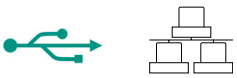
Delivery: 3 weeks | Warranty: 24 months

RESISTOMAT® for high-speed resistance measurement in automation

MODEL 2311 NEW

Preliminary data sheet



USB Ethernet

EtherNet/IP PROFINET EtherCAT

Front side control cabinet module

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
- 32 adjustable measuring programs
- Dry circuit measurement following DIN IEC 512

Options

- Flexible fieldbus integration with EtherCAT, PROFINET or EtherNet/IP
- 24 V/DC control cabinet module without display
- 24 V/DC desktop device with 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	100 µA/ 1 mA	100 µA/ 100 µA	10-100 µA/ 10-100 µA
Measuring error (with temperature compensation disabled)	0.03 % of reading ±2 digits							
Measurement modes	R, Z, cooling curve							
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	±0.1 °C							
Temperature recording	via external transmitter							
Input signal	0 … 10 V							
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	Desktop/panel version V0xxx: IP30 / IP65 panel mounted Cabinet mounted version V2xxx: IP20							
Connections	Fieldbus, PLC I/O, analog input, PT100, measuring input, Ethernet/USB							
Control cabinet module	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	**Desktop device V0xxx:** 100 … 240 V/AC ±10 %, 50 … 60 Hz ±10 % **24 V/DC variants V1xxx & V2xxx:** 20 … 30 V/DC (nominal value 24 V/DC)							
Power consumption	32 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 values or the current program number from the device to an EtherCAT controller and actuation of the device, e.g. program 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.							

* F.S. = from full scale value

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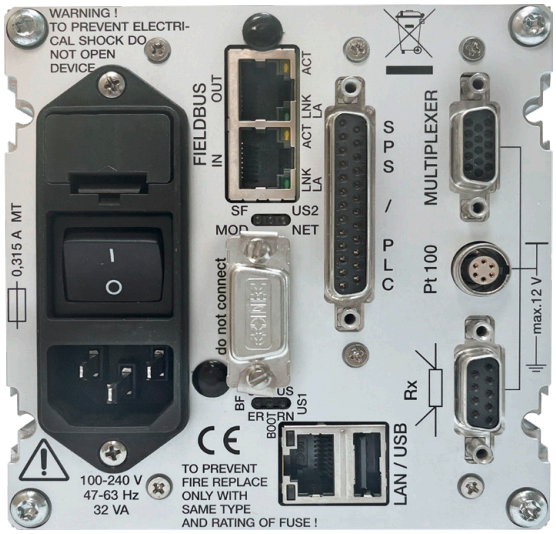
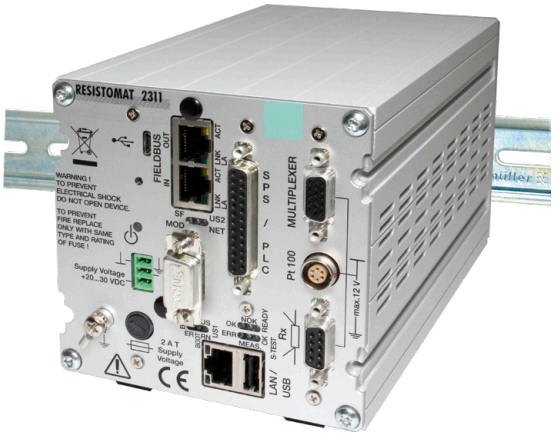
PROFINET		
Connection		2 x RJ45, 10/100 Mbit/s
Communication		RT communication **Cyclic data transmission (process data)** Transmission of PLC data such as evaluation results or the current program number from the device to an PROFINET controller and actuation of the device, e.g. program selection or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

Display measuring mode

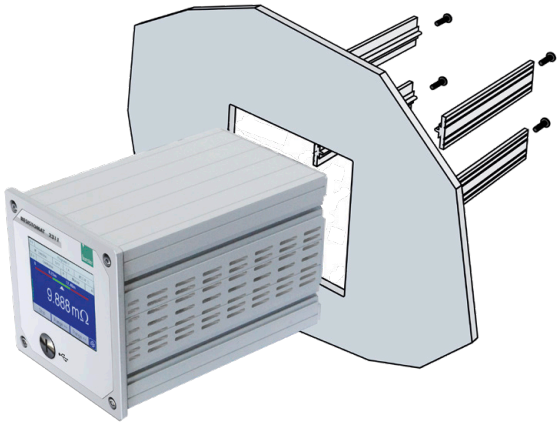
Rear view with connections



Control cabinet module with mounting rail



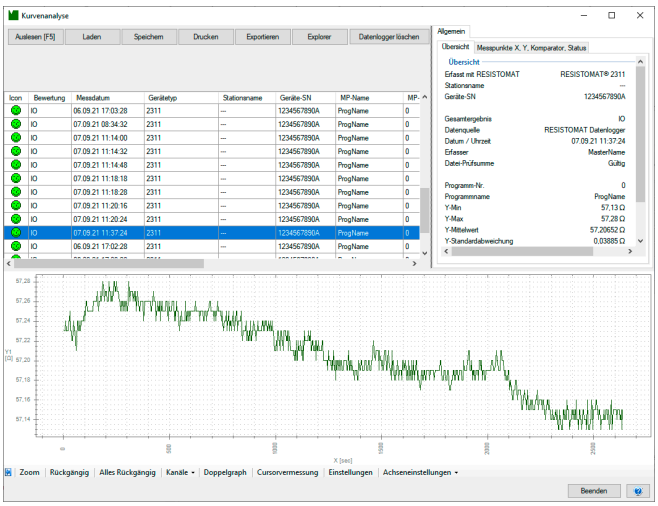
Panel mounting



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 export/storage in a Excel file
- Manual calibration of the RESISTOMAT® 2311
- Measurement polling (data logging) triggerable under time control and externally via the device
- Printout of a measurement report with flexible design options
- Readout, display and storage of the cooling curve in a Excel file and triggering of external calculation of an extrapolation by an Excel macro



Accessories

Order code		
99209-111A-0280015		Measuring cable, 6-pin, 1.5 m length, shielded cable, with 9-pin D-SUB connector and 4 mm male tuft connector
2392-V001		PT100 temperature sensor with 2.5 m shielded connecting cable and connector
2328-Z001		Pyrometer for temperature range of 0 … 100 °C
9900-V160		25-pin connector for digital I/O interface
9900-V209		9-pin connector for analog I/O interface
9310-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

4528-002311EN-5699-031527

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
■ Control cabinet module without display 24 V/DC	2

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