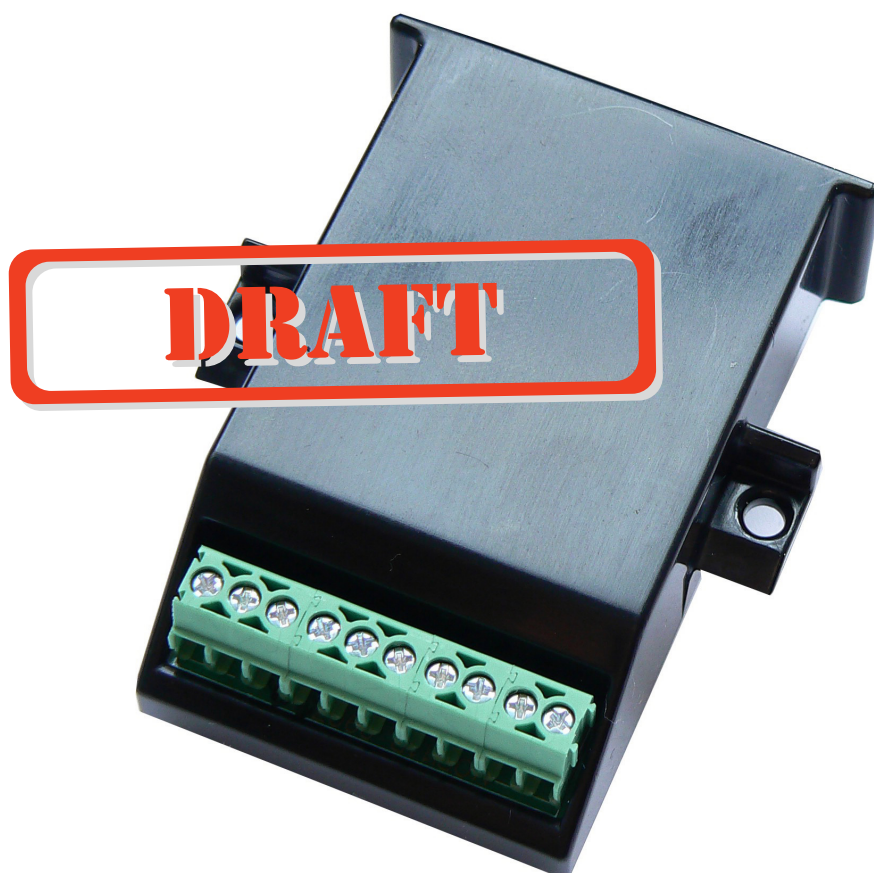


AM-MODBUS / AM-MODBUS-W

Part.-No. 349045 / 349050

Communication module for ECblue fans

Operating Instructions



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1 General notes

1.1 Structure of the operating instructions

These operating instructions are valid only in connection with the device's operating instructions into which this module is being integrated. The remarks concerning safety, installation and connection described in those operating instructions must be followed!

Before installation and start-up, read this manual carefully to ensure correct use!

1.2 Exclusion of liability

Concurrence between the contents of these operating instructions and the described software has been examined. It is still possible that non-compliances exist; no guarantee is assumed for complete conformity to a given state of development. Future developments given are subject to alteration. We do not accept any liability for errors or omissions in the information contained in data, illustrations or drawings provided.

Liability for damage due to misuse, incorrect or improper use.

1.3 FCC / IC Statements (for AM-MODBUS-W modules only)

FCC Compliance (US)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Warning

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC Compliance (Canada)

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

2 Safety information

- Installation, electrical connection, and start-up operation may only be carried out by an electrical specialist in accordance with electrotechnical regulations (e.g. DIN EN 50110 or DIN EN 60204).
- It is strictly forbidden for work to be carried out on any components while they are connected to live voltage. The open equipment is protected to IP00. It is possible to come into direct contact with dangerous voltages!

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3 General description

3.1 Operational area

The add-on module can only be used together with compatible Ziehl-Abegg devices.

Note: The AM-MODBUS-W module is strictly limited for the integration and usage in host devices (fans and converters) of Ziehl-Abegg AG.

3.2 Function

By extension of a Basic fan with an add-on module "AM-Modbus" the following functions are available:

- Over the "AM-MODBUS" module can be communicated with the controller of the fan. The module can be put in temporarily for programming of desired functions during start-up or for diagnostics. The connection to the control terminal is made by a connecting cable or wirelessly by means of radio.
- The fans can be integrated into existing MODBUS-RTU networks.
- A MODBUS network of several ECblue fans can be built up. The communication between the fans happens via MODBUS-RTU.
- Tacho output with frequency signal available. The interpretation of this signal shows the current speed of the fan.
- If the MODBUS module is used, all fans attached in a network can be addressed automatically! A manual addressing is not necessary!
- With AM-MODBUS-W can be communicated additionally over a radio link with the fan,

3.3 Transport

- The device is packed ex factory to suit the transport method previously agreed.
- Always use the original packaging materials when transporting the device.
- Avoid shocks and impacts to the device during the transport.
- During manual handling the human lifting and carrying restrictions must be observed and adhered to.

3.4 Storage

- The device must be stored in its original packaging in a dry and weather-proof room.
- Avoid exposure to extreme heat and cold.
- Avoid over-long storage periods (we recommend a maximum of one year).

3.5 Waste disposal / recycling

Disposal must be carried out professionally and environmentally friendly in accordance with the legal stipulations.

4 Mounting

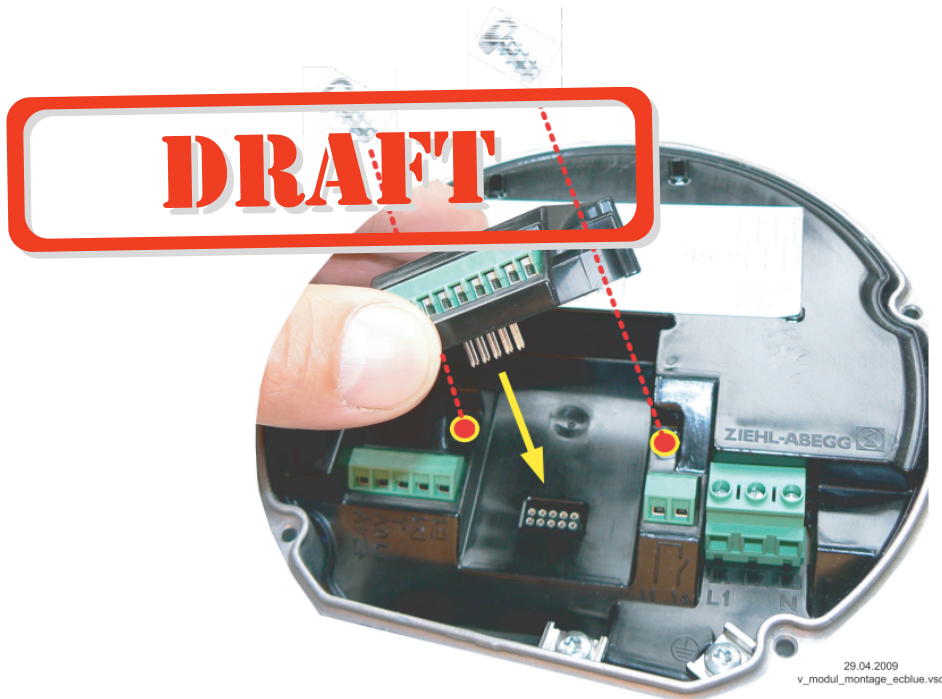
- Before installation remove the device from the packing and check for any possible shipping damage!
- For installation the cover of the controller housing must be removed. The module is then put into the intended slot of the ECblue fan. (📄 Operating Instructions for fan / Electrical Installation).
- Install afterwards module with both enclosed screws in the controller housing.
- When the AM-MODBUS-W module will be mounted in a fan or converter of Ziehl-Abegg AG, the FCC/IC label (AM-MODBUS-W inside) has to be stick on the housing of the converter



Danger owing to electric current

Voltage supply for motor must be interrupted and secured against restoration!

Installing the add-on module



Sticking the FCC/IC label (AM-MODBUS-W inside) on the housing of the fan.



5 Electrical installation

5.1 Safety precautions

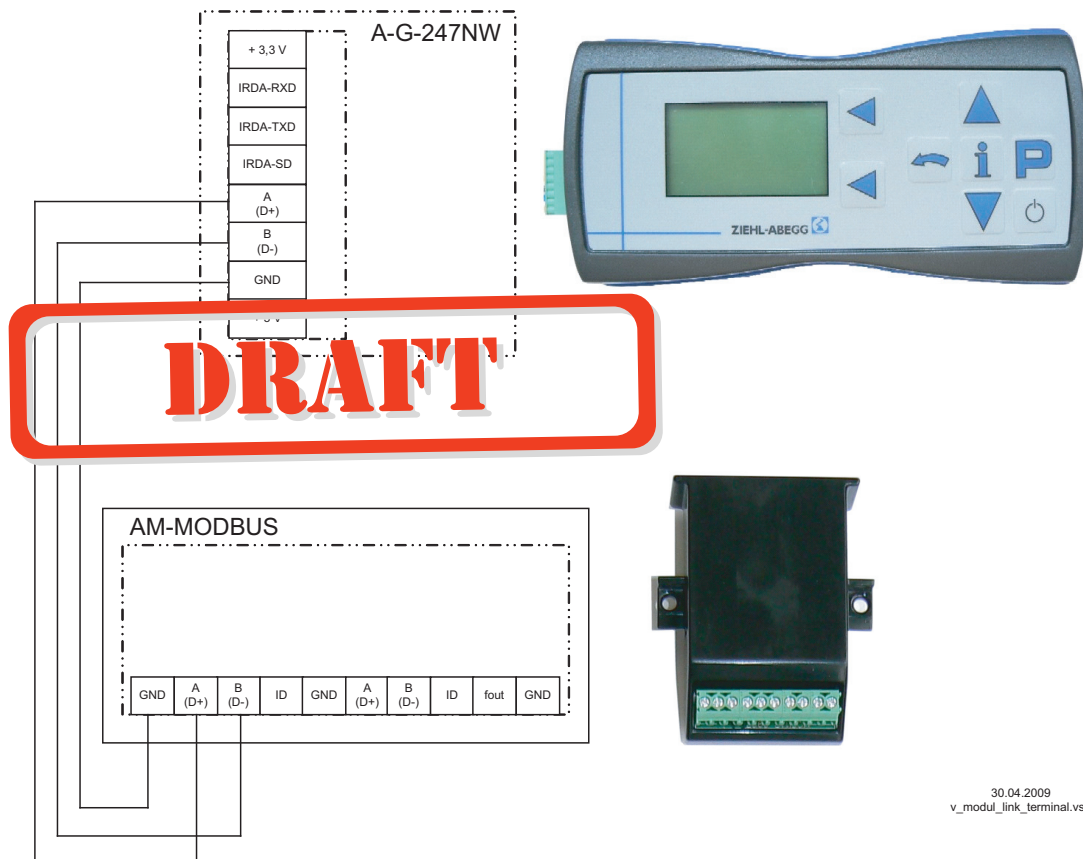


Danger owing to electric current

- Work on electric components may only be carried out by trained electricians or by persons instructed in electricity under the supervision of an electrician in accordance with electrical engineering regulations.
- It is forbidden to carry out work on electrically live parts.

5.2 Connection of external terminal type A-G-247NW

If necessary an external terminal can be connected. This can be e.g. necessary to adapt the pre-setting during start-up. For information about the current operating condition a terminal can be permanent attached.



The connection is made via a 4-strand line at the terminals (D-, D+ and GND).
e.g., telephone flex e.g. J-Y (St) Y 2x2x0.6 (or similar), maximum line length ca. 250 m.

- Signal “D+” and “D-” (RS 485)
- The voltage supply of the terminal is made by the accumulators inserted there or the plug power supply unit.

5.3 Communication

5.3.1 Networking via MODBUS-RTU

The device comes equipped with a RS-485 interface for networking via a MODBUS. Connection to terminals “D+”, “D-”, “ID” and “GND”.

The addressing takes place automatically over the terminals “ID”. Therefore a manual addressing of each member in a network is not necessary anymore.

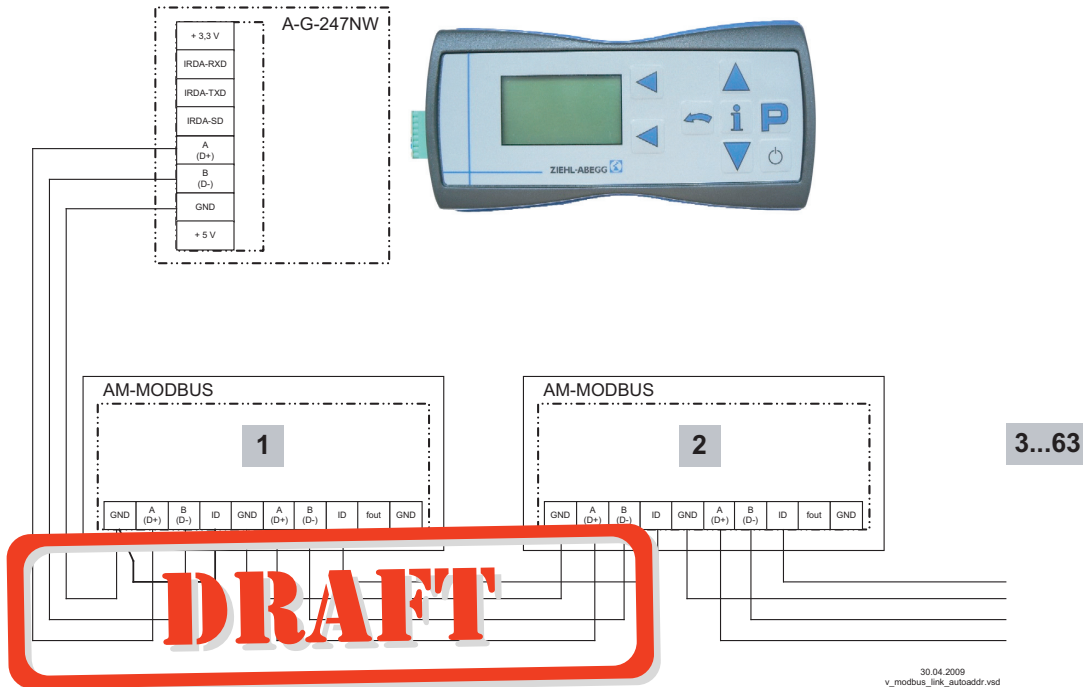
A maximum of 64 members can be directly connected to one another, and another 63 members via a repeater.

5.3.2 RS-485 - network design and interface parameter

You must ensure correct connection; i.e. "D+" must also be connected on the following devices to "D+". The same applies to "D-".

At the first fan (connected with the terminal for programming), the terminals "GND" and "ID" must be bridged. This guarantees that the software assigns to this fan the address 1.

In addition, a "GND" connection must be established, as dissimilar potential (over 10 V!) will lead to the destruction of the RS-485 interface (e.g. lightning).



Connection example for MODBUS device connection with automatic addressing

The data line must be conducted from one device to the next. No other type of wiring is allowed. Always use only two wires of one lead (twisted pair) for the connection.

Recommended wire types

1. CAT5 / CAT7 cables
2. J-Y (St) 2x2x0.6 (telephone wire)
3. AWG22 (2x2 twisted pair)

When using telephone flex with four cable cores, we recommend the following allocation:

- "D+" = red
- "D-" = black
- "ID" = yellow
- "GND" = white



Information

- Pay attention to sufficient distance from powerlines and motor wires (min. 20 cm)
- Do not use wire shield
- Except the data link "D+", "D-" the "ID" and the "GND" connection may no further cable cores of the data line be used.
- Max. allowed wire length 1000 m (CAT5/7 500 m)

Default interface parameter

Baud rate	=	19200
Bits	=	8
Parity	=	even
Stop bits	=	1
Handshake	=	non



Information

If any matters are unclear, please contact our V-STE support department for control systems - ventilation technology. The information sheet "Network structure of Modbus" R-TIL08_01 contains detailed information about Modbus.

5.3.3 AM-MODBUS-W Wireless Communication

The type A-G-247NW hand-held terminal can communicate wireless with the type **AM-MODBUS-W** communications module.

In a hard-wired system, wireless communication is primarily designed in order to have a second interface for communicating with the device (e.g., for configuration and diagnostics).

In the A-G-247NW, for wireless communication with an EC fan type **ECblue Basic** use the **[ECblue Basic (RF)]** menu item.

Wireless communication is also used by the MODBUS protocol, so it is necessary to assign an address. **Wireless and hard-wired communications use the same address.** The address can be hard-wire assigned via an RS-485.

For pure, wireless communication, it is recommended to assign the address manually.

- Switch on the device you want to re-address and establish a connection with address 247.
- In “IO Setup”, change the address and then switch this device off again.
- Apply the same procedure to the next device.

Radio control key (0 - 9999)

Different from RS-485 communication, wireless communication also has a radio control key (0 - 9999). This radio control key is used to encode the messages and ensures that several networks can be operated in mutually overlapping radio ranges.

For that reason, every wireless MODBUS network should have its own radio control key if there is another wireless MODBUS network in the vicinity.

The factory setting is [9999].

A radio control key with the value 0 switches off encoding.

The ECblue fan terminal will not receive the new radio control key.

The radio control key must be assigned in the same manner as the assignment of the MODBUS address. The radio control key is assigned in the ECblue basic menu in the “Controller Setup” menu item.

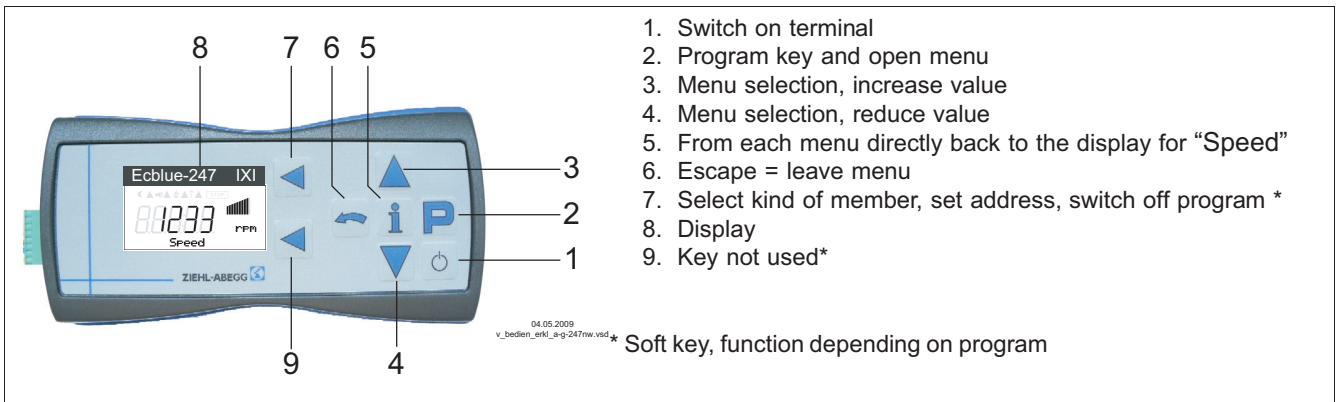
Technical data for wireless Communication:

Radio communication standard:	IEEE 802.15.4
Frequency:	2.4 GHz (not licensed wireless band, like WLAN, Bluetooth) 16 wireless channels, default wireless channel 0
Communications range:	Short-distance radio, within buildings max. 8 m typically 3 - 5m, free field to 25 m, generally strongly dependent on interferences
Type of communication:	Bi-directional, half duplex
Application protocol:	MODBUS-RTU (max. protocol length 125 Bytes and/or 50 register)
Coding:	Proprietary through 4-digit number
Network structure:	Point - to - point or point - to- mulit point - communication

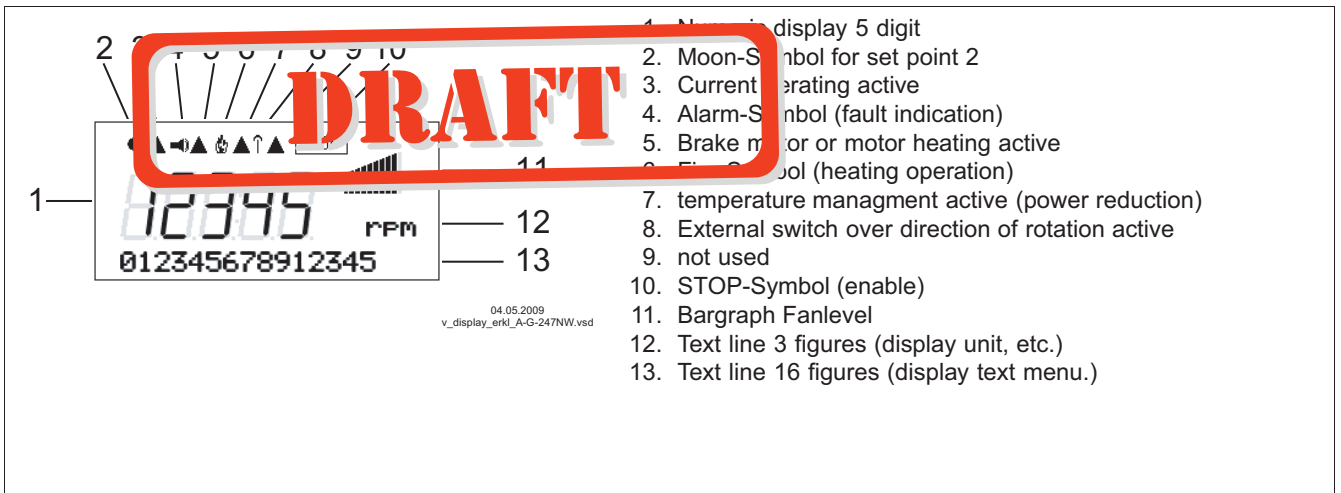
6 Operating by terminal

6.1 Hand held terminal type A-G-247NW

Operating elements



Display description





6.2 Establish connection to member

The connection to the member is made by a connecting cable or wirelessly by means of radio. First select the kind of member with the keys ▼ + ▲ and confirm it with the **P**-key.

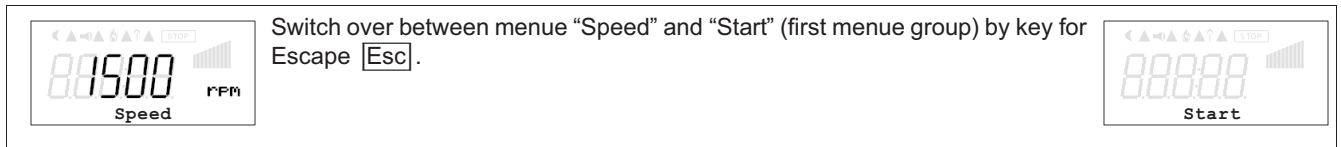
Setting kind of member

Main menu	IXI
ECblue Basic (RS485)	ECblue fan with built in communication module type AM-MODBUS. Communication via cable.
ECblue Basic (RF)	ECblue fan with built in communication module type AM-MODBUS. Communication wireless.
ECblue Premium (RS485)	ECblue fan with built in Premium Module. Communication via cable.
ECblue Premium (RF)	ECblue fan with built in Premium Module. Communication wireless.
ECblue Addressing	Activation of the automatic addressing.
ECblue Filetransfer	File exchange via USB (PC ↔ Terminal).

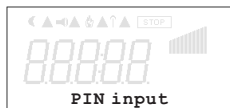
Confirm address

Network Key	IXI
99	Set network key and confirm with P -key.
Device ID	IXI
247	The device address (Device-ID) of the members is factory set to the highest available MODBUS address: 247 Set address and confirm with P -key in order to make first connection.
ECblue-247	IXI
	Successful connection.
ECblue-246	IXI
	If no connection comes, settings cannot be stored. In the display the two symbols for alarm and antenna appear. Cause: wrong address, no connection via wire and/or radio.

6.3 Menu operation



By pushing the **P**-key one reaches the menu item “Start”.

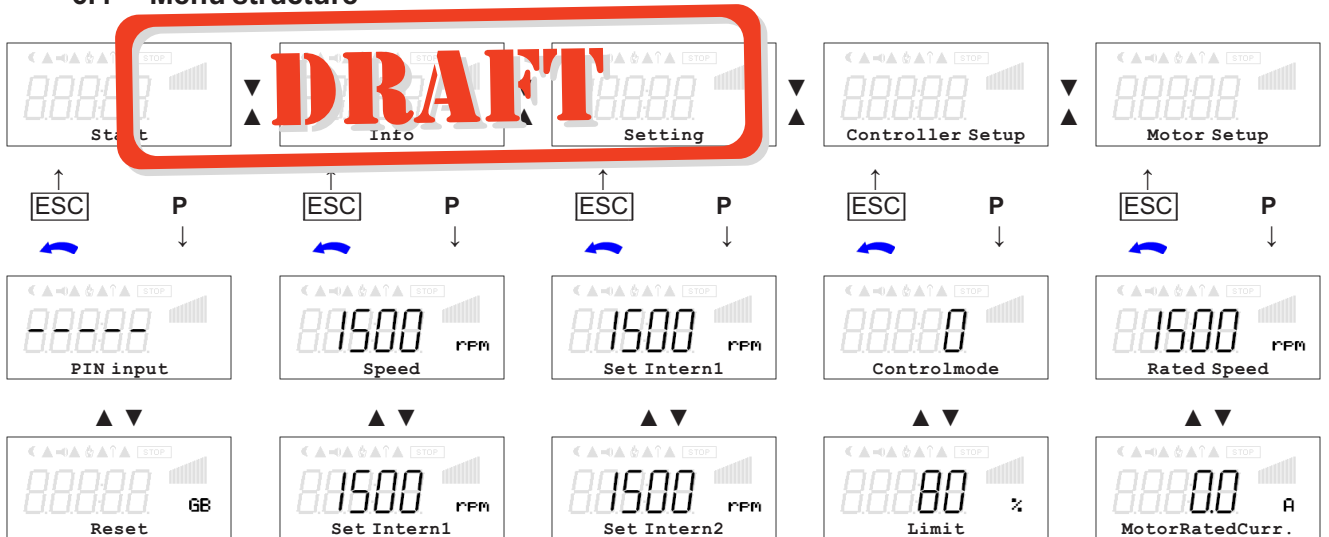


Return to the menu group “Start” using key [Esc].



One moves up and down within the menu group using the arrow keys.

6.4 Menu structure



Selection of the menu group (e.g. Setting) to the right through the ▼-key, to the left through the ▼-key.
 You can go to the menu items in the menu groups (e.g. Set Intern1) by using the **P**-key. Use the arrow keys to move up and down within the menu group.
 The menu groups consist of one area for the user (user menu) and one area for installation (service). The service area can be protected against unauthorized access by using a PIN.
 To make adjustments, press the **P**-key after selecting the menu item. If the previously set value starts to flash, it can be adjusted with the ▼ + ▲ keys and then saved with the **P**-key. To exit the menu without making any changes, use the “Esc” key, i.e., the originally set values remain.

7 Programming

7.1 Menu overview

Parameter	Factory setting	User Setting	
Start			
PIN input	-----		PIN 0010: Opening service menu (Controller Setup, IO Setup, Motorsetup), for programmed access level <2
Reset	OFF		PIN 1234: Opening user menu (Setting) for programmed access level <1
ECblue Firmware	6		PIN 3698: Assumption of the communication parameters (Address, Com Baudrate, Com. Mode)
Info			
Speed	0 rpm		PIN 9095: load factory setting (only parameters for current access level)
Motor current	0.0 A		
Output power	0.0 %		
Set Intern1	0 rpm		

Setting			
Set Intern1	1800 rpm		Setting in control mode [4] active. By inputs "D1" and "E1" switch over to "Set Intern2" or "Set Intern3" possible. Display for active setting: Set Intern1 *
Set Intern2	1800 rpm		Setting in control mode [5] active or in control mode [4] , if activated by inputs "D1" or "E1". Display for active setting: Set Intern2 *
Set Intern3	1800 rpm		Setting in control mode [6] active or in control mode [4] , if activated by inputs "D1" or "E1". Display for active setting: Set Intern3 *
Min. Speed	0 rpm		
Max. Speed	1800 rpm		

Controller Setup			
Controlmode	[0]		[0] : Control by "E1" (0 - 10 V / PWM) [1] : Bus control: control register2 (speed value) [2] : Bus control: control register2 Fractional 0-32767 = 0 – 100% [3] : Bus control: control register2 Fractional 0-100 = 0 – 100% [4] : Constant speed "Set Intern1" with switch-over possibility to "Set Intern2" or "Set Intern3" [5] : Constant speed "Set Intern2" [6] : Constant speed "Set Intern3"
Limit	75 %		Function only actively if function [3D] for "D1" or "E1" assigned.
LED Mode	[ON]		[ON] : Status LED in ECblue active (operating conditions are indicated by flash code). [OFF] : Status LED not active.
Accesslevel	[2]		[0] : No setting without PIN (☞ PIN input). [1] : "Setting" free, without PIN alterable, PIN 0010 for "Controller Setup", "IO Setup", "Motorsetup". [2] : All settings without PIN possible.
Network Key	9999		Network key 0 - 9999 0 = no protection

Parameter	Factory setting	User Setting	
IO Setup			
D1 Function	[1D]		[OFF]: without function [1D]: Enable ON / OFF [3D]: Limit ON / OFF [5D]: Constant speed "Set Intern2" for controlmode [5] (priority when simultaneous activation of "Set Intern3"). [6D]: Constant speed "Set Intern3" for controlmode [6] [11D]: Setting max. Speed ON / OFF [13D]: Switch over direction of rotation
D1 Inverting	[OFF]		
E1 Function	[1E]		[1E] 0 - 10 V external Setpoint works at settings higher [1E] as digital input ([1D]... [13D] ⇨ D1 function)
E1 Inverting	[OFF]		
E1 Min.	0 %		Adjustment input signal and output characteristic with function [1E]
E1 max.	100 %		
K1 Function	[2K]		[1K] Operating indication [2K] Fault indication [4K] Limit (Speed > Set Intern3 at output power > 0%) [17K] Bus control
K1 Inverting	[OFF]		
Watchdog time	[0]		MODBUS communication watchdog defines a behavior in case of a communication failure. If the device receives no message in a time window the device will execute the selected function (⇨ Watchdog Mode). Functions executed when watchdog time outs:
Watchdog Mode	[0]		0: no function (Default) 1: fault triggering 2: constant speed Set Intern1 3: fault + Set Intern1
Bus Address	247		Default interface parameter
Com. Baud rate	19200		Changes become only effective after PIN input 3698 or interruption the line voltage for ECblue.
Com. Mode	8E1		



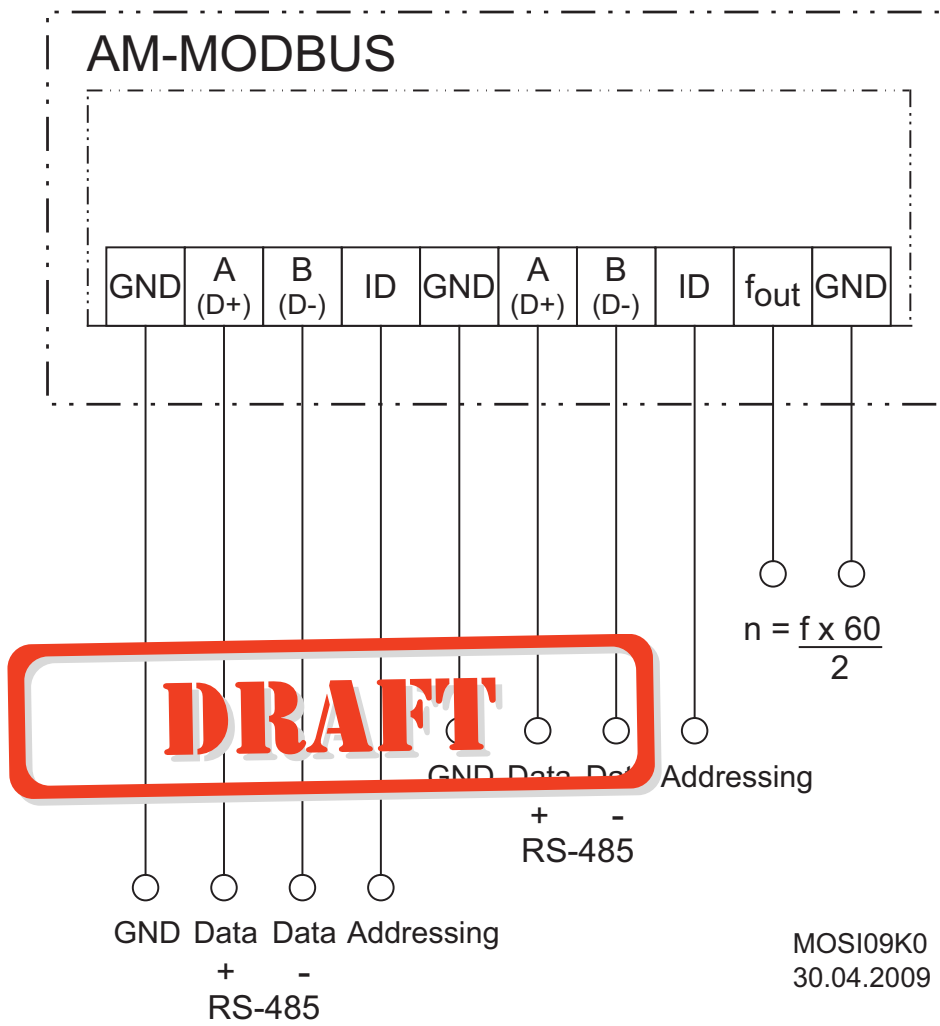
Parameter	Factory setting	User Setting	
Motor Setup			
Rated Speed	1800 rpm *		*These settings are shown for informational purposes and must only be changed after consultation with Ziehl-Abegg and entering a password.
MotorRatedCurr.	2.5 A *		
Rampup time	10 sec *		
Rampdown time	10 sec *		
Rolling direct.	R *		
Suppression1	OFF		
Range1 min.	-----		
Range1 max.	-----		
Suppression2	OFF		
Range2 min.	-----		
Range2 max.	-----		
Suppression3	OFF		
Range3 min.	-----		
Range3 max.	-----		

Diagnostic			
OTM	00		
IGBT temperature	23.6 °C		
Inside Temperature	23.6 °C		
MCU temperature	23.6 °C		
Motor temperature	23.6 °C		
E1 Input	0 %		
DC Voltage	409 V		
Line voltage \hat{u}	330 V		
Status messages	0		
Fault messages	0		
Accesslevel	[2]		

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8 Enclosure

8.1 Connection diagram




8.2 Manufacturer reference

Our products are manufactured in accordance with the relevant international regulations. If you have any questions concerning the use of our products or plan special uses, please contact:

Ziehl-Abegg AG
Heinz-Ziehl-Straße
74653 Künzelsau
Telephone: +49 (0) 7940 16-0
Telefax: +49 (0) 7940 16-504
info@ziehl-abegg.de
<http://www.ziehl-abegg.de>

8.3 Service information

If you have any technical questions while commissioning or regarding malfunctions, please contact our V-STE support department for control systems - ventilation technology.

Our worldwide contacts are available in our subsidiaries for deliveries outside of Germany. 
www.ziehl-abegg.com.

If you make returns for inspections or repairs we need certain information in order to facilitate focused trouble shooting and fast repair. Please use our repair tickets for this. It is provided to you after you have consulted our support department.

In addition, you can download it from our homepage. Download - Ventilation Technology - Topic: Control Engineering - Document type: General documents.

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