



Electronic measuring device

SPIDER

for wheel diameter

The SPIDER is an electronic device designed to measure rise values and to make subsequent calculations of wheel diameters of railway and tram vehicles. It can be used for wheel checking for operational wear (wheel diameter) or wheel testing before re-profiling.



MEASURING PRINCIPLE

The wheel diameter is determined indirectly, by calculations based on the rise measured on a three-point symmetrical chord 300 mm in length. The rise results from a contact measurement at a distance of 70 mm (for railway vehicles), or 45 mm (for tram vehicles) away from the internal surface of the wheel rim.

The calculated values of the radius are shown on the LCD display of the MITUTOYO absolute digital sensor. The sensor is able to remember the zero setting calibration, even after it has been turned off.

SPIDER DESIGN

The meter consists of a base plate with the bearing-fitted arms at its ends, making the two end points of the symmetric chord. A MITUTOYO sensor is at the midpoint of the chord. Precise meter positioning on the wheel rim inner surface is assured by a three arms with their ground, hardened contact points. The bearing chord end points are fitted so that the measuring device could be slightly moved along the wheel being measured. A rise amount is then measured in more points to eliminate any local extremes.

A sensor tip is spring-mounted, held in transport position by a turn able stop. The sensor is fitted so that it could be turned 180°. Due to this arrangement the wheel can be measured from its inner and outer side. With its sensor turned, the meter must be re-calibrated on a calibrating stand (supplied complete with the meter). The calibration is done by mounting the meter on a calibration stand and zero value recording with the ORIGIN button.



MEASUREMENT RANGES AND ACCURACY

Rise measurement range is given by the sensor dynamic range being 0 - 50 mm and measurement is accurate within 0,003 mm. The corresponding wheel diameter calculation accuracy is 0,2 mm. Accuracy of the calibration stand and precise calibration gauges (0,001 mm – 0,002 mm) is subject to reviews by the Czech Metrological Institute.

Range of assessed wheel diameters (d):

- The minimum wheel diameter: $d_{\min(20)} = 500$ mm
- The maximum wheel diameter: $d_{\max(10)} = 2250$ mm

THE BASIC TECHNICAL DATA:

Mass: approx. 1,3 kg (measuring device)
approx. 3,1 kg (complete transport suitcase with all parts)

Dimensions of the device: 322 mm x 225 mm x 115 mm

Digital indicator:

Working temperature: 0°C ÷ 40°C
Dynamic range: 50,0 mm
Measurement precision: 0,003 mm
Battery life: 3000 hours



Commercial railway research

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