



Operating Manual

EN

RS 1410-1002

Stock number: 205-0958



Table of contents

1	About this documentation	4
1.1	Purpose of the document.....	4
1.2	Legal notices	4
1.3	Further information	4
2	Safety	5
2.1	Explanation of safety symbols	5
2.2	Foreseeable misuse	5
2.3	Safety instructions	6
2.4	Intended use.....	6
3	The product at a glance	7
3.1	RS 1400 series	7
3.2	Display elements	7
3.3	Operating elements	8
4	Measurement Basics.....	9
4.1	General information about conductivity measuring.....	9
4.2	Conductivity measurement	9
5	Operation and maintenance	10
5.1	Operating and maintenance notices.....	10
5.2	Battery.....	10
5.2.1	Battery indicator.....	10
5.2.2	Changing battery	10
6	Operation	12
6.1	Opening the configuration menu	12
6.2	Adjustment of the measuring input.....	14
7	Error and system messages.....	16
8	Technical data	18



9	Service	20
9.1	Manufacturer	20



1 About this documentation

1.1 Purpose of the document

- This document is intended as a quick reference option.

1.2 Legal notices

This document is entrusted to the recipient for personal use only. Any impermissible transfer, duplication, translation into other languages or excerpts from this operating manual are prohibited.

The manufacturer assumes no liability for print errors.

1.3 Further information

Software version of the product:

- V1.3 or later

For the exact product name, refer to the type plate on the rear side of the product.

NOTE

For information about the software version, press and hold the ON button to switch on the product for longer than 5 seconds. The series is shown in the main display and the software version of the product is shown in the secondary display.

2 Safety

2.1 Explanation of safety symbols

DANGER

This symbol warns of imminent danger, which can result in death, severe bodily injury, or severe property damage in case of non-observance.

CAUTION

This symbol warns of potential dangers or harmful situations, which can cause damage to the device or to the environment in case of non-observance.

NOTE

This symbol indicates processes, which can have a direct influence on operation or can trigger an unforeseen reaction in case of non-observance.

2.2 Foreseeable misuse

The fault-free function and operational safety of the product can only be guaranteed if applicable safety precautions and the device-specific safety instructions for this document are observed.

If these notices are disregarded, personal injury or death, as well as property damage can occur.

 **DANGER****Incorrect area of application!**

In order to prevent erratic behaviour of the product, personal injury or property damage, the product must be used exclusively as described in the chapter Description in the operating manual.

- Do not use in safety / Emergency Stop devices!
- The product is not suitable for use in explosion-prone areas!
- The product must not be used for diagnostic or other medical purposes on patients!
- The product is not intended to come into direct contact with food. For measurement in foods, samples must be taken and discarded after the measurement!
- Not suitable for use with requirements on functional safety, e.g. SIL!

2.3 Safety instructions

 **NOTE**

This product does not belong in children's hands!

2.4 Intended use

The product is designed for measuring the conductivity in liquids. The measuring cell is connected permanently.





3 The product at a glance

3.1 RS 1400 series



3.2 Display elements

Display

 Battery indicator	Evaluation of the battery status
 Unit display	Display of units or type of mode, min/max/hold
 Main display	Measurement of the current conductivity value or value for min/max/hold
 Auxiliary display	Corresponding temperature value for the value shown in the main display. If applicable, alternating with the temperature compensation.

3.3 Operating elements



On / Off button

Press briefly

Switch on the product

Activate / deactivate lighting

Long press

Switch off the product

Reject changes in a menu



Up / Down button

Press briefly

Display of the min/max value

Change value of the selected parameter

Long press

Reset the min/max value of the current measurement

Both simultaneously

Rotate display, overhead display



Function key

Press briefly

Freeze measurement (Hold)

Return to measurement display

Call up next parameter

Long press, 2s

Open menu, frozen measurement is displayed

Close menu, changes are saved

4 Measurement Basics

4.1 General information about conductivity measuring

During the measurement, the conductivity measuring cell must be dipped at least in so far, that at least 30 mm beginning from the top of the measuring cell, is located in the medium. The maximum immersion depth for continuous operation should not exceed 110 mm.



The measuring cell can either be stored dry or in water. After dry storage wetting time will be prolonged slightly. If changing over from one liquid to another with conductivities varying widely make sure to properly rinse and shake dry measuring cell.

If conductivity measured is much higher or lower than expected this may be due to the electrode being soiled with non-conducting or conducting foreign materials. Measuring cell has to be cleaned with a watery soap solution. When measuring media with low conductivities the electrode has to be stirred sufficiently.

! NOTE

Measuring cell must never come into contact with water-repellent materials such as oil or silicone.

4.2 Conductivity measurement

The conductivity measurement is a comparatively uncomplicated measurement. The standard electrodes are stable for correct use for a long time and can be calibrated over the gradient correction.

5 Operation and maintenance

5.1 Operating and maintenance notices

NOTE

The product and conductivity measuring cell must be handled with care and used in accordance with the technical data. Do not throw or strike.

NOTE

If the product is stored at a temperature above 50 °C, or is not used for an extended period of time, the batteries must be removed. Leaks from the batteries are avoided as a result.

The device is calibrated at the factory with the permanently connected conductivity measuring cell. The highest system precision can be achieved in this manner. If desired, a gradient correction can be carried out for the product in order to further optimise the accuracy in a narrow range. This is only necessary for normal use. See Adjustment of the measuring input.

5.2 Battery

5.2.1 Battery indicator

If the empty frame in the battery display blinks, the batteries are depleted and must be replaced. However, the device will still operate for a certain length of time.

If the BAT display text appears in the main display, the battery voltage is no longer adequate for operation of the product. The battery is fully depleted.

5.2.2 Changing battery

DANGER

Danger of explosion!

Using damaged or unsuitable batteries can generate heat, which can cause the batteries to crack and possibly explode!

- Only use high-quality and suitable alkaline batteries!

⚠ CAUTION**Damage!**

If the batteries have different charge levels, leaks and thus damage to the product can occur.

- Use new, high-quality batteries!
- Do not use different types of batteries!
- Remove depleted batteries and dispose of them at a suitable collection point.

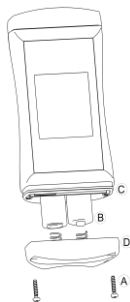
! NOTE

This symbol indicates processes, which can have a direct influence on operation or can trigger an unforeseen reaction in case of non-observance.

! NOTE

Read the following handling instructions before replacing batteries and follow them step by step.

If disregarded, the product could be damaged or the protection from moisture could be diminished.






1. Unscrews the Phillips screws (A) and remove the cover.
2. Carefully replace the two Mignon AA batteries (B). Ensure that the polarity is correct! It must be possible to insert the batteries in the correct position without using force.
3. The O-ring (C) must be undamaged, clean and positioned at the intended depth. In order to facilitate assembly and avoid damage, a suitable grease can be applied.
4. Fit the cover on evenly. The O-ring must remain at the intended depth!
5. Tighten the Phillips screws (A).

6 Operation

6.1 Opening the configuration menu

1. Press the *Function key* for 2 seconds to open the **Configuration** menu.
2. ConF appears in the display. Release the *Function key*.

Parameter	Values	Meaning
	 	
Input		
InP		
	Cond	Measured variable - conductivity
	SRL	Measured variable - salt content / salinity
	tdS	Measured variable - total dissolved solids
Factor for TDS		
ctdS		
	$0.40 \dots 1.00$	Conversion factor for TDS measurement
Temperature compensation		
tcor		
	aFF	Do not compensate conductivity measurement
	nLF	Non-linear function for natural water in accordance with EN 27888 (ISO 7888) Ground water, surface water or drinking water

Reference temperature for temperature compensation

t_{rEF}

25 °C Reference temperature 25 °C or 77 °F

20 °C Reference temperature 20 °C or 68 °F

Shut-off time

P_{oFF}

oFF No automatic shut-off

 15 30 60 120 240 Automatic shut-off after a selected time in minutes,
 during which no buttons have been pressed

Backlight

L₁ tE

oFF Backlight deactivated

 15 30 60 120 240 Automatic shut-off of the backlight after a selected
 time in seconds, during which no buttons have
 been pressed

on No automatic shut off of the backlight

Display unit

U_{ni t}

°C Temperature display in °C

°F Temperature display in °F






Factory settings

<i>in</i> ϵ		
	<i>no</i>	Use current configuration
	<i>YES</i>	Reset product to factory settings. <i>in</i> ϵ <i>done</i> appears in the display

6.2 Adjustment of the measuring input

The temperature input can be adjusted with the zero point correction and the gradient correction. If an adjustment is made, you change the pre-adjusted factory settings. This is signalled with the *LoF*, *LSL* or *SLL* display text when the product is switched on.

1. The product is switched off
2. Press and hold the *Down button*.
3. Press the *On/Off button* to switch on the product and open the **Configuration** menu. Release the *Down button*. The display shows the first parameter.

Parameter	Values	Meaning
	 	
Zero point correction of the temperature		
t_{0F}		
	0.00	No zero point correction
	-5.00 .. 5.00	Zero point correction in °C. and/or at °F -9.00 .. 9.00

Gradient correction of the temperature

t_{5L}		
	0.00	No gradient correction
	-5.00 .. 5.00	Gradient correction in %

Gradient correction for the conductivity value

s_{5L}		
	1.000	No gradient correction
	0.800 .. 1.200	Multiplier for the gradient correction

Formula:

Zero point correction: Displayed value = measured value – t_{0F}

Gradient correction °C: Display = (measured value - t_{0F}) * (1 + t_{5L} / 100)

Gradient correction °F: Display = (meas. value - 32 °F - t_{0F}) * (1 + t_{5L} / 100) + 32 °F

Gradient correction γ : Display = measured value / s_{5L}

7 Error and system messages

Display	Meaning	Possible causes	Remedy
----	Range switching or measured value unstable	Measuring cell defect	Wait for the transient effect of the controller
	Measurement far outside of the measuring range	Contamination or air bubbles	Measurement leaves the permissible range Send in for repair
(, ,)	Sensor cable defect	Cable breakage	Send in for repair
5Err5 Error	Sensor or probe defect	Defective sensor or probe	Send in for repair
	Measuring range exceeded or undercut	Measurement outside of the measuring range	
No display, unclear characters or no response when buttons are pressed	Battery depleted	Battery depleted	Replace battery
	System error	Error in the product	Send in for repair
	Product is defective	Product is defective	
bAtt	Battery depleted	Battery depleted	Replace battery
Err.i	Measuring range exceeded	Measurement too high	Stay within allowable measurement range
		Measuring cell defect	Check the measuring cell Send in for repair

<i>Err.2</i>	Measuring range is undercut	Measurement too low Measuring cell defect	Stay within allowable measurement range Check the measuring cell Send in for repair
<i>545 Err</i>	System error	Error in the product	Switch product on/off Replace batteries Send in for repair

8 Technical data

Measuring range	Conductivity	0 .. 2000 μ S/cm 0.00 .. 20.00 mS/cm 0.0 .. 100.0 mS/cm
	Specific re- sistance	-
	Salinity	0.0 .. 50.0 g/kg
	TDS	0 .. 2000 mg/l
	Temperature	-5.0 .. +105.0 °C (23.0 .. +221.0 °F) – the conductivity measuring cells can be exposed temporarily to temperatures of up to 100 °C and permanently to temperatures of up to 80 °C.
Accuracy	Conductivity	\pm 0.5 % of measured value \pm 0.5 % FS
	Temperature	\pm 0.3 °C
Measuring cycle		approx. 10 measurements per second Updating of the display approx. 2 times per second
Display		3-line segment LCD, additional symbols, illuminated (adjustable white, permanent illumination)
Additional functions		Min/Max/Hold
Adjustment		Offset and gradient correction - temperature, Gradient correction - conductivity
Housing		Break-proof ABS housing
	Protection rating	IP65 / IP67
	Dimensions L*W*H [mm] and weight	108 * 54 * 28 mm without measuring cell or kink protection 180 g, incl. battery and measuring cell
Operating conditions		-20 to 50 °C; 0 to 95 %RH (temporarily 100 %RH)

Storage temperature		-20 to 70 °C
Power supply		2*AA battery (included in the scope of delivery)
	Current requirement/ battery life	approx. 2.2 mA, approx. 3.5 mA with lighting Service life > 1000 hours with alkaline batteries (without backlighting)
	Battery indicator	4-stage battery status indicator, Replacement indicator for depleted batteries: "BAT"
Auto-power-OFF function		The device switches off automatically if this is activated
Directives and standards		<p>The devices conform to the following Directives of the Council for the harmonisation of legal regulations of the Member States:</p> <p>2014/30/EU EMC Directive 2011/65/EU RoHS</p> <p>Applied harmonised standards:</p> <p>EN 61326-1:2013 Emission limits: Class B Immunity according to Table 2 Additional errors: < 1 % FS</p> <p>EN 50581:2012</p> <p>The device is intended for mobile use and/or stationary operation in the scope of the specified operating conditions without further limitations.</p>



9 Service

9.1 Manufacturer

If you have any questions, please do not hesitate to contact us:

Contact **RS Components Limited**
Birchington Road
Corby
Northamptonshire
NN17 9RS
WEE/GF0002ZR

