

PROlinetest

User Manual



Diagnostic and service tools for PROFINET / Ethernet

List of revisions

Date	Revision	Change(s)
30/07/2014	0	First release

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Attention!

This device may only be started and operated by **qualified personnel**. Qualified personnel within the meaning of the safety information contained in this manual are persons who are authorized to start, ground and mark devices, systems and circuits in accordance with the safety standards.

Table of contents

1	Introduction	6
2	Connections and status displays	6
3	Safety instructions	7
4	PROlinetest is indispensable for:	7
5	Measurement and display of:	8
5.1	Cable test	8
5.2	Power over Ethernet	8
5.3	General	9
5.4	Power supply	9
5.5	Battery life with a good quality battery	9
6	Using the PROlinetest	10
6.1	Keypad	10
6.2	Test settings	10
6.2.1	Wiring	10
6.2.2	Velocity	11
6.2.3	Cable type	11
7	Device settings	12
7.1	Language	12
7.2	Units	12
7.3	Battery type	12
7.4	Back light	12
7.5	Auto Power off	12
7.6	Key beep	12
7.7	Sound	12
7.8	Contrast	12
7.9	Reset to factory settings	13
7.10	Configurations	13
8	Test settings	13
8.1	Cable definitions	13
8.2	Wiring definitions	13
9	Testing	14
9.1	Cable test	14

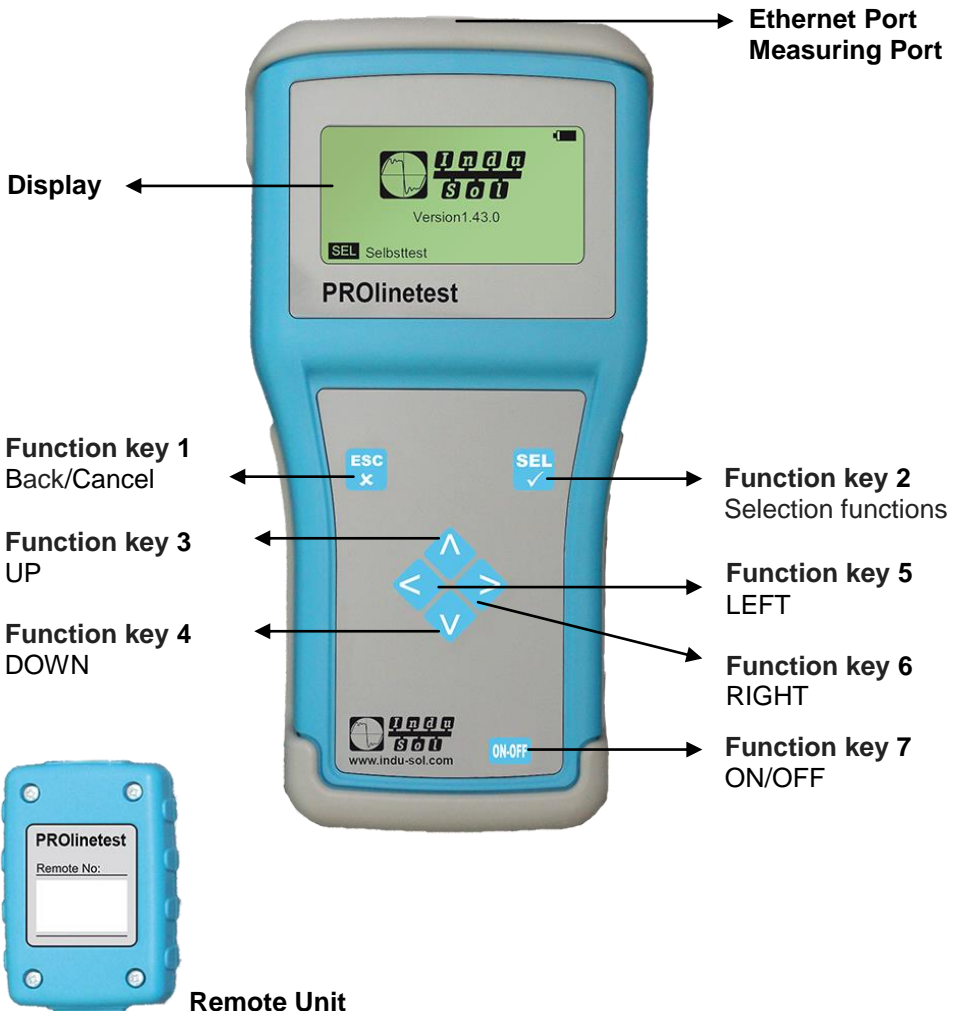
9.2	Performing the test	14
9.3	Cable / Wire trace	16
9.4	PoE test per IEEE802.3af	16
10	Appendix A	17
11	Test settings	17
11.1	Cable definitions	17
11.2	Wiring definitions	18
12	Technical data	20
12.1	PROlinetest – Main unit	20
12.2	PROlinetest – Remote unit	21
13	General information	22

1 Introduction

The **PROlinetest** you purchased is an easy-to-operate, intuitive LAN tester. Please read the entire instruction manual carefully to help you use the PROlinetest effectively.

2 Connections and status displays

Main Unit



3 Safety instructions

The **PROlinetest** may only be operated with the accessories originally provided. Using the device with accessories that are not original or for applications for which it was not intended can lead to incorrect test results and may damage the device.

The relevant safety regulations in VDE 0100, 0800 and 0805 must be observed.

- The use of cables other than those provided can damage the device. The device should not be connected to high voltage sources such as AC power circuits. Indu-Sol GmbH assumes no liability for damage resulting from improper use.
- Do not apply any external voltage to the device.
- Never open the device. There are no parts in the device that need to be serviced or calibrated. To change the battery, open the battery compartment. See the instructions in [Appendix A](#).
- The tester is protected from splashing water and dust by the front covering by the cover film. It is not water-tight, however.
- Never pull unnecessarily on the device's cables. To hang it up, use the eyelet in the device and the provided strap.

4 PROlinetest is indispensable for:

- Testing and starting up 10/100/1000 Mbit LAN networks
- Verifying new LAN installations
- Troubleshooting of existing LAN installations
- Cable mapping
- Fault finding
- Testing PoE performance
- Measuring length, finding cables of all kinds, etc.

5 Measurement and display of:

5.1 Cable test

- Incorrect wiring
- Short circuit
- Open circuit
- Split pair
- Length of cables and wires with TDR up to 150 m
- External voltage



Example of error diagnosis

5.2 Power over Ethernet

- PoE version A or B
- Available power in Watts according to IEEE 802.3af

5.3 General

- 16 different predefined wiring versions
- Original predefined versions can be created
- Cable types with predefined VP value
- Original cable types can be created
- Illuminated graphical display
- Automatic shutoff time can be set
- Display illumination time can be set

5.4 Power supply

4 x UM-3 / AA battery or 4 x rechargeable batteries of the same size

5.5 Battery life with a good quality battery

(such as a GP Super Alkaline or Varta Industrial)

Measurement always with the illuminated display

- Powered on with no testing: approximately 40 hours
- Cable test without remote: approximately 35 hours
- Cable test with remote: approximately 18 hours

The available testing time can be extended by turning off the device or limiting the display lighting time.

Note: Testing is continuous. Different durations may result with batteries of different quality. Only use batteries from the same manufacturer with the same capacity. Remove the batteries if the device will not be used for a long time. If the battery compartment is damaged by leaking batteries, it can be exchanged.

6 Using the PROlinetest

6.1 Keypad

When the PROlinetest was developed, emphasis was placed on fast and easy operation. For this reason, the PROlinetest has only seven keys despite its many test options.

Function key 1 – ESC

Similar to a PC, the ESC key means undo the last step.

Function key 7 – ON/OFF

Key for turning the device ON and OFF. This key has a delay of approx. 1 second when turning off.

Function keys 3 - 6 – Arrow keys

The arrow keys are for menu scrolling: UP ▲ / DOWN ▼ and LEFT ◀ / RIGHT ▶.

Function key 2 – SEL

The SELECT key. Press this button to select a function or start a test.

6.2 Test settings

6.2.1 Wiring

You can select from the list of different possible types of wiring (which pin to which wire). This can even be changed during the cable test. It is important to precisely specify the correct type of wiring because all information of wire pairs and PIN assignment rely on it. Without it there is no OK status possible. The proper identification of errors in the case of split pairs also requires a precise definition.

16 popular versions are predefined.

The following abbreviations are used:

UTP = Unshielded Twisted Pair in a cable

STP = Shielded Twisted Pair in a cable

CR = Cross connected cable

6.2.2 Velocity

This is the propagation velocity (VP) of the signal in the cable expressed as a fraction of the speed of light. This information is necessary to measure length with the TDR function. The value must be correct if the measurements are to be precise.

Obtain the VP data from the cable manufacturer. If there is no data on the cable, the VP factor can be determined from a piece of cable with a known length.

First perform the **Cable test** on this piece of cable without a remote. After the test is finished, go to the **Velocity** menu. The measured length for the set VP is displayed here. Press the ▲ or ▼ keys until the known cable length is displayed. The displayed VP value is the one that will be used for this cable. You can then create your own cable definition in the **Test settings / Cable definition** menu.

6.2.3 Cable Type

You can retrieve the cable definitions. Seven different cable types with the VF factor are predefined.

7 Device settings

All device settings are made in the menu **Settings / Device Settings**. These are preset values and can be left unchanged. If needed there is a selection to **Reset to defaults**. The possible control selections for the menu are shown on the bottom status line.

7.1 Language

Select German (default) or English

7.2 Units

m (meters) or ft (feet)

7.3 Battery type

The PROlinetest can be operated with 4 AA batteries, or 4 AA rechargeable batteries. Since the voltage is lower with rechargeable batteries, the capacity display can be changed to reflect primary batteries and rechargeable batteries.

7.4 Back light

Duration of back lighting each time a key is pushed in seconds. Set the time with the ▲ or ▼ key, select with **SEL**.

7.5 Auto Power off

The time when the tester automatically turns off after the last key has been pressed. Set with the ▲ or ▼ key, select with **SEL**.

7.6 Key beep

On or off

7.7 Sound

On or off. This sound occurs when the cable test finishes.

7.8 Contrast

LCD contrast setting value, default: 14. Set with ▲ or ▼, confirm with **SEL**.

7.9 Reset to factory setting

All of the settings are reset to the factory defaults.

7.10 Configurations

The PROlinetest comes with 16 predefined wiring versions and 10 predefined cable versions. With the setup function, new definitions can be created at any time, or existing ones can be revised.

For details, see [Appendix A](#).

8 Test settings

8.1 Cable definitions

You can select from the list of the different cables in use. The cable type is assigned to the name and the associated VP value. The VP value is needed for measuring the length. The cable type only appears in the saved or printed results. For that, enter the cable that is being used.

You can create your own definitions. See [Appendix A](#).

8.2 Wiring definitions

Approximately 16 different wiring versions are predefined for your selection. You need to correctly choose the wiring version to be tested to obtain Pass/Fail information. This information must be correct (pin to pair assignment) to test for crosstalk. With the PROlinetest, the wire to pin assignment is checked and the correct pair assignment is also checked. This is done with a high frequency test signal to provide true results.

You can also create your own versions in this menu. See [Appendix A](#).

9 Testing

The PROlinetest checks the connected line for external voltage each time before starting one of the four possible tests. If external voltage is present, the test is not started and the level of the voltage is displayed in volts. The test may only be run after the external voltage has been turned off. External voltage does not have anything to do with PoE during this type of detection. With PoE systems working properly, the voltage supply always needs to be activated.

9.1 Cable test

The cable test can be run with or without the remote unit. If it is run without the remote, only cable length is measured and a split pair check is done.

When the remote unit is connected to the end, measuring the length using the TDR method is accurate enough to determine if a cable is within the 90 m max. length standard. This test can measure a max. of 150 m.

We recommend measuring the length of installed cables separately without the remote. This measurement of length is more precise since a specific end is detectable without the remote.

9.2 Performing the test

Using the supplied patch cables, connect up to 32 remote units to the ports to be measured. If only one remote is being used, the remote needs to be brought to the next connection point after the test. When using a helper, the helper can determine whether the test yielded any errors by the flashing rhythm of the LED. If no errors are found, the LED flashes slowly once every second and the remote can be brought to the next port.

We generally recommend using several remotes, one for each room. With 32 possible unique remote IDs larger facilities like a patch field can be easily covered. The main advantage is that it saves time since only one person is required. The unique remote ID numbers show up in the saved records, too.

Connect the PROlinetest to the port to be tested in the patch panel or wall jack with the 0,5 m patch cable (supplied).

On the main menu select **Cable test**, start the test by pressing the SEL key. The message **Cable test running** indicates that the test is underway and the progress is displayed as a percentage. If the test is without errors, a long beep sounds and the okay checkmark is shown in the display. The LED in the remote flashes once every second signifying a passed test.

If an error is found, two short beeps sound, the LED in the remote flashes

quickly 4 times (0,5 seconds in length), then pauses for 1 second, and then flashes again quickly 4 times, etc.

The number of the remote units is always displayed in the PROlinetest at the top left of the display. This is followed by the type of cable wiring selected. This can be changed by pressing the ▼ key. Then the set VF value is displayed. It is either selected by choosing a cable type, or by setting it directly beforehand.

The **Wire mapping** is displayed in the main window. This clearly identifies any circuitry errors. Split pairs are displayed with a branch to the linked wire which then returns. The measured distance to the panel appears in right field. Distances of less than 2 m are not shown. The measurement is too imprecise at this close range.

The max. length that can be measured is approximately 150 m. However, this depends on the cable itself.

The key display line is the dialogue line. The possible operating steps for the current test are displayed in this line.

Navigate with the ◀ / ▶ keys to see the identified details per wire. This allows for example an open or short to be clearly assigned to the near or far end. If the fault is somewhere in between, then its location is indicated in meters.

The ◀ key reveals the length of the wires and the ▶ key indicates the number of errors, type of errors, the affected pin, where it should be and where it actually is, if misconnected, as well as the distance to the fault. In the case of split pairs, of course only the linked pair can be defined. Sometime individual couplings between other wires can be identified. Because of the split pair, the crosstalk also relates to other neighboring wire pairs.

Make sure that the selected wiring version (such as 568A) corresponds to the actual cabling.

9.3 Cable / Wire trace

The PROlinetest has two different ways of identifying a known jack on the patch panel, switch or hub. Insert the test cable of the PROlinetest into the outlet box in the room and select Test Link/Blink in the **Cable / Wire trace** menu. This only tests if the box is active in the network. The response is displayed in the status line. If there is an active connection, the message appears: **Ethernet 10/100/1000 Mbit connection** and only the identified speed is displayed.

If the port is not active, **No connection** is displayed.

9.4 PoE test per IEEE802.3af

Start the test by pressing the SEL key. The PROlinetest activates the PoE port and shows in the display whether the PoE is available or not. If the PoE can be activated, it is. Then the max. load is applied to drain the cable charge. The max. available power is then measured. This is done according to IEEE 802.3af. This standard regulates the voltage that has to be provided on the line when a specific current is flowing. If the voltage is below the standard value, the PROlinetest reduces the load until the voltage lies within the normal range. This power is then calculated and displayed.

This information is important in every network with PoE powered devices since faults repeatedly arise because the power supply in the switch has reached the limit. If a small, additional load is created, for example from different operating conditions such as turning on an infrared light, the network fails and the switch only provides the emergency power. This situation cannot be detected without the proper test equipment.

10 Appendix A

Changing the battery:

First loosen the 2 bottom screws in the bottom bumper. Pull the bumper downward.

The four AA batteries are in a holder. Remove the old batteries and replace them with new batteries. Note the polarity. Do not combine new and old batteries. Always use batteries of the same type and date of manufacture.

Return old batteries to the supplier or a recycling facility.

11 Test settings

11.1 Cable definitions

You can enter the different types of cables used. The types which already have been entered can also be overwritten.

After selecting the cable type to be changed or the last position without an entry, select it by pressing SEL. The display shows **Name**. You can enter a unique cable name. 15 characters are available. At the flashing cursor position, press the ▲ and ▼ keys to scroll through the alphabet and the numbers 0 - 9 including a space. Select the character or number at the cursor position by pressing SEL. Once the name is entered, confirm it by pressing SEL. The following appears **Velocity: xx%**. This is the percentage velocity of propagation (VP) in the cable in relation to the speed of light. Enter either the value indicated by the cable manufacturer, the previously determined value, or an approximate value. The value is approximately 64 - 68 for telephone and Cat3 cables, approximately 72 for Cat5/6, and approximately 77 for Cat6/7.

Note that the cable lengths can only be correctly measured when the VP is correct.

After entering the VP value, save it by pressing SEL. This allows you to quickly and easily predefine the cable types that are being used.

11.2 Wiring definitions

You can add the wiring versions used.

It is helpful if you write down the pin/pair assignment of the wiring version to be created.

16 common versions are predefined. The abbreviations UTP, STP, and CR are described on [page 10 – Wiring](#). The list appears after the menu item **Wiring definition** is selected. The first item is **NO TEST**. Do not change this one.

After selecting a wiring version to be changed or the last **NOT USED** item, the **Name** menu appears.

You can enter a unique wiring name such as **568C**. 15 characters are available. At the flashing cursor position, press the ▲ and ▼ keys to scroll through the alphabet and the numbers 0 - 9 including a space. Select the character or number at the cursor position by pressing SEL. Once the name is entered, confirm it by pressing SEL.

The **Connections** menu appears. The assignment **PIN to PIN** and **Wire pair** can be made that corresponds to the wiring version. This assignment is needed for identifying split pairs regarding crosstalk and good/bad information after testing. The scrollbar shows

Pin	to	Pin	Line pair
1		NC	none.

Select it by pressing SEL. You are then in the menu **Connection to pin 1**.

An option appears where you can select all 8 pins that can be assigned to pin 1. Press the ▲ and ▼ keys to select the right pin and press SEL.

Then you go to the menu **Pair**.

Now you can assign the selected pins to a pair by pressing SEL.

Then you go to the menu **Connections**.

The assignment of the first pin is displayed. Press the ▼ key to move the scrollbar to the next item and continue as before with the assignment.

The assignments cannot be deleted. If you make incorrect assignments while practicing, you can correct them. As an alternative, you can select the item **Device settings / Reset to defaults**. This resets all definitions that you have created.

12 Technical data

12.1 PROlinetest – Main Unit

Copper wiring test	<p>Test of the data line assignment with the pin and pair assignment</p> <p>16 predefined connection versions – easily create your own definitions as simple as single pair</p> <p>Clearly laid-out graphic display for quickly identifying errors</p> <p>Identification of split pairs (crosstalk) starting at 2 m with a graphic display</p> <p>Measure the individual wire lengths with TDR and display in m or ft.</p>
Power over Ethernet Test	<p>Activate PoE functions, measure voltage and determine power available according to IEEE 802.3af</p>
Cable trace	<p>Link-blink function with NLP</p> <p>Trace tone for tracing cables with capacitive probe</p> <p>Choose from four frequencies:</p> <ol style="list-style-type: none"> 1. SOLID: 1000 Hz 2. ALT: 1000/800 Hz 3. SOLID: 2600 Hz 4. ALT: 2600/1900 Hz
Overvoltage protection	<p>Up to 100 V</p>
Power supply	<p>4 x 1,5 V alkaline batteries provide a life greater than 40 hours or 4 x NiMH rechargeable batteries with an operational lifetime that depends on the capacity (neither is included)</p>
Operating temperature	<p>-5 to +50 °C</p>
Storage temperature	<p>-25 to +75°C</p>
Relative humidity	<p>90 % no condensation</p>
Housing	<p>Sturdy and impact resistant, weather resistant ABS housing</p>
Weight	<p>380 g without battery</p>
Dimensions (H x W x D):	<p>195 x 100/78 x 45 mm</p>

12.2 PROlinetest – Remote-Unit

Overvoltage protection	Up to 100 V
Performance features	ID programmable 01 - 32 LED for Pass / Fail display
Housing	Sturdy and impact resistant, weather resistant ABS housing
Weight	30 g
Dimensions (H x W x D):	61 x 41 x 26 mm

13 General information

The device was manufactured according to the following guidelines:

- 73/23/EEC
- DIN VDE 0800
- DIN EN 61010
- DIN EN 41003
- DIN IEC 60068-2-1, 60068-2-2, 60068-2-3, 60068-2-14, 60068-2-27, 60068-2-6-fc, 60068-2-78, 60068-2-29



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