Modbus adapter CI66

Installation Instructions

Contents

Fig. 1

1 Introduction

The Modbus adapter is a unit that you connect between your Flexit ventilation unit and a superior control system that communicates using Modbus RTU with RS485 (se Fig. 1).

The superior system could be a house central that connects the ventilation unit with heating and lighting control, or a system that supervises and monitors several ventilation units from a central hub.

2 Installation

2.1 Location

The Modbus adapter can be placed a maximum of 1m from the ventilation unit with the enclosed cable (see Fig. 2).

If needed the cable can be replaced with a longer cable, maximum 12 m. The cable has RJ12-connectors (6-pin modular connector) at both ends and the connection is 1-1 (see Fig 3).

Fig. 3
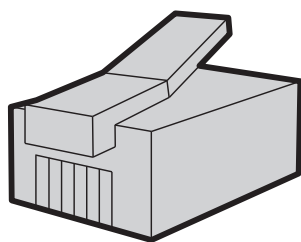
The Modbus adapter requires an external 230V AC voltage supply. This is enclosed with the package.

Fig. 2

Modbus adapter

Max. 1 meter

2.2 Mounting

Fix the wall bracket with PCB to the wall using the enclosed screws as shown in Fig. 4.

Fig. 4
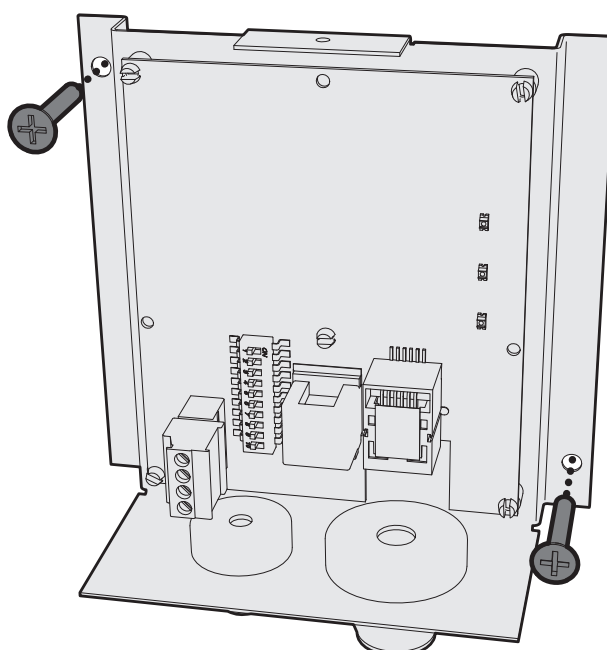
2.3 Connecting the Modbus adpater to the ventilation unit

On top of the ventilation unit there's an extension connector intended for connection of the CI60/600 control panel. Replace the extension connector with the enclosed Y-connectior (see Fig. 5) and connect the enclosed cable to the extra slot on the Y-connector (see Fig. 6).

Fig. 5

Fig. 6

Modbus adapter
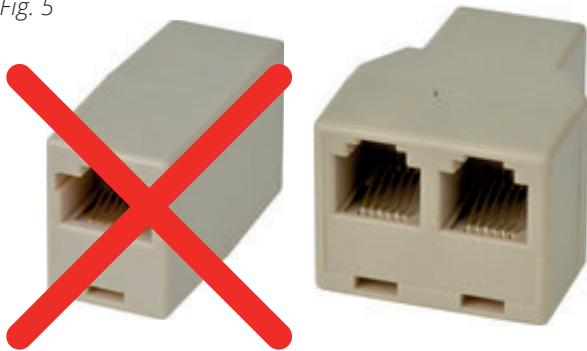
Pull the control cable from the Y-connector through the large grommet on the adapter wall bracket , and insert it into the **connector no. 2** shown in Fig. 7.

Fig. 7

The adapter can be used alone, or in conjunction with up to one CI60 control panel and one CI600 control panel. The panel(s) and the Modbus adapter follow a hierarchy where the adapter is equal to a CI60 panel. Each unit needs its own identity, which means it's necessary to configure the adapter with the single DIP switch on the PCB (see Fig. 8). Use the relevant settings shown in the table on the right. Serial connection of the units can be performed arbitrarily.
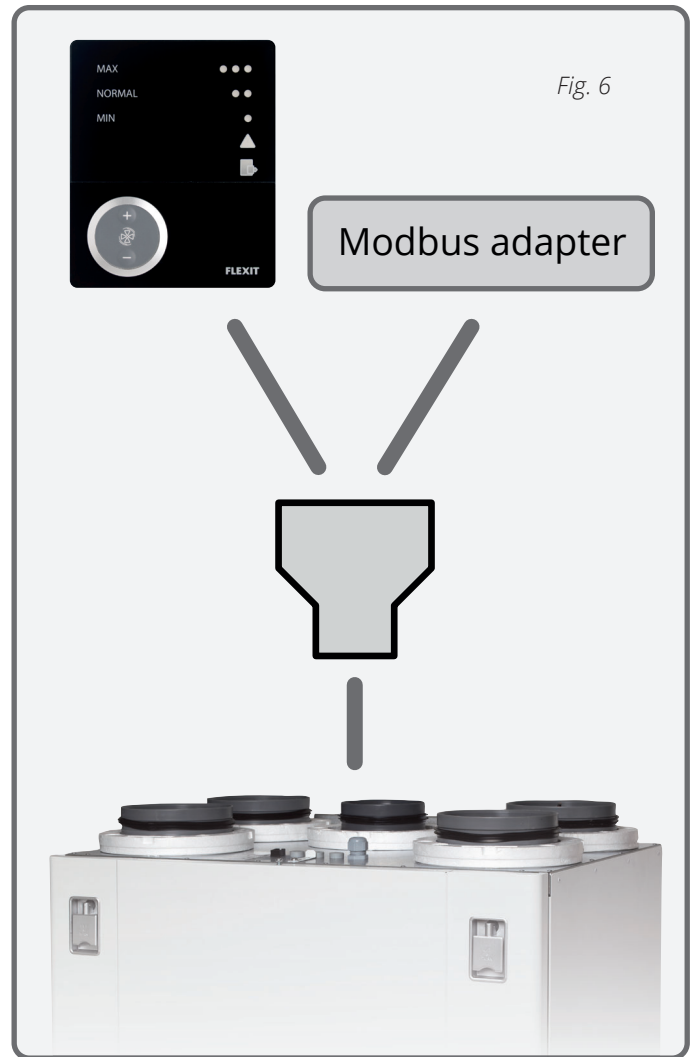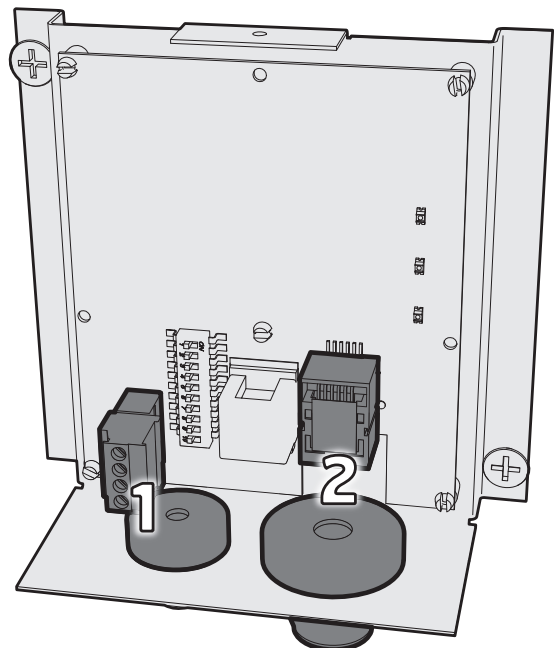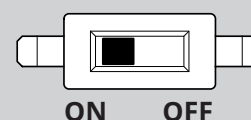
OFF = MASTER
ON = SLAVE

Fig. 8

ON   OFF

Configuration	Setting
CI 600 (MASTER)	Automatic
CI 60 (SLAVE)	OFF
MODBUS ADAPTER (SLAVE)	ON
CI 60 (MASTER)	OFF
MODBUS ADAPTER (SLAVE)	ON
MODBUS ADAPTER(MASTER)	OFF
CI 60 (SLAVE)	ON
CI 600 (MASTER)	Automatic
MODBUSADAPTER (SLAVE)	Irrelevant

2.4 Connecting the Modbus adpater to the superior system

Connect to the Modbus adapter using **connector no. 1** (see Fig. 7), in accordance with the table below. The cable must be a TP (Twisted Pair) type, to minimize the risk of electrical interference.

Nr	Designation	Description
1	D0	RS 485 connection A
2	D1	RS 485 connection B
3	Common	RS 485 connection C, signal reference and supply return
4	VP	Supply for isolated bus connection 5 - 24V DC

Section view of Modbus adapter
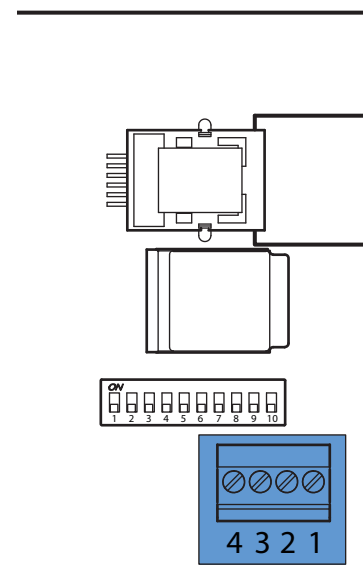
2.5 Power connection

Connect the PSU (see Fig. 9) to a regular mains supply, 230V AC / 50Hz.

Alternatively, power can be supplied from a superior system rather than the enclosed supply. The adapter requires a voltage supply of 5-24V DC, power consumption is 100mA.

Fig. 9

5

2.6 Configuration

Figure 10 displays the functions of the DIP switches.
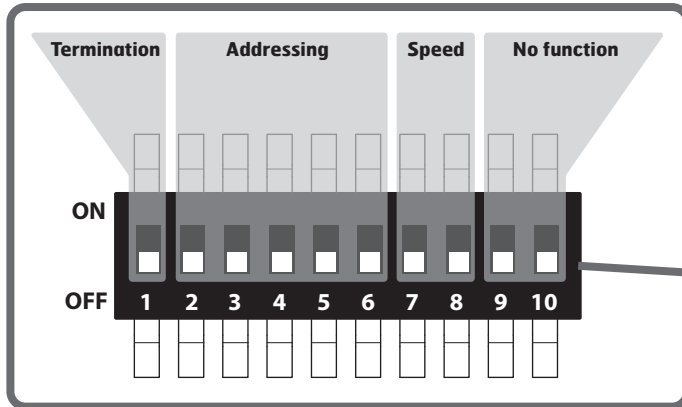
Fig. 10
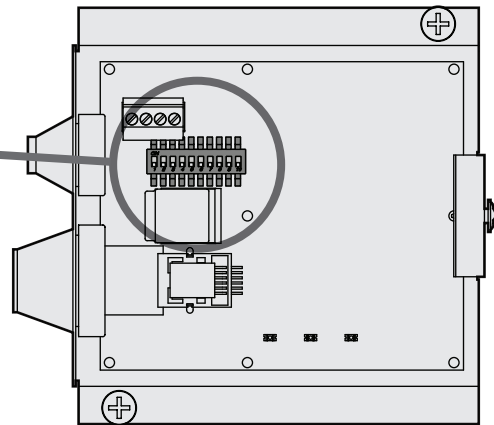
2.6.1 Termination (DIP switch 1)

Depending on the number of Modbus components installed on the data bus and which one is configured as terminating unit, the adpater can be configured to achieve appropriate termination.

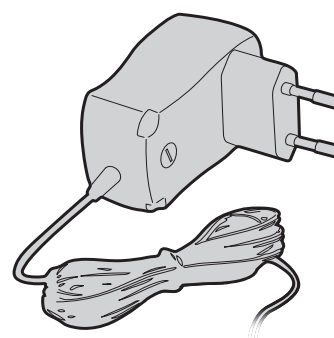| Position	Function
ON	Termination on
OFF	Termination off

2.6.2 Addressing (DIP switch 2-6)

The adapter can be configured to offer 32 unique addresses. This means that up to 32 ventilation units can be connected to the same superior system.

An address is set with the help of five DIP switches employing a binary code system.

DIP #	Value
DIP 2	1
DIP 3	2
DIP 4	4
DIP 5	8
DIP 6	16

A value is attained by setting the relevant DIP switch to ON. In the OFF position the value is zero.

> EXAMPLE
> Required address = 21
> Set DIP switch 2, 4 and 6 to ON (1+4+16 =21)
> Set DIP switch 3 and 5 to OFF

2.6.3 Communication (DIP switch 7-8)

Communication is physically connected in half duplex (2W-MODBUS) via an ITr interface (Trunk Interface).
Modbus response time is max 100 ms.

The adapter communicates with Modbus with 8 data bits, 1 stop bit and even parity. Communication rate (bit rate) can be configured to the following speeds: 9.600, 19.200, 38.400 og 56.000 bits/s.

Speed	DIP switch 7	DIP switch 8
9.600	OFF	OFF
19.200	ON	OFF
38.400	OFF	ON
56.000	ON	ON

2.6.4 Other

DIP switch 9 and 10 have no function.

2.7 Finalizing

Move the cover upwards from below the wall bracket, making sure that the hooks insert into the back of the wall bracket. Then move the upper part of the cover towards the wall (see Fig. 11)
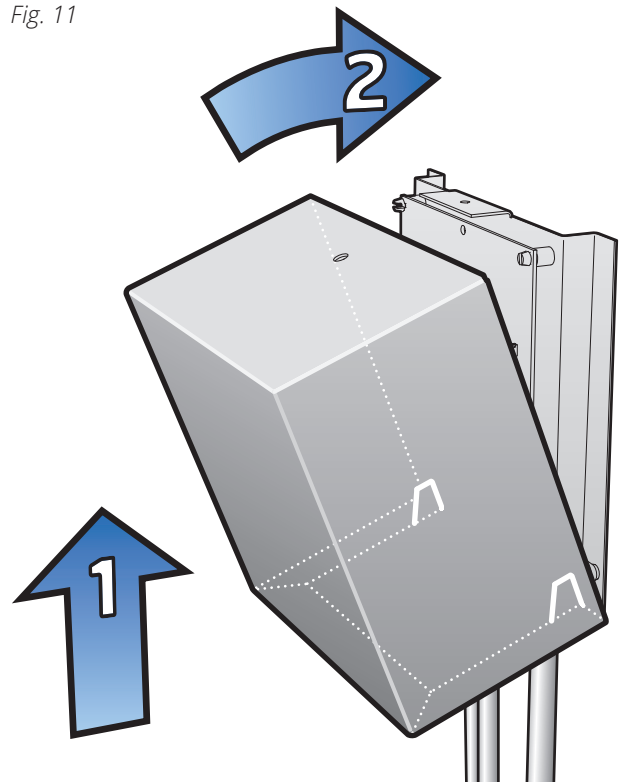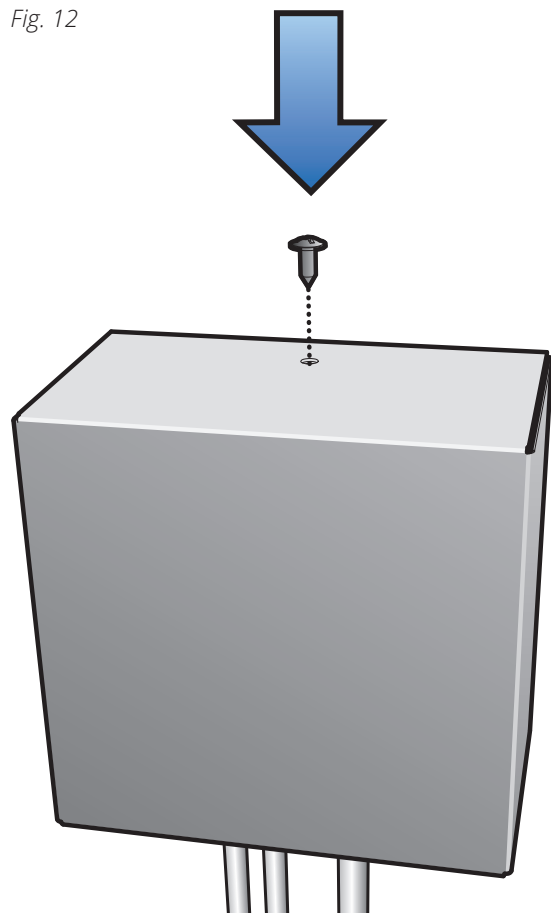
Fig. 11

Fix the cover with the enclosed screw (see Fig. 12).

Fig. 12

7

3 Modbusregister

3.1 Modbus Input Registers (03)

Adress	Name	Description	Data-format	Read (R) / Write (W)	Unit	Default	Min	Max
3x0001	GWYVer	*Protokollversion.*	*UINT 16*	*R*		0	0	0xffff
3x0002	CUHWType	*Main board hardware type*	*UINT 16*	*R*		0	0	0xffff
3x0003	CUSWRev	*Main board software rev.*	*UINT 16*	*R*		0	0	0xffff
3x0004	CPASWRev	CPA board software rev.	*UINT 16*	*R*		0	0	0xffff
3x0005	CPB1SWRev	CPB1 board software rev. (Norm. GB)	*UINT 16*	*R*		0	0	0xffff
3x0006	CBPS2WRev	CPB2 board software rev. (if installed)	*UINT 16*	*R*		0	0	0xffff
3x0007	Time1	Real time clock value	*UINT 32*	*R*		0	0	0xffffffff
3x0009	FilterTimer	Filter timer	*UINT 16*	*R*	h	0	0	0xffff
3x0010	SupplyAirTemp	Supply air temperature	*INT 16*	*R*	0.1°C	200	-450	500
3x0011	ExtractAirTemp	Extract air temperature	*INT 16*	*R*	0.1°C	200	-450	500
3x0012	OutdoorAirTemp	Outdoor air temperature	*INT 16*	*R*	0.1°C	200	-450	500
3x0013	ReturnWaterTemp	Return water temperature	*INT 16*	*R*	0.1°C	200	-450	500
3x0014	Cooling	Cooling	*INT 16*	*R*	%	45	0	100
3x0015	HeatExchanger	Heat exchanger	*INT 16*	*R*	%	45	0	100
3x0016	Heating	Heating	*INT 16*	*R*	%	45	0	100
3x0017	RegulationFanSpeed	Regulation fan speed	*INT 16*	*R*		0	0	3
3x0018	OperTime	Operational time	*UINT 16*	*R*	h	0	0	0xffff
3x0019	FilterResetNo	The number of filter resets	*UINT 16*	*R*		0	0	0xffff
3x0020	SupplyAirAlarm	Supply air sensor range alarm	*INT 16*	*R*	bool	0	0	1
3x0021	ExtractAirAlarm	*Extract air sensor range alarm*	*INT 16*	*R*	bool	0	0	1
3x0022	OutsideAirAlarm	Outside air sensor range alarm	*INT 16*	*R*	bool	0	0	1
3x0023	ReturnWaterAlarm	*Return water sensor range alarm*	*INT 16*	*R*	bool	0	0	1
3x0024	FireThermostatAlarm	Fire thermostat active alarm	*INT 16*	*R*	*bool*	0	0	1
3x0025	FireSmokeAlarm	Fire/smoke detector active alarm	*INT 16*	*R*	bool	0	0	1
3x0026	FreezeProtectionAlarm	Freeze proctection return water alarm (low return water temperature)	*INT 16*	*R*	bool	0	0	1
3x0027	RotorAlarm	Rotor alarm	*INT 16*	*R*	bool	0	0	1
3x0028	ReplaceFilterAlarm	Replace filters alarm	*INT 16*	*R*	bool	0	0	1
3x0029	HeatingBatteryActive	Heating battery active	*INT 16*	*R*	bool	1	0	1
3x0030	SchActive	Scheduler active	*INT 16*	*R*	bool	0	0	1
3x0031	SP0TimeH	SP0 Time counter	*UINT 32*	*R*	s	0	*0*	0xffffffff
3x0033	SP1TimeH	SP1 Time counter	*UINT 32*	*R*	s	0	0	0xffffffff
3x0035	SP2TimeH	SP2 Time counter	*UINT 32*	*R*	s	0	0	0xffffffff
3x0037	SP3TimeH	SP3 Time counter	*UINT 32*	R	s	0	0	0xffffffff
3x0039	VVX1TimeH	VVX1 Time counter	*UINT 32*	R	s	0	0	0xffffffff
3x0041	EV1TimeH	EV1 Time counter High	*UINT 32*	*R*	s	0	0	0xffffffff
3x0043	OperTimeH	Operational counter High	*UINT 32*	*R*	s	0	0	0xffffffff
3x0045	FilterTimeH	Filter counter High	*UINT 32*	*R*	s	0	0	0xffffffff
3x0047	FilterAlarmPeriod	Filter alarm, time period	*UINT 16*	*R*	s	180	0	360
3x0048	ActualSetAirTemperature	The set air temperature used on CU	*INT 16*	R	0.1 °C	200	0	250
3x0049	ActualSetAirSpeed	The set air speed used on CU	*INT 16*	R		2	0	3

3.2 Modbus Holding Registers (04)

Adress	Name	Description	Data-format	Read (R) / Write (W)	Unit	Default	Min	Max
4x0001	SupplyAirSpeed1	Speed 1 (sa)	INT 16	R/W	%	50	20	100
4x0002	SupplyAirSpeed2	Speed 2 (sa)	INT 16	R/W*	%	75	20	100
4x0003	SupplyAirSpeed3	Speed 3 (sa)	INT 16	R/W	%	100	20	100
4x0004	SupplyAirSpeed4	Speed 4 (sa)	INT 16	R/W		3	1	3
4x0005	ExtractAirSpeed1	Speed 1 (ea)	INT 16	R/W	%	50	20	100
4x0006	ExtractAirSpeed2	Speed 2 (ea)	INT 16	R/W*	%	75	20	100
4x0007	ExtractAirSpeed3	Speed 3 (ea)	INT 16	R/W	%	100	20	100
4x0008	ExtractAirSpeed4	Speed 4 (ea)	INT 16	R/W		1	1	3
4x0009	SetAirTemperature	Air temperature	INT 16	R/W*	0.1°C	200	100	300
4x0010	SupplyAirMinTemp	Min supply air temp.	INT 16	R/W	0.1°C	160	50	250
4x0011	SupplyAirMaxTemp	Max supply air temp.	INT 16	R/W	0.1°C	350	150	450
4x0012	CoolingOutdoorAirMinTemp	CO, Min outdoor temp.	INT 16	R/W	0.1°C	170	50	250
4x0013	ForcedVentSpeed	Speed to set during forced ventilation (max timer)	INT 16	R/W		3	1	3
4x0014	ForcedVentTime	Forced ventilation (max timer) activation time	INT 16	R/W	min	30	0	360
4x0015	AirRegulationType	Air regulation type	INT 16	R/W	bool	1	0	1
4x0016	CoolingActive	Cooling (CO)	INT 16	R/W	bool	0	0	1
4x0017	ForcedVentilation	Forced ventilation activate/ deactivate	INT 16	R/W**	bool	0	0	1
4x0018	SetAirSpeed	A set value that panels use to write wanted air speed to CU.	INT 16	R/W		2	0	3
4x0019	Time	Real time clock value	UINT 32	R	s	0	0	0xffffffff
4x0022	FireSmokeMode	Fire/Smoke mode	INT 16	R/W		1	1	4
-								
4x0049	Spare							

* Values can only be changed if CI66 is set to "Master", see table in chapter 2.3.
** Value can only be written if a CI600 is connected to the system.

3.3 Additional information

The registers in Table 3.1 and 3.2 using PLC addressing (Base 1)

In the Modbusstandard only registers of 16 bits are used. In some cases, more data to the description of the value are needed, and in this case two successive registers are used. Register marked with data format INT 32 has data in two registers (the current registry and following).

Register n: (MSB = data for the highest values)

X	X	X	X				

Register n+1: (LSB=data for the lowest values)

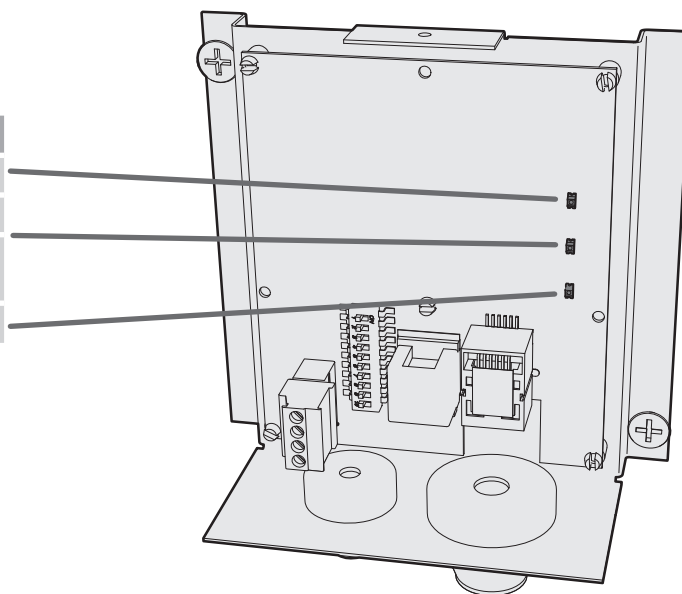|				X	X	X	X

n = registeradress

3.4 Visual diagnosis

The Modbus adapter has three diodes for diagnostic purposes, shown in Fig . 13. They are implemented in the following manner:
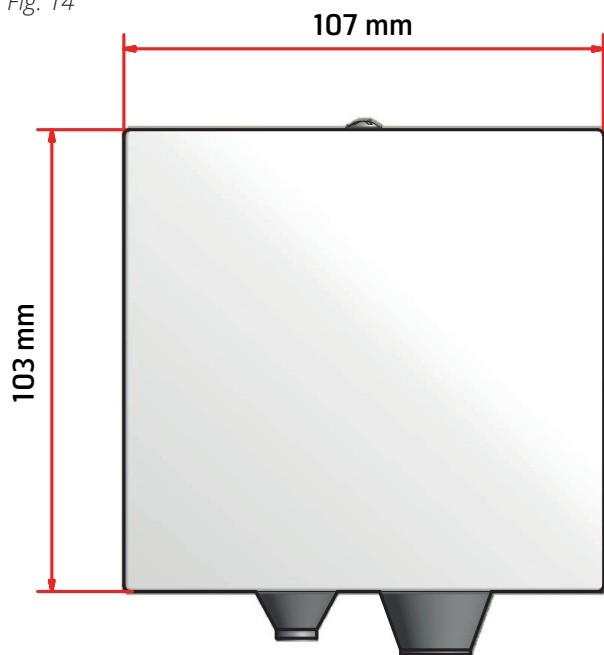
Diode	Behaviour	Indication
Green	Permanent	Power on
Red	Permanent	Internal Modbus error
	Flashing	Communication or configuaration error
Yellow	Permanent	Sending or receiving data

4 Dimensions

Fig. 14

107 mm

103 mm

5 Technical data

Rated voltage	5-24V DC
Rated current	Max 100 mA
Communication interface	RS485
Communication protocol	Modbus RTU according to [1] and [2]
Communication - physical connection	Half duplex (2W-MOD-BUS) via ITr interface (Trunk Interface)
Communication - Data bits - Stop bits - Parity - Bit rate	8 1 Even 9.600, 19.200, 38.400 and 56.000 bit/s
Response time	Max 100 ms + [1] och[2]
Recommended temperature range	0 – 40°C
Ingress protection rating	IP20

References
[1] MODBUS Application Protocol Specification V1.1b, http://www.modbus.org, December 28, 2006.
[2] MODBUS over serial line specification and implementation guide V1.02,
http://www.modbus.org, December 20, 2006.

6 Troubleshooting

Problem	Symptom / possible cause	Solution
No communication between the adapter and the superior system	1. The green LED on the adapter does not light 2. The red LED on the adapter is blinking 3. The red LED on the adapter is permanently on	Make sure the supply is connected to 230V. Make sure the communication parameters on the adapter and the superior system are identical. Internal adapter error, or between the adapter and the ventilation unit - check the cable between the units
Wrong command while writing to the adapter	Erratic registry designation has been configured on the superior system	Correct the register address
Wrong command while reading from the adapter	Erratic registry designation has been configured on the superior system	Correct the register address