

**OMICRON**



THE ULTIMATE  
TESTING SYSTEM FOR

# TRANSFORMER DIAGNOSIS

CPC 100 + CP TD1

## TEST UNIVERSE

World Leader in Innovative Power System Testing Solutions



# Transformer Diagnosis

The OMICRON Transformer Diagnostic System is a unique test equipment which provides automatic testing of important transformer parameters within one portable system. The test system is comprised of the CPC 100 Multi-function Primary Test System and the CP TD1 Tangent Delta unit. The patented CPC 100 is the main control unit for the test system and the CP-TD1 unit is used for testing of insulation condition. Together, the system is the ideal tool for comprehensive testing of the following parameters of a power transformer:

- Winding resistance
- Turns ratio and excitation current
- On-load tap changer condition
- Leakage reactance
- Insulation condition (capacitance, tangent delta, power factor)

## NO NEED FOR MULTIPLE TEST SETS

- One system for multiple tests
- Eliminates the need to train on multiple devices
- All test results stored in one device and in the same format

## FIELD RUGGEDNESS WITH LABORATORY PRECISION

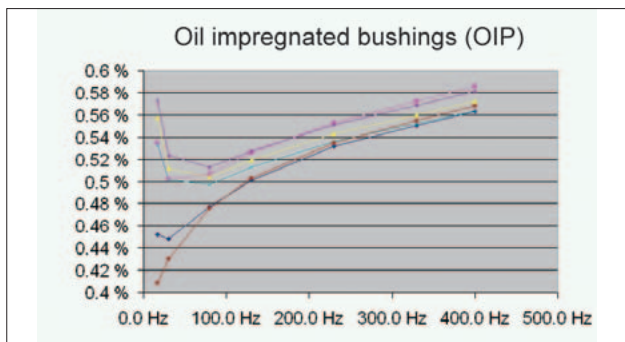
- High precision in a rugged design
- Excellent line-frequency suppression in the presence of electrical and magnetic interference
- High precision components for measuring voltages and currents and a gas-insulated reference capacitor for capacitance and Tan delta measurement

## PORTABLE

- Easy transportation by a single person - heaviest component: 29kg (64lbs)
- Practical handling on and off-site with a custom-built trolley with easy and quick break-down into single components

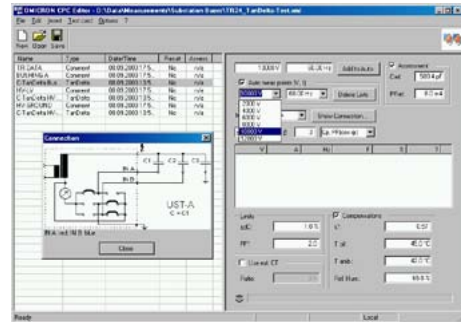
## FREQUENCY SWEEPS

- Testing at different frequencies with switch-mode power amplifier technique
- Detailed analysis and accurate fault location by the measurement of leakage reactance, ratio, capacitance and tangent delta

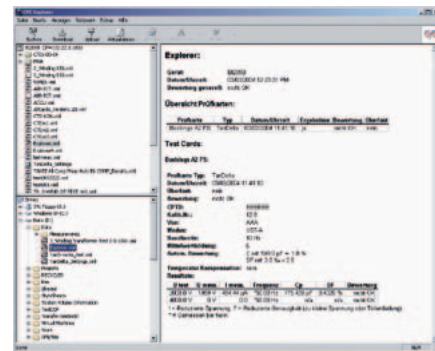


## AUTOMATED TESTING AND REPORTING

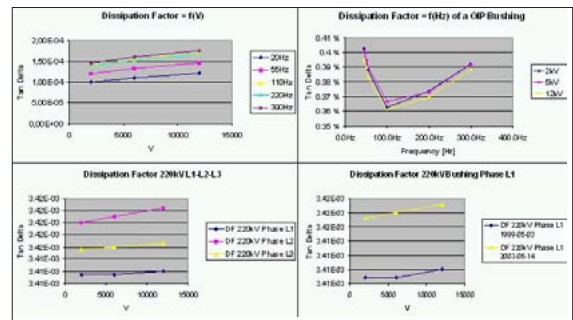
- Test plans and parameters can be prepared off-line on the computer. This reduces the time for set-up in the field.



- Tests are executed automatically. This reduces errors in manual measurement and the recording of data.
- Reports are generated automatically which reduces the time required to complete the overall test procedure.



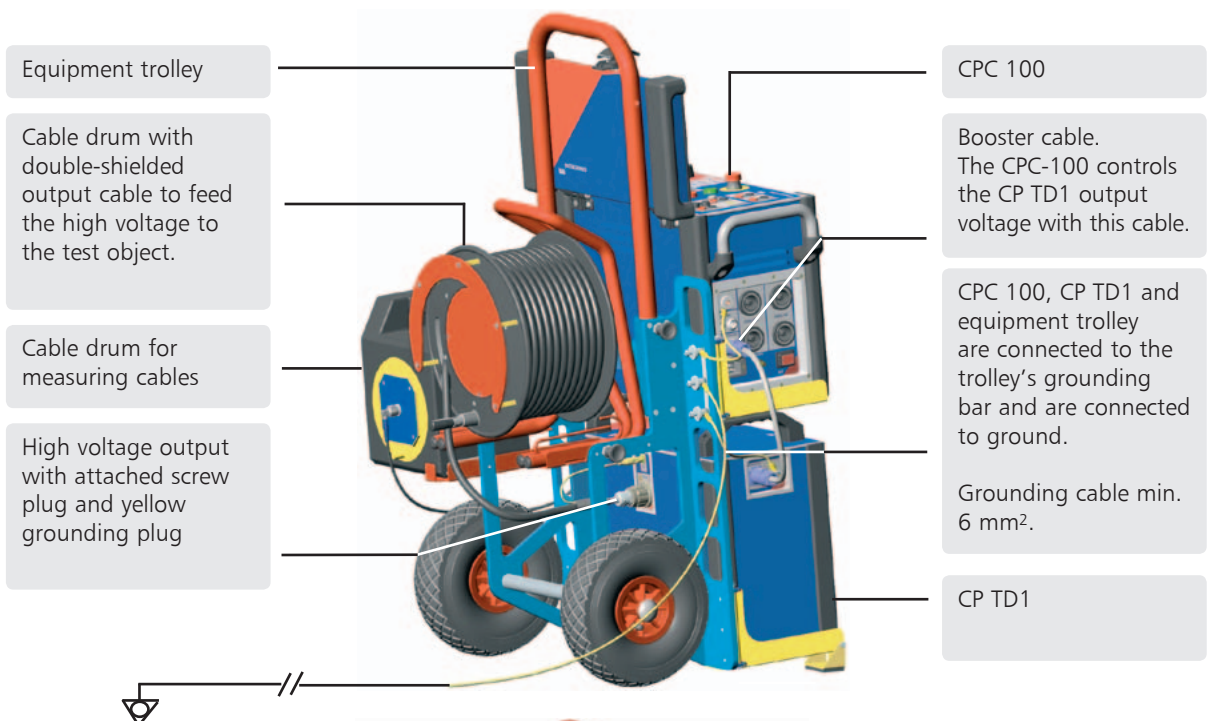
The reports can be exported to MS-Excel™ format which enables easy manipulation for detailed analysis of the results such as trending and graphing.







### SYSTEM COMPONENTS



**Option CP CAL1**  
 This can be used to re-calibrate the CP TD1. CP CAL1 has a reference capacitor with known values of capacity  $C_{ref}$  and dissipation factor  $D_{Fref}$ . In mode UST-A the values  $C_x$  and  $D_{Fx}$  can be measured and then compared to the known reference values. The corrective values can be entered into the TanDelta test card's Settings page.



**Option TH 3631**  
 This option allows for measuring ambient temperature, test object temperature and humidity. Once these values were measured, they can be entered into the TanDelta test card's Settings page under "Compensations".

# Applications

## Insulation Diagnosis (Tangent Delta / Power Factor Test)

The condition of the insulation is an essential aspect for the operational reliability of electrical power transformers, generators, and other high voltage equipment.

CPC 100 + CP TD1 provide laboratory precision for capacitance and dissipation / power factor measurements in the field.

Quantities measured include:

- Capacitance  $C_p$
- Dissipation factor  $\tan \delta$  (tangent delta)
- Power factor  $\cos \phi$
- Power (active, reactive, apparent)
- Impedance (absolute value, phase, inductivity, resistance, Q)



Quick TanDelta

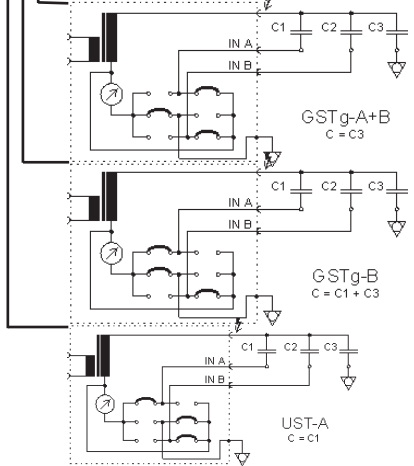
12000 V 60.00 Hz Assessment

Auto test points [V, f] Cref: 4646.0 pF

Mode: UST-A DRef: 550.0 e-6

V	A	Hz	F	%	?
10024	14.645m	50.00	4.64595n	0.0527	OK
12038	17.571m	50.00	4.64613n	0.0528	OK
7999	14.010m	60.00	4.64567n	0.0559	OK

Assessed: 12/12/03 11:51:04 AM



Built-in temperature correction curves are used to recalculate the measured results from the ambient temperature to the reference conditions (20°C / 68°F). The method of correction is dependent on the type of insulation and the relevant standard.

If reference values for  $C_x$ , consisting of capacitance and the dissipation factor, are known, an automatic assessment is possible at the test location.

A fully automatic test sequence can be recorded to analyze tests at several test voltages and different frequencies.

The automatic change-over on the capacitance measurement modes UST-A, UST-B, UST-A+B, GST, GSTg-A, GSTg-B and GSTg-A+B reduces re-wiring to a minimum, as is shown in the example below for a 3-winding transformer (UST ungrounded specimen test, GST grounded specimen test).

OMICRON CPC Editor - D:\data\3 - Windows

Mode: GST gB

Microsoft Excel - CP TD1 Report 3-Winding Trafo.xls

A	B	C	D	E	F	G	H	I	J	K
3	HV output	Ground	Guard	UST	V TEST	C	TanDelta	Measured	Mode	Connection
4	H	L	T	not used	10kV	9.68E-09	0.35%	H-G + H-L	GST gB	H to HV OUT
5	H	L	T	not used	10kV	2.35E-09	0.36%	H-G	GST gA-B	L to IN A
6	H	T	L	L	10kV	7.32E-09	0.35%	H-L	UST A	T to IN B
7				#1 - #2		7.93E-09				
8	L	T	H	not used	10kV	6.23E-09	0.38%	L-G + L-T	GST gA	L to HV OUT
9	L	T	H	not used	10kV	2.98E-09	0.39%	L-G	GST gA-B	H to IN A
10	L	H	T	T	10kV	3.31E-09	0.39%	L-T	UST B	T to IN B
11				#5 - #6		3.31E-09				
12	T	H	L	not used	5kV	3.64E-09	0.42%	T-G + T-H	GST gB	T to HV OUT
13	T	H	L	not used	5kV	3.50E-09	0.42%	T-G	GST gA-B	H to IN A
14	T	L	H	H	5kV	4.00E-11	0.36%	T-H	UST A	L to IN B
15				#9 - #10		4.00E-11				
16				All (Check)	5kV	8.83E-09	0.39%	HG+LG+TG	GST	H-L-T to HV

The influence of line frequency interference is automatically suppressed with an innovative measurement technique. If higher selectivity or precision is desired, the measurement bandwidth can be reduced to  $\pm 5$  Hz and averaging of up to 20 results can be activated. This technology enables precise measurements even in the presence of strong electromagnetic interferences.

All measurement results and test object data can be saved at the test location in XML format, which allows an easy transfer to database applications. For printing the test report and for further processing of the data (e.g. with MS EXCEL™) it is possible to transfer it to a PC.

The electronic circuits of the CP TD1 unit are internally recalibrated with each measurement.

TanDelta

Limits

$\pm dC$ : 1%

DF%: 2.0

Custom Calibration

C%: 1.027

DFIPF+: 0.0 ppm

by: REINI

V13.8 10/2/03

Compensations

k\*: 1.16

T oil: 31.4 °C

T amb.: 16.2 °C

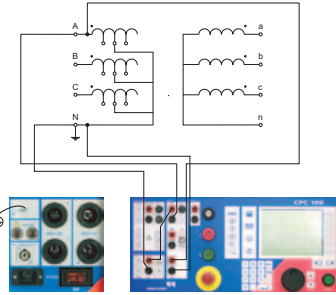
rel.Hum.: 46.0 %

Use ext. CT

Ratio: 3.0

## TRANSFORMER DIAGNOSIS TEST CARDS

PolCheck	Resistance	R/Winding	Comment	Add Card
I test:	5.000 A	R min:	80.00 $\mu\Omega$	Delete Card
I DC:	4.9990 A	R max:	2.0000 $\Omega$	Rename Card
V DC:	2.5430 V			Clear Results
R meas.:	508.7 m $\Omega$	Time:	31.000 s	Save As Template
Interval:	10.000 s	Dev.:	0.01 %	Save Results
<input checked="" type="checkbox"/> Temperature compensation for Cu				
T meas.:	25.0 $^{\circ}\text{C}$			
T ref.:	70.0 $^{\circ}\text{C}$			
R targ.:	608.4 m $\Omega$			
Assessed:	n/a			



### Winding Resistance

Measures the winding resistance including all internal connections and contacts

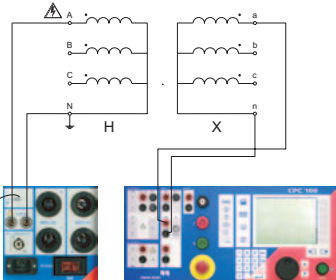
- After entering the test current and pressing the Start button, the test card
- displays deviation of measurement over time during period of charging the winding
- automatically performs a discharging of the winding after saving the measurement
- measures the DC voltage
- measures the resistance
- compensates the temperature behavior of copper, where the applied temperature compensation calculates the resistance for working temperature

Duration of the test: depending on the charging time. After the charging period, the user creates the report by pressing Save Results.

Output: up to 6 A DC

Input: up to 10 V DC and 10 A DC

VTBurden	VTElectronics	TRRatio	VWithst	Min
V prim.:	110000.0 V	V sec.:	10000.0 V	Max
<input checked="" type="checkbox"/> 1/√3		<input type="checkbox"/> 1/√3 Ratio:	6.3509	
V test:	2000.0 V	f:	50.00 Hz	
I prim.:	640.0 $\mu\text{A}$	3.14 $^{\circ}$		
Tap:	014	Count down		
Tap	VPrim	VSec		%
013	1.999k	314.96	1.25	6.35
012	1.999k	312.01	1.35	6.41
014	1.999k	308.64	1.25	6.48
Assessed:	n/a			



### Transformer Ratio (per Tap)

Measures ratio and excitation current per tap

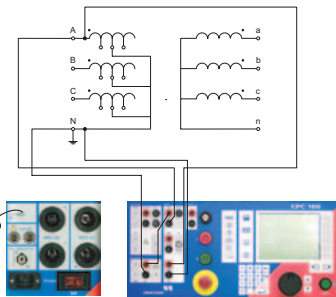
For this test, a test voltage of up to 2 kV is injected on the transformer high voltage side. This voltage is measured internally with high precision. The voltage (amplitude and phase angle) on the low level voltage winding is measured back via the measuring input. The ratio is calculated automatically. The magnetizing current in amplitude and phase angle is also measured and reported.

Duration of the test: ~ 5 sec per tap including automatic reporting

Output: up to 2 kV

Input: up to 300 V

Resistance	R/Winding	TRTapCheck	RIGrol	Min
I test:	1.000 A	Interval:	10.000 s	Max
I DC:	n/a	T meas.:	25.0 $^{\circ}\text{C}$	
V DC:	n/a	T ref.:	70.0 $^{\circ}\text{C}$	
Tap	007	Count up		
Tap	R meas. Dev.	R ref.	Ripple	Slope
	$\Omega$	%	$\Omega$	%
001	508.7m	0.42	608.4m	2.11 -11.64m
002	528.5m	0.52	632.4m	2.78 -14.12m
003	542.6m	0.52	659.7m	2.23 -17.32m
004	568.8m	0.22	678.4m	2.68 -13.45m
007	569.7m	1.53	693.3m	42.31 -628.5m
Assessed:	n/a			



### Resistance per Tap and Continuity of OLTC

Measures winding resistance per tap and detects interruptions of on-load tap changer (OLTC) diverter switches. Due to the excellent precision small changes of the contact resistance of the tap changer can be recognized.

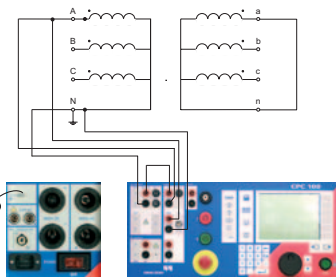
The voltage drop at the winding resistance is measured with a sense line. The resistance value of each tap can easily be saved to a table containing all taps. An automatic temperature compensation is possible. Interruptions of the current because of a faulty diverter can be detected.

Duration of the test: depends on the inductivity of the winding inductance. Due to the high output voltage of up to 65 V, testing time is reduced

Output: up to 6 A DC (65 V)

Input: up to 10 V DC and 10 A DC

Sequencer	Insert Card
AC 3A	<input type="checkbox"/> SDOOT <input type="checkbox"/> Repeat
A	Hz
1.000	15.00
1.000	30.00
1.000	70.00
1.000	120.00
Trigger	Thresh
No Trigger	n/a
No Trigger	n/a
No Trigger	n/a
No Trigger	n/a
VT AC sel	I AC sel
V	A
6.6589	0.00
13.509	0.00
32.452	0.00
Assessed:	n/a



### Leakage Reactance

Measures the complex short circuit impedance

Measures the complex short circuit impedance and displays the result as Z and  $\varphi$ , R and  $X_L$ , or R and L. Frequency scans from 15 to 400 Hz enable an improved diagnosis and an excellent line frequency suppression.

This is done with the Sequencer test card, which allows for individual automatic test procedures. The definition of a test program is easily done by entering the values of each state into the test card (no programming knowledge required).

Duration of the test: 2 sec per state (typically < 1 min)

Output: 6 A / 130 V (range 3 A AC)

Input: V1 AC / I AC / DC

## Further applications

The CPC 100 is a multifunctional test system which can be used for other applications not covered in this brochure. For more information on further areas of application, please refer to our **CP LINE catalog**, or visit [www.omicron.at](http://www.omicron.at) or [www.omicronusa.com](http://www.omicronusa.com).

### CURRENT TRANSFORMER (CT)

automatic testing of:

- Ratio and polarity
- Phase and magnitude error
- Excitation curve
- Winding resistance
- Secondary burden
- Withstand voltage (2 kV AC)
- CT circuit continuity

### VOLTAGE TRANSFORMER (VT)

automatic testing of:

- Ratio and polarity
- Phase and magnitude error
- Secondary burden
- Withstand voltage (2 kV AC)
- VT circuit continuity

### RESISTANCE TESTING

- Contact resistance ( $\mu\Omega$ )
- Winding resistance ( $\mu\Omega$  - k $\Omega$ )
- Ground resistance
- Measuring of complex impedances (winding impedances, cable impedances, etc.)

### PROTECTION RELAYS

- Single phase testing of primary and secondary relays (I>, V>, V<, or frequency relays)

### EARTH IMPEDANCE

### LINE + CABLE IMPEDANCE



# Technical Data

## CONTROL UNIT CPC 100

The output is either voltage or current, and is automatically selected by the software or manually by the user. Current and voltage outputs are overload and short circuit proof and protected against over temperature.



### Generator / Output

#### Current outputs

Range	Amplitude	t <sub>max</sub> <sup>1</sup>	V <sub>max</sub> <sup>2</sup>	Power <sub>max</sub> <sup>2</sup>	f
800 A AC <sup>3</sup>	0...800 A	25 s	6.0 V	4800 VA	15-400 Hz
	0...400 A	8 min	6.4 V	2560 VA	15-400 Hz
	0...200 A	> 2 h	6.5 V	1300 VA	15-400 Hz
6 A AC <sup>10</sup>	0...6 A	> 2 h	55 V	330 VA	15-400 Hz
3 A AC <sup>10</sup>	0...3 A	> 2 h	110 V	330 VA	15-400 Hz
400 A DC	0...400 A	2 min	6.5 V	2600 W	DC
	0...300 A	3 min	6.5 V	1950 W	DC
	0...200 A	> 2 h	6.5 V	1300 W	DC
6A DC <sup>4, 10</sup>	0...6 A	> 2 h	60 V	360 W	DC

2000 A AC<sup>3</sup> with an optional Current Booster (see CP Line catalog for details).

#### Voltage outputs

Range	Amplitude <sup>5</sup>	t <sub>max</sub>	I <sub>max</sub>	Power <sub>max</sub> <sup>5</sup>	f
2 kV AC <sup>3</sup>	0...2 kV	1 min	1.25 A	2.5 kVA	15-400 Hz
	0...2 kV	> 2 h	0.5 A	1.0 kVA	15-400 Hz
1 kV AC <sup>3</sup>	0...1 kV	1 min	2.5 A	2.5 kVA	15-400 Hz
	0...1 kV	> 2 h	1.0 A	1.0 kVA	15-400 Hz
500 V AC <sup>3</sup>	0...0.5 kV	1 min	5.0 A	2.5 kVA	15-400 Hz
	0...0.5 kV	> 2 h	2.0 A	1.0 kVA	15-400 Hz
130 V AC <sup>10</sup>	0...130 V	> 2 h	3.0 A	390 VA	15-400 Hz

#### Internal measurement of outputs

Output	Range	Accuracy <sup>6</sup>		
		Amplitude		Phase
		Reading	Full Scale	Full Scale
800 A AC	-	error < 0.10 %	error < 0.10 %	error < 0.10 °
400 A DC	-	error < 0.20 %	error < 0.05 %	-
2 kV AC	2000 V	error < 0.05 %	error < 0.05 %	error < 0.10 °
	1000 V	error < 0.05 %	error < 0.05 %	error < 0.15 °
	500 V	error < 0.05 %	error < 0.05 %	error < 0.20 °
	5 A	error < 0.20 %	error < 0.05 %	error < 0.10 °
	500 mA	error < 0.05 %	error < 0.05 %	error < 0.10 °

Guaranteed values valid over one year within 23°C ± 5°C (73°F ± 10°F), in the frequency range of 45 ... 65 Hz or DC. Accuracy values indicate that the error is smaller than +/- (Value read \* Reading error + Full Scale of the range \* Full Scale Error).

<sup>1</sup> With mains voltage 230 V with 2 x 6 m high current cable at 23°C ± 5°C (73°F ± 10°F) ambient temperature.

<sup>2</sup> Signals below 50 Hz or above 60 Hz with reduced values possible.

<sup>3</sup> Output can be synchronized with mains.

<sup>4</sup> The input / output is protected with lightning arrestors between the pins and against protective earth. In case of energies above a few hundred Joule the lightning arrestors apply a permanent short circuit to the input / output.

<sup>5</sup> Signals below 50 Hz or above 200 Hz with reduced values possible.

<sup>6</sup> 98 % of all units have an accuracy better than specified as Typical.

<sup>7</sup> Input is galvanically separated from all other inputs.

<sup>8</sup> V1 and V2 are galvanically coupled but separated from all other inputs.

<sup>9</sup> There are power restrictions for mains voltages below 190 V AC.

<sup>10</sup> Fuse protected.

<sup>11</sup> Error of reading < than ± value.

Inputs					
Measuring inputs					
Input	Imped.	Range	Accuracy <sup>6</sup>		
			Amplitude		Phase
			Reading	Full Scale	Full Scale
I AC/DC <sup>4,7</sup>	< 0.1 Ω	10 A AC	error < 0.05 %	error < 0.05 %	error < 0.10 °
		1 A AC	error < 0.05 %	error < 0.05 %	error < 0.15 °
		10 A DC	error < 0.03 %	error < 0.08 %	-
		1 A DC	error < 0.03 %	error < 0.08 %	-
V1 AC <sup>8</sup>	500 kΩ	300 V	error < 0.05 %	error < 0.05 %	error < 0.10 °
		30 V	error < 0.05 %	error < 0.05 %	error < 0.10 °
		3 V	error < 0.10 %	error < 0.05 %	error < 0.10 °
		300 mV	error < 0.15 %	error < 0.05 %	error < 0.10 °
V2 AC <sup>8</sup>	10 MΩ	3 V	error < 0.03 %	error < 0.08 %	error < 0.10 °
		300 mV	error < 0.08 %	error < 0.08 %	error < 0.10 °
		30 mV	error < 0.10 %	error < 0.25 %	error < 0.15 °
V DC <sup>4,7</sup>	500 kΩ	10 V	error < 0.03 %	error < 0.08 %	-
		1 V	error < 0.03 %	error < 0.08 %	-
		100 mV	error < 0.05 %	error < 0.10 %	-
		10 mV	error < 0.05 %	error < 0.15 %	-

\* Automatic range switching

\* Galvanically separated potential groups: I AC/DC ; V1 & V2 ; V DC

\* AC frequency range 15 - 400 Hz

\* Protection of I AC/DC input: 10 A FF fuse<sup>4</sup>

**Binary input for dry contacts or voltages up to 300 V DC<sup>7</sup>**

Trigger criteria

Input impedance

Response time

Toggleing with potential free contacts or voltages of up to 300 V.

> 100 kΩ

1 ms

Ω meter (DC)					
Mode	Connection	Range	Current	Accuracy (full scale)	
0.5 μΩ ... 12.5 mΩ	4-wire	400 A DC	400 A	error < 0.45 %	
10 μΩ ... 1 Ω	4-wire	6 A DC	6 A	error < 0.35 %	
100 μΩ ... 10 Ω	4-wire	6 A DC	1 A	error < 0.25 %	
0.2 Ω ... 200 kΩ	2-wire	V DC in	<5 mA	error < 0.50 % + 0.1 Ω <sup>11</sup>	

### General

Display

1/4 VGA greyscale LCD display

### Power Supply

Single-phase, nominal<sup>9</sup>

Single-phase, permissible

Frequency, nominal

Power consumption

Connection

100 V AC...240 V AC, 16 A

85 V AC...264 V AC (L-N or L-L)

50/60 Hz

<7000 VA short time (< 10 sec)

IEC320/C20

### Environmental conditions

Operating temperature

Storage temperature

Humidity range

Shock

Vibration

EMC

Safety

-10...+55 °C (+14...+131 °F)

-20...+70 °C (-4...+158 °F)

Rel. humidity 5...95 %, non-condensing

IEC68-2-27 (operating) 15 g / 11 ms half sine

IEC68-2-6 (operating) 10 ... 150 Hz : 2g

EN 50081-2, EN 55011, EN 61000-3-2, FCC Subpart B of Part 15

Class A, EN 50082-2, IEC 61000-4-2/3/4/8

CE conform (89/336/EEC)

EN 61010-1, EN 60950, EN 50191, IEC 61010-1

Produced and tested in an EN ISO 9001 certified company

## CP TD1 (WITH CPC 100)

The CP TD1 is connected via interfaces to the CPC 100 and thus does not need further control elements.



High voltage output			
V	I	$t_{\max}$	at f (Hz) <sup>1</sup>
0...12 kV AC	300 mA	>2 min	15 ... 400
	100 mA	>60 min	

Internal measurement of voltage output / current inputs		
Range	Resolution	Accuracy
12000 V AC	1 V	error < 0.3 % reading + 1V
5 A AC	5 digits	error < 0.5 % reading
8 mA AC		error < 0.3 % reading + 100 nA

Capacitance Cp (equivalent parallel circuit)			
Range	Resolution	Accuracy	Conditions
1 pF ... 3 μF	6 digits	error < 0.05 % reading + 0.1 pF	< 8 mA
		error < 0.2 % reading	> 8 mA

<sup>1</sup> Signals below 45 Hz with reduced values possible. Capacitive linear loads.

Dissipation factor DF (tan δ)			
Range	Resolution	Accuracy	Conditions
0 ... 10 % (capacitive)	5 digits	error < 0.1 % reading + 0.005 %	15 ... 70 Hz < 8 mA
0 ... 100 (0..10000 %)	5 digits	error < 0.5% reading + 0.02 %	-

Power factor cos φ			
Range	Resolution	Accuracy	Conditions
0 ... 10 % (capacitive)	5 digits	error < 0.1 % reading + 0.005 %	15 ... 70 Hz < 8 mA
0 ... 100 %	5 digits	error < 0.5 % reading + 0.02 %	-








### Representation of the following values is also possible:

- Power (active, reactive, apparent)
- Impedance (absolute value, phase, inductivity, resistance, Q)

Nominal voltage CPC 100 1 x 100 ... 240 Vac / 50 ... 60 Hz / 16 A  
 Operating temperature -10 ... +55 °C (+14 ... +131 F)  
 Transport and storage -20 ... +70 °C (-4 ... +158 F)  
 Relative humidity 5 ... 95 %, non condensing

## WEIGHT AND DIMENSIONS

Weight and dimensions (W x H x D)			
CPC 100	test set	29 kg (63 lbs)	450 x 330 x 220 mm (11.4 x 8.4 x 5.6 ") without handles
	test set & case	42 kg (92 lbs)	700 x 500 x 420 mm (17.8 x 12.7 x 10.7 ")
CP TD1	test set	25 kg (55.2 lbs)	450 x 330 x 220 mm (11.4 x 8.4 x 5.6 ") without handles
	test set & case	38.1 kg (84 lbs)	700 x 500 x 420 mm (17.8 x 12.7 x 10.7 ")
CP CAL1	test set	8.8 kg (19.4 lbs)	450 x 330 x 220 mm (11.4 x 8.4 x 5.6 ") without handles
	test set & case	21 kg (46.3 lbs)	700 x 500 x 420 mm (17.8 x 12.7 x 10.7 ")
Cables and accessories	equipment	16.6 kg (36.6 lbs)	-
	equipment & case	26.6 kg (58.7 lbs)	680 x 450 x 420 mm (17.3 x 11.4 x 10.7 ")
Equipment trolley	equipment	14.5 kg (32 lbs)	-
	equipment & carton	18.9 kg (41.7 lbs)	590 x 750 x 370 mm (15.0 x 19.1 x 9.4 ")
CP TD1, CPC 100, equipment & trolley (without CP CAL1)	equipment	85 kg (187.5 lbs)	750 x 1050 x 600 mm (19.1 x 26.7 x 15.2 ")
	equipment & packing	125 kg (275.8 lbs)	-

Components	Packages	CP Transformer test set [VE000645]	CP Tan Delta test set [VE000640]	CP Tan Delta upgrade [VE000641]
CPC 100 Multifunctional primary test system		✓	✓	
Transformer diagnosis test set accessories		✓		
CP TD1		✓	✓	✓
CP TD1 Accessories (includes trolley delivered in separate carton)		✓	✓	✓
CPC 100 Software components	Quick test card	✓	✓	
	CP TanDelta test card	✓	✓	
	CP Transformer Diagnosis test cards	✓		
	CP State Sequencer test card	✓		
	CPC Editor	✓		
TH3631 Temperature/humidity measurement set [VEHZ0644]		✓		
CPC 100 Interface upgrade (eIFC) [VEHZ0646]				✓
CP CAL1 Calibration set [VEHZ0642]				

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