

# Operating Manual isoplus\_HST Hand System Tester

## Important! Please read!

Any damage arising out of failure to follow the instructions will void the warranty. We accept no liability for any resulting consequential damage.

This manual must be studied carefully before using the equipment. Keep these instructions safe for future reference. Not only do they show you the correct operating procedure, but also help you make full use of all of the technical features of this product. Should your device require inspection or repair, our customer service department and our service workshops are at your disposal.

## Contents

- 1 Intended Use
- 2 Safety Instructions and Hazard Warnings
- 3 Product Description
- 4 Scope of delivery
- 5 Connection Instructions
- 6 Display and Controls
- 7 Operation, Start-Up and Functionality
- 8 Calculation of Pipe Length
- 9 Setting the Longitudinal Resistance, L-factor (only for NiCr systems)
- 10 Alarm Threshold / Alarm Signals
- 11 Technical Specifications
12. Care and Maintenance
13. Declarations

### 1. Intended Use.

HST is intended for use as a mobile leak-monitoring device for monitoring district heating pipework that is equipped with sensor leads using either the "Nordic Wire System" or the "Resistance Wire System." Use in any way other than that described above may damage the product. No modifications or changes may be made to the product. The safety instructions must be followed under all circumstances.

### 2. Safety Instructions and Hazard Warnings

The HST meets the requirements of Safety Class III. The device is designed for use in Measurement Category I (for measuring low-voltage circuits that are not directly connected to the mains).

#### **The HST must not be used in Measurement Categories II, III and IV!**

Do not switch on the device immediately after it has been brought into a warm area from a cold area. The resulting condensation may, under some circumstances, damage the device. Allow the device to reach room temperature, waiting until any condensation has evaporated.

Avoid subjecting the device to high mechanical stresses. Do not expose the device to high temperatures, strong vibration or high levels of humidity. If it is not clear how the device should be correctly connected, or should any questions arise that are not answered in this manual, please contact our technical support.

### **3. Product Description**

The HST is used to monitor leaks in district heating pipes that have been equipped with sensor leads using either the "Nordic Wire System" or the "Resistance Wire System." Low voltage is used to check the loop impedance and insulation resistance of a pipeline. The alarm threshold of the insulation resistance can be adjusted from 10K $\Omega$  to 39.9M $\Omega$ . When it drops below this alarm threshold, an acoustic signal is triggered. The alarm is also displayed on the LCD display.

The loop impedance covers the range 0 - 8000 $\Omega$ . A variety of length factors are available to calculate the length of the pipe.

### **4. Scope of Delivery.**

Monitoring device with test leads, 9V battery, user manual

### **5. Connection Instructions**

The test lead consists of a three core cable. The "yellow-green" core should be connected to the carrier pipe. The other two cores are connected to the sensor wires.

### **6. Display and controls.**

All current data is displayed on the LCD display. The display has 2 lines of 16 characters each. The HST is turned on using the button, and measurement starts automatically. The unit switches off automatically, 20 seconds after the final result has been displayed. Under the lid mounted on the side of the device you will find the battery compartment and the rotary selector control for setting the alarm threshold and the length factor.

### **7. Operation, Start-Up and Functionality**

Before taking the first measurement, the battery (supplied) must be fitted. The battery compartment can be found under the flap on the side. To open the flap, from the rear of the device, press on the the hinge of the lid with both thumbs. The flap can now be easily opened with your index fingers.

Initially, the HST displays the opening page

ISOPLUS HST V2.0  
measurement in progress

and starts measuring in the background. After a few seconds, the result of the loop impedance measurement appears.  
e.g.

R pipe	length	Length factor
374.	65m	5.7
Measurement running		
R insulation	Alarm th'hold	Status

and after a few seconds more, this is followed by the insulation resistance.

R pipe	length	Length factor
374.	65m	5.7
2954K	1000K	OK
R insulation	Alarm th'hold	Status

If the insulation resistance is greater than 4 MΩ, a longer measurement period is needed. The progress of the measurement is indicated by an increasing number of dots

R pipe	length	Length factor
7830.	1373m	5.7
>4M .....		
R insulation	Alarm th'hold	Status

The final result looks like this:

R pipe	length	Length factor
7830.	1373m	5.7
35.3M	1000K	OK
R insulation	Alarm th'hold	Status

### 8. Calculation of Pipe Length

The HST calculates the associated line length using the loop impedance (R-Ltg.). There are a total of 16 different L-factors available (see "Technical Data" list) that can be set using the rotary switch below the side flap.

Calculating the length is only possible when the pipe length is more than 10 metres, and with NiCr wire systems. When using the Cul position, irrespective of the loop impedance, the length is not calculated. This setting is mainly intended for measurements using the "Nordic System" sensor wires.

## 9. Setting the Longitudinal Resistance, L-factor (only for NiCr systems)

By default, the IPS-HST is set to an L-factor of 5.7 ohm/m.

This value can be set to 16 settings using the rotary selector switch on the side (under flap).

Setting for known pipe length and unknown longitudinal resistance:

1. Connect device to the monitoring system
2. Carry out measurement
3. After completion of the measurement and where the displayed is still active, turn the rotary selector switch to the correct length in metres. If necessary, repeat measurement.

Setting for known longitudinal resistance and unknown pipe length

1. Connect device to the monitoring system
2. Carry out measurement
3. After completion of the measurement and where the displayed is still active, turn the rotary selector switch to the correct L-factor. If necessary, repeat measurement.

The arrangement of the L-factor levels can be found on the device.

## 10. Alarm Threshold / Alarm Signals

The HST compares the measured insulation resistance with a preset alarm threshold. 16 different alarm thresholds are available in the range 10K $\Omega$  to 39.9 M $\Omega$  (rotary selector switch under the side flap). If the value falls below this threshold, this triggers an acoustic signal and the type of fault is shown in the display.

"**AI1**" indicates that the insulation resistance is too low.

"**AI2**" means that the loop impedance is above 8k $\Omega$ . The HST will interpret this value as a break in the wire.

### LOW BATT

The state of the battery is monitored during each measurement. When the battery capacity declines, the message "LOW BATT" appears in the display. However, it is still possible to make measurements as long as the HST starts the process. If on pressing the start button the HST responds with the opening page and the words LOW BATT, no further measurements can be made. The battery must be replaced immediately.

## 11. Technical Specifications

Battery voltage	9V / Size 6LR61
Current consumption	approximately 35 mA
Protection class III	
Measurement category I	
Alarm threshold value (insulation resistance) AL1	10K to 39.9, adjustable 10K, 50K, 100K, 300K, 500K 1M, 3M, 5M, 8M, 10M, 15M, 20M 25M, 30M, 35M, 39.9M
Alarm threshold value (loop impedance) AL2	>8K (fixed)

**Insulation measurement:**

Measuring range	10K to 4M, 1K resolution >4M to 40M resolution 10K/100K
Measurement voltage	max. 12V
Measurement current	max. 3µA
Accuracy	± 3% ± 1 digit

**Loop impedance measurement**

Measuring range	0 – 8K, resolution 1
Measurement voltage	max. 12V
Measurement current	max. 5mA
Accuracy	± 0.5% ± 1 digit
Operating temperature range	0 °C to +40°C
Storage temperature	-10°C bis +50°C
Relative humidity	max. 80% (bis +31°C), non-condensing
Temperature for guaranteed accuracy	20°C ± 8°C

**Important**

There may be changes to the specifications and design. No liability is accepted for misprints.

**12. Care and Maintenance**

The HST is maintenance free. Apart from the battery, it contains no parts that may be changed by the user. The outside of the HST should be cleaned with a soft, dry cloth or brush. Do not use abrasive cleaners or chemical solutions as this may damage the surfaces of the housing.

**13. Declarations**

This product complies with European directives 89/336/EEC and 73/23/EEC.

# EC-Declaration of Conformity

## In accordance with EC Directive

EMC Directive 2004/108/EG

### Name of Manufacturer:

**isoplus Fernwärmetechnik Vertriebsgesellschaft GmbH**  
**Aisingerstraße 12**  
**83026 Rosenheim**  
**Tel. +49(0)8031 650 0**

Hereby we explain that those corresponds to below designated products in this conception and design complies with the requirements of the Community directives mentioned. In case of change of the product not co-ordinated with us this explanation loses its validity.

### Description of the Electrical Equipment

Function: Monitoring System

Typ: IPS-HST

Reference to the harmonised standards:

- EN 61326-1:2006

A Technical Documentation ist entirely available.

The operation manual is available in the national language of the user.

GERMANY, Rosenheim 09.10.2013

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Signature