TI01518M/00/EN/01.20
71462895
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Technical Information
Solitrend MMP20 (Option D)

Material moisture measurement

Application

- Measuring range 0 to 100 % vol. water content, depending on the probe type
- Material conductivity range 0 to 20 dS/m (mS/cm), depending on the probe type
- Degree of protection: handheld device IP67, probes IP68
- Accuracy: up to ±0.2 %

Your benefits

- Mobile moisture measurement of fresh concrete, sand and gravel directly on site
- Easy operation with four keys
- Powerful battery for hundreds of measurements
- Automatic probe detection
- Product in case, optional

Endress+Hauser
People for Process Automation

Table of contents

About this document

Symbols

Symbols for certain types of information and graphics

Tip
Indicates additional information

Reference to graphic

1., 2., 3.
Series of steps

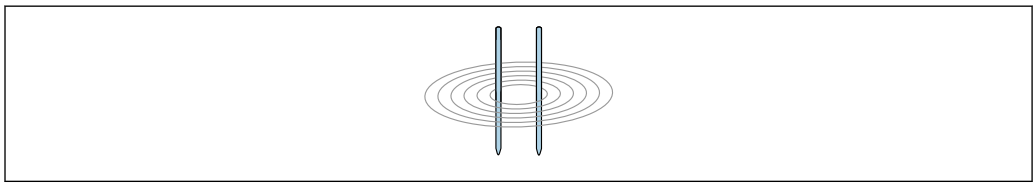
1, 2, 3, ...
Item numbers

A, B, C, ...
Views

Function and system design

Measuring principle

Time-domain reflectometry (TDR) is a radar-based dielectric measurement method where the transit time of electromagnetic pulses is determined to measure the dielectric constant, and therefore the water content. The high-frequency TDR pulse generated in the transmitter travels along wave guides, creating an electromagnetic field around these guides and therefore also in the material around the sensor. Using a patented measurement method, the transit time of this pulse is measured with a resolution of one picosecond (1×10^{-12}) in order to determine the moisture and conductivity.



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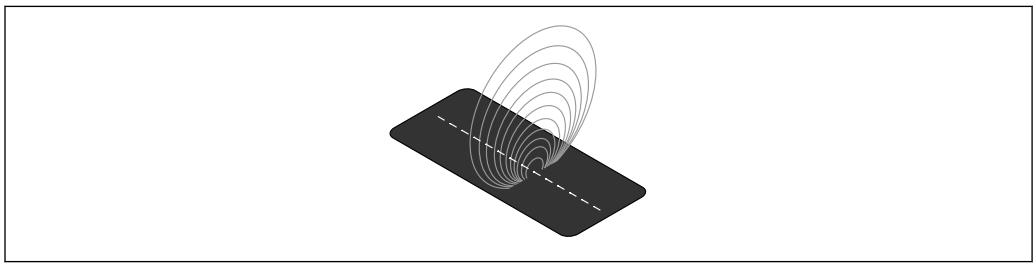
1 Two-rod probe; wave guide



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2 SWZ probe; wave guide; sawtooth

The TDR method operates in the ideal frequency range between 600 MHz and 1.2 GHz.

The modular TDR technology enables special applications with little effort and can be adapted to many applications thanks to the variable sensor design.

Calibration

Two-rod probes
Up to 15 calibration curves saved
Pre-programmed calibration for sand, gravel and grit

SWZ probe
Up to 15 calibration curves saved
Pre-programmed calibration for fresh concrete

Operating mode

The handheld device recognizes the probe automatically. Different operating modes are available depending on the probe.

- **Two-rod probe**
  - Individual values (measurement of moisture and conductivity)
  - Average (is determined from up to 6 moisture measured values)
  - Water calculation (water quantity is calculated in l/m^3)
- **SWZ probe**
  - Individual values (measurement of moisture and conductivity)
  - Average automatically calculated when 4 to 10 individual measurements are taken
  - Water calculation (water quantity is calculated in l/m^3)
  - Kiln-dried water
  - Effective water

Input

Measured variable

- Material moisture in % vol. (water content)
- Material conductivity in mS/cm

Measuring range

- **S1 / S2 two-rod probe**
  - **Material moisture**: 0 to 25 % vol. water content
  - **Material conductivity**: 0 to 1 mS/cm
- **S1C two-rod probe (probe rods PVC-coated)**
  - **Material moisture**: 0 to 100 % vol. water content
  - **Material conductivity**: 0 to 5 mS/cm
- **SWZ probe**
  - **Material moisture**: 0 to 100 % vol. water content
  - **Material conductivity**: 0 to 20 mS/cm

Output

The handheld device does not have any outputs or interfaces for measured value transmission.

The measured values are shown on the display and saved temporarily. When the device is switched off, the measured values are deleted.

Power supply

Supply voltage

Ni-MH battery (4 × 1.2 V (AA)) 2 000 mA/h; built-in

Performance characteristics

Measured value resolution

S1 two-rod probe
Uncoated probe rods, application in non-/conductive materials (e.g. sand, gravel, grit, expanded clay)
- Material moisture: 0 to 25 % vol.
- Material conductivity: 0 to 1 mS/cm
  ℹ The conductivity value determined is uncalibrated and is primarily used to characterize the material being measured.
- Temperature range: −15 to 50 °C (5 to 122 °F)

S1C two-rod probe
PVC-coated probe rods, application in non-/conductive materials (e.g. sand, gravel, grit, expanded clay)
- Material moisture: 0 to 100 % vol.
- Material conductivity: 0 to 5 mS/cm
  ℹ The conductivity value determined is uncalibrated and is primarily used to characterize the material being measured.
- Temperature range: −15 to 50 °C (5 to 122 °F)

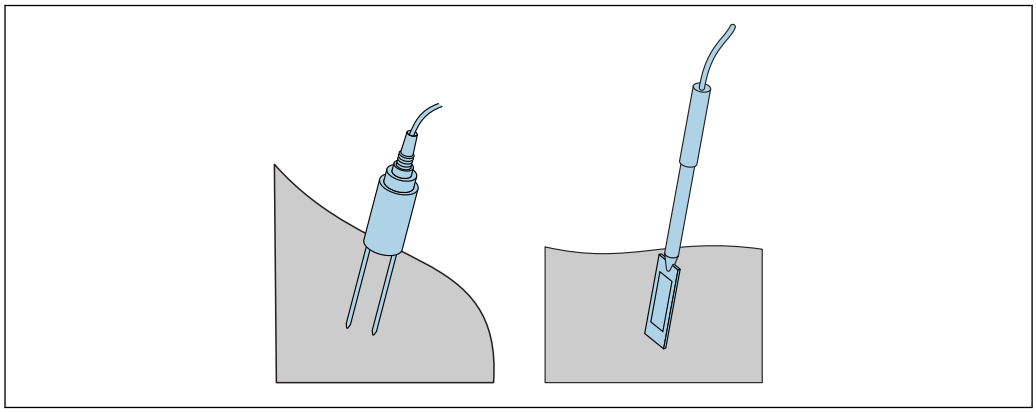
S2 two-rod probe
Uncoated probe rods, wedge-shaped probe for deep introduction into aggregate pile, application in non-/conductive materials (e.g. sand, gravel, grit, expanded clay)
- Material moisture: 0 to 25 % vol.
- Material conductivity: 0 to 1 mS/cm
  ℹ The conductivity value determined is uncalibrated and is primarily used to characterize the material being measured.
- Temperature range: −15 to 50 °C (5 to 122 °F)

SWZ probe
Application in fresh concrete with consistence class F2 to F6
- Material moisture: 0 to 100 % vol.
- Material conductivity: 0 to 20 mS/cm
  ℹ The conductivity value determined is uncalibrated and is primarily used to characterize the material being measured.
- Temperature range: 0 to 50 °C (32 to 122 °F)

Installation

The handheld device is connected to the selected probe via a 7-pin socket and is then ready for use.

The probe can be inserted directly into the medium to be measured.



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3 Probe inserted in medium

Environment

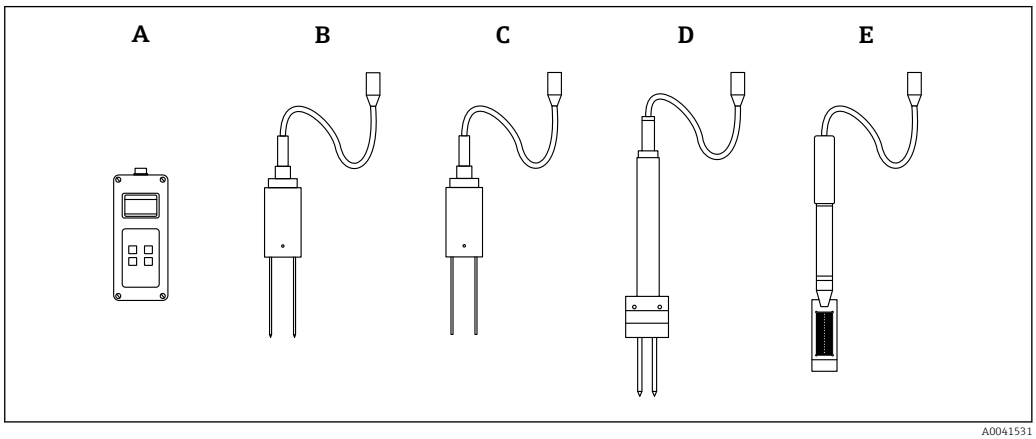
Ambient temperature	−20 to +70 °C (−4 to +158 °F)
Storage temperature	−30 to +80 °C (−22 to +176 °F)
Operating altitude	Up to 2 000 m (6 600 ft) above sea level
Degree of protection	▪ Handheld device, IP67 ▪ Probes, IP68

Process

Process temperature range	▪ Handheld device: −20 to +70 °C (−4 to +158 °F) ▪ SWZ probe: 0 to 50 °C (32 to 122 °F) ▪ Two-rod probe: −15 to +50 °C (5 to +122 °F) Moisture measurement below 0 °C (32 °F) is not possible. The water content of ice (frozen water) cannot be determined.

Mechanical construction

Design



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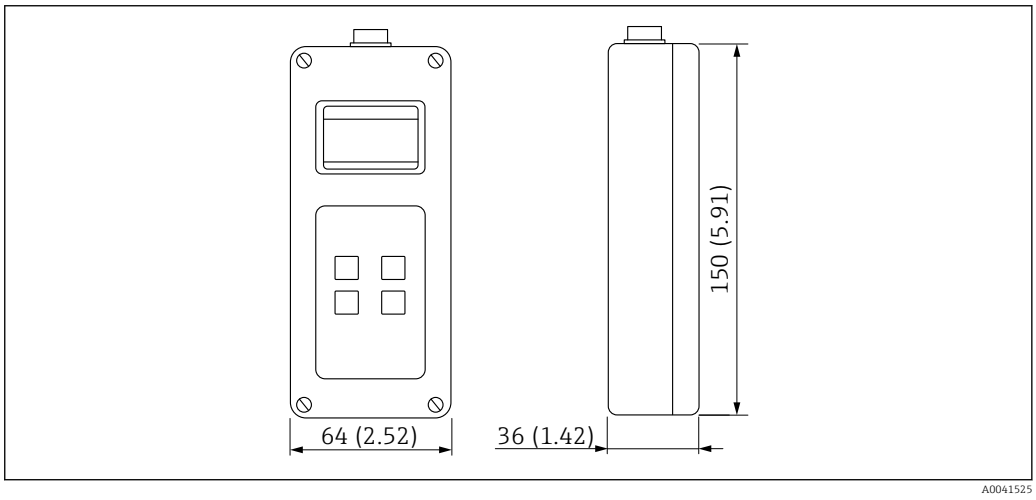
A Handheld device
B S1 two-rod probe
C S1C two-rod probe
D S2 two-rod probe
E SWZ probe

Handheld device

Dimensions



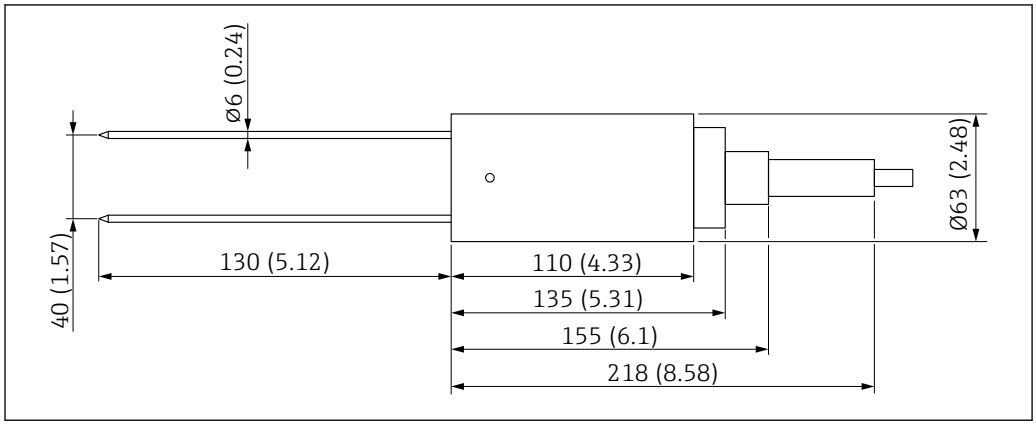
5 *Dimensions of handheld device. Unit of measurement mm (in)*

Weight

0.44 kg (0.97 lb) (with battery)

S1 two-rod probe

Dimensions

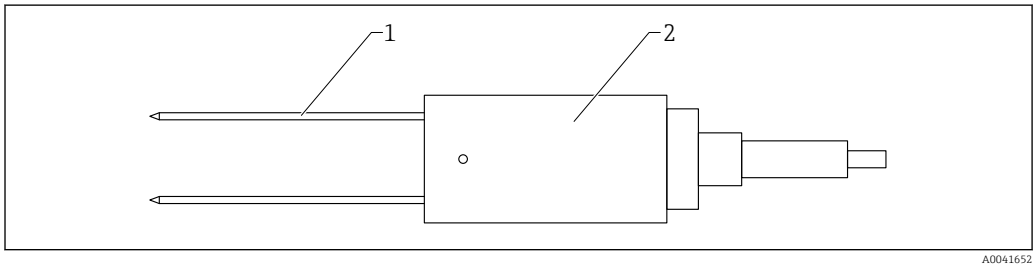


6 Dimensions of S1 two-rod probe. Unit of measurement mm (in)

Weight

0.6 kg (1.32 lb) (incl. 1.5 m (4.92 ft) cable and plug)

Material

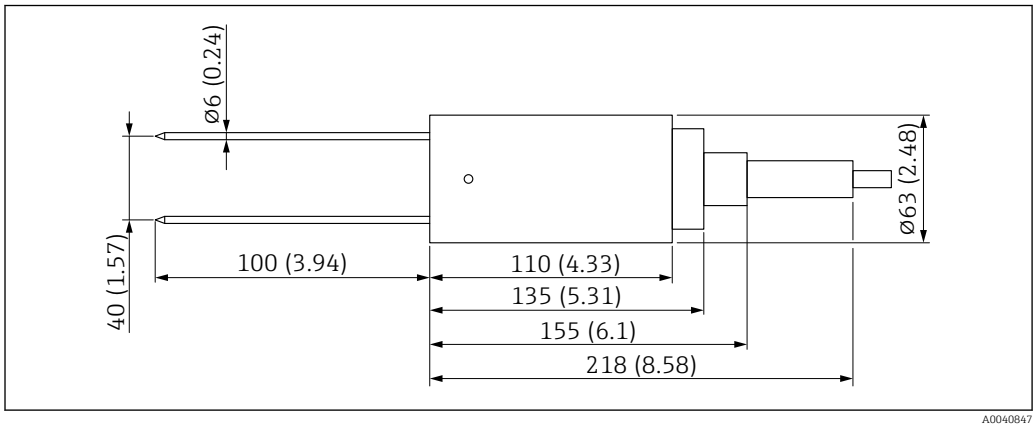


7 Material of S1 two-rod probe

1 Rod; 1.4301
2 Housing; plastic

S1C two-rod probe

Dimensions

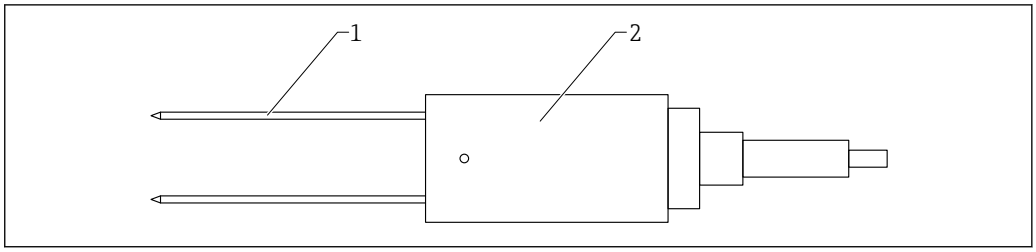


8 Dimensions of S1C two-rod probe. Unit of measurement mm (in)

Weight

0.6 kg (1.32 lb) (incl. 1.5 m (4.92 ft) cable and plug)

Material

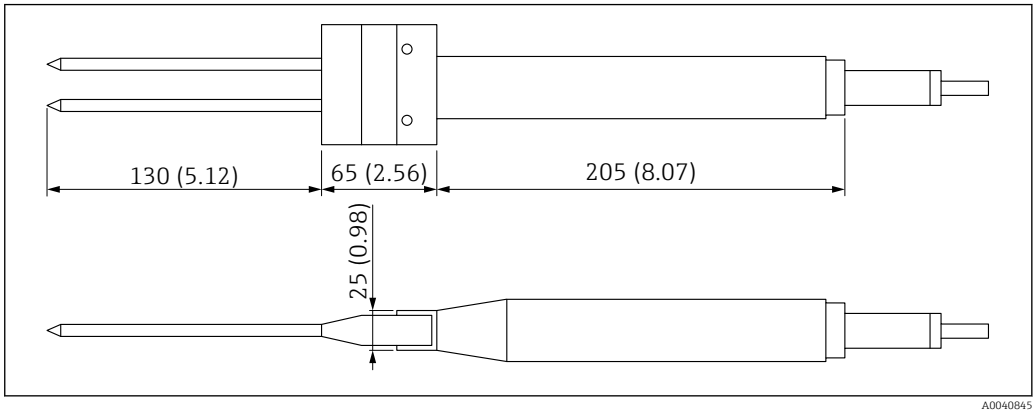


9 *Material of S1C two-rod probe*

1 Rod; 1.4301, PVC-coated
2 Housing; plastic

S2 two-rod probe

Dimensions

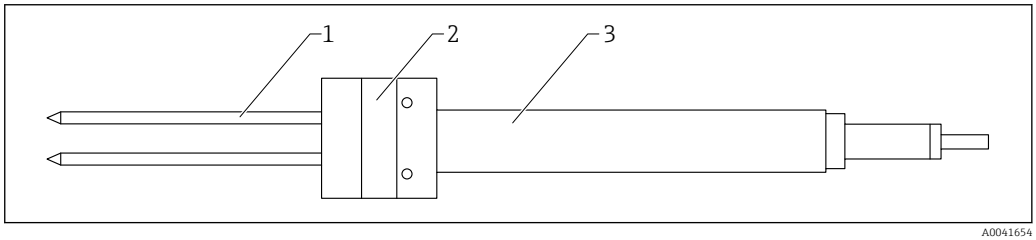


10 *Dimensions of S2 two-rod probe. Unit of measurement mm (in)*

Weight

1.1 kg (2.42 lb) (incl. 1.5 m (4.92 ft) cable and plug)

Material

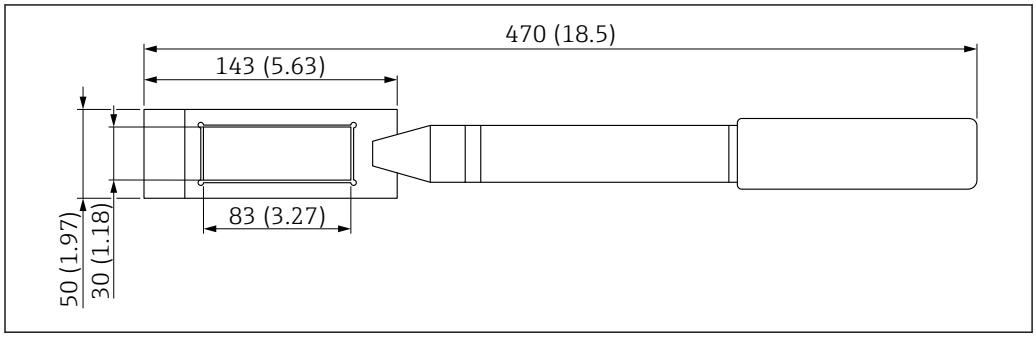


11 *Material of S2 two-rod probe*

1 Rod; 1.4301
2 Probe head, wedge-shaped; plastic
3 Housing; stainless steel

SWZ probe

Dimensions

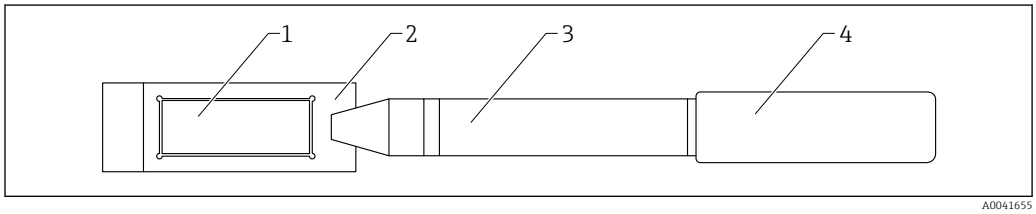


12 *Dimensions of SWZ probe. Unit of measurement mm (in)*

Weight

1.25 kg (2.76 lb) (incl. 1.5 m (4.92 ft) cable and plug)

Material



13 *Material of SWZ probe*

1 *Measuring cell; ceramic (silicon nitride)*
2 *Probe head; 1.4301*
3 *Housing; 1.4301*
4 *Handle; plastic*

Certificates and approvals

CE mark

The measuring system meets the legal requirements of the applicable EU Directives. These are listed in the corresponding EU Declaration of Conformity along with the standards applied.

Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

RoHS

The measuring system complies with the substance restrictions of the Restriction on Hazardous Substances Directive 2011/65/EU (RoHS 2).

Ordering information

Detailed ordering information is available for your nearest sales organization www.addresses.endress.com or in the Product Configurator under www.endress.com :

1. Click Corporate
2. Select the country
3. Click Products
4. Select the product using the filters and search field
5. Open the product page

The Configuration button to the right of the product image opens the Product Configurator.

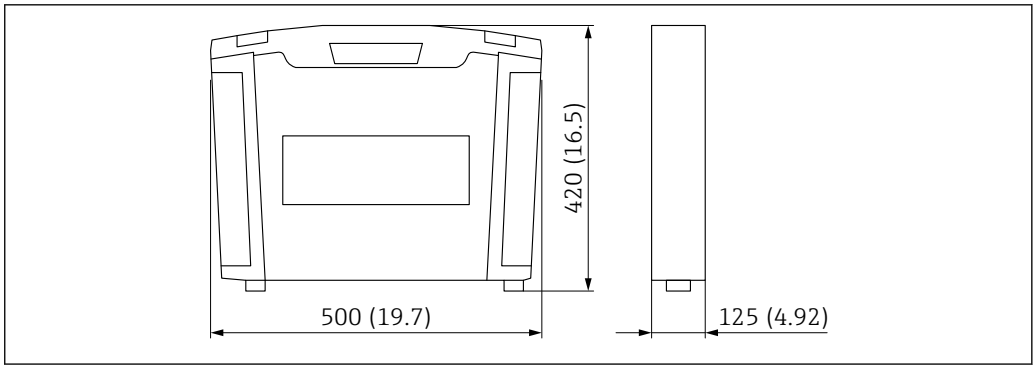
Product Configurator - the tool for individual product configuration
- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

Accessories

Device-specific accessories

Case

The product, complete in a product case, can be ordered via the "Accessory enclosed" section of the product order structure.



14 Case

Material
Plastic

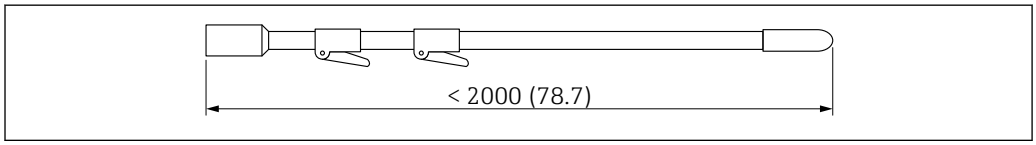
Case set incl. probe

Contents:
- Handheld device
- Protection cap
- Power adapter 12 V_{DC}/2 A/24 W, input voltage 100 to 240 V_{AC} 50 to 60 Hz, 2 m cable, DC plug
- Charging adapter (7-pin coupling socket on DC plug)
- Travel plug set
- Operating Instructions
- Ordered probe or probe combination
  The SWZ probe also comes with a plug-in blade

Weight:
The weight depends on the ordered probe or probe combination and cable length
- Case without probe (cannot be ordered):
  2.81 kg (6.19 lb)
- Case with S1 probe:
  max. 3.41 kg (7.52 lb)
- Case with S1C probe:
  max. 3.41 kg (7.52 lb)
- Case with S2 probe:
  max. 4.01 kg (8.84 lb)
- Case with SWZ probe:
  max. 4.16 kg (9.17 lb)
- Case with SWZ probe and S1 two-rod probe:
  max. 4.76 kg (10.5 lb)

Telescopic extension, max. 2m

The telescopic extension for the S2 two-rod probe can be ordered together with the device via the "Accessory enclosed" product structure.



15 Dimensions of telescopic extension

Documentation

The following documentation types are available in the Downloads section of the Endress+Hauser website (www.endress.com/downloads):

For an overview of the scope of the associated Technical Documentation, refer to the following:
- *W@M Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from nameplate
- *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the 2D matrix code (QR code) on the nameplate

Operating Instructions (BA)

Your reference guide

These Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.

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