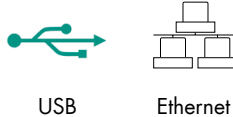


## RESISTOMAT® for high-speed resistance measurement in automation

### MODEL 2311 NEW

Preliminary data sheet



Rear view of device with connections

#### Highlights

- Measuring ranges of 20 mΩ ... to 200 kΩ
- Resolution up to 1 μΩ
- Measurement accuracy 0.03 % of reading
- High-speed measurements from 10 ms/measurement, including evaluation
- Temperature compensation for all materials
- Thermoelectric voltage compensation
- Input protection up to 400 V<sub>eff</sub>
- 32 adjustable measuring programs
- Dry circuit measurement in accordance with DIN IEC 512

#### Options

- Flexible fieldbus integration with EtherCAT, PROFINET or EtherNet/IP
- Installation variant without display

#### Areas of application

- Resistance measurement of fuses or heating wire coils
- Resistance determination of solenoid coils
- Plug contacts and mechanical switches
- Determination of transitional resistances

#### Product description

The RESISTOMAT® model 2311 has been designed and optimized for high-speed applications in automation systems. Up to 100 measurements per second can be achieved. It works on the basis of the well-tried four-wire measurement method in which test-lead resistances and contact resistances are eliminated. The instrument leads are monitored for damage by a built-in open circuit detector.

A 2-way and 4-way comparator with switching outputs is available for classifications and selections. Of course, temperature compensation is available for any test object material. Specific temperature coefficients can be entered. Temperature recording takes place using a PT100 sensor or a temperature transmitter (pyrometer) with an analog output.

A special circuit for protecting the measurement input when measuring inductive test objects has been developed to prevent damage to the meter from voltage peaks produced when the test object is disconnected.

A special area of application is the measuring of contact resistances (dry circuit measurement), since the load voltage is limited to 20 mV in order to avoid so-called "fritting" (DIN IEC 512).

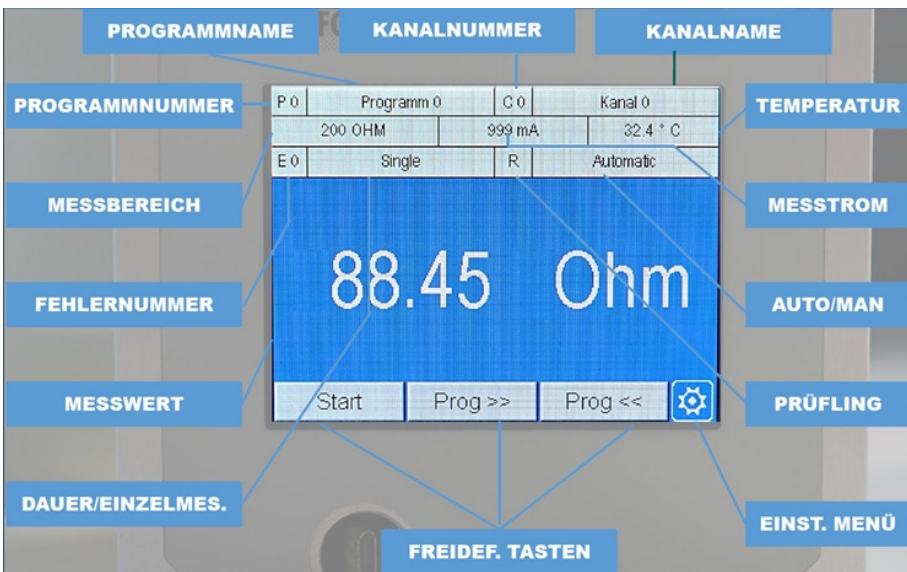
All device settings can be individually stored in up to 32 measuring programs. Of course, all device settings can also be made via the Ethernet, USB (default) or fieldbus interfaces (optional). Up to 900 measurements per measuring program can be stored using the integrated data logger.

## Technical data

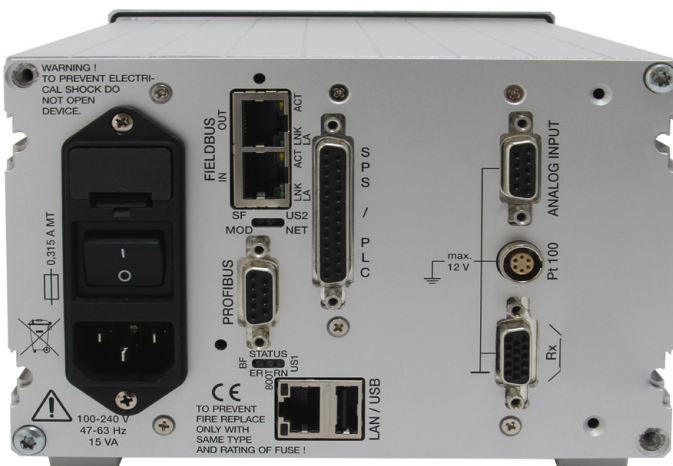
Measuring parameters									
Measuring range from 0 ...		20.000 mΩ	200.00 mΩ	2.0000 Ω	20.000 Ω	200.00 Ω	2.0000 kΩ	20.000 kΩ	200.00 kΩ
Resolution		1 μΩ	10 μΩ	100 μΩ	1 mΩ	10 mΩ	100 mΩ	1 Ω	10 Ω
Large/small measuring current		1 A/ 1 A	100 mA/ 1 A	10 mA/ 100 mA	10 mA/ 100 mA	1 mA/ 10 mA	1 mA/ 1 mA	100 μA/ 100 μA	10 μA/ 10 μA
Measuring error (with temperature compensation disabled)		0.03 % of reading ±2 digits							
Measurement modes		R, Z, cooling curve, min/max							
Measurement recording		Internal data logger, USB stick, interfaces							
Temperature measurement (PT100)									
Measuring range		0 ... 100 °C							
Resolution		0.1 °C							
Measuring error		0.1 °C							
Temperature recording		via external PT100 sensor							
Temperature compensation		10 different temperature coefficients can be selected and individually set							
Temperature measurement (pyrometer)									
Measuring range		0 ... 100 °C							
Resolution		0.1 °C							
Measuring error		± 1 % FS							
Temperature recording		via external transmitter							
Input signal		0 ... 10 V, 0 ... 20 mA, 4 ... 20 mA							
Temperature compensation		10 different temperature coefficients can be selected and individually set							
Housing									
Material		Aluminum							
Size		110 x 110 x 183 (W x H x D / mm)							
Weight		Approx. 1.5 kg							
Protection type		IP40							
Connections		PROFINET, fieldbus, PLC I/O, analog input, PT100, measuring input, Ethernet/USB							
Panel-mount unit		for mounting rail installation (mounting rail in accordance with DIN EN 50022)							
Ambient conditions									
Operating temperature		+5 ... +23 ... +40 °C							
Storage temperature range		-10 °C ... +60 °C							
General data									
Supply voltage		100 ... 240 VAC ±10 %, 50 ... 60 Hz ±10 %							
Power consumption		< 15 VA							
Communication		USB, Ethernet (default)							
Fieldbus interfaces									
EtherCAT									
Connection		2 x RJ45, 10/100 Mbit/s							
Communication		<p><b>PDO – Process Data Objects</b></p> <p>Transmission of PLC data such as measurement results or the current program number from the device to an EtherCAT controller and actuation of the device, e.g. channel selection or measurement start/stop by an Ethernet controller.</p> <p><b>SDO – Service Data Objects</b></p> <p>Device configuration, e.g. setting of comparator limits or modification of the assignment of PLC inputs and outputs.</p>							

PROFINET	
Connection	2 x RJ45, 10/100 Mbit/s
Communication	RT communication <b>Cyclic data transmission (process data)</b> Transmission of PLC data such as measurement results or the current program number from the device to an EtherCAT controller and actuation of the device, e.g. channel selection or measurement start/stop by an Ethernet controller. <b>Acyclic data transmission (configuration data)</b> Device configuration, e.g. setting of comparator limits or modification of the assignment of PLC inputs and outputs.
Ethernet/IP	
Connection	2 x RJ45, 10/100 Mbit/s
Communication	<b>Cyclic data transmission (implicit messaging)</b> Transmission of PLC data such as measurement results or the current program number from the device to an EtherCAT controller and actuation of the device, e.g. channel selection or measurement start/stop by an Ethernet controller. <b>Acyclic data transmission (explicit messaging)</b> Device configuration, e.g. setting of comparator limits or modification of the assignment of PLC inputs and outputs.

### Display measuring mode



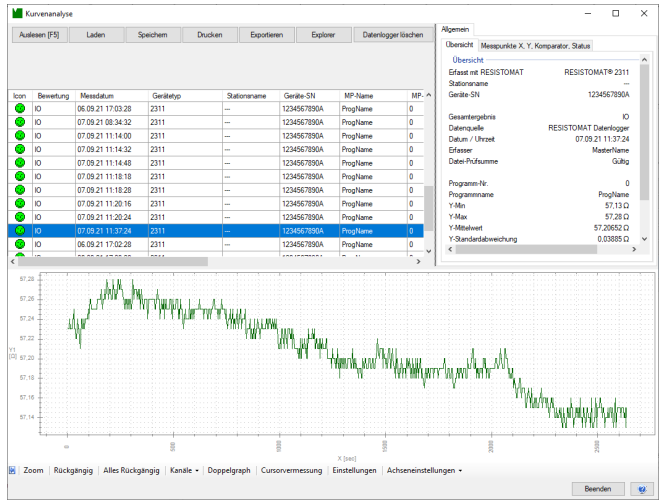
### Rear view with connections



## DigiControl PC software

The full version of the DigiControl software contains the following features for the RESISTOMAT® model 2311:

- Convenient parameterization of the 32 measurement programs
- Copy programs
- Backup of device settings (download)
- Print device settings
- Command line for service purposes
- Measurement polling (data logging) triggerable under time control and externally via the device
- Measurement export/storage in a BIFF Excel file
- Printout of a measurement report with flexible design options
- Readout, display and storage of the cooling curve in a BIFF Excel file and triggering of external calculation of an extrapolation by an Excel macro
- Manual calibration of the RESISTOMAT® 2311
- Calibration via product database handover date



## Accessories

Order code	
2392-V001	PT100 temperature sensor with 2.5 m shielded connecting cable and connector
2328-Z001	Pyrometer for temperature range of 0 ... 100 °C
2311-P001	DigiControl PC software
9900-V160	25-pin connector for digital I/O interface
9900-V209	9-pin connector for analog I/O interface
2311-Z001	Fixing kit for front-panel mounting

## Calibration

Calibration certificates	
23WKS-2311	Standard factory calibration certificate (WKS)
23DKD-2311	Calibration certificate with accreditation symbol (DAkks)



**DAkks**  
Deutsche  
Akkreditierungsstelle  
D-K-15141-01-00

burster calibration services according to the accredited scope of services

## Generate order code

						Standard			
						0	0	0	0
<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>V</b>		<b>0</b>	<b>0</b>	
<b>Housing variant</b>									
■ Desktop device with display 85 ... 240 V/AC						0			
■ Desktop device with display 24 V/DC						1			
■ Panel-mount unit without display 24 V/DC						2			
<b>Fieldbuses</b>									
■ None									0
■ EtherCAT									1
■ PROFINET									3
■ Ethernet/IP									4