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Assembly and Operating Manual

Air handling unit with heat recovery

ETA 600 H30/31
ETA 600 H36/37

ETA 1200 H30/31
ETA 1200 H36/37

ETA 2400 H30/31
ETA 2400 H36/37

English

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The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification.
It must be remembered that our products are subject to a natural process of wear and aging.

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The picture on the cover shows an example configuration. The product supplied may therefore differ from the illustration.

The original manual has been produced in the German language.

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ruck **Ventilatoren GmbH** Max-Planck-Str. 5 D-97944 Boxberg-Windischbuch **Tel.** +49 7930 9211-0 **Fax** +49 7930 9211-150 info@ruck.eu

Assembly and Operating Manual

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EC Declaration of Conformity

As required by EC Directive

Electromagnetic Compatibility (EMC) Directive 2004/108/EC

The manufacturer ruck **Ventilatoren GmbH**
Max-Planck-Strasse 5
D-97944 Boxberg
Tel.: +49 (0)7930 9211-100

declares herewith that the following partly completed machines in their conception and design, and in the versions marketed by us comply with the requirements of the named EC directives. In the event of any changes to the partly completed machine not approved by us, this declaration loses its validity.

Product designation: **Air handling unit with heat recovery**
Type designation: **ETA 600, 1200, 2400 F / V / H**

The following harmonised standards were used:

DIN EN 61000-6-2: 2005 Electromagnetic Compatibility (EMC) - Part 6-2: Generic standards: Immunity for industrial environments.

DIN EN 61000-6-3: 2007 Electromagnetic Compatibility (EMC) - Part 6-3: Generic standards: Emission standard for residential, commercial and light-industrial environments.

CE Declaration of Incorporation

in accordance with the Machinery Directive (2006/42/EC)

The manufacturer ruck **Ventilatoren GmbH**
Max-Planck-Strasse 5
D-97944 Boxberg
Tel.: +49 (0)7930 9211-100

herewith declares that the following product:

Product designation: **Air handling unit with heat recovery**
Type designation: **ETA 600, 1200, 2400 F / V / H**

complies with the basic requirements of the Machinery Directive (2006/42/EC), Annex I, Sections 1.1.2, 1.1.3, 1.1.5, 1.2.1, 1.3.1, 1.3.2, 1.3.4. and 1.5.1.

The partly completed machine also complies with all requirements of the Low Voltage Directive (2006/95/EC) and the Electromagnetic Compatibility Directive (2004/108/EC).

The partly completed machine shall only be taken into service when it has been established that the machine in which the partly completed machine is to be installed complies with the requirements of the Machinery Directive (2006/42/EC).

The following harmonised standards were used:

DIN EN 12100-1 Safety of machinery. Basic concepts, general principles for design. Part 1: Basic terminology, methodology.

DIN EN 12100-2 Safety of machinery. Basic concepts, general principles for design. Part 2: Technical principles.

DIN EN 60204-1 Safety of Machinery - Electrical Equipment of Machines, Part 1: General requirements.

The manufacturer undertakes to send the special documentation for the partly completed machine electronically to the relevant authority in an individual state on request. The special technical documentation to Annex VII Part B, which belongs to the machine, has been prepared.

Responsibility for this declarations rests with:
ruck **Ventilatoren GmbH**
Max-Planck-Strasse 5
D-97944 Boxberg

Boxberg, 19.10.2014

Andreas Seth
(Technical Director)

1. Important information

This manual contains important information on the safe and appropriate assembly, transport, commissioning, operation, maintenance, disassembly and simple troubleshooting of the product.
The product has been manufactured according to the accepted rules of current technology.
There is, however, still a danger of personal injury or damage to equipment if the following general safety instructions and the warnings before the steps contained in these instructions are not complied with.

- **Read these instructions completely and thoroughly before working with the product.**
- **Keep these instructions in a location where they are accessible to all users at all times.**
- **Always include the operating instructions when you pass the product on to third parties.**

1.1. Rules and regulations

Also observe the generally applicable, legal or otherwise binding regulations of the European or national legislation and the rules for the prevention of accidents and for environmental protection applicable in your country.

1.2. Guarantee and liability

ruck products are made to the highest technical standards in accordance with the generally recognized rules of the profession. They are subject to constant quality control and meet the relevant requirements when delivered. Because the products are being constantly developed, we reserve the right to make changes to the products at any time and without prior announcement. We do not accept any liability for the correctness or completeness of this assembly and operating manual.
The warranty only applies to the delivered configuration. The warranty will not apply if the product is incorrectly assembled or handled or not used as intended.

2. General safety instructions

Planners, plant engineers and operators are responsible for ensuring that the product is installed and operated correctly.

- Exclusively use ruck fans in good technical order and condition.
- Check the product for visible defects, for example cracks in the housing or missing rivets, screws and covers.
- Only use the product within the performance range provided in the technical data.
- Protection against contact and being sucked in and safety distances should be provided in accordance with DIN EN 13857.
- Generally prescribed electrical and mechanical protection devices are to be provided by the client.
- Safety components must not be bypassed or put out of operation.
- The product may be operated by personnel with limited physical, sensory or mental capacities only if they are supervised or have been instructed by responsible personnel.
- Children must be kept away from the product.

2.1. Intended use

The ruck fan is a component in terms of the machine directive 2006/42/EC (partly completed machinery). The product is a not ready-for-use machine in terms of the machine directive.
It is intended exclusively for installation in a machine or in ventilation equipment and installations or for combination with other components to form a machinery or installation. The product may be commissioned only if it is integrated in the machinery/system for which it is designed and the machinery/system fully complies with the EC machinery directive.

Observe the operating conditions and performance limits specified in the technical data.

ruck ventilation products can be used to provide:

- Clean, dry air (no condensation) and non-aggressive gases with a maximum density of 1.2 kg/m³.
- Outside air and supply air
- The medium and room temperatures and the humidity range given in the technical data and on the rating plate.

Intended use includes having read and understood these instructions, especially chapter 2 “General safety instructions”.

2.2. Improper use

Any use of the product other than described in chapter “Intended use” is considered as improper.

The following points are improper and dangerous:

- Delivery of explosive and flammable media or operation in potentially explosive atmospheres.
- Delivery of aggressive and abrasive media.
- Delivery of media containing dust or grease.
- Installation outside without any protection against the weather.
- Installation in wet areas.
- Operation without the duct system.
- Operation with closed air connections.

2.3. Personnel qualifications

Assembly, commissioning, operation, disassembly and service (including maintenance and repair) require basic mechanical and electrical knowledge, as well as knowledge of the appropriate technical terms. In order to ensure operating safety, these activities may therefore only be carried out by qualified technical personnel or a person under the direction and supervision of qualified personnel. Qualified personnel are those who can recognize possible hazards and institute the appropriate safety measures due to their professional training, knowledge, and experience, as well as their understanding of the relevant conditions pertaining to the work to be done. Qualified personnel must observe the rules relevant to the subject area.

2.4. Safety instructions in this manual

In this manual, there are safety instructions before the steps whenever there is a danger of personal injury or damage to the equipment. The measures described to avoid these hazards must be observed.

Safety instructions are set out as follows:

Safety sign (warning triangle) - Draws attention to the risk.

- **Type of risk!** - Identifies the type or source of the hazard.

» **Consequences** - Describes what occurs when the safety instructions are not complied with.

→ **Precautions** - States how the hazard can be avoided.

Safety sign (warning triangle)	Consequence
	General warning! Indicates possible hazardous situations. Failure to observe the warnings may result in personal injury and / or damage to property.
	Electricity warning (hazardous voltage)! Indicates possible hazards due to electricity. Failure to observe the warnings may result in death, injury and/or damage to property.
	Hot surface warning! Indicates possible hazards due to high surface temperatures. Failure to observe the warnings may result in personal injury and/or damage to property.
	Finger-Crushing Warning! Indicates possible hazards due to moving and rotating parts. Failure to observe the warnings may result in personal injury.
	Overhead load warning! Indicates possible hazards due to overhead loads. Failure to observe the warnings may result in death, injury and/or damage to property.
	Follow important information! Instructions for safe, optimum use of the product.

2.5. Adhere to the following instructions

2.5.1. General instructions

- Observe the provisions for accident prevention and environmental protection for the country where the product is used and at the workplace.
- Persons who assemble, operate, disassemble or maintain ruck products must not consume any alcohol, drugs or pharmaceuticals that may affect their ability to respond.
- Responsibilities for the operation, maintenance and regulation of the product should be clearly determined and observed so that there can be no unclear areas of responsibility with regard to safety.
- Never overload the product. Never use it as a handle or step. Do not place anything on it.
- The warranty only applies to the delivered configuration.
- The warranty will not apply if the product is incorrectly assembled or handled or not used as intended.

2.5.2. During installation

- Disconnect all of the product's poles from the mains before installing the product or connecting or removing plugs. Make sure that the product cannot be switched back on again.
- Lay cables and lines so that they cannot be damaged and no one can trip over them.
- Before commissioning, make sure that all gaskets and seals in the plug-in connections are correctly fitted and undamaged in order to prevent fluids and foreign matter getting into the product.
- Information signs must not be changed or removed.

2.5.3. During commissioning

- Make sure that all electrical connections are either used or covered. Commission the product only if it is installed completely.
- The power switch must always be fully functional and easy accessible!

2.5.4. During operation

- Only authorized personnel is allowed to operate the setting mechanisms of the components or parts, under the provision that the system is used as intended.
- In an emergency, or if there is a fault, or other irregularities, switch the equipment off and make sure it cannot be switched back on again.
- The technical data given on the rating plate must not be exceeded.

2.5.5. During cleaning

- Never use solvents or aggressive detergents. Only clean the product using a slightly damp, lint-free cloth. Only use water to do this and, if necessary, a mild detergent.
- Do not use a high-pressure cleaner for cleaning.
- After cleaning, make sure that the product is working correctly again.

2.5.6. During maintenance and repair

- If operated correctly, ruck products only require a minimum amount of maintenance. Please follow all of the instructions given in section 10 in this respect.
- Make sure that no connections or components are loosened unless the device is disconnected from the mains. Make sure that the equipment cannot be switched back on again.
- Individual components must not be interchanged. For example, the components intended for one product may not be used for other products.

2.5.7. Disposal

- Dispose of the product in accordance with the currently applicable national regulations in your country.

2.6. Safety labels on the product

ETA 600 H
Heater

ETA 600 H
Electrical heating coil

ETA 1200 H
Heater

ETA 1200 H
Electrical heating coil

ETA 2400 H
Heater

ETA 2400 H + external electrical heating coil

- General warning

» Failure to observe the warnings may result in personal injury and / or damage to property.

→ Unauthorized repairs may cause personal injury and / or damage to property, in which case the manufacturer's guarantee or warranty will not apply.

- Electricity warning (hazardous voltage)!

» Failure to observe the hazard may result in death, injury or damage to property.

→ Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.

- Caution! Burning hazard.

» Failure to observe the hazard may result in personal injury and/or damage to property.

→ Do not touch the surface until the motor and heater have cooled.

- Never reach into the impeller or other rotating or moving parts.

» Failure to observe the hazard may lead to serious injury.

→ Work may only be performed once the impeller has come to a complete halt.

- Never reach into rotating or moving parts.

» Failure to observe the hazard may lead to serious injury.

→ Work may only be performed once the impeller has come to a complete halt.

- Never clean the internal space with flowing water or a high-pressure cleaner. Do not use aggressive or easily flammable products for cleaning (impellers/housing).

→ Only use mild soapsuds. The impeller should be cleaned with a cloth or brush.

Read the operating manual before commissioning the product.

Connections for the heating coils

Connection condensate drainage

Heat exchanger (Counter cross-flow heat exchanger)

Air filter (Panel Filter) Filter class F7

Air filter (Panel Filter) Filter class M5

Bypass

3. Delivery contents

Included in delivery depending on model type:

- ETA 600 H / ETA 1200 H / ETA 2400 H, Ventilation unit with heat wheel recovery
- 2 x ETALINE EC Tube Fan
- 1 x compact filter M5
- 1 x compact filter F7
- 1 x remote control with control cable 10m
- 1 x main heater (Hot water coil or electrical heating coil depending on the type)
- 1 x counter cross-flow heat exchanger
- 1 x bypass flap with actuator
- 1 x assembly and operating manual

4. Product and Performance description

The ETA unit is a ventilation unit with integrated cross-flow heat exchanger for optimum heat recovery. Large compact filters M5 / F7, hot water reheater or electric heater (depending on the type) and integrated regulation are integrated in the device. The device has a remote control for controlling and setting the operating parameters. The high quality housing consists of a frameless sheet metal structure with smooth internal and external walls. The housing is insulated with 40 mm (ETA 600 H) or 50 mm (ETA 1200/2400 H) mineral wool. There are no cold bridges. The unit can be operated at a constant volume. The Control using external sensors ensures the appropriate ventilation.

Data in detail:

- Frameless casing manufactured from galvanized steel sheet.
- Extractable counter cross-flow heat exchanger.
- Hot water coil or electrical heating coil (depending on the type)
- Extractable large compact filters M5 / F7.
- Controller installed, wired, ready to plug in.
- Main / Isolator switch
- External control unit with control cable.
- Protection class: in ceiling installation correct duct and cable connection, IPX4 (see 6.1. Permitted installation positions).

4.1. Device description

ETA H

Fig. 1
ETA 600 H

Legend

1. Housing
2. Door
3. Isolator switch
4. Socket
5. ETALINE EC tube fan
6. Cable glands
7. Rating plate
8. Connection heating coil
9. Connection supply air
10. Connection extract air
11. Connection condensate drainage
12. Remote control
13. Remote control cable
14. Hot water coil or electrical heating coil (depending on the type)
15. Supply air temperature sensor
16. Controller board
17. Safety labels
18. Switchboard cover
19. Actuator bypass damper
20. Extracted air temperature sensor
21. Air filter M5 - extract air
22. Counter cross-flow heat exchanger
23. Air filter F7 - supply air
24. Connection intake air
25. Connection exhaust air
26. Temperature sensor fresh air
27. Temperature sensor exhaust air

Fig. 2:
ETA 600 H

5. Transport and storage

Transport and storage should only be performed by specialist personnel in accordance with the assembly and operating manual and regulations in force.

The following points should be noted and followed:

- Check the delivery according to the delivery note to ensure it is complete and correct and check for any damage. Any missing quantities or damage incurred during transport should be confirmed by the carrier. No liability is accepted if this is not observed.
- The product weighs approx. 100 - 363 kg (depending on the product type in question). For weight see technical data
- It should be transported with suitable lifting equipment in the original packaging or on the transport equipment indicated.
- If transported with a forklift, it should be ensured that the product is resting with the basic profile or base frame completely on the forks or on a pallet and the product‘s centre of gravity is between the forks (see Fig.3).
- The driver must be authorized to drive a forklift.
- Do not go beneath the suspended load.
- Never lift and transport the unit by the door handles, covers or other mounting parts!
- Avoid damage or deformation of the housing.
- The product must be stored in a dry area and protected from the weather in the original packaging. Open pallets should be covered with tarpaulins. Even weatherproof modules should be covered because their weather resistance is only guaranteed after complete installation.
- Storage temperature between +5 °C and +40 °C. Avoid severe temperature fluctuations.
- If the product has been in storage for more than a year, check the smooth running of impellers and valves by hand.

Fig. 3:
Unit transported on a pallet with a forklift.

6. Assembly

Assembly work may only be performed by specialist personnel in accordance with the installation and operating manual and the regulations and standards in force.

The following points should be noted and followed:

- The foundation must be even and levelled. It must not exhibit unevenness or a slope in any direction.
- Suitable foundations are: full foundation in concrete, strip foundations or steel bearer structures. In the case of strip foundations and steel structures, it must be ensured that the machine base sits fair and square on the bearers. Steel structures must be sufficiently rigid for the size of the machine.
- Set up and align the machine with the aid of a water level. Only if the machine is horizontally installed can proper condensate drainage be guaranteed.
- Only suitable installation aids, in accordance with regulations, should be used.
- The installation should be easily accessible for maintenance and cleaning and should be easy to dismantle.
- The unit should only be installed with authorized and suitable fastening materials at all fastening points.
- Do not distort the unit when installing.
- The unit should be suitably secured.
- Just use the indicated mounting and fixing places. No holes should be made in the housing or any screws screwed into it.
- The duct system must not be supported on the housing.
- It is recommended that the duct system is attached with flexible connections or connection collars in order to isolate any structure-borne noise. For floor or wall mounting, all units should be mounted to isolate structure-borne noise.
- Make sure that the intake duct has direct access to the intake air.
  Warning: branches in the intake duct, to other fan units for example, may, if the dimensions are too small, lead to low pressure in the duct and therefore malfunction of the unit.
- The pressure loss in the duct system must not exceed the capacity of the unit! The pressure loss in the duct should not be more than 2/3 the unit‘s maximum pressure so that an adequate air output can still be achieved. This will prevent malfunction. Pressure losses in the duct system are adversely affected by: the length of the duct system, small duct cross-section, elbows, additional filters, valves, etc.

6.1. Permitted installation positions

Exclusive mounting in upright position, connection nozzles upwards. (Fig. 4)

Fig. 4:

6.2. Duct connections

Duct connections should be made such way that no condensate can get into the unit via the ducts.

- Insulate cold ducts in warm rooms
- Insulate warm ducts in cold rooms
- Ground heat exchangers should be equipped with a controlled condensate drain positioned before the unit

Duct connections should match nominal width NW. (see 15. Technical Data)

Fig. 5:
Connection air duct

6.3. Operating limits

Operating limits indoor installation

Fresh air temperature	-28 °C to +40 °C
Installation place:	+5 °C / max. 15g/kg

Operating limits outdoor installation

Fresh air temperature	-20 °C to +40 °C
Installation place:	-20 °C / max. 15g/kg
Extract air class EN 13779	ETA 1 / ETA 2

For the ventilation of rooms where the emission sources are human metabolism or building materials and structures, e.g. offices, spaces for public service, meeting rooms as well as in rooms where smoking is allowed.

6.4. Medium connections / Heating Coil

- Before connecting heating coil, the duct system must be thoroughly cleaned.
- Use only permitted sealants (DIN EN 751-2, DVGW tested).
- Water connections to be carried out as marked on the heat exchanger.
- When making pipe connections to the unit with screw connections, a wrench, for example, must be used to hold against the tightening torque.
- The connection must be executed without tension.
- Air bleeding must be done on site.
- All pipes and fittings of the medium connections must be insulated.

Fig. 6:
Bypass circuit

Hydraulic circuits
For air conditioning applications, there are three basic circuits:

Bypass circuit
With the bypass circuit, only the hot water is fed to the heating coil. The rest of the water supplied by the pump, bypasses the heating coil. This can lead to a temperature difference between top and bottom of the heating coil if the flow of water through it is very small. The resulting temperature gradients can lead to false temperature measurements in the duct or to draught effects in the room. The bypass circuit is usually used in air coolers. In air coolers, the air is partly cooled below the dew point and thereby dehumidified.

Fig. 7:
Admixture circuit

Admixture circuit
In the admixture circuit, the circulating pump always supplies the full amount of water required by the heating coil with an amount of hot water determined by the valve setting. The temperature is thus constant over the whole heating surface. The temperature control is thus much better. Furthermore, the risk of frost damage when the pump is running is reduced as the continuous circulation and increased pressure reduce the freezing point of the water.
The only advantage of the bypass circuit over the admixture circuit arises when the pipe lengths between three-way ball valve and water heater are very long. Because the pump is ahead of the valve, there is always hot water available at the valve that can be immediately fed to the heat exchanger if required. It is possible that the water in the pipe to the valve cools during admixture circuit. When heating is required there is a short delay before hot water gets into the heating coil.

Fig. 8:
Injection circuit

Injection circuit
The combination of these circuits is the injection circuit which is generally recommended.

Fig. 9:
Water seal height H

Δp_{st} [Pa]	H [mm]
300	60
400	60
500	66
600	76
700	86
800	97

Table 1: Water seal height H in siphon as a function off pressure.

6.5. Condensate drainage

- The counter cross-flow heat exchanger is equipped with a stainless steel condensate pan.
- A drainage connection from the condensate pan is brought out of the unit.
- To avoid corrosion, the drain pipe from this connection should be in stainless steel, copper or plastic.
- A siphon for negative pressure must be installed at the condensate drain pipe.
- The water seal height in the siphon depends on the pressure inside the unit, the minimum is 60 mm. For internal pressures above 400 Pa, please refer to the water trap heights in Table 1.

The water seal height can also be determined by calculation, provided the minimum of 60 mm is maintained:

Example calculation:

$\Delta p_{st} = \Delta p_t - \Delta p_d$

Δp_{st} = 500 Pa (see technical data)

1 mm water gauge equals 9,81 Pa

Legend

Δp_{st} = Static pressure [Pa]

Δp_t = Total pressure [Pa]

Δp_d = Dynamic pressure [Pa]

H = Water seal [mm]

Water seal H

H = Δp_{st} / 9,81 Pa/mm + 15 mm

H = 500 Pa / 9,81 Pa/mm +15 mm

H = 66 mm

For hygienic reasons, it is recommended to use the suitable siphon SYS 01 for the unit. This siphon provides sufficient water seal height and is equipped with a self-closing ball siphon.
The water seal height for on site siphons can also be determined by calculation, provided the minimum water seal height of 60 mm is maintained.

6.6. Ball siphon installation

Fig. 10:
ETA 600 H with ball siphon

Fig. 11:
System drawing
ball siphon
SYS 01

1. Connection with internal screw thread 1“ x 20
2. Union nut 1 1/2“
3. Combo gasket D = 40 (wedge-shaped)
4. Elbow pipe D = 40
5. Pipe D = 40 with union nut 1 1/2“, L = 450 mm
6. Gasket 1 1/2“ (flat)
7. Back-pressure valve
8. Round rubber gasket D = 48
9. Screw cap 1 1/2“
10. Back-pressure ball
11. Screw cap 2“

7. Electrical connection

- **Electricity warning (hazardous voltage)!**

» **Failure to observe the hazard may result in death, injury or damage to property.**

→ **Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.**

Electrical installation may only be performed by qualified electricians in accordance with the installation and operating manual and the national regulations, standards and guidelines in force:

- EN, DIN and VDE specifications, including all safety requirements.
- Technical connection conditions.
- Safety at work and accident prevention requirements.

This list does not claim to be complete.
Requirements should be applied under one's own personal responsibility.

- The electrical connections must be made as shown in the corresponding wiring diagrams and terminal diagrams.
- The type of cable, size of cable and method of laying should be determined by an authorized electrician.
- Low and extra-low voltage cables should be laid separately.
- An all-pole mains disconnection device with at least 3 mm contact gap must be provided in the supply line.
- Use a separate cable inlet for each cable.
- Any cable inlets that are not used must be sealed so that it is airtight.
- All cable inlets must have strain relief.
- Create equipotential bonding between the unit and the duct system.
- Check all protective measures after the electrical connection work (earthing resistance, etc.)

Connection compartment / Connections on the unit
The connection compartment is inside the unit. At first, remove the terminal box cover (see Fig. 12). Each lead that is connected must pass through a separate cable gland (see Fig. 13). For this, use the supplied cable glands, fittings and cover plate.
Cables that carry mains voltage must be fastened with the tension relief devices available.

Unit supply cable
Connect the mains supply cable as shown in the wiring diagram. For the dimensioning of the line, observe the unit's rating plate and the relevant guidelines. Suitable fuse protection should be provided.

The extra-low voltage control cables must be laid separately from the mains cables.

Fig. 12:
Connection compartment
(1) Controller board
(2) Switchboard cover

Fig. 13:
Cable glands
(3) Cable gland power supply
(4) Cable gland free
(5) Cable gland control unit

7.1. Overcurrent protection

- The unit may only be operated with the correct overcurrent protection.
- This must be established by a qualified electrician.
- The recommended protection is shown in the enclosed wiring diagram.
- Pre-fuse 16 A up to max. voltage of 240 V.

Type	Fuse protection
ETA 600 H30/31	1 x 16A
ETA 600 H36/37	1 x 16A
ETA 1200 H30/31	1 x 16A
ETA 1200 H36/37	3 x 16A
ETA 2400 H30/31	1 x 16A
ETA 2400 H36/37	3 x 16A

7.2. Description external inputs and outputs

Unit enabling
The unit can be switched on and off with an external potential-free contact (see wiring diagram). An external voltage must never be applied to this connection. The control system would be destroyed. Any devices providing a potential-free contact (e.g. central building control system) can be used to control the unit. This contact must be securely isolated from external voltages because otherwise dangerous conditions might occur in the event of a fault.

The extra-low voltage control cables must be laid separately from the mains cables.

Motion detector
A motion detector can be connected to the controller. When the contact is closed, the device changes to the operating mode „Intermittent ventilation“ with the preset follow-up time according to parameter 30.
External, potential-free contact.

Circulation pump enable
A circulation pump can be connected to the controller (see circuit diagram). If heating is required, the heating valve is opened by the controller and the circulation pump output is activated. Any pump connected must be inherently safe and block-proof.
Electrical connection with Vmax =230 VAC and Imax=2 A.

Fire detector
An external, potential-free fire detection contact switches the device off. The display indicates „Error fire protection“. This signals requires a manual reset.

Modbus RTU
The communication interface with Modbus RTU protocol is already integrated as standard. The central building control system can be connected directly to the integrated interface via Modbus. Multiple devices can be connected to the bus with an adapter board as accessory.
The unit can be visualized using the ruck view software software. All parameters, measured and set values can be controlled with ruck view.

3-way valve heating
Temperature control for the optional warm water heating coil, e.g. active heating to cover the heating demand by the ventilation system. Control output 3-position. Control output 230V.

3-way valve cooling
Temperature control for the optional cold water cooling coil, e.g. active outdoor air cooling by the ventilation system. Control output 3-position. Control output 230V.

0-10V heating
Temperature control for the optional warm water heating coil, e.g. active heating to cover the heating demand by the ventilation system. Parallel to the 3-position output
The power supply for the 3-way valve must be field installed.

0-10V cooling
Temperature control for the optional cold water cooling coil, e.g. active outdoor air cooling by the ventilation system. Parallel to the 3-position output
The power supply for the 3-way valve must be field installed.

Unit malfunction
If there is a unit malfunction, an error message appears on the display and at the same time switches a relay. A closing and opening signal is available (see wiring diagram). Electrical connection of the changeover contact with U - 230 VAC and Imax = 2A. (There is not any double insulation on the mains cables).

Frost protection thermostat
An external frost protection thermostat is connected to the control system. When the temperature undershoots the set-point, the dampers close, the circulation pump starts running and the heating valve opens. If the set value is not reached after 20 minutes, the unit switches off completely and the control unit indicates an error.

External 0 - 10V input
An external measuring transducer can be connected to the 0 - 10V input for demand controlled ventilation. Fan control according parameters in chapter 9.4. Commissioning level.

External pressure sensor
Two pressure sensors can be connected to the control unit for the operation with constant pressure control. One sensor for extract air pressure, one sensor for supply air pressure.

Cooling system enable
A floating, normally open contact is provided to enable a cooling unit (see circuit diagram). If cooling is required, the contact is closed. Electrical connection with Vmax=230 VAC and Imax=6.3 A. (there is no double insulation from the mains). If cooling is required, the contact is closed. Electrical connection with Vmax=230 VAC and Imax=2 A. There is no double insulation from the mains.
If the set value is reached, if the supply air temperature sinks below 16°C, the contact will be opened.

Control unit
The control unit is connected to the supply air unit‘s control system with a control cable.
A connector on the control cable is plugged directly into the socket on the control unit from beneath (see Fig. 14). On the unit, the control cable is first fed through a cable gland (see Fig. 13), placed in the cable duct and then connected to the RJ10 socket provided in the controller board. The control cable must not be shortened. Any excess length must be stowed outside of the housing. If the cable is too short, extensions can be ordered from the manufacturer or supplier. Alternatively, a 4-wire data cable with 120 Ohm resistance can also be connected. This is fed through the back wall of the control unit and connected to the spring-loaded terminals. In the unit, instead of being connected to the controller board in the RJ10 socket, the cable is connected in the spring-loaded terminals next to it (see wiring diagram).

8. Commissioning

- **Electricity warning (hazardous voltage)!**
» **Failure to observe the hazard may result in death, injury or damage to property.**
→ **Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.**

- **Never reach into the impeller or other rotating or moving parts.**
» **Failure to observe the hazard may lead to serious injury.**
→ **Work may only be performed once the impeller has come to a complete halt.**

- **Caution! Burning hazard.**
» **Failure to observe the hazard may result in personal injury and/or damage to property.**
→ **Do not touch the surface until the motor and heater have cooled.**

Commissioning by trained technical personnel may only be performed after any risk has been ruled out. The following checks should be performed in accordance with the installation and operating manual and the regulations in force:

- Correctly sealed installation of the unit and duct system.
- Check the duct system, unit and medium lines, if present, remove any foreign bodies if necessary.
- The intake opening and inflow into the unit must be clear.
- Check all mechanical and electrical protection measures (e.g. earthing).
- Voltage, frequency and type of current must correspond with the rating plate.
- Check all electrical connections and wiring.
- Check any electrical, switching, safety and control devices connected.
- The unit may not be switched on when the housing is open.
- Measure electricity consumption at operating speed and compare with the rated current.
- Check the fan for excessive vibrations and noise generation.

9. Operation

9.1. Control unit

The control unit enables the control and input of the unit's various functions. The control unit has an integrated temperature sensor (set-point sensor) for measuring the room temperature. The display shows the various operating parameters and error messages. You can select individual menu points or change values with the various buttons.

Fig. 14:
Control unit

1) M — Mode button — Switches to the control unit parameter menu. Change-over operating menu to basic menu (Escape).

2) ⏻ — ON/OFF button — Button for switching the unit on or off or switching to menu management.

A) ▲ ▼ — Button **A**: Can be used to increase or reduce the set-point temperature in the status display or to switch through the individual operating menus or operating parameters.

B) ▲ ▼ — Button **B**: This allows setting the values of the individual operating menus or operating parameters.

3) Control cable

4) Display

Battery

CO2 control active

Timer active

Temperature

Filter

Fan stage

Humidity

9.1.1. Adjustment of the control unit parameter

To be able to make changes to the control unit parameter, you must press the „Mode button“ (M) for at least 5 seconds. P 1 will appear on the display. Use button A (▲) to change to your desired parameter.

P 1 Unit control system
This parameter shows the software version number.

P 2 Language setting
Use button A (▲) to change to parameter language setting P 2. Now press button B (▲) and the control unit will change to input mode. You can now use buttons A (▲ and ▼) to select the language required.
Press button B (▲) again to accept the language selected.
Then press the „Mode button“ (M) for at least 2 seconds. The parameters will be saved and the menu will close. The display switches into operating mode.
Depending on the application, the devices are delivered with language selection 1 or 2.

9.2. Overview menu management

ruck.eu VENTILATOREN

Commissioning level (trained personnel)

Parameter level (trained personnel)

Minimum set-point value

Maximum set-point value

Enable

I - component

P - component

Temperature correction

Address

Baud rate

Fan calibration supply air

Fan calibration extract air

Parameter settings Menu

» *Explanations of parameters P 1 to P 30 see 16.1. list of parameters.*

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9.3. Display user level

Constant 4 sec
hold down

You move to the user level by pushing and holding the ON/OFF button for approx. 4 seconds. The display then changes to the volumetric flow. The individual menu points can be called up with buttons A (▲ and ▼) on the control unit. Press the „Mode button“ (M) once to go back to the start functions and the status display.

```
↓            400 m³/h
400 m³/h     ↑
```

▲
A
▽

Actual value volumetric flow
Display of the actual running volumetric flow.
↓ Volumetric flow outside air - supply air
↑ Volumetric flow extract air - exhaust air

```
↓  20,0°   OUT 21,0°
IN 21,0°   ↑   22,0°
```

▲
A
▽

Temperatures
Display of the currently prevailing air temperatures in the device.

↓	»	Outside air - temperature
IN	»	Supply air - temperature
↑	»	Extract air - temperature
OUT	»	Exhaust air - temperature

```
ROOM TEMPERATURE
21,0°          V 1.0
```

▲
A
▽

Room temperature
This shows the value of the current room temperature, measured by a temperature sensor in the control unit.

The value after V shows the software version of your unit.

```
▒ SUPPLY AIR    88 PA
▒ EXTRACT AIR   92 PA
```

▲
A
▽

Pressure loss at the filter
Display for the current pressure loss at the filters.

```
UNUSED            ↑
0011001011001111
Pos. 15 13 11 9 7 5 3 1
     16 14 12 10 8 6 4 2
```

▲
B
▼

▲
A
▽

Control unit outputs
Display of the assigned outputs on the control unit.
The individual outputs can be interrogated with buttons B (▲ and ▼).
The selection is made from right to left.

Description:
0 = no relay connected
1 = relay connected

Position:	Consequence:	Description:
1	unimplemented	UNUSED
2	unimplemented	UNUSED
3	1 = on	ENABLE COLDNESS
4	1 = opening	BYPASS OPEN
5	1 = closing	BYPASS CLOSE
6	1 = opening	HEAT.VALVE OPEN
7	1 = closing	HEAT.VALVE CLOSE
8	1 = on	CIRCULATOR PUMP
9	1 = error	FAULT RELAIS
10	1 = closing	AIR FLAP CLOSE
11	1 = opening	AIR FLAP OPEN
12	1 = opening	COOL.VALVE OPEN
13	1 = closing	COOL.VALVE CLOSE
14	1 = on	HEATING
15	1 = on	ENABLE FRQ CONVERTER
16	unimplemented	UNUSED

```
UNIT UNABLE       ↓
0000000000001111
Pos. 15 13 11 9 7 5 3 1
     16 14 12 10 8 6 4 2
```

▲
B
▼

▲
A
▽

Control unit inputs
Display of the assigned inputs on the control unit.
The individual inputs can be interrogated with buttons B (▲ and ▼).
The selection is made from right to left.

Description:
0 = false
1 = true

Position:	Consequence:	Description:
1		UNIT ENABLE
2	1 = OK	FRQ. CONVERT.FAULT
3	1 = OK	MOTOR PROTECTION
4	1 = OK	FROST PROTECTION
5		MOTION DETECTOR
6	1 = OK	FIRE PROTECTION
7	unimplemented	UNUSED
8	unimplemented	UNUSED
9	unimplemented	UNUSED
10	unimplemented	UNUSED
11	unimplemented	UNUSED
12	unimplemented	UNUSED
13	unimplemented	UNUSED
14	unimplemented	UNUSED
15	unimplemented	UNUSED
16	unimplemented	UNUSED

Hours of operation
The current number of hours for which the unit has been in constant operation.
- Value x 10 in hours.

Filter change counter
Number of filter changes made. The value rises automatically whenever a filter has been correctly changed.
More information and notes on changing the filter are given in Section 10.3.2. „Air filter“ in this manual.

9.4. Commissioning level (trained personnel)

Setting the current time / day

From the status display, press button A (▲) and B (▲) for approximately 8 s to get to the menu for setting the current time and the current day of the week.

The display shows the current time and day set.

Above the „DAY“ display, there is a value indicating the current day of the week.

When the value is flashing, the value can now be set. Press buttons B (▲ and ▼) to set the current day of the week (see table). Press button A (▲) to confirm the set value.

On the display, the „hour“ now starts to flash. The hour is set by again pressing buttons B (▲ and ▼) and then confirmed with button A (▲). The display then moves to „minutes“ which can be set in the same way with buttons B (▲ and ▼) and confirmed with button A (▲).

Set	Day
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday
7	Sunday

Press the „Mode button“ (M) to go back to the status display.

1 **Setting control mode**
ETA-S: Constant volume flow control

When confirming constant air volume control, the following parameters have to be adjusted/checked.

P 13 ETA-S
Variable control with constant volume operation

P 29 ETA-TYP
H30 / H36 / V30 / V36 / F30 / F36
Factory setting

P 14 without external sensor
Constant air volume control active

P 14 SENSORTYPE
W/O EXT.SENSOR

▲ B ▽

P 14 SENSORTYPE
.....CO2

P 14 Sensor type CO2
Volumetric flow, demand controlled by CO2 of the extract air

▲ B ▽

P 14 SENSORTYPE
VOC

P 14 Sensor type VOC
Volumetric flow, demand controlled by external measuring transducer (VOC)

▲ B ▽

P 14 SENSORTYPE
EXT.REG.

P 14 External control
External volume flow control via 0 - 10 V input (see wiring diagram).

▲ A ▽ ▲ B ▽

P 14 SENSORTYPE
HUMIDITY

P 14 Sensor type humidity
Volumetric flow, demand controlled by external measuring transducer (humidity)

▲ A ▽ ▲ B ▽

P 23
0 V 0

P 23 and P 24
These settings can be found in the measuring range of the used measuring transducer. The measuring range is already preset for devices with integrated CO2 sensor.

▲ A ▽ ▲ B ▽

Example: Measuring area sensor 0 - 5000 ppm
P 23 = 0
P 24 = 5000

P 24
10 V 2000

▲ A ▽ ▲ B ▽

P 20
AIR QUALITY

▲ A ▽

P 20 Air quality
When using external measuring transducers, the maximum air flow rate can be adjusted by parameter P 20.
Example:

Class room	CO^2:	max. set-point e.g. 1400 ppm
	VOC:	max. set-point e.g. 1400 ppm

P 15 ↓ 300 m³/h
MIN.VENT
Factory setting

▲ A ▽ ▲ B ▽

P 16 ↑ 300 m³/h
MIN.VENT
Factory setting

▲ A ▽ ▲ B ▽

P 15 Minimum ventilation supply air / P 16 Minimum ventilation extract air
The volumetric flow can also be adjusted to „MINIMUM VENTILATION“ (night setback). This parameter is controlled using the timer switch or Level 1 and can be set across the entire air volume range.

P 17 ↓ 450 m³/h
BASIC VENT
Factory setting

▲ A ▽ ▲ B ▽

P 18 ↑ 450 m³/h
BASIC VENT
Factory setting

P 17 Basic ventilation supply air / P 18 Basic ventilation extract air
The designed volume flow for the „BASIC VENTILATION“ is set in m³/h on the control unit and regulated via the parameters P17 and P18 at Level 2 The volumetric flows can be individually set for supply and extract air. To achieve the correct building ventilation, the supply air volume must be adjusted according to the extract air volume. Complex adjustments are thus not necessary and the air volume for the building ventilation can be adjusted exactly.

P 19 ↓ 600 m³/h
SHOCK VENT
Factory setting

P 28 ↑ 600 m³/h
SHOCK VENT
Factory setting

P 19 Intermittent ventilation supply air / P 28 Intermittent ventilation extract air
The air handling unit runs on closing the external contact to the motion sensor and in Level 3 at the volume flows set in P19 and P28.

Continued on page 30!

2 ETA-P: Constant pressure control

OFF

Constant 6 sec
hold down

Factory setting

P 13 TYP
ETA-S

▲ B ▽

P 13 TYP
ETA-P

P 13 ETA-P Constant pressure control
Operating mode P is the common control mode for the operation with variable air volumes by variable air volume controllers. The desired supply and extract air pressure can be set with the control unit. Two pressure sensors SEN P are necessary for this operating mode. The device does not balance the air volume. We recommend a reheater for this operating mode to control the air volume balance.

P 15 ↓ 100 Pa
MIN.VENT

▲ A ▽ ▲ B ▽

P 16 ↑ 100 Pa
MIN.VENT

▲ A ▽ ▲ B ▽

P 15 Minimum ventilation supply air / P 16 Minimum ventilation extract air
The duct pressure can also be adjusted to „MINIMUM VENTILATION“ (night setback). This parameter is controlled by the timer and can be adjusted to the complete pressure range.

P 17 ↓ 150 Pa
BASIC VENT

▲ A ▽ ▲ B ▽

P 18 ↑ 150 Pa
BASIC VENT

P 17 Basic ventilation supply air / P 18 Basic ventilation extract air
The required duct pressure for „BASIC VENTILATION“ can be set in Pa with the control unit. The duct pressure can be individually set for supply and extract air.

Continued on page 30!

3 ETA-PV: Constant pressure control with balanced air volume

P 13 ETA-PV Constant pressure control with balanced air volume
The operating mode PV is set for air-tight low-energy houses with variable air volumes by variable air volume controllers. The device automatically balances the air volume when sections will be added on or switched off. The desired supply pressure must only be set on the control unit. A response of the air volume controller is not necessary.

P 15 Minimum ventilation supply air
The duct pressure can also be adjusted to „MINIMUM VENTILATION“ (night setback). This parameter is controlled by the timer and can be adjusted to the complete pressure range.

P 17 Basic ventilation supply air / P 18 Basic ventilation extract air
The duct pressure required for „BASIC VENTILATION“ can be set on the control unit in Pa. The extract air volume automatically follows up the supply air volume. Complex adjustments are thus not necessary and the air volume for the building ventilation can be adjusted exactly.

The following parameters for all 3 control modes:

P 21
ROOMTEMP.CONTROL

P 21 Room, supply or extract air temperature regulation
The room, supply air or extract air temperature regulator compares the air temperature measured at the temperature sensors with the reference temperature set on the control unit In the case of heating, a difference between the set-point and actual temperature causes the controller to increase or reduce the heat output.

P 21 Room temperature control
With room temperature control, any external heat source in the room will be taken into account and compensated for by a correction to the supply air temperature. The room temperature sensor is in the control unit.

▲ B ▽

P21
SUP.AIR TEMP.CON

P 21 Supply air temperature control
With supply air temperature control, the external heat source is not taken into account.
Fixed supply air temperature. No other adjustability.

▲ B ▽

P21
ETA TEMP. CTL

P 21 Extract air temperature control
With extract air regulation, any external heat source in the room will be taken into account and compensated for by a correction to the supply air. Fixed extract air temperature. No other adjustability.

▲ A ▽

P 22
HEATING

P 22 Heating
The air handling unit is operated in WRG mode and with a warm water heat register or external electric heat register*.
3-point control and 0 - 10 V

▲ B ▽

P22
COOLING

P 22 Cooling
The air handling unit is operated in WRG mode.
3-point control or 0-10V

▲ B ▽

P22
HEATING-COOLING

P 22 Heating and cooling
Only with option Warm water heating coil or Electric heater* and option cooling coil.
Heating: 3-point control or 0-10V
Cooling: potential-free contact ON / OFF and linear output 0-10V,
3-point control or 0-10V

▲ B ▽

P22 DX COIL
HEATING-COOLING

P 22 Heating and cooling (direct expansion)
Only with option Warm water heating coil or Electric heater* and option cooling coil.
Heating: 3-point control or 0-10V
Cooling: potential-free contact ON / OFF and linear output 0-10V,
3-point control or 0-10V

* The electric heaters are controlled by the internal bus.

Continued on page 31!

▲ A ▽

P25 SUPPLY AIR FILT
100 Pa

P 25 Supply air filter pressure loss
Setting for pressure loss at the supply air filter before the filter is clogged or 100% clogging is reached. The current level of clogging can be seen on the status display. The factory setting is 100 Pa. You might have to optimize the settings if a different type of filter is used.

▲ B ▽

▲ A ▽

P26 EXHAUST AIR FILT
100 Pa

P 26 Extract air filter pressure loss
Setting for pressure loss at the supply air filter before the filter is clogged or 100% clogging is reached. The current level of clogging can be seen on the status display. The factory setting is 100 Pa. You might have to optimize the settings if a different type of filter is used.

▲ B ▽

▲ A ▽

P27
CALIBRATE FILTER

P 27 Calibrate filter
Calibrating the pressure loss at the unclogged filter.
The calibrated value corresponds to 0% clogging.

▲ B ▽

P 27
COMPLETED

For the filters to be calibrated the whole ventilation system has to be set up and adjusted.
Pushing the B (▲) button opens automatically the calibration mode. Display flashes „FILTER CALIBRATION“ After calibration, the display shows „COMPLETED“.

▲ A ▽

P30 RUN-ON TIME
5 MINS

P 30 Follow-up time
This parameter sets the stop delay of the motion detector input. The device runs for intermittent ventilation with the adjusted time according to parameter 19 and 28.

▲ B ▽

9.5. Menu parameter level

Parameter values, see table 16.1. List of parameters.
You move to the parameter settings menu by pressing the ON/OFF button, which must be held down for approx. 9 seconds. The display then changes to „P 1 MIN-VALUE“. The individual menu points can be called up with buttons A (▲ and ▼) on the control unit. The values can be changed with buttons B (▲ and ▼). Press the „Mode button“ (M) to go back to the starting functions.

⏻
Constant 9 sec
hold down

P 1 MIN-VALUE
16,0 °

P 1 Minimum set-point value
Parameter P 1 gives the minimum set-point temperature that can be set on the control unit. Values between 16 °C and 20 °C can be selected. The default setting is 16 °C.

▲ A ▽ ▲ B ▽

P 2 MAX-VALUE
24,0 °

P 2 Maximum set-point value
Parameter P 2 gives the maximum set-point temperature that can be set on the control unit. Values between 20 °C and 30 °C can be selected. The default setting is 22 °C.

▲ A ▽ ▲ B ▽

P 3 ENABLE
AUTOMATED

P 3 Enable
Switching the unit on and off with an external contact
The unit must be switched on at the control unit.

▲ B ▽

P 3 ENABLE
AUTOMATED

Contact open. The unit is switched off.
Contact closed. The unit is switched on / ready for operation.

P 3 ENABLE
ACKNOWLEDGED

The unit can only be switched on if the contact is closed. If the contact is open, the display will show „NOT ENABLE“. The contact should be closed and then acknowledged with button B (▲).
The default mode is AUTOMATIC.

P 4 I - component
A value between 5-20 can be set for the I – component.
The factory setting is at 10.
If the value decreases, the control becomes more sensitive.
CAUTION! Due to highly sensitive settings, the control tends to pulsate.

P 5 P - component
A value between 5-20 can be set for the P – component.
The factory setting is at 10.
If the value increases, the control becomes more sensitive.
CAUTION! Due to highly sensitive settings, the control tends to pulsate.

P 6 Temperature correction
The room temperature sensor in the control panel may show minor differences with the actual prevalent room air. In this case, the control sensor can be corrected in the range from -5 °C to 5 °C.

P 7 Address
The bus address can be set between 1 and 247 with parameter P27 on the control unit.
Every device on a bus line needs an individual address.
Ensure that an address is not used for two devices. This can lead to malfunctions of the complete bus system.

P 8 Baud rate
The baud rate defines the data speed.
2400, 4800, 9600 and 14400 baud rates can be set.
1 stop bit (fixed), no parity

P 9 Fan calibration supply air

P 10 Fan calibration extract air

9.6. Menu functions

Switching the unit on/off on the control unit.
Press the ON/OFF button (1) to switch the unit on or off.
The unit's status now appears on the display with the current values.

» Set-point temperature display

» Time switch

» Contamination degree of the filters

» CO2 / VOC control

Changing the set-point temperature
When commissioning for the first time, a set-point value of 21 °C is given. This value is shown on the left-hand side of the display. The set-point value can be increased (▲) or reduced (▼) on the control unit using buttons A. *(The setting range is limited by parameters P 1 and P 2.)*

9.6.1. Time / Time switch

Setting the time switch

With the setting parameters for the time switch, the times when the unit is to come on (ON) or off (OFF) can be set individually for each day of the week.

From the status display, press button A (▲) and B (▲) to get to the menu for setting the time switch.

On the top line, the display flashes for the „hour“ in which the unit is to come on (ON) on day 1. Press buttons B (▲ and ▼) to set the „hour“ and then confirm the entry with button A (▲). The display then moves on to the „minutes“ which can be set in the same way with buttons B (▲ and ▼) and confirmed with button A (▲).
(The minutes are set in 5-minute increments)

On the bottom line, the display now flashes for the „hour“ in which the unit is to switch off on day 1. The „hour“ and „minutes“ are again set and confirmed with buttons B (▲ and ▼) and button A (▲).

Set	Day
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday
7	Sunday

Once the entry has been confirmed, the display moves on to day 2 where the individual on and off times can be set. Days 3 to 7 then follow.

Once you have set all of the parameters / days, press the „Mode button“ (M) to go back to the unit‘s status display.

However, you do not have to go through the whole time switch menu to get back to the status display. You can press the „Mode button“ (M) at any time to go back to the status display.

Note:

- If the time 0:00 is given in the parameters, the unit will not switch on or off.
  If, for example, you do not want the unit to come on during the weekend, you should set the value to 0:00 for „Day 6“ and „Day 7“.
- The values set are saved even when there is a power failure or if the battery in the control unit runs down. Only the current time and day of the week have to be reset.
  Note: Instructions on changing the clock battery are give in section 10.3.3.

Setting day - night switch-over

This menu has the same functions as the timer. The only difference is that the device is not switched on (ON) or off (OFF), but from day to night mode.
The device runs in day mode with the basic ventilation volume flow.
The device runs in night mode with the minimum ventilation volume flow.

On the display, push button A (▲) and B (▲) simultaneously for approx. 3 seconds to get to the menu for day-night switch-over.

The display flashes on the top line for the time point in which the device starts the night mode on day 1 (Monday). Press buttons B (▲ and ▼) to set the „hour“ and then confirm the entry with button A (▲). The display then moves on to the „minutes“ which can be set in the same way with buttons B (▲ and ▼) and confirmed with button A (▲).
(The minutes are set in 5-minute increments)

The display now flashes on the bottom line for the time point in which the device stops the night mode on day 1 (Monday). The „hour“ and „minutes“ are again set and confirmed with buttons B (▲ and ▼) and button A (▲).

Set	Day
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday
7	Sunday

Once the entry has been confirmed, the display moves on to day 2 where the individual on and off times can be set. Days 3 to 7 then follow.

Once you have set all of the parameters / days, press the „Mode button“ (M) to go back to the unit‘s status display.

However, you do not have to go through the whole time switch menu to get back to the status display. You can press the „Mode button“ (M) at any time to go back to the status display.

Note:

- If the time 0:00 is given in the parameters, the unit will not switch to night operation.
- The values set are saved even when there is a power failure or if the battery in the control unit runs down. Only the current time and day of the week have to be reset.
  Note: Instructions on changing the clock battery are give in section 10.3.3.

Switching the time switch on and off.

The time switch can be switched on and off as required.
From the status display you can switch the time switch on or off by pressing button A (▼) and B (▼) at the same time.

When the time switch is on, a continuous clock symbol is shown on the display.

Time switch on

Time switch off

Fig. 15:
Systematic drawing without timer settings

Fig. 16:
Systematic drawing for timer settings

Fig. 17:
Systematic drawing for timer and day-night switch-over settings

9.7. Functions

9.7.1 Fan error message contact

Each motor has an error message contact which is closed during fan operation. The unit switches off when the contact opens. After correction of the fault (see 14.2. Fault diagnosis chart), the unit can then be restarted.
The fans are each controlled by a EC-controller.
If a fault occurs regarding the fans or EC-controller, the device will switch off, and an error message will be displayed. To reset the EC-controller, the electricity supply must be switched off at the main switch for at least 20 s.

9.7.2 Hot water coil / frost protection

The power of the hot water coil is steplessly regulated with the heating valve. The installed heating coil is protected against icing by a frost-protection thermostat. If the supply air temperature drops below the temperature set on the anti-freeze controller, the valves close and the circulating pump runs constantly, the heating valve opens and a fault message is given. The device automatically runs „PRE-RINSING“ until heating provides the desired operation temperature. The unit restarts then automatically. If the desired operating temperature cannot be achieved after 20 min., an error message is displayed. Afterwards, the unit turns itself completely off until the fault is repaired. (see 14.2. Error table F07)

9.7.3 Safety temperature limiter for types with electrical heating coil

- **Electricity warning (hazardous voltage)!**
» **Failure to observe the hazard may result in death, injury or damage to property.**
→ **Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.**

Depending on the type and in case of a fault, the safety temperature limiter (STL) switches off the electrical heating coil when the temperature reaches 75 °C. Once the safety temperature limiter has been tripped, it has to be reset manually (see Fig. 18/19). Before resetting the STL and reinstalling the electrical heating coil, the cause for tripping of the STL needs troubleshooting and debugging.

Fig. 18:
Position reset button STL
ETA 600 H (1 STB)

Fig. 19:
Position reset button STL
ETA 1200 H (4 STB)

CAUTION: Tripping of the STL indicates no direct error message. (Possibly in conjunction with error F18.)
Possible cause for tripping of the STL:
- Regulation fault
- Relay fault
- Supply air fan failure
- Air duct is blocked

9.7.4 For version with electric heating module (EHM) ETA 2400

ETA2400…36 is fitted with an external electric heating module.

Air connections

When installing a heating module, the following must be observed:
- For the duct diameter transition, accessories are used.
- Fasten transition piece to the housing (Rotoline) with 4 hexagon-head bolts (M8x20).
- The heating module must maintain a minimum distance (L) of between 0.50m and 4.00m from the air handling unit.

1. Heating module
2. Air duct
3. ETA 2400 H36

Fig. 20:
Connection EHM to ETA 2400…36

Electrical connection

- **Electricity warning (hazardous voltage)!**
» **Failure to observe the hazard may result in death, injury or damage to property.**
→ **Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.**

Electrical installation may only be performed by qualified electricians in accordance with the installation and operating manual and the national regulations, standards and guidelines in force:
- EN, DIN and VDE specifications, including all safety requirements.
- Technical connection conditions.
- Safety at work and accident prevention requirements.

This list does not claim to be complete.
Requirements should be applied under one‘s own personal responsibility.
- The electrical connections must be made as shown in the corresponding wiring diagrams and terminal diagrams.
- The type of cable, size of cable and method of laying should be determined by an authorized electrician.
- Low and extra-low voltage cables should be laid separately.
- An all-pole mains disconnection device with at least 3 mm contact gap must be provided in the supply line.
- Use a separate cable inlet for each cable.
- Any cable inlets that are not used must be sealed so that they are airtight.
- All cable inlets must have strain relief.
- Create equipotential bonding between the unit and the duct system.
- Check all protective measures after the electrical connection work (earthing resistance, etc.)

Connection compartment / Connections on the unit
The connection compartment is inside the unit. You must first remove the side cover from the unit. Each lead that is connected must pass through a separate cable gland. The cable glands can be on either the left or the right side of the unit. Use the cable glands and fittings supplied for this purpose.

Unit supply cable
Connect the mains supply cable as shown in the wiring diagram. For the dimensioning of the line, observe the unit‘s rating plate and the relevant guidelines. Suitable fuse protection should be provided. A qualified electrician must determine the necessary fuse requirements.

Low voltage control leads must be installed so that they are separated from mains leads.

Control unit
First use the control cable (1) supplied with the heating module to connect the air handling unit (4) to the heating module (3). Connect the surplus control cable (2) from the air handling unit to the second RJ10 socket on the control board of the heater module (3). Then connect the other end of the control cable directly from below to the RJ10 socket on the control unit. The control cable must not be shortened. Any excess length must be stowed outside of the housing. If the cable is too short, extensions can be ordered from the manufacturer or supplier.

Fig. 21:
Connecting the control unit to the heating module

Commissioning

- **Electricity warning (hazardous voltage)!**
» **Failure to observe the hazard may result in death, injury or damage to property.**
→ **Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.**

- **Caution! Burning hazard.**
» **Failure to observe the hazard may result in personal injury and/or damage to property.**
→ **Do not touch the surface until the motor and heater have cooled.**

Commissioning by trained technical personnel may only be performed when any risk has been ruled out. The following checks should be performed in accordance with the installation and operating manual and the regulations in force:
- Correctly sealed installation of the unit and duct system.
- Check the duct system, unit and medium lines, if present, remove any foreign bodies if necessary.
- The intake opening and inflow into the unit must be clear.
- Check all mechanical and electrical protection measures (e.g. earthing).
- Voltage, frequency and type of current must correspond with the rating plate.
- Check all electrical connections and wiring.
- Check any electrical, switching, safety and control devices connected.
- The unit may not be switched on when the housing is open.

Operation

```
OFF
      ⌸   8
```

Heating module display
When the heating module is correctly connected, a symbol appears in the control unit display.
⌸

10. Maintenance and repair

10.1. Important notes

- **Electricity warning (hazardous voltage)!**
» **Failure to observe the hazard may result in death, injury or damage to property.**
→ **Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.**

- **Never reach into the impeller or other rotating or moving parts.**
» **Failure to observe the hazard may lead to serious injury.**
→ **Work may only be performed once the impeller has come to a complete halt.**

- **Caution! Burning hazard.**
» **Failure to observe the hazard may result in personal injury and/or damage to property.**
→ **Do not touch the surface until the motor and heater have cooled.**

Maintenance and repairs may only be performed by specialised personnel in accordance with this installation and operating manual and the regulations in force.

Do not repair defective or damaged units yourself, but report the damage or faults to the manufacturer in writing.

- **Unauthorized repairs may cause personal injury and / or damage to property, in which case the manufacturer‘s guarantee or warranty will not apply.**

10.2. Cleaning and care

Servicing, troubleshooting and cleaning may only be performed by specialised personnel in accordance with this installation and operating manual and the regulations in force.

If operated correctly, ruck products only require a small amount of maintenance.
The following work should be performed at regular intervals, in accordance with health and safety regulations:

- Check the operation of the control system and safety devices.
- Check electrical connections and wiring for damage.
- Remove any dirt from the fan impeller or impellers and from inside the fan housing in order to prevent any unbalance or reduction in output.
    1. Do not use aggressive or easily flammable products for cleaning (impellers/housing).
    2. Preferably only water (not flowing water) or mild soapsuds should be used.
    3. The impeller should be cleaned with a cloth or brush.
    4. Never use a high-pressure cleaner.
    5. Balancing clips must not be moved or removed.
    6. The impeller and fittings must not be damaged in any way.
- Check the operation of the bearing with a visual inspection and by checking running noise.
- Check the unit for leaks on the air side.
- Check the correct running of the counter cross-flow heat exchanger.

Before putting the unit back into operation after maintenance and servicing work, carry out a visual inspection as described in section 7 and 8.

10.3. Maintenance

10.3.1. Counter cross-flow heat exchanger

Counter cross-flow heat exchangers generally require no maintenance. For hygienic reasons, cleaning of the exchanger is occasionally recommended. Damage to the blades should always be avoided. Use warm, flowing water for cleaning.

Fig. 22:
Demounting counter cross-flow heat exchanger

10.3.2. Air filters

The differential pressure increases as one of the air filters becomes more clogged. When the pressure reaches the value set on the corresponding pressure sensor, this can be seen on the status display. The filter must be changed when the level of clogging reaches 100%. To reset the filter display after changing the filter, press buttons A (▲ and ▼) at the same time until the clogging level display shows 0% again. The filter change counter will then increase by one.
To ensure that the air filter is changed correctly, proceed as follows:

- The air filter can be removed without the use of tools.
- The air filter should be replaced if severely clogged.
- When changing the filter, make sure that the filter frame is sitting correctly on the guide rail in the device.
- Finally, the filter display should be reset and the new air filter calibrated (see Section 9.4. „Calibrate filter“)

Find filters positions in the device description or safety instructions.

Status display

Reset the display:

Fig. 23:
Position air filter

10.3.3. Changing the battery

Status display:

21,0°	1	0%
	8	0%

Display after changing the battery

21,0°	1	0%
	8	0%

The battery‘s operating capacity is checked when voltage is applied to the unit. A dead battery is indicated by a battery symbol in the status display.

Change the battery as follows:

- Remove the control cable (1) from the control unit.
- Open the control unit by removing the cover (2).
- The holder (3) for the battery is on the board. Remove the battery and replace it with a new one as shown in Fig. 24 C.
- The control unit can now be closed again and the control cable connected again.
- You only have to reset the current time (see Section 9.4.). The battery symbol disappears from the status display. Your control unit is fully functional again.

Note: requires a 3 V lithium CR 1616 button cell battery.

Fig. 24
(1) Control cable
(2) Control unit cover
(3) Battery holder

11. Modbus communication interface

11.1. Wiring diagram

Fig. 25:

11.2. Functions implemented

Function code	Name	Description
03 Hex	Read Hold Register	Read device parameter
04 Hex	Read Input Register	Read current value
06 Hex	Write Single Register	Write device parameter word by word
10 Hex	Write Multiple Register	Write several device parameters word by word

Function code	Name	Sub-function	Description
08 Hex	Return Query Dat	00	Send the received message back
08 Hex	Restart Communications	01	Restart communication
08 Hex	Force Listen Only Mode	04	Switch to listen-only mode

11.3. Parameter table

Register address	Protocol address	Parameter name	Value range	Data type	Authority
40001	0	Reserved		integer	R/W
40002	1	Minimum target temperature	160 - 200 corresponds to 16.0 - 20.0 °C	integer	R/W
40003	2	Maximum target temperature	200 - 300 corresponds to 20.0 - 30.0 °C	integer	R/W
40004	3	External error input	0 = Automatic start 5 = Start after acknowledgement	integer	R/W
40005	4	I - component of heating controller	5 - 20 5 = 0.5 min 20 = 2 min	integer	R/W
40006	5	P - component of heating controller	5 - 20	integer	R/W
40007	6	Temperature-correction sensor	-50 - +50 corresponds to -5.0 -+5.0 °C	integer	R/W
40008	7	Modbus address	1 - 247	integer	R/W
40009	8	Modbus baud rate	0 = 2400 ; 1 = 4800 ; 2 = 9600 ; 3 = 14400 Baud	integer	R/W
40010	9	Fan calibration supply air	800 - 1200	integer	R/W
40011	10	Fan calibration extract air	800 - 1200	integer	R/W
40012	11	Reserved		integer	R/W
40013	12	Reserved		integer	R/W
40014	13	Units	0 = Air volume control 1 = Pressure control 2 = Supply air pressure control Extract air volume control	integer	R/W
40015	14	External sensor type	0 = Constant air volume 1 = CO2 sensor 2 = VOC sensor 3 = Humidity 4 = Ext. control	integer	R/W
40016	15	Minimum ventilation supply air	See Table below or 50 - 500 Pa	integer	R/W
40017	16	Minimum ventilation extract air	See Table below or 50 - 500 Pa	integer	R/W
40018	17	Basic ventilation supply air	See Table below or 50 - 500 Pa	integer	R/W
40019	18	Basic ventilation extract air	See Table below or 50 - 500 Pa	integer	R/W
40020	19	Intermittent ventilation supply air	See Table below	integer	R/W
40021	20	External set-point (CO2, VOC, humidity))	CO2/VOC Range of values 600 - 1500PPM / Humidity Range of values 20 - 90 %	integer	R/W
40022	21	Type of regulation	0 = Room temperature 1 = Supply-air temperature 2 = Outlet-air temperature	integer	R/W
40023	22	Function (heating – cooling coil)	0 = Heating (Water) 1 = Cooling (Water) 2 = Heating and cooling (Water) 3 = Heating water and cooling direct expansion	integer	R/W
40024	23	Min. value when analogue input 0V external sensor	0 - 500 for CO2 and VOC sensor 0 - 50 Humidity	integer	R/W
40025	24	Max. value when analogue input 10V external sensor	0 - 5000 for CO2 and VOC sensor 0 - 100 Humidity	integer	R/W
40026	25	Sensor contamination filter 1	0 - 500 Pa Pressure loss	integer	R/W
40027	26	Sensor contamination filter 2	0 - 500 Pa Pressure loss	integer	R/W
40028	27	Calibrate filter	1 = Calibrate filter	integer	R/W
40029	28	Intermittent ventilation extract air	See Table below	integer	R/W
40030	29	ETA TYPE	0=H30 1=H36 2= V30 3=V36 4=F30 5=F36	integer	R/W
40031	30	Follow-up time motion detector	60 - 3600 sec	integer	R/W
40032	31	Target temperature	Minimum - maximum target temperature in 1/10 degree	integer	R/W
40033	32	Ventilation change-over	1 = Minimum ventilation 2 = Basic ventilation 3 = Intermittent ventilation	integer	R/W
40034	33	Status and control word	See Table below	integer	R/W
40035	34	Reserved		integer	R/W
40036	35	Save parameters	12439 Value change after saving under 0	integer	R/W

Register address	Parameter name	Value range		
		ETA 600	ETA 1200	ETA 2400
40016	Minimum ventilation supply air	250 - 600 m³/h	500 - 1200 m³/h	800 - 2400 m³/h
40017	Minimum ventilation extract air	250 - 600 m³/h	500 - 1200 m³/h	800 - 2400 m³/h
40018	Basic ventilation supply air	250 - 600 m³/h	500 - 1200 m³/h	800 - 2400 m³/h
40019	Basic ventilation extract air	250 - 600 m³/h	500 - 1200 m³/h	800 - 2400 m³/h
40020	Intermittent ventilation supply air	250 - 600 m³/h	500 - 1200 m³/h	800 - 2400 m³/h
40029	Intermittent ventilation extract air	250 - 600 m³/h	500 - 1200 m³/h	800 - 2400 m³/h

Status and control word, protocol address 33

	Function	Authority	Comment
Bit 0	1 = Error present	R	
Bit 1	1 = Pre-heating mode	R	
Bit 2	Reserved	R	
Bit 3	Reserved		
Bit 4	Filter changed	R/W	With rising slope, filter change acknowledged
Bit 5	1 = Cancel error	R/W	With rising slope, error is cancelled
Bit 6	0 = Unit switched ON 1 = Unit switched OFF	R/W	shut-off with increasing flank
Bit 7	1 = Unit switched ON 0 = Unit switched OFF	R/W	With rising slope, unit switched ON
Bit 8	E-heating module 1	R	1 = present 0 = not present
Bit 9	E-heating module 2	R	1 = present 0 = not present
Bit 10	Reserved	R/W	
Bit 11	Reserved	R/W	
Bit 12	Reserved	R/W	
Bit 13	Reserved	R/W	
Bit 14	Reserved	R/W	
Bit 15	Reserved	R/W	

11.4. Current value table

Register address	Protocol address	Parameter name	Value range	Data type	Authority
30001	0	Unit identification	10000	integer	R
30002	1	Room temperature	Temp in 1/10 ° - 500 to 1000	integer	R
30003	2	Supply-air temperature	Temp in 1/10 ° - 500 to 1000	integer	R
30004	3	Outlet-air temperature	Temp in 1/10 ° - 500 to 1000	integer	R
30005	4	Exhaust-air temperature	Temp in 1/10 ° - 500 to 1000	integer	R
30006	5	Outdoor-air temperature	Temp in 1/10 ° - 500 to 1000	integer	R
30007	6	Pressure-difference, filter 1	0 - 1000 Pa	integer	R
30008	7	Pressure-difference, filter 2	0 - 1000 Pa	integer	R
30009	8	Soiling indicator 1	0 - 100%	integer	R
30010	9	Soiling indicator 2	0 - 100%	integer	R
30011	10	Program version	0 - 100	integer	R
30012	11	Operating hours	(0 - 32767) *10	integer	R
30013	12	Number of filter changes	0 - 32767	integer	R
30014	13	Inputs	See Table below	integer	R
30015	14	Outputs	See Table below	integer	R
30016	15	Volumetric flow supply air in m³/h		integer	R
30017	16	Volumetric flow extract air in m³/h		integer	R
30018	17	Reserved		integer	R
30019	18	Reserved		integer	R
30020	19	Used by system		integer	R
30021	20	Used by system		integer	R
30022	21	Valve setting, heating valve	0 - 100%	integer	R
30023	22	Valve setting, cooling valve	0 - 100%	integer	R
30024	23	Actual sensor value	0-2000 ppm / 0-100 % Humidity	integer	R
30025	24	Error number	See Table below	integer	R
30026	25	Reserved		integer	R
30027	26	Pressure supply air analogue input 2		integer	R
30028	27	Pressure extract air analogue input 3		integer	R
30029	28	Reserved		integer	R
30030	29	Reserved		integer	R

Current value table, protocol addresses 13 (inputs)

Bit 0	1 = Enable_signal_external	
Bit 1	1 = Frequency converter ready	Fan motor electronic ok
Bit 2	1 = Thermal switch, fan	
Bit 3	1 = Frost protection OK	
Bit 4	1 = Motion detector	
Bit 5	1 = Fire detector ok	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	

Current value table, protocol addresses 14 (outputs)

Bit 0	Reserved
Bit 1	Reserved
Bit 2	1 = Cooling requirement
Bit 3	1 = Bypass open
Bit 4	1 = Bypass closed
Bit 5	1 = Heating valve open
Bit 6	1 = Heating valve closed
Bit 7	1 = Heating pump on
Bit 8	1 = Unit defective
Bit 9	1 = Damper closed
Bit 10	1 = Damper open
Bit 11	1 = Cooling valve open
Bit 12	1 = Cooling valve closed
Bit 13	1 = E-heating on
Bit 14	1 = Enable frequency converter
Bit 15	Reserved

Current value table, protocol addresses 24 (error numbers)

Value	
0	No error
1	Supply-air temperature sensor defective
2	Room-air temperature sensor defective
3	Outlet-air temperature sensor defective
4	Exhaust-air temperature sensor defective
5	Outdoor-air temperature sensor defective
6	Damper position
7	Frost protection triggered
8	Safety thermostat triggered
9	Thermal switch for ventilator triggered
10	Frequency converter defective
11	Reserved
12	Not enabled
13	Cooling plant defective
14	Fire detector
15	Reserved
16	Reserved
17	Supply-air temperature too low
18	Supply-air temperature too hot
19	Reserved
20	Heat exchanger

12. Expansion and reconfiguration

The unit must not be reconfigured.

The warranty for ruck fans only applies for the configuration delivered.
The warranty will cease to apply after any reconfiguration or expansion.

13. Dismantling and disposal

- **Risk of injury if dismantled under hazardous voltage!**

» **If you do not switch off the voltage before starting to dismantle the unit, you may injure yourself and damage the product or parts of the installation.**

→ **Make sure that the relevant parts of the installation have been disconnected from the voltage supply.**

Dismantle the unit as follows:

13.1. Disassembling the product

Observe the safety instructions given in Sections 2 to 8 and Section 12 when decommissioning and disassembling the unit.

13.2. Disposal

Careless disposal of the unit may cause pollution.
Please therefore dispose of the unit in accordance with the national requirements that apply in your country.

14. Troubleshooting

Please note the following instructions:

- Proceed systematically and purposefully when troubleshooting, even under time pressure.
  In the worst case, randomly and indiscriminately dismantling and changing settings may result in it no longer being possible to determine the original cause of the fault.
- Get an overview of the unit‘s operation in conjunction with the overall installation.
- Try to clarify whether the unit provided the required function in the overall installation before the fault occurred.
- Try to find any changes to the overall system in which the unit is installed:
  1. Have the unit‘s operating conditions or operating range been changed?
  2. Have any changes (e.g. reconfigurations) or repairs been performed on the overall system (installation, electrics, control) or to the unit? If yes: what?
  3. Has the unit been operated correctly?
  4. How does the fault appear?
- Form a clear idea of the cause of the fault. If necessary, question the immediate operator or the installation operator.

If you have not been able to remove the fault, please contact the manufacturer. The contact address can be found at www.ruck.eu or on the back cover of this assembly and operating manual.

14.1. Low-current fuses

There are two low-current fuses built-in at the controller circuit board to protect the electrical equipment. If the fuse blows, the fault can be located and repaired by using the following table. A low-current fuse must be changed by specialised personnel.
The low-current fuses must comply with EN 60127, dimensions 5 x 20 mm.
For position of microfuse see wiring diagrams.

Fuse	Possible causes	Fault correction
F1 / T 0,2 A	• Control unit defect. • Connecting lead defect. • Board on control unit soiled. • Mainboard defect. • Mainboard soiled.	• Replace control unit. • Replace connecting lead. • Clean board with appropriate means. • Inform Service • Inform Service
F2 / T 6,3 A	• Valve gear and cable defect. • Circulating pump and cable defect. • Damper drive and cable defect.	• Replace valve gear and cable. • Replace circulating pump and cable. • Replace damper drive and cable.

14.2. Fault diagnosis chart

If a fault occurs on the unit, one or more fault messages will appear on the display. A fault is acknowledged with button B (▲). It is not possible to use the control unit until all of the faults have been removed and acknowledged. Depending on the priority of the fault, the installation will either switch off or continue working with the last settings.

The following faults might be shown on the display:

Faults displayed	Type of fault and repair
ERR	**ERROR** » The control unit has no reception. » Check the connection or replace the cable if necessary.
F01 FAULT SUPPLY AIR TEMP	**Supply air temperature sensor fault** » The supply air temperature sensor is defective or the cable is broken. » Replace the defective temperature sensor or replace the broken cable if necessary. » After removing the cause of the fault, the fault must be acknowledged with button B (▲).
F02 FAULT ROOM.TEMPERATURE	**Room temperature sensor fault.** » The room temperature sensor is defective or the cable is broken. » Replace the defective temperature sensor or replace the broken cable if necessary. » After removing the cause of the fault, the fault must be acknowledged with button B (▲).
F03 FAULT EXTRACT AIR TEMP	**Extracted air temperature sensor fault.** » The extracted air temperature sensor is defective or the cable is broken. » Replace the defective temperature sensor or replace the broken cable if necessary. » After removing the cause of the fault, the fault must be acknowledged with button B (▲).
F04 FAULT EXHAUST AIR TEMP	**Exhaust air temperature sensor fault.** » The exhaust air temperature sensor is defective or the cable is broken. » Replace the defective temperature sensor or replace the broken cable if necessary. » After removing the cause of the fault, the fault must be acknowledged with button B (▲).
F05 FAULT EXTERN AIR TEMP	**Outside air temperature sensor fault.** » The outside air temperature sensor is defective or the cable is broken. » Replace the defective temperature sensor or replace the broken cable if necessary. » After removing the cause of the fault, the fault must be acknowledged with button B (▲).
F07 FAULT FROST PROTECTION	**Error frost protection** » The air temperature has fallen below the value set on the antifreeze thermostat.The fans will be switched off, the air flaps closed, the heating valve fully opened and the circulating pump switched on. » Check fuse F2. » After removing the cause of the fault, the fault must be acknowledged with button B (▲).
F8 FAULT SAFTY THERMOSTAT	**Fault in the safety thermostat - electric heating element temperature monitoring** » The housing temperature is higher than 75 °C. The control circuit is broken, the electric heater is switched off. Possible cause: defective supply air valve, fan has failed, etc. » Repair supply air valve, check fuses F2. » Once the cause of the fault has been removed, the reset button on the safety thermostat (see Fig. 18/19) must be reset manually and the fault must be acknowledged on the control unit with button B (▲) .
F9 FAULT FAN TEMP	**Fault, fan thermal contact** » The thermal contact has been tripped, device will be switched off. Possible cause: motor overheating or defective. » The power supply must be switched off at the main switch for at least 20 s. Check fuse F2, replace the motor if necessary. » After removing the cause of the fault, the fault must be acknowledged with button B (▲).
F10 FAULT FREQUENCY.CONVER	**Frequency converter fault** » A frequency converter‘s signalling relay has been tripped. See display on the frequency converter for fault. » To remove the fault, please consult the operating manual for the frequency converter. » After removing the cause of the fault, the fault must be acknowledged with button B (▲).
F14 CONTACT FIRE PROTECTION	**Fire protection signal** » The fire protection contact is open. The fire detector has tripped. » After removing the cause of the fire detection, the fault must be acknowledged with button B (▲).
F17 FAULT TEMP.LOW SUP.AIR	**Insufficient temperature of supply air** » The maximum set supply air temperature (12 °C) was undershot longer than 30 minutes. » After removing the cause of the fault, the fault must be acknowledged with button B (▲).
F18 FAULT TEMP.HIGH.SU.AIR	**Excess temperature, supply air** » The maximum set supply air temperature about 80 °C was overshot longer than 10 minutes or cable break supply air filter. » Switch off the device, check fans. » After removing the cause of the fault, the fault must be acknowledged with button B (▲).
NOT ENABLE	**No release** » The release contact is not closed. » Close the release contact. The unit can then be started.

15. Technical data

Technical data												
Units / Model			**ETA 600 H 30**	**ETA 600 H 31**	**ETA 600 H 36**	**ETA 600 H 37**	**ETA 1200 H 30**	**ETA 1200 H 31**	**ETA 1200 H 36**	**ETA 1200 H 37**	**ETA 2400 H 30**	**ETA 2400 H 31**	**ETA 2400 H 36**	**ETA 2400 H 37**
			129730	129647	129733	129650	129609	129581	129612	129584	129654	129661	129657	129664
Length	L	mm	1050		1050		1380		1380		1800		1800	
Width	B	mm	767		767		805		805		940		940	
Height	H	mm	873		873		1083		1083		1443		1443	
Nominal width	NW	mm	250		250		315		315		355		355	
Weight		kg	112,0		111,0		199,0		197,0		363,0		363,0	
Operating voltage		V	230V ~		230V ~		230V ~		400V 3~N		230V ~		400V 3~N	
Frequency		Hz	50		50		50		50		50		50	
Power consumption		W	400		3400		700		6700		1650		10650	
Maximum current		A	2,0		15,0		3,5		13,7		7,5		21,5	
Pre-fuse			1 x 16A		1 x 16A		1 x 16A		3 x 16A		1 x 16A		3 x 16A	
Max. ambient temp.		°C	40		40		40		40		40		40	
Max. air volume		m³/h	840		840		1560		1560		2570		2570	
RPM		1/min	3200		3200		3600		3600		2900		2900	
Max. pressure		Pa	510		510		730		730		915		915	
Sound supply air	$L_{WA\,6}$	dB(A)	59		59		63		63		63		63	
Sound exhaust air	$L_{WA\,5}$	dB(A)	54		54		59		59		59		59	
Sound fresh air	$L_{WA\,5}$	dB(A)	75		75		79		79		73		73	
Sound extract air	$L_{WA\,6}$	dB(A)	79		79		83		83		82		82	
Sound extraction	$L_{WA\,2}$	dB(A)	50		50		55		55		61		61	
Wiring diagrams No.			129724		129724		129725		129725		129726		129726	

Fig. 26:
Dimensions of the supply air unit

Fig. 27:
Outside dimensions of the control unit.

Fig. 27a:
Installation dimensions of the control unit.

Control unit			
Size	*B+H+T*	*mm*	82+82+30
Assembly size	*Ø B*	*mm*	60
	Ø D	*mm*	22

16. Appendix

16.1. List of parameters

The following table lists all of the parameters that are displayed on the control unit, some of which may be changed. Section 9.3.4. „Parameter settings menu“ gives full instructions on operating and setting the corresponding parameters.

No.	Consequence	Range of values	Factory setting
P 1	Mini.set-point temp. that can be set on the control unit	16 °C ... 20 °C	16 °C
P 2	Max. set-point temp. that can be set on the control unit	20 °C … 30 °C	22 °C
P 3	External release	AUTOMATED ACKNOWLEDGED	AUTOMATED
P 4	I - component	5 ... 20	10
P 5	P - component	5 ... 20	10
P 6	Temp. correction of the ambient temp. sensor on the control unit	-5 °C ... 5 °C	0
P 7	Address	1 - 247	1
P 8	Baud rate	2400 / 4800 / 9600 / 14400	9600
P 9	Fan calibration supply air	800 - 1200	1.000
P 10	Fan calibration extract air	800 - 1200	1.000
P 13	Type	S / PV / P	S
P 14	Sensor type	CO2 / VOC / EXT.REG. / HUMIDITY	Units / Model
P 15	Minimum ventilation supply air		200
P 16	Minimum ventilation extract air		200
P 17	Basic ventilation supply air		450
P 18	Basic ventilation extract air		450
P 19	Intermittent ventilation supply air		600
P 28	Intermittent ventilation extract air		600
P 20	Air quality	CO2 / VOC / r.F	1400 ppm / 45 %
P 21	Type of regulation	SUP.AIR TEMP.CON / ETA TEMP. CTL / ROOMTEMP.CONTROL	SUP.AIR TEMP.CON
P 22	Selection of heating system	HEATING / COOLING / HEATING-COOLING DX COIL	HEATING
P 23	Sensor measuring range min.	0 ppm	
P 24	Sensor measuring range max.	2000 ppm	
P 25	Supply air filter	0 - 500 Pa	100 Pa
P 26	Extract air filter	0 - 500 Pa	100 Pa
P 27	Calibrate filter		
P 29	ETA TYPE	H30 / H36 / V30 / V36 / F30 / F36	
P 30	Extended running time	1 - 60 mins	5 MINS

16.2. Technical drawings

ETA 1200 H

784
Türe offen
open door
805
401
(153)
395
841
1083
Kondensatablauf 1"
Außengewinde
Drain 1"
male thread
321
+3
1487 - 13
1380
930
985
NW 315 -1,6
-0,7
Zuluft / Supply Air
Fortluft / Exhaust Air
Abluft / Extract Air
Außenluft / Fresh Air

ETA 2400 H
960
Türe offen
open door
469
4x NW 355 -0,7 -1,7
467
Kondensatablauf 1"
Außengewinde
Drain 1"
male thread
(153)
461
1136
1443
1907 +3 -13
1800
1290
1350
413
940
Zuluft / Supply Air
Fortluft / Exhaust Air
Abluft / Extract Air
Außenluft / Fresh Air

16.3. Wiring diagram

ETA 600 Wiring diagram No.: 129724 Part 1

ETA 600 Wiring diagram No.: 129724 Part 2

ETA 600 V/F/H 30

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ETA 600 Wiring diagram No.: 129724 Part 3

ETA 1200 Wiring diagram No.: 129725 Part 1

ETA 1200 Wiring diagram No.: 129725 Part 2

ETA 1200 V/F/H 30

ETA 1200 Wiring diagram No.: 129725 Part 3

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ETA 2400 Wiring diagram No.: 129726 Part 1

Schaltplan circuit diagram : ETA 2400 Warmwasserheizung / E-Heizung

Lüftungsgerät

Netzspannung Mains voltage	:	230V / N / 50Hz
Leistung power	:	1600W
Vorsicherung Fuse	:	16A

Elektoheizmodul

Netzspannung Mains voltage	:	400V 3~ / N / 50Hz
Leistung power	:	9000W
Vorsicherung Fuse	:	3 x 16A

Tel. +49 7930 9211-0 Fax +49 7930 9211-150

ETA 2400 Wiring diagram No.: 129726 Part 2

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ETA 2400 Wiring diagram No.: 129726 Part 3

Connection plan for parameter P14 external sensors

ETA 600 / 1200 / 2400 ... 30/36

External volume flow control

10V: max. Volumenstrom
2V : min Volumenstrom
<2V: Gerät aus

External sensor (CO2, VOC)

Notes:

r u c k **Ventilatoren GmbH**

Max-Planck-Str. 5
D-97944 Boxberg-Windischbuch

Tel. +49 (0)7930 9211-0
Fax +49 (0)7930 9211-150

info@ruck.eu
www.ruck.eu

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