Information sheet

Modbus TCP

L2003592-F 18.07.2025

01 Introduction

The Modbus interface on DUCO systems (via the Duco Connectivity Board option on a DucoBox)[1] allows an external controller or building management system to communicate with the DUCO ventilation system.

That way, you can retrieve info about the ventilation network via read parameters or input registers, or read or adjust settings via write parameters or holding registers.

The supported protocol is Modbus TCP over Ethernet or Wi-Fi via the Duco Connectivity Board. The information in this document is valid from API version v2.5 onwards.

1 Duco Connectivity Board option only possible on DucoBox Silent Connect, DucoBox Focus and DucoBox Energy (all variants).

02 Working with registers / parameters

The DucoBox Silent Connect, Focus and Energy support the following Modbus subset:

HEX	DEC	SUPPORT FUNCTION
0x03	3	Read multiple HOLDING registers
0x04	4	Read multiple INPUT registers
0x06	6	Write single HOLDING register
0x10	16	Write multiple HOLDING registers

Here, input registers are 16-bit read-only variables and holding registers are 16-bit read/write variables. Combined consecutive registers are not used. The Duco Connectivity Board functions as a Modbus component via TCP on port 502. The Modbus address can be set via the Display menu (see information sheet L8000002), the Duco Installation App or the Duco Network Tool.

The external control unit communicates with each component (node) through read parameters (INPUT) and write parameters (HOLDING).

→ Read parameters (INPUT): ventilation system type, ventilation status, indoor air quality based on relative humidity, indoor air quality based on CO_2 value, ...

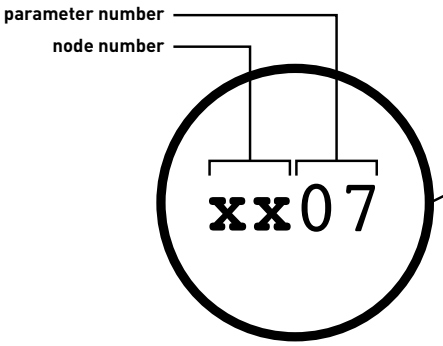
→ Write parameters (HOLDING): ventilation status, identification (of components), ...

Note: Read parameters can be read without restriction. There are, however, two important limits to write actions:

1. a daily limit of 200 write actions. From a second supply or extraction zone, 100 write actions are added per additional zone.
2. a periodic limit of one write action every 2 seconds.

It is recommended to use a logic that first reads the current value before determining whether a new write action is needed to adjust the value.

Each node and its parameters are assigned a code: **XX**yy (**XX**=node number, yy=parameter number).



INPUT
(read parameter)

INPUT REGISTER	DATA	CONVERSION
xx06	**Ventilation status** Indicates the status of ventilation	0 = OK 1 = Error 2 = Inactive
xx07	**Filter Time Remaining** Indicates remaining filter life	Days

This allows all values to be read and controlled from the external control unit. There are specific parameters for each component.

Due to a difference in some Modbus implementations compared to the official specification (on which our implementation is based), an address shift of '1' may occur for the read and write parameters.
E.g.: read address '20' will become '19'.
For any box type (Silent Connect, Focus, Energy), this can be resolved via the Duco Installation App or the Duco Network Tool under tab > Tree view-Settings-external settings. With the DucoBox Focus, moreover, this can be solved by setting ' > 'RegOffs' to '1' under > CONFIG > Modbus in the Display menu. With the DucoBox Energy also via 'Register Offset' under > Setting > Modbus in the advanced menu.

03 Overview of parameters

The overview is grouped into three sections:
- Parameters that are only supported at the system level.
- Parameters that are only supported by the DucoBox.
- Parameters that are supported by the nodes (components).

Below is an overview of the INPUT and HOLDING parameters for both the ventilation system and the components.

System parameters:

INPUT (read parameter)				
Register	Data	Conversion	Application	Recommended survey frequency
0020	**Temperature ODA** Displays the temperature of the supply air from outside to the unit (Outdoor Air).	°C / 10	DucoBox Energy	1 / min
0021	**SUP temperature** Displays the temperature of the supply air from the unit to the home (Supply Air).	°C / 10	DucoBox Energy	1 / min
0022	**Temperature ETA** Displays the temperature of the exhaust air from the home to the unit (Extract Air).	°C / 10	DucoBox Energy	1 / min
0023	**Temperature EHA** Displays the temperature of the exhaust air from the unit to the outside (Exhaust Air).	°C / 10	DucoBox Energy	1 / min
0024	**Outdoor temperature** Measured via the weather station.	°C / 10	DucoBox with weather station	1 / min
0025	**Wind speed** Measured via the weather station.	Decimetre/second	DucoBox with weather station	1 / min
0026	**Rain** Measured via the weather station.	0 = No (False) 1 = Yes (True)	DucoBox with weather station	1 / min

INPUT (read parameter)				
Register	Data	Conversion	Application	Recom-mended survey frequency
0027	**Light intensity south** Measured via the weather station.	Kilolux	DucoBox with weather station	1 / min
0028	**Light intensity east** Measured via the weather station.	Kilolux	DucoBox with weather station	1 / min
0029	**Light intensity west** Measured via the weather station.	Kilolux	DucoBox with weather station	1 / min
0030	**Local API Version** Displays the local API version.	Whole number Example: 2.4 becomes 204. Public API version 'X.Y' becomes Modbus = X · 100 + Y	DucoBox Silent Connect DucoBox Focus DucoBox Energy	1 / day
0031	**Remaining write actions** Displays the number of corrective commands until midnight.	Whole number	DucoBox Silent Connect DucoBox Focus DucoBox Energy	1 / min

Negative temperatures are displayed as a number greater than 32767.
To display this value correctly, you need to implement some logic to convert the value.
The formula is: **`(value-65536)/ 10`**

Example:

```
If(ModBusInputRegisterValue >= 32768)
  Temp = (ModbusInputRegisterValue - 65536)/10
Else
  Temp = ModbusInputRegisterValue/10
End
```

DucoBox parameters:

INPUT (read parameter)					
Register	Data	Conversion		Application	Recom-mended survey frequency
0100	**System type** Indicates the type of ventilation system	17 = DucoBox		DucoBox Silent Connect DucoBox Focus DucoBox Energy	one-time
0102	**Remaining time Current Ventilation mode** Indicates the remaining time the DucoBox will ventilate in this mode	Seconds		DucoBox Silent Connect DucoBox Focus DucoBox Energy	1 / min
0103	**Flow rate versus target level** Displays the actual ventilation mode for the zone in which the component is located	Percentage		DucoBox Silent Connect DucoBox Focus DucoBox Energy	1 / min
0104	**Indoor air quality based on RH** Average indoor air quality based on measured relative humidity	100 % 95 %	Very good indoor air quality	Box sensor DucoBox Silent Connect Box sensor DucoBox Energy	1 / min
		90 % 80 % 65 %	Good indoor air quality		
		50 % 35 %	Temporarily acceptable indoor air quality		
		20 % 5 %	Poor indoor air quality		
0105	**Indoor air quality based on CO_2** Average indoor air quality based on measured CO_2 value	100 % 95 % 90 %	Very good indoor air quality	Box sensor DucoBox Silent Connect Box sensor DucoBox Energy	1 / min
		85 % 80 % 75 %	Good indoor air quality		
		70 % 65 % 60 % 55 % 50 %	Temporarily acceptable indoor air quality		
		45 % 40 % 35 % 35 %	Poor indoor air quality		

INPUT (read parameter)				
Register	Data	Conversion	Application	Recom-mended survey frequency
0106	**Ventilation status** Indicates the status of ventilation	0 = OK 1 = Error 2 = Inactive	DucoBox Silent Connect DucoBox Focus DucoBox Energy	1 / min
0107	**Filter Time Remaining** Indicates remaining filter life	Days	DucoBox Energy	1 / day
0108	**Filter status** Indicates the status of the filter	0 = OK 1 = Filter is dirty 2 = Inactive	DucoBox Energy	1 / min
0109	**Humidity** Indicates the measured humidity value.	RH (%) (relative humidity) 10 % 15 % — Poor indoor air quality 20 % 25 % — Temporarily acceptable indoor air quality 30 % 35 % 40 % — Good indoor air quality 45 % 50 % 55 % — Very good indoor air quality 60 % 65 % 70 % — Good indoor air quality 75 % 80 % — Temporarily acceptable indoor air quality 85 % — Poor indoor air quality	DucoBox Silent Connect DucoBox Focus DucoBox Energy + minimum 1 humidity sensor	1 / min

INPUT (read parameter)

Register	Data	Conversion	Application	Recommended survey frequency
0110	**CO_2** Indicates the measured CO_2 value .	CO_2 (ppm) < 800 800 900 — Very good indoor air quality 1000 1100 1200 — Good indoor air quality 1250 1300 1350 1400 1450 — Temporarily acceptable indoor air quality 1500 1550 1600 > 1600 — Poor indoor air quality	DucoBox Silent Connect DucoBox Focus DucoBox Energy + minimum 1 CO_2 Sensor	1 / min

HOLDING (read/write parameter)

Register	Data	Conversion	Application	Recommended survey frequency
0100	**Ventilation mode** Here, the ventilation mode can be adjusted. Conversion 11 through 16 is used to maintain manual modes longer. For example: Manual 1 (conversion 4) is set to duration t by default. For Manual 1 x 2 (conversion 11), the mode t x 2 (= 2 x standard duration) will be maintained and for Manual 1 x 3 (conversion 14), the mode t x 3 (= 3 x standard duration) will be maintained.	0 = AUTO 4 = Manual 1 5 = Manual 2 6 = Manual 3 7 = Not at home 8 = Permanent 1 9 = Permanent 2 10 = Permanent 3 11 = Manual 1 x 2 12 = Manual 2 x 2 13 = Manual 3 x 2 14 = Manual 1 x 3 15 = Manual 2 x 3 16 = Manual 3 x 3	DucoBox Silent Connect DucoBox Focus DucoBox Energy	1 / min
xx01	**Identification** Here, a component can be identified. This will light up blue.	0 = Node Visualisation OFF 1= Node Visualisation ON	DucoBox Silent Connect DucoBox Focus DucoBox Energy	One-time, read before write. (Read and check before write)

HOLDING (read/write parameter)				
Register	Data	Conversion	Application	Recommended survey frequency
0102	**Supply temperature target zone 1** Here, the comfort temperature of the SUP zone 1 can be adjusted	°C / 10	DucoBox Energy	One-time, read before write. (Read and check before write)
0103	**Supply temperature target zone 2** Here, the comfort temperature of the SUP zone 2 can be adjusted	°C / 10	DucoBox Energy	One-time, read before write. (Read and check before write)
0104	**Supply temperature target zone 3** Here, the comfort temperature of the SUP zone 3 can be adjusted	°C / 10	DucoBox Energy	One-time, read before write. (Read and check before write)
0105	**Supply temperature target zone 4** Here, the comfort temperature of the SUP zone 4 can be adjusted	°C / 10	DucoBox Energy	One-time, read before write. (Read and check before write)

Node parameters:

INPUT (read parameter)				
Register	Data	Conversion	Application	Recom-mended survey frequency
xx00	**System type** Indicates the type of ventilation system	0 = Unknown 7 = DucoTronic window ventilator 8 = User controller RF/BAT 9 = User controller RF/Wired 10 = Humidity Room sensor 12 =CO_2 Room sensor 13 = Sensorless Control Valve 14 = Humidity Control Valve 16 = CO_2 Control Valve 18 = Switch Sensor 22 = iAV Control valve 23 = iAV Humidity 25 = iAV CO2 27 = Control unit 28 =CO_2/RH control valve 29 = User Controller 'Sun Control' 30 = User Controller 'Ventilative Cooling' 31 = External multi-zone valve 35 = Humidity box sensor 37 = CO_2 Box Sensor 38 = Motor relay 39 = Duco Weather Station or Outdoor Temperature Sensor 40 = Modbus motor 41 = Digital input 42 = Digital output 44 = Modbus relay 45 = Perilex 46 = Relay output	User controller Room sensor Box sensor Control valve Switch sensor Electronic window ventilator	one-time
xx02	**Remaining time Current Ventilation mode** Indicates the remaining time the DucoBox will ventilate in this mode	Seconds	User controller Room sensor Control valve Switch sensor	1 / min
xx03	**Flow rate versus target level** Displays the actual ventilation mode for the zone in which the component is located	Percentage	Control valve Electronic window ventilator	1 / min

INPUT (read parameter)					
Register	Data	Conversion		Application	Recommended survey frequency
xx04	**Indoor air quality based on RH** Average indoor air quality based on measured relative humidity	100 % 95 %	Very good indoor air quality	Room sensor Control valve	1 / min
		90 % 80 % 65 %	Good indoor air quality		
		50 % 35 %	Temporarily acceptable indoor air quality		
		20 %	Poor indoor air quality		
xx05	**Indoor air quality based on CO_2** Average indoor air quality based on measured CO_2 value	100 % 95 % 90 %	Very good indoor air quality	Room sensor Control valve	1 / min
		85 % 80 % 75 %	Good indoor air quality		
		70 % 65 % 60 % 55 % 50 %	Temporarily acceptable indoor air quality		
		45 % 40 % 35 % 30 %	Poor indoor air quality		
xx09	**Humidity** Indicates the measured humidity value.	RH (%) (relative humidity)		Humidity Room Sensor Humidity Box Sensor Humidity Control Valve Electronic window ventilator	1 / min
		10 % 15 %	Poor indoor air quality		
		20 % 25 %	Temporarily acceptable indoor air quality		
		30 % 35 % 40 %	Good indoor air quality		
		45 % 50 % 55 %	Very good indoor air quality		
		60 % 65 % 70 %	Good indoor air quality		
		75 % 80 %	Temporarily acceptable indoor air quality		
		85 %	Poor indoor air quality		

INPUT (read parameter)

Register	Data	Conversion	Application	Recommended survey frequency
xx10	**CO_2** Indicates the measured CO_2 value .	CO_2 (ppm) < 800 800 900 — Very good indoor air quality 1000 1100 1200 — Good indoor air quality 1250 1300 1350 1400 1450 — Temporarily acceptable indoor air quality 1500 1550 1600 > 1600 — Poor indoor air quality	CO_2 Room Sensor CO_2 Box Sensor CO_2 Control Valve	1 / min

HOLDING (read/write parameter)

Register	Data	Conversion	Application	Recommended survey frequency
xx00	**Ventilation mode** Here, the ventilation mode can be adjusted. Conversion 11 through 16 is used to maintain manual modes longer. For example: Manual 1 (conversion 4) is set to duration t by default. For Manual 1 x 2 (conversion 11), the mode t x 2 (= 2 x standard duration) will be maintained and for Manual 1 x 3 (conversion 14), the mode t x 3 (= 3 x standard duration) will be maintained.	0 = AUTO 4 = Manual 1 5 = Manual 2 6 = Manual 3 7 = Not at home 8 = Permanent 1 9 = Permanent 2 10 = Permanent 3 11 = Manual 1 x 2 12 = Manual 2 x 2 13 = Manual 3 x 2 14 = Manual 1 x 3 15 = Manual 2 x 3 16 = Manual 3 x 3	User controller Room sensor Box sensor Control valve Electronic window ventilator	1 / min
xx01	**Identification** Here, a component can be identified. This will light up blue.	0 = Node Visualisation OFF 1= Node Visualisation ON	User controller Room sensor Control valve Switch sensor Electronic window ventilator	One-time, read before write. (Read and check before write)

04 General data

To find out which nodes are present in the network, you can (optionally) use the INPUT registers below. Alternatively, you can scan all registers.

Example:

INPUT REGISTER	DATA
0000	*Bit field* indicating which node numbers between 1 and 15 are occupied in the network
0001	*Bit field* indicating which node numbers between 16 and 31 are occupied in the network
0002	*Bit field* indicating which node numbers between 16 and 31 are occupied in the network
0003	*Bit field* indicating which node numbers between 48 and 63 are occupied in the network
0004	*Bit field* indicating which node numbers between 64 and 79 are occupied in the network
0005	*Bit field* indicating which node numbers between 80 and 95 are occupied in the network
0006	*Bit field* indicating which node numbers between 96 and 111 are occupied in the network
0007	*Bit field* indicating which node numbers between 112 and 127 are occupied in the network
0008	*Bit field* indicating which node numbers between 128 and 143 are occupied in the network

Example:
Response to input register 0001:

0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 1

- → *Node* 16 is present in the network
- → *Node* 17 is not present in the network
- → *Node* 18 is present in the network
- ...

REGISTER	DATA	RECOMMENDED SURVEY FREQUENCY
0000	*Bit field* indicating which node numbers between 1 and 15 are occupied in the network	one-time
0001	*Bit field* indicating which node numbers between 16 and 31 are occupied in the network	
0002	*Bit field* indicating which node numbers between 16 and 31 are occupied in the network	
0003	*Bit field* indicating which node numbers between 48 and 63 are occupied in the network	
0004	*Bit field* indicating which node numbers between 64 and 79 are occupied in the network	
0005	*Bit field* indicating which node numbers between 80 and 95 are occupied in the network	
0006	*Bit field* indicating which node numbers between 96 and 111 are occupied in the network	
0007	*Bit field* indicating which node numbers between 112 and 127 are occupied in the network	
0008	*Bit field* indicating which node numbers between 128 and 143 are occupied in the network	