to 4 controllers can be connected.. Every controller requires its own address (1-4)
2. Language: Selection: German, English, French or Italian
3. Date: Setting of current date
4. Time: setting of current time

B1 to B14 = Speed steps Auto / Manual-Mode:
The speed control of the KWL EC 370/370 Pro can be set for automatic or manual mode. In the automatic-mode the speed control takes place in dependence of the humidity, the CO_2-concentration and/or the weekly program. Therefore the accessories CO_2-sensor KWL-CO_2 respectively humidity sensor KWL-FF 270/370 must be connected.
In manual-mode the speed control takes place individually. By turning the rotating encoder following speed steps can be selected:
Level 0-1-2-3-4-supply air-extract air

C1 = Activate booster:
The KWL EC 270/370 Pro can be operated via the menu point „booster“ for a certain time in a preset speed step. The display shows the time remaining (C1.1) in the booster mode, the mode can be interrupted at any time. The adjustment of fan speed, and the duration is set in the submenu D3.

C2 = Activate whisper mode:
The KWL EC 270/370 Pro can be operated via the menu point „whisper mode“ for a specified time in a preset speed step. The display shows the time remaining (C2.1). The mode can be interrupted at any time. The adjustment of fan speed, and the duration is set in the submenu D4.



C3 = Heater battery:
Display only available, if sensor T5 is connected.
C3.1 = Heater battery ON/OFF
C3.1 = Supply air temperature, temperature adjustment range +16,5 till +40 ° C

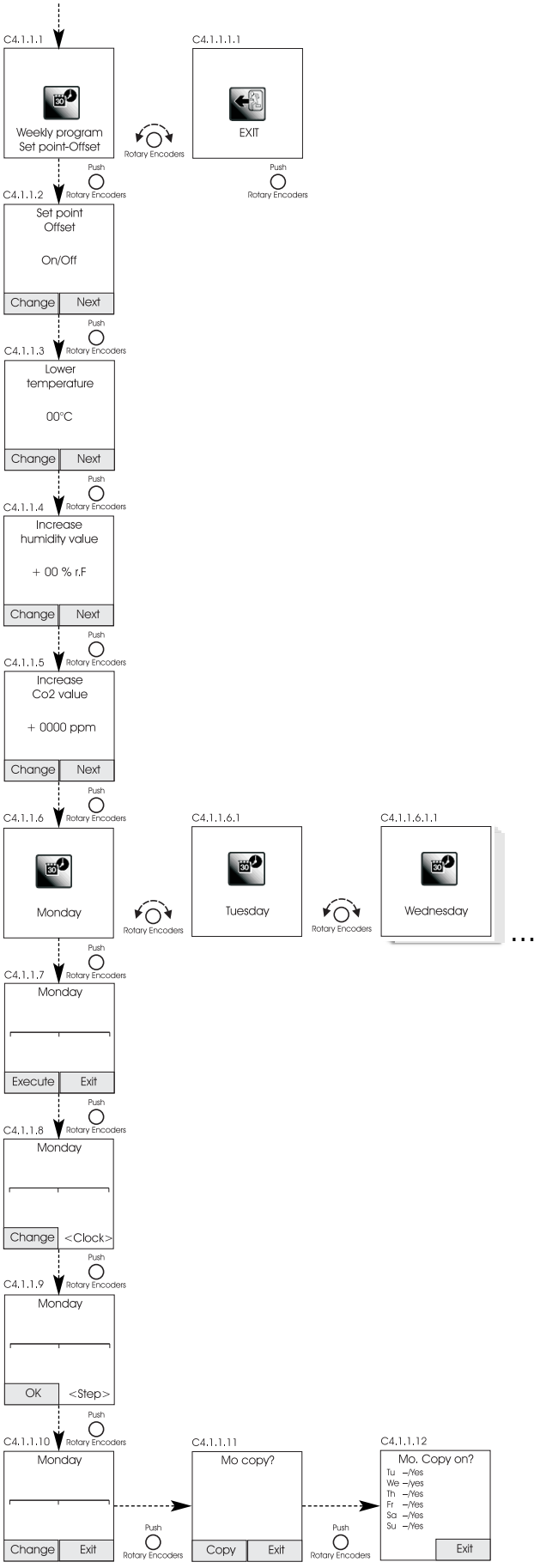
C3.3 = Minimum supply air temperature
Temperature adjustment range +16,5 till +40 ° C
Display only available, if sensor T5 and T7 is connected

C3.4 = Maximum supply air temperature
Temperature adjustment range +20 till +50 °C
Display only available, if sensor T5 and T7 is connected

C4 = Clock timer:
C4.1 = Standard weekly program
Six weekly programs (WP6) are preset, which can be selected via the menu C4.2, see table “weekly program”.
C4.1.1 = individual weekly program:
Optionally also an individual week program can be prepared for each day (see menu C4.1.4)

Table weekly program:

WP 1							
Time	0:00-6:30	6:30–11:30	11:30–13:30	13:30–21:00	21:00–24:00		
Mo.–Fr.	Step 1	Step 2	Step 3	Step 2	Step 1	-	-
Time	0:00–8:30	8:30–12:00	12:00–14:00	14:00–23:00	23:00–24:00		
Sa.	Step 1	Step 2	Step 3	Step 2	Step 1	-	-
Time	0:00–8:30	8:30–9:30	9:30–21:00	21:00–23:00	23:00–24:00		
Su.	Step 1	Step 2	Step 3	Step 2	Step 1	-	-
WP 2							
Time	0:00–6:30	6:30–8:00	8:00–16:00	16:00–18:00	18:00–20:30	20:30–22:30	22:30– 24:00
Mo.–Fr.	Step 1	Step 3	Step 1	Step 2	Step 3	Step 2	Step 1
Time	0:00–8:00	8:00–8:30	8:30–10:00	10:00–18:00	18:00–21:00	21:00–24:00	
Sa.	Step 1	Step 2	Step 3	Step 2	Step 3	Step 2	-
Time	0:00–9:00	9:00–10:30	10:30–15:00	15:00–22:00	22:00–24:00		
Su.	Step 1	Step 2	Step 3	Step 2	Step 1	-	-
WP 3							
Time	0:00–5:30	5:30–8:00	8:00–11:00	11:00–11:30	11:30–13:00	13:00–21:00	
Mo.–Fr.	Step 2	Step 3	Step 1	Step 3	Step 3	Step 3	-
Time	0:00–6:30	6:30–8:00	8:00–11:30	11:30–13:00	13:00–22:00	22:00–24:00	
Sa.–Su.	Step 2	Step 3		Step 4	Step 3	Step 2	-
WP 4							
Time	0:00–5:30	5:30–8:00	8:00–10:00	bis 16:00	16:00–23:00	22:00–24:00	
Mo.–Fr.	Step 1	Step 2	Step 1				
Sa.	Step 1		Step 2	Step 1	Step 2	Step 2	-
Su.	Step 2		Step 2				
WP 5							
Time	0:00–8:00	8:00–22:00	22:00–24:00				
Mo.–Sa.	Step 1	Step 4	Step 1				-
Su.	Step 1						-
WP 6							
Time	0:00–13:00						
Mo.–Su.	disabled	-	-	-	-	-	-



C4.1.1.1 = Weekly program set point – offset:
The time and date dependent allow the lowering or raising of the set point adjustments temperature, humidity or CO_2. An additional optimization of the room climate results from it to save costs and energy.
C4.1.1.1.1 = Exit

C4.1.1.2 = Set point – offset (C3.3)
ON/OFF

C4.1.1.3 = Lower supply air temperature
Lower the set point by the displayed value (-3 °C)

C4.1.1.4 = Raise humidity sensor
Raise set point by the displayed value

C4.1.1.5 = Raise CO_2-sensor
Raise set point by the displayed value

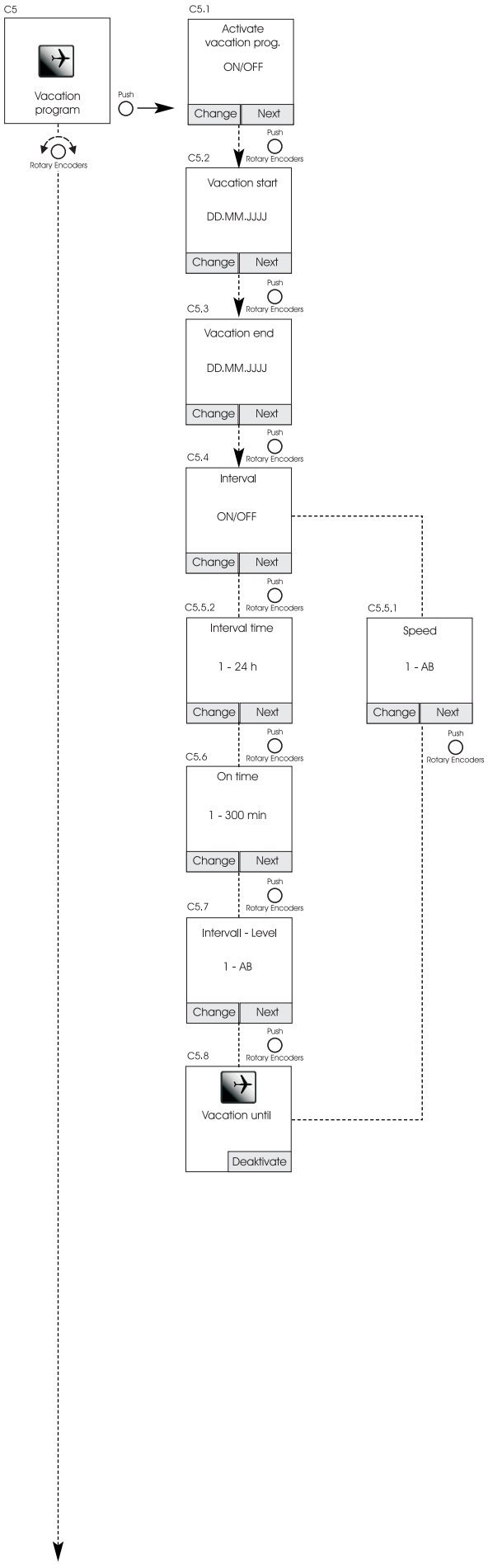
C4.1.1.6 = Monday to Sunday
Add to set point

C4.1.1.7 = Monday

C4.1.1.8 = Monday
Clock

C4.1.1.9 = Monday
Offset ON/OFF

C4.1.1.10 = Monday
C4.1.1.11 = Copy Monday?
C4.1.1.12 = Copy Monday
Copy function can be execute to further weekdays (Thu-Su)



C5 = Vacation program:
For example a firm vacation date can be deposited over the „vacation program“. For this time duration an individual ventilation process can be set. The program is activated to beginning of vacation and operated automatically again at expiration of the defined time in the normal condition.

C5.1 = Activate vacation program
ON/OFF

C5.2 = Start of vacation
Set date > DD.MM.JJJJ

C5.3 = End of vacation
Set date > DD.MM.JJJJ

C5.4 = Intervall
ON/OFF

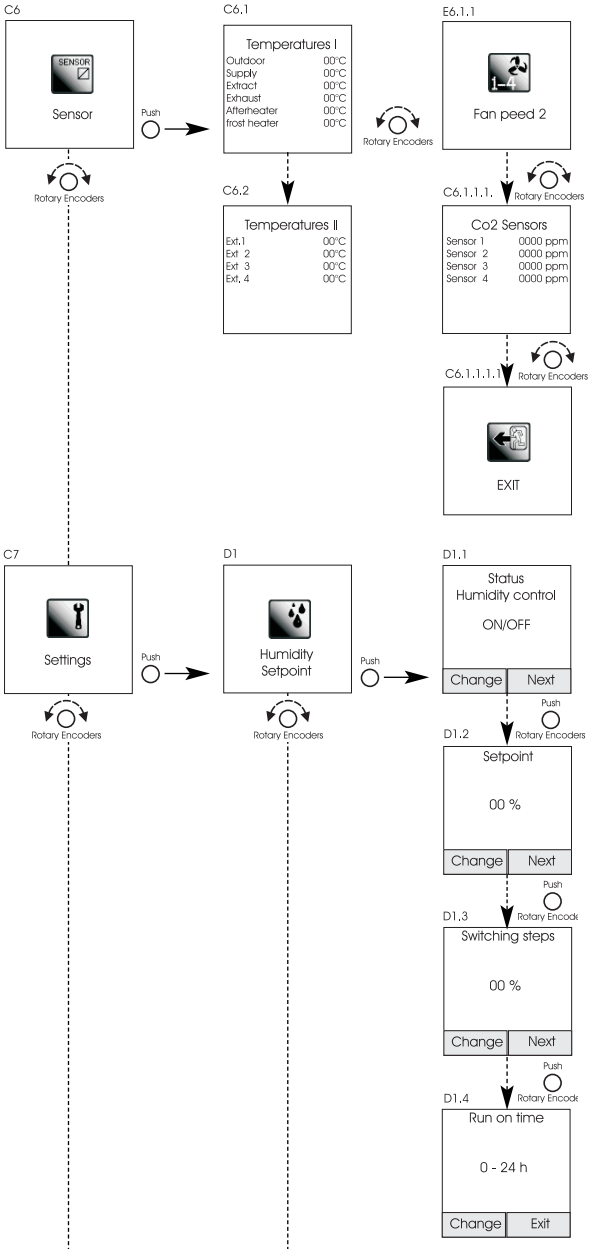
C5.5.2 = Interval time
1-24 h

C5.5.1 = Speed level
Level 1 to AB (extract air mode)

C5.6 = Activation period
1-300 minutes

C5.7 = Interval - Level
Level 1 to AB (extract air mode)

C5.8 = Automatic mode
If the vacation mode is active, the “end date” is displayed. The vacation program can be interrupted at any time via the feature “deactivate”!



C6 = Sensor values::
The following temperature values are displayed as standard:
Outside air, exhaust air, supply air, extract air
With attached accessory components e.g. CO2- or humidity sensor (max 4. sensors of each type), they are indicated in the display. If no sensors are connected the display indicates "---".
C6.1 = Temperatures I and II
alternates, as soon as external sensor is connected.
C6.1.1 = Humidity sensor
Humidity sensor 1-4
C6.1.1.1 = CO2-sensor
CO2-sensor 1-4

If no sensors are connected the display indicates "---".

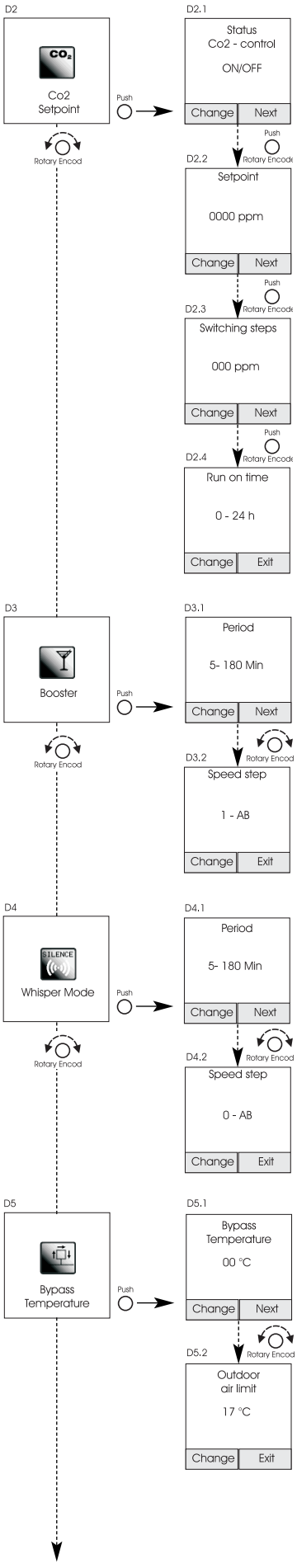
EXIT (C6.1.1.1.1)
Exit sensor menu

C7 = Settings:
Over menu „settings" several parameters can be installed individually.
D1 = Humidity set points:
D1.1 = Status humidity control
ON/OFF

D1.2 = Set point, 25 to 95 % r.F
Indicates the relative humidity in the room, which is to be considered as normal room climate. The unit is operated at fan speed 1 e.g., **60** % RH.
Factory setting: 60 % RH

D1.3 = Switching step, 5 to 20 % r.F
In low switching step (e.g. 5 %), the humidity control is more sensitive to changes in humidity, since the activation of the fan speed is faster
For example: Step 5 % means, that speed step 2 at set point + 5 % RH is activated (see table on page 9).
Factory setting: 10 % RH

D1.4 = Run on time, 0-24 hours
If the set point isn't achieved within 2 hours, the unit operates in the minimum speed step (0)/1 for the adjusted time (pause time 0-24 hours). This is to prevent that the unit does not stress the building with water vapour of saturated outside air (e.g. muggy weather) additionally with humidity.
Factory setting: 2 hours



D2 = CO_2-control:
The CO_2-control provides at high CO_2 -concentration (ppm) an increased air change in order to reduce high levels of CO_2 -concentration and thus to prevent fatigue and lack of concentration and headaches.
On delivery the CO_2-function is activated (factory setting: CO_2-set point 800 ppm, switching stage 100 ppm, run on time 2 hours).

D2.2 = Set point, 50 to 500 ppm:
Indicates the CO_2-concentration, which is to be considered as normal CO_2-value. The unit is operated at fan speed 1 e.g., **800** ppm.
Factory setting: 800 ppm

D2.3 = Switching step, 100 to 500 ppm:
The CO_2- control reacts to CO_2 changes more sensitively for a low switching step (e.g. 5 %), since the activation of the fan speeds is carried out faster (see example table 9).
Factory setting: 100 ppm

D2.4 = Run on time, 0 –24 hours:
If the set point isn't achieved within 2 hours, the unit operates on the minimum speed step (0)/1 for the adjusted time (pause time 0-24 hours). For example if the ventilation unit cannot exchange the CO_2-concentration in the room any more.
Factory setting: 2 hours

D3 = Booster:
The KWL EC 270/370 Pro can be operated via the menu point „booster" for a certain time (5-180 minutes) in a preset speed step. The display shows the time remaining (C1.1) in the booster mode, the mode can be interrupted at any time. The adjustment of fan speed, and the duration is set in the submenu D4.

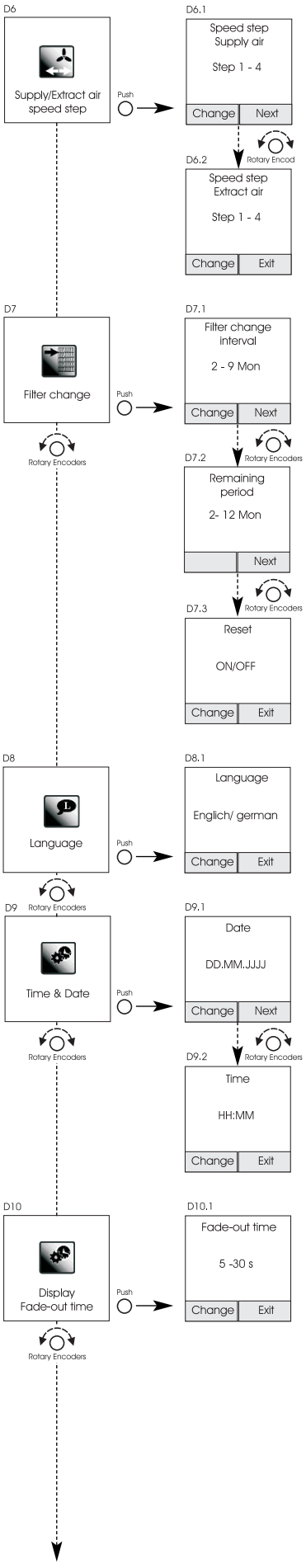
D3.1 = Speed step:
Level 1 to AB (extract air mode)

D4 = Whisper mode:
D4.1 = Period
5 - 180 minutes

D4.2 = Speed step
Level 0 to AB (extract air mode)

D5 = Bypass temperature
D5.1 = Bypass temperature 00 °C
The automatic bypass allows fresh air supply without heat recovery. This function is necessary, if the room air warms up through e.g. windows over the desired value. If the outside air is cooler than the ambient air, it can be used directly without heat recovery for cooling. If the outside air is colder than 17 °C, this function is prevented.
Bypass temperature is always minimum 3 °C higher than set point supply air (see point 3.2)

D5.2 = Outside air limitation
Possible setting of bypass temperature: 17 – 30 C°



D6 = Supply/extract air speed step
D6.1 = Speed step supply air
Step 1 to 4
Display is shown, if DIBt configuration is adjusted

D6.2 = Speed step extract air
Step 1 to 4

D7 = Filter change:
D7.1 = Replacement interval
Setting of filter replacement interval is between 2 to 9 months possible

D7.2 = Remaining term
The query of the remaining term filter change in the menu is available. If the filter is changed earlier, the remaining term will be reset. At expiration of the interval time a request appears to the filter change in the display!

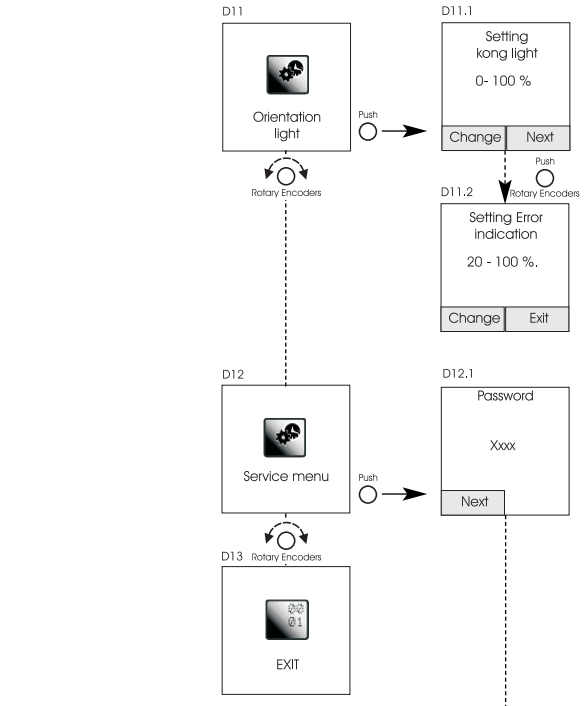
D7.3 = Reset
ON/OFF

D8 = Language:
D8.1 = Language
Setting of menu language: German, English, French or Italian.

D9 = Date and time:
D9.1 = Date
Setting of date and time

D9.2 = Time
Setting of hours and minutes

D10 = Display fade-out time:
D10.1 = Fade-out time
The display fade-out time can be set between 5-30 seconds. If the control element is not operated in this time, the lighting of the display expires. At the same time the rotating encoder lighting is activated.

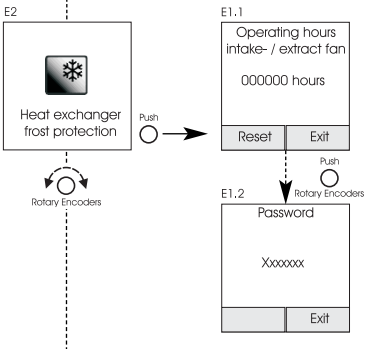


D11= Knob light (rotating encoder):
1. Location light:
- Blue lighted:
The lightness can be set between 0-100 %.

2. Error indication:
- Red lighted: The lightness can be set between 20-100 %.
If an error is present the knob (rotating encoder) is flashing red, when the display is off.

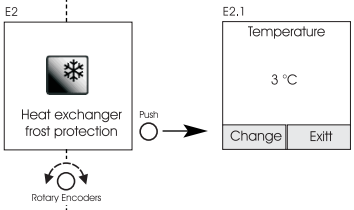
D12 = Service menu:
Setting menu for the specialist, here several parameters can be installed, e.g. adjusting of speed levels. *Password: 5255*
D12.1 = Password

D13 = Exit

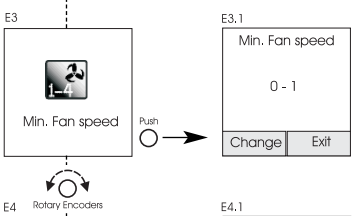


E1 = Operating hours display:
E1.1 = Operating hours Supply-/Extract air fan
Reset of operating hours only by manufacturer

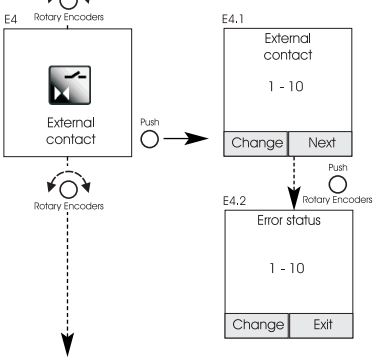
E1.2 = Password
Xxxxxxx
Password: *Will not be published !*



E2 = Heat exchanger frost protection:
E2.1 = Temperature +3 °C
Description see page 8, point 3.1.5
The temperature heat exchanger frost protection is the same as the temperature of the preheating.

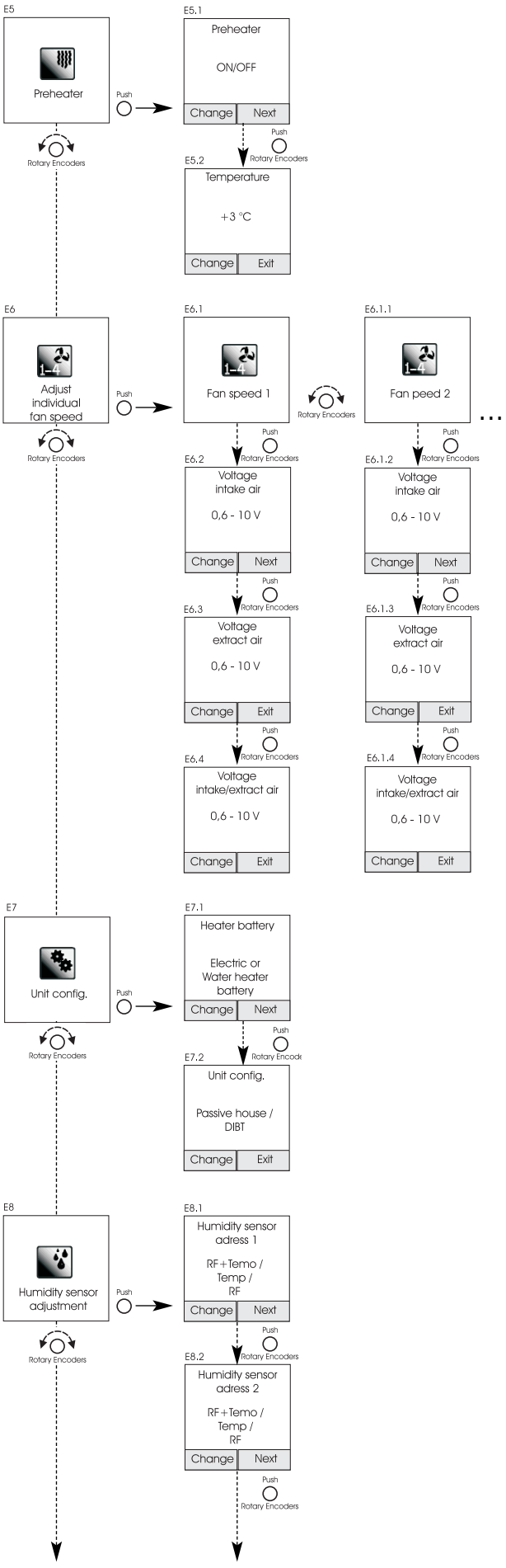


E3 = Minimum speed step:
E3.1 = Minimum speed step 0-1:
Setting of minimum speed step 1 or 0. If step 1 is selected, speed step 0 cannot be activated any more. Especially in rented apartments it can be guaranteed in such a way that the system is not switched off.



E4 = External contact error output:
E4.1 = Function external 1- 10
Function setting of potential-free contact
See table on page 8, point 3.1.8

E4.2 = Function error output
"not available"



E5 = Preheating
E5.1 = Preheating
ON/OFF
Description see page 6, point 3.1.1

E5.2 = Temperature 0 to 10 °C
The temperature preheating is the same as the temperature heat exchanger frost protection
Factory setting: +3 °C

E6 = Adjust individual speed steps
E6.1 = Step 1 to 4
Volume constant fans are installed in the units i.e. the fan regulates independently in order to achieve the set air flow volume (capacity). If adjustments should be necessary nevertheless, an adjustment of the flow rates can take place over the menu. As in the performance curves to be seen, the volume and the voltage 1.7 V to 10 V are indicated on the x axis (see page 21).

E6.2 = Voltage supply air fan
0,6-10 V
Configuration DIBt
Factory setting: Step1 = 2,5 V, Step 2 = 5 V, Step 3 = 7,5 V, Step 4 = 10 V

E6.3 = Voltage extract air fan
0,6-10 V
Configuration DIBt
Factory setting: Step1 = 2,5 V, Step 2 = 5 V, Step 3 = 7,5 V, Step 4 = 10 V

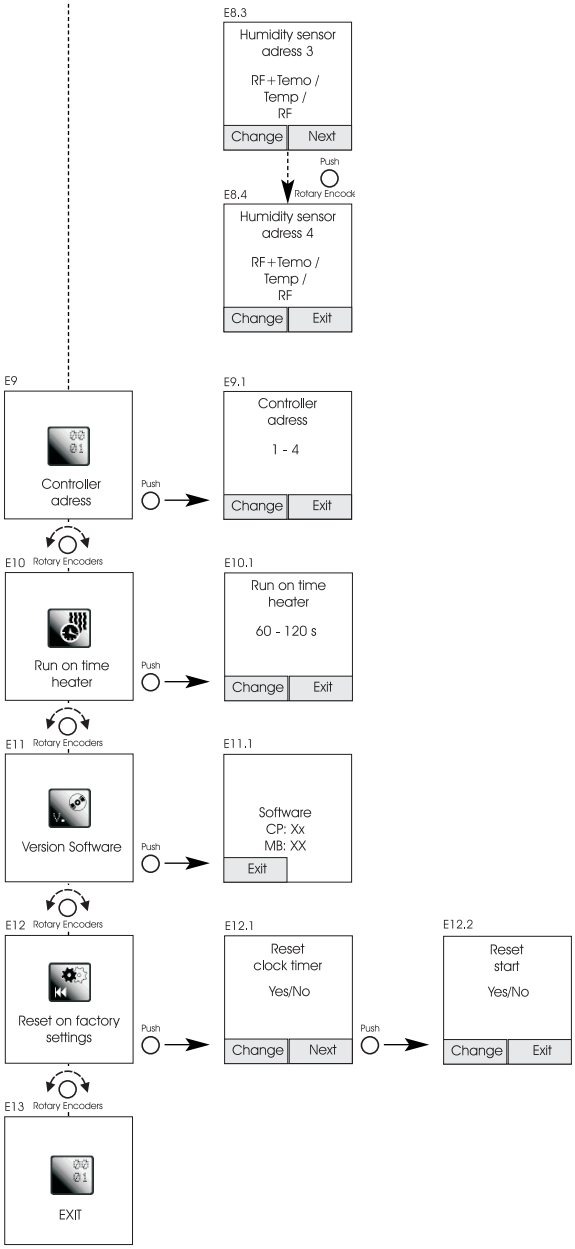
E6.4 = Supply-/Extract air fan
0,6-10 V
Configuration Passive House Institute
Example: Performance curve KWL EC 270 Pro: 200 m³ equals 6,2 V.
This value can be set in the submenu to the corresponding level.

E7 = Unit configuration
E7.1 = Configuration
EH-Electric heater battery
WW-Water heater battery
No heating

E7.2 = Configuration
Passive House /
DIBt approval

E8 = Sensor setting Humidity
E8.1 = Humidity sensor KWL-FF 270/370, address 1
Humidity/Temperature/Humidity and Temperature
Display available only if at least one external sensor KWL-FF 270/370 is attached.
The address is set in the menu „address controller“

E8.2 = Humidity sensor address 2
Humidity/Temperature/Humidity and Temperature
The address is set in the menu „address controller“



E8.3 = Humidity sensor address 3
Humidity/Temperature/Humidity and Temperature
The address is set in the menu „address controller“

E8.4 = Humidity sensor address 4
Humidity/Temperature/Humidity and Temperature
The address is set in the menu „address controller“

E9 = Controller address
Setting of controller address; there is the possibility to attach up to 4 controllers. For this every controller must have its own address, address 1 to 4.

E10 = Run on time Pre-heater / heater
E10.1 = Run on time supply air fan
60-120 seconds
During the run on time, the supply air fan runs on highest speed
Factory setting: 60 seconds

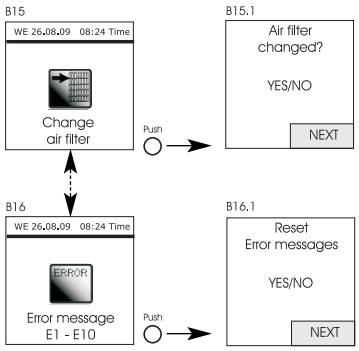
E11 = Version Software
E11.1 = Software Version
Current state of installed software
Controller element BT:
Power element LT:

E12 = Reset to factory setting
E12.1 = Reset weekly clock
YES/NO
All parameters can be reset to factory setting. If the preset weekly program is to remain, this can be adjusted optionally.

E13 = EXIT

4.2 Error menu/Error indication in the display

The red LED (rotating encoder) flashes in case of unit failure



Change air filter (B15)
Air filter changed (B15.1)
YES/NO

Error message E1-E10 (B16)
Reset error message (B16.1)
YES/NO
See error description page 24, point 6.7

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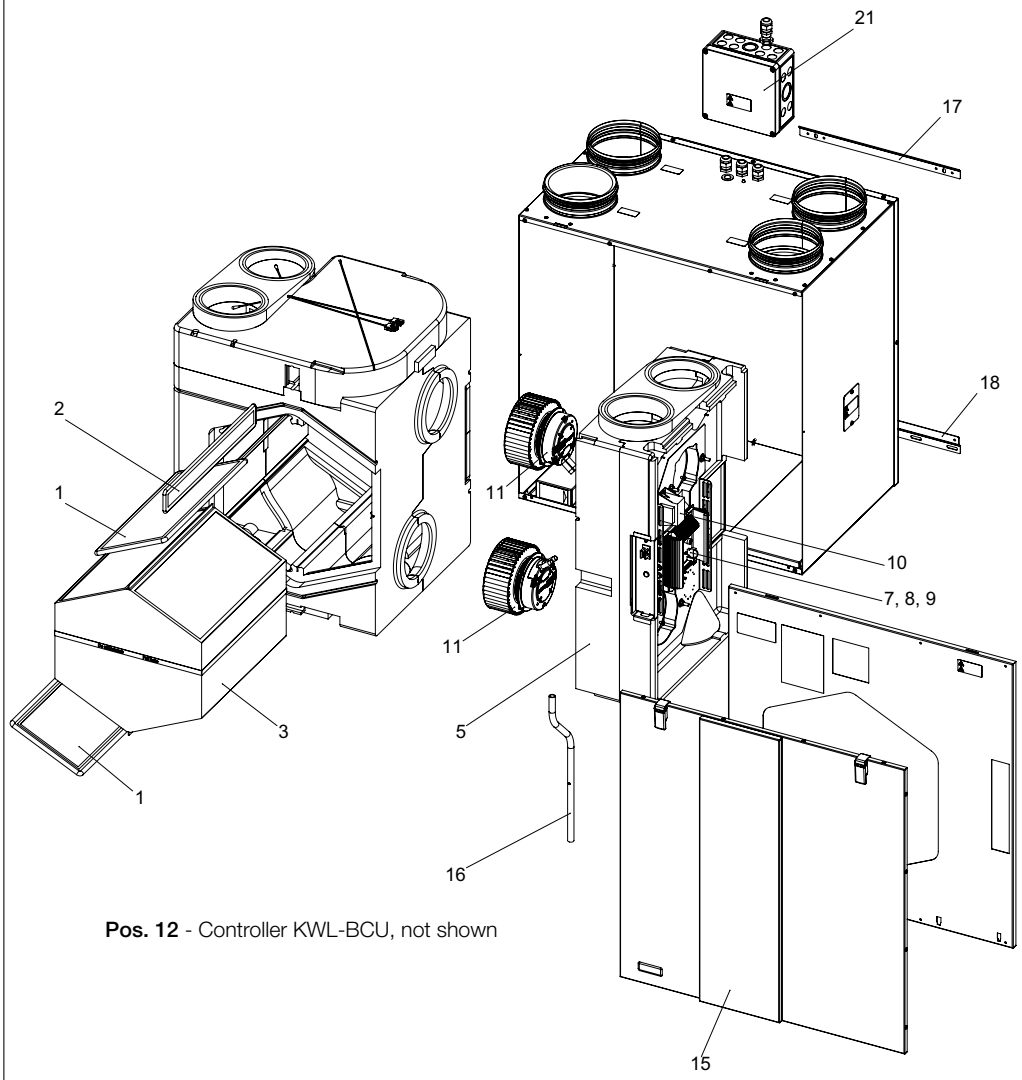
CHAPTER 5

COMPONENTS
DIMENSIONS
ADJUSTMENT

5.0 Components

fig.14



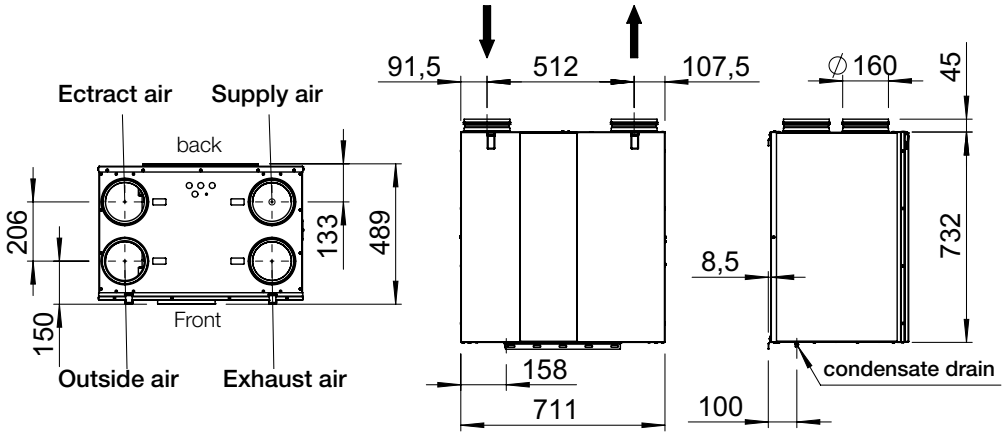
Pos. 12 - Controller KWL-BCU, not shown

KWL EC 270/370 Pro right/left					
Pos.	**Indication**	**Ref.No.**	**Pos.**	**Indication**	**Ref.No.**
1	Supply air filter G4	09613	11	Centrifugal fan	-----
2	Bypass air filter G4	09617		- Centrifugal fan ø 140 (KWL EC 270)	84707
3	Heat exchanger	84695		- Centrifugal fan ø 160 (KWL EC 370)	84708
4	-------	-------	12	Controller KWL-BCU	09955
5	Motor unit Pro	-------	13	-------	-------
	· Motor unit (KWL EC 270 Pro right)	84700	14	-------	-------
	· Motor unit (KWL EC 270 Pro left)	84701	15	Casing door	------
	· Motor unit (KWL EC 370 Pro right)	84702		· Casing door (KWL EC 270/370 ECO right)	84712
	· Motor unit (KWL EC 370 Pro left)	84703		· Casing door (KWL EC 270/370 ECO left)	84713
6	-------	-------	16	Condensate drain pipe	84714
7	Mainboard Pro	86671	17	Upper wall mounting rail	84715
8	Fuse Type: M315/250V - 5x20	84704	18	Lower wall mounting rail	84716
9	Battery Type: CR2032 - 3V	84705	19	-------	------
9	Transformer	84706	20	-------	------
10	-------	-------	21	Terminalbox casing cover Pro (plastic)	84717

fig.: right-hand side unit

5.1 Dimensions

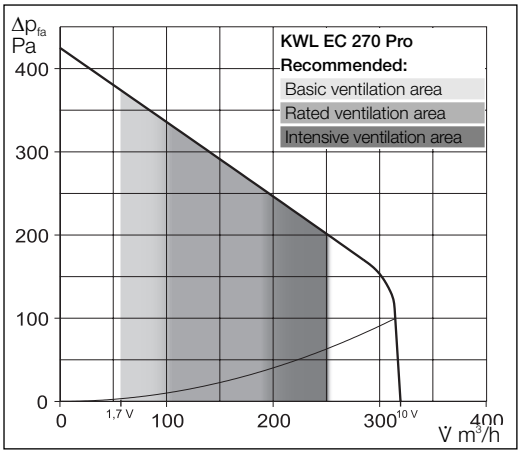
KWL EC 270/370 Pro L Left-hand side unit **fig.15**

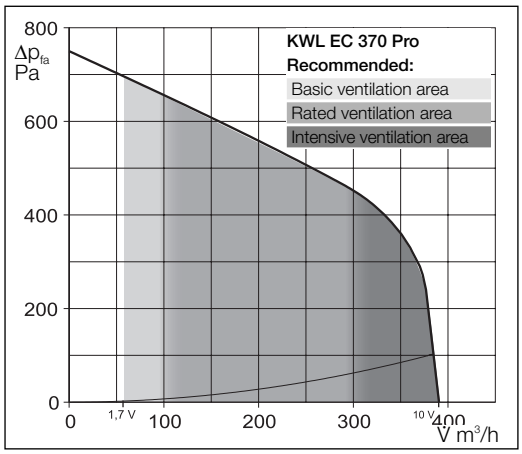


Dimensions in mm

5.2 Adjustment

Adjusting the performance curve values, indicating the recommended ventilation area.





Model calculation:

$$\text{calculation I} = \frac{\text{air flow rate max. - air flow rate min.}}{\text{control voltage 10V - control voltage 1,7V}}$$

$$\text{calculation II} = \frac{\text{debit air flow rate - air flow rate min.}}{\text{calculation I}}$$

required control voltage = control voltage 1,7V + calculation II

Example: Step by step explanation

1. Setting of nominal flow rate to DIN 1946-6

Speed level 2: Required e.g. _ _ m³/h
Factory setting e.g. _ _ m³/h

a.) Determination of set point from table as shown opposite
b.) Setting at the controller
- *Rotate as far as "Settings" (C7) > confirm (push)*
- *Rotate as far as "Service menu" (D12) > confirm (push) Enter password: 5255*
- *Rotate as far as "Adjust individual speed level" (E6) > confirm (push)*
- *Rotate as far as " Level 2" (E6.1.1) > confirm (push)*
- *Rotate as far as "Voltage supply-/extract air fan" (E6.1.4) > confirm (push)*

Change: Set read off or calculated voltage (applies for both fans)

2. Adjust supply-/extract air valves

with set speed level 2, according to the calculations to DIN 1946-6 (e.g. KWL easyPlan)

Air flow rate	KWL EC 270 Pro	KWL EC 370 Pro
[m³/h]	[VOLT]	
60	1,7	1,7
80	2,4	2,2
85	-	-
90	-	-
100	3	2,7
120	3,7	3,2
140	4,3	3,7
160	5	4,3
180	5,6	4,8
200	6,3	5,3
220	6,9	5,8
240	7,6	6,3
260	8,2	6,8
280	8,9	7,3
300	9,5	7,8
315	10	8,2
340	-	8,9
360	-	9,4
385	-	10

UK

CHAPTER 6

SERVICE/MAINTENANCE

WARNING ⚠

6.0 Service and maintenance

⚠ All work must be carried out with the equipment fully isolated from the power supply!
Danger by electrical impact, mobile parts (fan) and hot surfaces.

6.1 Cross counter flow heat exchanger

Open both upper snap-fits of front cover and remove this. Pull-out heat exchanger from unit as shown in Fig. 17.
For cleaning vacuum the fins with a vacuum cleaner.

NOTE ☞

Do not clean cross counter flow heat exchanger with water!

NOTE ☞

When installing insert heat exchanger into guide rail and push up to limit stop (Fig.18).
Pullout-strip may not rest on seal! (Fig.17, Pos.1)

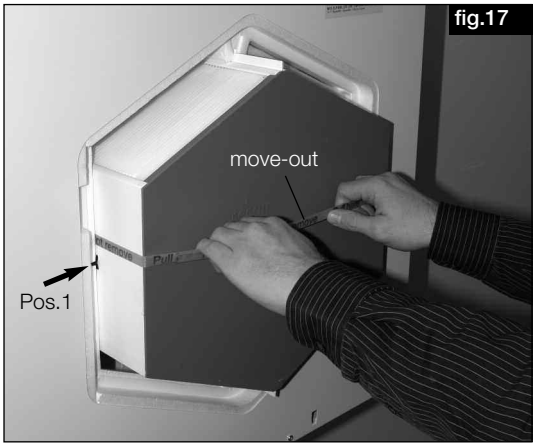


fig.17

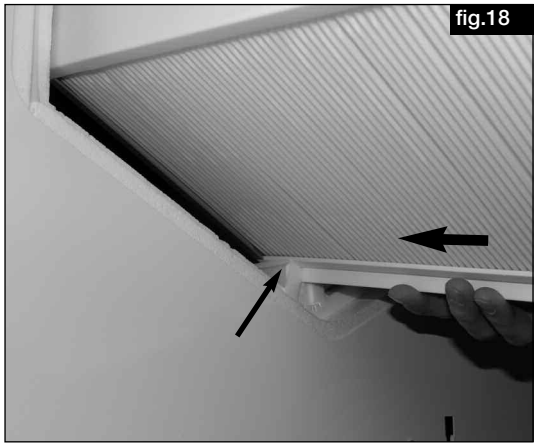


fig.18

6.2 Filter change

In order to change the filters open both upper snap-fits of front cover and remove this. The inspection opening at the front of the compact unit permits an easy filter change of outside, extract and bypass filter (Fig.19). Optionally are supply and bypass filter in class F7 available (Fig.20)

NOTE ☞

When using F7 filters, pay attention on air flow direction arrows on the filter labels! The air flow direction is shown on the unit label (Fig. 20).

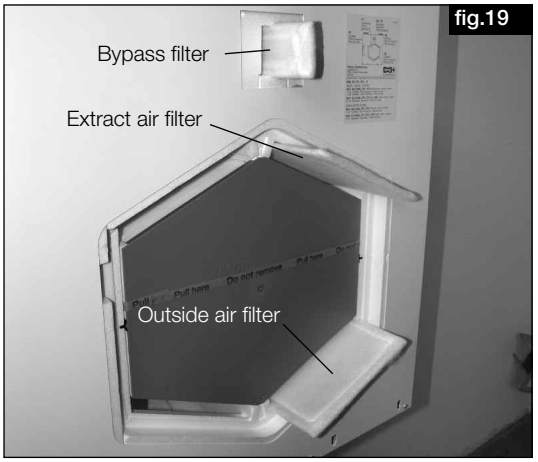


fig.19

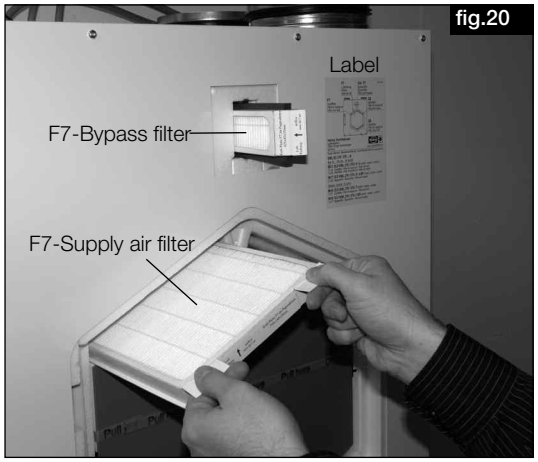


fig.20

– Filter

The KWL compact unit is equipped with outside and extract air filter class G4 as standard (to DIN EN 13779):

• Outside air/extract air:

Spare filter G4	**ELF-KWL 270/370/4/4**	**Ref.No. 09613**
Spare filter fine filter F7	**ELF-KWL 270/370/7**	**Ref.No. 09614**
Bypass filter G4	**ELF-KWL 270/370/4/4 BP**	**Ref.No. 09617**
Bypass-filter F7	**ELF-KWL 270/370/7 BP**	**Ref.No. 09618**

NOTE ☞

The filters are to be checked regularly (see controller display, factory setting every 6 months) depending on the degree of pollution (development of mildew), to be cleaned if necessary. By vacuuming once or after a maximum of 1-year operation they must be replaced for hygienic reasons.
If the filters should be moist or mouldy, they must be changed immediately!

6.3 Condensation outlet

In connection with maintenance, e.g. in autumn before beginning of the heating season, make sure that the condensation outlet (Ø 10 mm) in the bottom reservoir is not clogged (Fig.6). You may check it by pouring a little water into the reservoir.

ATTENTION ☞

Do not let water flow into electrical parts!

6.4 Access to internal terminal box

The inspection opening on the side (Fig.21) to the internal terminal box guarantees free access to the electronics (battery, fuse or DIP-switch setting (Fig.22)). The inspection opening of the right hand version is located on the left side, with the left hand version on right side.


fig.21

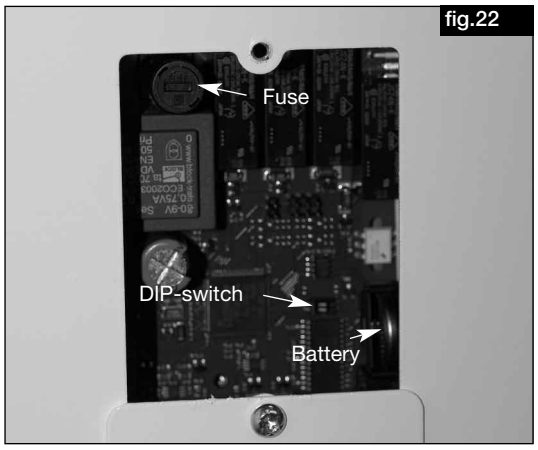


fig.22

6.5 Dismounting EPS-interior with motor unit

In order to dismount the EPS-interior (with motor and heat exchanger unit), the intermediate panel in the casing (six screws) must be removed (Fig.23).

NOTE ☞

Before pulling out the EPS-interior, take off condensate hose (Fig.24).


fig.23

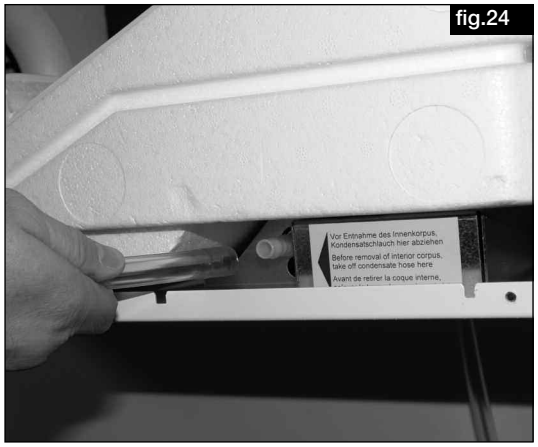


fig.24

Hold the heat exchanger guide rails and pull out the EPS-interior from the metal casing (Fig.25).
The connection cable has to be pulled along eventually.

NOTE ☞

Do not pull on the leading edges of the EPS-interior, since these can break out!
Unplug it and remove EPS-interior (Fig.26).


fig.25


fig.26

6.6 Installation of EPS-interior with motor unit

Proceed when assembling the EPS-interior oppositional to point 6.5. Make sure the cables are installed properly (Fig. 27). Finally insert EPS-interior evenly to a complete stop into the casing (Fig.28).


fig.27

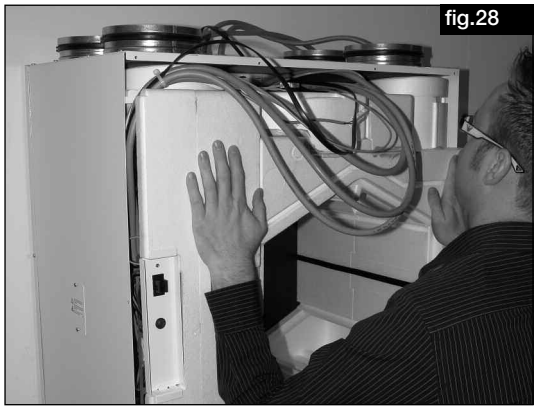


fig.28

Attach condensate hose (Fig.29) and lay it in the intended guide groove (Fig.30).

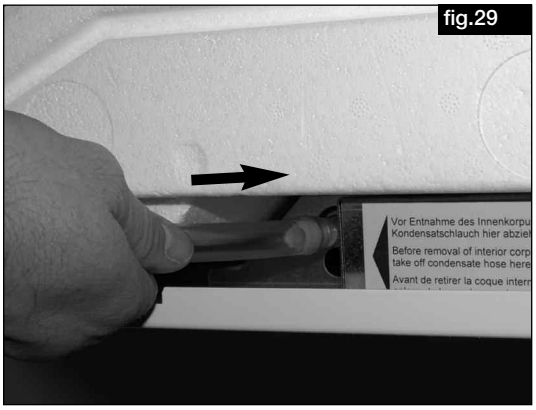


fig.29

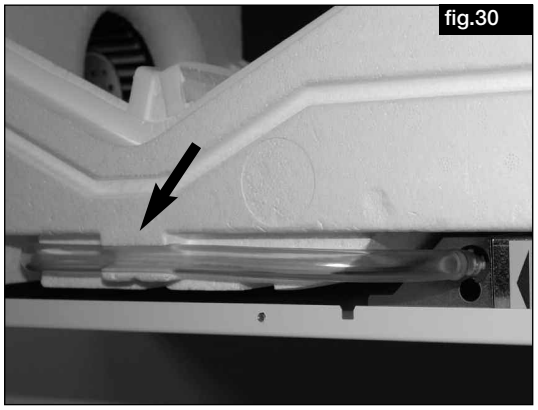


fig.30

6.7 Error messages/Alarm signals

Warning and/or alarm notes are displayed at the controller as follows:

Display notification	Error message	Cause	Reset
E1	speed monitoring supply air fan	– defective motor – defective impeller – cable break	Reset error message „E1“! YES (see point 4.2)
E2	speed monitoring extract air fan		
E13	thermal cutout (STB) Pre-heater has released	– polluted filter – to low air flow rate – defective main board	reset only via mains cut-off possible! (see instruction manual EHR-R)
E14	supply air temp. below +5 °C	serves only as reference	self-dependant (see point 3.1.5)
E15	frost protection heat exchanger	– polluted filter – to low air flow rate – defective main board	self-dependant
E3	sensor break	– extract-,supply-, or outside air sensor not connected or defective	Reset error message „E1“! YES (see point 4.2)

6.8 Accessories

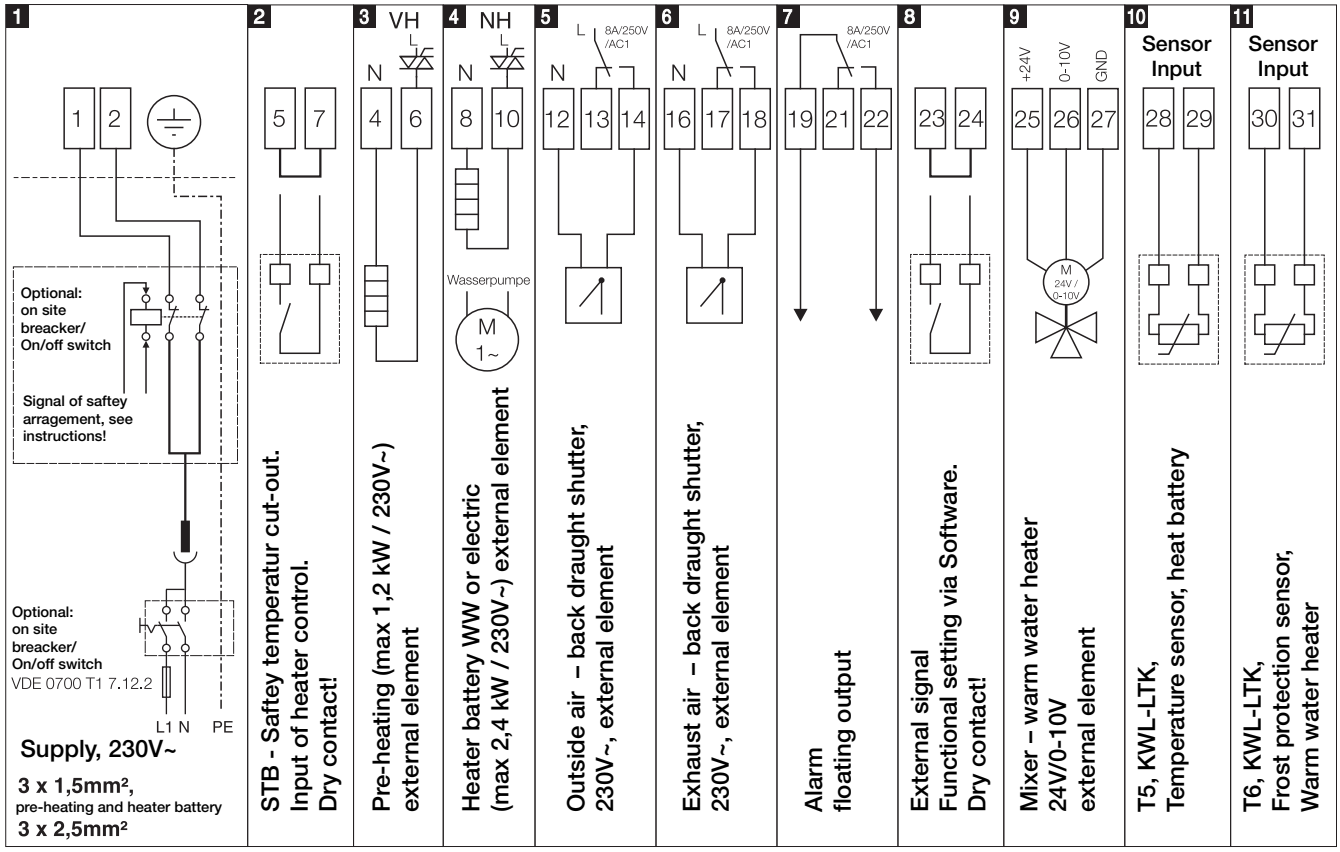
KWL BCU	Ref.No. 9955	**Controller (for flush mounting)** incl. 3 m connecting cable
KWL BCA	Ref.No. 9956	**Controller (for surface mounting)** incl.3 m connecting cable
EHR-R 1,2/160	Ref.No. 9434	**Pre-heater battery 1,2 kW,** diameter 160 mm
EHR-R 2,4/160	Ref.No. 9435	**Heater battery 2,4 kW,** diameter 160 mm
WHR 160	Ref.No. 9481	**Water heater battery,** diameter 160 mm
KWL-LTK	Ref.No. 9644	**Duct sensor** for heater battery
WHSH 1100 24V (0-10V)	Ref.No. 8819	**Temperature regulating system** for water heater battery
LFBR 160 G4	Ref.No. 8578	**Pre-filter** for pre-heater battery
KWL-CO_2	Ref.No. 9958	**CO_2-sensor** to detect CO_2-concentration of the room air
KWL-FF 270/370	Ref.No. 9953	**Humidity sensor** to detect humidity of the room air
KWL-ALA	Ref.No. 9460	**Wye junction board** to connect optional units
KWL-AL 10	Ref.No. 9444	**Connecting cable** (length 10 m)
KWL-AL 20	Ref.No. 9959	**Connecting cable** (length 20 m)

6.9 Wiring diagram SS-943

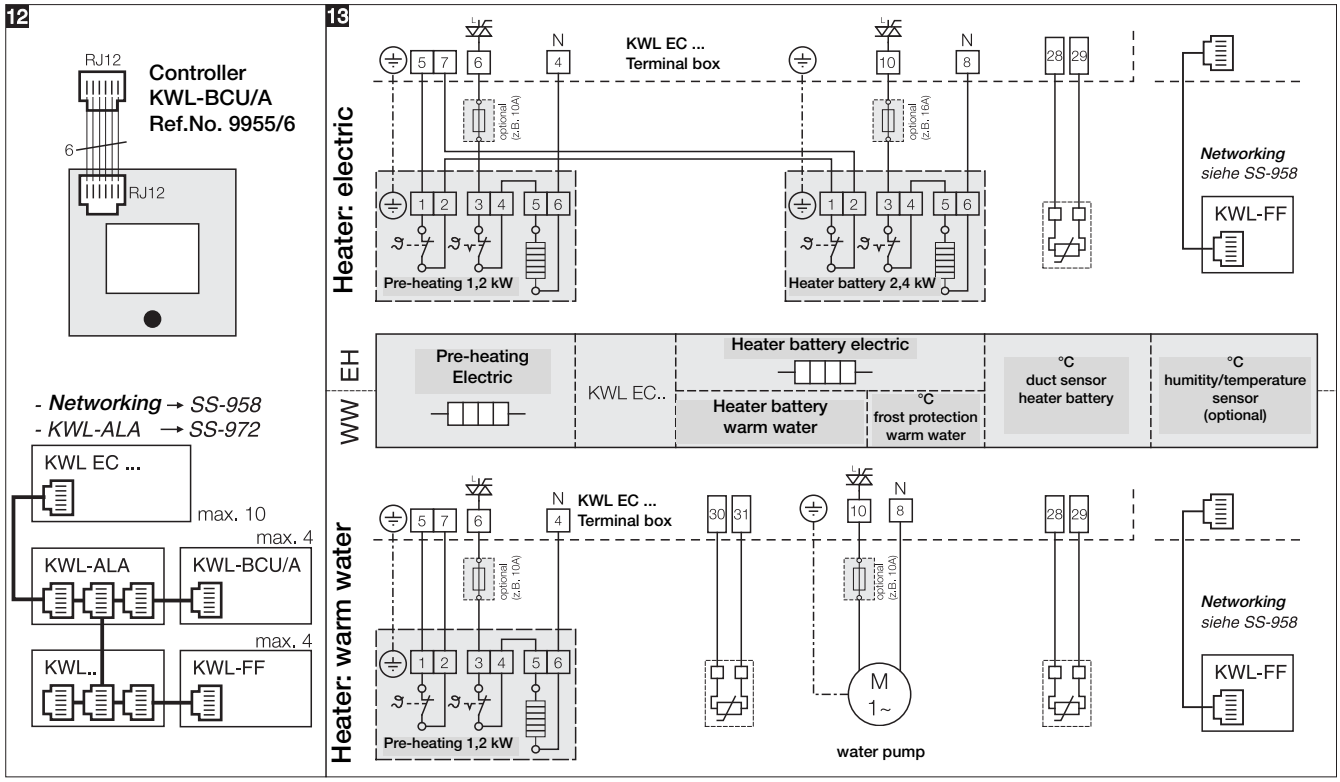
fig.31

KWL EC 270/370 Pro

Terminal box at the unit



Connection RJ 12 input Example heating connection



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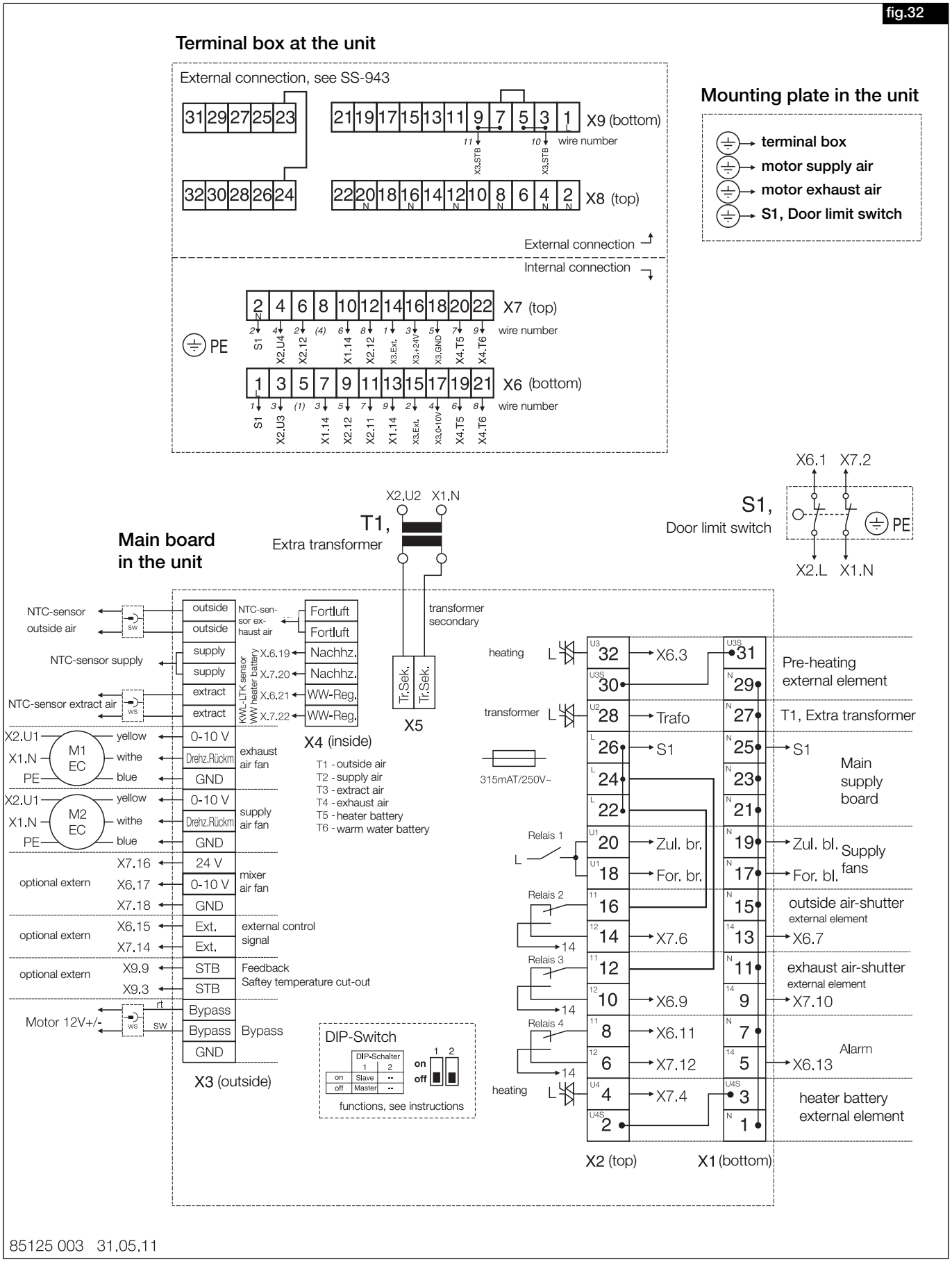
6.10 Wiring KWL EC... Pro

fig.32



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Notes:

Alle Abbildungen ohne Gewähr!
Als Referenz am Gerät griffbereit aufbewahren!

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