



2291 / 2292

High Current Resistance Meters



High performance is the key feature of these high current resistance meters based on the four point measuring technique. The instruments are especially designed and optimized for low resistance measurements in highly inductive circuits. The design responds to the needs of utilities and transformer manufacturers for a lightweight, portable unit with high accuracy and ease of operation.

The powerful built-in 1kW/2.5kW DC supply and the automatic controlled measuring circuitry are more than adequate to handle even the most demanding application. The DC current is continuously adjustable up to 33A/50A to accommodate resistance values from 0.1 $\mu\Omega$ up to 20k Ω . The 33V/50V DC test voltage saturates even the largest transformers typically within seconds.

The instruments are capable to measure the resistance of up to three serial windings simultaneously. The test object temperature is measured and resistance readings are automatic temperature compensated for copper and aluminium windings using a standard or customized reference temperature.

An intrinsically safe discharge circuit dissipates the stored magnetic energy rapidly after the test. The discharge process is continuously monitored and clear indicators show when it is safe to remove the test leads.

The instrument is fully automatic and requires no measuring range adjustment. Measurements are performed according to the related IEC, NEMA and ANSI standards.

Complete field test reports can be generated on an optional printer. The report can also be sent over a RS-232C interface to a common PC or notebook. For factory use the system can be remote controlled by a host computer.

FEATURES

- Fully automated resistance measurement of virtually any size and type of windings.
- Large graphic display shows all data at a glance and supports quick and easy operation of the instruments.
- Compact and rugged design for use in harsh environments in field or factory applications.
- Three independent measurement channels allow testing of three series connected windings simultaneously.
- Data exchange to printer or computer over built-in interface without additional software.
- Remote control software to operate the unit from a laptop or PC, for easy gathering, exchanging and analyzing of measuring data. Optimized for transformer measurement and heat run test.

BENEFITS

Unmatched speed, range and accuracy make these instruments the perfect tools for cost-effective and reliable maintenance measurements.

Safety discharge circuit feature proofs and indicates the rapid discharge process to avoid any damage of personnel, test equipment and instrument.

Highest charging power guarantees fast saturation of even the largest power transformers within shortest time.

The 2291/2292 can be operated either as a single instrument or be combined with the transformer turns ratio meter TTR 2795 and the mobile insulation diagnosis and analyzing system MIDAS 2880 for an **integrated transformer maintenance system**.

APPLICATIONS

- Power Transformers
- Distribution Transformers
- Instrument Transformers
- Rotating Machines
- Bushings
- Cables
- Circuit Breakers

TECHNICAL SPECIFICATIONS

	Type 2291	Type 2292 Recommended for transformers > 100MVA
Resistance Measurement		
Range	0.1 $\mu\Omega$.. 20 k Ω	0.1 $\mu\Omega$.. 20 k Ω
Resolution	0.1 $\mu\Omega$	0.1 $\mu\Omega$
Accuracy	± 0.05 % rdg ± 0.05 % full-scale	± 0.05 % rdg ± 0.05 % full-scale
System Configuration		
Source power	1.0 kW	2.5 kW
Test current	0 .. 33 A	0 .. 50 A
Test voltage	33 VDC	50 VDC
Temperature coefficient	< 25 ppm / °C	< 25 ppm / °C
Winding measured	Y, Δ or mixed	Y, Δ or mixed
Printer interface	parallel (serial)	parallel (serial)
Computer interface	RS-232C	RS-232C
Built-in Memory	Storage of 32 measurement results and 4 measurement setups	
Environmental Conditions		
Operating temperature	0 .. 40°C	0 .. 40°C
Humidity range	< 80 % r.h. non-condensing	< 80 % r.h. non-condensing
Power Supply		
Voltage	115 / 230 VAC	115 (3-phase) / 230 VAC
Current @ 115 / 230 VAC	15 / 7.5 A	15 / 7.5 A
Frequency	50 / 60 Hz	50 / 60 Hz
Weight and Dimension		
Weight	25 kg (55 lb)	32 kg (71 lb)
W x H x D	57 x 29 x 56 cm (22" x 12" x 22")	57 x 38 x 56 cm (22" x 15" x 22")

SCOPE OF SUPPLY

High current resistance meter type 2291 (1kW) or type 2292 (2.5kW) instrument in rugged field case, mains cable, two high-current supply cables with clamps (10m or 20m), three measuring cable sets with clamps (10m or 20m), one surface temperature sensor with cable (PT100, 30m), operating instructions and test certificate.

OPTIONS

Application software for remote operation, data collecting, reporting, transformer heat run testing, export functionality to MS Excel and ASCII.	APSW 229X
PT100 resistance temperature probe for measurement in fluids with connecting cable (30m)	021167-30
Set of three current leads for interconnecting of transformer windings (3m, $\varnothing 16\text{mm}^2$)	026142
RS-232C fiber optic link set (30m)	5992
Printer cable (3m, parallel port)	021992
Interface converter RS-232/IEEE488	5945
Wire holding device for resistance measurement on cables ($\varnothing 0.1$.. 25mm or $\varnothing 0.3$.. 45mm)	8871 or 8872

European Contact

Haefely Test AG
Lehenmattstrasse 353
4052 Basel
Switzerland
☎ +41 61 373 4111
☎ +41 61 373 4912
✉ sales@haefely.com

Locate your local sales representative at

www.haefely.com

USA Contact

Hipotronics Inc.
1650 Route 22
PO Box 414
Brewster, NY 10509 USA
☎ +1 845 279 8091
☎ +1 845 279 2467
✉ sales@hipotronics.com

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