

SIEMENS



Duct Temperature, Humidity and Air Quality Sensors:

- QAM2151.040/MO
- QFM2150/MO, QFM3150/MO
- QPM2102/MO, QPM2150/MO, QPM2152/MO

Immersion Temperature Sensor:

- QAE2154.010/MO

Modbus RTU (RS-485)

Basic Documentation

Table of Contents

1	About this document	3
1.1	Revision history	3
1.2	Before you start	3
2	Product overview	5
2.1	Type summary.....	5
2.2	Product documentation.....	5
3	Wiring	6
4	Configurations	7
4.1	DIP switch for configuration method selection	7
4.2	Modbus configuration parameters.....	7
4.3	Modbus registers	8
4.4	LED colors and patterns	9
4.5	Push button configuration	10
4.5.1	On-event addressing (Climatix™ controllers configuration).....	10
4.5.2	Resetting Modbus parameters	11
4.6	DIP switch configuration	12
4.7	Bus termination.....	13
5	Maintenance	14
5.1	Disposal	14
6	Appendices	15
6.1	Cyber security disclaimer.....	15
6.2	FCC	15

1 About this document

1.1 Revision history

Edition	Date	Changes	Section
a	2019-07	First version.	All

1.2 Before you start

Copyright

This document may be duplicated and distributed only with the expressed permission of Siemens Switzerland Ltd.

Quality assurance

These documents were prepared with great care.

- The content of all documents is checked at regular intervals.
- All necessary corrections are included in subsequent versions.
- Documents are automatically amended as a consequence of modifications and corrections to the products described.

Please ensure that you have the latest document revision.

If you have any questions or suggestions about this document, or if you have any criticisms or suggestions, please contact your local point of contact (POC) at the nearest branch office. Addresses for Siemens RCs are available at www.siemens.com/sbt.


Conventions for text marking


Markups

Special markups are indicated in the document as follows:

•	Numbered lists and instructions with an operation sequence
1. 2.	Procedures must be performed in the specified order.
[→ X]	Reference to a page number

Symbol identifications

	⚠ WARNING
	This is the symbol for hazard. It warns you of Risks of injury . Comply with all measures designated by this symbol to prevent injury or death.

	NOTICE
	This symbol identifies an important notice that you should be aware of when you are using the product.

Document use/ request to the reader

Before using products from Siemens Switzerland Ltd., it is important that you carefully read the documents supplied with or ordered at the same time as the products (equipment, applications, tools, and so on).

We assume that users are authorized and trained appropriately and have the technical knowledge required to use our products as intended.

Additional information on products and applications is available:

- From your Siemens branch office www.siemens.com/sbt or at your system suppliers.
- From the support team at headquarters fieldsupport-zug.ch.sbt@siemens.com if no local POC is available. Siemens assumes no liability to the extent allowed under the law for any losses resulting from a failure to comply with the aforementioned points or for the improper compliance of the same.

2 Product overview

The sensors are used in ventilation and air conditioning plants.

2.1 Type summary

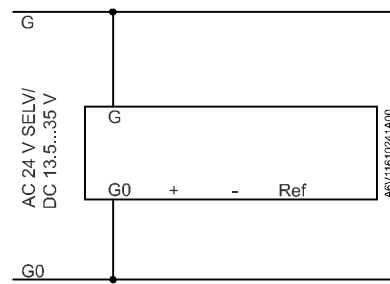
Product number	SSN no.	Measurement parameter				Output signal
		CO ₂	IAQ (VOC)	Temperature	Relative humidity	
QAE2154.010/MO	S55720-S465	-	-	-10...120 °C	-	Modbus RTU
QAM2151.040/MO	S55720-S466	-	-	-50...50 °C	-	Modbus RTU
QFM2150/MO	S55720-S467	-	-	-40...70 °C	0...100 % r.h.	Modbus RTU
QFM3150/MO	S55720-S468	-	-	-40...70 °C	0...100 % r.h.	Modbus RTU
QPM2102/MO	S55720-S469	0...2000 ppm	0...100 %	-	-	Modbus RTU
QPM2150/MO	S55720-S470	0...2000 ppm	-	-35...50 °C	-	Modbus RTU
QPM2152/MO	S55720-S471	0...2000 ppm	-	-35...50 °C	0...100 % r.h.	Modbus RTU

2.2 Product documentation

Product number	Datasheet	Mounting instructions
QAE2154.010/MO	A6V11610252	A6V11610241
QAM2151.040/MO	A6V11610632	A6V11610244
QFM2150/MO	A6V11610635	A6V11610246
QFM3150/MO	A6V11610638	
QPM2102/MO, QPM2150/MO, QPM2152/MO	A6V11610641	A6V11610248

See the datasheets and mounting instructions for detailed information. You can download the above documents at <http://siemens.com/bt/download>.

3 Wiring



G Operating voltage AC 24 V \pm 20 % or DC 13.5...35 V

G0 GND

+ RS485 Modbus A

- RS485 Modbus B

Ref GND_ISO

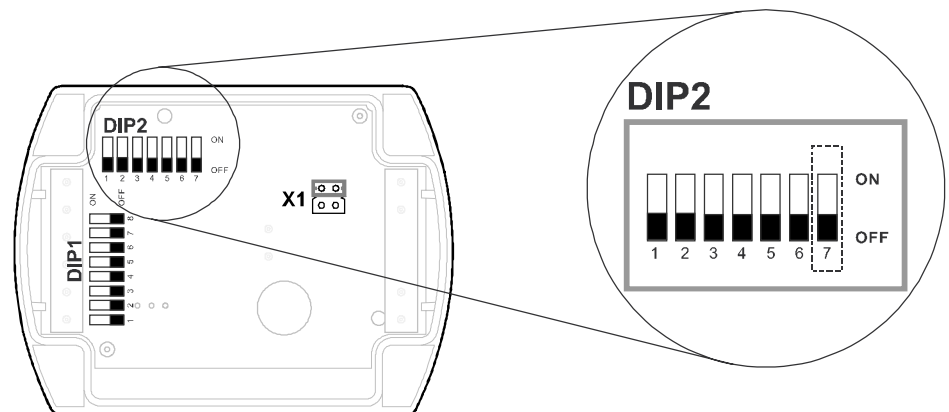
4 Configurations

4.1 DIP switch for configuration method selection

The sensor is a Modbus RTU (RS-485) slave device. It can be configured with a Modbus master when DIP2-Position 7 is OFF (default setting).

The sensor has two sets of DIP switches: DIP1 and DIP2. It can be manually configured with DIP switches when DIP2-Position 7 is ON.

For details, see DIP switch configuration [→ 12].



A6V11610643Z02

4.2 Modbus configuration parameters

	Name	Range/numeration	Default
Configurable	Modbus address	1...247	1
	Baud rate (bps)	0 = Auto 1 = 9600 2 = 19200 3 = 38400 4 = 57600 5 = 76800 6 = 115200	0
	Transmission format (start bits-data bits- parity-stop bits)	0 = 1-8-E-1 1 = 1-8-O-1 2 = 1-8-N-1 3 = 1-8-N-2	0
	Bus configuration command	0 = Ready 1 = Load 2 = Discard	0
Basic	Parity	Even Odd None	Even
	Stop bits	1 / 2	1
	Data	8 bits (0...255)	-
	Identity	Slave	-
	Cable length	< 600 m	-

NOTES:

- Register 764 (Modbus address) cannot be configured as 246 via a master. Address 246 is reserved for on-event addressing.
- Bus configuration command (768) is for on-event addressing only.

4.3 Modbus registers

Holding Register (16-bit) No.	Description	Range	Unit	Scaling	Default	R/W
1	Temperature value	-327...327 °C -556.6...620.6 °F	°C °F	0.01	-	R
2	Temperature reliability	0 – No error 1 – Bad reliability, unavailable	-	-	-	R
3	Relative humidity value	0...100 %	%	0.01	-	R
4	Humidity reliability	0 – No error 1 – Bad reliability, unavailable	-	-	-	R
5	CO ₂ value	0...2000 ppm	ppm	-	-	R
6	CO ₂ reliability	0 – No error 1 – Bad reliability, unavailable	-	-	-	R
7	IAQ value	0...100 %	%	0.01	-	R
8	IAQ reliability	0 – No error 1 – Bad reliability, unavailable	-	-	-	R
212	VOC sensitive	0 – Slow 1 – Medium 2 – Fast	-	-	1	RW
401	System unit	0 – Celsius 1 – Fahrenheit others - invalid value to be discard	-	-	0	RW
1286	SW version: Major & Minor versions	-	-	-	-	R
1287	SW version: Build version	-	-	-	-	R
764	Modbus address	1...247	-	-	1	RW

Holding Register (16-bit) No.	Description	Range	Unit	Scaling	Default	R/W
765	Baud rate	0 = Auto 1 = 9600bps 2 = 19200bps 3 = 38400bps 4 = 57600bps 5 = 76800bps 6 = 115200bps	-	-	0	RW
766	Transmission format (start bits-data bits-parity-stop bits)	0 = 1-8-E-1 1 = 1-8-O-1 2 = 1-8-N-1 3 = 1-8-N-2	-	-	0	RW
767	Reserve	-	-	-	-	RW
768	Bus configuration command	0 = Ready 1 = Load 2 = Discard	-	-	0	RW

NOTES:

- The register number is counted from 1.
- 764 (Modbus address) cannot be configured as 246 via a master. Address 246 is reserved for on-event addressing.
- In the case of a multiple writing command from the master with invalid values, the sensor rejects the command with an error notice. The register values remain unchanged.
- Bus configuration command (768) is for on-event addressing only.
- Software version format: major version is 1 byte, minor version is 1 byte and build version is 2 bytes, such as [2.01.33] = 0x02010021.

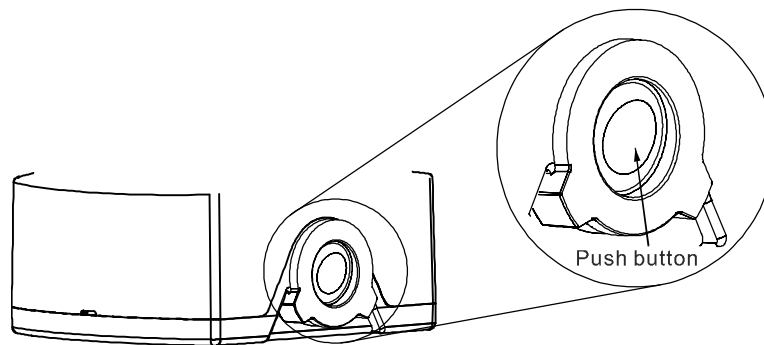
4.4 LED colors and patterns

Color	Pattern	Description
Green	Constant until device boots	Power up
	Flashing (1 s on / 5 s off)	<ul style="list-style-type: none"> • Power-up is completed. • Working properly • Modbus is configured.
	Flickering	Bus communication
Orange	Flashing (1 s on / 5 s off)	Bus communication failure
	Flashing (1 s on / 1 s off)	<ul style="list-style-type: none"> • Power-up is completed. • Working properly • Modbus is not configured.
	Constant	Waiting configuration via Modbus in on-event addressing mode
Red	Flashing (0.1 s on / 1 s off)	Invalid parameter value received from master
	Flashing (1 s on / 5 s off)	Internal error: <ul style="list-style-type: none"> • Sensing element malfunction • Sensing element is not connected.

4.5 Push button configuration

When DIP2-Position 7 is OFF (default setting), push button function is activated.

Push button



The following can be operated via push button:

- On-event addressing
- Resetting the Modbus parameters to factory default settings

4.5.1 On-event addressing (Climatix™ controllers configuration)

On-event addressing is a rapid configuration approach working together with Siemens Climatix™ controllers.

The sensor is wired and connected to the Climatix™ controller via Modbus.

Enter addressing mode and configuration workflow via push button

Press the push button for	LED	Action	More details
1...5 s	Constant red	Press and hold the button	
5...10 s	LED off	Release the button	<p>Entering the addressing mode, LED is constant orange.</p> <ul style="list-style-type: none"> • Address is set to 246 temporarily. • Baud rate is set to Auto and then auto baud rate recognition is done. • Format is set to 1-8-E-1 temporarily. <p>Communication is established.</p> <ul style="list-style-type: none"> • Master writes the Modbus parameters. ¹⁾ • Master writes "1" into register 4x0768 ("Bus configuration. command") to activate the change. <p>After a successful pairing, the LED flashes green (1 s on / 5 s off). Otherwise the LED turns back to its original state.</p> <ul style="list-style-type: none"> • Time out after 30 s ²⁾
< 10 min	Constant orange in addressing mode	Press once and release the button	<p>If the LED is constant orange, a short press of the push button stops and exits the on-event addressing mode.</p> <p>After exiting addressing mode, the LED turns back to its original state.</p>

NOTES:

- 1) The master cannot change the Modbus address (register 764) to 246.
- 2) The interval between every configuration command for register 764...768 from Climatix™ is not more than 30 s. If it exceeds 30 s, the addressing mode ends automatically.
- 3) 10-minute countdown starts from entering addressing mode.

4.5.2 Resetting Modbus parameters

Reset Modbus parameters to factory default settings

Press the push button for	LED	Action	More details
1...5 s	Constant red	Press and hold the button	
5...10 s	LED off	Press and hold the button	
10...13 s	LED flashes orange	Release the button	Release the button while LED still flashes orange. LED keeps flashing orange for 3 s, then turns red for 1s. The reset to factory default 1) is completed. LED turns to permanent orange.
> 13 s	Returns to the initial status	Release the button	Release after 13 s, resetting is cancelled.

NOTE:

- 1) Only Modbus address, baud rate and transmission format are reset to factory default.

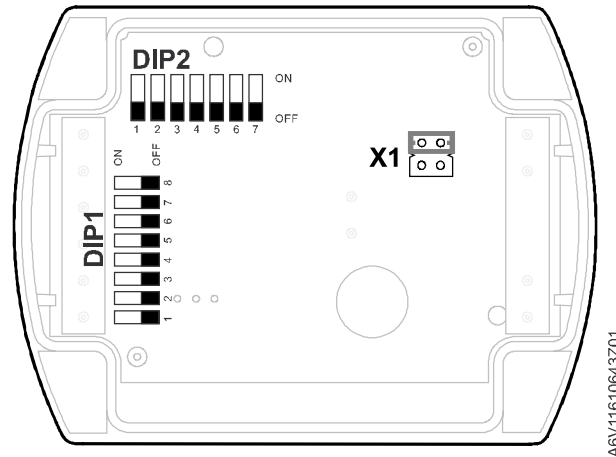
4.6 DIP switch configuration

The Modbus setting can be configured via DIP switches when DIP2-position 7 is ON.



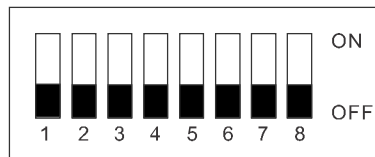
NOTICE

Modbus registers 764...768 are not writable via a master under DIP switches configuration.



The sensor has two sets of DIP switches: DIP1 and DIP2.

DIP1 Address configuration

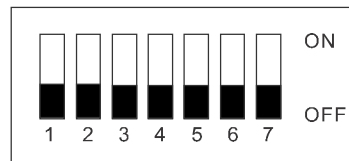


2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	Address
1	2	3	4	5	6	7	8	
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	0 (default)
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	2
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	3
OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	4
...
ON	ON	ON	ON	ON	ON	ON	ON	255

NOTES:

- Modbus address configuration: Valid address range 1...247, others = 0
- If an invalid address is set, the newly set values of register 764...768 are not activated. The registers keep the previous value.

DIP2
Baud rate, transmission
format, configuration

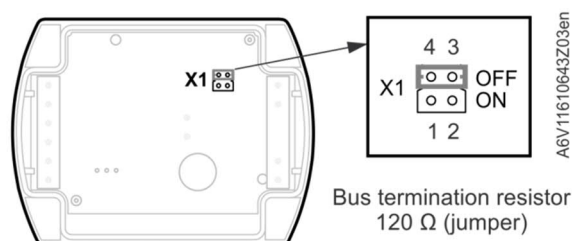


Baud rate			Parity		Stop bit ¹⁾	Configuration	Function
1	2	3	4	5	6	7	
OFF	OFF	OFF					0 = Auto
OFF	OFF	ON					1 = 9600
OFF	ON	OFF					2 = 19200
OFF	ON	ON					3 = 38400
ON	OFF	OFF					4 = 57600
ON	OFF	ON					5 = 76800
ON	ON	OFF					6 = 115200
ON	ON	ON					others = Auto
			OFF	OFF			0 = Even (default)
			OFF	ON			1 = Odd
			ON	OFF			2 = No parity
			ON	ON			others = Even
					OFF		1 (default)
					ON		2
						OFF	Configurable via master or push button / on-event addressing
						ON	DIP switches

NOTE:

¹⁾ Parity + Stop bit only support following combinations: 1-8-E-1, 1-8-O-1, 1-8-N-1 and 1-8-N-2. Others will be treated as 1-8-E-1.

4.7 Bus termination



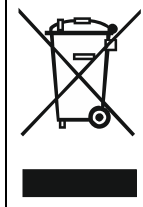
Bus termination resistor
120 Ω (jumper)

Jumper position descriptions:

- Jumper position (OFF) = disable terminating resistor (factory setting)
- Jumper position (ON) = enable terminating resistor

5 Maintenance

5.1 Disposal



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

6 Appendices

6.1 Cyber security disclaimer

Products, solutions and services from Siemens include security functions to ensure the secure operation of building automation and control, fire safety, security management, and physical security systems. The security functions on these products, solutions and services are important components of a comprehensive security concept.

Drafting, implementing and managing a comprehensive and up-to-date security concept, customized to individual needs, is nevertheless necessary, and may result in additional plant- or site-specific preventive measures to ensure secure operation of your site regarding building automation and control, fire safety, security management, and physical security. These measures may include, for example, separating networks, physically protecting system components, user training, multi-level defensive measures, etc.

For additional information on security as part of building technology and our product, solution and service offerings, please contact your Siemens sales representative or project department. We strongly recommend to always comply with our security advisories on the latest security threats, patches and other related measures.

<http://www.siemens.com/cert/en/cert-security-advisories.htm>

6.2 FCC

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference;
2. This device must accept any interference received, including interference that may cause undesired operation.

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

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAN ICES-3 (B)/NMB-3(B)

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
+41 58 724 2424
www.siemens.com/buildingtechnologies

© Siemens Switzerland Ltd, 2019
Technical specifications and availability subject to change without notice.