IBEKO POWER AB

SWEDEN

" Reliable test devices for reliable electric power systems"

IBEKO POWER AB develops, manufactures and markets the new generation of test and measurement equipment for electric power industry under the trade mark **"DV Power".**

Our products are:

- Portable – up to two or three times lighter then similar devices from our competitors.
- Powerful – can use lighter/thinner cables
- User-friendly – completely automated
- Efficient – modern switching techniques, power electronics, sophisticated design
- Reliable – Our devices are built in metal or plastic cases. The robust design makes our products ideal for use in high voltage substations and industrial environments. Plastic packaging is developed to protect even in the most severe conditions.
- Comply with IEC, CE and the most used international standards.

IBEKO Power product line consist of:

Circuit Breaker Test Equipment:

- Micro Ohmmeters - RMO-A series
- Micro Ohmmeters - RMO-G series
- Circuit Breaker Analyzer and Timer CAT60
- Coil Testers & Breaker Suppliers POB series.
- Coil Analyzer SAT30

Transformer Test Equipment:

- Winding Ohmmeters & Tap Changer Test Set RMO-T series
- Winding Ohmmeter & Tap Changer Analyzer RMO60T
- Three phase transformer turns ratio tester TRT30

Presently, IBEKO Power AB has a rising presence on the World Market, with over **40 Representatives and Distributors** worldwide. DV Power products can be found and are used in more than **50 countries!**

SALES

More information about our price list and additional information on delivery terms can be received from our distributor or via e-mail: **sales@dv-power.com.**

TECHNICAL SUPPORT

Our technical support is always available. All questions will be responded to within 24 hours. This applies to questions via e-mail: **support@dv-power.com.**

WARRANTY

IBEKO POWER AB provides a **3 years warranty** on all our products. That is a guarantee to our customers that they will receive the highest quality instrumentation available.

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CIRCUIT BREAKER TEST EQUIPMENT

DVpower

RMO-A Series – High DC current resistance meter

The Micro Ohmmeter RMO-A series instruments are designed for contact resistance measurement of non-inductive devices. An important part of commissioning tests, maintenance and production is the resistance measurement of:

- high, middle and low voltage circuit breakers
- disconnecting switches
- high-current busbar joints
- cable splices
- welding joints

RMO-A series

RMO100A
RMO200A
RMO300A
RMO400A
RMO500A
RMO600A
RMO60E

Micro Ohmmeter RMO600A

- Lightweight - only 8 kg
- Powerful 5 A - 600 A DC
- True DC (ripple free) current
- Measuring range 0,1 µΩ - 999,9 mΩ
- Max. resolution 0,1 µΩ
- Single/Continuous Mode
- RMOWin-R PC software

Optional accessories:

- Thermal printer (built in)
- Test Shunt 100 µΩ
- Transport case

RMO-G Series – High DC current resistance meter

The Micro Ohmmeters RMO-G series instruments are designed to provide safer, faster and easier measurement of high, middle and low voltage circuit breakers and disconnecting switches with possibility to perform measurements with both sides of a specimen grounded. RMO-G series can be used anywhere you need a high accuracy resistance measurement of high-current busbar joints, cable splices and welding joints.

RMO-G series are built in plastic cases which are watertight, airtight, dustproof, crush resistant and designed to keep the device safe from all damages.

All these features make RMO-G series Micro Ohmmeters an important tool for maintenance personnel.

RMO-G series

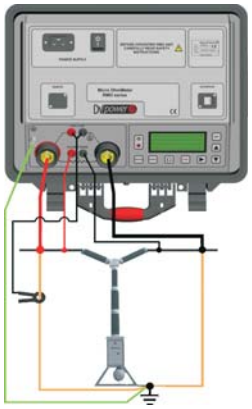
RMO100G
RMO200G
RMO300G
RMO400G
RMO500G
RMO600G

Micro Ohmmeter RMO600G

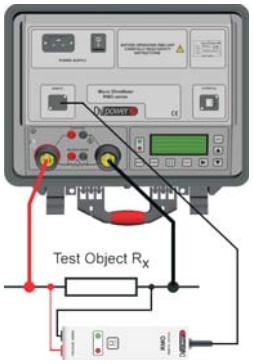
- Lightweight - only 9,5 kg
- Powerful 5 A - 600 A DC
- True DC (ripple free) current
- Measuring range 0,1 µΩ - 999,9 mΩ
- Max. resolution 0,1 µΩ
- Single/Continuous Mode
- RMOWin-R PC software

Optional accessories:

- Thermal printer (built in)
- Test Shunt 100 µΩ
- Both sides grounded unit
- Remote control unit
- Plastic cable bag



Circuit breaker both sides grounded measurement



Remote control unit

Technical specifications

Mains Power Supply	90 V to 264 V AC; 50-60 Hz
Test current	5 A - 600 A DC
Measuring range / Resolution	
0,1 µΩ - 999,9 µΩ	0,1 µΩ
1,000 mΩ - 9,999 mΩ	1 µΩ
10,00 mΩ - 99,99 mΩ	10 µΩ
100,0 mΩ - 999,9 mΩ	0,1 mΩ
Typical accuracy	±(0,2% rdg + 0,2%FS)
Operating temperature	-10°C - +50°C / 14°F - +122°F

CIRCUIT BREAKER TEST EQUIPMENT

DV power

POB series - Powerful DC power supply for a circuit breaker test

Coil Tester & Breaker Supply POB30D generates true DC (ripple free) voltage and was developed for regular maintenance tests of power circuit breakers:

- minimum trip voltage test of the circuit breaker's coils
- supplying spring-charging motors
- power supply at test with breaker analyzers

POB series

POB30D
POB30AD
POB30DL
POB30ADL

Main features:

- Powerful – up to 30 A DC
- Voltage 10 V DC to 300 V DC
- Voltage 10 V AC to 250 V AC
- True DC (ripple free) current
- Minimum trip voltage test
- Output protection

POB30AD/POB30ADL

POB30D/POB30DL

POB30AD is compatible with breaker analyzers from different vendors and eliminates use of stationary batteries during testing. Output voltage is selectable from 10 V to 300 V DC or from 10 V to 250 V AC.

The POB30AD is a powerful and versatile unit that can generate, at 230 V mains supply, initial current of 30 A as well as continues current according to the table below:

LOAD VOLTAGE	CURRENT	MAX LOAD INTERVAL
110 V	24 A 20 A	20 sec 60 sec
220 V	12 A 10 A	20 sec 60 sec

POB30ADL is a power supply unit employing the latest power electronics technology. It generates ripple free DC-voltage and it is developed for regular maintenance tests of power circuit breakers. POB30ADL also generates AC voltage. Output voltage is selectable from 1 V to 50 V DC or from 1 V to 40 V AC.

LOAD VOLTAGE	CURRENT	MAX LOAD INTERVAL
5 V	24 A 20 A	20 sec 60 sec
15 V	24 A 20 A	20 sec 60 sec
25 V	24 A 20 A	20 sec 60 sec

SAT30 - Versatile circuit breaker coil analyzer

SAT30 is a powerful breaker coils analyzer using the latest power electronics technology. SAT30 generates true DC (ripple free) or AC voltage and was developed for regular maintenance tests of power circuit breakers

- coil current measurement
- coil resistance measurement
- minimum trip voltage test of the circuit breaker's coils
- supplying spring-charging motors
- power supply at test with breaker analyzers

Technical specifications:	
Power Output	
Coils output DC Voltage	10 V DC to 300 V DC
Coils output AC Voltage	10 V AC to 250 V AC
Motor output DC Voltage	10 V DC to 250 V DC
Coil resistance measurement	
Measuring range / Resolution	0,5 Ω - 99,9 Ω / 0,1 Ω
	100 Ω – 999 Ω / 1 Ω
Minimum trip voltage test – full automatically	
Start voltage	10 V - 299 V DC; 10 V - 249 V AC
Stop voltage	11 V - 300 V DC; 11 V - 250 V AC
Step voltage	1 V - 20 V DC; 1 V - 20 V AC
Typical accuracy	± (0,5% rdg + 0,5% F.S.)
Operating temperature	–10°C - +50°C

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CIRCUIT BREAKER TEST EQUIPMENT

DV power

CAT60 - Circuit Breaker Analyzer & Timer

CAT60 is based on state of the art technology, using the most advanced switch mode technique available today. CAT60 is a digital instrument for condition assessment of circuit breakers. It measures timing and records graphs of coil currents and displacements of moving parts of a circuit breaker. Two contacts per phase are measured and recorded plus additional auxiliary contacts. CATWin software provides full control of all CAT60 functions over PC and monitoring of test results.

Main features:

- Simple & easy to operate
- Timing and motion measurement
- 6 channels (3x2) for main contacts
- 2 channels for auxiliary Inputs
- Analog input
- Breaker sequences: C , O, C-O, O-C, O-C-O, C-O-C
- Results printed on 112 mm thermal printer
- CATWin software for detailed analysis of test results

Main Contact Inputs

Number of channels 6 (3 x 2), 2 per phase.
Each channel detects Main and Pre-insertion resistor contacts.

- Closed ≤ 10 Ω,
- Resistor contacts range 10 Ω to 5 kΩ,
- Open ≥ 5 kΩ

Open circuit voltage 24 V; Short circuit current 100 mA
Each input group is isolated with respect to the others

Time Measurement

Time measurement resolution:

0,1 ms for 2 s test duration;
1 ms for 20 s test duration;
10 ms for 200 s test duration;

Time accuracy 0,05% of the reading ± resolution

Auxiliary inputs

Number of channels: 2, galvanically isolated

- Contact sensing (dry):	- Voltage sensing (wet):
Closed ≤ 600 Ohm, 30%	From 5 V - 360 V DC or 4 V - 250 V AC
Open ≥ 600 Ohm, 30%	Open indication ≤ 5 V
Open circuit voltage 24 V DC,	Close indication ≥ 12 V
Short circuit current 25 mA	

Current Measurement

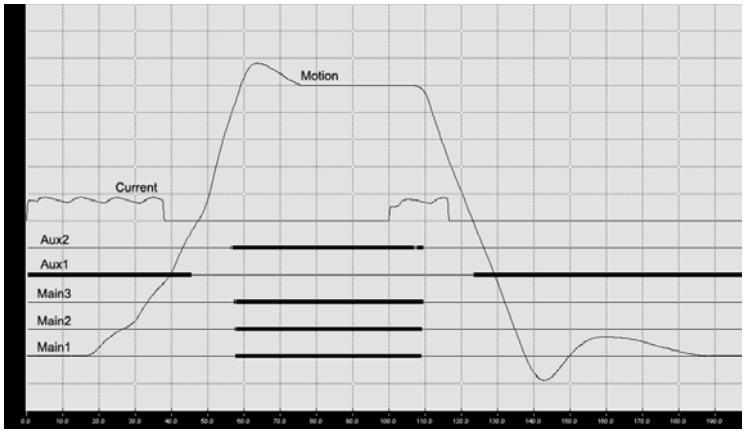
Current measurement for Open and Close coil,
2 channels, Hall-Effect sensor
Range ±35 A DC to 5 kHz
Accuracy 1%
Graphic presentation: waveform of currents is displayed with resolution of 0,1 ms

Analog input

Travel Transducer Input range 0 V to +5 V, resolution 1 mV, accuracy 1%; Transducer resistance 100 Ω to 5 kΩ
Input impedance 200 kΩ, 30 pF

Coil Operation

Number of channels: 2 (Open and Close coil)
Two separate outputs for coil triggering
Minimum trip voltage test



Graphic printout

CATWin software

User friendly software
Complete control of CAT60 during the testing
Complete analysis of tests results
Test results can be edited, exported, printed and saved
Database for management and analysis of test data

TRANSFORMER TEST EQUIPMENT

DV power

RMO-T Series – Winding resistance meter & Tap changer test set

The Winding Ohmmeters RMO-T series are designed for winding resistance measurement of inductive test objects (transformers/generators/motors) and for On Load Tap Changer analysis of power transformers. Typical application areas of RMO-T are high-voltage substations and industrial environments. An important part of commissioning, maintaining and production is measuring winding resistance of:

- transformers
- generators/motors
- electrical machines
- high-current busbar joints
- cable splices

Winding Ohmmeter & Tap changer test set RMO20T:

- Lightweight - only 7,5 kg
- Test current 5 mA - 20 A DC
- Measuring range 0,1 µΩ – 2 kΩ
- Two voltage sense channels
- Extremely quick measurement
- Automatic discharge circuit
- RMOWin-T PC software
- OLTC dynamic resistance measurement

Optional accessories:

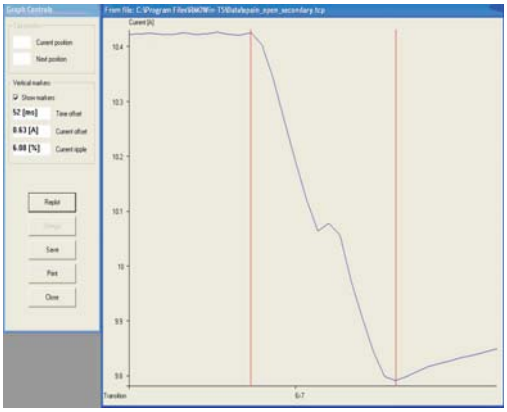
- Thermal printer (built in)
- Test Shunt 75 A/150 mV

Winding Ohmmeter & Tap changer test set RMO40T:

- Lightweight - only 9,5 kg
- Test current 5 mA - 40 A DC
- Measuring range 0,1 µΩ – 2 kΩ
- Two voltage sense channels
- Extremely quick measurement
- Automatic discharge circuit
- RMOWin-T PC software
- OLTC dynamic resistance measurement

Optional accessories:

- Thermal printer (built in)
- Test Shunt 75 A/150 mV
- Built-in Tap Changer Control Unit



ON LOAD TAP CHANGER (OLTC) ANALYSIS

Using RMOWin-T software with the RMO-T device, tap changer switching problems can be detected by analyzing a graph which represents dynamic resistance during tap changes. It is obtained by recording the test current at high sampling rate during the OLTC test.

The horizontal axis of the graph provides the tap transition from one position of the changer to another (from tap to tap). The test current is shown on the vertical axis.

Important parameters can be obtained from the graph using the markers provided, which include: time difference (time for a transition), and difference between test currents (current ripple between two transitions). Parts of the graph of interest can be magnified in order to analyze it.

Winding Ohmmeter & Tap Changer Analyzer RMO60T:

- Lightweight - only 12,5 kg
- Test current 5 mA - 60 A DC
- Measuring range 0,1 µΩ – 2 kΩ
- Two voltage sense channels
- Built-in Tap Changer Control Unit
- Extremely quick measurement
- Automatic discharge circuit
- RMOWin-T PC software
- OLTC dynamic resistance measurement

Optional accessories:

- Thermal printer (built in)
- Test Shunt 75 A/150 mV

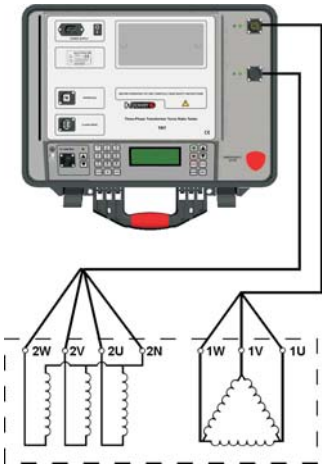
TRANSFORMER TEST EQUIPMENT

TRT30 - Three-phase Transformer Turns Ratio Tester

The TRT30 is a true three-phase, fully automatic, test set specially designed for turns ratio, phase shift and excitation current measurement of power, distribution and instrument transformers. The TRT30 determines the transformer turns ratio by accurately measuring the voltages across the unloaded transformer windings and then displaying the ratio of these voltages (ratios range from 0,8 to 15 000).

Main features:

- Test voltages 8 V, 40 V, 100 V AC
- Ratio range 0,8 – 15 000
- Measurement of turns ratio
- Measurement of phase shift
- Measurement of excitation current
- Vector group detection
- Built-in thermal printer



Setting up the TRT30 is as simple as entering the transformer configuration using the device front panel keyboard and connecting to un-energized transformer. Once the parameters are selected the test of three phase transformers is performed in two ways:

PHASE BY PHASE - All three phases can be measured consecutively. All connections and short circuit procedures at the primary and secondary voltage terminals are automatic, done internally before each measurement.

TRUE THREE PHASE - A true three phase excitation voltage test is applied to the three transformer primary windings. In such a way it is possible to detect the phase angle and measure a turns-ratio of any transformer type, including phase-shifting transformers, where other “three phase” transformer ratio devices can not.

TRTWin software -All measurements can be exported to a PC using the powerful TRTWin software. A PC and the TRT30 communicate via a standard USB cable. The TRTWin allows reports and analysis of results. Also, the TRT30 can be controlled, and the test status can be viewed from a PC using the TRTWin software.

GENERATOR/MOTOR TEST EQUIPMENT

RMO50M & RMO100M - Winding Ohmmeter

The Winding Ohmmeters RMO50M and RMO100M are designed for winding resistance measurement of motors and generators. Built-in discharging circuit designed for energy discharge of motors and generators. Using RMOWin-M PC software a test can be performed from a PC and the results can be obtained directly at a PC.

Main features:

- Lightweight - only 8 kg
- Test current 10 mA – 100 A DC
- Measuring range 0,1 μΩ - 600 Ω
- Mechanical protection IP54
- Extremely quick measurement

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