



## TRAN SERIES 3Φ Transformer Analyser with Built-in Printer

TRAN Series is designed using advanced engineering technology to measure the turns ratio and winding resistance of three-phase and single-phase transformers. TRAN has easy, fast and accurate measurement features using its user-friendly software.

### URNS RATIO MEASUREMENT

By using ANSI/IEEE C57.12.90 measurement method TRAN can produce precise results. TURA-03 is one of the most accurate devices with its wide range (0.8 to 50,000) ratio measurement capability and high precision (0.08 %).

Apart from the ratio measurement, TRAN can also measure excitation current, phase angle, polarity, ratio error and magnetic balance. Even though TRAN has three-phase cable configuration, users can also make single-phase transformer tests as well.

TRAN can detect vector groups automatically. It has a wide operation range from high excitation value current transformer to high powered power transformer at substations with 1V, 4V, 10V, 40V, 100V and 250V AC test voltages generation capability.

### WINDING RESISTANCE MEASUREMENT

TRAN Series can measure winding resistance of current, voltage and power transformers. Applying up to 20A Direct Current allows TRAN Series to measure the resistance of the transformers fast and accurate. The smart design of the TRAN Series makes easier to determine the end of measurement automatically according to users' decision.

TRAN'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.

**3Φ Ratio Measurement**

**0.8 to 50,000**

**Test Voltages**

**1 V to 250 V**

**3Φ Resistance Measurement**

**0.1 μΩ - 100,000 Ω**

**Current Output**

**0.001 A - 20 A DC**

Users need to connect the test cables just one time to measure all three phases while testing three-phase transformers. Starting from 0.1 μΩ resistances, TRAN Series can measure up to 100,000 Ω resistance.

TRAN Series discharges the measured circuit after each test. For inductive load, TRAN Series can demagnetise the load. The temperature measurement input enables one to connect an optional sensor to TRAN Series and perform temperature correction automatically.

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

### GENERAL FEATURES

A 7-inch TFT touch display allows TRAN Series to show all measurement results on a single screen. TRAN 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 or to an external USB flash memory. With the HighTest Data Management Platform (DMP Software), users can control TRAN 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 TRAN Series. TRAN 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 TRAN Series. TRAN Series can control tap changer (raise and lower) with its tap changer outputs.

TRAN Series is a light, compact and rugged device with the protection class IP67 (case closed).

## Technical Specifications

<b>Measurement Parameters</b>	3-Phase Turns Ratio Measurement, Excitation Current, Phase Angle, Polarity, Ratio Error (%), Vector group detection, Magnetic Balance; 3-Phase Winding Resistance Measurement
<b>URNS RATIO MEASUREMENT FEATURES</b>	
<b>Ratio Measurement Modes</b>	CT Mode, PT Mode (Single-Phase and Three-Phase)
<b>Measurement Method</b>	ANSI/IEEE C57.12
<b>Test Voltages</b>	CT Mode: 1 V and 4 V ; PT Mode: 1, 4, 10, 40, 100 & 250 V
<b>Ratio Range</b>	0.8 – 50,000
<b>Phase Angle Measurement</b>	0-360 Degree, ±0.2 degree (±1 digit)
<b>Excitation Current</b>	0 to 2 A
<b>Excitation Current Accuracy</b>	±0.1 mA
<b>WINDING RESISTANCE MEASUREMENT FEATURES</b>	
<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 μΩ to 100,000 Ω
<b>Accuracy</b>	1%
<b>Resolution</b>	5 digits
<b>Demagnetisation</b>	Yes
<b>GENERAL FEATURES</b>	
<b>Power Supply</b>	100-240 V, 47/63 Hz,
<b>Battery</b>	14.4 V 6.9 Ah battery (Models: TRAN-B, TRAN-B BLUE)
<b>Internal Memory</b>	Yes
<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: TRAN- BLUE & TRAN- B 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>	9.5 kg
<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>	TRAN, 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, Bluetooth (factory install option), Battery (factory install option)

## Ordering Information

**TRAN**



Three-Phase Transformer Analyser with Built-in Printer

**TRAN-BLUE**



Three-Phase Transformer Analyser with Built-in Bluetooth & Printer

**TRAN-B**



Three-Phase Transformer Analyser with Built-in Battery & Printer

**TRAN-B BLUE**



Three-Phase Transformer Analyser with Built-in Battery, Bluetooth & Printer



## SUWI SERIES Multifunctional Substation Test device

SUWI Series is designed using advanced engineering technology to test power and control equipment in the substations. SUWI is an all in one device which can test Relay Timing, Transformer's Turns Ratio, Circuit Breaker Contact Resistance & Timing, and Fuses etc.

SUWI is a combined substation testing device with advanced features hence; named Substation Wizard that is SUWI. SUWI has easy, fast and accurate measurement features using its user-friendly software.

### RELAY TIMING MEASUREMENT

SUWI can automatically test over current, over voltage, directional over current relays and frequency control relays. SUWI has a current output up to 110A AC/150A DC and a voltage output up to 150V AC/ 220V DC. It has four universal input modules.

### URNS RATIO MEASUREMENT

By using ANSI/IEEE C57.12.90 measurement method SUWI can produce precise results. SUWI is one of the most accurate devices with its wide range (0.8 to 33,000) ratio measurement capability and high precision (0.08 %).

Apart from the ratio measurement, SUWI can also measure phase angle and polarity. It has 1V, 4V, 10V, 40V and 100V AC test voltages generation capability. SUWI Series can measure turns ratio of current, voltage and power transformers.

### LOW RESISTANCE MEASUREMENT/MICROOHM METER

SUWI can easily measure contact resistances of a circuit breaker, shunt, and disconnecter by applying adjustable current from 1A to 150A. It can calculate the real values of the resistors by providing penetration with the feature of the continuous current application.

## Multifunctional test device

## Relay Timing Tests

## Turns Ratio Tests

## Microohmmeter

## 3 $\Phi$ Circuit Breaker Timing Tests

SUWI can measure resistance up to 5  $\Omega$ . It is capable of measuring static resistance of the contact points of the circuit breaker. SUWI can measure idle circuit breakers as well as dual grounded circuit breakers.

The frequently used test models can be saved as templates and the tests can be performed more rapidly and quickly. Thanks to the quick test feature of the SUWI's user interface, the test can be performed in barely 15 seconds.

### CIRCUIT BREAKER TIMING

Contact Timing Tests are performed to determine the optimal performance of the breakers. Contact timing tests are performed to compare the breakers' contact performance against the manufactures specifications.

The breakers OPEN, CLOSE, OPEN-CLOSE, CLOSE-OPEN and OPEN-CLOSE-OPEN operations are timed in milliseconds (ms) and cycles and then compared with the manufacturers' specifications to determine the performance of the circuit breaker. SUWI can perform 3-phase circuit breaker timing test; open, close, open-close, close-open, open-close-open timings, coil current measurement as well as internal and external trigger operations.

### GENERAL FEATURES

A 7-inch IPS 1024x600 pixel touch panel display allows SUWI Series to show all measurement results on a single screen. Users can record test results to the device's 8GB internal memory or an external USB flash memory.

With the HighTest Data Management Platform (DMP Software), users can analyse and manage measurement results using a PC. Multi-language capability and user-friendly operation menu make it easy to control SUWI Series. SUWI Series is a light, compact and rugged device with the protection class IP67 (case closed).

# Technical Specifications

<b>Measurement Parameters</b>	<b>Relay Timing Tests</b> (over current relays, over voltage relays, directional over current relays, frequency control relays); <b>Turns Ratio Measurement</b> , Phase Angle, Polarity, Ratio Error (%); <b>Microohmmeter/Low Resistance Tests</b> (Circuit breaker contact resistance and shunt resistance) <b>Circuit breaker timing test</b> (3-phase circuit breaker timing tests; open, close, open-close, close-open, open-close-open timings, coil current measurement, internal and external trigger operations)
<b>PROTECTION RELAY TIMING MEASUREMENT FEATURES</b>	
<b>Current Outputs</b>	Up To 110 A AC (magnitude and frequency adjustable) 150 A DC
<b>Voltage Outputs</b>	150 V AC (magnitude and frequency adjustable)
<b>Universal Input Modules</b>	4 input module; Binary wet/dry Up to 300 V AC and DC voltage measurement
<b>TURNS RATIO MEASUREMENT FEATURES</b>	
<b>Ratio Measurement Modes</b>	CT Mode PT Mode (Single-Phase and Three-Phase)
<b>Test Voltages</b>	CT Mode: 1 V and 4 V ; PT Mode: 1, 4, 10, 40 & 100 V
<b>Ratio Range</b>	0.8 – 33,000
<b>Excitation Current</b>	0 to 2 A
<b>Excitation Current Accuracy</b>	±0.1 mA
<b>LOW RESISTANCE MEASUREMENT FEATURES/MICROOHM METER</b>	
<b>Measurement Modes</b>	Static Dual ground Resistance Measurement
<b>Auto Test Mode</b>	Yes
<b>Test Current</b>	1 A to 150 A DC
<b>Measurement Range</b>	Up to 5 Ω
<b>CIRCUIT BREAKER TIMING MEASUREMENT FEATURES</b>	
<b>Measurement Parameters</b>	Contact Timing (O, C, O-C, C-O & O-C-O); Coil Current Measurement, Internal and External Trigger Operations
<b>Timing Windows</b>	1s, 10s, 20s
<b>Timing Accuracy</b>	0.05% rdg ± 0.1 ms
<b>Contact detection</b>	Yes
<b>Trigger input voltage</b>	24 – 300 V DC or AC <sub>peak</sub>
<b>Breaker Initiate Capacity</b>	20 A, 300 V DC or AC <sub>peak</sub>
<b>Initiate current reading range</b>	0 – 20A DC, 5 kHz
<b>GENERAL FEATURES</b>	
<b>Power Supply</b>	100-240 V, 47/63 Hz,
<b>Internal Memory</b>	Yes
<b>Communication</b>	USB 2.0/1.1 Standard-A, USB 2.0/1.1 Standard-B
<b>PC Software</b>	DMP Software
<b>Display</b>	7-inch IPS 1024x600 pixel touch panel display
<b>Dimensions</b>	(16.9 × 12.9 × 9.3)" (429 x 328 x 236) mm
<b>Weight</b>	9.5 kg
<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)