



## Electrical Test & Measuring Solutions



M/s Epro Gallspach GmbH, Austria



**ISO FARAD**

Isosfarad Kft, Hungary

An ISO 9001-2015 Certified Company

Measuring up to your high standard!!

Raytech develops and produced high quality measuring and testing equipments for the international power industries.

Leading manufacturer in this field rely on our test equipments.

Our consistent high quality is guaranteed in every instrument.



### 3-Phase Turns Ratio Meter - TR MARK III 250V

Fully automatic 3 Phase measurements. Automatic Vector Group Detection. Rugged and Reliable. A Color LCD with back lighting and touch screen increases user comfort. USB interfaces make it easy to store measurements on external storage devices and transfer easily to personal computer.

Turns Ratio Range	0.8 ...40,000
Accuracy	± 0.06% Rdg
Resolution	5 Digit
Current range	0 ...1A
Test Voltage	1/10/40/100/250 Volt
Phase angle	±90 Degree
Operating range	-10°C to 60°C
Input Power	100 to 250 V AC 50/60 Hz



### 3-Phase Voltage Extension to Turns Ratio Meter-T REX

The Raytech three phase voltage system T-REX is an optional system accessory for 3-Phase transformer ratio meter test sets. Fully automatic. Measuring phases other than 30°, shifting transformers, measure power rectifier transformers.

Turns Ratio Range	0.8 ...4000
Accuracy	± 0.8%
Test Voltage	3 phase 24V AC 50/60 Hz
Operating range	-10°C to 60°C
Input Power	100 to 250 V AC 50/60 Hz

The T-REX R is the same instrument as the T-REX but built in a 19" rack housing.



### 1-Phase Turns Ratio Meter TR-1 & TR 1P

Fully automatic. Battery operated. Reverse polarity test. Continuity test. Pass/Fail function. Extremely rugged. Built in printer in the TR-1P model. Can be charged by DC Car adapter.

Turns Ratio Range	0.8 ...4000
Accuracy	± 0.08% Rdg
Resolution	5 Digit
Current range	0A ...1A
Operating range	-10°C to 60°C
Weight	3.2 kg (7.0 lbs.)
Input Power	85 to 264 V AC 47...63 Hz 12 V DC (optional car adapter)



### Winding Resistance Meter 15A

“High accuracy measurement of very low resistance of any inductive loads with the fastest discharge unit on the market and most advanced demagnetizing circuit, comes with its own rugged waterproof field case. Battery Operated. Result are reported on the easy-to-read color LCD display and can be stored on USB or printed. Heat Run Test Functionality can be added”.

### WR14R/WR14

Resistance Range	0.01 $\mu\Omega$ to 100 k $\Omega$
Accuracy	$\pm 0.1\%$ Rdg
Resolution	0.05 $\mu\Omega$
Current range	25 mA...15A
Inductance range	upto 1500 Henry
Operating range	-10°C to 60°C
Input Power	88 to 264 V AC, 47...63 Hz / 12 V DC (Charging Only)



### Winding Resistance Meter 50A, 2 or 3 channels

2 or 3 measuring channels. Heavy duty protection circuitry. Fastest Discharge Unit on Market. 3 Temperature channels. Built in panel printer. Demagnetisation circuit. Internal <<Heat Run Test>> software available. USB interfaces. Color touch screen. Extremely rugged.

### WR50-12R/13R and WR50-12/13

Resistance Range	0.01 $\mu\Omega$ to 100 k $\Omega$
Accuracy	$\pm 0.1\%$ Rdg
Resolution	0.05 $\mu\Omega$
Current range	25 mA...50A / 50 V DC
Inductance range	0 Henry...1500 Henry
Operating range	-10°C to 55°C
Input Power	90 to 264 V AC, 47...63 Hz (Max. 1.5 kVA)
Output Power	Max. 1.2 kW



### Winding Resistance Meter 100A, 2 or 3 channels 19" Rack-mount

Suitable for Large to very Large Transformers, Generators, GT's & ICT's 2 or 3 measuring channels. Fastest discharge unit on the market. 3 temperature channels. Heavy duty protection circuitry. Demagnetization circuit. Internal <<Heat Run Test>> software available. USB interfaces. Color touch screen. Rack Mounted 100A/50V unit.

### WR100-12R/13R

Resistance Range	0.01 $\mu\Omega$ to 100 k $\Omega$
Accuracy	$\pm 0.1\%$ Rdg
Resolution	5 Digits or 0.05 $\mu\Omega$
Current range	25 mA...100A / 50 V DC
Inductance range	0 Henry...1500 Henry
Operating range	-10°C to 40°C
Weight	21.9 kg (48.3 lbs.)
Input Voltage	2 x 90 to 264 V AC, 47...63 Hz
Output Power	Max. 3 kW



### Micro Ohm Meter 10 A

The Raytech Digital Micro ohm meter, Micro Junior 2, was designed for high degree of accuracy for the measurement of very low resistance. It is battery operated with a lithium-ion battery that allows to do over 2000 test measurement with 10 A Output without recharging. The Micro Junior 2 is one of the most lightweight system available that comes complete with its own rugged waterproof fieldcase.

### Micro Junior 2

Resistance Range	0.01 $\mu\Omega$ ...400 k $\Omega$
Accuracy	$\pm$ 0.1% Rdg
Resolution	5 Digit or 0.01 $\mu\Omega$
Current range	1mA ...10 A DC
Operating range	-10°C to 60°C
Weight	5.9 kg (13 lbs.)
Power Lithium-Ion battery	16.4 V/6 Ah



### Micro Ohm Meter 200 A

The Micro Centurion II is a high precision, fully automatic, microprocessor based Micro Ohm meter for measuring very low resistance. This system is designed for highly accurate reading on-site with laboratory precision. Extensive filtering and high precision standards are used within the test system. The MC-II applies a preset current level, selected by the user up to 200 A

### Micro Centurion II

Resistance Range	0.01 $\mu\Omega$ ...5 $\Omega$
Accuracy	$\pm$ 0.1% Rdg
Resolution	5 Digit or 0.01 $\mu\Omega$
Current range	10A ...200 A DC at 5 V
Operating range	-10°C to 60°C
Weight	14.4 kg (31.5 lbs.)
Input Power	100 to 250 V AC 50/60 Hz



### Current Transformer Test Set CT - T1

The measuring instrument CT-T1 is a new Current Transformer Tester in a portable case. Comparing to CT Analyzer the CT Tester has less functions but with the big advantage of fast and easy operation.

Combined measurement of ASA 10/50, IEEE30°, IEEE45°, knee point, turns ratio and polarity.

Interfaces	USB host and device RS232	
Operation	5.7" TFT Color LCD touch screen additional dipot	
Ratio Range	Accuracy	Resolution
0.9 - 5000	$\pm$ 0.05 %	5 Digit
5001 - 10000	$\pm$ 0.5 %	5 Digit
10001 - 15000	$\pm$ 1 %	5 Digit
Voltage Range	Accuracy	Resolution
0 - 2000 V	1 % Rdg	0.01 V
Current Range	Accuracy	Resolution
0-10A	1 % Rdg	0.01 mA

## Capacitance & Tan Delta Test Set CAPO 12

The CAPO 12 is a fully automatic Capacitance, Insulation  $\tan \delta$  / Power Factor measuring instrument. The self-contained instrument performs measurements of Insulation Power Factor ( $\cos \phi$ ), Dissipation Factor ( $\tan \delta$ ), Capacitance, Inductance, Excitation current, Quality Factor and Power Loss (watts). Measurements can be made up to 12kV AC at variable frequency (from 10Hz to 400Hz). This system initializes itself with a self-calibrating and circuit check Sequence. The operator is immediately notified if any problem is detected.



Range	Accuracy	Resolution
PF :		
0 ... 0.10	$\pm 0.5\% \text{ Rdg} \pm 1 \times 10^{-4}$	$1 \times 10^{-5}$
0.1...1	$\pm 0.5\% \text{ Rdg} \pm 1 \times 10^{-4}$	$1 \times 10^{-4}$
Tan $\delta$ :		
0 ... 0.10	$\pm 0.5\% \text{ Rdg} \pm 1 \times 10^{-4}$	$1 \times 10^{-5}$
0.1 ... 1	$\pm 0.5\% \text{ Rdg} \pm 1 \times 10^{-4}$	$1 \times 10^{-4}$
Capacitance :		
0.1pF ... 53nF @ 12 kV	$\pm 0.3\% \text{ Rdg} \pm 0.3\text{pF}$	0.01pF or 5 Digits
Output Frequency :		
10 Hz - 400 Hz (Step 0.5 Hz)	$\pm 0.01\%$	0.1Hz
Test Voltage :		
Upto 12 000 V(rms) (45...400 Hz)	$\pm 0.5\% \text{ Rdg} \pm 1\text{V}$	1V
Test Current :		
Upto 200 mA (rms)	$\pm 0.3\% \text{ Rdg} \pm 1\mu\text{A}$	0.1 $\mu\text{A}$ or 4 Digits

## Automatic Transformer Observation System (mini-ATOS)

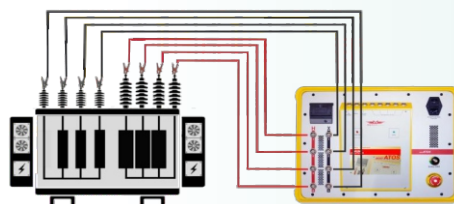
Introducing the mini-ATOS, an exceptional multi functional power transformer and substation diagnostic system. This intelligent and compact instrument revolutionizes the field of measurements with its cutting-edge hardware and software generation and versatile capabilities.



Measurement Parameters	
<b>Resistance Measurement</b>	
Test current	30A and 7.5A Simultaneously & User Adjustable
Charging voltage	100V
Resistance range	0.01 $\mu\Omega$ ... 100k $\Omega$
Accuracy	up to 0.1% $\pm$ 0.1 $\mu\Omega$
<b>Turns Ratio Measurement</b>	
Test Voltage	up to 250VAC User Adjustable
Turns Ratio range	0.8 ... 50 000
Accuracy	up to 0.05%

Features	
• Winding Resistance	• Excitation current
• Turns Ratio	• Automatic Multiplexer
• Demagnetisation	• 5 Built-In Temperature Channels
• Auto vector detection	• Internal Thermal Printer
• Magnetic balance	
Optional Features	
• DRM (Dynamic Resistance Measurement)	
• FRSL (Frequency Response of Stray Losses)	
• Short circuit impedance	
• OLTC motor current measurement	
• AHRT (Automatic Heat-Run)	
Specifications	

mini-ATOS streamlines the measurement process, requiring only a single connection for most functions. This intelligent feature significantly reduces testing time, allowing engineers & technicians to work efficiently & effortlessly.



<b>Input Power</b>	85 ... 264VAC, 47 ... 63Hz
<b>Panel Display</b>	7-inch color LCD touch display
<b>Weight</b>	16 kg (35.27 lbs.)
<b>Interface</b>	2x USB-A 1x USB-B, 1x Ethernet

EPRO GmbH is a leader in the supply of high precision CT's & PT's. The accuracy and reliability is unmatched in the industry. The latest state of art facility produces highly accurate CTs, PTs, Fully Automatic Loss Measuring System and Complete Transformer Test Systems.

EPRO Calibration Laboratory is also Accredited Calibration Laboratory For EN ISO/IEC17025.



M/s Epro Gallspach GmbH, Austria

### Standard Voltage Transformers

From 1 KV to 40 KV dry-insulated  
1 KV to 800/√3KV Oil-insulated,

Transformer ratio from 1 KV to 800/√3KV to 100 V up to 220/√3 V with accuracy as max. ±0.005%, ±0.5 Min at 0.4 to 1.2 of rated voltage.



### Standard Current Transformers

From 1 KV dry-insulated to 100 KV  
Oil-insulated,

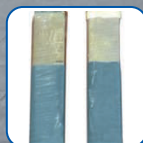
Transformer ratio from 1 A to 20 KA to 1A and 5 A with accuracy as max. ± 0.005 % ± 0.5 Min at 0.05 to 2.0 of rated voltage.



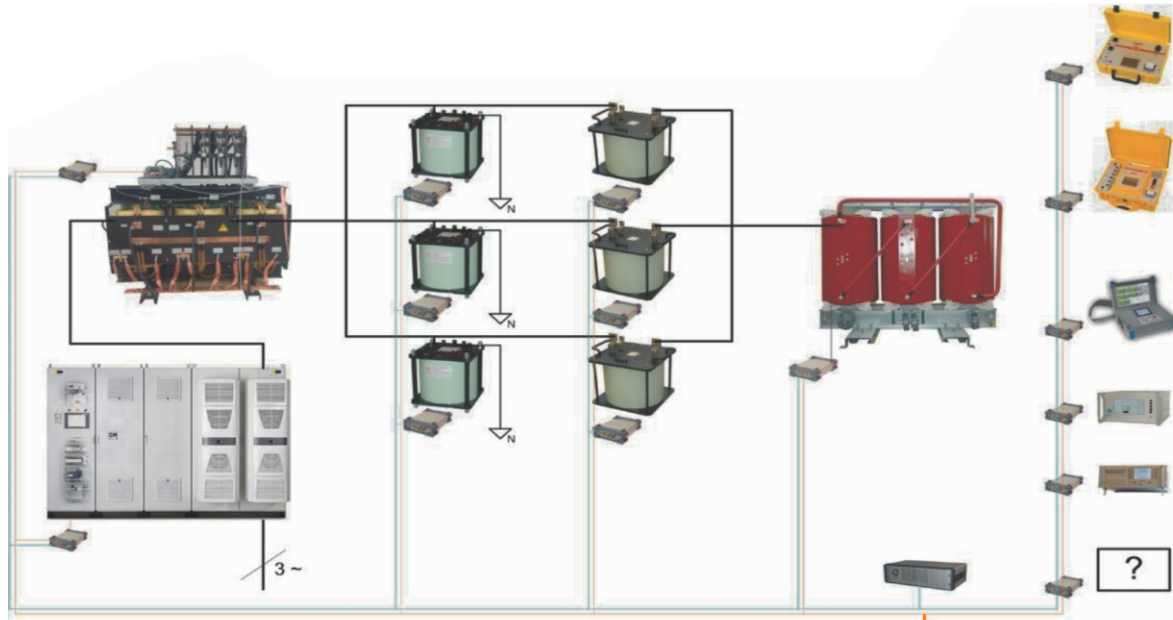
### The Insulation Test Tan Delta (ITTD)

This machine is an unique, easy and cost efficient device for Tan Delta testing of solid insulation materials under controlled temperature & pressure. All values and complete machine control is done via the included PC software. The measured values are recorded in real time and saved in Microsoft Excel Format. Values for capacitance, Tan Delta, temperature, pressure, Power factor & test time are recorded, and can be graphically displayed in function of other parameters.

Capacitance Range :	10 pF.....1.5 nF
Capacitance :	± 0.1% Rdg ± 1pF between 50 pF and 1.5 nF
Loss Factor Tan Delta :	± 0.01% Rdg ± 1X10 <sup>-4</sup> between 50 pF and 1.5 nF
Temperature Control :	± 3.0 °C between 10 °C and 79 °C ± 5.0 °C between 80 °C and 200 °C
Temperature measurement :	± 1.0 °C between 10 °C and 79 °C ± 2.0 °C between 80 °C and 200 °C

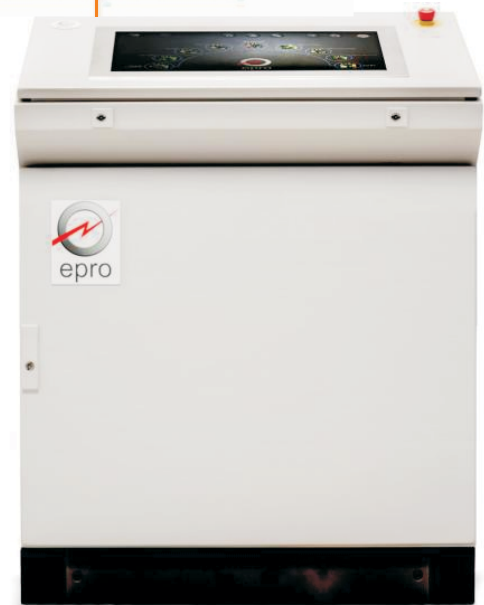


## Fully Automatic Transformer Test System For Small & Medium Size Transformer



### System Accuracy and Measurements

	Power Factor	Range	Frequency	Accuracy*
Voltage		5% <Un<39%		0.05%
		40%<Un<120%		0.02%
Current		1%<In<200%		0.01%
Power	1	40%<Un<120%		0.02%
	0.5			0.02%
	0.05	40%<Un<120%	50 Hz	0.09%
			60 Hz	0.10%
	0.01	40%<Un<120%	50 Hz	0.44%
60 Hz			0.53%	




### EPRO TMS (Fully Automatic Transformer Loss Measurement System)

- Basic Measurements:
- No Load Loss
  - Load Loss
  - Heat Run
  - Induced Voltage
  - Zero Sequence
- Optional Test possible with Integrated Device & Com box:
- Winding Resistance
  - Turns Ratio
  - Insulation Resistance
  - C & Tan Delta
  - Partial Discharge

All these measurements are realized for 1 or 3 Phase EUT according to the latest standards (IEC-60076-1,2,3,8 & ANSI/IEEE C57.12.90)


ETL Pruftechnik offers you intelligent CE test systems and test device. Our Test Device and automation ensure efficiency and process reliability by being easy to operate and using a future oriented concept of connection the test device and system to the information technology of today and tomorrow. Our systems are align with all globally Established norms and standards.



**AC High Voltage Test Set**

Test voltage	500 - 30 000 V AC, PI - regulated
Test current, Limit	0.5 - 50 MA
Power	> 1 500 VA
Short circ. Current	> 50 mA
Testing Time	1 s - 99 min, endless
Grounded on one side	For Applications With Fixed High Voltage Cabling


- Over limit trip
- Voltage ramp
- minimum current monitoring
- Remote controllable (DLL, ASCII, Lab VIEW, C#, Data View, Digital-IO)
- Key Panel Interlock & Safety Circuit Including interlock safety relay
- Circuit including interlock safety relays




**Ground Bond Tester**

Test current	25 A AC
Open circuit voltage	>12 V
Test resistance, limit	1 - 500 mΩ
Type of measurement	4-wire measurement
Testing time	1 s - 99 min, infinite
Operation	Test probe including start button and result LED

Test voltage	100 - 5 000 V AC, PI - regulated
Test current, limit	0,5 - 100 mA
Power	> 500 VA
Short circ. current	> 200 mA, according to EN 61180
Testing time	1s - 99 min, endless
Potential free	suitable for testing with test pistols, according to EN 50191



**Portable AC / DC HV Tester**



**Patented Test Pistol**

HV test Pistol

HV test Pistol with automatic start, contact control and monitoring for cable breakage


HV cable 2-pin, blue (D=9.6mm)


Length 1 - 20 m

HV connector HVPO6C (D=6mm), 2-Pin, For Plugging in

## World's Unique Stand Alone & Computer Operated HV Tester

**ATS 400**





Hipot Test	100-6000 V AC, 0.1 - 100 mA, 500 VA Isc > 200 mA, potential free
Insulation resistance	50-3000 V DC, 0.50 - 400 MΩ, Current - limited, EN 50191

- Fully electronic test system for production and laboratory
- 5 different versions available, LAN, USB, RS232, CAN, VGA
- Frequency - IO, Sequence option
- Freely programmable test procedure, parameters. operator information
- Extension modules : matrix, AC and DC sources, hot HV
- Standard safety technology as required in BS/ EN 50191

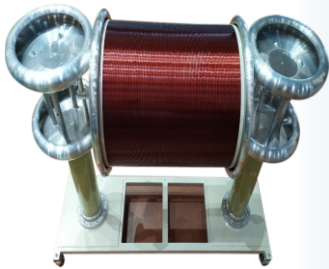




## **ISO FARAD**

Isosfarad Kft, Hungary

More than 25 years of experience in designing and manufacturing capacitors Isosfarad Ltd. was founded in 1992 by electrical engineers specialised in designing and manufacturing medium - and high voltage capacitors. ISO FARAD's capacitors, voltage dividers and filters are present all over the world in HV laboratories and test systems. ISO FARAD are ready to design and manufacture unique products and also offer to repair or renew old or failed high voltage capacitors.



### **LC filters**

For filtering the PD-noise of test transformers

Design for customer's request

Range: Upto 1000 kV & 150 A  
-50 dB attenuation

### **PD Free Coupling Capacitors**

For High voltage network, PD measurement, Voltage divider

Range: 10 kV-1500 kV  
Capacitance: 100 pF-100nF  
Low self-inductance



### **Standard Capacitors**

For Capacitance & tan  $\delta$  measurement

Range: 10 kV-200 kV  
Capacitance: 100 pF  
Tan  $\delta < 1 \times 10^{-5}$   
SF6 filling

### **Power Capacitors / Capacitor Banks / Harmonics Filters**

Range: 6 kV-36 kV  
Reactive power: 25 kvar-3Mvar



# INTERFACE CONNECTORS



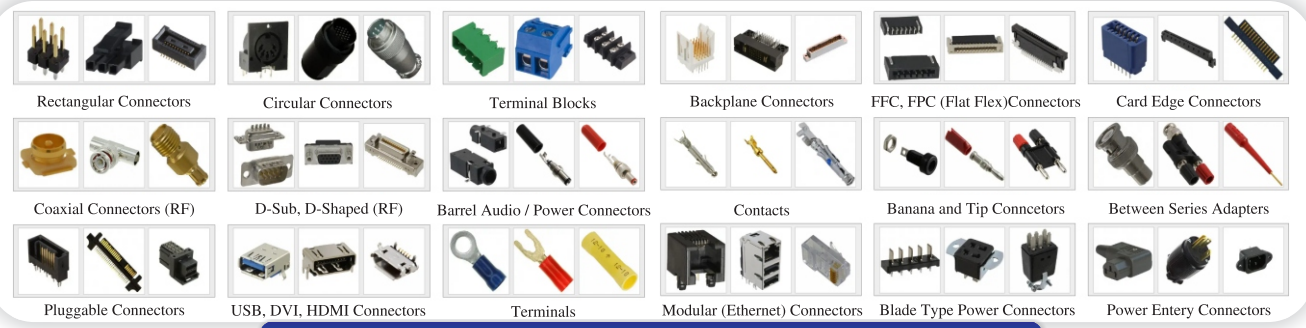
**INTERFACE CABLES**



**Heavy Duty Interface connector**



**Heavy Duty Circular Connectors**



**Various Interface Connectors**



**Various Testing / Measuring Equipments & Tools**



**M12 Connectors**



**Crocodile Clips**

## Our Customers



Automatic Transformer  
Observation System (mini-ATOS)

Capacitance & Tan Delta  
Test Set - CAPO 12

**Raytech**  
SWITZERLAND  
Raytech AG, Switzerland

3-Phase Turns Ratio Meter  
TR MARK III 250 V

Winding Resistance  
Meter 50 A

**ETL**  
**PRÜFTECHNIK**  
ETL Prüftechnik, Germany

ATS 400

AC High Voltage  
Test Set

Portable AC / DC  
HV Tester

75 KV AC  
High Voltage Test Set

Automatic Transformer Test System

Standard CT

Cast Resin Standard PT

**e pro**  
M/s Epro Gallsbach GmbH, Austria

**ISO FARAD**  
Isosfarad Kft, Hungary

LC FILTERS

CAPACITOR BANK & POWER  
CAPACITORS

COUPLING CAPACITOR

STANDARD  
CAPACITOR



**OUR PRODUCT RANGE**

Winding Resistance Meter	mini ATOS	Power Capacitors / Capacitor Banks	ATS 400
Turns Ratio Meter	The Insulation Test Tan Delta (ITTD)	Harmonics Filters	AC / DC HV Test Set
C & Tan Delta Test Set	Standard CT / PT	High Voltage PD Filters	Heavy Duty Circular Connectors
Contact Resistance Meter	Transformer Loss Measuring System	Coupling Capacitor/ HV Dividers	Interface Connectors

\* Specifications are subject to change without notice.

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