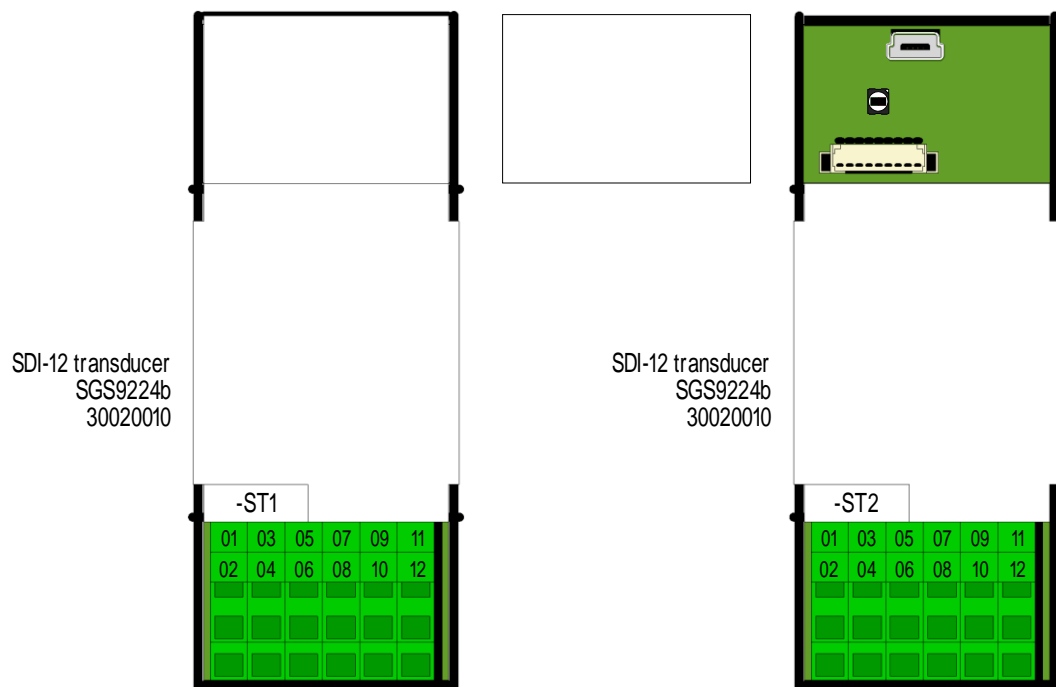


Image



Connection data

01	DC24V [+]	Power supply DC24V [+]
02	DC24V [-]	Power supply DC24V [-]
03	DC24V [+]	Power supply DC24V [+]
04	DC24V [-]	Power supply DC24V [-]
05	OUT_A1	Analogue output 1
06	OUT_A2	Analogue output 2
07	OUT_A3	Analogue output 3
08	OUT_A4	Analogue output 4
09	SDI-12 DC12V [+]	SDI-12 sensor power supply [+]
10	SDI-12 DC12V [-]	SDI-12 sensor power supply [-]
11	IN_SDI-12	SDI-12 sensor data signal
12	GND	GND outputs [OUT_A1], [OUT_A2], [OUT_A3], [OUT_A4]

Commercial data

Product code	30020010
Product description	SDI-12 transducer RGS9224b
Packing unit	1
Weight	0.073 [kg]
Custom tariff number	8537.10.91
Country of origin	NL (Netherlands)

Dimensions

Width	35.60 [mm]
Height	89.60 [mm]
Depth	62.20 [mm]

Standards and regulations

EMC	Conformance with EMC directive 2014/30/EU
RoHS	Conformance with RoHS directive 2011/65/EU
WEEE	Conformance with WEEE directive 2002/96/EC

Connection data, details

01	DC24V [+]	Terminal power supply DC24V of SDI-12 transducer, polarity [PLUS].
03		
02	DC24V [-]	Terminal power supply DC24V of SDI-12 transducer, polarity [MIN].
04		

05	OUT_A1	Terminals output signal measured value 1.
12	GND	

06	OUT_A2	Terminals output signal measured value 2.
12	GND	

07	OUT_A3	Terminals output signal measured value 3.
12	GND	

08	OUT_A4	Terminals output signal measured value 4.
12	GND	

09	SDI DC12V [+]	SDI-12 input for signal of SDI-12 sensor.
10	SDI DC12V [-]	
11	SDI DATA	

Sensor soil moisture TEROS 12, VWC, T, EC

Product code	xxxxxxx
Product description	Sensor soil moisture TEROS 12, VWC, T, EC
[09] - SDI-12 DC12V [+]	Brown
[10] - SDI-12 DC12V [-]	Shield
[11] IN_SDI-12	Orange

Sensor infrared radiometer SI-411-SS

Product code	31512220
Product description	Sensor infrared radiometer SI-411-SS
[09] - SDI-12 DC12V [+]	Red
[10] - SDI-12 DC12V [-]	Black
[11] IN_SDI-12	White
Paneelkast ground	Transparant

Mounting sensor infrared radiometer SI-411-SS

Product code	31512630
Product description	Mounting bracket AM-220 adjustable angle

Sensor net radiometer SN-500-SS

Product code	xxxxxxx
Product description	Sensor net radiometer SN-500-SS
[09] - SDI-12 DC12V [+]	Red
[10] - SDI-12 DC12V [-]	Black
[11] IN_SDI-12	White
Paneelkast ground	Transparant

Project name:	30020010DSH010 044 SDI-12 transducer RGS9224b		
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Ambient conditions

Degree of protection	IP20	
Ambient temperature (operation)	-10...50 [°C]	14...122 [°F]
Ambient temperature (storage/transport)	-20...50 [°C]	-4...122 [°F]
Permissible humidity (operation)	20...85 [%]	
Permissible humidity (storage/transport)	20...85 [%]	

Terminal data

Conductor cross section solid min.	0.2 [mm²]
Conductor cross section solid max.	2.5 [mm²]
Conductor cross section flexible min.	0.2 [mm²]
Conductor cross section flexible max.	2.5 [mm²]
Conductor cross section AWG min.	24
Conductor cross section AWG max.	14

General

Mounting type	DIN rail mounting according to EN 60715
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Power supply

Power supply	DC24V
Current consumption typically	≤ 150 [mA], at DC24V, at 25 [°C]

Data interface

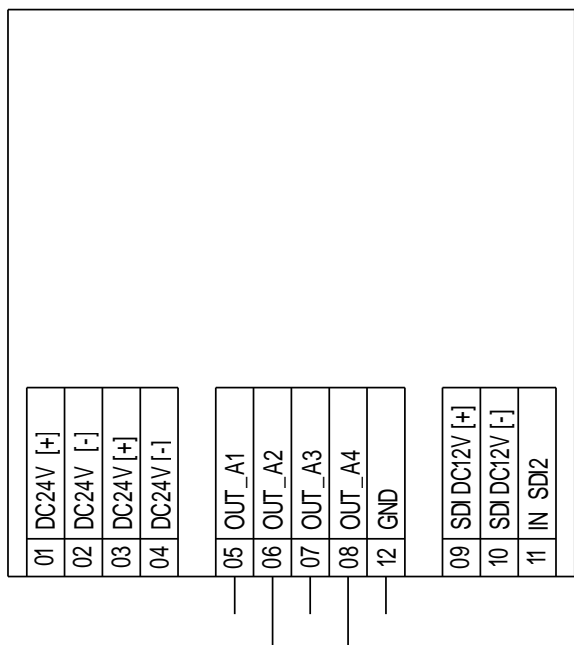
Interface 1	SDI-12
Connection method	Spring-cage connection
Transmission medium	3-wire 12 [V] + ground + data signal
Transmission length	200 [m]
Transmission speed	1200 Baud

Notification

Location	LED status	Status SDI-12 transducer control
PCB [1]	Green continuously	-
	Green blinking	SDI-12 control is active.
	Red continuously	Auto detection of connected SDI-12 sensor fails.
	Red blinking	-

Schematic

-ST3
SDI-12 transducer
SGS9224b
30020010



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Clusters and parameters

-	LED_RD	
1	Location	-
2	Control LED [Off/On/0.5[s]/1.0[s]]	-
3	Status LED	-

-	SDI-12 DEVICE	
1	Profile	Here is set which profile will be used for an [23 Output] instance. Profile is [0] is the custom profile of which when selected the parameters can be edited by the user. When setting [2 Auto profiler] is set to [1], this parameter is set automatically. The appropriate profile is set when a known sensor type is detected during booting of the SDI-12 transducer.
2	Auto profiler	Here is set if an [23 Output] instance should be configured automatically. [0] - The [23 Output] instance is not configured automatically. [1] - The [23 Output] instance will be configured automatically.
3	Meas pos	Here is set which input value(s) at which position in the SDI-12 data stream is(are) to be used for an [23 Output] instance. The maximum value of a data stream position is 255. Some calculations require more than one input value. It is possible to configure that in a single number. This 32-bit number can be split up in 4 bytes. Every single byte represents a data stream position. The LSByte represents the first data stream position, the MSByte represents the fourth data stream position.
4	Calc type	Here is set which calculation will be applied to the input value(s) for determining the value of an [23 Output] instance.
5	Result min.	Here the minimum calculated result value of an [23 Output] instance is set.
6	Result max.	Here the maximum calculated result value of an [23 Output] instance is set.
7	Calc parameter 1	Here calculation parameter 1 is set. A calculation can have up to 5 constant parameters. Which parameter(s) is(are) used depends on [4 Calc type]. Each parameter is described with 2 values. The [Calc parameter] and the [Calc exponent]. The value actually used in the calculation is: [Calc parameter] * 10 ^ [Calc exponent]. So, when [Calc parameter 1] = [123] and [Calc exponent 1] = [-3], the actual value that will be used in the calculation is [0.123].
8	Calc exponent 1	Here the exponent of [7 Calc parameter 1] is set. See [7 Calc parameter 1].
9	Calc parameter 2	Here calculation parameter 2 is set. See [7 Calc parameter 1].
10	Calc exponent 2	Here the exponent of [9 Calc parameter 2] is set. See [7 Calc parameter 1].
11	Calc parameter 3	Here calculation parameter 3 is set. See [7 Calc parameter 1].
12	Calc exponent 3	Here the exponent of [11 Calc parameter 3] is set. See [7 Calc parameter 1].
13	Calc parameter 4	Here calculation parameter 4 is set. See [7 Calc parameter 1].
14	Calc exponent 4	Here the exponent of [13 Calc parameter 4] is set. See [7 Calc parameter 1].
15	Calc parameter 5	Here calculation parameter 5 is set. See: [7 Calc parameter 1]
16	Calc exponent 5	Here the exponent of [15 Calc parameter 5] is set. See [7 Calc parameter 1].
17	Output type	Here the output type of an [23 Output] instance is set. [0] = 0 ... 10 [V] [1] = 0 ... 3.3 [V] [2] = 0 ... 20 [mA] [3] = 4 ... 20 [mA] [4] = 0 ... 4 [mA]
18	Too low offset	Here the percentage is set that is added to the [23 Output] value when the [22 Calculated] result is lower than the set [5 Result min.]. This function can be used to indicate an alarm situation and is only visible in the [23 Output] value.
19	Too high offset	Here the percentage is set that is added to the [23 Output] value when the [22 Calculated] value is higher than the set [6 Result max.]. This function can be used to indicate an alarm situation and is only visible in the [23 Output] value.
20	Input	Here the Input value from of the SDI-12 data stream of the connected SDI-12 sensor is shown. When [3 Meas pos] contains more than one value, only the first input value is shown.
21	Input decimals	Here the number of decimals is shown with which the [20 Input] is multiplied. So, to get the actual input value [20 Input] has to be provided with the number of decimals shown here. For example [20 Input] = 227854 and [21 Decimals] = 4 will result in an input value of 22.7854.
22	Calculated	Here the calculated value on an [23 Output] instance is shown, based on the input value, the set [4 Calc type], the set [Calc parameter 1 - 5], and the set [Calc exponent 1 - 5].
23	Output	Here the is the calculated value of an [23 Output] instance is shown, in [µA] or [mV], depending on the set [17 Output type]. The value is the result of an interpolating between the set [5 Result min.] and the set [6 Result max.] values.

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Clusters and parameters, continued

-	SYSTEM	
1	Hardware version	Hardware version (identification). This should always be RGS9224x. The [x] can be a letter that represents the hardware revision.
2	Software version	Software version of the module. Format is a.b.c.d. The first three numbers are the actual software version. The last number is the hardware revision number. The revision letter used in the hardware version is derived from this last number. When the revision is 1, the revision letter is [a], when the revision is 2, the revision letter is [b], etc.
3	Node id	The node id is not used in this application.
4	Test execute	Here the test sequence of the SDI-12 transducer can be initiated. This function is used for test purposes in the production process of the SDI-12 transducer.
5	SDI-12 online	When this value is 1 an SDI-12 sensor is detected on the SDI-12 transducer.
6	SDI-12 company	Here the company name of the detected sensor is shown. This value will be empty if no sensor is connected or is recognised.
7	SDI-12 model	Here the model identification of the detected sensor is shown. This value will be empty if no sensor is connected or is recognised.
8	Measurement index	Normally SDI-12 sensors are measured with the default register (0). When a sensor is recognised, and the profile is set, this index is automatically set to the correct value.

Profiles

SDI-12 DEVICE	Profile 0	CUSTOM_PROFILE	Profile 11	TEROS-12 VWC Mineral Soil	Profile 12	TEROS-12 VWC Potting Soil	Profile 14	TEROS-12 Temperature	Profile 15	TEROS-12 EC Pore	Profile 20	Apogee SI 400 target temperature	Profile 21	Apogee SI 400 sensor body temperature	Profile 30	Apogee SN500 incoming SW	Profile 31	Apogee SN500 outgoing SW	Profile 32	Apogee SN500 incoming LW	Profile 33	Apogee SN500 outgoing LW
1	Profile	0	11	12	14	15	20	21	30	31	32	33										
2	Auto profiler	x	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	Meas pos	x	1	1	2	66051	1	2	1	2	3	4										
4	Calc type	x	2	2	0	3	1	1	1	1	1	1										
5	Result min.	x	0	0	-40	0	-10000	-10000	-200000	-200000	-200000	-200000										
6	Result max.	x	1000	1000	60	10000	50000	50000	200000	200000	200000	200000										
7	Calc parameter 1	x	0	6771	0	803	100	1000	1000	1000	1000	1000										
7	Calc exponent 1	x	0	-13	0	-1	3	3	3	3	3	3										
8	Calc parameter 2	x	0	-5105	0	37	0	0	0	0	0	0										
7	Calc exponent 2	x	0	-9	0	-2	0	0	0	0	0	0										
9	Calc parameter 3	x	3879	1302	0	20	0	0	0	0	0	0										
7	Calc exponent 3	x	-7	-5	0	0	0	0	0	0	0	0										
10	Calc parameter 4	x	-6956	-10848	0	41	0	0	0	0	0	0										
7	Calc exponent 4	x	-4	-3	0	-1	0	0	0	0	0	0										
11	Calc parameter 5	x	1000	1000	0	1000	0	0	0	0	0	0										
7	Calc exponent 5	x	0	0	0	0	0	0	0	0	0	0										
12	Output type	x	x	x	x	x	x	x	x	x	x	x										
13	Too low offset	x	0	0	0	0	0	0	0	0	0	0										
14	Too high offset	x	0	0	0	0	0	0	0	0	0	0										
15	Input	y	y	y	y	y	y	y	y	y	y	y										
16	Input decimals	y	y	y	y	y	y	y	y	y	y	y										
17	Calculated	y	y	y	y	y	y	y	y	y	y	y										
18	Output	y	y	y	y	y	y	y	y	y	y	y										

Profile remarks

Blue parameters can always be changed by the user.
Black parameters are settings that can be changed by the user when the selected [1 Profile] = [0].
Red parameters are readouts.

A [x] represents a setting value.
A [y] represents a readout value.
A numeric value represents a default value that is applied when the corresponding profile is set.

Setting [2 Auto profiler] has to be switched on [1] for all four outputs to automatically designate a profile to all these four outputs at start-up of the SDI-12 transducer.
The SDI-12 transducer will only reboot when it disconnected from its supply power and then is reconnected with its supply power.
Only connecting the USB connector will also boot the controller of the SDI-12 transducer.

Formulas

Type	Name	Formula	Formula
0	None	Input1	No calculation
1	Linear	Input1 * c1 / 1000 + c2	Linear interpolation
2	VWC	(Input1^3 * c1 * 1e-9 + Input1^2 * c2 * 1e-9 + Input1 * c3 * 1e-9 + d4 * 1e-9) * e5	Calculation for Volumetric Water Content [TEROS12]
3	EC pore	Input1 * (c1 - c2 * (Input2 - c3)) / (Input3 - c4) * c5	Calculation for EC pore [TEROS 12]

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Automatic profile designation

SENSOR TYPE 1 TEROS-12	Output instance 1	Profile 12	TEROS-12 VWC Potting Soil
	Output instance 2	Profile 14	TEROS-12 Temperature
	Output instance 3	Profile 15	TEROS-12 EC Pore
	Output instance 4	Profile 0	Custom

SENSOR TYPE 2 SI-400-SS	Output instance 1	Profile 20	Apogee SI 400 target temperature
	Output instance 2	Profile 21	Apogee SI 400 sensor body temperature
	Output instance 3	Profile 0	Custom
	Output instance 4	Profile 0	Custom

SENSOR TYPE 3 SN-500-SS	Output instance 1	Profile 30	Apogee SN 500 incoming SW
	Output instance 2	Profile 31	Apogee SN 500 outgoing SW
	Output instance 3	Profile 32	Apogee SN 500 incoming LW
	Output instance 4	Profile 33	Apogee SN 500 outgoing LW

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