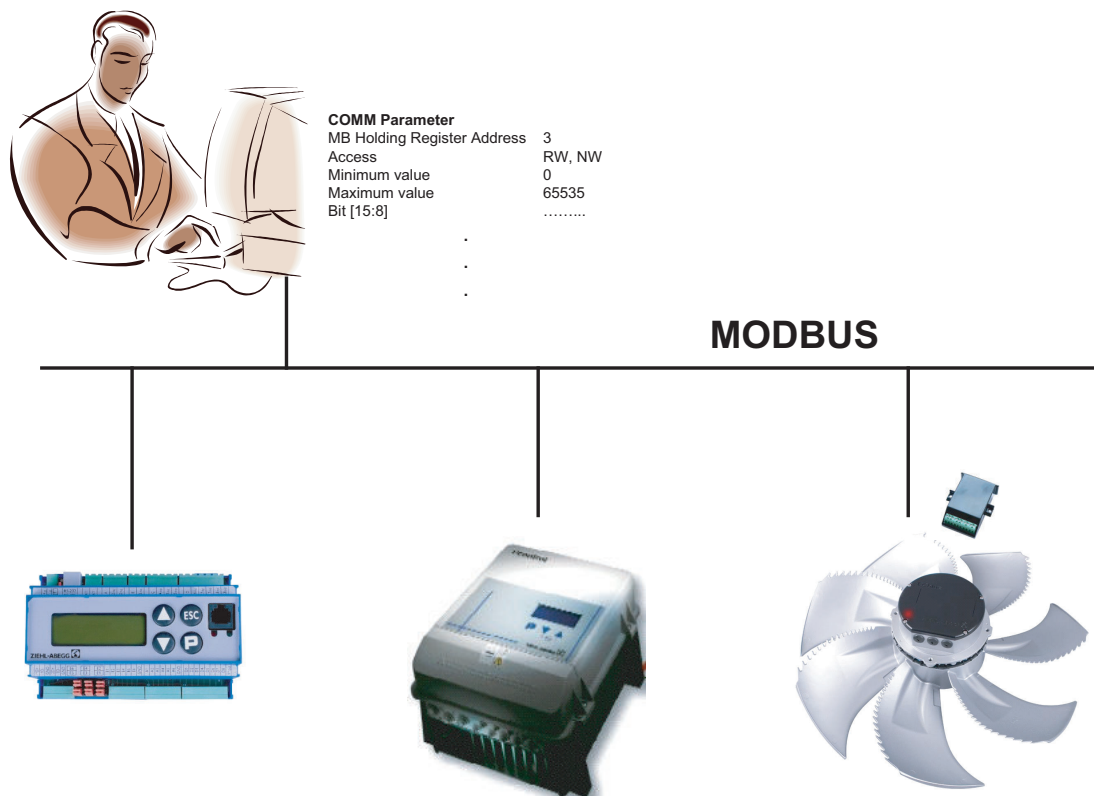


ECblue Premium



Software version: ECblue Firmware from 1.03, updated for Firmware 9.05
MODBUS Firmware from 07

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1 General notes

1.1 Target group

This specification addresses users with excellent knowledge of serial bus systems and in particular of the MODBUS RTU protocol.

The MODBUS RTU protocol specification is not part of this document. The MODBUS RTU protocol specifications can be downloaded over the internet.

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 allow for future developments given are subject to alteration. We do not accept any liability for possible errors or omissions in the information contained in data, illustrations or drawings provided.

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1.3 Copyright

These operating instructions contain copyright protected information. The operating instructions may be neither completely nor partially photocopied, reproduced, translated or put on data medium without previous explicit consent from Ziehl-Abegg AG. Infringements are liable for damages. All rights reserved, including those that arise through patent issue or registration on a utility model.

2 Safety instruction



Attention!

Remarks concerning safety, installation and connection must be followed (→ Assembly instructions or Operating Instructions).

3 MODBUS Register Description

3.1 Explanations

- The device can be controlled and parameterised by the MODBUS-RTU protocol by using this module. The MODBUS-RTU protocol implementation of the device complies with the standards as described in the MODBUS Application Protocol Specification 1.1. Not all the function codes contained therein are implemented in the device. The device basically supports all functions which are available for holding-, input and Coil registers.
- All registers marked with "NV" have limited write cycles (10.000). Registers of this type must only be used for configuration purpose.
- The device supports MODBUS functions for register write and read (Read Register, Write Single Register, Write multiple Register).
- Default COM parameters 19200, 8, E, 1 Address 247 (see Holding Register Address h100 - 102).
- Changes to the COM parameters only become effective after a device reset or input of a certain PIN.

Kind of register

Abbreviation	Possible access
R	Register writeable
RW	Register read- and writeable
NV	Register permanent stored (non-volatile)

Short cut for register

h18	Example for Holding Registeraddress 18
i12	Example for Input Registeraddress 12
c1	Example for Coil Registeraddress 1

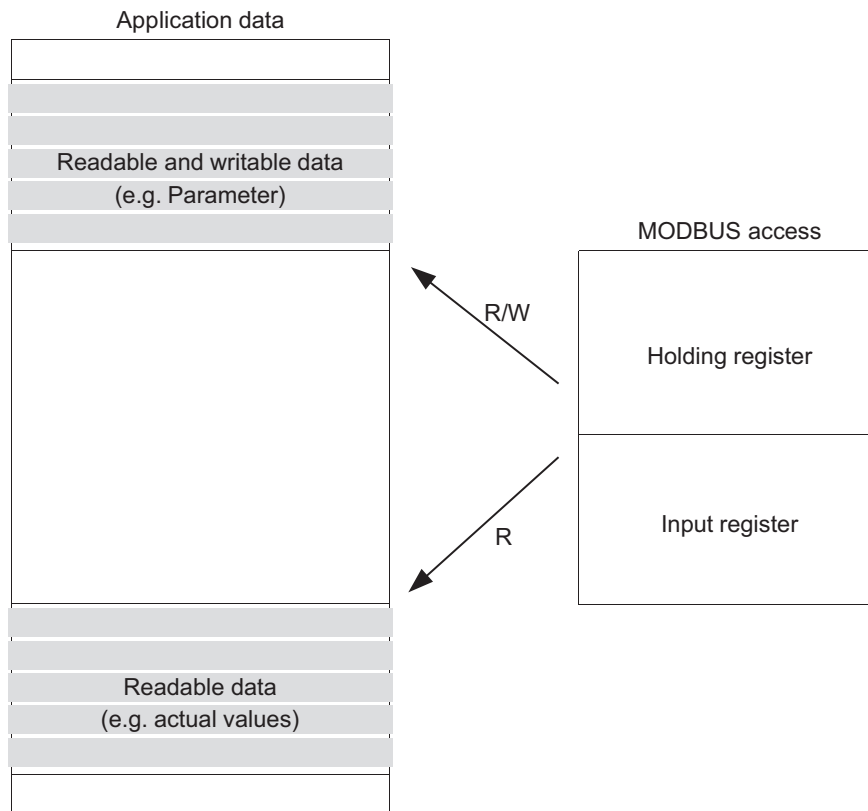
Necessary PIN protection level for acces to register

[0]	Not protected, in each PIN protection level recordably
[1]	Starting from adjustet PIN protection level [1] or higher recordably. For adjusted PIN protection level [0] PIN: 1234 necessary.
[2]	Starting from adjustet PIN protection level [2] or higher recordably. For adjusted PIN protection level [0] and [1] PIN: 0010 necessary.
[3]	Only with administrator password recordably.

3.2 Data model and access options

The MODBUS access to the application data is gained with the following MODBUS functions for registers:

- Read Input register (function code 4)
- Read Holding register (function code 3)
- Write Single register (function code 6)
- Write Multiple registers (function code 16)
- Read Coil register (function code 1)
- Write Single Coil Register (function code 5)



The application data are arranged completely in the Holding Register and the Input Register section respectively beginning at MODBUS register address **0**.

An exception message is output on exceeding the register range.

It is urgently recommended to observe the further information and examples in the L-BAL-E095-D Operating Instructions!

3.3 Start settings


MB Holding Register 1, Address: h0		PIN input (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Code input to execute special functions e.g. load default setting		
Access / necessary PIN protection level	RW	
minimal value	0	
maximum value	65535	
Default	0	
Bit [15:0]	Decimal value 0 - 65535	


PIN Code	Function
1234	PIN Code to suspend set protection for programmed set protection [1=ON] (☞ Register address: h27) and PIN- protection [1=ON] (☞ Register address: h26)
0010	PIN Code to suspend set protection for programmed set protection [1=ON] (☞ Register address: h26)
9090	Restore user setting
9091	Save user setting (corresponds function "Save user Setup" = "ON")
9095	Restore factory setting = delivery status

MB Holding Register 2, Address: h1		Language
For setting menu language e.g. operation with hand held terminal A-G-247NW.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	4	
Default	1=GB	
Bit [15:0]	0=D, 1=GB, 2=F, 3=SE, 4=I	


MB Holding Register 3, Address: h2		Controller Reset
It is automatically reset to 0 to trigger a Reset command on the controller.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	0	
Bit [15:0]	0, 1=Controller Reset (>0)	


MB Holding Register 19, Address: h18		Mode
Setting of Mode.		
☞ After setting a new mode, a device reset is performed and the communication is interrupted for a few seconds.		
The set mode must be checked on the display.		
N.B.: All register values are reset to the factory settings!		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	15	
Default	0	
Bit [15:0]	0=1.01, 1=2.01, 2=2.02, 3=2.03, 4=2.04, 5=2.05, 6=3.01, 7=3.02, 8=3.03, 9=3.04, 10=4.01, 11=4.02, 12=4.03, 13=5.01, 14=5.02, 15=6.01	


MB Holding Register 27, Address: h26		PIN Protection
To activate the PIN protection to protect inputs in the service level by a password.  only applies for ZA terminal / AXG, no protection for direct register access via MODBUS.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	0	
Bit [15:0]	0=no PIN-Protection, 1=PIN-protection active	


MB Holding Register 28, Address: h27		Set protection
To activate the setting protection, to protect inputs in the "Settings" menu by a password. Function only possible in combination with activated PIN protection.  only applies for ZA terminal / AXG, no protection for direct register access via MODBUS.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	0	
Bit [15:0]	0=no set protection, 1=set protection active	

3.4 COM settings

MB Holding Register 101, Address: h100		Bus Address
For setting MODBUS address. Changes only possible if write protection was deactivated before ( h103).		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	247	
Default	247	
Bit [15:0]	1-247	

MB Holding Register 102, Address: h101		Baudrate
To set the baud rate. Input is only accepted after a reset ( h2).		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	3	
Default	2	
Bit [15:0]	0=4800, 1=9600, 2=19200, 3=38400	

MB Holding Register 103, Address: h102		Parity
To set the parity. Input is only accepted after a reset ( h2).		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	2	
Bit [15:0]	0=8N1, 1=8O1, 2=8E1	

MB Holding Register 104, Address: h103		Write protection Bus-address
The register serves to deactivate the write protection to be able to enter a new MODBUS address ( h100). The write protection is automatically reactivated after entering the new address.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=write protection active	

3.5 Bus Mode Register

MB Holding Register 9001, Address: h9000		E2 Bus Mode
Alternative setting for E2 (☞ h63, only active if E2 Analog IN =4). A setting value of 32767 corresponds 10V or 20mA.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		32767
Default		0
Bit [15:0]		0-32767


MB Holding Register 9002, Address: h9001		E3 Bus Mode
Alternative setting for E3 (☞ h64, only active if E3 Analog IN =4). A setting value of 32767 corresponds 10V or 20mA.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		32767
Default		0
Bit [15:0]		0-32767


MB Coil Register 1, Address: c0		D1 Bus Mode
Alternative setting for D1 (☞ h104, only active, when D1 BUS Mode active).		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0=D1 OFF


MB Coil Register 2, Address: c1		D2 Bus Mode
Alternative setting for D1 (☞ h104, only active, when D2 BUS Mode active).		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0=D2 OFF



3.6 Mode 1.01


3.6.1 Settings (1.01)

MB Holding Register 10, Address: h9		Set Intern1  ²⁾
Setting of constant speed 1 in 1/min (rpm)		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	200	
Bit [15:0]	0 - Rated speed h126	

MB Holding Register 11, Address: h10		Set Intern2  ²⁾
Setting of constant speed 2 in 1/min (rpm). Only active when D1 function [5D] active.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	0	
Bit [15:0]	0 - Rated speed h126	

MB Holding Register 113, Address: h112		Min. Speed
Setting of Min. Speed 1 in 1/min (rpm). ( Min. Speed 1 h113)		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Max. Speed h113	
Default	0	
Bit [15:0]	0 - Max. Speed h113	

MB Holding Register 114, Address: h113		Max. Speed  ²⁾
Setting of Max. Speed 1 in 1/min (rpm). ( Rated speed h126)		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	1800	
Bit [15:0]	0 - Rated speed h126	


MB Holding Register 18, Address: h17		Set external1
Speed setting by external signal at E3, if Set external 1 active. ( E3 functions h62)		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	1	
Bit [15:0]	0=OFF, 1=ON	

2)

Values > Max. Speed (h113) or rated speed (h126), are reduced for operation to max. speed or rated speed.


3.6.2 Base setup (1.01)


MB Holding Register 64, Address: h63	E2 Analog IN
Selection analog input E2. In BUS Mode (h63=4) the control takes place by MODBUS register h9000. The value setting 0-32767 corresponds e.g. an analog input value of 0-10V.	
Access / necessary PIN protection level	RW, NV
minimal value	1
maximum value	4
Default	1
Bit [15:0]	1=0-10V, 2=0-20mA, 3=4-20mA, 4=BUS

MB Holding Register 63, Address: h62	E3 Function
1E-->setting with second analog signal (E3) and switch over between both signals by digital input D1  D1 function h60 setting [4D] 4E-->setting with second analog signal (E3) and control to the respective higher value.	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	2
Default	0
Bit [15:0]	0=no function, 1=1E, 2=4E

MB Holding Register 65, Address: h64	E3 Analog IN
Selection analog input E3. No function if E3 functions h62=0. In BUS Mode (h63=4) the control takes place by MODBUS register h9001. The value setting 0-32767 corresponds e.g. an analog input value of 0-10V.	
Access / necessary PIN protection level	RW, NV
minimal value	1
maximum value	4
Default	1
Bit [15:0]	1=0-10V, 2=0-20mA, 3=4-20mA, 4=BUS

3.6.3 Controller Setup (1.01)

MB Holding Register 25, Address: h24	Limit
Setting the limitation of speed in 1/min (rpm) and activation the limit function by a digital input D1 or D2.  D1 function h60 setting [3D], D2 (E1) function h61setting [3D]	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	Rated speed h126
Default	200
Bit [15:0]	0-rated speed h126

MB Holding Register 98, Address: h97	Group 2 ON value
If the setting signal of the control (0-100%) exceeds the value set here, the setting signal for group 2 is output at analog output A1 and group 1 is reduced to the value n-min for group 2 (h98). From here on both groups run parallel at maximum power.  A1 function h56 setting [5A]	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	100
Default	50 [50%]
Bit [15:0]	0-100

MB Holding Register 99, Address: h98		n-min at Group2
If the setting signal of the control (0-100%) exceeds the value of one value group 2 (h97), the relay K1 switches on group 2 and group 1 is reduced to the value n-min for group 2 (h98). From here on group 1 runs at maximum power. ☞ K1 function h58 setting [8K]		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	100	
Default	20 [20%]	
Bit [15:0]	0-100	






3.6.4 IO Setup (1.01)

MB Holding Register 57, Address: h56		A1 Function
1A-->constant voltage (10V output) 2A-->output voltage proportional to modulation 3A-->output voltage proportional input E2 4A-->output voltage proportional input E3 5A-->output voltage proportional to modulation, from On value Group2, ☞ h97, h98 9A-->output voltage proportional to speed		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	6	
Default	1	
Bit [15:0]	0=no fuction, 1=1A, 2=2A, 3=3A, 4=4A, 5=5A, 6=9A	

MB Holding Register 66, Address: h65		A1 Min
Min. value of output voltage at A1 in 0.1V steps.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	100	
Default	0	
Bit [15:0]	0-100 [0-10V]	

MB Holding Register 67, Address: h66		A1 Max
Max. value of output voltage at A1 in 0.1V steps.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	100	
Default	100	
Bit [15:0]	0-100 [0-10V]	

MB Holding Register 97, Address: h96		Inverting A1
Inverting of output voltage at A1		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	

MB Holding Register 61, Address: h60	D1 Function
1D-->ON/OFF function	
2D-->external fault indication input	
3D-->Limit functions ON/OFF  Limit function h24	
4D-->switch over E2/E3  E3 function h62 [1E]	
5D-->switch over set intern1/ intern2  h9/h10	
6D-->switch over intern1/external  h9/E2 , set external1 h17=OFF	
10D-->device Reset	
11D-->setting Max. speed ON/OFF  Max. Speed1 h12	
13D-->switch over direction of rotation	
14D-->Current modulation value is frozen and issued ("Freeze" function).	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	10
Default	0
Bit [15:0]	0=no function, 1=1D, 2=2D, 3=3D, 4=4D, 5=5D, 6=6D, 7=10D, 8=11D, 9=13D, 10=14D


MB Holding Register 93, Address: h92		D1 Inverting
Inverting of D1 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	


MB Holding Register 105, Address: h104		D1 BUS Mode
If BUS Mode active, D1 function by MODBUS register c0.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no function, 1=BUS mode active	


MB Holding Register 62, Address: h61	D2 function (E1)
The D2 function is realized over the analog input E1 on the motor plate. 1D-->ON/OFF function 2D-->external fault indication input 3D-->Limit functions ON/OFF ➡ Limit function h24 4D-->switch over E2/E3 ➡ E3 function h62 [1E] 5D-->switch over set intern1/ intern2 ➡ h9/h10 6D-->switch over intern1/external ➡ h9/E2 , set external1 h17=OFF 10D-->device Reset 11D-->setting Max. speed ON/OFF ➡ Max. Speed1 h12 13D-->switch over direction of rotation 14D-->Current modulation value is frozen and issued ("Freeze" function).	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	10
Default	0
Bit [15:0]	0=no function, 1=1D, 2=2D, 3=3D, 4=4D, 5=5D, 6=6D, 7=10D, 8=11D, 9=13D, 10=14D


MB Holding Register 94, Address: h93		D2 Inverting (E1)
Inverting of D2 function		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no inverting, 1=inverting active


MB Holding Register 106, Address: h105		D2 BUS Mode (E1)
If BUS Mode active, D2 function by MODBUS register c1.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no function, 1=BUS mode active


MB Holding Register 107, Address: h106		E2 Min
Signal adaption E2  E2 Mode h110		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		0
Bit [15:0]		0-100 [%]

MB Holding Register 108, Address: h107		E2 Max
Signal adaption E2  E2 Mode h110		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		100
Bit [15:0]		0-100 [%]

MB Holding Register 109, Address: h108		E3 Min
Signal adaption E3  E3 Mode h111		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		0
Bit [15:0]		0-100 [%]






MB Holding Register 110, Address: h109		E3 Max
Signal adaption E3  E3 Mode h111		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		100
Bit [15:0]		0-100 [%]

MB Holding Register 111, Address: h110		E2 Mode
Signal adaption E2  only for Mode 1.x, see operating instructions		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=Offset/Rotation (Modus1), 2=Signal range (Modus2)	


MB Holding Register 112, Address: h111		E3 Mode
Signal adaption E3  only for Mode 1.x, see operating instructions		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=Offset/Rotation (Modus1), 2=Signal range (Modus2)	


MB Holding Register 95, Address: h94		Inverting E2
Inverting of E2 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	

MB Holding Register 96, Address: h95		Inverting E3
Inverting of E3 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	


MB Holding Register 59, Address: h58		K1 Function
The K1 function is realized over the relay output K1 on the motor plate.		
1K-->Operating indication		
2K-->Fault indication		
3K-->External fault indication  D1 function h60 [2D], D2 function (E1) h61 [2D]		
4K-->Limit over or falling bellow modulation factor  h70/h71		
5K-->Limit over or falling bellow E2  h74/h75		
6K-->Limit over or falling bellow E3  h79/h80		
8K-->Group control  n-min at Group2 h98		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	7	
Default	1	
Bit [15:0]	0=no function, 1=1K, 2=2K, 3=3K, 4=4K, 5=5K, 6=6K, 7=8K	

MB Holding Register 91, Address: h90		Inverting K1
Inverting of K1 function		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no inverting, 1=inverting active

MB Holding Register 133, Address: h132		Radio network code
Input radio network key  only AM-Premium-W		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		9999
Default		9999
Bit [15:0]		0 - 9999

MB Holding Register 134, Address: h133		Radio channel
Input radio network channel  only AM-Premium-W		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		15
Default		0
Bit [15:0]		0-15


3.6.5 Limits (1.01)


MB Holding Register 70, Address: h69		Limit modulation function
Selection of function assignment 1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K] 2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		2
Default		0
Bit [15:0]		0=no function, 1=1L, 2=2L


MB Holding Register 71, Address: h70		Limit modulation Min
Setting of min. limit value in rpm.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		Rated speed h126 (e.g. 1800)
Default		200
Bit [15:0]		0-Rated speed h126 [rpm]


MB Holding Register 72, Address: h71		Limit modulation Max
Setting of max. limit value in rpm.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		Rated speed h126 (e.g. 1800)
Default		200
Bit [15:0]		0-Rated speed h126 [rpm]

MB Holding Register 73, Address: h72		Limit modulation delay
Setting of the time delay in seconds from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	


MB Holding Register 74, Address: h73		Lmt E2 Function
Selection of function assignment		
1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K]		
2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	


MB Holding Register 75, Address: h74		Lmt E2 Min
Setting of min. limit value in 0.1 steps for analog input E2. Unit depends on selected type.		
 E.g voltage input 0-10V: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	min. sensor value	
Bit [15:0]	0-65535	


MB Holding Register 76, Address: h75		Lmt E2 Max
Setting of max. limit value in 0.1 steps for analog input E2. Unit depends on selected type.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	max. sensor value	
Bit [15:0]	0-65535	


MB Holding Register 77, Address: h76		Lmt E2 Hyst.
Setting of limit value hysteresis in 0.1 steps for analog input E2. Unit depends on selected type.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	0	
Bit [15:0]	0-65535	

MB Holding Register 78, Address: h77		Lmt E2 Delay
Setting of the time delay from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	

MB Holding Register 79, Address: h78		Lmt function E3
Selection of function assignment 1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K] 2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	

MB Holding Register 80, Address: h79		Lmt E3 Min
Setting of min. limit value in 0.1 steps for analog input E2. Unit depends on selected type.  E.g voltage input 0-10V: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	min. sensor value	
Bit [15:0]	0-65535	

MB Holding Register 81, Address: h80		Lmt E3 Max
Setting of max. limit value in 0.1 steps for analog input E2. Unit depends on selected type.  E.g voltage input 0-10V: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	max. sensor value	
Bit [15:0]	0-65535	

MB Holding Register 82, Address: h81		GW E3 Hysteresis
Setting of limit value hysteresis in 0.1 steps for analog input E2. Unit depends on selected type.  E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	0	
Bit [15:0]	0-65535	

MB Holding Register 83, Address: h82		Lmt E3 Delay
Setting of the time delay from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	

3.6.6 Motor Setup

MB Holding Register 125, Address: h124		Rampup time (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
The controller output rises or drops from 0 to 100% or vice versa within the set time.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	255	
Default	10	
Bit [15:0]	1-255 [s]	

MB Holding Register 126, Address: h125		Rampdown time (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
The controller output rises or drops from 0 to 100% or vice versa within the set time.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	255	
Default	2	
Bit [15:0]	1-255 [s]	

MB Holding Register 115, Address: h114		Suppression1 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression1.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	

MB Holding Register 116, Address: h115		Range1 Min
Input of the start speed from which Supression1 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	200	
Bit [15:0]	0-rated speed h126	

MB Holding Register 117, Address: h116		Range1 Max
Input of the stop speed from which Supression1 ends.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	300	
Bit [15:0]	0-rated speed h126	

MB Holding Register 118, Address: h117		Suppression2 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression2.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	

MB Holding Register 119, Address: h118		Range2 Min
Input of the start speed from which Supression2 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	400	
Bit [15:0]	0-rated speed h126	

MB Holding Register 120, Address: h119		Range2 Max
Input of the stop speed from which Supression2 ends		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	500	
Bit [15:0]	0-rated speed h126	

MB Holding Register 121, Address: h120		Suppression3 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression3.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	

MB Holding Register 122, Address: h121		Range3 Min
Input of the start speed from which Supression3 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	700	
Bit [15:0]	0-rated speed h126	

MB Holding Register 123, Address: h122		Range3 Max
Input of the stop speed from which Supression3 ends.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	800	
Bit [15:0]	0-rated speed h126	

MB Holding Register 124, Address: h123		LED Mode
Activation the LED for operation- / fault indication by flashing code.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	1	
Bit [15:0]	0-1	

MB Holding Register 127, Address: h126		Rated speed (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated speed in 1/min (rpm) \Rightarrow 1800 = 1800 rpm.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	1800	
Bit [15:0]	0-65535	

MB Holding Register 128, Address: h127		Rated current (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated current in 0.01 A steps \Rightarrow 250 = 2.50A.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	250	
Bit [15:0]	0-65535	

MB Holding Register 129, Address: h128		Rated voltage (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated voltage in V \Rightarrow 230 = 230V.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	230	
Bit [15:0]	0-65535	

MB Holding Register 130, Address: h129		Direction of rotation (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting direction of rotation \Rightarrow 1 = CW, 0 = CCW		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0-1	

MB Holding Register 131, Address: h130		Speed KP (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Input P-Factor for ECblue Controller		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	30000	
Bit [15:0]	0-65535	

MB Holding Register 132, Address: h131		Speed KI (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Input I-Factor for ECblue Controller		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	800	
Bit [15:0]	0-65535	

3.7 Mode 2.01 - 2.05


3.7.1 Settings (2.01 - 2.05)



MB Holding Register 4, Address: h3		Setpoint1
Setting Setpoint in °C. The register value 2740 corresponds a Setpoint 0. A register value of 2940 corresponds for a temperature sensor the value of 20.0 °C.		
Access / necessary PIN protection level	RW, NV	
minimal value	2240	
maximum value	4240	
Default	2940 (2.02=2790, 2.05=2740)	
Bit [15:0]	2240 - 4240	


MB Holding Register 5, Address: h4		Setpoint2
Setting Setpoint in °C. The register value 2740 corresponds a Setpoint 0. A register value of 2940 corresponds a temperature sensor with a value of 20.0 °C.		
Access / necessary PIN protection level	RW, NV	
minimal value	2240	
maximum value	4240	
Default	2940 (2.02=2790, 2.05=2740)	
Bit [15:0]	2240 - 4240	

MB Holding Register 6, Address: h5		Pband
Setting control range in K. The register value 2740 corresponds the value 0. A register value of 2760 corresponds for a temperature sensor the value of 2.0 K.		
Access / necessary PIN protection level	RW, NV	
minimal value	2740	
maximum value	4740	
Default	2790 (2.02=2940)	
Bit [15:0]	2740 - 4740	

MB Holding Register 113, Address: h112		Min. Speed
Setting the Min. Speed		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Max. Speed h113	
Default	0	
Bit [15:0]	0 - Max. Speed h113	

MB Holding Register 114, Address: h113		Max. Speed  ²⁾
Setting of Max. Speed (Rated speed)		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	Rated speed h126	
Bit [15:0]	0 - Rated speed h126 [1/min]	

MB Holding Register 16, Address: h15		Speed Manual mode  ²⁾
Speed setting for activated Manual mode in 1/min (rpm)  to activate Manual mode h16		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	200	
Bit [15:0]	0-Rated speed h126 [1/min]	


MB Holding Register 17, Address: h16		Manual mode
Activate Manual mode  speed for manual mode h15		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no function, 1=Manual mode active	


MB Holding Register 7, Address: h6		OffsetAnalogOut (only 2.03)
Setting an offset in 0.1K for analog output. The register value of 2740 corresponds a value 0. A register value of 2760 corresponds for a temperature sensor the value of 2.0 K.		
Access / necessary PIN protection level	RW, NV	
minimal value	2640	
maximum value	2840	
Default	2740	
Bit [15:0]	2640-2840	


MB Holding Register 9, Address: h8		PbandAnalogOut (only 2.03)
Setting the control range in 0.1 steps for the analog output. The register value 2740 corresponds a value 0. A register value of 2760 corresponds for a temperature sensor the value of 2.0 K.		
Access / necessary PIN protection level	RW, NV	
minimal value	2740	
maximum value	4740	
Default	2760	
Bit [15:0]	2740-4740	


MB Holding Register 14, Address: h13		Min. AnalogOut (only 2.03)
Setting a minimal output voltage in 0.1V steps		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	100	
Default	0	
Bit [15:0]	0-100	

MB Holding Register 15, Address: h14		Max. AnalogOut (only 2.03)
Setting a maximal output voltage in 0.1V steps		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	100	
Default	100	
Bit [15:0]	0-100	

MB Holding Register 8, Address: h7		OffsetDigitalOut (only 2.03)
Setting an offset in 0.1 K for Setpoint/Actual value for relay control.  Relais function K1 [9K, 10K] h58. The register value 2740 corresponds a value 0. A register value of 2760 corresponds for a temperature sensor the value of 2.0 K.		
Access / necessary PIN protection level	RW, NV	
minimal value	2640	
maximum value	2840	
Default	2730	
Bit [15:0]	2640-2840	

MB Holding Register 82, Address: h81		Hyst. DigitalOut (only 2.03) --> Lmt E3 Hysteresis
Setting switching hysteresis in 0.1 K for the relay output.  Relais function K1 [9K, 10K] h58. The register value 2740 corresponds a value 0. A register value of 2760 corresponds for a temperature sensor the value of 2.0 K.		
Access / necessary PIN protection level	RW, NV	
minimal value	2740	
maximum value	4740	
Default	2750	
Bit [15:0]	2740-4740	

MB Holding Register 75, Address: h74		Alarm Min (only 2.03) --> Lmt E2 Min
Setting the lower alarm limit in 0.1 °C.  Relais function K1 [2K] h58. A register value of 2760 corresponds a value 2.0 °C.		
Access / necessary PIN protection level	RW, NV	
minimal value	2240	
maximum value	4240	
Default	2740	
Bit [15:0]	2240-4240	

MB Holding Register 76, Address: h75		Alarm Max (only 2.03) --> Lmt E2 Max
Setting the upper alarm limit in 0.1 °C.  Relais function K1 [2K] h58. A register value of 2760 corresponds a value 2.0 °C.		
Access / necessary PIN protection level	RW, NV	
minimal value	2240	
maximum value	4240	
Default	3140	
Bit [15:0]	2240-4240	

2)

Values > max. Speed (h113) or rated speed (h126), are reduced for operation to max. speed or rated speed.

3.7.2 Basic settings (2.01 - 2.05)

MB Holding Register 64, Address: h63		E2 Analog IN
Selection analog input E2. In BUS Mode (h63=7) the control takes place by MODBUS register h9000. The value setting 0-32767 corresponds e.g. an analog input value of 0-10V.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	7	
Default	1	
Bit [15:0]	1=KTY, 2=PT1000, 3=120MTG, 4=0-10V, 5=0-20mA, 6=4-20mA, 7=BUS	


MB Holding Register 41, Address: h40		E2 Min
Setting the minimal value of E2 with corresponding unit in 0.1 steps, by a position after decimal point (---> h39). ☞ Only when E2 Analog IN (h63) selection 4=0-10V, 5=0-20mA, 6=4-20mA oder 7=BUS. Attention: value affects h3, h4, h5. New value is taken over at the same time to h45. For a E2 Analog IN setting of 0-10V corresponds a value of 2750 a voltage value of 1.0V (2750-2740=10 --> 1.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	min. sensor value	
Bit [15:0]	0-65535	

MB Holding Register 42, Address: h41		E2 Max
Setting the maximal value of E2 with corresponding unit in 0.1 steps, by a position after decimal point (----> h39). ☞ Only for E2 Analog IN (h63) selection 4=0-10V, 5=0-20mA, 6=4-20mA oder 7=BUS. Attention: value affects h3, h4, h5. New value is taken over at the same time to h46 For a E2 Analog IN setting of 0-10V corresponds a value of 2840 a voltage value of 10V (2840-2740=100 --> 10.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	depending on selection of h63, max. sensor value	
Bit [15:0]	0-65535	


MB Holding Register 40, Address: h39		E2 Decimals
Number of decimal places. ☞ Only for E2 Analog IN h63 selection 4=0-10V, 5=0-20mA, 6=4-20mA oder 7=BUS. The setting values may have to be adjusted accordingly if the decimal places count changes!		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	3	
Default	1	
Bit [15:0]	0-3	


MB Holding Register 39, Address: h38		E2 Unit
Selection of display unit ☞ Only for E2 Analog IN h63 selection 4=0-10V, 5=0-20mA, 6=4-20mA oder 7=BUS.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	14	
Default	depending on selection of h63	
Bit [15:0]	0=mA, 1=V, 2=Hz, 3=kHz, 4=A, 5=rpm, 6=°C, 7=m3/h, 8=bar, 9=%, 10=Pa, 11=m/s, 12=m3/s, 13=Ohm, 14=mbr	


MB Holding Register 43, Address: h42		E2 Offset
Offset to sensor adjustment with comparison measurement unit. Example: 1.5K --> input value in register: 2740+15=2755 The register value 2740 corresponds a value 0. A register value of 2760 corresponds for a temperature sensor the value of 2.0 K. A register value of 2720 corresponds for a temperature sensor the value of -2.0 K.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	2740	
Bit [15:0]	0-65535	


MB Holding Register 63, Address: h62		E3 Function
1E-->setting with second analog signal (E3) and switch over between both signals by digital input D1  D1 function h60 setting [4D] 2E-->External Manual Mode. 3E-->average value E2/E3. 4E-->setting with second analog signal (E3) and control to the respective higher value. 5E-->Sensor difference E2/E3 6E-->Sensor for Setpoint 7E-->Measurement value		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	7	
Default	0 (2.04=4, 2.05=5)	
Bit [15:0]	0=no function, 1=1E, 2=2E, 3=3E, 4=4E, 5=5E, 6=6E, 7=7E	

MB Holding Register 65, Address: h64		E3 Analog IN
Selection analog input E3. No function if E3 functions h62=0. In BUS Mode (h63=7) the control takes place by MODBUS register h9001. The value setting 0-32767 corresponds e.g. an analog input value of 0-10V.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	7	
Default	1	
Bit [15:0]	1=KTY, 2=PT1000, 3=120MTG, 4=0-10V, 5=0-20mA, 6=4-20mA, 7=BUS	

MB Holding Register 50, Address: h49		E3 Min
Setting the minimal value of E3 with corresponding unit in 0.1 steps, by a position after decimal point (---> h48).  Only when E3 Analog IN (h64) selection 4=0-10V, 5=0-20mA, 6=4-20mA oder 7=BUS. New value is taken over at the same time to h54 For a E3 Analog IN setting of 0-10V corresponds a value of 2750 a voltage value of 1.0V (2750-2740=10 --> 1.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	min. sensor value	
Bit [15:0]	0-65535	

MB Holding Register 51, Address: h50		E3 Max
Setting the minimal value of E3 with corresponding unit in 0.1 steps, by a position after decimal point (---> h48).  Only when E3 Analog IN (h64) selection 4=0-10V, 5=0-20mA, 6=4-20mA oder 7=BUS. New value is taken over at the same time to h55 For a E3 Analog IN setting of 0-10V corresponds a value of 2840 a voltage value of 10V (2840-2740=100 --> 10.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	depending on selection of h64, max. sensor value	
Bit [15:0]	0-65535	


MB Holding Register 49, Address: h48		E3 Decimals
Number of decimal places.  Only for E3 Analog IN h64 selection 4=0-10V, 5=0-20mA, 6=4-20mA oder 7=BUS. The setting values may have to be adjusted accordingly if the decimal places count changes!		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	3	
Default	1	
Bit [15:0]	0-3	

MB Holding Register 48, Address: h47		E3 Unit
Selection of display unit  Only for E3 Analog IN h64 selection 4=0-10V, 5=0-20mA, 6=4-20mA oder 7=BUS.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	14	
Default	depending on selection of h64	
Bit [15:0]	0=mA, 1=V, 2=Hz, 3=kHz, 4=A, 5=rpm, 6=°C, 7=m3/h, 8=bar, 9=%, 10=Pa, 11=m/s, 12=m3/s, 13=Ohm, 14=mbr	


MB Holding Register 52, Address: h51		E3 Offset
Offset to sensor adjustment with comparison measurement unit. Example: 1.5K --> input value in register: 2740+15=2755 The register value 2740 corresponds a value 0. A register value of 2760 corresponds for a temperature sensor the value of 2.0 K. A register value of 2720 corresponds for a temperature sensor the value of -2.0 K.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	2740	
Bit [15:0]	0-65535	


3.7.3 Controller Setup (2.01 - 2.05)

MB Holding Register 35, Address: h34	Alarm sensors
Activating the sensor alarm.	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	1
Default	0
Bit [15:0]	0=no function, 1=Sensor alarm activated

MB Holding Register 25, Address: h24	Limit
Setting the limitation of modulation and activation by a digital input D1 or D2.  D1 function h60 setting [3D], D2 (E1) function h61setting [3D]	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	Rated speed h126
Default	200
Bit [15:0]	0-rated speed h126

MB Holding Register 23, Address: h22	Minimum speed cut off
Setting of a difference in steps of 0.1 to the setpoint at which the minimum air switch-off becomes active. If the value is positive, the fan will be switched off before reaching the setpoint, if the value is negative, after dropping below the setpoint. The register value 2740 corresponds the value 0, function deactivated A register value of 2760 corresponds for a temperature sensor the value of 2.0 K. A register value of 2720 corresponds for a temperature sensor the value of -2.0 K.	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	65535
Default	2740
Bit [15:0]	0-65535

MB Holding Register 98, Address: h97	Group 2 ON value
If the setting signal of the control (0-100%) exceeds the value set here, the setting signal for group 2 is output at analog output A1 and group 1 is reduced to the value n-min for group 2 (h98). From here on both groups run parallel at maximum power. Function active, if  A1 function h56 setting [5A]	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	100
Default	50 (50%)
Bit [15:0]	0-100

MB Holding Register 99, Address: h98	n-min at Group2
If the setting signal of the control (0-100%) exceeds the value of one value group 2 (h97), the relay K1 switches on group 2 and group 1 is reduced to the value n-min for group 2 (h98). From here on group 1 runs at maximum power. Function active, if  K1 function h58 setting [8K]	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	100
Default	20 (20%)
Bit [15:0]	0-100

MB Holding Register 21, Address: h20		Change over control function (Actual>Set=n+)
Activation of the control function change over		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		1
Bit [15:0]		0=Actual<Set=n+, 1=Actual>Set=n+

MB Holding Register 20, Address: h19		Controller type
Setting the controller type		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		1
Bit [15:0]		0=P, 1=PID


MB Holding Register 31, Address: h30		KP
Setting P-Factor		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		200
Default		50
Bit [15:0]		0-200

MB Holding Register 32, Address: h31		KI
Setting I-Factor		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		200
Default		50
Bit [15:0]		0-200

MB Holding Register 33, Address: h32		KD
Setting D-Factor		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		200
Default		50
Bit [15:0]		0-200

MB Holding Register 34, Address: h33		TI
Setting I-time (control setting time)		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		200
Default		0
Bit [15:0]		0-200






3.7.4 IO Setup (2.01 - 2.05)

MB Holding Register 57, Address: h56		A1 Function
1A-->constant voltage (10V output)		
2A-->output voltage proportional to modulation		
3A-->output voltage proportional input E2		
4A-->output voltage proportional input E3		
5A-->output voltage proportional to modulation, from On value Group2,  h97		
6A-->output voltage for mode 2.03 cooling function		
7A-->output voltage for mode 2.03 heating function		
9A-->output voltage proportional to speed		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		6 (2.03=8)
Default		1 (2.03=6)
Bit [15:0]		0=no fuction, 1=1A, 2=2A, 3=3A, 4=4A, 5=5A, 6=9A (only 2.03: 1=1A, 2=2A, 3=3A, 4=4A, 5=5A, 6=6A, 7=7A, 8=9A)

MB Holding Register 66, Address: h65		A1 Min
Min. value of output voltage at A1 in 0.1V steps.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		0
Bit [15:0]		0-100 [0-10V]






MB Holding Register 67, Address: h66		A1 Max
Max. value of output voltage at A1 in 0.1V steps.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		100
Bit [15:0]		0-100 [0-10V]

MB Holding Register 97, Address: h96		Inverting A1
Inverting of output voltage at A1		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no inverting, 1=inverting active

MB Holding Register 61, Address: h60		D1 Function
1D-->ON/OFF function		
2D-->external fault indication input		
3D-->Limit functions ON/OFF  Limit function h24		
4D-->switch over E2/E3  E3 function h62 [1E]		
5D-->switch over set intern1/ intern2  h9/h10		
6D-->switch over intern1/external  h9/E2 , set external1 h17=OFF		
7D-->switch over Control/Manual mode		
8D-->Switch over control function (e.g. heating/cooling)		
10D-->device Reset		
11D-->setting Max. speed ON/OFF  Max. Speed1 h12		
13D-->switch over direction of rotation		
14D-->Current modulation value is frozen and issued ("Freeze" function).		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		12
Default		0
Bit [15:0]		0=no function, 1=1D, 2=2D, 3=3D, 4=4D, 5=5D, 6=6D, 7=7D, 8=8D, 9=10D, 10=11D, 11=13D, 12=14D


MB Holding Register 93, Address: h92		D1 Inverting
Inverting of D1 function		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no inverting, 1=inverting active


MB Holding Register 105, Address: h104		D1 BUS Mode
If BUS Mode active, D1 function by MODBUS register c0.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no function, 1=BUS mode active


MB Holding Register 62, Address: h61		D2 function (E1)
The D2 function is realized over the analog input E1 on the motor plate.		
1D-->ON/OFF function		
2D-->external fault indication input		
3D-->Limit functions ON/OFF  Limit function h24		
4D-->switch over E2/E3  E3 function h62 [1E]		
5D-->switch over set intern1/ intern2  h9/h10		
6D-->switch over intern1/external  h9/E2 , set external1 h17=OFF		
7D-->switch over Control/Manual mode		
8D-->Switch over control function (e.g. heating/cooling)		
10D-->device Reset		
11D-->setting Max. speed ON/OFF  Max. Speed1 h12		
13D-->switch over direction of rotation		
14D-->Current modulation value is frozen and issued ("Freeze" function).		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		12
Default		0
Bit [15:0]		0=no function, 1=1D, 2=2D, 3=3D, 4=4D, 5=5D, 6=6D, 7=7D, 8=8D, 9=10D, 10=11D, 11=13D, 12=14D


MB Holding Register 94, Address: h93		D2 Inverting (E1)
Inverting of D2 function		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no inverting, 1=inverting active


MB Holding Register 106, Address: h105		D2 BUS Mode (E1)
If BUS Mode active, D2 function by MODBUS register c1.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no function, 1=BUS mode active


MB Holding Register 107, Address: h106		E2 Min
Signal adaption E2  E2 Mode h110		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		0
Bit [15:0]		0-100 [%]

MB Holding Register 108, Address: h107		E2 Max
Signal adaption E2  E2 Mode h110		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		100
Bit [15:0]		0-100 [%]

MB Holding Register 109, Address: h108		E3 Min
Signal adaption E3  E3 Mode h111		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		0
Bit [15:0]		0-100 [%]









MB Holding Register 110, Address: h109		E3 Max
Signal adaption E3  E3 Mode h111		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		100
Bit [15:0]		0-100 [%]

MB Holding Register 111, Address: h110		E2 Mode
Signal adaption E2  only for Mode 1.x, see operating instructions		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=Offset/Rotation (Modus1), 2=Signal range (Modus2)	


MB Holding Register 112, Address: h111		E3 Mode
Signal adaption E3  only for Mode 1.x, see operating instructions		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=Offset/Rotation (Modus1), 2=Signal range (Modus2)	


MB Holding Register 95, Address: h94		Inverting E2
Inverting of E2 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	

MB Holding Register 96, Address: h95		Inverting E3
Inverting of E3 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	


MB Holding Register 59, Address: h58		K1 Function
The K1 function is realized over the relay output K1 on the motor plate.		
1K-->Operating indication		
2K-->Fault indication		
3K-->External fault indication  D1 function h60 [2D], D2 function (E1) h61 [2D]		
4K-->Limit over or falling bellow modulation factor  h70/h71		
5K-->Limit over or falling bellow E2  h74/h75		
6K-->Limit over or falling bellow E3  h79/h80		
7K-->Setpoint Offset, deviation between actual value and setpoint too high  h84/h85		
8K-->Group control  n-min at Group2 h98		
9K-->Heating function only 2.03  h7/h81		
10K-->cooling function only 2.03  h7/h81		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	8 (2.03=10)	
Default	1 (2.03=2)	
Bit [15:0]	0=without function 2.01, 2.02, 2.04, 2.05: 1=1K, 2=2K, 3=3K, 4=4K, 5=5K, 6=6K, 7=7K, 8=8K 2.03: 1=1K, 2=2K, 3=3K, 4=4K, 5=5K, 6=6K, 7=7K, 8=8K, 9=9K, 10=10K	

MB Holding Register 91, Address: h90		K1 Inverting
Inverting of K1 function		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no inverting, 1=inverting active

MB Holding Register 133, Address: h132		Radio network code
Input radio network key  only AM-Premium-W		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		9999
Default		9999
Bit [15:0]		0 - 9999

MB Holding Register 134, Address: h133		Radio channel
Input radio network channel  only AM-Premium-W		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		15
Default		0
Bit [15:0]		0-15


3.7.5 Limits (2.01 - 2.05)


MB Holding Register 70, Address: h69		Limit modulation function
Selection of function assignment 1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K] 2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		2
Default		0
Bit [15:0]		0=no function, 1=1L, 2=2L


MB Holding Register 71, Address: h70		Limit modulation Min
Setting of min. limit value in rpm.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		Rated speed h126 (e.g. 1800)
Default		200
Bit [15:0]		0-Rated speed h126 [rpm]


MB Holding Register 72, Address: h71		Limit modulation Max
Setting of max. limit value in rpm.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		Rated speed h126 (e.g. 1800)
Default		200
Bit [15:0]		0-Rated speed h126 [rpm]

MB Holding Register 73, Address: h72		Limit modulation delay
Setting of the time delay in seconds from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	


MB Holding Register 74, Address: h73		Lmt E2 Function
Selection of function assignment		
1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K]		
2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0 (2.03=1)	
Bit [15:0]	0=no function, 1=1L, 2=2L	


MB Holding Register 75, Address: h74		Lmt E2 Min
Setting of min. limit value in 0.1 steps for analog input E2. Unit depends on selected sensor type.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	2240	
maximum value	4240	
Default	2740	
Bit [15:0]	2240-4240	


MB Holding Register 76, Address: h75		Lmt E2 Max
Setting of max. limit value in 0.1 steps for analog input E2. Unit depends on selected sensor type.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	2240	
maximum value	4240	
Default	2740 (3140 for 2.03 --> 40.0°C)	
Bit [15:0]	2240-4240	


MB Holding Register 77, Address: h76		Lmt E2 Hyst.
Setting of limit value hysteresis in 0.1 steps for analog input E2. Unit depends on selected sensor type.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	2740	
maximum value	4740	
Default	2740 (2750 for 2.03 --> 1.0K)	
Bit [15:0]	2740-4740	

MB Holding Register 78, Address: h77		Lmt E2 Delay
Setting of the time delay from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	0 (2.03=2)	
Bit [15:0]	0-120 [s]	


MB Holding Register 79, Address: h78		Lmt function E3
Selection of function assignment 1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K] 2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	

MB Holding Register 80, Address: h79		Lmt E3 Min
Setting the min. limit value for E3 in 0.1 steps.  E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	2240	
maximum value	4240	
Default	2240	
Bit [15:0]	2240-4240	

MB Holding Register 81, Address: h80		Lmt E3 Max
Setting the max. limit value for E3 in 0.1 steps.  E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	2240	
maximum value	4240	
Default	2240	
Bit [15:0]	2240-4240	

MB Holding Register 82, Address: h81		GW E3 Hysteresis
Setting the limit value.  E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	2740	
maximum value	4740	
Default	2750	
Bit [15:0]	2740-4740	

MB Holding Register 83, Address: h82		Lmt E3 Delay
Setting of the time delay from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	

MB Holding Register 84, Address: h83		Lmt Offset Function
Selection of function assignment 1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K] 2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	

MB Holding Register 85, Address: h84		Lmt Offset 1
Setting the limit value.		
☞ E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	2740	
Bit [15:0]	0-65535	

MB Holding Register 86, Address: h85		Lmt Offset 2
Setting the limit value.		
☞ E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	2740	
Bit [15:0]	0-65535	

MB Holding Register 87, Address: h86		Lmt Offset Hysteresis
Setting the limit value.		
☞ E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	2740	
maximum value	4740	
Default	2761	
Bit [15:0]	2740-4740	

MB Holding Register 88, Address: h87		Lmt Offset delay
Setting of the time delay from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	

3.7.6 Motor Setup

MB Holding Register 125, Address: h124		Rampup time (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
The controller output rises or drops from 0 to 100% or vice versa within the set time.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	255	
Default	10	
Bit [15:0]	1-255 [s]	

MB Holding Register 126, Address: h125		Rampdown time (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
The controller output rises or drops from 0 to 100% or vice versa within the set time.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	255	
Default	2	
Bit [15:0]	1-255 [s]	

MB Holding Register 115, Address: h114		Suppression1 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression1.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	

MB Holding Register 116, Address: h115		Range1 Min
Input of the start speed from which Supression1 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	200	
Bit [15:0]	0-rated speed h126	

MB Holding Register 117, Address: h116		Range1 Max
Input of the stop speed from which Supression1 ends.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	300	
Bit [15:0]	0-rated speed h126	

MB Holding Register 118, Address: h117		Suppression2 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression2.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	

MB Holding Register 119, Address: h118		Range2 Min
Input of the start speed from which Supression2 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	400	
Bit [15:0]	0-rated speed h126	

MB Holding Register 120, Address: h119		Range2 Max
Input of the stop speed from which Supression2 ends		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	500	
Bit [15:0]	0-rated speed h126	

MB Holding Register 121, Address: h120		Suppression3 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression3.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	


MB Holding Register 122, Address: h121		Range3 Min
Input of the start speed from which Supression3 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	700	
Bit [15:0]	0-rated speed h126	


MB Holding Register 123, Address: h122		Range3 Max
Input of the stop speed from which Supression3 ends.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	800	
Bit [15:0]	0-rated speed h126	

MB Holding Register 124, Address: h123		LED Mode
Activation the LED for operation- / fault indication by flashing code.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	1	
Bit [15:0]	0-1	

MB Holding Register 127, Address: h126		Rated speed (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated speed in 1/min (rpm) ⚙ 1800 = 1800 rpm.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	1800	
Bit [15:0]	0-65535	

MB Holding Register 128, Address: h127		Rated current (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated current in 0.01 A steps ⚙ 250 = 2.50A.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	250	
Bit [15:0]	0-65535	

MB Holding Register 129, Address: h128		Rated voltage (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated voltage in V  230 = 230V.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	230	
Bit [15:0]	0-65535	


MB Holding Register 130, Address: h129		Direction of rotation (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting direction of rotation  1 = CW, 0 = CCW		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0-1	


MB Holding Register 131, Address: h130		Speed KP (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Input P-Factor for ECblue Controller		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	30000	
Bit [15:0]	0-65535	


MB Holding Register 132, Address: h131		Speed KI (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Input I-Factor for ECblue Controller		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	800	
Bit [15:0]	0-65535	

3.8 Mode 3.01 - 3.04


3.8.1 Settings (3.01 - 3.04)



MB Holding Register 4, Address: h3		Setpoint 1 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting Setpoint in °C or bar. The register value 2740 corresponds a Setpoint 0. A register value of 2940 corresponds for a temperature sensor the value of 20.0 °C. For a pressure sensor corresponds a register value 2940 a pressure of 12 bar.		
Access / necessary PIN protection level	RW, NV	
minimal value	3.02 and 3.04=1853 3.01 and 3.03=2740	
maximum value	3.02 and 3.04=2792 3.01 and 3.03=5740	
Default	3.02 and 3.04=3090 3.01 and 3.03=3940	
Bit [15:0]	0 - 65535  setting range depending on refrigerant	


MB Holding Register 5, Address: h4		Setpoint 2 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting Setpoint in °C or bar . The register value 2740 corresponds a Setpoint 0. A register value of 2940 corresponds a temperature sensor with a value of 20.0 °C.		
Access / necessary PIN protection level	RW, NV	
minimal value	3.02 and 3.04=1853 3.01 and 3.03=2740	
maximum value	3.02 and 3.04=2792 3.01 and 3.03=5740	
Default	3.02 and 3.04=3090 3.01 and 3.03=3940	
Bit [15:0]	0 - 65535  setting range depending on refrigerant	

MB Holding Register 6, Address: h5		Pband
Setting control range in K. The register value 2740 corresponds the value 0. A register value of 2760 corresponds for a temperature sensor the value of 2.0 K.		
Access / necessary PIN protection level	RW, NV	
minimal value	2740	
maximum value	3.02 and 3.04=3679 3.01 and 3.03=5740	
Default	3.01 and 3.03=3240 3.02 and 3.04=2810	
Bit [15:0]	2740 - 65535  setting range depending on refrigerant	

MB Holding Register 113, Address: h112		Min. Speed
Setting the Min. Speed		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Max. Speed h133	
Default	0	
Bit [15:0]	0 - Max. speed h133 [1/min]	

MB Holding Register 114, Address: h113		Max. Speed  ²⁾
Setting of Max. Speed (Rated speed)		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	Rated speed h126	
Bit [15:0]	0 - Rated speed h126 [1/min]	

MB Holding Register 16, Address: h15		Speed Manual mode  ²⁾
Speed setting for active manual operation 1/min (rpm)  h15		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	200	
Bit [15:0]	0-Rated speed h126 [1/min]	


MB Holding Register 17, Address: h16  speed for manual mode h15		Manual mode
Activate Manual mode		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no function, 1=Manual mode active	


2)


Values > Rated speed (h126) are reduced for operation to rated speed.


3.8.2 Basic settings (3.01- 3.04)


MB Holding Register 64, Address: h63		E2 Analog IN
Selection analog input E2. In BUS Mode (h63=7) the control takes place by MODBUS register h9000. The value setting 0-32767 corresponds e.g. an analog input value of 0-10V.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	7	
Default	1	
Bit [15:0]	1=0-30MBG, 2=0-50MBG, 3=2-25DSF, 4=0-10V, 5=0-20mA, 6=4-20mA, 7=BUS	

MB Holding Register 45, Address: h44		E2 Refrigerant
Selection refrigerants		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	25	
Default	23 (R503)	
Bit [15:0]	0-25  see table L-BAL-E095	


MB Holding Register 41, Address: h40		E2 Min
Setting the minimal value of E2 with corresponding unit in 0.1 steps, by a position after decimal point (---> h39).  Only when E2 Analog IN (h63) selection 4=0-10V, 5=0-20mA, 6=4-20mA oder 7=BUS. Attention: value affects h3, h4, h5. New value is taken over at the same time to h45. For a E2 Analog IN setting of 0-10V corresponds a value of 2750 a voltage value of 1.0V (2750-2740=10 --> 1.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	min. sensor value	
Bit [15:0]	0-65535	

MB Holding Register 42, Address: h41		E2 Max
Setting the maximal value of E2 with corresponding unit in 0.1 steps, by a position after decimal point (---> h39).  Only for E2 Analog IN (h63) selection 10=0-10V, 11=0-20mA, 12=4-20mA or 13=Bus. Attention: value affects h3, h4, h5. New value is taken over at the same time to h46 For a E2 Analog IN setting of 0-10V corresponds a value of 2840 a voltage value of 10V (2840-2740=100 --> 10.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	depending on selection of h63, max. sensor value	
Bit [15:0]	0-65535	


MB Holding Register 40, Address: h39		E2 Decimals
Number of decimal places.  Only for E2 Analog IN h63 selection 4=0-10V, 5=0-20mA or 6=4-20mA. The setting values may have to be adjusted accordingly if the decimal places count changes.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	3	
Default	1	
Bit [15:0]	0-3	


MB Holding Register 39, Address: h38		E2 Unit
Selection of display unit  Only for E2 Analog IN h63 selection 4=0-10V, 5=0-20mA or 6=4-20mA.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	14	
Default	1	
Bit [15:0]	0=mA, 1=V, 2=Hz, 3=kHz, 4=A, 5=rpm, 6=°C, 7=m3/h, 8=bar, 9=%, 10=Pa, 11=m/s, 12=m3/s, 13=Ohm, 14=mbr	


MB Holding Register 43, Address: h42		E2 Offset
Offset to sensor adjustment with comparison measurement unit. Example: 1.5K --> input value in register: 2740+15=2755 The register value 2740 corresponds a value 0. A register value of 2760 corresponds for a temperature sensor the value of 2.0 K. A register value of 2720 corresponds for a temperature sensor the value of -2.0 K.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	2740	
Bit [15:0]	0-65535	

MB Holding Register 63, Address: h62		E3 Function
1E-->setting with second analog signal (E3) and switch over between both signals by digital input D1  D1 function h60 setting [4D]		
2E-->External Manual Mode.		
3E-->average value E2/E3.		
4E-->setting with second analog signal (E3) and control to the respective higher value.		
5E-->Sensor difference E2/E3		
6E-->Sensor for Setpoint		
7E-->Measurement value		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		7
Default		0 (3.03 and 3.04=4)
Bit [15:0]		0=no function, 1=1E, 2=2E, 3=3E, 4=4E, 5=5E, 6=6E, 7=7E

MB Holding Register 65, Address: h64		E3 Analog IN
Selection analog input E3. No function if E3 functions h62=0.		
In BUS Mode (h63=7) the control takes place by MODBUS register h9001. The value setting 0-32767 corresponds e.g. an analog input value of 0-10V.		
Access / necessary PIN protection level		RW, NV
minimal value		1
maximum value		7
Default		1
Bit [15:0]		1=0-30MBG, 2=0-50MBG, 3=2-25DSF, 4=0-10V, 5=0-20mA, 6=4-20mA, 7=BUS

MB Holding Register 54, Address: h53		E3 Refrigerant
Selection refrigerants		
Access / necessary PIN protection level		RW, NV
minimal value		1
maximum value		25
Default		23
Bit [15:0]		0-25  see table L-BAL-E095

MB Holding Register 50, Address: h49		E3 Min
Setting the minimal value for E3 with the corresponding unit in 0.1 steps.		
 Only for E3 Analog IN h64 selection 4=0-10V, 5=0-20mA, 6=4-20mA oder 7=BUS.		
New value is taken over at the same time to h54.		
For a E3 Analog IN setting of 0-10V corresponds a value of 2750 a voltage value of 1.0V (2750-2740=10)		
Access / necessary PIN protection level		RW, NV
minimal value		min. sensor value
maximum value		max. sensor value
Default		min. sensor value
Bit [15:0]		0-65535

MB Holding Register 51, Address: h50		E3 Max
Setting the maximal value for E3 with the corresponding unit in 0.1 steps.		
 Only for E3 Analog IN h64 selection 4=0-10V, 5=0-20mA or 6=4-20mA.		
New value is taken over at the same time to h55		
For a E3 Analog IN setting of 0-10V corresponds a value of 2750 a voltage value of 1.0V (2750-2740=10)		
Access / necessary PIN protection level		RW, NV
minimal value		min. sensor value
maximum value		max. sensor value
Default		max. sensor value
Bit [15:0]		0-65535

MB Holding Register 49, Address: h48		E3 Decimals
Number of decimal places. ☞ Only for E3 Analog IN h64 selection 4=0-10V, 5=0-20mA or 6=4-20mA.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	3	
Default	1	
Bit [15:0]	0-3	

MB Holding Register 48, Address: h47		E3 Unit
Selection of display unit ☞ Only for E3 Analog IN h64 selection 4=0-10V, 5=0-20mA or 6=4-20mA.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	14	
Default	1	
Bit [15:0]	0=mA, 1=V, 2=Hz, 3=kHz, 4=A, 5=rpm, 6=°C, 7=m3/h, 8=bar, 9=%, 10=Pa, 11=m/s, 12=m3/s, 13=Ohm, 14=mbr	

MB Holding Register 52, Address: h51		E3 Offset
Offset to sensor adjustment with comparison measurement unit. Example: 1.5K --> input value in register: 2740+15=2755 The register value 2740 corresponds a value 0. A register value of 2760 corresponds for a temperature sensor the value of 2.0 K. A register value of 2720 corresponds for a temperature sensor the value of -2.0 K.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	2740	
Bit [15:0]	0-65535	

3.8.3 Controller Setup (3.01 - 3.04)

MB Holding Register 35, Address: h34		Alarm sensors
Activating the sensor alarm		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no function, 1=	

MB Holding Register 25, Address: h24		Limit
Setting the limitation of modulation and activation by a digital input D1 or D2. ☞ D1 function h60 setting [3D], D2 (E1) function h61setting [3D]		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	200	
Bit [15:0]	0-rated speed h126	

MB Holding Register 23, Address: h22		Minimum speed cut off
Setting of a difference in steps of 0.1 to the setpoint at which the minimum air switch-off becomes active. If the value is positive, the fan will be switched off before reaching the setpoint, if the value is negative, after dropping below the setpoint. The register value 2740 corresponds the value 0, function deactivated. A register value of 2760 corresponds for a temperature sensor the value of 2.0K. A register value of 2720 corresponds for a temperature sensor the value of -2.0K.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	2740	
Bit [15:0]	0-65535	

MB Holding Register 98, Address: h97		Group 2 ON value
If the setting signal of the control (0-100%) exceeds the value set here, the setting signal for group 2 is output at analog output A1 and group 1 is reduced to the value n-min for group 2 (h98). From here on both groups run parallel at maximum power. ☞ A1 function h56 setting [5A]		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	100	
Default	50 (50%)	
Bit [15:0]	0-100	

MB Holding Register 99, Address: h98		n-min at Group2
If the setting signal of the control (0-100%) exceeds the value of one value group 2 (h97), the relay K1 switches on group 2 and group 1 is reduced to the value n-min for group 2 (h98). From here on group 1 runs at maximum power. ☞ K1 function h58 setting [8K]		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	100	
Default	20 (20%)	
Bit [15:0]	0-100	

MB Holding Register 21, Address: h20		Change over control function (Actual>Set=n+)
Activation of the control function change over		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=Actual<Set=n+, 1=Actual>Set=n+	

MB Holding Register 20, Address: h19		Controller type
Setting the controller type		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	1	
Bit [15:0]	0=P, 1=PID	


MB Holding Register 31, Address: h30		KP
Setting P-Factor		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		200
Default		50
Bit [15:0]		0-200

MB Holding Register 32, Address: h31		KI
Setting I-Factor		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		200
Default		50
Bit [15:0]		0-200

MB Holding Register 33, Address: h32		KD
Setting D-Factor		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		200
Default		50
Bit [15:0]		0-200

MB Holding Register 34, Address: h33		TI
Setting I-time		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		200
Default		0
Bit [15:0]		0-200






3.8.4 IO Setup (3.01 - 3.04)

MB Holding Register 57, Address: h56		A1 Function
1A-->constant voltage (10V output)		
2A-->output voltage proportional to modulation		
3A-->output voltage proportional input E2		
4A-->output voltage proportional input E3		
5A-->output voltage proportional to modulation, from On value Group2,  h97		
9A-->output voltage proportional to speed		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		6
Default		1
Bit [15:0]		0=no fuction, 1=1A, 2=2A, 3=3A, 4=4A, 5=5A, 6=9A

MB Holding Register 66, Address: h65		A1 Min
Min. value of output voltage at A1 in 0.1V steps.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		0
Bit [15:0]		0-100 [0-10V]






MB Holding Register 67, Address: h66		A1 Max
Max. value of output voltage at A1 in 0.1V steps.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		100
Bit [15:0]		0-100 [0-10V]

MB Holding Register 97, Address: h96		Inverting A1
Inverting of output voltage at A1		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no inverting, 1=inverting active

MB Holding Register 61, Address: h60		D1 Function
1D-->ON/OFF function		
2D-->external fault indication input		
3D-->Limit functions ON/OFF  Limit function h24		
4D-->switch over E2/E3  E3 function h62 [1E]		
5D-->switch over set intern1/ intern2  h9/h10		
6D-->switch over intern1/external  h9/E2 , set external1 h17=OFF		
10D-->device Reset		
11D-->setting Max. speed ON/OFF  Max. Speed1 h12		
13D-->switch over direction of rotation		
14D-->Current modulation value is frozen and issued ("Freeze" function).		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		10
Default		0
Bit [15:0]		0=no function, 1=1D, 2=2D, 3=3D, 4=4D, 5=5D, 6=6D, 7=10D, 8=11D, 9=13D, 10=14D


MB Holding Register 93, Address: h92		D1 Inverting
Inverting of D1 function		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no inverting, 1=inverting active


MB Holding Register 105, Address: h104		D1 BUS Mode
If BUS Mode active, D1 function by MODBUS register c0.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no function, 1=BUS mode active


MB Holding Register 62, Address: h61		D2 function (E1)
The D2 function is realized over the analog input E1 on the motor plate.		
1D-->ON/OFF function		
2D-->external fault indication input		
3D-->Limit functions ON/OFF  Limit function h24		
4D-->switch over E2/E3  E3 function h62 [1E]		
5D-->switch over set intern1/ intern2  h9/h10		
6D-->switch over intern1/external  h9/E2 , set external1 h17=OFF		
10D-->device Reset		
11D-->setting Max. speed ON/OFF  Max. Speed1 h12		
13D-->switch over direction of rotation		
14D-->Current modulation value is frozen and issued ("Freeze" function).		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	10	
Default	0	
Bit [15:0]	0=no function, 1=1D, 2=2D, 3=3D, 4=4D, 5=5D, 6=6D, 7=10D, 8=11D, 9=13D, 10=14D	


MB Holding Register 94, Address: h93		D2 Inverting (E1)
Inverting of D2 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	


MB Holding Register 106, Address: h105		D2 BUS Mode (E1)
If BUS Mode active, D2 function by MODBUS register c1.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no function, 1=BUS mode active	


MB Holding Register 107, Address: h106		E2 Min
Signal adaption E2  E2 Mode h110		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	100	
Default	0	
Bit [15:0]	0-100 [%]	

MB Holding Register 108, Address: h107		E2 Max
Signal adaption E2  E2 Mode h110		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	100	
Default	100	
Bit [15:0]	0-100 [%]	

MB Holding Register 109, Address: h108		E3 Min
Signal adaption E3  E3 Mode h111		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	100	
Default	0	
Bit [15:0]	0-100 [%]	






MB Holding Register 110, Address: h109		E3 Max
Signal adaption E3  E3 Mode h111		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	100	
Default	100	
Bit [15:0]	0-100 [%]	

MB Holding Register 111, Address: h110		E2 Mode
Signal adaption E2  only for operation mode 1.x, see operating instructions		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=Offset/Rotation (Modus1), 2=Signal range (Modus2)	


MB Holding Register 112, Address: h111		E3 Mode
Signal adaption E3  only for operation mode 1.x, see operating instructions		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=Offset/Rotation (Modus1), 2=Signal range (Modus2)	


MB Holding Register 95, Address: h94		Inverting E2
Inverting of E2 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	

MB Holding Register 96, Address: h95		Inverting E3
Inverting of E3 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	


MB Holding Register 59, Address: h58		K1 Function
The K1 function is realized over the relay output K1 on the motor plate.		
1K-->Operating indication		
2K-->Fault indication		
3K-->External fault indication  D1 function h60 [2D], D2 function (E1) h61 [2D]		
4K-->Limit over or falling below modulation factor  h70/h71		
5K-->Limit over or falling below E2  h74/h75		
6K-->Limit over or falling below E3  h79/h80		
8K-->Group control  n-min at Group2 h98		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	7	
Default	1	
Bit [15:0]	0=no function, 1=1K, 2=2K, 3=3K, 4=4K, 5=5K, 6=6K, 7=8K	

MB Holding Register 91, Address: h90		K1 Inverting
Inverting of K1 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	

MB Holding Register 133, Address: h132		Radio network code
Input radio network key  only AM-Premium-W		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	9999	
Default	9999	
Bit [15:0]	0 - 9999	

MB Holding Register 134, Address: h133		Radio channel
Input radio network channel  only AM-Premium-W		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	15	
Default	0	
Bit [15:0]	0-15	


3.8.5 Limits (3.01 - 3.04)


MB Holding Register 70, Address: h69		Limit modulation function
Selection of function assignment		
1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K]		
2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	


MB Holding Register 71, Address: h70		Limit modulation Min
Setting of min. limit value in rpm.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126 (e.g. 1800)	
Default	200	
Bit [15:0]	0-rated speed h126	

MB Holding Register 72, Address: h71		Limit modulation Max
Setting of max. limit value in rpm.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	200	
Bit [15:0]	0-rated speed h126	

MB Holding Register 73, Address: h72		Limit modulation delay
Setting of the time delay from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	

MB Holding Register 74, Address: h73		Lmt E2 Function
Selection of function assignment		
1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K]		
2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	

MB Holding Register 75, Address: h74		Lmt E2 Min
Setting of min. limit value in 0.1 steps for analog input E2. Unit depends on selected type.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	min. sensor value	
Bit [15:0]	0-65535	

MB Holding Register 76, Address: h75		Lmt E2 Max
Setting of max. limit value in 0.1 steps for analog input E2. Unit depends on selected type.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	max. sensor value	
Bit [15:0]	0-65535	

MB Holding Register 77, Address: h76		Lmt E2 Hyst.
Setting of limit value hysteresis in 0.1 steps for analog input E2. Unit depends on selected type. ☞ E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	0	
Bit [15:0]	0-65535	

MB Holding Register 78, Address: h77		Lmt E2 Delay
Setting of the time delay from exceeding the limit E2 until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	0	
Bit [15:0]	0-120 [s]	


MB Holding Register 79, Address: h78		Lmt function E3
Selection of function assignment 1L--> Indication warning symbol "AL" in display and switching the relay output. ☞ Assignment K1 functions h58 [2K] 2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	


MB Holding Register 80, Address: h79		Lmt E3 Min
Setting the limit value for E3 in 0.1 steps. ☞ E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	min. sensor value	
Bit [15:0]	0-65535	


MB Holding Register 81, Address: h80		Lmt E3 Max
Setting the limit value for E3 in 0.1 steps. ☞ E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	max. sensor value	
Bit [15:0]	0-65535	


MB Holding Register 82, Address: h81		GW E3 Hysteresis
Setting the hysteresis for limit of E3 in 0.1 steps. ☞ E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	0	
Bit [15:0]	0-65535	

MB Holding Register 83, Address: h82		Lmt E3 Delay
Setting of the time delay from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	

MB Holding Register 84, Address: h83		Lmt Offset Function
Selection of function assignment		
1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K]		
2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	

MB Holding Register 85, Address: h84		Lmt Offset 1
Setting the limit in steps of 0.1 for exceeding a maximum deviation between actual value and setpoint.		
Unit depending on selected type.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	2740	
Bit [15:0]	0-65535	

MB Holding Register 86, Address: h85		Lmt Offset 2
Setting the limit in steps of 0.1 for dropping below a maximum deviation between actual value and setpoint.		
Unit depending on selected type.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	2740	
Bit [15:0]	0-65535	

MB Holding Register 87, Address: h86		Lmt Offset Hysteresis
Setting the hysteresis for limit of offset in 0.1 steps.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	max. sensor value	
Default	2761	
Bit [15:0]	0-65535	

MB Holding Register 88, Address: h87		Lmt Offset delay
Setting of the time delay from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	

3.8.6 Motor Setup

MB Holding Register 125, Address: h124		Rampup time (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
The controller output rises or drops from 0 to 100% or vice versa within the set time.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	255	
Default	10	
Bit [15:0]	1-255 [s]	

MB Holding Register 126, Address: h125		Rampdown time (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
The controller output rises or drops from 0 to 100% or vice versa within the set time.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	255	
Default	2	
Bit [15:0]	1-255 [s]	

MB Holding Register 115, Address: h114		Suppression1 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression1.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	

MB Holding Register 116, Address: h115		Range1 Min
Input of the start speed from which Supression1 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	200	
Bit [15:0]	0-rated speed h126	

MB Holding Register 117, Address: h116		Range1 Max
Input of the stop speed from which Supression1 ends.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	300	
Bit [15:0]	0-rated speed h126	

MB Holding Register 118, Address: h117		Suppression2 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression2.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	

MB Holding Register 119, Address: h118		Range2 Min
Input of the start speed from which Supression2 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	400	
Bit [15:0]	0-rated speed h126	

MB Holding Register 120, Address: h119		Range2 Max
Input of the stop speed from which Supression2 ends		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	500	
Bit [15:0]	0-rated speed h126	

MB Holding Register 121, Address: h120		Suppression3 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression3.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	

MB Holding Register 122, Address: h121		Range3 Min
Input of the start speed from which Supression3 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	700	
Bit [15:0]	0-rated speed h126	

MB Holding Register 123, Address: h122		Range3 Max
Input of the stop speed from which Supression3 ends.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	800	
Bit [15:0]	0-rated speed h126	

MB Holding Register 124, Address: h123		LED Mode
Activation the LED for operation- / fault indication by flashing code.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	1	
Bit [15:0]	0-1	

MB Holding Register 127, Address: h126		Rated speed (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated speed in 1/min (rpm) ⚙ 1800 = 1800 rpm.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	1800	
Bit [15:0]	0-65535	

MB Holding Register 128, Address: h127		Rated current (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated current in 0.01 A steps ⚙ 250 = 2.50A.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	250	
Bit [15:0]	0-65535	

MB Holding Register 129, Address: h128		Rated voltage (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated voltage in V ⚙ 230 = 230V.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	230	
Bit [15:0]	0-65535	

MB Holding Register 130, Address: h129		Direction of rotation (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting direction of rotation ⚙ 1 = CW, 0 = CCW		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0-1	

MB Holding Register 131, Address: h130		Speed KP (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Input P-Factor for ECblue Controller		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	30000	
Bit [15:0]	0-65535	

MB Holding Register 132, Address: h131		Speed KI (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Input I-Factor for ECblue Controller		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	800	
Bit [15:0]	0-65535	


3.9 Mode 4.01-4.03


3.9.1 Settings (4.01-4.03)



MB Holding Register 4, Address: h3		Setpoint1
Setting Setpoint in 0.1 steps. The register value 2740 corresponds a value 0. Unit and display depending on adjusted analoginput h63. A register value of 3740 corresponds for a pressure sensor a value 3740-2740=1000 --> 100 Pa. The default value is always set to 50 % of the max. sensor value. E.g. for DSG200 the default value is set to 100 Pa.		
Access / necessary PIN protection level	RW, NV	
minimal value	2740	
maximum value	max. sensor value	
Default	3740 (100Pa)	
Bit [15:0]	2740 - max. sensor value	


MB Holding Register 5, Address: h4		Setpoint2
Setting Setpoint in 0.1 steps (e.g. night setback). The register value 2740 corresponds a Setpoint 0. Unit and display depending on adjusted analoginput h63. A register value of 3740 corresponds for a pressure sensor a value of 3740-2740=1000 --> 100 Pa. Activation takes place by D2 function h61 (5D)		
Access / necessary PIN protection level	RW, NV	
minimal value	2740	
maximum value	max. sensor value	
Default	3740 (100Pa)	
Bit [15:0]	2740 - max. sensor value	


MB Holding Register 6, Address: h5		Pband
Setting control range in 0.1 steps. The register value 2740 corresponds a value 0. Unit and display depending on adjusted analoginput h63. A register value of 3740 corresponds for a pressure sensor a value of 100 Pa. The default value is always set to 50 % of the max. sensor value. E.g. for DSG200 the default value is set to 100 Pa.		
Access / necessary PIN protection level	RW, NV	
minimal value	2740	
maximum value	max. sensor value	
Default	3740 (100 Pa)	
Bit [15:0]	2740 - max. sensor value	


MB Holding Register 113, Address: h112		Min. Speed  2)
Setting of Min. Speed in 1/min (rpm)		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Max. Speed h113	
Default	0	
Bit [15:0]	0 - Max. Speed h113	


MB Holding Register 114, Address: h113		Max. Speed  2)
Setting of Max. Speed (note Rated speed h126) in 1/min (rpm)		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	Rated speed h126	
Bit [15:0]	0 - Rated speed h126	

MB Holding Register 16, Address: h15		Speed Manual mode  2)
Speed setting for activated Manual mode in 1/min (rpm)  to activate Manual mode h16		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	200	
Bit [15:0]	0 - Rated speed h126	

MB Holding Register 17, Address: h16		Manual mode
Activate Manual mode  speed for manual mode h15		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no function, 1=Manual mode active	

MB Holding Register 36, Address: h35		T-Band SA
Temperature range in 0.1 K in which the Setpoint (pressure) is changing linear to the outdoor temperature  diagram operating instructions. A value of e.g. 3040 corresponds 3040-2740=300 --> 30 K		
Access / necessary PIN protection level	RW, NV	
minimal value	2740	
maximum value	3740	
Default	3040 (30 K)	
Bit [15:0]	2740-3740	

MB Holding Register 37, Address: h36		T-Start SA
Setting the start point in 0.1 °C for reduce the setpoint. The setpoint reduction starts at this outdoor temperature.  Diagram Operating Instructions A value of e.g. 2890 corresponds 2890-2740=150 --> 15 °C		
Access / necessary PIN protection level	RW, NV	
minimal value	2640	
maximum value	3140	
Default	2890 (15°C)	
Bit [15:0]	2640 - 3140	


MB Holding Register 38, Address: h37		P-Min SA
Setting for minimal pressure in 0,1 Pa for setpoint reduction for a very low outdoor temperatures.  Diagram operating instructions A value of e.g. 3440 corresponds 3440-2740=700 --> 70 Pa		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	max. sensor value	
Default	3440 (70 Pa)	
Bit [15:0]	1 - max. sensor value	


2)


Values > Max. Speed (h113) or rated speed (h126), are reduced for operation to max. speed or rated speed.


3.9.2 Basic settings (4.01- 4.03)

MB Holding Register 64, Address: h63		E2 Analog IN
Selection analog input E2. In BUS Mode (h63=7) the control takes place by MODBUS register h9000. The value setting 0-32767 corresponds e.g. an analog input value of 0-10V.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	13	
Default	3	
Bit [15:0]	1=DSG50, 2=DSG100, 3=DSG200, 4=DSG300, 5=DSG500, 6=DSG1000, 7=DSG2000, 8=DSG4000, 9=DSG6000, 10=0-10V, 11=0-20mA, 12=4-20mA, 13=BUS	

MB Holding Register 44, Address: h43		E2 K-Factor
Setting of the K-factor  fan wheel dependent value which must be requested from the manufacturer.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	4000	
Default	75	
Bit [15:0]	0 - 4000	

MB Holding Register 41, Address: h40		E2 Min
Setting the minimal value of E2 with corresponding unit in 0.1 steps, by a position after decimal point (---> h39).  Only if E2 Analog IN (h63) selection 10=0-10V, 11=0-20mA, 12=4-20mA or 13=Bus. Attention: value affects h3, h4, h5. New value is taken over at the same time to h45. For a E2 Analog IN setting of 0-10V corresponds a value of 2750 a voltage value of 1.0V (2750-2740=10 --> 1.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	min. sensor value	
Bit [15:0]	0 - 65535	

MB Holding Register 42, Address: h41		E2 Max
Setting the maximal value of E2 with corresponding unit in 0.1 steps, by a position after decimal point (---> h39).  Only for E2 Analog IN (h63) selection 10=0-10V, 11=0-20mA, 12=4-20mA or 13=Bus. Attention: value affects h3, h4, h5. New value is taken over at the same time to h46 For a E2 Analog IN setting of 0-10V corresponds a value of 2840 a voltage value of 10V (2840-2740=100 --> 10.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	depending on selection of h63, max. sensor value	
Bit [15:0]	0 - 65535	


MB Holding Register 40, Address: h39		E2 Decimals
Number of decimal places.  Only for E2 Analog IN (h63) selection 10=0-10V, 11=0-20mA, 12=4-20mA or 13=Bus. The setting values may have to be adjusted accordingly if the decimal places count changes!		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	3	
Default	1	
Bit [15:0]	0 - 3	

MB Holding Register 39, Address: h38		E2 Unit
Selection of display unit ☞ Only for E2 Analog IN (h63) selection 10=0-10V, 11=0-20mA, 12=4-20mA or 13=Bus.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	14	
Default	depending on selection of h63	
Bit [15:0]	0=mA, 1=V, 2=Hz, 3=kHz, 4=A, 5=rpm, 6=°C, 7=m3/h, 8=bar, 9=%, 10=Pa, 11=m/s, 12=m3/s, 13=Ohm, 14=mbr	


MB Holding Register 43, Address: h42		E2 Offset
Offset to sensor adjustment with comparison measurement unit. Example: 1.5Pa --> input value in register: 2740+15=2755 The register value 2740 corresponds a value 0. A register value of 2760 corresponds for a pressure sensor a value of 2.0 Pa. A register value of 2720 corresponds for a pressure sensor a value of -2.0 Pa.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	2740	
Bit [15:0]	0 - 65535	


MB Holding Register 46, Address: h45		Setpoint Min 1
Setting the minimal value for E2 with the corresponding unit in 0.1 steps. ☞ Only if E2 Analog IN (h63) selection 10=0-10V, 11=0-20mA, 12=4-20mA or 13=Bus. Attention: value affects h3, h4, h5. New value must be > h40 and < h41. A value change in h40 overwrites the value h45. For a E2 Analog IN setting of 0-10V corresponds a value of 2750 a voltage value of 1.0V (2750-2740=10 --> 1.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	h40	
maximum value	h41	
Default	0	
Bit [15:0]	h40 - h41	

MB Holding Register 47, Address: h46		Setpoint Max 1
Setting the maximal value for E2 with the corresponding unit in 0.1 steps. ☞ Only for E2 Analog IN (h63) selection 10=0-10V, 11=0-20mA, 12=4-20mA or 13=Bus. Attention: value affects h3, h4, h5. New value must be > h41 and < h40. A value change in h41 overwrites the value h46. For a E2 Analog IN setting of 0-10V corresponds a value of 2840 a voltage value of 10V (2840-2740=100 --> 10.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	h40	
maximum value	h41	
Default	2840	
Bit [15:0]	h40 - h41	

MB Holding Register 63, Address: h62		E3 Function
1E-->setting with second analog signal (E3) and switch over between both signals by digital input D1  D1 function h60 setting [4D]		
2E-->External Manual Mode.		
3E-->average value E2/E3.		
4E-->setting with second analog signal (E3) and control to the respective higher value.		
5E-->Sensor difference E2/E3		
6E-->Sensor for Setpoint		
7E-->Measurement value		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		7
Default		0 (4.02 and 4.03=6)
Bit [15:0]		0=no function, 1=1E, 2=2E, 3=3E, 4=4E, 5=5E, 6=6E, 7=7E

MB Holding Register 65, Address: h64		E3 Analog IN
Selection analog input E3. No function if E3 functions h62=0.		
In BUS Mode (h64=7) the control takes place by MODBUS register h9001. The value setting 0-32767 corresponds e.g. an analog input value of 0-10V.		
Access / necessary PIN protection level		RW, NV
minimal value		1
maximum value		7
Default		1
Bit [15:0]		1=KTY, 2=PT1000, 3=120MTG, 4=0-10V, 5=0-20mA, 6=4-20mA, 7=BUS

MB Holding Register 50, Address: h49		E3 Min
Setting the minimal value of E3 with corresponding unit in 0.1 steps, by a position after decimal point (---> h48).		
 Only if E3 Analog IN (h64) selection 10=0-10V, 11=0-20mA, 12=4-20mA or 13=Bus.		
New value is taken over at the same time to h54		
For a E3 Analog IN setting of 0-10V corresponds a value of 2750 a voltage value of 1.0V (2750-2740=10 --> 1.0V)		
Access / necessary PIN protection level		RW, NV
minimal value		min. sensor value
maximum value		max. sensor value
Default		min. sensor value
Bit [15:0]		0-65535

MB Holding Register 51, Address: h50		E3 Max
Setting the maximal value of E3 with corresponding unit in 0.1 steps, by a position after decimal point (---> h48).		
 Only if E3 Analog IN (h64) selection 10=0-10V, 11=0-20mA, 12=4-20mA or 13=Bus.		
New value is taken over at the same time to h55		
For a E3 Analog IN setting of 0-10V corresponds a value of 2840 a voltage value of 10V (2840-2740=100 --> 10.0V)		
Access / necessary PIN protection level		RW, NV
minimal value		min. sensor value
maximum value		max. sensor value
Default		depending on selection of h63, max. sensor value
Bit [15:0]		0-65535

MB Holding Register 49, Address: h48		E3 Decimals
Number of decimal places. ☞ Only for E3 Analog IN h64 selection 4=0-10V, 5=0-20mA or 6=4-20mA. The setting values may have to be adjusted accordingly if the decimal places count changes!		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	3	
Default	1	
Bit [15:0]	0-3	

MB Holding Register 48, Address: h47		E3 Unit
Selection of display unit ☞ Only for E3 Analog IN h64 selection 4=0-10V, 5=0-20mA or 6=4-20mA.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	14	
Default	depending on selection of h64	
Bit [15:0]	0=mA, 1=V, 2=Hz, 3=kHz, 4=A, 5=rpm, 6=°C, 7=m3/h, 8=bar, 9=%, 10=Pa, 11=m/s, 12=m3/s, 13=Ohm, 14=mbr	

MB Holding Register 52, Address: h51		E3 Offset
Offset to sensor adjustment with comparison measurement unit. Example: 1.5K --> input value in register: 2740+15=2755 The register value 2740 corresponds a value 0. A register value of 2760 corresponds for a temperature sensor the value of 2.0 K. A register value of 2720 corresponds for a temperature sensor the value of -2.0 K.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	2740	
Bit [15:0]	0-65535	

MB Holding Register 55, Address: h54		Setpoint Min 2
Setting the minimal value for E2 with the corresponding unit in 0.1 steps. ☞ Only if E2 Analog IN (h63) selection 10=0-10V, 11=0-20mA, 12=4-20mA or 13=Bus. New value must be > h49 and < h50. A value change in h49 overwrites the value h54. For a E2 Analog IN setting of 0-10V corresponds a value of 2750 a voltage value of 1.0V (2750-2740=10 --> 1.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	h49	
maximum value	h50	
Default	0	
Bit [15:0]	h49 - h50	

MB Holding Register 56, Address: h55		Setpoint Max 2
Setting the minimal value for E2 with the corresponding unit in 0.1 steps. ☞ Only if E2 Analog IN (h63) selection 10=0-10V, 11=0-20mA, 12=4-20mA or 13=Bus. New value must be > h49 and < h50. A value change in h50 overwrites the value h55. For a E2 Analog IN setting of 0-10V corresponds a value of 2750 a voltage value of 1.0V (2750-2740=10 --> 1.0V)		
Access / necessary PIN protection level	RW, NV	
minimal value	h49	
maximum value	h50	
Default	0	
Bit [15:0]	h49 - h50	

3.9.3 Controller Setup (4.01 - 4.03)

MB Holding Register 35, Address: h34	Alarm sensors
Activating the sensor alarm	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	1
Default	0
Bit [15:0]	0=no function, 1=Sensor alarm activated

MB Holding Register 25, Address: h24	Limit
Setting the limitation of speed and activation the limit function by a digital input D1 or D2. D1 function h60 setting [3D], D2 (E1) function h61 setting [3D]	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	Rated speed h126
Default	200
Bit [15:0]	0 - Rated speed h126

MB Holding Register 23, Address: h22	Minimum speed cut off
Setting of a difference in steps of 0.1 to the setpoint at which the minimum air switch-off becomes active. If the value is positive, the fan will be switched off before reaching the setpoint, if the value is negative, after dropping below the setpoint. The register value 2740 corresponds the value 0, function deactivated A register value of 2760 corresponds for a temperature sensor the value of 2.0 K. A register value of 2720 corresponds for a temperature sensor the value of -2.0 K.	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	65535
Default	2740
Bit [15:0]	0-65535

MB Holding Register 98, Address: h97	Group 2 ON value
If the setting signal of the control (0-100%) exceeds the value set here, the setting signal for group 2 is output at analog output A1 and group 1 is reduced to the value n-min for group 2 (h98). From here on both groups run parallel at maximum power. Function active, if A1 function h56 setting [5A]	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	100
Default	50 (50%)
Bit [15:0]	0-100

MB Holding Register 99, Address: h98	n-min at Group2
If the setting signal of the control (0-100%) exceeds the value of one value group 2 (h97), the relay K1 switches on group 2 and group 1 is reduced to the value n-min for group 2 (h98). From here on group 1 runs at maximum power. Function active, if K1 function h58 setting [8K]	
Access / necessary PIN protection level	RW, NV
minimal value	0
maximum value	100
Default	20 (20%)
Bit [15:0]	0-100

MB Holding Register 21, Address: h20		Change over control function (Actual>Set=n+)
Activation of the control function change over		
Access / necessary PIN protection level	RW, NV / 2	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=Actual<Set=n+, 1=Actual>Set=n+	

MB Holding Register 20, Address: h19		Controller type
Setting the controller type		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	1	
Bit [15:0]	0=P, 1=PID	


MB Holding Register 31, Address: h30		KP
Setting P-Factor		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	200	
Default	50	
Bit [15:0]	0-200	

MB Holding Register 32, Address: h31		KI
Setting I-Factor		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	200	
Default	50	
Bit [15:0]	0-200	

MB Holding Register 33, Address: h32		KD
Setting D-Factor		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	200	
Default	50	
Bit [15:0]	0-200	

MB Holding Register 34, Address: h33		TI
Setting I-time (control setting time)		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	200	
Default	0	
Bit [15:0]	0-200	






3.9.4 IO Setup (4.01 - 4.03)

MB Holding Register 57, Address: h56		A1 Function
1A-->constant voltage (10V output)		
2A-->output voltage proportional to modulation		
3A-->output voltage proportional input E2		
4A-->output voltage proportional input E3		
5A-->output voltage proportional to modulation, from On value Group2,  h97		
9A-->output voltage proportional to speed		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		6
Default		1
Bit [15:0]		0=no fuction, 1=1A, 2=2A, 3=3A, 4=4A, 5=5A, 6=9A

MB Holding Register 66, Address: h65		A1 Min
Min. value of output voltage at A1 in 0.1V steps.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		0
Bit [15:0]		0-100 [0-10V]






MB Holding Register 67, Address: h66		A1 Max
Max. value of output voltage at A1 in 0.1V steps.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		100
Bit [15:0]		0-100 [0-10V]

MB Holding Register 97, Address: h96		Inverting A1
Inverting of output voltage at A1		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no inverting, 1=inverting active

MB Holding Register 61, Address: h60		D1 Function
1D-->ON/OFF function		
2D-->external fault indication input		
3D-->Limit functions ON/OFF  Limit function h24		
4D-->switch over E2/E3  E3 function h62 [1E]		
5D-->switch over set intern1/ intern2  h9/h10		
6D-->switch over intern1/external  h9/E2 , set external1 h17=OFF		
7D-->switch over Control/Manual mode		
8D-->Switch over control function (e.g. heating/cooling)		
10D-->device Reset		
11D-->setting Max. speed ON/OFF  Max. Speed1 h12		
13D-->switch over direction of rotation		
14D-->Current modulation value is frozen and issued ("Freeze" function).		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		12
Default		0
Bit [15:0]		0=no function, 1=1D, 2=2D, 3=3D, 4=4D, 5=5D, 6=6D, 7=7D, 8=8D, 9=10D, 10=11D, 11=13D, 12=14D


MB Holding Register 93, Address: h92		D1 Inverting
Inverting of D1 function		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no inverting, 1=inverting active


MB Holding Register 105, Address: h104		D1 BUS Mode
If BUS Mode active, D1 function by MODBUS register c0.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no function, 1=BUS mode active


MB Holding Register 62, Address: h61		D2 function (E1)
The D2 function is realized over the analog input E1 on the motor plate.		
1D-->ON/OFF function		
2D-->external fault indication input		
3D-->Limit functions ON/OFF  Limit function h24		
4D-->switch over E2/E3  E3 function h62 [1E]		
5D-->switch over set intern1/ intern2  h9/h10		
6D-->switch over intern1/external  h9/E2 , set external1 h17=OFF		
7D-->switch over Control/Manual mode		
8D-->Switch over control function (e.g. heating/cooling)		
10D-->device Reset		
11D-->setting Max. speed ON/OFF  Max. Speed1 h12		
13D-->switch over direction of rotation		
14D-->Current modulation value is frozen and issued ("Freeze" function).		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		12
Default		0
Bit [15:0]		0=no function, 1=1D, 2=2D, 3=3D, 4=4D, 5=5D, 6=6D, 7=7D, 8=8D, 9=10D, 10=11D, 11=13D, 12=14D


MB Holding Register 94, Address: h93		D2 Inverting (E1)
Inverting of D2 function		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no inverting, 1=inverting active


MB Holding Register 106, Address: h105		D2 BUS Mode (E1)
If BUS Mode active, D2 function by MODBUS register c1.		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		1
Default		0
Bit [15:0]		0=no function, 1=BUS mode active


MB Holding Register 107, Address: h106		E2 Min
Signal adaption E2  E2 Mode h110		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		0
Bit [15:0]		0-100 [%]

MB Holding Register 108, Address: h107		E2 Max
Signal adaption E2  E2 Mode h110		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		100
Bit [15:0]		0-100 [%]

MB Holding Register 109, Address: h108		E3 Min
Signal adaption E3  E3 Mode h111		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		0
Bit [15:0]		0-100 [%]






MB Holding Register 110, Address: h109		E3 Max
Signal adaption E3  E3 Mode h111		
Access / necessary PIN protection level		RW, NV
minimal value		0
maximum value		100
Default		100
Bit [15:0]		0-100 [%]

MB Holding Register 111, Address: h110		E2 Mode
Signal adaption E2  only for Mode 1.x, see operating instructions		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=Offset/Rotation (Modus1), 2=Signal range (Modus2)	


MB Holding Register 112, Address: h111		E3 Mode
Signal adaption E3  only for Mode 1.x, see operating instructions		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=Offset/Rotation (Modus1), 2=Signal range (Modus2)	


MB Holding Register 95, Address: h94		Inverting E2
Inverting of E2 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	

MB Holding Register 96, Address: h95		Inverting E3
Inverting of E3 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	


MB Holding Register 59, Address: h58		K1 Function
The K1 function is realized over the relay output K1 on the motor plate.		
1K-->Operating indication		
2K-->Fault indication		
3K-->External fault indication  D1 function h60 [2D], D2 function (E1) h61 [2D]		
4K-->Limit over or falling bellow modulation factor  h70/h71		
5K-->Limit over or falling bellow E2  h74/h75		
6K-->Limit over or falling bellow E3  h79/h80		
7K-->Setpoint Offset, deviation between actual value and setpoint too high		
8K-->Group control  n-min at Group2 h98		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	8	
Default	1	
Bit [15:0]	0=no function, 1=1K, 2=2K, 3=3K, 4=4K, 5=5K, 6=6K, 7=7K, 8=8K	

MB Holding Register 91, Address: h90		K1 Inverting
Inverting of K1 function		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no inverting, 1=inverting active	

MB Holding Register 133, Address: h132		Radio network code
Input radio network key  only AM-Premium-W		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	9999	
Default	9999	
Bit [15:0]	0 - 9999	

MB Holding Register 134, Address: h133		Radio channel
Input radio network channel  only AM-Premium-W		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	15	
Default	0	
Bit [15:0]	0-15	


3.9.5 Limits (4.01 - 4.03)


MB Holding Register 70, Address: h69		Limit modulation function
Selection of function assignment 1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K] 2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	


MB Holding Register 71, Address: h70		Limit modulation Min
Setting of min. limit value in rpm.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126 (e.g. 1800)	
Default	200	
Bit [15:0]	0-Rated speed h126 [rpm]	


MB Holding Register 72, Address: h71		Limit modulation Max
Setting of max. limit value in rpm.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126 (e.g. 1800)	
Default	200	
Bit [15:0]	0-Rated speed h126 [rpm]	

MB Holding Register 73, Address: h72		Limit modulation delay
Setting of the time delay in seconds from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	


MB Holding Register 74, Address: h73		Lmt E2 Function
Selection of function assignment		
1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K]		
2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	


MB Holding Register 75, Address: h74		Lmt E2 Min
Setting of min. limit value in 0.1 steps for analog input E2. Unit depends on selected sensor type.		
 E.g voltage input 0-10V: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	min. sensor value	
Bit [15:0]	0-65535	


MB Holding Register 76, Address: h75		Lmt E2 Max
Setting of max. limit value in 0.1 steps for analog input E2. Unit depends on selected sensor type.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	max. sensor value	
Bit [15:0]	0-65535	


MB Holding Register 77, Address: h76		Lmt E2 Hyst.
Setting of limit value hysteresis in 0.1 steps for analog input E2. Unit depends on selected sensor type.		
 E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	0	
Bit [15:0]	0-65535	

MB Holding Register 78, Address: h77		Lmt E2 Delay
Setting of the time delay from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	0	
Bit [15:0]	0-120 [s]	


MB Holding Register 79, Address: h78		Lmt function E3
Selection of function assignment 1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K] 2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	

MB Holding Register 80, Address: h79		Lmt E3 Min
Setting the min. limit value for E3 in 0.1 °C steps.  selected limit value 1.5°C --> input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	min. sensor value	
Bit [15:0]	0-65535	

MB Holding Register 81, Address: h80		Lmt E3 Max
Setting the max. limit value for E3 in 0.1 °C steps.  selected limit value 1.5°C --> input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	max. sensor value	
Bit [15:0]	0-65535	

MB Holding Register 82, Address: h81		GW E3 Hysteresis
Setting the hysteresis for limit of E3 in 0.1K steps.  selected hysteresis 1.5K --> input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	0	
Bit [15:0]	0-65535	

MB Holding Register 83, Address: h82		Lmt E3 Delay
Setting of the time delay from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	

MB Holding Register 84, Address: h83		Lmt Offset Function
Selection of function assignment 1L--> Indication warning symbol "AL" in display and switching the relay output.  Assignment K1 functions h58 [2K] 2L-->only indication in menu Events as "msg".		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	2	
Default	0	
Bit [15:0]	0=no function, 1=1L, 2=2L	

MB Holding Register 85, Address: h84		Lmt Offset 1
Setting the limit in steps of 0.1 for exceeding a maximum deviation between actual value and setpoint Unit depending on selected type. ☞ E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	2740	
Bit [15:0]	0-65535	

MB Holding Register 86, Address: h85		Lmt Offset 2
Setting the limit in steps of 0.1 for dropping below a maximum deviation between actual value and setpoint Unit depending on selected type. ☞ E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	min. sensor value	
maximum value	max. sensor value	
Default	2740	
Bit [15:0]	0-65535	

MB Holding Register 87, Address: h86		Lmt Offset Hysteresis
Setting the hysteresis for limit of offset in 0.1 steps. ☞ E.g voltage input: selected limit value 1.5V --> Input value in register: 2740+15=2755		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	max. sensor value	
Default	2761	
Bit [15:0]	0-65535	

MB Holding Register 88, Address: h87		Lmt Offset delay
Setting of the time delay from exceeding the limit until the alarm message.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	120	
Default	2	
Bit [15:0]	0-120 [s]	

3.9.6 Motor Setup

MB Holding Register 125, Address: h124		Rampup time (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
The controller output rises or drops from 0 to 100% or vice versa within the set time.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	255	
Default	10	
Bit [15:0]	1-255 [s]	

MB Holding Register 126, Address: h125		Rampdown time (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
The controller output rises or drops from 0 to 100% or vice versa within the set time.		
Access / necessary PIN protection level	RW, NV	
minimal value	1	
maximum value	255	
Default	2	
Bit [15:0]	1-255 [s]	

MB Holding Register 115, Address: h114		Suppression1 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression1.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	

MB Holding Register 116, Address: h115		Range1 Min
Input of the start speed from which Supression1 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	200	
Bit [15:0]	0-rated speed h126	

MB Holding Register 117, Address: h116		Range1 Max
Input of the stop speed from which Supression1 ends.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	300	
Bit [15:0]	0-rated speed h126	

MB Holding Register 118, Address: h117		Suppression2 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression2.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	

MB Holding Register 119, Address: h118		Range2 Min
Input of the start speed from which Supression2 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	400	
Bit [15:0]	0-rated speed h126	

MB Holding Register 120, Address: h119		Range2 Max
Input of the stop speed from which Supression2 ends		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	500	
Bit [15:0]	0-rated speed h126	

MB Holding Register 121, Address: h120		Suppression3 (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Activating the suppression range suppression3.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0=no suppression, 1=suppression active	

MB Holding Register 122, Address: h121		Range3 Min
Input of the start speed from which Supression3 takes place.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	700	
Bit [15:0]	0-rated speed h126	

MB Holding Register 123, Address: h122		Range3 Max
Input of the stop speed from which Supression3 ends.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	Rated speed h126	
Default	800	
Bit [15:0]	0-rated speed h126	

MB Holding Register 124, Address: h123		LED Mode
Activation the LED for operation- / fault indication by flashing code.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	1	
Bit [15:0]	0-1	

MB Holding Register 127, Address: h126		Rated speed (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated speed in 1/min (rpm) ⚙ 1800 = 1800 rpm.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	1800	
Bit [15:0]	0-65535	

MB Holding Register 128, Address: h127		Rated current (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated current in 0.01 A steps ⚙ 250 = 2.50A.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	250	
Bit [15:0]	0-65535	

MB Holding Register 129, Address: h128		Rated voltage (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting the rated voltage in V ⚙ 230 = 230V.		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	230	
Bit [15:0]	0-65535	

MB Holding Register 130, Address: h129		Direction of rotation (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Setting direction of rotation ⚙ 1 = CW, 0 = CCW		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	1	
Default	0	
Bit [15:0]	0-1	

MB Holding Register 131, Address: h130		Speed KP (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Input P-Factor for ECblue Controller		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	30000	
Bit [15:0]	0-65535	

MB Holding Register 132, Address: h131		Speed KI (by MODBUS not adjustable)
Action / setting must be made directly at the device or with software ZA terminal.		
Input I-Factor for ECblue Controller		
Access / necessary PIN protection level	RW, NV	
minimal value	0	
maximum value	65535	
Default	800	
Bit [15:0]	0-65535	

3.10 Input register

3.10.1 Info, monitoring and diagnostic

MB Input Register 1, Address: i0		Actual speed 1/min
Display of the actual speed in 1/min [rpm].		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 2, Address: i1		Control value
Display of the current actual value depending on the set sensor --> note set decimal place and unit.		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 3, Address: i2		Setpoint control
Display of the adjusted Setpoint		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 4, Address: i3		E2 Actual
Raw value E2		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 5, Address: i4		E3 Actual
Raw value E3		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 6, Address: i5		Setpoint1
Display of the adjusted Setpoint 1 (h3)		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 7, Address: i6		Setpoint2
Display of the adjusted Setpoint 2 (h4)		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 9, Address: i8		Display modulation motor
Modulation degree motor		
Access		R
minimal value		0
maximum value		32768
Bit [15:0]		Decimal value 0 - 32768 = 0 - 100 %

MB Input Register 10, Address: i9		Display Manual Mode
Info Manual mode		
Access		R
minimal value		0
maximum value		1
Bit [15:0]		0 = Manual operation OFF, 1 = Manual operation ON

MB Input Register 11, Address: i10		Status minimum air switch-off
Access		R
minimal value		0
maximum value		1
Bit [15:0]		0 = minimum air switch-off OFF, 1 = minimum air switch-off active

MB Input Register 12, Address: i11		error code
Display error conditions --> see error list		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		

MB Input Register 13, Address: i12		ECblue Premium
Display of ECblue Premium Version		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 14, Address: i13		Temperature value E2
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 15, Address: i14		Temperature value E3
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 16, Address: i15		Current value E2
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 17, Address: i16		Current value E3
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 18, Address: i17		Voltage E2
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 19, Address: i18		Voltage E3
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 20, Address: i19		D1 state
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 21, Address: i20		E1 (D2) Status
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 22, Address: i21		K1 Status
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 24, Address: i23		IGBT-Temperature: °C
Display IGBT temperature 2940 = 20.0 °C		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535 in 0.1 °C steps

MB Input Register 25, Address: i24		Elco-temperature: °C
Display of elco-temperature inside the housing 2940 = 20.0 °C		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535 in 0.1 °C steps

MB Input Register 26, Address: i25		DC-link voltage
Display of DC-link voltage in volt.		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 27, Address: i26		Supply voltage
Display of line voltage in volt.		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 28, Address: i27		Motor current
Display of motor current in 0.001A steps		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535

MB Input Register 29, 30, Address: i28, i29		OTC
i28 MSB, i29 LSB		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535 [s]

MB Input Register 31, 32, Address: i30, i31		OTM
i30 MSB, i31 LSB		
Access		R
minimal value		0
maximum value		65535
Bit [15:0]		Decimal value 0 - 65535[s]

Input Register i7 and i32 - i38 are reserved for future use or factory usage

4 Document history

Drawing number: L-BAL-E099-GB		
Edition / Index	Editor	Description
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5 Enclosure

5.1 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>