en

VARIABLE LIST

SCS-S2

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Regin's offer, in combination with DEOS and Industrietechnik, empower system integrators, installers, and property owners with a powerful toolbox, setting them in a position to create building automation solutions that save both energy and engineering time. Today, versatile building management, optimized room control, and effective workflows have become the pillars for leading property owners in realizing significant energy savings in properties. Regin shares the clear goal of the group; to make this challenge easier on the way towards a sustainable future.

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1   Introduction

1.1   About this variable list

The damper unit SCS-S2 has two analogue inputs, two digital inputs, one analogue output and two digital outputs. The in- and outputs are used for e.g damper control, smoke detector, temperature sensors and VAV. It communicates via Modbus. One terminal is used as +19 V DC supply voltage for a smoke detector.

There is an app available (**Regin:GO**) for Android and iOS that can be used to identify the units and for setting a Modbus address for the unit. The app can also be used to upgrade the firmware. It is also possible to set different Modbus baud rates, parities and stop bits. Get Regin:GO from the *App store* (iPhone and iPad) or *Google play* (Android).

1.2   Peripheral units

1.2.1   Smoke detector

One smoke detector can be connected between DO1 (+19 V) and AI1. The detector is powered with +19 V DC supplied from the SCS-S2 damper unit. AI1 is used to read the detector status in the range 0-100 mA.
It is possible to detect wire break, short circuit, and to reset the detector in software (turn on and off the supply for the smoke sensor (DO1)). A 2.2 kΩ resistor is mounted as default to simulate a smoke detector.

> **(!) Note!** The SCS-S2 damper unit only measure current (mA).

Table 1-1 Recommended states when using Regin SDD detectors

State	Current
Wire break	< 5 mA
Normal operation	10 mA
Service alarm	20 mA
Fire alarm	50 mA
Short circuit	100 mA

1.2.2   Temperature sensor

A PT1000 temperature sensor can be connected on the AI4 and G0 terminal. A 1 kΩ resistor is mounted as default to simulate a temperature sensor at 0 °C.

It is also possible to connect a PT1000 temperature sensor on AI1 (and G0), when no smoke detector is used.

1.2.3   Damper actuators

Four (4) types of dampers can be connected to the damper unit. All four types connect open/close end position switch between the terminals DI2/DI3 (S2/S6) and G0 (S1/S4).

> **(!) Note!** It is possible to not use any damper actuator. Such as, if you only want to connect smoke detector. and/or temperature sensors.

Spring return (2-point)

The damper is connected and powered from the G and the DO2 terminal.

3-point

The damper is connected and powered from the G, DO2 and DO3 terminal.

0-10 V DC (VAV) Non-spring return

The damper is connected and powered from the G, G0 and controlled from AO4 terminal (reference is G0).

0-10 V DC (VAV) Spring return

The damper is connected and powered from the G, DO2 and controlled from AO4 terminal.

1.3 Inputs and Outputs

1.3.1 Inputs

The analogue inputs AI1 and AI4 are short circuit proof.

1.3.2 Outputs

DO1-3 cannot handle over current and will be damaged if shorted to G.

AO4 is short circuit proof and will limit output current internally.

1.3.3 Inputs and outputs specifications

Analogue inputs (AI)	2
Digital inputs (DI)	2
Analogue outputs (AO)	1
Digital outputs (DO)	2
+19 V DC (DO1 on label)	1

Analogue inputs

Analogue inputs	0…10 V or PT1000
Accuracy for input	± 1 % (0…10 V) ± 1 K (PT1000)
Measuring range, PT1000	-40…+150 °C

Digital inputs

Digital input (DI)	Potential-free contacts on / off (on = closed)
Output pull-up current	0.5 mA (max. 12 V)

Analogue outputs

Analogue outputs	0…10 V
Load impedance, 0...10 V	Min. 10 kΩ
Accuracy	± 1 %

Digital outputs

Configuration	Mosfet sinking type outputs, 24 V AC or DC
Output current	Max. 2 A (in total), 2 A continuous
	⚠ **Caution!** This is a non-protected output. A current over-load will destroy the unit

1.4   Communication

1.4.1   Modbus

Modbus is used as communication protocol. You can adjust the settings for Modbus communication. See *Appendix A Modbus signal list*.

1.4.2   Serial port

An isolated RS485 port is available to connect to the master.

Table 1-2 Default serial port settings

Baud rate	Stop bit	Parity
9600	1	None

1.5   Damper unit settings

1.5.1   Button

The button is used for manual addressing purposes and to factory reset the unit.

Address change

You perform the following procedure to make an address change:

1. Press the button shortly one time
   If the damper unit has Address 1, it will for 10 seconds change to 101. If you during that time set another new address, it will be saved. Otherwise it will change back to Address 1.

Factory reset

You perform the following procedure to make factory reset:

1. Press and hold button for 10 seconds

2. The LED turns red

3. Release the button

4. Press (and release) the button three (3) times in 10 seconds

5. The LED blinks three (3) times to confirm a successful factory reset

Note! If you have not succeeded in pressing the button three (3) times during these 10 seconds in step four (4), the reset operation is interrupted, the LED returns to what it showed before, and you may start again in step one (1).

Appendix A Modbus signal list

A.1   Coil status registers

Coil register	Default value	Description
1	0	Commit Communication Settings: Write 1 here to update communication settings according to holding registers 5 to 7.

A.2   Input registers

Input register	Bit	Description
7000 (unsigned)	0	-
	1	DI2 value
	2	DI3 value
	3	-
	4	DO1 value (indicates +19 V active)
	5	DO2 value
	6	DO3 value
	7	-
	8[1]	Unit offline, watchdog, 1=communication error and 0=communication in place
	9[1]	Application Watchdog time reset (bit 0, holding register 7000)
	10[1]	Watchdog time reset -
	11	New values flag (bit 0, holding register 7002)
	12	Power up flag (reset in bit 5, holding register 7000)
	13	New name on unit (reset in bit 8, holding register 7000)
	14-15	-
7001 (signed)		AI1 value, in mA when smoke, PT1000 scale 10
7002 (signed)		AI4 value, 0-10 V scale 100, PT1000 scale 10 or resistance scale 1
7003 (signed)		AO4 value, 0-10 V scale 100
7004 (signed)[1]		Watchdog, time since last time reset (in sec, updates each five (5) sec.)
7005 (signed)		Serial number, first 4 numbers
7006 (signed)		Serial number, middle 4 numbers
7007 (signed)		Serial number, last 4 numbers

1. Watchdog — see chapter A.3.2

A.3 Holding registers

Holding register	Bit	Default value	Description
1		1	Modbus address
5[1]		15	Communication mode: 0=inactive 15=Modbus
6[1]		16	Communication parity: 16=8 bit, no parity, 1 stop bit 24 = 8 bit, no parity, 2 stop bits 48= 8 bit, even parity, 1 stop bit 56= 8 bit, even parity, 2 stop bits
7[1]		0	Communication baudrate: 0=9600 bit/s 2=2400 bit/s 3=1200 bit/s 15=19200 bit/s 17=38400 bit/s 18=57600 bit/s 20=115200 bit/s
38[2]		21325 ("SC")	Character 1-2 in PRODUCT_NAME
39[2]		21293 ("S-")	Character 3-4 in PRODUCT_NAME
40[2]		21298 ("S2")	Character 5-6 in PRODUCT_NAME
41[2]		0	Character 7-8 in PRODUCT_NAME
42[2]		0	Character 9-10 in PRODUCT_NAME
43[2]		0	Character 11-12 in PRODUCT_NAME
7000 (unsigned)	0[3]	0	Watchdog time reset (must be set for damper unit to react to new values in holding register 7000-7001)
	1		DO1 value (+19 V enable)
	2		DO2 value
	3		DO3 value
	4[3]		Watchdog function (0=Disabled, 1=Enabled)
	5		Power up flag reset
	6		Alarm led on (1=Red)
	7		Service led on (1=Yellow)
	8		New name flag reset
	9		Bluetooth® Low Energy (0=off, 1=on)
	10-15		-
7001 (signed)		0	AO4 value, 0-10 V scale 100
7002 (unsigned)	0	0	New values flag (must be set to change values in holding register 7002-7005)
	1		DO1 communication error fallback value
	2		DO2 communication error fallback value
	3		DO3 communication error fallback value
	4-15		-
7003 (signed)		0	AO4 communication error fallback value (scale 100)
7004 (signed)		132	AI1 mode (3=PT1000, 132=mA)
7005 (signed)		9	AI4 mode (3=PT1000, 9=0-10 V, 31=Resistance)
7006 (signed)[3]		30	Watchdog time setting (in sec.)

1. Coil register 1 must be set to 1 for communication settings to take effect, see chapter A.1
2. Product Name — see chapter A.3.1
3. Watchdog — see chapter A.3.2

A.3.1   Product Name with an example

The product name can be set in the Regin:GO app or via the PRODUCT_NAME register, and can be up to 12 characters (ASCII) long.

Each 16-bit register in the damper unit are interpreted as two characters (each 1 byte = 8 bits).
For example: Six (6) consecutive registers can hold 12 characters (12 bytes). International characters (Unicode/UTF-8) are not supported. Pad unused characters with 0 or space (0x20) writes to PRODUCT_NAME must be done with Modbus function code 16 (Write multiple holding registers), and the full string should be included in one message.

Example data: The below register settings results in PRODUCT_NAME = "SCS-S2"

Register 38	21315 = 0x5343 => character 1 = 0x53 = 'S' and character 2 = 0x43 = 'C'
Register 39	21293 = 0x53d2 => character 3 = 0x53 = 'S' and character 4 = 0xd2 = '-'
Register 40	21298 = 0x5332 => character 5 = 0x53 = 'S' and character 6 = 0x32 = '2'
Register 41	0 = 0x0000
Register 42	0 = 0x0000
Register 43	0 = 0x0000

A.3.2   Watchdog

There is a built-in function in the damper unit that take action when the watchdog timer runs out.

The variable "*Watchdog time reset*" (holding register 7000 bit 0) is set to zero (0) by the damper unit and the communication (master system) shall set it to one (1). The trigger will be checked and reset by the damper unit once per five (5) seconds.

A variable "*Unit offline*" (input register 7000 bit 8) will be set in the damper unit, if the trigger is not set to one (1) by communication for a configurable time, "*Watchdog time setting*" (holding register 7006), default 30 seconds. The delay is set in seconds.

The variable "*Unit offline*" (input register 7000 bit 8) will be set to one (1) when communication is missing, and reset to zero (0) when communication is back.

If "*Watchdog time setting*" (holding register 7006) or "*Watchdog function*" (holding register 7000 bit 4), is set to zero (0), the watchdog function is disabled and will never trigger.

If there is missing communication, the unit will do as follows:

✓ Set indication LED colour to magenta

✓ Set digital output to default value (set in holding register 7002 bit 1-3)

✓ Set analogue output AO4 to default value (set in holding register 7003)

The recommended settings to get to a safe mode, if communication is lost, are:

✓ set DO1-3 and AO4 to engage the state - fire damper closed, smoke damper open, VAV damper closed.

Appendix B Input and output lists

B.1 I/O list

| I/O	Terminal marking	Abbreviation	Description
AI1	AI1	Smoke, PT1000	Smoke detector current input, selectable PT1000
DI2	S2	Damper open	Damper open position switch
DI3	S6	Damper close	Damper close position switch
AI4	AI4	VAV input or PT1000	0-10 V DC or PT1000
DO1	DO1	Smoke supply	+19 V DC Smoke supply
DO2	DO2	Damper open output	Power output to open damper
DO3	DO3	Damper close output	Power output to close damper
AO4	AO4	VAV output	VAV 0-10 V output
G	G	24 V (G) +	Power supply AC/DC+ (positive)
G0	G0	24 V (G0) -	Power supply AC/DC- (negative)
G0	S1/S4	Damper switch common	Damper position switch return, common

Appendix C Circuit wiring diagram
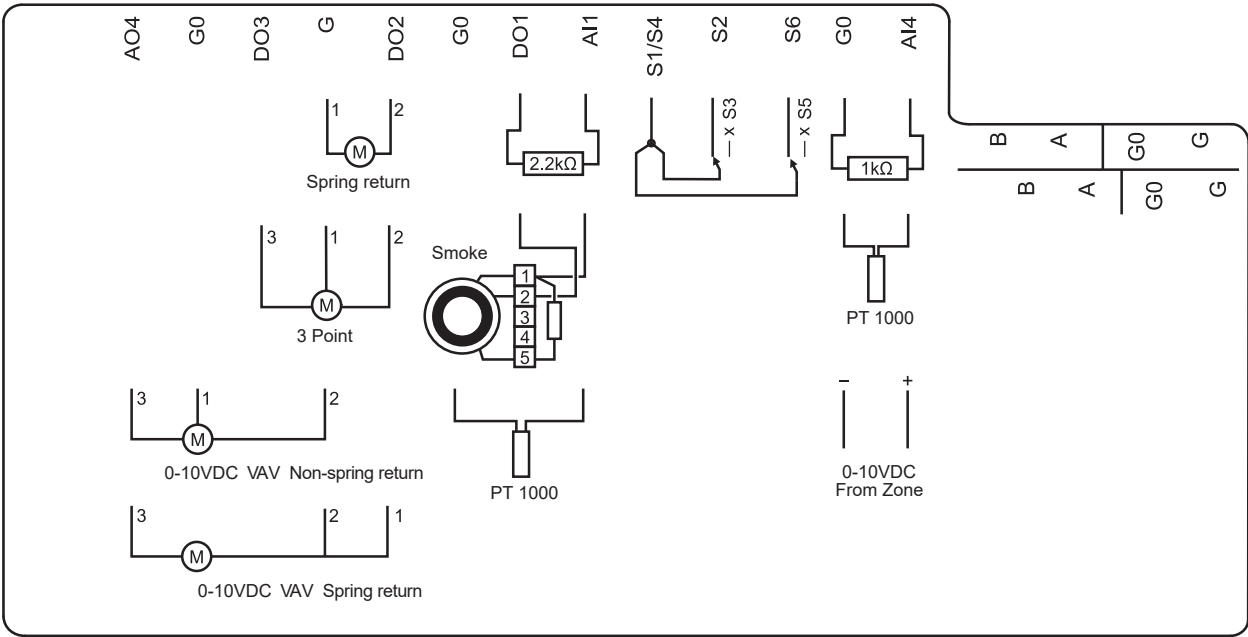
Figure C-1 Circuit wiring diagram examples

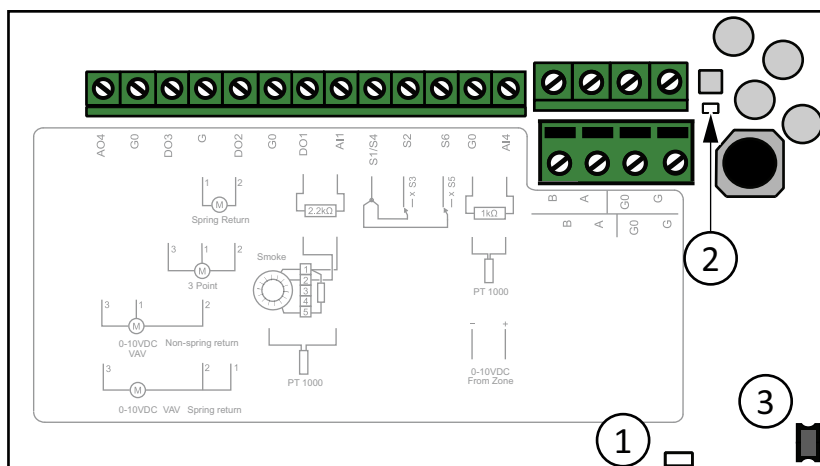*Note! Smoke - wiring example is for Regins SDD detectors.*

Appendix D Circuit board

Figure D-1 Inside the SCS-S2. 1=LED light for status indication, 2= LED light for communication, 3= Push-button

D.1 LED lights

LED number	Colour	Pattern	Description
1 (seen from outside of housing)	Blue	Steady	Bluetooth® connection active
	Yellow	Steady	Service alarm
		Blinking	Unit identified
	Red	Steady	Alarm
		Blinking	Factory reset
	Green	Steady	Everything OK
	Magenta	Steady	Unit offline
	White	Steady	Unit has address 1 and is ready to be addressed in the system
		Blinking	The button has been pressed on the unit and it's waiting to be addressed
2	Yellow	Fast blinking	Communication in progress

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