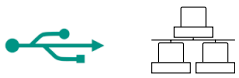
RESISTOMAT® for high-speed resistance measurement in automation

MODEL 2311 NEW

Preliminary data sheet



USB Ethernet

EtherNet/IP PROFINET EtherCAT

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_{eff}
- 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

Rear view of device with connections

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.

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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	**PDO – Process Data Objects** 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. **SDO – Service Data Objects** Device configuration, e.g. setting of comparator limits or modification of the assignment of PLC inputs and outputs.							

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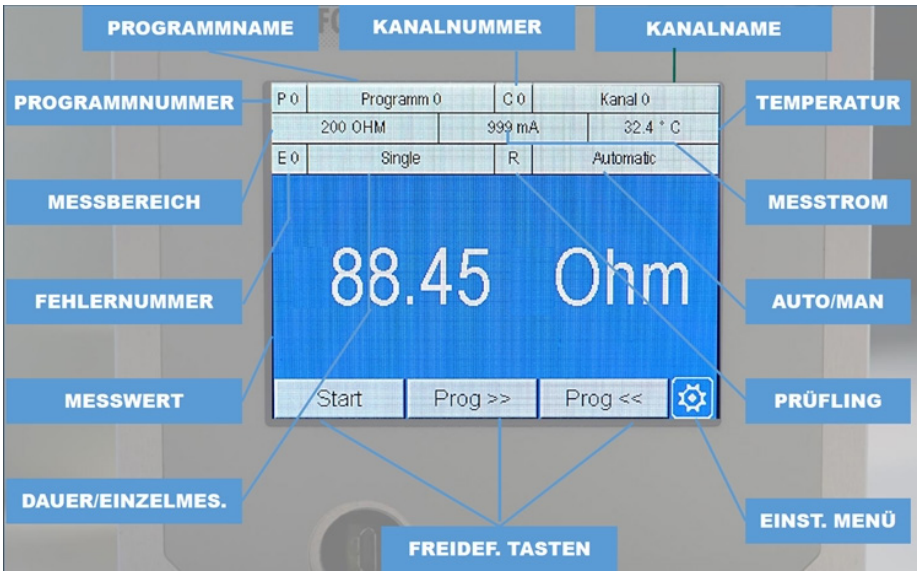
PROFINET		
Connection		2 x RJ45, 10/100 Mbit/s
Communication		RT communication **Cyclic data transmission (process data)** Transmission of PLC data such as measurement results or the current program number from the device to an EtherCAT controller and actuation of the device, e.g. channel selection or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

Display measuring mode

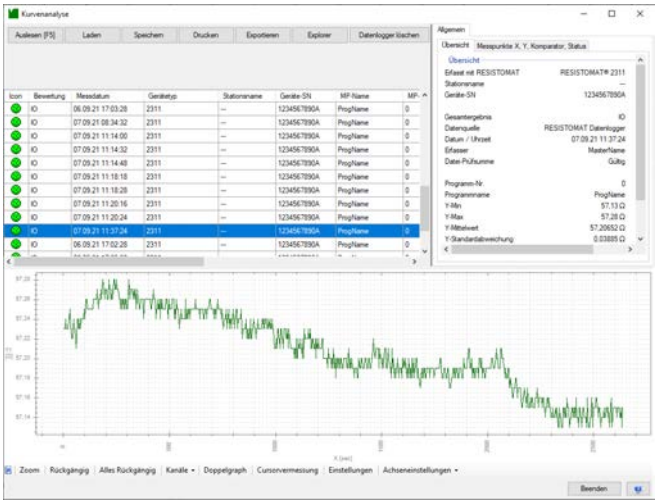


Rear view with connections

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

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Generate order code

						Standard			
						0	0	0	0
2	**3**	**1**	**1**	**–**	**V**		**0**	**0**	

Housing variant	
■ 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

Fieldbuses	
■ None	0
■ EtherCAT	1
■ PROFINET	3
■ Ethernet/IP	4