

**HUKX**

Sensor  
Technology

Brochure  
Thermal needle set  
**TNS02**

# TNS02

## Thermal needle set

for thermal conductivity/resistivity measurement

TNS02 efficiently and accurately performs on-site (field) as well as laboratory measurements of the thermal conductivity and thermal resistivity of soils. The system is a combination of our FTN02 and MTN02 systems. Measurement with TNS02 complies with ASTM D5334 and IEEE 442 standards. It is designed for optimal flexibility. TNS02 includes two different needles; one on a short insertion tool for use in the laboratory, the other mounted on a long lance for use on-site.

### Introduction

TNS02 is a combination of our [FTN02](#) and [MTN02](#) systems. It allows efficient and accurate measurement of thermal conductivity and resistivity of soils, both in the field and in laboratory environments. The control and readout unit, CRU02, is shared between the two (on-site and laboratory) needle models.

### Standards

Applicable standards are IEEE Guide for Soil Thermal Resistivity Measurements (IEEE Standard 442-1981(03)) and ASTM D5334-14 Standard Test Method for Determination of Thermal Conductivity of Soil and Soft Rock.

Figure 1 TNS02 thermal needles set.



## Suggested use

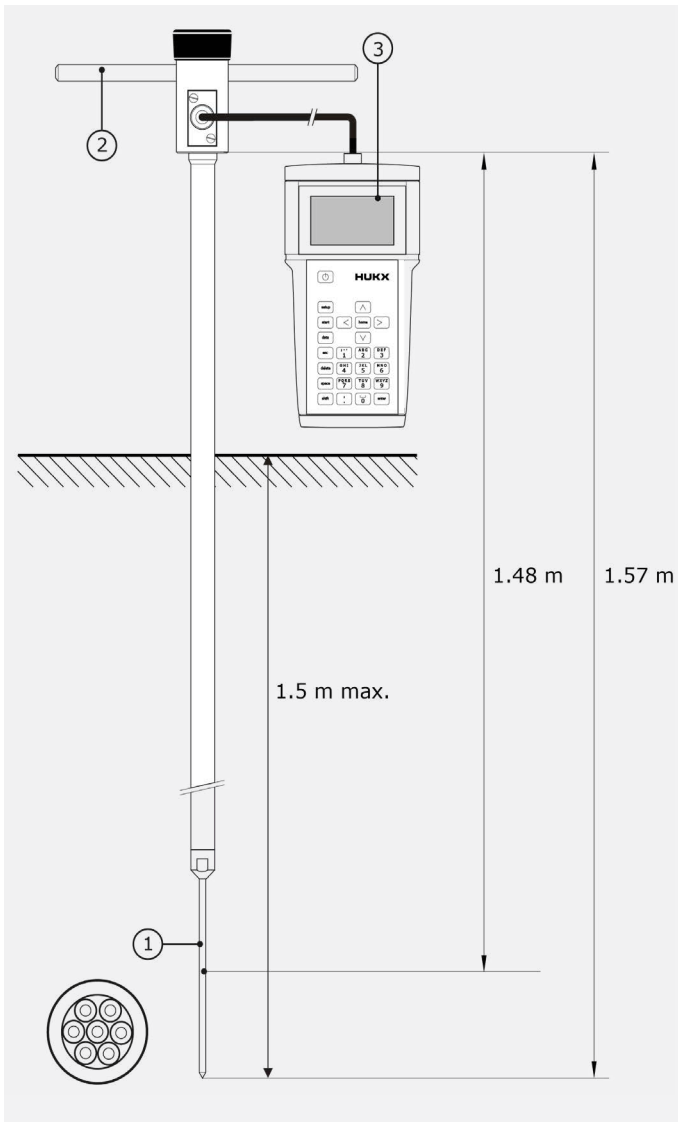
- route surveys, on-site (field) measurements
- laboratory analysis of soil specimens



**Figure 3** TNS02: Thermal needle TP07 with insertion tool IT03 for laboratory analysis of soil specimens. TP09 and lance LN02 are used for on-site measurements.



**Figure 4** TNS02: CRU02 allows users to control the measurement using the keyboard and LCD display. Results are stored in CRU02's memory.



**Figure 2** TNS02 system in operation, combining the use of MTN02 for laboratory soil analysis (top drawing) and that of FTN02 in the field (bottom drawing).

**Table 1** Component summary for all system types that Hukx offers.

| system type | thermal needle | transport case | insertion tool |
|-------------|----------------|----------------|----------------|
| FTN02       | TP09           | TC01           | LN02           |
| MTN02       | TP07           | TC02           | IT03           |
| TNS02       | TP09 + TP07    | TC01           | LN02 + IT03    |



Figure 5 GT03: guiding tubes for use with TNS02



Figure 6 A calibration reference cylinder type CRC05 for needle calibration. The CRC05 is not included in the standard TNS02. For TNS02 two cylinders are required: CRC04 and CRC05.

## See also

Hukseflux is specialized in thermal needle design.

Alternative models are available at Hukseflux.

Please consult the brochures of complementary systems [MTN02](#) and [FTN02](#). We also provide separate solutions for measurements of sediment core samples and off-shore measurement at large depths (down to 3000 m). For insertion of TP07 in hard soils and for analysis of cements: guiding tubes of type [GT series](#).

For calibration there is the choice between calibration using glycerol or using calibration reference cylinders: for needles TP07 and TP09 calibration reference cylinders [CRC series](#) are available.

## Ordering

Please consult the product manuals. Send us an e-mail to get the latest versions.

Standard configuration is TNS02 (including LN02, IT03 and CRU02) + two TP07 + two TP09. (one spare needle of each type). TNS02 is delivered with its accessories in a practical transport case. [Product training is available upon request.](#)

## TNS02 specifications

### General specifications

measurands

- thermal conductivity
- thermal resistivity
- temperature

measurement range

0.1 to 6 W/(m·K)  
(all common soils)

rated operating  
temperature range

0 to + 50 °C

measurement method

absolute  
measurement per  
ASTM D5334-14 and  
IEEE 442-1981 (03)

further specifications

see [FTN02](#) and [MTN02](#)

## About Hukx

Hukx is the leading innovator in solar radiation and heat flux sensor technology. We are proud to set the standard in high-accuracy measurement, and to be working at the heart of the energy transition.

Customers worldwide rely on our bestselling pyranometers and heat flux sensors. From sensor design and selection to supply and recalibration, we support you across the entire lifecycle.

Hukx is headquartered in the Netherlands, with locally owned representative sales offices in the USA, Brazil, India, China, Southeast Asia, and Japan.

Let us help you select the best sensor for your application. Get in touch with our experts today via: [info@hukx.com](mailto:info@hukx.com)

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