



**Resistance Measurement**  
**0.1  $\mu\Omega$  - 100,000  $\Omega$**

**Current Output**  
**0.001 A - 20 A DC**

**Test Voltage**  
**50 V**

## **WINRES-20**

### **20 A Winding Resistance Tester with Built-in Printer**

WINRES-20 is designed using advanced engineering technology to measure the winding resistance of transformers.

WINRES-20 can measure current, voltage, power transformer windings and shunt resistors.

Applying up to 20 A Direct Current allows WINRES-20 to measure the resistance of the transformers fast and accurate.

The smart design of the WINRES-20 makes easier to determine the end of measurement automatically according to users' decision.

WINRES-20 can measure two resistance values simultaneously with its two voltage measurement channels.

Users can prefer to test two primary or two secondary or one primary and one secondary winding according to the configuration of transformers.

Beginning from 0.1  $\mu\Omega$  resistances, WINRES-20 can measure up to 100,000  $\Omega$  resistance.

WINRES-20 discharges the measured circuit after each test. For inductive load, WINRES-20 can demagnetise the load.

The temperature measurement input enables one to connect an optional sensor to WINRES-20 and perform temperature correction automatically.

WINRES-20's intelligent software allows controlling the current flow if there is a failure in the current circuit. With this feature, WINRES-20 procures added safety to users.

A 7-inch TFT touch display allows WINRES-20 to show all measurement results on a single screen.

WINRES-20 can be controlled by USB and optional Bluetooth interface and users can record/store measurement results.

In case setting up Laptop or PC for the onfield test is difficult; users can record data to the device's internal memory (up to 100 Test Records) or to an external USB flash memory.

With the HighTest Data Management Platform (DMP Software), users can control WINRES-20, analyse and manage measurement results using a PC.

Operators can easily print the measurement results with the 2.28-inch built-in Printer of WINRES-20.

WINRES-20 has an optional battery power feature which allows users to make tests even when there is no electricity.

Multi-language capability and user-friendly operation menu make it easy to control WINRES-20, even by less trained staffs.

Three-Phase Adaptor TPA-03 (optional accessory) allows connecting all primary and secondary sides concurrently, whereby users can select either to test the resistance of all phases or selective phases.

With the TPA-03 option, WINRES-20 can control tap changer (raise and lower) with its tap changer outputs.

WINRES-20 is a light, compact and rugged device with the protection class IP67 (case closed).

## Features

- 2-channel resistance measurement
- Measurements from 0.1  $\mu\Omega$  to 100,000  $\Omega$
- 0.001 A to 20 A DC adjustable current output
- High accuracy (0.1%)
- Test Voltage 50 V
- Demagnetisation feature
- On-Load Tap Changer Test
- Built-in printer (2.28-inch)
- Data Management Platform (DMP Software) allows WINRES-20 analyse and manage results on PC
- Battery Power (Option)
- Internal memory, USB Flash Drive
- PC control via USB cable
- Optional Bluetooth control and communication
- 7-inch TFT touch display
- Temperature correction (1 input, optional sensor)
- User-friendly operation menu
- Optional accessory TPA-03 (Three-Phase Adapter) makes WINRES-20 outputs concurrently connectable to primary and secondary sides of three-phase power transformers.

## Technical Specifications

<b>Measurement Parameters</b>	2-channel resistance			
<b>Test Voltage</b>	50 V			
<b>Current output</b>	From 0.001 A to 20 A DC (User-selectable)			
<b>Resistance Measurement</b>	From 0.1 $\mu\Omega$ to 100,000 $\Omega$			
<b>Accuracy</b>	<b>Current Value</b>	<b>Resistance Value</b>	<b>Accuracy</b>	<b>Resolution</b>
	1 mA - 10 mA	Up to 100 k $\Omega$	0.1 % rdg 0.1 % of Fs	100 $\mu\Omega$
	10 mA - 100 mA	Up to 5 k $\Omega$	0.1 % rdg 0.1 % of Fs	10 $\mu\Omega$
	100 mA - 1 A	Up to 500 $\Omega$	0.1 % rdg 0.1 % of Fs	10 $\mu\Omega$
	1 A	Up to 50 $\Omega$	0.1 % rdg 0.1 % of Fs	1 $\mu\Omega$
	20 A	Up to 2.5 $\Omega$	0.1 % rdg 0.1 % of Fs	0.1 $\mu\Omega$
<b>Demagnetisation</b>	Yes			
<b>Power Supply</b>	100-240 V 47/63 Hz			
<b>Built-in Battery</b>	Yes, 14.4 V 6.9 Ah Optional (Models: WINRES-20B, WINRES-20B BLUE)			
<b>Memory</b>	Up to 500 records (recommended for better device performance)			
<b>Printer</b>	2.28-inch built-in printer			
<b>Communication</b>	USB 2.0/1.1 Standard-A, USB 2.0/1.1 Standard-B, Bluetooth (Models: WINRES-20 BLUE & WINRES-20B BLUE)			
<b>PC Software</b>	DMP Software			
<b>Display</b>	7-inch TFT touch display			
<b>Dimensions</b>	16.7" x 13.4" x 6.8" (424 mm x 340 mm x 173 mm )			
<b>Weight</b>	7 kg (models with battery)			
<b>Temperature</b>	Working: -10 °C to + 60 °C ; Storage: -30 °C to + 70 °C			
<b>Humidity</b>	95% RH Non-condensing			
<b>Protection Class</b>	IP67 (case closed)			
<b>Set of Package</b>	WINRES-20, Power Cable, Ground Cable , 1x 5m Current Cable Set, 2 x 5m Voltage Cable Set, USB Cable, Tap Changer Cable Set, Jumper Cable, Printer Paper (x2), USB flash drive, Instruction Manual (Soft Copy), DMP Software, Cable Bag			
<b>Options</b>	Hard carrying case, Battery, Bluetooth (factory install), Three-Phase Adapter TPA-03, Temperature Sensor, 10m Long Cable Sets for Current and Voltage channels			

## Ordering Information

### WINRES-20



20A Winding Resistance Tester with Built-in Printer

### WINRES-20 BLUE



20A Winding Resistance Tester with Built-in Bluetooth & Printer

### WINRES-20B



20A Winding Resistance Tester with Built-in Battery & Printer

### WINRES-20B BLUE



20A Winding Resistance Tester with Built-in Battery, Bluetooth & Printer



**3-Phase Resistance Measurement**  
**0.1  $\mu\Omega$  - 100,000  $\Omega$**

**Current Output**  
**0.001 A - 20 A DC**

**Test Voltage**  
**50 V**

## **TRIORES-20 SERIES** **20A Three-Phase Winding Resistance Tester with Built-in Printer**

TRIORES-20 Series is designed using advanced engineering technology to measure the winding resistance of transformers.

TRIORES-20 Series can measure current transformers, voltage transformers and power transformer windings. Applying up to 20A Direct Current allows TRIORES-20 Series to measure the resistance of the transformers fast and accurate.

The smart design of the TRIORES-20 Series makes easier to determine the end of measurement automatically according to users' decision.

TRIORES-20's measurement channels are designed in such a way that it can measure both three-phase and single-phase transformers' winding resistance. Simultaneous primary & secondary measurement without disconnecting and reconnecting cables. Users need to connect the test cables just one time to measure all three phases while testing three-phase transformers.

Beginning from 0.1  $\mu\Omega$  resistances, TRIORES-20 Series can measure up to 100,000  $\Omega$  resistance. TRIORES-20 Series discharges the measured circuit after each test. Dynamic resistance (OLTC) measurement of on-load tap changers, which can be performed simultaneously on all three phases, or a single phase.

For inductive load, TRIORES-20 Series can demagnetise the load. The temperature measurement input enables one to connect an optional sensor to TRIORES-20 Series and perform temperature correction automatically.

TRIORES-20 Series's intelligent software allows controlling the current flow if there is a failure in the current circuit. With this feature, TRIORES-20 Series procures added safety to users.

A 7-inch TFT touch display allows TRIORES-20 Series to show all measurement results on a single screen. TRIORES-20 Series can be controlled by USB and optional Bluetooth interface and users can record/store measurement results.

In case setting up Laptop or PC for the field test is difficult; users can record data to the device's internal memory (up to 100 Test Records) or to an external USB flash memory.

With the HighTest Data Management Platform (DMP Software), users can control TRIORES-20 Series, analyse and manage measurement results using a PC.

Operators can easily print the measurement results with the 2.28-inch built-in Printer of TRIORES-20 Series. TRIORES-20 Series has an optional battery power feature which allows users to make tests even when there is no electricity.

Multi-language capability and user-friendly operation menu make it easy to control TRIORES-20 Series, even by less trained staffs.

TRIORES-20 Series can control tap changer (raise and lower) with its tap changer outputs. TRIORES-20 Series is a light, compact and rugged device with the protection class IP67 (case closed).



**Built-in Printer**

## Features

- Fully Automatic Three-phase and single-phase resistance measurement
- Simultaneous primary & secondary measurement without disconnecting and reconnecting cables
- Measurements from 0.1  $\mu\Omega$  to 100,000  $\Omega$
- 0.001 A to 20 A DC adjustable current output
- High accuracy (0.1%)
- Test Voltage 50 V
- Demagnetisation feature
- Dynamic resistance (OLTC) measurement
- Heat-run test
- Built-in printer
- Optional Battery
- Internal memory, USB Flash Drive
- PC control via USB cable
- Optional Bluetooth control and communication
- 7-inch large colour touch display
- Temperature correction (1 input, sensor optional)
- Data Management Platform (DMP Software) allows to control TRIORES-20, analyse and manage results on PC

## Technical Specifications

<b>Measurement Parameters</b>	Three-phase and single-phase resistance measurement
<b>Test Voltage</b>	50 V (Continuous)
<b>Current output</b>	From 0.001 A to 20 A DC (User-selectable)
<b>Resistance Measurement</b>	From 0.1 $\mu\Omega$ to 100,000 $\Omega$
<b>Accuracy</b>	1%
<b>Resolution</b>	5 digits
<b>Demagnetisation</b>	Yes
<b>Power Supply</b>	100-240 V 47/63 Hz
<b>Battery</b>	14.4 V 6.9 Ah battery (Optional) (Models: TRIORES-20B, TRIORES-20B BLUE)
<b>Memory</b>	Up to 100 records (include up to 25 tap results) Unlimited Storage using an external USB
<b>Printer</b>	2.28-inch built-in printer
<b>Communication</b>	USB 2.0/1.1 Standard-A, USB 2.0/1.1 Standard-B, Optional Bluetooth (Models: TRIORES-20 BLUE, TRIORES-20B BLUE)
<b>PC Software</b>	DMP Software
<b>Display</b>	7-inch TFT touch display
<b>Dimensions</b>	(16.9 × 12.9 × 9.3)" (429 x 328 x 236) mm
<b>Weight</b>	9 kg (models with battery)
<b>Working Temperature</b>	-10 °C to + 60 °C
<b>Storage Temperature</b>	-30 °C to + 70 °C
<b>Humidity</b>	95% RH Non-condensing
<b>Protection Class</b>	IP67 (case closed)
<b>Set of Package</b>	TRIORES-20, Power Cable, Ground Cable, 2x 5m H&X Measurement Cable Set, 2x 10m H&X Extension Cable Set, 5m Tap Changer Cable Set, USB Cable, Jumper Cable, Printer Paper (x2), USB flash drive, Instruction Manual (Soft Copy), DMP Software, Cable Bag
<b>Options</b>	Hard carrying case, Battery, Bluetooth (factory install), Three-Phase Adapter TPA-03, Temperature Sensor, 10 m (33 ft.) Long Cable Set

## Ordering Information

### TRIORES-20



20A 3-Phase Winding Resistance Tester with Built-in Printer

### TRIORES-20 BLUE



20A 3-Phase Winding Resistance Tester with Built-in Bluetooth & Printer

### TRIORES-20B



20A 3-Phase Winding Resistance Tester with Built-in Battery & Printer

### TRIORES-20B BLUE



20A 3-Phase Winding Resistance Tester with Built-in Battery, Bluetooth & Printer