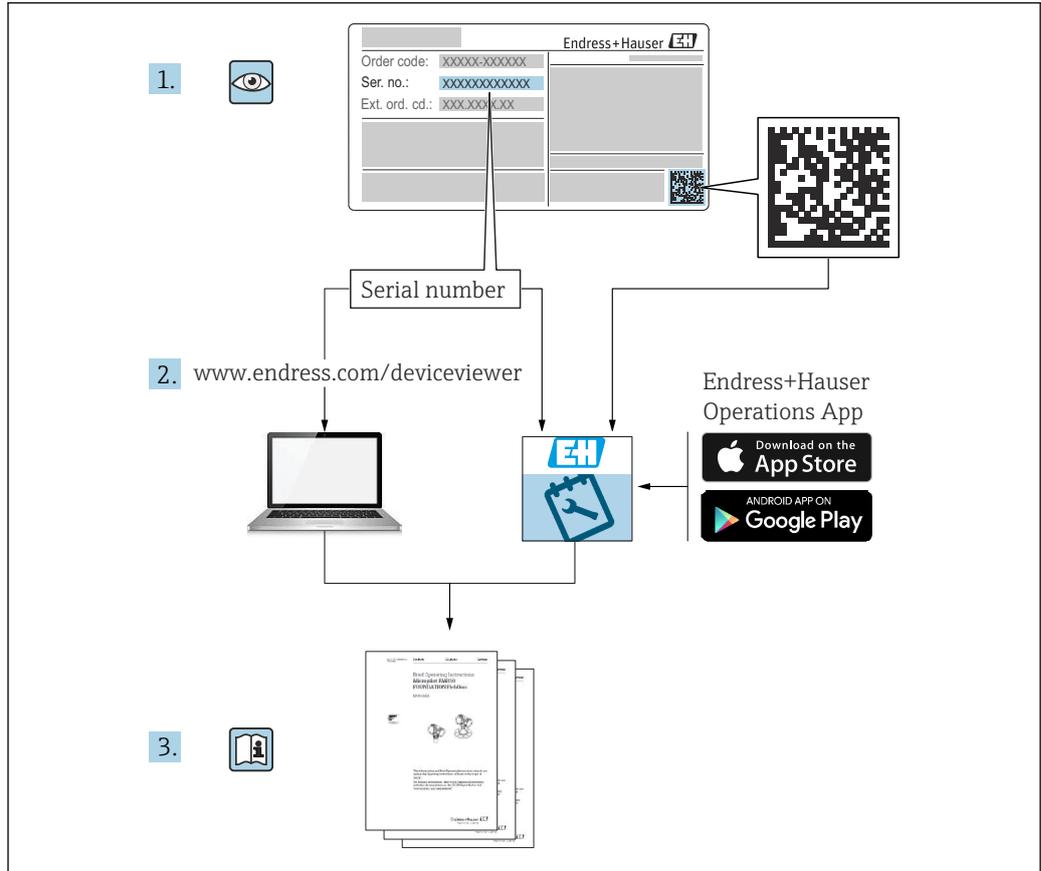


Special Documentation Service tool for Prothermo NMT81

Average temperature device





A0023555

Table of contents

1	About this document	4
1.1	Document function	4
1.2	Document conventions	4
1.3	Documentation	6
2	Basic safety instructions	7
2.1	Requirements for the personnel	7
2.2	Intended use	7
2.3	Workplace safety	7
2.4	Operational safety	7
2.5	Product safety	8
3	Product description	9
3.1	Main parts of the service tool	9
3.2	Internal parts of the service tool	10
4	Operation	11
4.1	Preparing the service tool	11
4.2	Modes of use	12

1 About this document

1.1 Document function

The document is to describe the parts and functionality of the NMT81 service tool.

 NMT81 service tool contains an adapter for mounting the electronics.

1.2 Document conventions

1.2.1 Safety symbols

DANGER

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

WARNING

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

CAUTION

This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE

This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2 Electrical symbols



Alternating current



Direct current and alternating current



Direct current



Ground connection

A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

Protective earth (PE)

Ground terminals that must be connected to ground prior to establishing any other connections.

The ground terminals are located on the interior and exterior of the device:

- Interior ground terminal: protective earth is connected to the mains supply.
- Exterior ground terminal: device is connected to the plant grounding system.

1.2.3 Tool symbols



Phillips head screwdriver



Flat blade screwdriver



Torx screwdriver



Allen key



Open-ended wrench

1.2.4 Symbols for certain types of information and graphics



Permitted

Procedures, processes or actions that are permitted



Preferred

Procedures, processes or actions that are preferred



Forbidden

Procedures, processes or actions that are forbidden



Tip

Indicates additional information



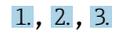
Reference to documentation



Reference to graphic



Notice or individual step to be observed



Series of steps



Result of a step



Operation via operating tool



Write-protected parameter

1, 2, 3, ...

Item numbers

A, B, C, ...

Views



Safety instructions

Observe the safety instructions contained in the associated Operating Instructions

1.3 Documentation

The following documentation types are available in the Downloads area 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

1.3.1 Technical Information (TI)

Planning aid

The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.

1.3.2 Brief Operating Instructions (KA)

Guide that takes you quickly to the 1st measured value

The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

1.3.3 Operating Instructions (BA)

The 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.

1.3.4 Description of Device Parameters (GP)

The Description of Device Parameters provides a detailed explanation of each individual parameter in the operating menu(except the Expert menu). The description is aimed at those who work with the device over the entire life cycle and perform specific configurations.

1.3.5 Safety Instructions (XA)

Depending on the approval, the following Safety Instructions (XA) are supplied with the device. They are an integral part of the Operating Instructions.

 The nameplate indicates the Safety Instructions (XA) that are relevant to the device.

1.3.6 Installation instructions (EA)

Installation Instruction are used to replace a faulty unit with a functioning unit of the same type.

2 Basic safety instructions

2.1 Requirements for the personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Follow instructions and comply with basic conditions.

The operating personnel must fulfill the following requirements:

- ▶ Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- ▶ Follow the instructions in this manual.

2.2 Intended use

Application and measured materials

Measuring devices for use in hazardous areas, in hygienic applications or in applications where there is an increased risk due to process pressure, are labeled accordingly on the nameplate.

To ensure that the measuring device remains in proper condition for the operation time:

- ▶ Only use the measuring device in full compliance with the data on the nameplate and the general conditions listed in the Operating Instructions and supplementary documentation.
- ▶ Check the nameplate to verify if the device ordered can be put to its intended use in the approval-related area (e.g. explosion protection, pressure vessel safety).
- ▶ If the measuring device is not operated at atmospheric temperature, compliance with the relevant basic conditions specified in the associated device documentation is absolutely essential.
- ▶ Protect the measuring device permanently against corrosion from environmental influences.
- ▶ Observe the limit values in the "Technical Information".

The manufacturer is not liable for damage caused by improper or non-designated use.

2.3 Workplace safety

For work on and with the device:

- ▶ Wear the required personal protective equipment according to federal/national regulations.

2.4 Operational safety

Risk of injury!

- ▶ Operate the device only if it is in proper technical condition, free from errors and faults.
- ▶ The operator is responsible for interference-free operation of the device.

Hazardous area

To eliminate danger to persons or the facility when the device is used in the hazardous area (e.g. explosion protection):

- ▶ Check the nameplate to verify if the device ordered can be put to its intended use in the hazardous area.
- ▶ Observe the specifications in the separate supplementary documentation that is an integral part of these instructions.

⚠ WARNING**Explosive atmosphere**

Opening the lid of the NTT81 in an explosive atmosphere may cause the device to explode and serious personal injury or death.

- ▶ When opening the lid, make sure that the NMT81 is not in an explosive atmosphere by using a gas detector.
- ▶ If an explosive atmosphere is confirmed, stop operation immediately.

2.5 Product safety

This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate. It meets general safety standards and legal requirements.

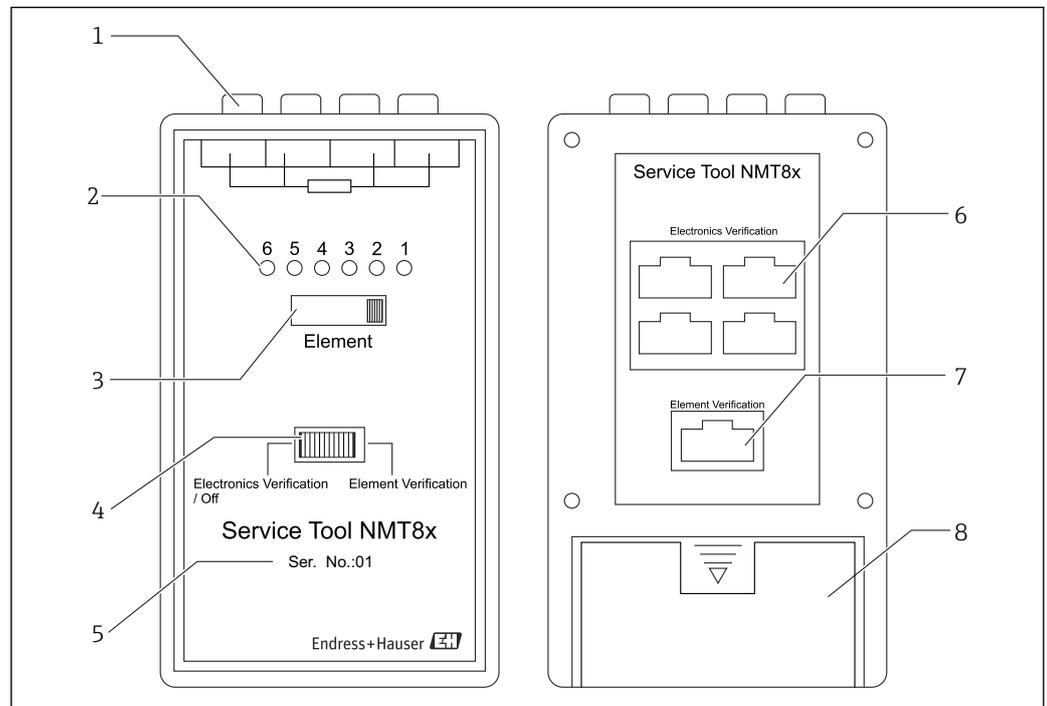
NOTICE**Loss of degree of protection by opening of the device in humid environments**

- ▶ If the device is opened in a humid environment, the degree of protection indicated on the nameplate is no longer valid. This may also impair the safe operation of the device.

3 Product description

3.1 Main parts of the service tool

The service tool is a device that is used to verify the function of the NMT81 electronics board and sensors.



A0054978

1 Service tool

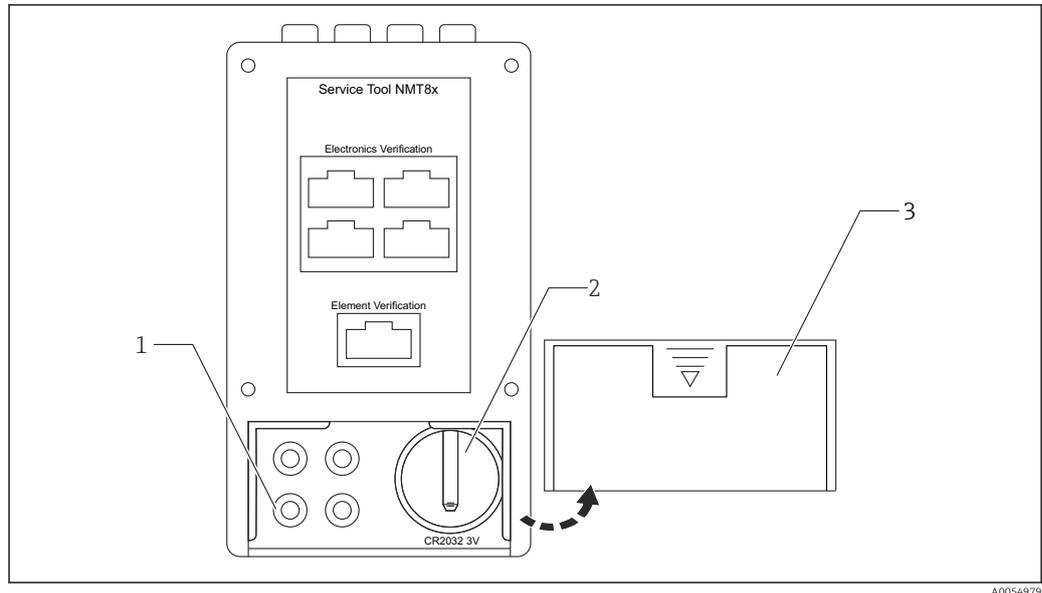
- 1 4-wire RTD connection
- 2 Element indicator
- 3 Element selection switch
- 4 Mode switch
- 5 Serial number
- 6 Cable connector for verification of electronics module
- 7 Cable connector for verification of temperature elements
- 8 Battery compartment

 The use of the battery in hazardous areas is prohibited.

3.2 Internal parts of the service tool

To access to the internal parts of the service tool, remove the battery cover [3].

For details, refer to →  11



 2 Service tool (Rear side)

- 1 Jack (not to be used)
- 2 Button cell battery (CR2032 3V)
- 3 Battery cover

NOTICE

The use of the battery

- ▶ The use of the battery in hazardous areas is prohibited.

4 Operation

4.1 Preparing the service tool

4.1.1 Use of the battery

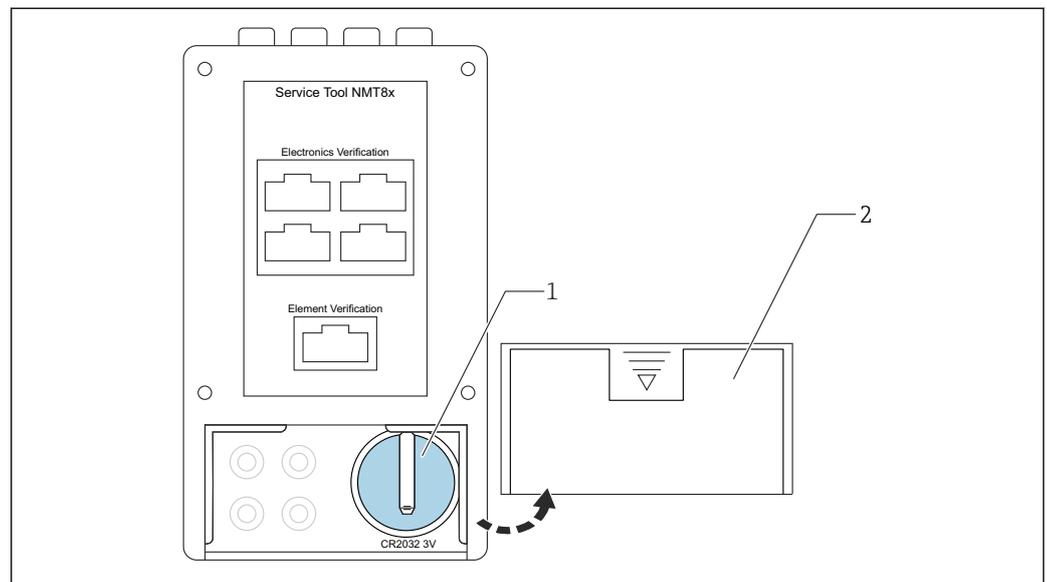
The button cell battery (CR2032 3V) operates to illuminate the LED indicator corresponding to temperature element selection (Nos.1 to 6) and this visual effect helps to select temperature elements easily. However, the function is not directly required for the operation of the service tool. Ensure that the batteries cannot be used in hazardous areas.

 The button cell battery (CR2032 3V) must be prepared by the customer if necessary.

4.1.2 Installing the battery

1. Press the triangle-shaped mark on the battery cover [2] and slide it downwards to remove it.
2. Insert the battery [1] carefully into the holder.
 - ↳ Make sure that the battery is installed with the positive (+) side facing outwards.
3. Replace the cover.
 - ↳ Make sure that the securing tab fully latches into the service tool.

Remove the battery by following the installation procedure in reverse.



3 Installation of a battery

- 1 Button cell battery (CR2032 3V)
- 2 Battery cover

4.2 Modes of use

The service tool has two functions as follows.

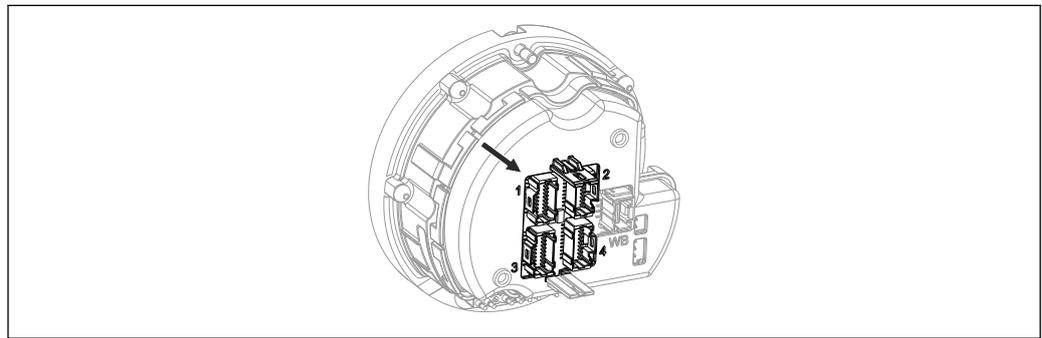
- Electronics module verification: To check electronics module performs appropriately
- Temperature element verification: To check each temperature element performs appropriately

4.2.1 Electronics module verification mode

In this mode, all available measuring points of the electronics module can be connected to a 4-wire RTD simulator to verify the operation of the electronics module.

Procedure to verify the electronics module

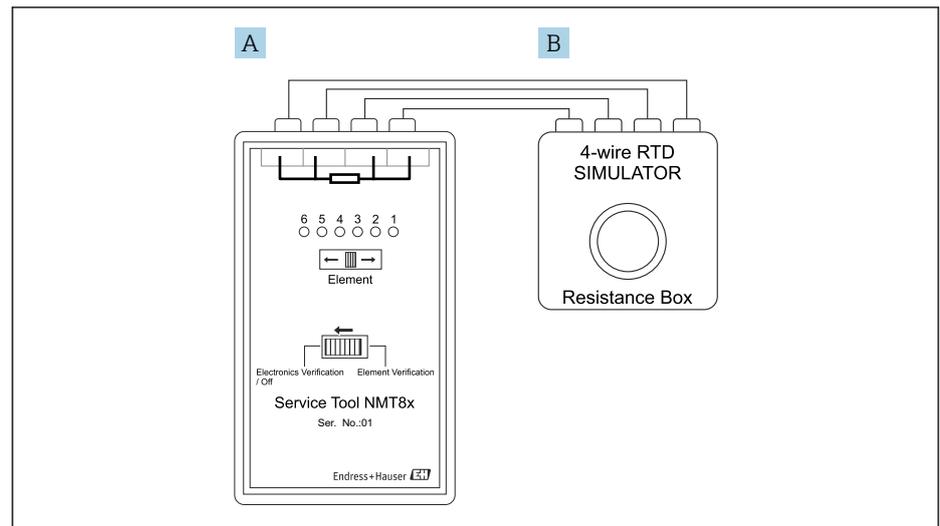
To verify the electronics module operation, connect the four electronics module connectors to the four connectors on the rear of the service tool, and then check the RTD resistance.



A0055132

4 NMT81 electronics module

1. Slide the operating mode switch to the left (Electronics Verification/OFF)
2. Connect the cables to the 4-wire RTD simulator [B] and the service tool [A].
 - ↳ The cables that connect the 4-wire RTD simulator to the service tool below must be prepared by the customer.



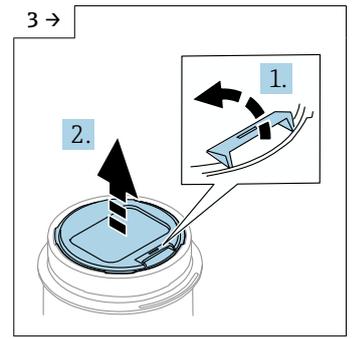
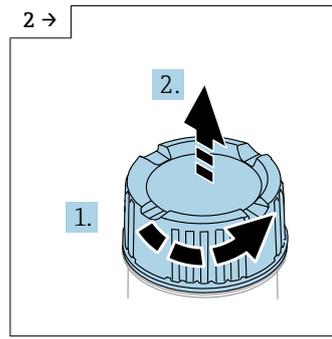
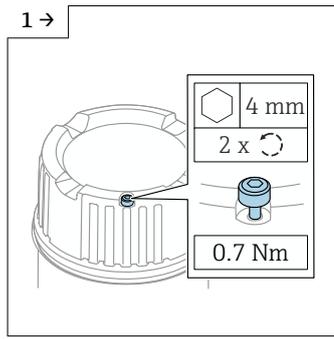
A0055130

5 Connection between the service tool and the simulator

- A Service tool (Front side)
- B 4-wire RTD simulator

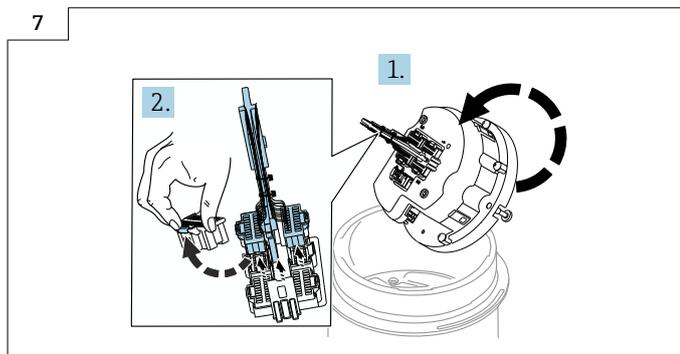
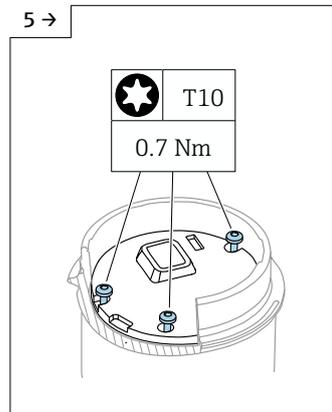
i Make sure to connect the 4-wire RTD simulator to the correct ports as per the RTD symbol on the service tool otherwise it will not work properly.

3. Remove the module as follows

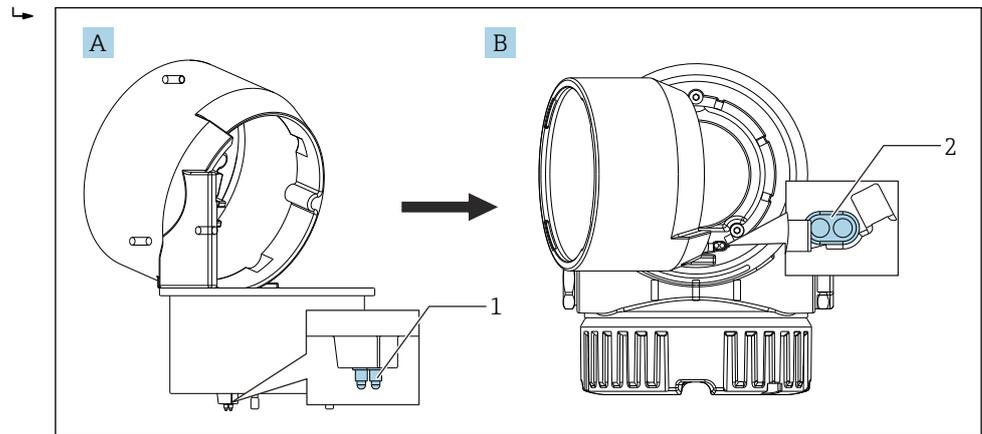


► Cover locking: optional

► Display: optional



4. Install the pins [1] on the insertion holes [2] to mount the service adaptor [A] on NMT81 [B].

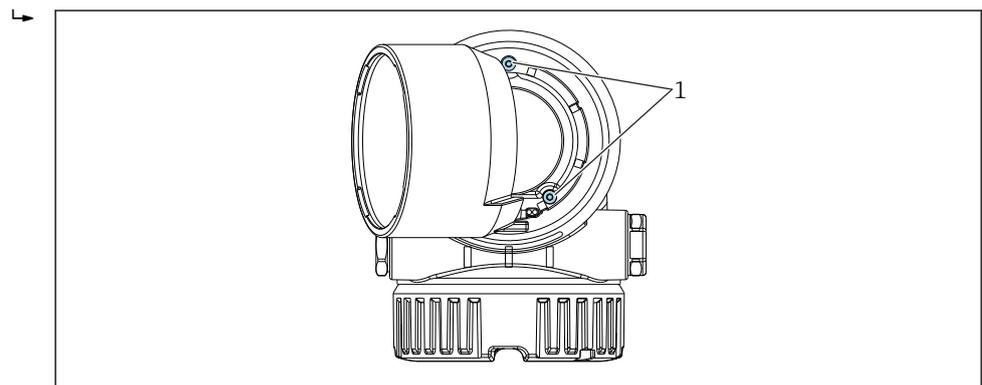


A0055134

6 Installation of service adaptor

- A Service adaptor (side view)
 B NMT81 with service adaptor (top view)
 1 Pin
 2 Insertion hole

5. Tighten the screws [1] to secure the service adaptor and NMT81.

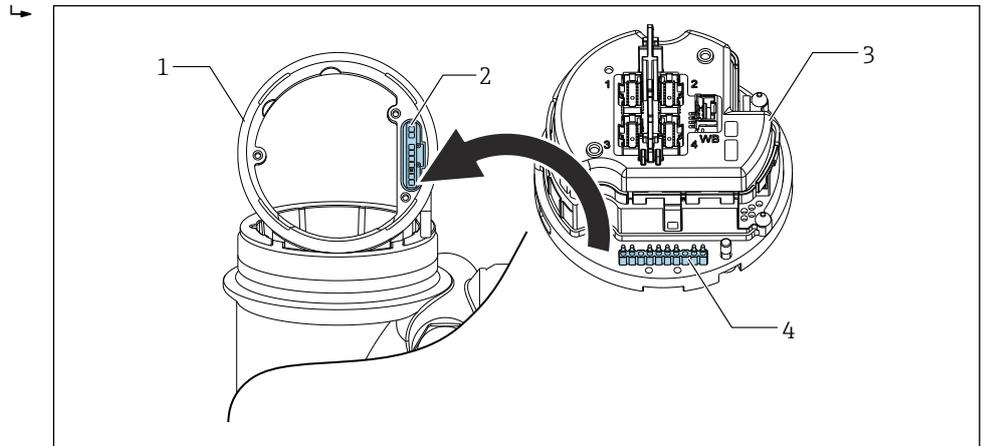


A0055139

7 Service adaptor on NMT81 (top view)

- 1 Screw

6. Install the pins [4] of the module [3] on the socket [2] of the service adaptor [1] to apply power to the modules.

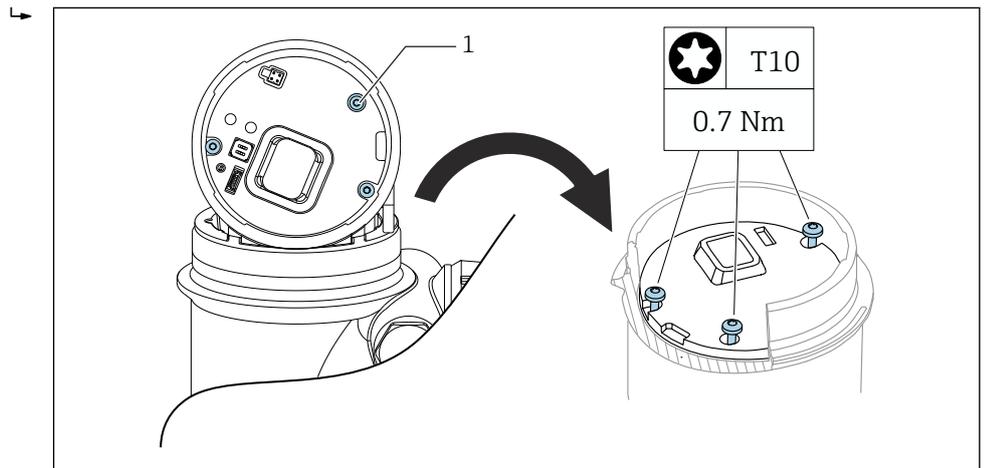


A0055135

8 Module installation

- 1 Service adaptor
- 2 Socket for module
- 3 Module
- 4 Pins of module

7. Tighten the screws [1] to secure the module on the service adaptor.

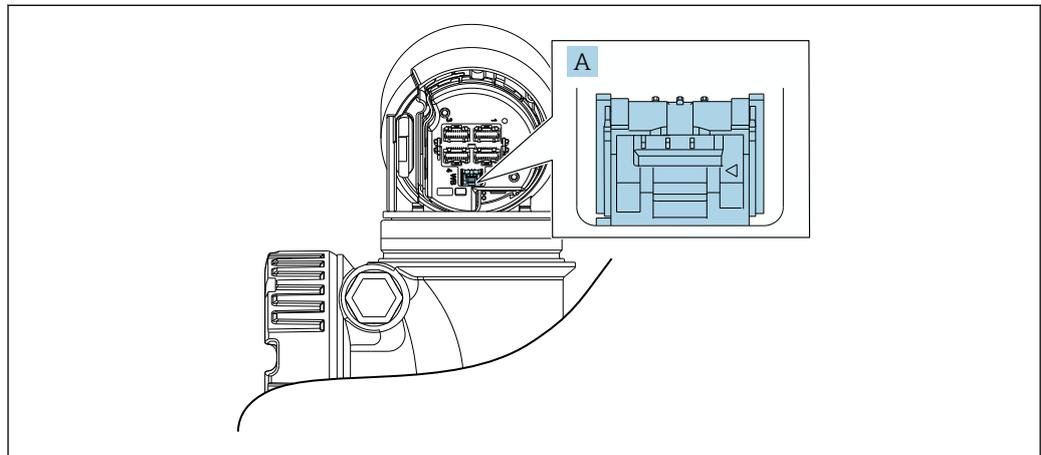


A0055136

9 Main unit

- 1 Screw

- i** If a water bottom sensor is installed, make sure that the water bottom sensor cable is connected to the sensor cable connector [A] to prevent water bottom sensor alarm from activating during verification.

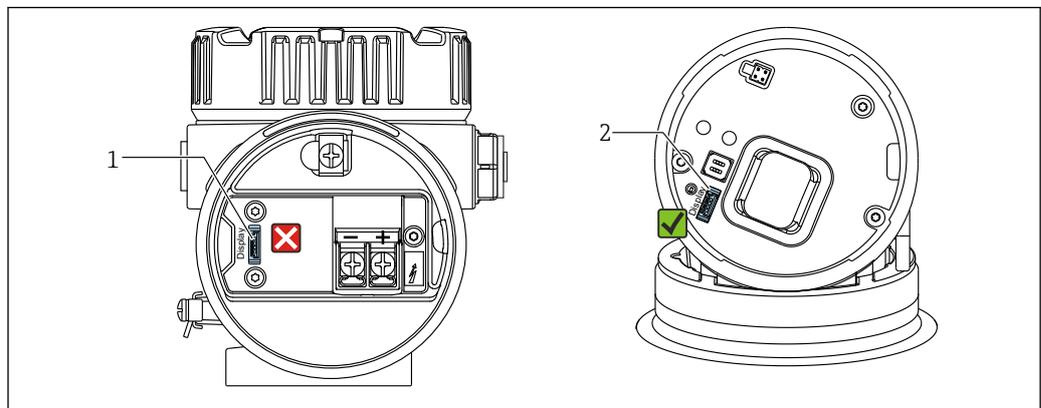


A0055138

10 Connector for the water bottom sensor

A Connector

- i** The display port on the main unit [1] will not function at this moment. If a display (optional) is required, connect it directly to the display port of the electronics module [2].



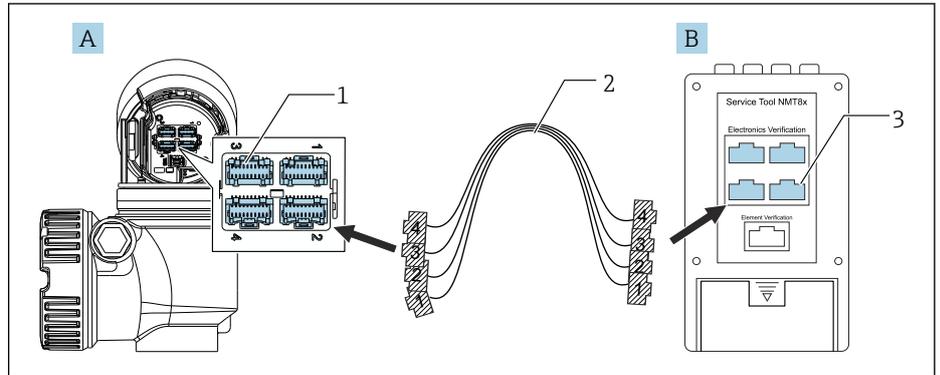
A0055140

11 Display port

1 Display port (front side)

2 Display port on the main unit

8. Connect the supplied cables [2] of the four connectors [3] listed Electronics Verification on the rear of the service tool and four connectors [1] of the electronics module.
 - ↳ Depending on the number of NMT81 sensors, the available number of ports on the electronics module may be less than four. No specific number is assigned to the ports for the electronics verification on the service tool. Connect cables to any of the four ports.

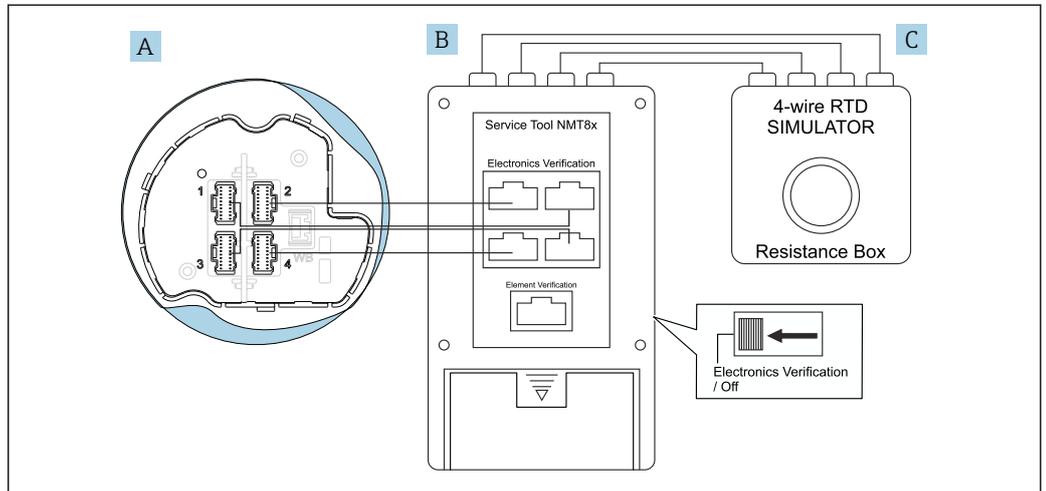


A0055137

12 Connectors for the electronics module and service tool

- A Electronics module on NMT81
- B Service tool
- 1 Connector on the electronics module
- 2 Supplied cable
- 3 Connector on the service tool

- i** The 4-wire RTD simulator [C] and the cables that connect the 4-wire RTD simulator to the service tool [B] must be prepared by the customer.

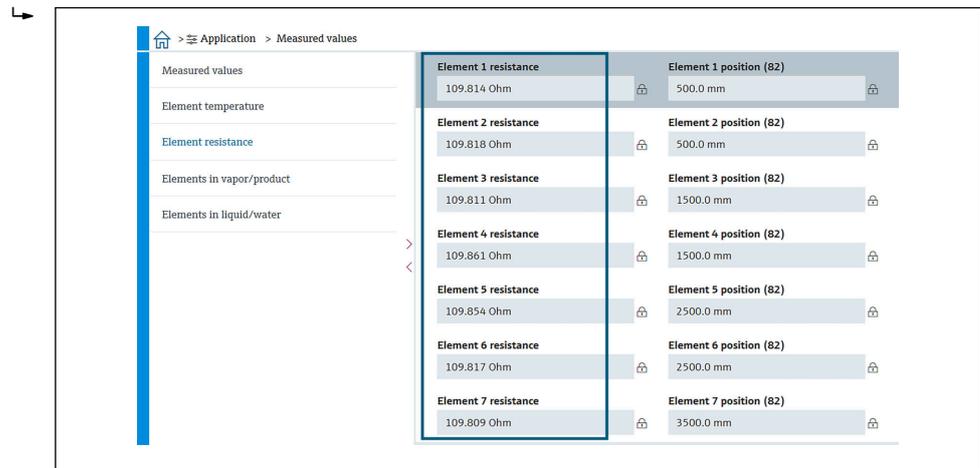


A0054980

13 System configuration for electronics module verification

- A Electronics module
- B Service tool
- C 4-wire RTD simulator

9. Using FieldCare, confirm that the resistance values of all temperature elements show almost the same values.



A0055131

14 Temperature element resistance screen

Navigate to: Application → Measured values → Element 1 to 24 resistance
The measured resistance slightly varies depending on each element.

This completes the procedure to verify the electronics module.

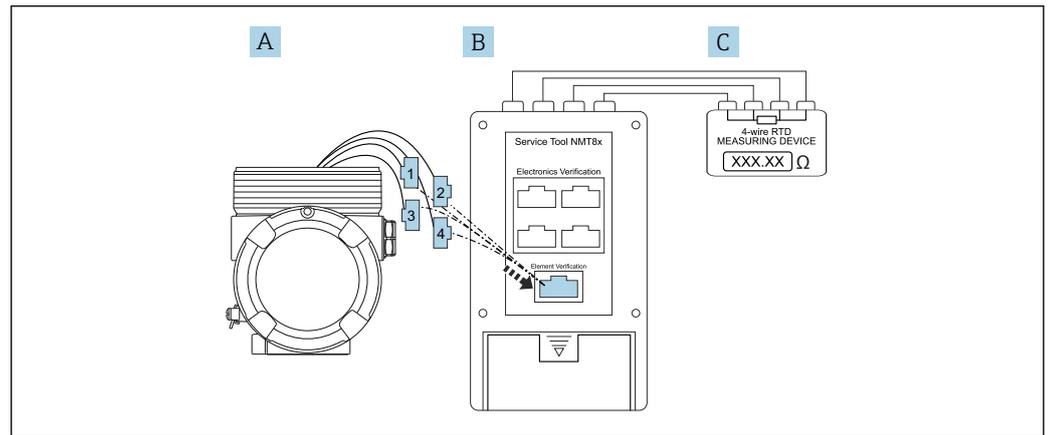
4.2.2 Temperature element verification mode

In this mode, each temperature element of NMT81 can be checked one at a time by using the 4-wire RTD measuring device.

i When using the LED indicator on the service tool, install the button cell battery (CR2032 3V) in the rear of the service tool. Ensure that the battery cannot be used in hazardous areas. For details of the battery → 11

Procedure to verify the temperature element

The 4-wire RTD measuring device and the cables that connect the 4-wire RTD measuring device to the service tool below must be prepared by the customer.

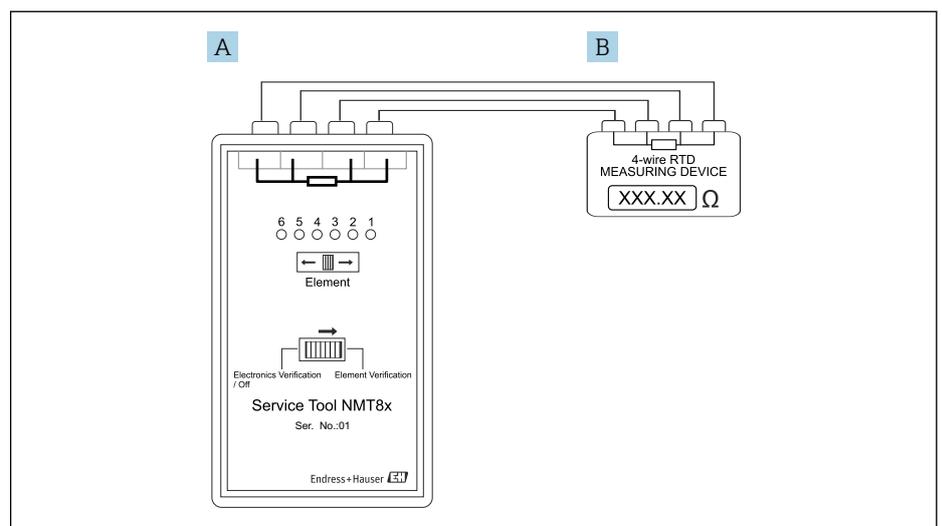


A0054981

15 System configuration for temperature element verification

- A Connector of electronics module
- B Service tool
- C 4-wire RTD measuring device

1. Slide the operating mode switch to the right (Element Verification)
2. Connect the 4-wire RTD measuring device to the service tool.
 - ↳ The cables that connect the 4-wire RTD measuring device to the service tool must be prepared by the customer.



A0055133

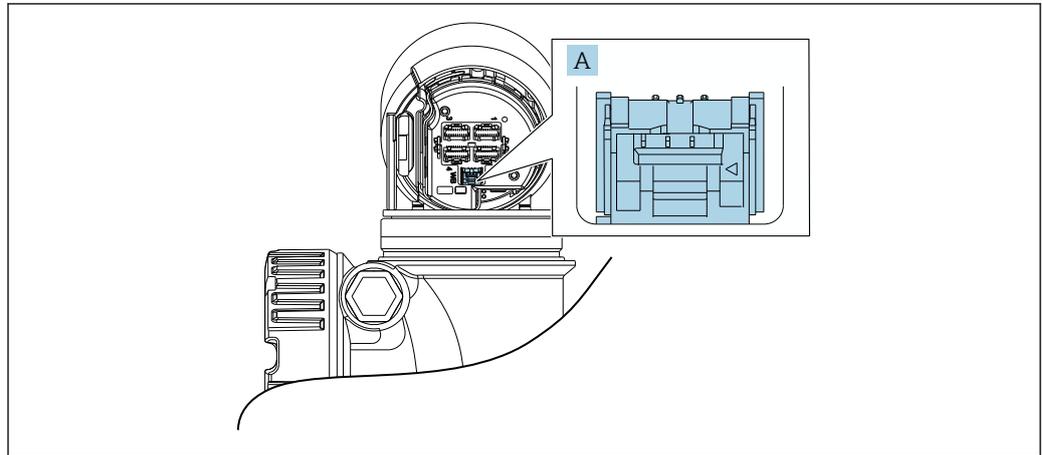
16 Connection between the service tool and the measuring device

- A Service tool (Rear side)
- B 4-wire RTD measuring device

i Make sure to connect the 4-wire RTD measuring device to the correct ports as per the RTD symbol on the service tool otherwise it will not work properly.

3. Remove the electronics module → 13

i If a water bottom sensor is installed, make sure that the water bottom sensor cable is connected to the sensor cable connector [A] to prevent water bottom sensor alarm from activating during verification.

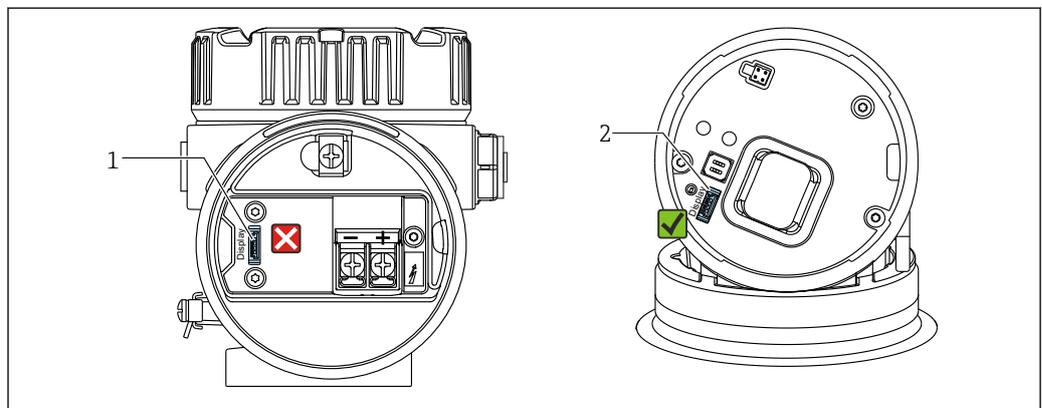


A0055138

17 Connector for water bottom sensor

A Connector

i The display port on the main unit [1] will not function at this moment. If a display (optional) is required, connect it directly to the display port of the electronics module [2].



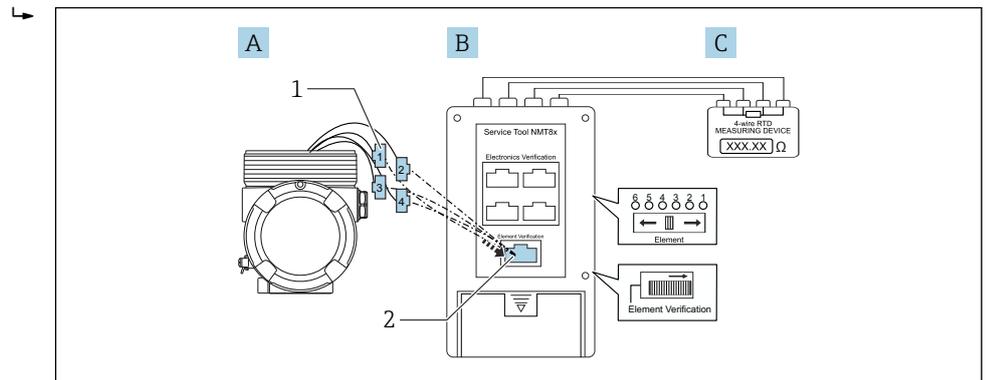
A0055140

18 Display port

1 Display port (front side)

2 Display port on the main unit

4. Connect the cables [1] to the connector [2] on the Element Verification on the rear of the service tool.



A0055141

19 Temperature element verification

A Electronics module on NMT81

B Service tool

1 Cables for the temperature element

2 Connector on the service tool

5. Confirm that the measured resistance values are all within the expected values.

This completes the procedure to verify the temperature element.



71646744

www.addresses.endress.com
