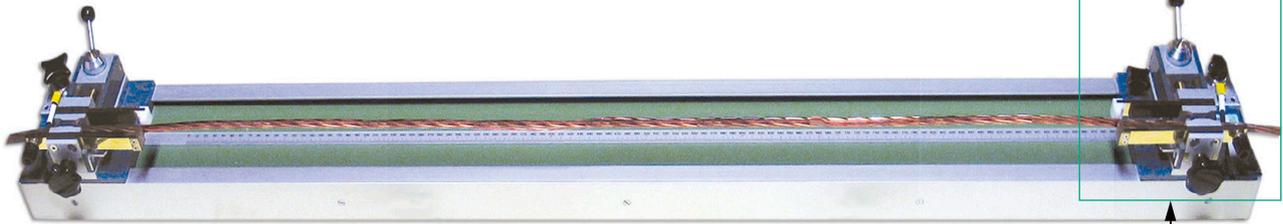


# Clamping Device

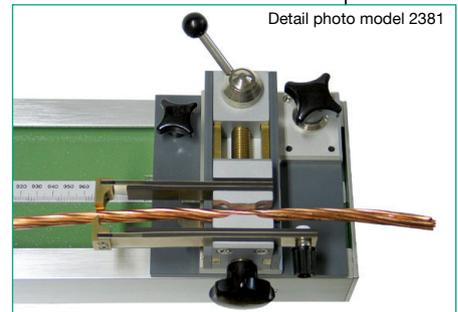
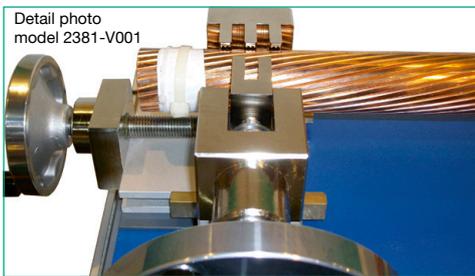
**Model 2381**  
**Model 2381-V001**  
**Model 2382 L**

Code: 2381 EN  
 Delivery: ex stock/8 weeks  
 Warranty: 24 months

**2381 EN**



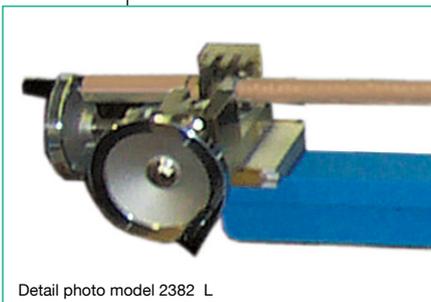
Model 2381



Model 2381-V001



Model 2382 L



Detail photo model 2382 L

During the manufacture of wires, rails, cables and sector conductors, the electrical conductivity respectively the resistance must be checked for compliance with specified values.

In conjunction with a digital ohmmeter of burster's RESISTOMAT® series, the clamping devices are used in the cable industry for production monitoring and quality assurance.

As most of the materials used have a very high temperature coefficient, e.g. copper 3.93 ‰/K, aluminium 4.03 ‰/K, a precise recording of the test unit's temperature during measurement is of particular importance.

Needless to say, the clamping devices described are equipped with 4-conductor technology, thus eliminating lead and contact resistances.

## Clamping Device Model 2381

With the help of clamping device model 2381 and a milliohm- or microohmmeter of burster's RESISTOMAT® series, the ohmic resistances of test cables and material samples in the shape of cords or strips can be measured. Fields of application include production monitoring, quality assurance and general test measurements.

Model 2381 consists of a robust, warp-resistant, light-metal rail with one movable and one rigid clamping device. It allows the measurement of samples 50 to 1000 mm long. The clamping device is designed to accommodate cable cross-sections of 0.1 mm<sup>2</sup> to approx. 100 mm<sup>2</sup>. For larger cross-sections, the distances between current feed and potential tap must be increased in order to ensure a uniform current distribution.

Adaptation to the diameter of the test unit is carried out through a coarse adjustment of the clamping jaws. The quick-action clamping device allows the test unit to be clamped rapidly and securely in one single movement.

### Optional Features

The clamping device can always be supplemented with the guide rail model 2388 shown in the illustration. This rail offers major advantages. It serves as a support and guidance for the test samples. In addition, it offers protection against draughts, thus preventing rapid changes in the temperature of the test objects. These advantages are particularly noticeable in the case of small cross-sections which, due to their low heat capacity, react to the slightest draught. Although thin test units sag only minimally even without a guide rail, the increase in length due to this sag is often significant enough to cause errors in the measurement results.

A sensor block is integrated into the guide rail. With the help of the temperature sensors model 2392 resp. 2391, the temperature of the guide rail resp. the sample material can be recorded and compensated appropriately by the measurement device.

### Technical Data

Adjustable clamp support: measurement length of up to 1000 mm  
 Test unit cross-sections: ranging from 0.1 mm<sup>2</sup> to approx. 100 mm<sup>2</sup>  
 Current connections: designed for 100 A  
 Potential tap:  
     routed to 4 mm standard device terminals via material with low thermoelectric power  
 Dimensions (height x width x depth): 1300 x 120 x 150 [mm]  
 Weight: approx. 8.5 kg

### Order Information

Clamping device	<b>Model 2381</b>
Guide rail	<b>Model 2388</b>
1 set interchangeable contacts for the potential tap	<b>Model 2390</b>
Connection cable for RESISTOMAT® models 2304, 2320, 2323, 2316-V000X with 4 banana plugs, 2 m length	<b>Model 2381-K003</b>
Connection cable for RESISTOMAT® models 2329, 2316-V000X with 5 pin bayonet plug, 2 m length	<b>Model 2381-K006</b>

## Clamping Device Model 2381-V001

The clamping device model 2381-V001 is designed for cross-sections of 1 ...1500 mm<sup>2</sup>. The measurement length is 1000 mm. A uniform current distribution is ensured by the distance between current and voltage tap. The clamp support is laterally adjustable by means of a spindle so that the immersed test unit can be stretched. This is particularly advantageous in the case of large cross-sections.

### Technical Data

Measurement length: 1000 mm  
 Clamping device:  
     designed for cross-sections of 1 ... 1500 mm<sup>2</sup> (max. 44 mm<sup>0</sup>)  
     option 2500 mm<sup>2</sup> (max. 57 mm<sup>0</sup>)  
 Distance between voltage tap and current feed: 420 mm  
 Connection cable: 2 m length with 4 banana plugs  
 Dimensions (H x W x D): approx. 190 x 2160 x 350 [mm]  
 Weight: approx. 25 kg

### Order Information

Clamping device **Model 2381-V001**

## Clamping Device Mode 2382 L

The clamping device model 2382 L can be used to check during production or in the test bay the electrical conductivity respectively resistance of wires, rails cables or sector conductors for power cables. The measurement length is 1000 mm. The clamping device is designed for cross-sections of 1 ... 1500 mm<sup>2</sup>.

Detailed investigations and long experience have shown that particularly in the case of larger cross-sections, precise temperature measurement is only possible in a liquid medium.

Model 2382 L is equipped with a water bath which temperature is controlled with an integrated thermostat.

The integrated circulation pump ensures a uniform temperature distribution in the water bath. The specimen's measurement length of 1000 mm is immersed entirely in a liquid medium (water). The digital ohmmeters of our RESISTOMAT® series correct the measurement value display automatically to the VDE value at 20 °C.

A uniform current distribution has been ensured on fitting quick-action vices outside the bath. The clamp support is laterally adjustable by means of a spindle so that the immersed test unit can be stretched. This is particularly advantageous in the case of large cross-sections.

### Technical Data

Measurement length: 1000 mm  
     in a temperature-controlled water bath  
 Clamping device:  
     designed for cross-sections of 1 ... 1500 mm<sup>2</sup> (max. 44 mm<sup>0</sup>)  
     option 2500 mm<sup>2</sup> (max. 57 mm<sup>0</sup>)

Constant water temperature ensured by a two-position controller and an integrated circulation pump  
 Precise temperature measurement with an integrated sensor

Operating range: 25 °C ... 60 °C, tolerance ± 0.5 °C  
     The distance between the potential tap and the current feed is 420 mm. This ensures an adequate current distribution even in the case of large cross-sections.

Current connections: designed for 100 A  
 Output of the integrated heating filaments: 2 kW  
 Voltage supply: 230 V, + 6 % -10%  
 Mains frequency: 50/60 Hz  
 Power consumption: approx. 2.2 kVA  
 Device protection: EN 61010  
 Weight (without water): approx. 85 kg  
 Dimensions (H x W x D): 0.3 x 2.10 x 0.5 [m]  
     without wire holder 0.3 x 1.33 x 0.5 [m]

### Order Information

Clamping device **Model 2382 L**

## Clamping Device Model 2382 A

This clamping device can be directly integrated in the stranding machine. A good fixation of the wire is therefore assured. So the clamp jaws, as included in the 2382 L, are not necessary.

### Technical Data

See model 2382 L, but without clamp jaws. The measurement current connection happens directly by the stranding equipment.

### Order Information

Clamping device **Model 2382 A**

## Application

### Control and Quality Inspection of Power Cables or Singular Wires during Production by means of a RESISTOMAT® 2304 and Clamping Device 2382 A

#### Application

The optimal quality control for production of singular wires and power cables is done with a test directly in the stranding machine. The components RESISTOMAT® 2304, clamping device 2382 A and a lifting table make a measurement of a sample length possible during production, however only with a temporary stop of the stranding machine.

The machine guide has the option to adjust the compressor according to the measurement result in order to optimize the cable diameter.

Due to the integration of the measurement system straight in the stranding machine the production process is supervised and therefore fulfils the requirements of ISO 9002. The single measurement values can be registered on a PC or by printout on a printer.

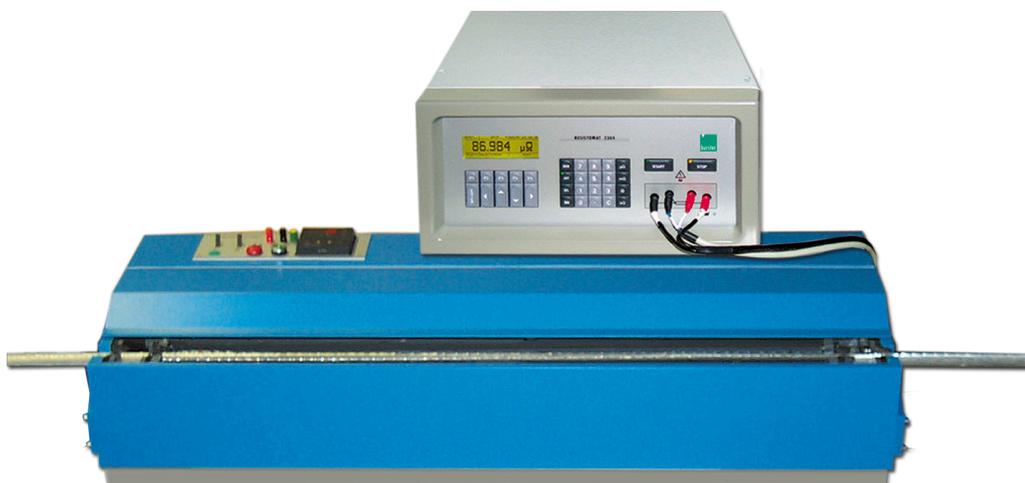
The ISO 9002 - verification level production - ranges of course on a considerably higher level in relation to the ISO 9003 - verification level end product - where the testing is effected on meter probes after the production of the batch (with RESISTOMAT® 2304 and clamping device 2382L).

#### Description

Before a measurement can be done, the twisting machine must stop and the lifting platform carrying the measurement basin rises to make contact with the specimen. The exact altitude positioning is effected by limit switches on the lifting platform. The contact to the cable happens with spring-mounted potential taps at a distance of 1000 mm. During the whole measurement the cable stays inside a temperature-controlled water bath.

A circulation pump ensures a uniform temperature distribution within the water bath and re-circulates the water flowing out through the bulkheads.

The water bath is heated and maintained by a thermostat at a temperature as close as possible to that of the test object. This cares for a very short temperature equalizing time of the test object and thus for a fast and very accurate measurement value. The determination of the water temperature is effected with an accurate Pt 100 sensor. The water temperature is necessary for the temperature compensation in the RESISTOMAT® which calculates the so-called VDE value at 20 °C.



#### Calibration of the Measuring System

Our series 1240 calibration resistors are designed for calibrating and testing the resistance measurement device. Each resistor is delivered with a works test certificate. Technical details are provided by data sheet 1240 EN.

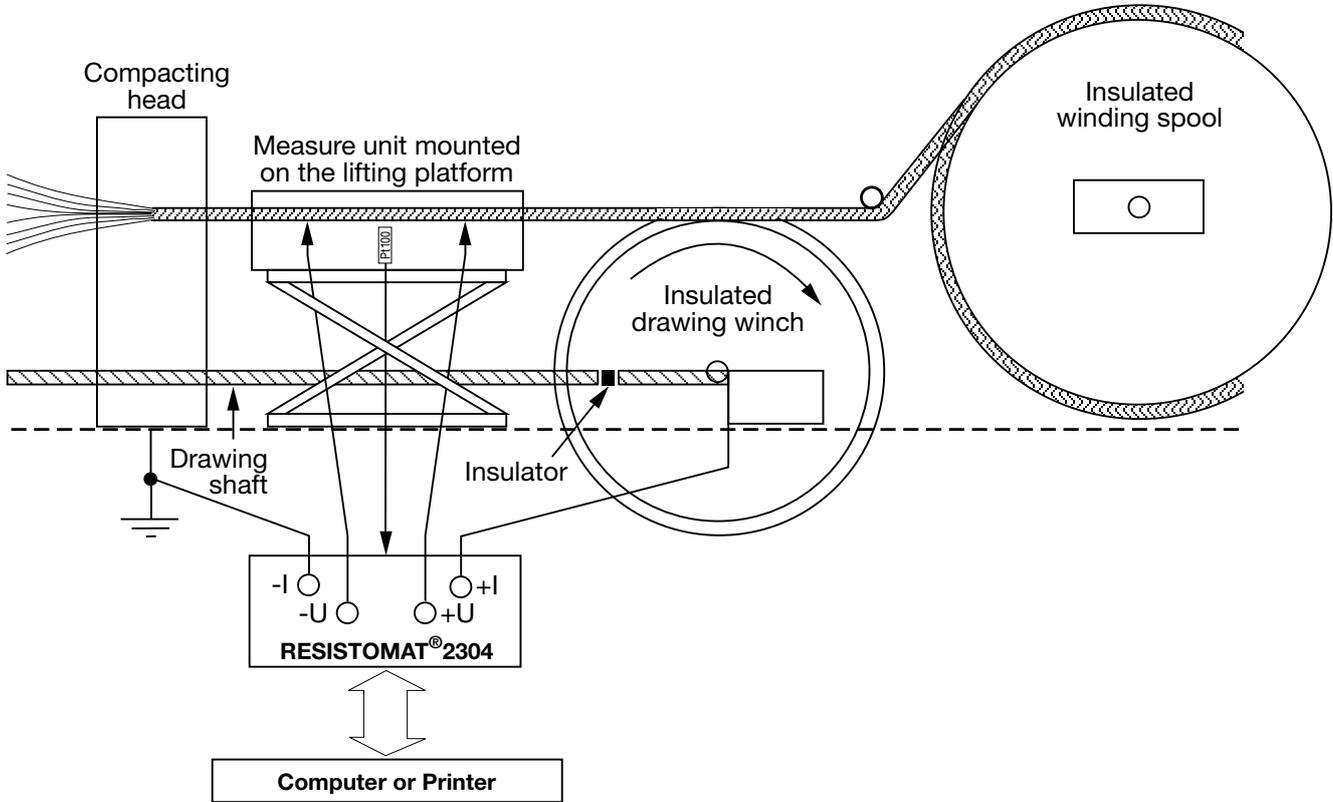
On request, the resistor can be delivered also with a DKD/DAkS Calibration Certificate. This certificate documents compliance with national standards for displaying physical units in agreement with the international SI system.

As the temperature of the conducting cable directly influences the measurement result, the temperature of the water bath measured and displayed by the RESISTOMAT® 2304 must also be checked. A calibrated thermometer with DKD/DAkS Calibration Certificate can be used for this purpose.

### Structure

No special terminals are required for routing the measurement current through the conducting cable. The current is routed directly through the cable via the compacting head at one end and the drawing winch at the other. The lifting platform with the measurement basin is assembled between these two machine components. Of course, one prerequisite must be fulfilled for measurements to proceed correctly:

The drawing winch as well as the cable guides and winding units following it must not be electrically linked with the remaining machine components on the side of the compacting head, or the resistance of the electrical link must be high enough to render it insignificant as a shunt to the cable section which is to be measured. In other words, this resistance should be about 1000 times larger than the line resistance between the compacting head and drawing winch.



The RESISTOMAT® 2304 has not necessarily to be mounted directly at the clamping device 2382 A. The instrument can also be placed at the general control elements of the machine.

### Clamping device model 2382 A with lifting platform and hand control unit

