burster

RESISTOMAT® for high-speed resistance measurement in automation

MODEL **2311** NEW

Preliminary data sheet
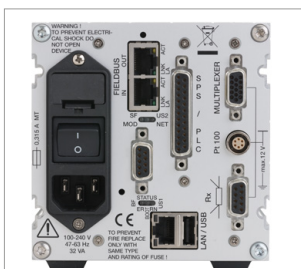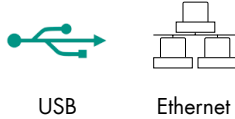
Highlights

- 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 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

USB   Ethernet

EtherNet/IP   PROFI NET®   EtherCAT®

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.
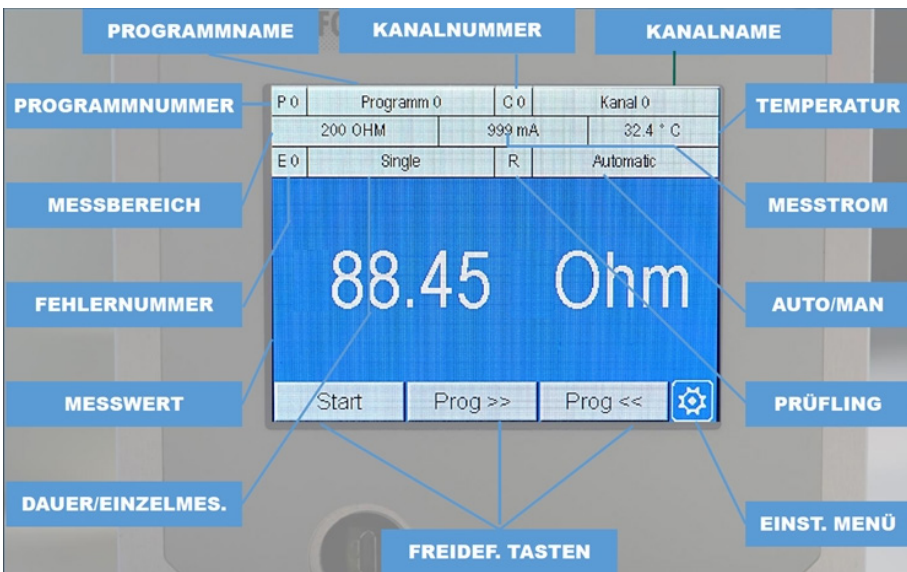
Rear view of device with connections

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, 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 % F.S.*
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	IP40
Connections	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	32 VA
Communication	USB, Ethernet (default)

| Fieldbus interfaces	
EtherCAT in preparation – not available yet	
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.

* F.S. = from full scale value

| 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
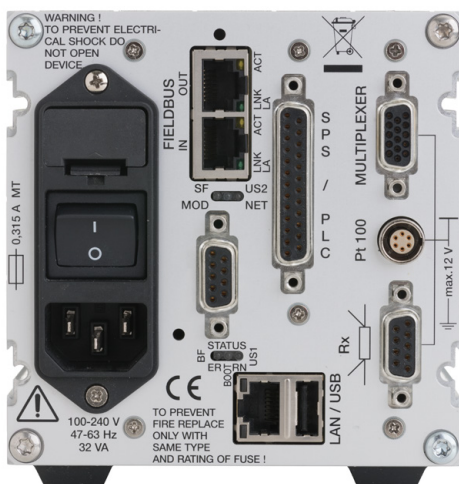
DigiControl PC software

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
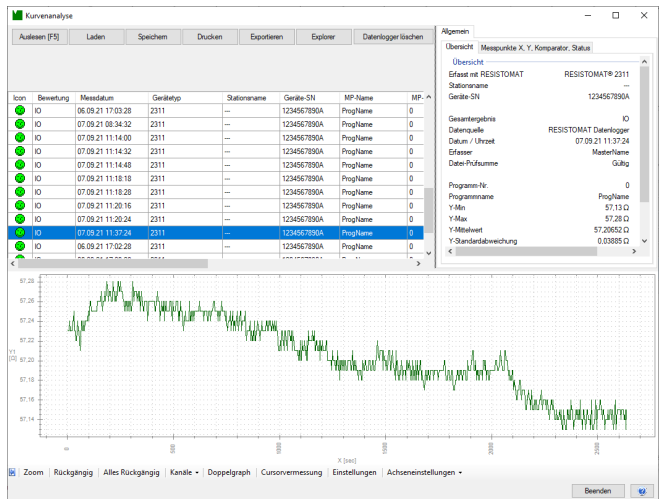
Accessories

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
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

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