

Manual

Modbus / BACnet

Model SensAir IndAC2 NOZ2

for software version U3.0 – 01
Original Manual

English



biddle

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1. Introduction

1.1 About this manual

This manual describes the connection of the comfort air curtain Sensair, the industrial air curtain model IndAC₂ or the air heater model NOZ₂ to the communication protocol Modbus RTU and its use.

For a possible connection to BACnet, the manual describes the installation of a gateway which makes communication with BACnet possible. The contents of this manual also apply to BACnet, unless otherwise specified.

For IndAC₂ and NOZ₂, it is the case that only units with an automatic control (type Auto) can be connected to a communication protocol.

1.2 Required basic knowledge

To use this manual, you must have general knowledge of the communication protocol ('Modbus RTU Slave' or 'BACnet'). This manual is not a guide to this protocol.

For more information about Modbus, please refer to the specifications and guidelines that are available on the website of the Modbus Organization: www.modbus.org.

1.3 How to read this manual

1.3.1 Designations used in the manual

The following symbols are used in the manual:



Note:

Refers to an important section in the text.



Caution:

If you do not carry out the procedure or action correctly, you may cause damage to the unit.

Follow the instructions precisely.

**Warning:**

If you do not carry out the procedure or action correctly, you may cause physical injury and/or damage.

Follow the instructions precisely.

**Danger:**

Is used to designate actions that are not permitted.

Ignoring this prohibition may lead to serious damage or to accidents resulting in physical injury.

1.3.2 Definitions

Modbus RTU

Communication protocol

BACnet

Communication protocol

gateway

Module which attends to the translation between two different communication protocols.

communication parameter

Characteristics of the Modbus connection (baud rate, parity, stop bit).

Modbus node address

Number by which the Modbus system recognises the unit.

register address

Position (number) in the Modbus system where the value/variable can be found (also called the Modbus address).

b-touch menu parameter

Number of the (corresponding) function that can be set in the *b-touch* control panel (via user interface or via settings.txt).

unit code

Eight-digit code that identifies the unit type.

unit ID	Unique number of the control circuit board of the unit. This number is used, amongst other things, to specify (via the <i>b-touch</i> control panel) which unit is used as master.
auto master unit	An auto master unit has a control circuit board for automatic control and is selected in order to attend to the global Biddle regulation. This unit also regulates the communication in a master-slave system.
auto slave unit	An auto slave unit has a control circuit board for automatic control, but is largely regulated by the auto master unit.
basic unit	<i>Only with units IndAC₂ and NOZ₂</i> : A basic unit has no control circuit board of its own.
single master system	Set-up of a single auto master unit without auto slave units. Optionally, one or more basic units have been linked.
master-slave system	Combination of a single auto master unit and one or more auto slave units.
multiple master system	Combination of multiple auto master units.
local register	The value of a local register can be individually set and/or read out for each connected unit.
global register	The value of a global register is the same for each connected unit and can be set and/or read out on each unit.

1.3.3 Related documentation

In addition to this manual, you need the manual for the unit that is being used.

2. . Installation

2.1 Special points

2.1.1 Modbus/BACnet

The unit is designed for communication with a Modbus system. With the aid of an IntesisBox Gateway, it is also possible to communicate with a BACnet system.

2.1.2 Multiple units on Modbus

If you connect multiple units to the Modbus system, various set-ups are possible. The set-up determines from which unit the local and global registers can be set and/or read out.



Opmerking:

The global registers are used by the automatic control.



Opmerking:

For operation, it does not matter whether units without control circuit board (type basic) are also present.



Opmerking:

For the illustrations, the NOZ₂ has been used. The same principles apply to other units.

SINGLE MASTER	MASTER - SLAVE	MULTIPLE MASTER
<p>The diagram shows a single unit labeled 'biddle' with a master (M) symbol, connected to a ModBus system.</p>	<p>The diagram shows two units labeled 'biddle'. The first is a master (M) and the second is a slave (S), both connected to a ModBus system.</p>	<p>The diagram shows two units labeled 'biddle', both with master (M) symbols, connected to a ModBus system.</p>
<p>Local registers: Relate to the connected unit.</p>	<p>Local registers: Relate to the connected unit / the connected units.</p>	<p>Local registers: Relate to the connected units.</p>
<p>Global registers: Relate to the connected unit.</p>	<p>Global registers: Are the same for each unit.</p>	<p>Global registers: Relate to the connected units.</p>

2.1.3 Communication parameters

The Modbus system must comply with the following communication parameters:

COMMUNICATION PARAMETER	VALUE
Baud rate	9600
DATA	8
Parity	none
Stop bits	1

The turnaround time between the unit and Modbus is 4.2 msec.

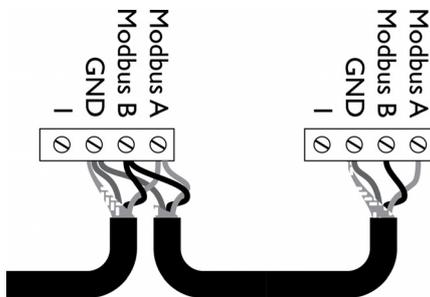
2.1.4 Wiring

A twisted-pair cable must be used for connection to the Modbus system. The cable must also have a third core for the GND (grounding). Normally, a four-pole, twisted-pair cable is used; one pair is used for communication and one core from the other pair is used as the GND.

Modbus A = -

Modbus B = +

GND = ground



Note:
If there is no communication, this may be caused by incorrectly connected wiring. Swap the A- and B+ wires.

2.2 Connecting the gateway for BACnet (accessory)

The unit is designed for communication with a Modbus system. With the aid of a gateway, this can be converted to communication that is suitable for BACnet.



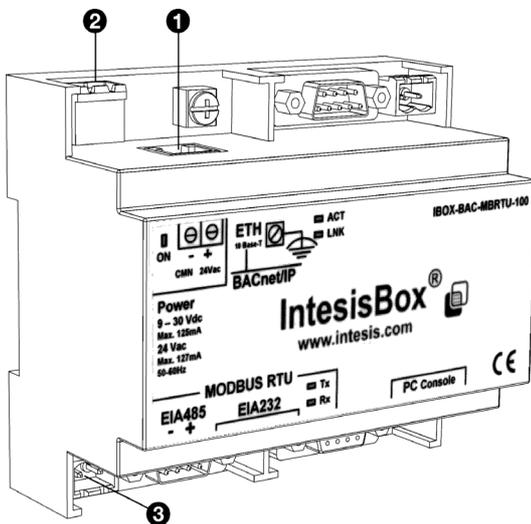
Warning:

Make sure that the mains supply is switched off.



Warning:

Make sure that the power supply to the BACnet system which is to be connected is switched OFF.



1. Mount the gateway to the wall or on a DIN rail.
2. Connect the gateway to the BACnet IP (terminal ❶), in accordance with the wiring diagram.
3. Using the adapter, connect the gateway to a power socket (connection ❷), in accordance with the wiring diagram.



Note:

In the absence of a power adapter, you yourself must fit a switch (250V, 6A) between the gateway and the power supply.

4. Connect the unit to the gateway (terminal ❸) as described in [2.3.2 Connecting the unit to Modbus](#).

2.3 Connecting the unit to Modbus

2.3.1 Accessing the control circuit board

For SensAir: The connection for Modbus is on the top of the unit.

For IndAC₂ and NOZ₂: The connection for Modbus is on the control circuit board in the unit.

- Open the unit as described in the unit's operating manual.



Warning:

Make sure that the mains supply is switched off.

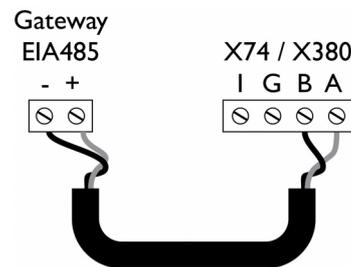
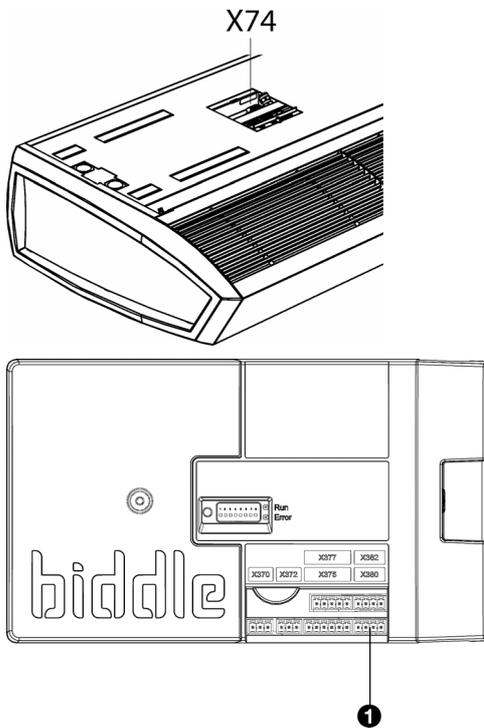
2.3.2 Connecting the unit to Modbus

1. Lay a cable between the Modbus system and the unit.

In the case of BACnet: Lay the cable between the gateway and the unit.

2. Attach the cable to the unit, in accordance with the wiring diagram supplied:

In the case of BACnet: Use the circuit diagram below.



For SensAir:

- Connect the cable to terminal X74 on the upper side of the unit.

For IndAC₂ and NOZ₂:

- Feed the cable into the electronics housing.
- Connect the cable to terminal X380 ❶ of the unit's control circuit board.



Note:

For a more reliable signal, it is possible to connect a 120 Ohm resistor. For this purpose, place a bridge between positions I and B of terminal X382 on the control circuit board in the unit.

Connecting multiple units to Modbus

If you also want to be able to read out the local registers of each unit individually, the Modbus connection must be connected in series.

For SensAir:

1. Lay a cable between the units.
2. Connect the cable on both units to terminal X74 (on the upper side of the unit).
3. Repeat steps 1 and 2 for each unit that is to be connected in series.

For IndAC₂ and NOZ₂:**Note:**

Only units with a control circuit board (type Auto) can be connected in series to the Modbus system.

1. Lay a cable between the units.
2. Feed the cable into the electronic housings.
3. Connect the cable in the first unit to terminal block X382, in accordance with the wiring diagram.
4. Connect the cable in the second unit to terminal block X380, in accordance with the wiring diagram.
5. Repeat steps 1 to 4 inclusive for each unit that is to be connected in series.

2.4 Entering the Modbus node address

The default value for the Modbus node address is 1. Depending on the Modbus network, it may be necessary to change this. This can be done via the dip switches on the control circuit board.

**Note:**

Valid Modbus node address numbers are 1 – 247.

**Note:**

The Modbus node address must be converted to an 8-digit code.

2.4.1 Determining the code

The dip switches are coded as follows:

DIP SWITCH	1	2	3	4	5	6	7	8
value (ON)	1	2	4	8	16	32	64	128

Determine the 8-digit code of the Modbus node address as follows:

1. Divide the number by 2 over and over again until the result is 0. After each division, note the residual value.

For example, Modbus node address 206:

VALUE / 2	RESULT	RESIDUAL VALUE
206 / 2	103	0
103 / 2	51	1
51 / 2	25	1
25 / 2	12	1
12 / 2	6	0
6 / 2	3	0
3 / 2	1	1
1 / 2	0	1

2. Note down the residual values from left to right. This is the code.

For example, for Modbus node address 206: 01110011



Note:

Note down the residual values from left to right.

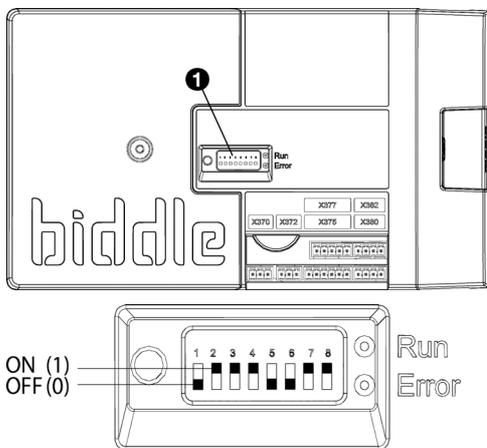
2.4.2 Entering the Modbus node address

Enter the code of the Modbus node address with the aid of the 8 dip switches ❶ on the control circuit board.

- 0 = OFF
- 1 = ON

For example, Modbus node address 206:

DIP SWITCH	1	2	3	4	5	6	7	8
code	0	1	1	1	0	0	1	1
position	off	on	on	on	off	off	on	on



With SensAir units the dip switches on the control circuit board are difficult to access:

- Use a mirror in order to be able to see the dip switches better.
- Possibly, partially loosen the control circuit board as described in the servicing chapter of the unit's manual.

2.5 Activating the connection

1. Connect the possible gateway for BACnet (accessory) to the mains supply, making use of the adapter.



Warning:

In the event that the adapter is absent: Connect the gateway to the mains supply in accordance with the locally applicable requirements.

2. Switch on the mains supply.
3. Activate the connection with the communication protocol by switching the power supply of the unit off and on.



Note:

If the connection with the communication protocol is active, you can possibly remove the *b-touch* control panel.

2.6 Configuring the gateway for BACnet (accessory)

In order to make communication with BACnet possible, the gateway has to be configured.

1. Download the necessary software from the manufacturer's website.
www.intesis.com/down/mb/linkboxmb.html
2. Connect a computer with the software to gateway ❶.
3. Install the software.
4. Program the register addresses that you wish to use.



Note:

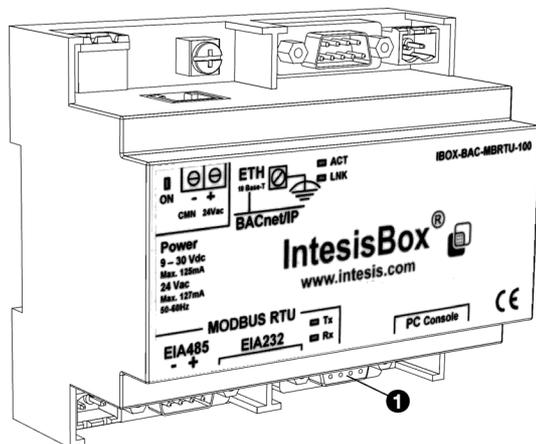
During the installation, a manual is saved to:

C:\Intesis\LinkBoxMB\DocsMB



Note:

The number of data points to be used is dependent on the module applied.



3 . . Frequently used register addresses

3.1 Introduction

This chapter describes frequently used functions and their corresponding register addresses. Listed in chapter 4 are all register addresses.



Note:

Functions can be adjusted both on the *b-touch* control panel and via Modbus. The most-recently sent signal is valid.



Note:

Some settings can only be adjusted via the *b-touch* control panel.



Note:

It may occur that the system applied uses a value of 1 higher than the register addresses given here. In that case, use 101 for register address 100, for example.

3.2 Register addresses for room temperature control

The automatic control keeps the room temperature at the set desired temperature. For this purpose, the control makes use of a number of factors:

REGISTER ADDRESS	DESCRIPTION	RO/RW*	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT
424	Required room temperature	rw	0.1°C	10	400	210
209	Discharge temperature setpoint.	ro	0.1°C			
208	Discharge temperature	ro	0.1°C			
203	Room temperature	ro	0.1°C			
149	Heating output	ro	%			
*ro = read only (read only)						
*rw = read & write (read and write)						

424 Required room temperature

You can set the temperature to a comfortable level. In this register address, the default value of the desired temperature is set. Temperature adjustments via the home screen of the *b-touch* control panel are only possible if the register address 414 has been set to 0 (changes via *b-touch* permitted) and apply only until the start time of the next switching moment by Modbus.

209 Discharge temperature setpoint.

The required discharge temperature is calculated by the automatic control.

In the case of multiple units, the required discharge temperature is set at the same for each unit.

208 Discharge temperature

The discharge temperature is used by the automatic control.

In the case of multiple units, the average value is used.

**Note:**

If a sensor is not detected, the control for this sensor uses the lowest possible value (-499).

203 Room temperature

The measured room temperature is used by the automatic control.

The value is corrected with the value that has been set in Menu parameter [9. Calibration](#) of the *b-touch* control panel.

**Note:**

Menu parameter [71. Indoor temperature sensor](#) of the *b-touch* control panel determines which sensor is used for the automatic control.

149 Heating output

The automatic control calculates how much heat must be added and adjusts the position of the water valve accordingly.

3.3 Other frequently used register addresses to be set

Other register addresses to be set are:

REGISTER ADDRESS	DESCRIPTION	RO/RW*	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT
420	Turning the unit ON and OFF	rw	-	0	2	1
421	Turning the heating on and off	rw	-	0	1	1
422	Manual setting of the strength	rw	%	0	100	50
423	Adjusting the automatic strength control	rw	-	-3	3	0
425	Automatic or manual control	rw		0	1	1
*ro = read only (read only)						
*rw = read & write (read and write)						

420 Turning the unit ON and OFF

You can switch the unit ON and OFF manually, using the control panel.

The unit can also be switched ON and OFF in other ways:

- Using external controls
- Via the internal timer or via an external release signal on the unit.

Values

VALUE	OPTION	DESCRIPTION
0	Off	The unit is switched off. <ul style="list-style-type: none"> • The unit reacts to signals on the inputs on the unit and to the control panel, and to the timer. • If this function is enabled, the unit will start working when the temperature in the room drops below the night temperature. • The frost protection is active.
1	On	The unit is on (normal operation)
2	Holiday setting (not applicable)	The unit is switched off. <ul style="list-style-type: none"> • The unit does not react to signals on the inputs or to the timer. • Night temperature is disabled. • The frost protection is active.

421 Turning the heating on and off

The unit's heating can be switched on and off manually.

Switching the heating off disables the room temperature control .

If the heating has been switched on via this function, it may occur that the automatic control switches the heating off again. This may be due to an external signal, for example, or because the desired temperature has been reached.

The heating can also be switched off by the control itself.

422 Manual setting of the strength

With the manual setting, you can select the strength. To achieve maximum comfort with minimum energy consumption, Biddle recommends selecting the lowest strength at which the airflow touches the ground. This setting may possibly need to be changed during the course of the day.

The unit can only be controlled manually if the functions below have been set as follows:

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	VALUE
1	-	Select modes (Options for modes)	1 = allowed: manual 3 = allowed: manual, automatic
0.6	405	Automatic or manual control Current status Caution: Use this address only for reading out. Use 425 for writing.	0 = manual

423 Adjusting the automatic strength control

In automatic mode, the strength and temperature of the airflow are regulated automatically. Due to weather conditions, in certain circumstances, you might want to adjust the automatic setting. If you feel a cold draught along the floor, you can increase the automatic strength.

The unit can only be controlled automatically if the functions below have been set as follows:

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	VALUE
I	-	Select modes (Options for modes)	2 = allowed: automatic 3 = allowed: manual, automatic
0.6	405	Automatic or manual control Current status Caution: Use this address only for reading out. Use 425 for writing.	I = automatic

425 Automatic or manual control

The unit has an automatic mode and a manual mode. When the unit is switched on, it is always in automatic mode.

In the manual mode, the unit operates with a fixed set fan speed.

3.4 Other frequently used register addresses that can be read out

Frequently used register addresses that can be read out are:

REGISTER ADDRESS	DESCRIPTION	RO/RW*	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT
102	Fan strength	ro	%			
103	Ventilation valve position	ro	%	0	128 (=100%)	
204	Outdoor temperature	ro	0.1°C			
*ro = read only (read only) *rw = read & write (read and write)						

102 Fan strength

In the event of multiple units, the fan strength is the same for all units.

With the NOZ₂: In automatic mode, the fan strength is adjusted to the temperature of the airflow and the set height of the unit.

With the SensAir and IndAC₂: In automatic mode, the fan strength is adjusted to the temperature difference between indoors and outdoors and the set height of the unit.

103 Ventilation valve position

Only with NOZ₂ units with ventilation (types 25V and 50V)

Depending on the settings, the unit can blow a set percentage of ventilation air.



Note:

In menu parameter 35.1, 'Ventilation control', of the *b-touch* control panel, one can enter whether the valve position can be set on a percentage basis or whether it can only be either entirely open or entirely shut.



Note:

In the case of ventilation units without recirculation, the value is always 128 (100% open).

204 Outdoor temperature

With the SensAir and IndAC₂ the outdoor temperature is used by the automatic control. An average value is taken over a period of 3 minutes.

The outdoor temperature can be determined in various ways:

- By the IR sensor. (only with SensAir)
- By a wired outdoor sensor.
- By making an estimate, based on the month of the year and your country.

With the NOZ₂ this function is not applicable.

4 . . All register addresses



Note:
It may occur that the system applied uses a value of 1 higher than the register addresses given here. In that event, you use 101 for register address 100, for example.



Note:
Menu parameters 0 – 1 are functions in the home screen of the *b-touch* control panel.



Note:
For all register addresses, the data type is int 16.

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	100	Discharge temperature setpoint	0.1°C					ro	L
	101	For SensAir: run time, discharge outlet motor	pulsen motor 1/ 50 Hz					ro	L
	102	Fan strength	%	0	100			ro	L
	103	For NOZ₂: Ventilation valve position	%	0	128 (=100%)			ro	L

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	104	Status bits outputs	Bit	0	6		0 (+1) = output 1 1 (+2) = output 2 2 (+4) = cooling 3 (+8) = heating 4 (+16) = on 5 (+32) = room control active (menu parameter 45.1 (105) is not active) 6 (+64) = output 3	ro	L
45.1	105	Valve position set-point active with extra frost protection	%	0	100			ro	G
	140	Unit temperature, sensor X360	0.1°C					ro	L
	141	Discharge temperature, sensor X350	0.1°C					ro	L
	142	Error bits from unit	Bit	0	15			ro	L
	144	Status bits inputs	Bit	0	6		0 (+1) = ok (not used) 1 (+2) = err (not used) 2 (+4) = status config. button 3 (+8) = input 1 4 (+16) = input 2 5 (+32) = PIR input 6 (+64) = input 3	ro	L
	145	Temperature sensor X540 For SensAir and IndAC₂ : Outdoor temperature For NOZ₂ : Room temperature	0.1°C					ro	L
	146	Input voltage, analogue input X375	0.01 V					ro	L

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	147	Air pressure, filter sensor	0.1 Pa					ro	L
	148	Position of water valve for cooling (not applicable)	%					ro	L
	149	Heating output	%					ro	L
	150	Temperature sensor X354 For SensAir H3: Medium sensor For IndAC₂: Room temperature For NOZ₂ ventilation: Inlet temperature of ventilation air	0.1 °C					ro	L
	151	Input voltage, analogue input X377	0.01 V					ro	L
	152	(not applicable)	-						
	153	(not applicable)	-						
	154	Serial number	-					ro	L
	156	Unit code, part 1	-					ro	L
	157	Unit code, part 2	-					ro	L
	158	Software version, control circuit board	-					ro	L
	200	Temperature sensor X540 (average value in the event of multiple units) For SensAir and IndAC₂: Outdoor temperature sensor For NOZ₂: Room temperature sensor	0.1 °C				0 = no sensor detected	ro	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	201	For SensAir: Unit temperature (average value of all units, without calibration correction menu 9) For IndAC₂ and NO₂: same as 205	0.1°C					ro	G
	202	For SensAir and IndAC₂: current outdoor temperature (IR sensor, sensor X540 or temperature table (highest of all units)) For NO₂: not applicable (always 0)	0.1°C					ro	G
	203	Room temperature with calibration correction menu 9 (dependent on sensor chosen at menu parameter 71 of the <i>b-touch</i> control panel)	0.1°C					ro	G
	204	For SensAir and IndAC₂: Outdoor temperature (average over 3 minutes) For NO₂: not applicable (always 0)	0.1°C					ro	G
	205	Unit temperature (lowest value in the event of multiple units) filtered with time constant from menu 30 (settings file)	0.1°C					ro	G
	206	Unit temperature (average value in the event of multiple units)	0.1°C					ro	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	207	(not applicable)	0.1°C					ro	G
	208	Discharge temperature (average value in the case of multiple units)	0.1°C					ro	G
	209	Discharge temperature setpoint. (calculated on the basis of the PID factors)	0.1°C					ro	G
	210	Temperature sensor X354 (highest value in the case of multiple units) For SensAir H3: Medium sensor For IndAC₂: Room temperature For NO₂ ventilation: Inlet temperature of ventilation air	0.1°C	0	700			ro	G
	211	Status input 1, (or-ed in the case of multiple units)	-	0	1		0= open 1= closed	ro	G
	212	Status output 1	-	0	1		0= open 1= closed	ro	G
	213	Status output 2	-	0	1		0= open 1= closed	ro	G
	214	Status digital input, control panel For NO₂ and IndAC₂: Not applicable (always 0)	-	0	1		0= open 1= closed	ro	G
	215	Input voltage, analogue input X375 (highest value in the case of multiple units)	0.1V					ro	G
	216	ErrorFlags-0	Bit	0	65536			ro	G
	217	ErrorFlags-1	Bit	0	65536			ro	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	218	(not applicable)	-					ro	G
	219	(not applicable)	-					ro	G
	220	Software version, control circuit board (lowest value in the case of multiple units) (not applicable)	-					ro	G
	221	Software version <i>b-touch</i> control panel (not applicable)	-					ro	G
	222	Number of units (not applicable)	-					ro	G
	223	Energy consumption, total	For SensAir and IndAC₂: 0.1 kWh/m NOZ₂: kWh/unit	0	65536			ro	G
	224	Input <i>b-touch</i> control panel (not applicable)	-					ro	G
	225	U0T (same as 500)	0.001 m/s	0	65536			ro	G
	226	U0C (same as 501)	0.001 m/s	0	65536			ro	G
	227	Door open ratio	%	0	100			ro	G
	228	Heating capacity	0.1kW					ro	G
	230	Filter contamination limit (same as 507)	Pa					ro	G
	231	Filter current level (same as 508)	Pa					ro	G
	232	Filter clean	Pa					ro	G
	233	Filter contamination percentage	%					ro	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
Menu settings									
	253	communication <i>b-touch</i> necessary	-	0	1		0= not necessary 1= necessary		
	254	Reset error messages	-	0	1		0= read 1= write reset	rw	G
	255	Reset user menu settings (not applicable)	-	0	1			rw	G
	256	Reset user settings	-	0	1			rw	G
	258	Reset system	-	0	1			rw	G
	259	Reset default outdoor temperature table	-	0	1			rw	G
Filter									
	260	Carry out filter check	-	0	1	0	0= read 1= write reset	rw	G
	261	Reset Filter	-	0	1	0	0= not active 1= reset filter lifespan	rw	G
	262	Track filter lifespan	-	0	1	1	0= do not track 1= do track	rw	G
	263	Elapsed filter time	weeks	0	255	0		rw	G
	264	Filter dirty	weeks	1	52	13		rw	G
	265	Filter check time	min.	0	1439	0		rw	G
	266	Filter cleaning interval adjustment	weeks	-3	+3	0		rw	G
Timer									
	270	Date							
	273	Timer							
Preferences									
	274	Language							
Settings									
1	275	Select modes	-	1	3	3	1= manual 2= automatic 3= manual or automatic	rw	G
5	276	Room temperature	0.1°C	10	400	210		rw	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
6	277	Minimum air temperature	0.1°C	-100	150	10		rw	G
8	278	Night temperature	0.1°C	100	300	150		rw	G
8.5	279	Night temperature sensor	-	0	7	0	SensAir and NO₂: 0= no night control 1= night control implemented IndAC₂: 0= no night control 1= night control with unit sensor 5= night control with floor sensor	rw	G
9	280	Calibration of room temperature sensor	0.1°C	-50	50	0		rw	G
Access control									
20.1	281	Pin code (not applicable)	-	0	9999	0000		rw	G
20.2	282	Access level (not applicable)	-	0	2	0	0= off 1= control panel 2= menu	rw	G
	283	(not applicable)	-						
Display									
21.1	284	Display on/off button	-	0	1	0	0= hidden 1= visible	rw	G
21.2	285	Temperature display	-	0	4	1	0= no display 1= room temperature calibrated 2= room temperature 3= setpoint	rw	G
21.3	286	Heating OFF option	-	0	1	1	0= hidden 1= visible	rw	G
21.4	287	Error display	-	0	3	1	0= hide everything 1= everything visible 2= hide F1 3= hide F2/F3	rw	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
Door response									
25.1	289	Door response: auto- matic	-	0	1	0	0= immediate 1= gradual	rw	G
25.2	290	Fan speed in event of closed door	%	0	100	SR: 20 IndAC₂ : 5		rw	G
25.3	291	Room temperature control in event of closed door	-	0	1	0	0= off 1= on	rw	G
25.4	292	Fan speed, room tem- perature control in event of closed door	%	0	100	0		rw	G
25.5	293	Stand-by heating	%	0	100	100		rw	G
26	294	Door response: man- ual	-	0	1	0	0= no response 1= response as with 289 auto	rw	G
Fan									
31	295	Maximum strength, auto	%	50	100	100		rw	G
32	296	Deceleration time For SensAir: not applicable	s	5	900	5		rw	G
Boost function									
33.1	297	Boost function	-	0	1	0	0= off 1= on	rw	G
33.2	298	Boost: temperature difference	0.1°C	-100	-15	-15		rw	G
33.3	299	Boost: speed increase	%	0	80	0		rw	G
Ventilation									
35.1	301	Only for NOZ₂ ventilation: Ventila- tion control	-	1	2	1	1= On/off 2= 0% – 100%	rw	G
35.2	302	Only for NOZ₂ ventilation: Maxi- mum position of ven- tilation valve	%	0	100	100		rw	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
35.3	303	Only for NOZ₂ ventilation: Minimum fan speed during ventilation	%	0	100	0		rw	G
35.4	304	Only for NOZ₂ ventilation: Maximum fan speed during ventilation	%	0	100	100		rw	G
Temperature									
41	311	Outdoor temperature, heating OFF	0.1°C	-300	300	180		rw	G
42	312	Outdoor temperature, fan OFF	0.1°C	100	500	500		rw	G
43	313	Outdoor temperature, unheated usage	0.1°C	150	500	500		rw	G
44	314	Country code for outdoor temperature table (not used)	-	0	65535	0		rw	G
45.1	315	Additional frost protection: valve setting	%	0	100	0		rw	G
45.2	316	Additional frost protection: maximum outdoor temperature	0.1°C	100	300	150		rw	G
46	317	Maximum discharge temperature	0.1°C	0	500	500		rw	G
47	318	Room temperature, overheat protection	0.1°C	15	150	20		rw	G
	319 - 330	Normal monthly temperatures (TJAN-TDEC)	0.1°C	-300	300			rw	G
Installation									
50	331	Installation height	cm	100	1500			rw	G
52	332	Nozzle angle	°	13	53	33		rw	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
Valve									
	335	Control valve type (not used)	-	0	4		0 = none 1 = normal 2 = 0-10V 3 = usual 3p		
	336	Run time 3p control valve (not used)	s	0	300				
Inputs and outputs									
60.1	337	Function, input 1	-	0	71	0	see table, unit manual	rw	G
60.2	338	Function, input 2	-	0	71	0		rw	G
60.3	339	Function, input 3	-	0	71	0	0= no door contact switch 13= door contact switch NO 63= door contact switch NC	rw	G
	341	Deceleration time	s	0	1000	0		rw	G
61.1	342	Function, output 1	-	0	69	1	see table, unit manual	rw	G
61.2	343	Function, output 2	-	0	69	1		rw	G
61.3	344	Function, output 3	-	0	69	1		rw	G
	346	Modbus function, output 1 (only if output 1 has no function) (not used)	-	0	2		0 = off 1 = on 2 = not possible	rw	G
	347	Modbus function, output 2 (only if output 2 has no function) (not used)	-	0	2			rw	G
	348	Modbus function, output 3 (only if output 3 has no function) (not used)	-	0	2			rw	G
	350	Function 0-10V input X375 (not used)	-	0	100	0	0= no function 1= CO2 three-way valve	rw	G
	351	Voltage, output 1 (not used)	0.1V	0	100	20		rw	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	352	current level (not used)	%	0	100			rw	G
	353	Voltage, output 2 (not used)	0.1V	0	100	10		rw	G
	354	current level (not used)	%	0	100			rw	G
Sensors									
71	360	Indoor temperature sensor	-	0	6	1	0,1,3= unit sensor 2 = floor sensor X354 (IndAC ₂) 4= average, unit and floor sensor (IndAC ₂) 5= average, unit and sensor in control panel (SensAir) 6= average, unit and IR sensor (SensAir)	rw	G
Control panel input									
65	361	Only with SensAir: Function, control panel input	-	0	2	0	0= no function 1 = On/off 2 = temperature sensor	rw	G
Daikin									
66	362	Only with SensAir: Daikin settings	-	0	3	0	0 = on 1 = use hybrid heating	rw	G
66.1	363	Only with SensAir: Temperature difference for hybrid heating on (same as 298)	0.1°C	-100	-15	-15		rw	G
Hysteresis									
	364	Hysteresis, fan on/off	0.1°C	5	30	10		rw	G
	365	Hysteresis, overheating	0.1°C	5	10	10		rw	G
	366	Hysteresis, night temperature	0.1°C	5	30	15		rw	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	367	Hysteresis, boost function	0.1°C	5	10	5		rw	G
	368	Hysteresis, room temperature	0.1°C	5	30	10		rw	G
Biddle specific parameters									
	369	Time constant, inlet temperature	min.	0	99	1		rw	G
	370	Time constant, door open ratio	min.	0	60	6		rw	G
	371	K factor NOZ25	-	100	10000	2000		rw	G
	372	K factor NOZ50	-	100	10000	4400		rw	G
	373	P factor, room temperature	-	0	99	3		rw	G
	374	I factor, room temperature	-	0	99	2		rw	G
	375	D factor, room temperature	-	0	99	0		rw	G
	376	P factor, discharge temperature	-	0	99	50		rw	G
	377	I factor, discharge temperature	-	0	99	4		rw	G
	378	D factor, discharge temperature	-	0	99	0		rw	G
	379	Model calculation: sensors or setpoint	-	0	2	2	0= setpoint 1= sensors 2= highest value	rw	G
	380	Deflection module, model calculation	-	1	100	33	33= SensAir 25= IndAC ₂	rw	G
74	381	IR sensor functions	-	0	15	0	0= no function +1= 30 min. on + +2= outdoor temperature sensor +4= door contact switch +8= early start	rw	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
74.1	382	IR sensor: correction to outdoor temperature	0.1°C	-100	100	0		rw	G
74.2	383	IR sensor: correction to room temperature	0.1°C	-100	100	0		rw	G
74.5	384	Reset IR sensor	-	0	1	0	0= always read 1= reset write values	rw	G
IR sensor									
PIRA	385	IR parameters (Bid- dle setting)	ms			1000		rw	G
PIRB	386		%	0	100	33		rw	G
PIRC	387		0.1°C			30		rw	G
PIRD	388		0.1°C			5		rw	G
PIRE	389	time frame for maximum temperature increase (390)	s			900		rw	G
PIRF	390	maximum increase in outdoor temperature over time frame 389 (limited temperature increase due to direct sunlight)	0.1°C			5		rw	G
PIRG	391	IR parameters (Bid- dle setting)	ms			3000		rw	G
PIRH	392		0.1°C			10		rw	G
PIRI	393		0.1°C			10		rw	G
PIRJ	394		-			-		rw	G
PIRK	395		min.			240		rw	G
PIRL	396		-			5		rw	G
Users' functions									
0.1	400	Turning the unit ON and OFF Current status Caution: Use this address only for reading out. Use 420 for writing.	-	0	2	1	0 = off 1 = on 2 = holiday setting (not applicable)	rw	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
0.2	401	Turning the heating on and off Current status Caution: Use this address only for reading out. Use 421 for writing.	-	0	1	1	0 = heating off 1 = automatic control active	rw	G
0.3	402	Manual setting of the strength Current status Caution: Use this address only for reading out. Use 422 for writing.	%	0	100	50		rw	G
0.4	403	Adjusting the automatic strength control Current status Caution: Use this address only for reading out. Use 423 for writing.	-	-3 (approx. -20%)	3 (approx. +20%)	0		rw	G
0.5	404	Required room temperature Current status Caution: Use this address only for reading out. Use 424 for writing.	0.1°C	10	400	210		rw	G
0.6	405	Automatic or manual control Current status Caution: Use this address only for reading out. Use 425 for writing.	-	0	1	1	0 = manual 1 = automatic	rw	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	406	Ventilation modes setting	-	0	2	2	0 = 100% recirculation 1 = choice of ventilation percentage 2 = 100% recirculation / 100% ventilation	rw	G
	407	Ventilation valve position	%	0	100	100		rw	G
	408	(not applicable)	-						
	409	(not applicable)	-						
	410	Turning the unit ON and OFF change via the <i>b-touch</i> control panel	-	0	1	0	0 = permitted (change of value**) 1 = not permitted	rw	G
	411	Turning the heating on and off change via the <i>b-touch</i> control panel	-	0	1	0	0 = permitted (change of value**) 1 = not permitted	rw	G
	412	Manual setting of the strength change via the <i>b-touch</i> control panel	-	0	1	0	0 = permitted (change of value**) 1 = not permitted	rw	G
	413	Adjusting the automatic strength control change via the <i>b-touch</i> control panel	-	0	1	0	0 = permitted (change of value**) 1 = not permitted	rw	G
	414	Required room temperature change via the <i>b-touch</i> control panel	-	0	1	0	0 = permitted (change of value**) 1 = not permitted	rw	G
	415	Automatic or manual control change via the <i>b-touch</i> control panel	-	0	1	0	0 = permitted (change of value**) 1 = not permitted	rw	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	416	Ventilation modes setting change via the <i>b-touch</i> control panel	-	0	1	0	0 = permitted (change of value**) 1 = not permitted	rw	G
	417	Ventilation valve position change via the <i>b-touch</i> control panel	-	0	1	0	0 = permitted (change of value**) 1 = not permitted	rw	G
	418	(not applicable)	-						
	419	(not applicable)	-						
	420	Turning the unit ON and OFF Modbus setpoint	-	0	2	1	0 = off 1 = on 2 = holiday setting (not applicable)	rw	G
	421	Turning the heating on and off Modbus setpoint	-	0	1	1	0 = heating off 1 = automatic control active	rw	G
	422	Manual setting of the strength Modbus setpoint	%	0	100	50		rw	G
	423	Adjusting the automatic strength control Modbus setpoint	-	-3 (approx. -20%)	3 (approx. + 20%)	0		rw	G
	424	Required room temperature Modbus setpoint	0.1°C	10	400	210		rw	G
	425	Automatic or manual control Modbus setpoint	-	0	1	1	0 = manual 1 = automatic	rw	G
	426	Ventilation modes setting Modbus setpoint (not applicable)	-	0	2	2		rw	G
	427	Ventilation valve position Modbus setpoint (not applicable)	%	0	100	100		rw	G

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	428	(not applicable)	-						
	429	(not applicable)	-						
	430	For SensAir and IndAC₂: Outdoor temperature measured via Modbus (note: update every 60 min.)	0.1°C	-500	800			rw	G
	431	For NOZ₂: Room temperature measured via Modbus (note: update every 60 min.)	0.1°C	-500	800			rw	G
	432	menu 90 function PIR grid sensor (not applicable)	-	0	2	2	0 = not in use 1 = used for control 2 = reading out only	rw	G
Other functions that can be read out									
	500	Required total strength of the air curtain (indicative)	10 ⁻³ m/s					ro	G
	501	Required total strength against convection of the air stream of the air curtain (indicative)	10 ⁻³ m/s					ro	G
	502	Door open ratio	%	0	100			ro	G
	503	Person counter	-					ro	G
	504	(not applicable)	-						
	505	IR counter – day	-					ro	G
	506	IR counter – total	-					ro	G
	507	Current filter contamination	Pa					ro	G
	508	Filter dirty	Pa					ro	G
	509	(not applicable)	-						
	510	IR sensor reference temperature (not applicable)	0.1°C					ro	L

MENU PARAMETER	REGISTER ADDRESS	DESCRIPTION	CONTROL UNIT	MINIMUM	MAXIMUM	DEFAULT	OPTIONS	RO* / RW*	LOCAL / GLOBAL
	511 - 518	IR sensor current temperature, surfaces 1 – 8	0.1°C					ro	L
	519	(not applicable)	-					ro	L
	520	(not applicable)	-					ro	L
	521 - 523	IR sensor, lowest temperature, surfaces 1 – 3 over the most recent period	0.1°C					ro	L
	524 - 528	IR sensor filtered temperature, average surfaces 4-8	0.1°C						
	529	IR sensor measured current outdoor temperature (not applicable)	0.1°C					ro	L
	530	Measured door position (not applicable)	-	0	1		0 = closed 1 = open	ro	L
	531	IR sensor start signal (not applicable)	-	0	1			ro	L
	532	IR sensor, number of persons detected (not applicable)	-	0	65535			ro	L
	533	Door open time (not applicable)	-					ro	L
	534	Summer outdoor temperature. Highest value (not applicable)	-					ro	L
* ro = read only (read only)									
* rw = read & write (read and write)									
** change of value = changes via the <i>b-touch</i> control panel apply only until the starting time of the next switching moment by Modbus.									

4.1 Register types

TYPE	LENGTH (WORDS)	DESCRIPTION
int16	1	Signed Integer (-32768 to 32767)

5 . . Errors

5.1 Resolving simple problems

PROBLEM	POSSIBLE CAUSE	SOLUTION
The unit does not respond to Modbus commands.	No communication with the Modbus network.	<ul style="list-style-type: none"> Check the connection and the cables of the Modbus network.
	The distance between the Modbus system and the first unit is too great, which results in the module not getting enough power supply.	<ul style="list-style-type: none"> Remove excess control cable.
	The wiring has been connected wrongly.	<ul style="list-style-type: none"> Reverse the Modbus A- and Modbus B+ connections.
	The unit has an incorrect Modbus node address.	<ul style="list-style-type: none"> Check the unit's Modbus node address.
	The baud rate of the Modbus system has been set wrongly.	<ul style="list-style-type: none"> Set the Modbus system to the correct baud rate. Default value is 9600.
The unit functions differently from expectations.	The unit is controlled temporarily via the <i>b-touch</i> control panel.	<ul style="list-style-type: none"> Changes via the <i>b-touch</i> control panel apply only until the starting time of the next switching moment by Modbus. If desired, modify the associated register address so that changes via the <i>b-touch</i> control panel are not permitted.
The values of the readings are not correct.	The wrong register address is being read out.	<ul style="list-style-type: none"> Read out the correct register address. It may occur that the system uses a value of 1 higher. In that event, use 101 for register address 100, for example.
	The read-out type is incorrect.	<ul style="list-style-type: none"> Check the type of the address.
There are errors in the communication.	Poor Modbus cabling.	<ul style="list-style-type: none"> Replace the cabling with better-quality cabling.
	Excessively long Modbus cabling.	<ul style="list-style-type: none"> Remove excess cabling.

5.2 Reading out errors

5.2.1 Reading out errors

Errors are recorded with a binary code in two registers. These are registers 216 and 217.

In the log file “log_error.csv”, which can be read out with a USB flash drive, the errors are indicated with a numeric value.

5.2.2 Error codes registers

For an explanation of the error messages, please refer to the manual for the unit.



Note:
not all error codes are applicable to each unit.

Error codes register 216/ErrorFlags[0]

	ERRORFLAGS[0]; MODBUS 216	LOG_ERROR.CSV		
BIT	VALUE	VALUE	CODE	DESCRIPTION
0	1	0	E6	Risk of freezing
1	2	1	E2	Wrong connection
2	4	2	E1	No communication
3	8	3	E7	Fan not running
4	16	4	E3	Too much heating
5	32	5	E5	Heating stays on
6	64	6	E4	Too much heating
7	128	7	F2	Too much heating
8	256	8	F3	Too little heating
9	512	9	F5	Faulty air discharge sensor
10	1024	10	F6	Faulty air inlet sensor
11	2048	11	F4	Control panel sensor faulty
12	4096	12	F8	Faulty pressure sensor
13	8192	13	F1	Error in air damper
14	16384	14	F2	Too much cooling
15	32768	15	F3	No cooling

Error codes register 217/ErrorFlags[1]

	ERRORFLAGS[1]; MODBUS 217	LOGERROR.CSV		
BIT	VALUE	VALUE	CODE	DESCRIPTION
0	1	16	-	Filters need cleaning
1	2	17	-	No power supply
2	4	18	-	Outdoor temperature sensor – replace battery
3	8	19	-	Indoor temperature sensor – replace battery
4	16	20	F7	Faulty outdoor temperature sensor
5	32	21	F11	Faulty pipe sensor
6	64	22	F9	Faulty wireless outdoor temperature sensor
7	128	23	F10	Faulty wireless indoor temperature sensor
8	256	24	F12	Faulty room sensor (CA IndAC ₂)
9	512	25	F13	Faulty pipe sensor
10	1024	26	F14	Faulty room sensor(NOZ ₂)

6. . Addresses

If you have any comments or queries relating to this product, please do not hesitate to contact your Biddle branch.

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Should you nevertheless discover any errors or ambiguities in the manual, we shall be glad to learn that from you. It helps us to improve the documentation still further.

For more information

If you have any comments or queries relating to this product, please do not hesitate to contact Biddle. You will find the contact information for your Biddle branch in chapter [6 Addresses](#).

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