SDC-Q1 Duct VOC-transmitter

Features

- VOC measurement for air ducts
- Minimum and maximum value memory
- 0…10V, 0…20mA or 2…10V, 4…20mA measuring signals selectable with jumpers
- Optional alternative signal ranges programmable
- May be used as simple P-controller
- Selectable averaging signal
- Optional internal or external display (OPC-S or OPA-S)
- Status LED

Applications

- Demand based ventilation for homes and offices based on measurement of the VOC concentration (air quality)
- Recording of minimum and maximum limits for critical environments
- Direct control of extraction fan

VOC Transmitter

Reliable evaluation of duct air quality: The sensing element used is a MOS (metal oxide semiconductor) based gas sensor component. It is specifically designed for a broad detection of reducing gases such as VOCs (volatile organic compounds) associated with bad air quality (cigarette smoke, solvents and cleaning agents, emissions, etc.). The sensor has to run at least 24h for reliable VOC values. It has the following features:

- Sensing range: 0 – 100.0% AQI (air quality index)
- High sensitivity and fast response
- Module with automatic baseline correction

The microprocessor samples the air quality once per second. It calculates an averaging signal over a preset number of samples and generates the output signal.

The analog output signal range may be customized by jumpers and if required by a programming module. Standard signal ranges are 0…10 VDC and 2…10 VDC. Other ranges can be defined by using the external display and programming module (OPA-S).

For OPA-S usage see section “Parameter configuration” on page 5.

Air quality index (AQI)

The value 20 % refers to the typical indoor gas composition over the past 24 h. While values between 20 and 100% indicate a deterioration, values between 0 and 20% inform about improvement of the air quality.

Minimum and maximum values

Using a display & programming module OPA-S or the optional built-in display and operation terminal OPC-S, the user has the option to read out and reset the AQI minimum and maximum values. The minimum and maximum values may as well be used as output signals. The minimum and maximum values are automatically saved to the device and are available after a power interruption.

For OPA-S, OPC-S usage see section “Displaying minimum and maximum values” on page 4.

NOTE: On OPA-S devices prior to firmware version V1.9, 0...100.0 % AQI VOC is displayed as 0..1000.

Safety

DANGER! Safety advice
This device is for use as a VOC concentration transmitter for comfort applications. It is not a safety device. Where a device failure could endanger human life and property, it is the responsibility of the client, installer and system designer to add additional safety devices to prevent such a device failure. Ignoring specifications and local regulations may cause equipment damage and endangers life and property. Tampering with the device and misapplication will void warranty.

Types and Ordering

Product Name	Product Nr.	Description/Option
VOC Sensor		
SDC-Q1-16-1	40-300205	VOC transmitter for air ducts, 160 mm probe, incl. cable gland AMC-1
Accessories		
OPC-S	40-500029	Built-in display and operation terminal.
OPA-S	40-500006	External display and operation terminal. Note: For the correct display of values, V1.7 and later is required.
AMC-2	40-500074	Conduit connector: NPT thread

Technical Specifications

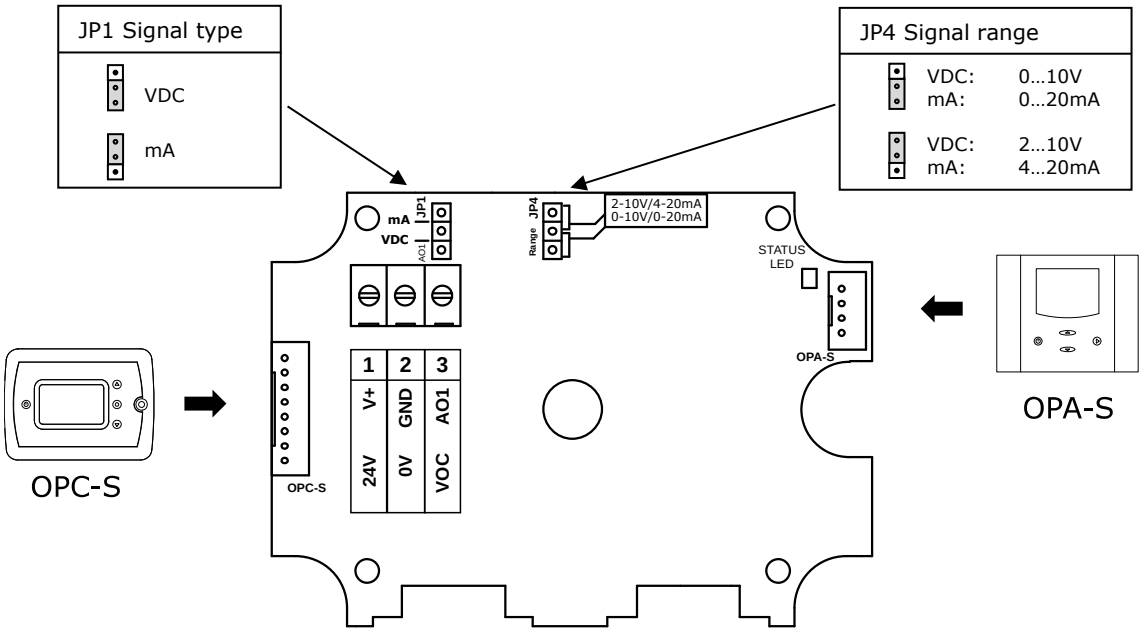
Power supply	Operating voltage	24 VAC 50/60 Hz ± 10%, 24 VDC ± 10%
	Power consumption	Max. 2 VA
	Safety extra-low voltage (SELV)	HD 384, class II
Connection	Terminal connectors	For wire 0.34…2.5 mm² (AWG 24…12)
VOC measurement	VOC sensor Sensing range 0-100% Air quality index	MOx based gas sensor with automatic VOC Algorithm 0 – 100% AQI (0 – 500 VOC index points)
Signal outputs	Analog outputs Output signal Resolution Maximum load	 0…10 VDC, 0…20 mA or 2…10 VDC, 4…20 mA 10 bit, 9.7 mV, 0.019.5 mA Voltage signal: ≥1kΩ, current signal: ≤250Ω
Environment	Operation Climatic conditions Temperature Humidity	To IEC 721-3-3 class 3 K5 0…50° C (32…122° F) <90% RH non-condensing
	Transport & storage Climatic conditions Temperature Humidity Mechanical conditions	To IEC 721-3-2 and IEC 721-3-1 class 3 K3 and class 1 K3 5…30° C (41…86° F) <80% RH non-condensing class 2M2
Standards	Degree of protection	IP30 to EN 60 529
	Safety class	III (IEC 60536)
Housing materials	Cover, back part	PC+ABS (UL94 class V-0)
General	Dimensions (H x W x D) Transmitter case Probe	 68 x 91 x 47mm (2.7 x 3.7 x 1.9 in) Ø 14 x 160 mm, (Ø 0.55 x 6.2 in)
	Weight (including package)	264 g (9.3 oz)

Product testing and certification

CE Declaration of Conformity

Information on the conformity of our products can be found on our website www.vectorcontrols.com on the corresponding product page under "Downloads".

Wiring and Connection



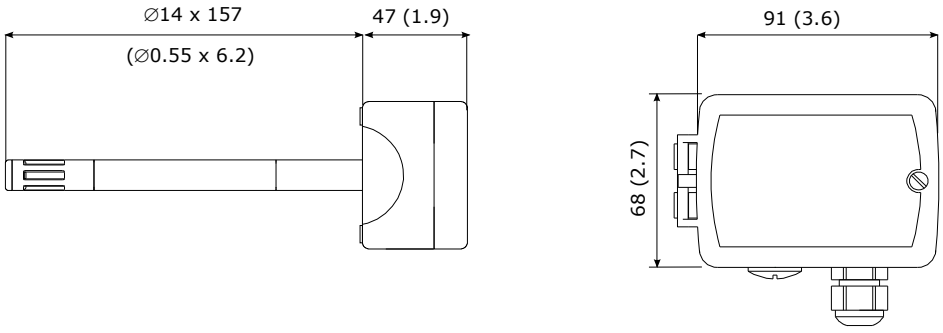
1	V+	AC 24 V 50-60 Hz, DC +24 V ± 10%
2	GND	AC 0 V, DC 0 V
3	AO1	VOC, DC 0(2)...10 V, DC 0(4)...20 mA

For jumper settings see section “Output signal configuration” on page 5.

Mounting instruction

See SDC-Q1 installation sheet no. 70-000949 (www.vectorcontrols.com).

Dimension mm (inch)



Operation

Displaying minimum and maximum values

To read out or reset the stored air quality index AQI minimum and maximum values use the optional display & programming module OPA-S or the built-in display & operation terminal OPC-S.

Use of OPA-S:

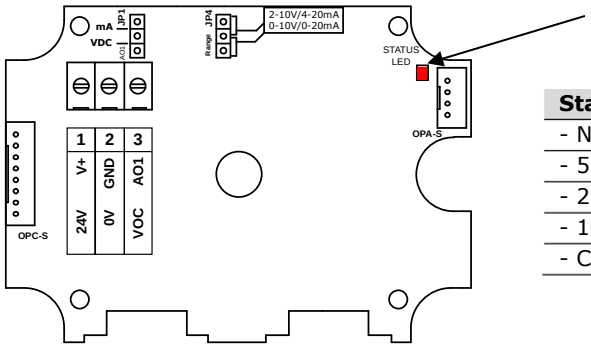
1. Open the SDC housing (see SDC-Q1 installation sheet 70-000949 www.vectorcontrols.com).
2. Connect the OPA-S operating device to the OPA-S connector on the SDC (see section "Wiring and Connection" on page 3). The measured VOC value as AQI (Air Quality Index) is displayed.
3. Press the "UP" key to see the maximum values or the "DOWN" key to see the minimum values.
4. To reset the minimum value, press the "DOWN" key for at least 5 seconds and wait until the value changes.
5. To reset the maximum value, press the "UP" key for at least 5 seconds and wait until the value changes.

NOTE: On OPA-S devices prior to firmware version V1.9, 0...100.0 % AQI VOC is displayed as 0..1000.

Use of OPC-S:

1. Press the "UP" key to see the maximum values or the "DOWN" key to see the minimum values.
2. To reset the minimum value, press the "DOWN" key for at least 5 seconds and wait until the value changes.
3. To reset the maximum value, press the "UP" key for at least 5 seconds and wait until the value changes.

Status-LED



Red Status-LED

Status LED	
- No light	: No power or unit damaged
- 5 sec flashing	: Normal
- 2 second blinking	: Calibration
- 10 second pulse	: Calibration successful
- Constant red > 10 sec	: Calibration or sensor error

Error messages shown on OPA-S or OPC-S

Error	Description
Err 1:	Communication error: Verify cable connections, cable type and maximum distance.
Err 3:	VOC sensor error (element damaged or missing)

Configuration

Output signal configuration, Jumper settings

The analog output signal type for the AO1 output may be configured with jumper **JP1** for Voltage or Current control signals. The factory setting is Voltage.

For Jumper location see section "Wiring and Connection" on page 3.

Signal type	JP1
Voltage (VDC)	
Current (mA)	

The signal range may be set with jumper **JP4** for the analog signal output AO1. **JP4** will only operate if the output range specified with output parameter **OP 01** and **OP 02** is left at the default value of 0 and 100%. With any other setting the position of **JP4** has no influence and the signal range defined with the output parameters **OP 01** and **OP 02** applies.

For Jumper location see section "Wiring and Connection" on page 3.

Signal range	JP4
0…10 V, 0…20 mA	
2…10 V, 4…20 mA	

Parameter configuration

The transmitter can be adapted to fit perfectly into any application by adjusting the software parameters. The parameters are set with the operation terminals OPA-S or the optional bult-in OPC-S. The OPA-S may also be used as remote indicator.

NOTE: For the correct display of data, version 1.7 or grater of OPA-S is required.

OPA-S operation

1. Open the SDC housing (see SDC-Q1 installation sheet no. 70-000949 http://www.vectorcontrols.com/).
2. Connect the OPA-S operating device to the OPA-S connector on the SRC (see section "Wiring and Connection" on page 3). The measured VOC value as AQI (Air Quality Index) is displayed.
3. Press the "Up" and "Down" keys simultaneously for more than 3 seconds. "Code 0000" is displayed.
4. Use the "UP" and "DOWN" keys to set the password "0009" and confirm with the "RIGHT" key.
5. Select "IP SEL (Input Parameter) or "OP SEL" (Output Parameter) with "UP" and "DOWN" and confirm with the "RIGHT" key. The first parameter is displayed.
6. Use the "UP" and "DOWN" key to switch to the desired parameter. After pressing the "RIGHT" key adjust the parameter value with the "UP" and "DOWN" keys. Confirm the setting with the "RIGHT" key.
7. Complete parameter setting by pressing the left "ON/OFF" key twice. The measured VOC value as AQI is displayed.

Important
In order for the SDC-Q1 to apply the new settings correctly, the parameter setting must be completed with the left "ON/OFF" key!

Detailed information on the OPA-S can be found on the website www.vectorcontrols.com on the corresponding product page under "Downloads".

OPC-S operation

1. Press the "Up" and "Down" keys simultaneously for more than 3 seconds. "Code 0000" is displayed.
2. Use the "UP" and "DOWN" keys to set the password "0009" and confirm with the "RIGHT" key.
3. Select "IP SEL (Input Parameter) or "OP SEL" (Output Parameter) with "UP" and "DOWN" and confirm with the "RIGHT" key. The first parameter is displayed.
4. Use the "UP" and "DOWN" key to switch to the desired parameter. After pressing the "RIGHT" key adjust the parameter value with the "UP" and "DOWN" keys. Confirm the setting with the "RIGHT" key.
5. Complete parameter setting by pressing the left "ON/OFF" key twice. The measured CO2 value is displayed.

Important
In order for the SDC-C1 to apply the new settings correctly, the parameter setting must be completed with the left "ON/OFF" key!

Detailed information on the OPC-S can be found on the website www.vectorcontrols.com on the corresponding product page under "Downloads".

Input configuration

Parameter	Description	Range	Default
IP 00	Not used	-	-
IP 01	QI1: Samples taken for averaging control signal [1]	1…255	10
IP 02	QI1: Calibration	-10…10%	0
IP 03	QI1: Minimum AQI range (VOC level when output is at its minimum)	0…100 % AQI	0 % AQI
IP 04	QI1: Maximum AQI (VOC level when output is at its maximum)	0…100 % AQI	100 % AQI

[1] Sample interval: 1 sec.

VOC = Volatile Organic Compounds
AQI = Air Quality Index (0 – 100)

Output configuration

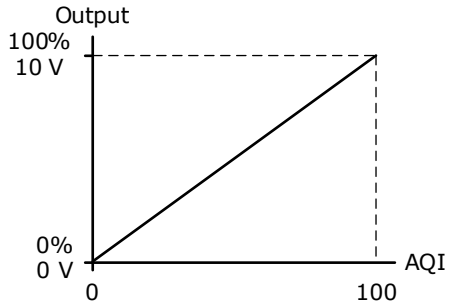
Parameter	Description	Range	Default
OP 00	AO1 (AQI): Configuration of AQI output signal: 0 = AQI value 1 = Recorded minimum AQI value 2 = Recorded maximum AQI value	0…2	0
OP 01	AO1 (AQI): Minimum limitation of AQI output signal [2] [3]	0…100 %	0 %
OP 02	AO1 (AQI): Maximum limitation of AQI output signal [2] [3]	0…100 %	100 %

[2] The Output signal will be scaled according to selected input range, selected limitation of output signal and the output signal range selected by the jumper.
[3] If the default values are changed, the position of JP2 has no influence and the output signal range defined with the parameters applies.

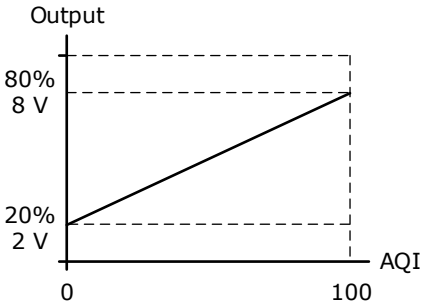
IP = Input Parameter
OP = Output Parameter
QI = VOC Input
AO = Analog Output

Examples of VOC output signal on AO1:
Output signal type = Voltage (JP1 jumper setting)
Output signal range = 0…10 VDC (JP4 jumper setting)

Default setting
IP 03 = 0 AQI, IP 04 = 100 AQI (range)
OP 00 = 0 (AQI value)
OP 01 = 0 % (limitation)
OP 02 = 100 % (limitation)



Custom setting
IP 03 = 0 AQI, IP 04 = 100 AQI (range)
OP 00 = 0 (AQI value)
OP 01 = 20 % (limitation)
OP 02 = 80 % (limitation)



Use the VOC-Transmitter as P-Controller

The VOC-transmitter may be converted into a proportional fresh air controller through a simple change of two parameter settings:

1. Set a minimum AQI concentration when the fresh air fan should start to run at its minimum speed at 40 AQI for example. Set this as the minimum value in **IP 03** parameter.
2. Then define the AQI value when the fan should run at full speed, for example 90 AQI and set this value in **IP 04**IP 04**.**

Your transmitter has now been converted into an air quality P-Controller!

By using the analog output, the fan will start to run if the VOC concentration is higher than 40 AQI. It increases to its maximum when VOC concentration reaches 90 AQI.

VOC = Volatile Organic Compounds
AQI = Air Quality Index (0 – 100)

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