

DELTA4000 Accessories

Megger[®]



EN
ENGLISH

FIELD & LAB CALIBRATION

Field & Laboratory Verification Tool PFD-10

When an electrical test and measurement instrument returns an unexpected result, a few questions come to mind: Are the connections from test instrument to asset correct? Is there truly a problem with the asset? Is the test and measurement instrument working as intended? Without an accurate and simple to use verification tool, these questions are difficult to answer. The PFD-10 provides the solution when testing power factor/dissipation factor and capacitance with the DELTA4000

The compact reference provides a three-electrode connection: HV, LV, and ground for verifying GST-GND, GSTg-R, and UST-R measurements. Two HV connections provide 0% and 1% power factor/dissipation factor for verifying good or bad measurements. 1 Hz to 505 Hz test points ensure the full range verification of advanced power factor test sets, up to 10kV.



Cat. No. PFD-10

SPECIFICATIONS

Rated Voltage	10 kV to 0.25 kV	
Nominal Capacitance	H-L	100 pF ± 5%
	H-G	1000 pF ± 5%
	L-G	2000 pF ± 5%

Tan delta (PF/DF)

Connection	Test mode	% PF / % DF			
		1 Hz	50 Hz	60 Hz	505 Hz
H1-L	UST-R	< 0.4	< 0.1	< 0.1	< 0.1
H1-G	GSTg-R	< 0.1	< 0.1	< 0.1	< 0.1
L-H1	UST-R	< 0.4	< 0.1	< 0.1	< 0.1
L-G	GSTg-R	< 0.1	< 0.1	< 0.1	< 0.1
H2-L	UST-R	N/A	0.86 ± 0.1	1.03 ± 0.1	N/A
H2-G	GSTg-R	N/A	0.86 ± 0.1	1.03 ± 0.1	N/A

Weight	2.3 kg (5 lbs)
Dimensions	317 x 257 x 153 mm (12.5 x 10.1 x 6.0 inches)

For more information about these products, visit our website us.megger.com

FIELD & LAB CALIBRATION

Laboratory Calibration Adjustment Tool, CAL4000

The CAL4000 is designed for use in performing calibration adjustments of the DELTA4000 series of instruments. Together with provided software, it allows for proper adjustment of critical measurements within the DELTA4000 including: tan delta (PF), capacitance, voltage, current, watts and other measurements. Operators are able to perform the calibration adjustments within a 20 to 30 minute timeframe. This tool does not replace a traceable report, only a method to bring the DELTA4000 to within specified accuracy.



Cat. No. 2002-137

Ratio and Reference Capacitors

When field testing, the reliability of test results is critical in determining the true condition of the transformer or related asset. In order to confirm proper operation of the DELTA4000 and its nominal accuracy, Megger has developed a set of capacitors that provide this confirmation of results. The capacitors come in a set of three where two capacitors contain one nominal tan delta (PF) value as to simulate a typical test result. The third capacitor is of a higher value and serves a second purpose as a TTR add-on function capability. All units include a field transit case for easy store and protection. Capacitors can be purchased individually should the specific need arise.

SPECIFICATIONS

HV Capacitors	10 nf, 10 kV – C/N 36610
	100 pf, 10 kV – C/N 36610-1
	1000 pf, 10 kV – C/N 36610-2

Transit case for capacitor with set of 3 above C/N 36610-CC



Cat. No. 36610-KIT2

Shown here: TTR cap, 2 ref caps, test hook, test clip, transit case

HV Reference Standard, Capacitance and Tan Delta (PF)

This is typically used by laboratories where traceable calibration results for capacitance and tan delta (PF) are required. The reference standard can be used with the DELTA4000 and any related test equipment that performs similar testing as the DELTA4000. The reference standard offers a maximum test voltage of 10 kV. To confirm proper DELTA4000 accuracy at critical values, this unit comes with six switch selectable tan delta (PF) test points. It is supplied with a report traceable to NIST.

SPECIFICATIONS

Rated Voltage	10 kV maximum (with oil)
Nominal Capacitance	High to low 100 pF ($\pm 1.0\%$) (internal SF6 filled capacitor, 10 psig)
Tan delta (PF) (at 0 position)	High to low $<0.005\%$ (50ppm)
Nominal tan delta values (switch positions)	0.0%, 0.105%, 0.32%, 1.05%, 3.2%, 10.5%
Weight	18 lbs (8.4 kg)
Dimensions	11 x 9.5 x 16 in. (28 x 24 x 41 cm)



Cat. No. 670500-1

TESTING LARGE SPECIMENS

Resonating Inductor

The resonating inductor expands the capacitance range of the DELTA automated insulation power factor test sets. The resonating inductor is a self-contained, air-insulated tool which allows the user to perform capacitance and dissipation factor tests on high-capacitance items such as large motors, large generators and long cable runs. A manual tuning wheel on the resonating inductor varies the inductance to tune the parallel circuit for minimum load current.

Resonating Inductor includes:

High-voltage interface cable, 8 ft (2.4 m)	30012-13
Ground interconnect lead, 8 ft (2.4 m)	30991-1
Inductor return cable, 8 ft (2.4 m), with connector	1001-802
Ground lead, 15 ft (4.6 m)	4702-5
Cable bag	18313
Instruction manual	670600a_UG

SPECIFICATIONS

Maximum Capacitive Load	1 μ F, at 60 Hz - 12kV
	1.2 μ F, at 50 Hz - 12 kV
	1.33 μ F, at 45 Hz - 12 kV
	(from DELTA4000 variable frequency source)
Dimensions	38.7 H x 21.4 W x 25.3 D in.
	983 H x 543 W x 641 D mm
Weight	280 lbs (127 kg)



Cat. No. 670600-1

Adapter Kit for Use with DELTA4000 and Competitor's Resonating Inductor

Megger provides adapter kits that offer solutions for users who already own an older style or competitor's resonating inductor and need to connect to a DELTA4000. Our C/N 1002-455 includes:

High-voltage interface cable, 8 ft (2.4 m)	30012-14
Inductor return cable, 8 ft (2.4 m), with connector	1001-802
Adapter kit box, unterminated	1002-231-1
Connector assembly	1002-506



Cat. No. 1002- 455

For more information about these products, visit our website us.megger.com

FACTORY AND FIELD RATIO TESTING

HV CVT/VT Ratio Transducer

Expand your testing capabilities with the latest transducer available for the DELTA4000. Accurate ratio and phase measurements are a sure-fire way to verify CVT stack integrity, as traditional capacitance measurements will not change significantly when there is a problem. With $\pm 0.1\%$ accuracy, the HV CVT/VT Ratio transducer provides factory accuracy while testing in the field.

The HV CVT/VT ratio comes complete with all the accessories you will need to connect to terminal blocks of CVTs or PT/VTs.

Note: Requires Delta 4010B HV Unit for $\pm 0.1\%$ Accuracy

Cat. No. 1013-061

SPECIFICATIONS

Voltage Range 1-600 V
Frequency Range 1-500 Hz
Ratio Accuracy $\pm 0.10\%$



HV Transducer

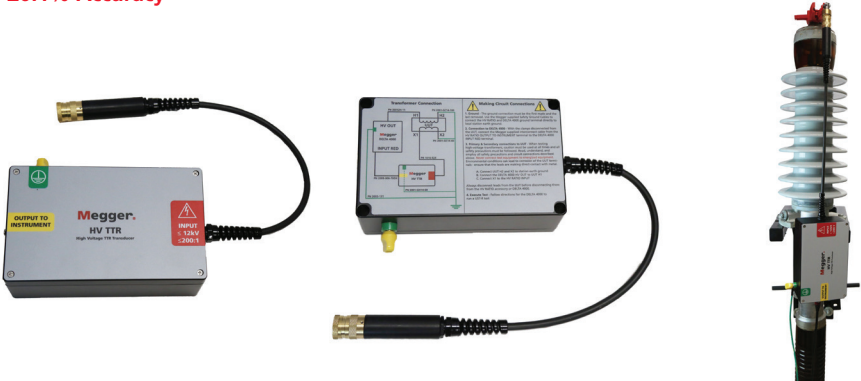
Measuring the ratio of power or distribution transformers is now easier than ever with the new HV TTR Transducer for the DELTA4000. This latest accessory utilizes the latest clamps for secure connection to the top of bushings, and provides an easy-to-follow connection diagram and steps to complete the test on the back of the accessory. With a $\pm 0.1\%$ accuracy, this accessory turns the DELTA into a true multifunction instrument.

Note: Requires Delta 4010B HV Unit for $\pm 0.1\%$ Accuracy

Cat. No. 1013-060

SPECIFICATIONS

Voltage Range 1-12,000 V
Frequency Range 1-500 Hz
Ratio Accuracy $\pm 0.10\%$



FIELD AND LAB OIL TESTING

Field Oil Cell

As an optional accessory, the field oil cell allows spot testing of oil while in the field without the delay required when sending samples to the lab. This cell is also useful for validation of oil taken from a tanker prior to filling a transformer, and associated assets. The oil cell has added value when validation of the condition/operation of a DELTA unit is required.

SPECIFICATIONS

Cell Type	3 terminal
Maximum Voltage	2 kV empty; 10 kV with insulating oil
Volume	0.6 L (20 fl. oz.)
Gap Space	0.35 in. (0.9 cm)
Weight	6 lbs (2.7 kg)
Temperature Limits	
Field oil cell	+2° C to +80° C



Cat. No. 670511

High-temperature Lab Oil Cell

The high-temperature lab oil cell is of the identical construction/ dimension as the field oil cell with the exception of the insulated spacers. The difference is the plastic insulators of the lab oil cell are replaced with Borosilicate glass, which allows operation under higher temperatures with no significant effect on results. The lab oil cell is designed to test to ASTM D924, IEC 62631-2-1:2018, and other related standards. Because this glass can break easily, it is not recommended for rough field use. It does include a rugged transit case to ensure safe transport.

SPECIFICATIONS

Cell Type	3 terminal
Maximum Voltage	2 kV empty; 10 kV with insulating oil
Volume	0.6 L (20 fl. oz.)
Gap Space	0.35 in. (0.9 cm)
Weight	6 lbs (2.7 kg)
Temperature Limits	
High-temp lab cell	+2° C to +105° C



Cat. No. 1004-716

All accessories above are included

For more information about these products, visit our website us.megger.com

SAFETY EQUIPMENT

External High-Voltage Strobe

For safe testing procedures, Megger offers a high-intensity flashing strobe complete with a 60 ft (18 m) detachable cable. A rugged connector on both ends enables typical field use. The cable used is oil resistant and designed for varying temperature condition.

The following can be purchased separately

HV strobe	Cat. No. 90009-210
Detachable cable, 60 ft (18 m)	Cat. No. 1004-532



Cat. No. 1004-639

Safety Foot Interlock

For hands-free operation, Megger offers a foot-operated safety switch. It comes with a 6.6 ft (2 m) rugged cable and an industrial rated mechanical foot pedal. This is a convenient accessory for operation of the DELTA4000 while performing routine testing



Cat. No. 1001-852

TRANSIT CASES

Hard-Sided Transport Case

Sturdy protection for your DELTA4000 and its test leads is critical. Megger offers a rugged, moisture-proof solution for storage and transport of your investment. This case is made of a tough plastic designed for harsh environments. Its foam-padded interior offers extra protection for your valuable equipment in an organized manner.

SPECIFICATIONS

Dimensions	27 x 27 x 16 in. (69 x 69 x 41 cm)
Dust and water protection rating	IP54
Weight	37 lbs (17 kg) empty



Cat. No. 2005-115

TRANSIT CASES

Soft-Padded Carry Case

If a rugged transit case is not needed or desired, a soft-padded case is available to carry your DELTA4000. This case is convenient to store the unit in when not in use yet durable enough to transport the DELTA4000 between jobs.

This carry case is **NOT** intended for transporting instruments via commercial carriers; its intention is for local transit from location to location

SPECIFICATIONS

Dimensions	11 x 12 x 20 in (28 x 30.5 x 50.8 cm)
Weight	1.6 lbs (0.7 kg)



Cat. No. 2001-766

Transport Cart

For substations and related environments where terrain is rough, and DELTA4000 is required to be moved to various testing locations, Megger offers a collapsible trolley/cart. The DELTA4000 can be setup on the cart for easy testing and allows for convenient movement throughout the testing area. The cart is equipped with a sturdy, wide handle for comfortable steering and control.

SPECIFICATIONS

Dimensions	20.5 D x 59 H x 24 W in. (52 x 150 x 61 cm)
Weight	30 lbs (13.6 kg)
Folded dimensions	11 D x 37 H x 24 W in. (28 x 94 x 61 cm)

For more information about these products,
visit our website us.megger.com



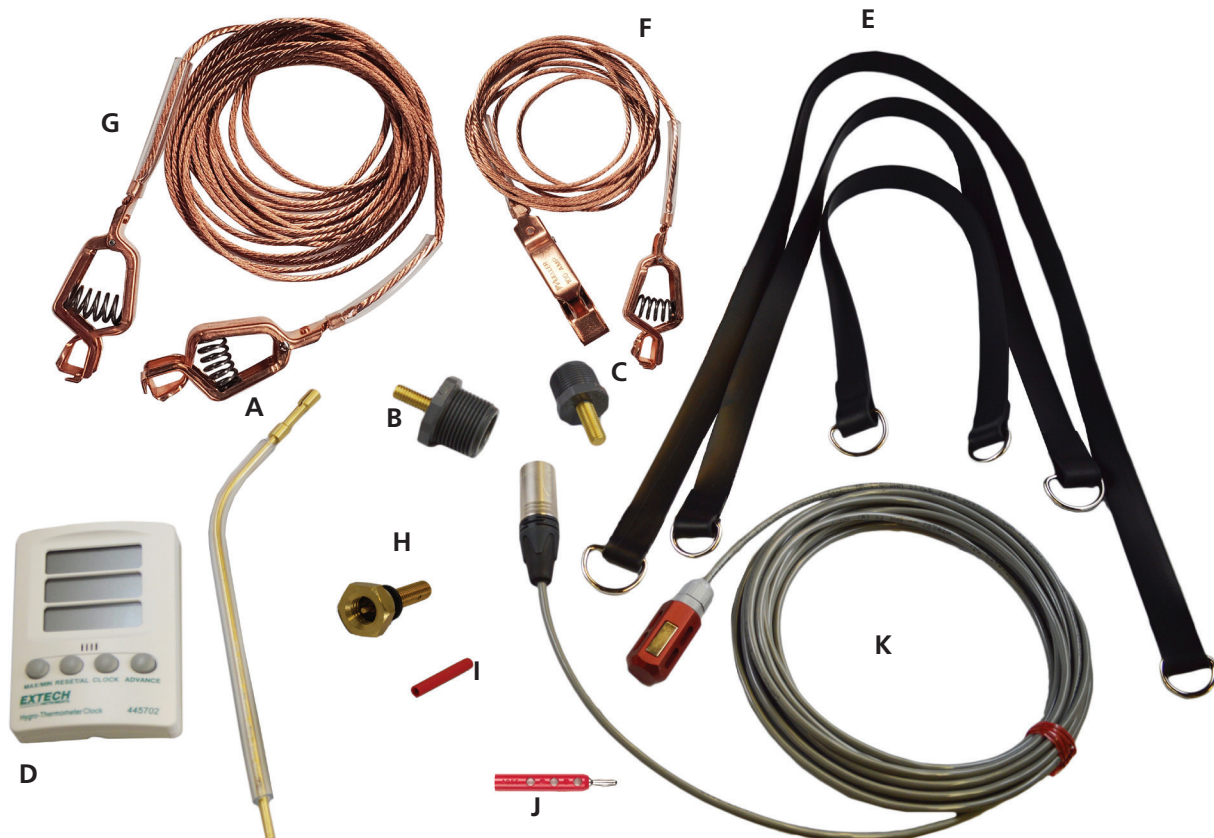
Cat. No. 2009-071

ACCESSORY KITS

Standard Kit

Cat. No. 670501

Testing transformers requires the performance of specific tests where additional apparatus is needed. Megger offers a kit that includes the most commonly used tools.



A	J" probe bushing adapter probe	30917	G	6m (20ft) non-insulating shorting lead	2014-136-20
B	Bushing tap adapter, 1 in. (2.5 cm)	30918-100	H	Bushing tap adapter – ABB (older style bushings)	2006-375
C	Bushing tap adapter, 0.75 in. (1.9 cm)	30918-000	I	Bushing adapter, female-to-female banana jack	90014-353
D	Thermometer – hygrometer – clock	670504	J	Bushing adapter, male to female	90021-216
E	Hot collar strap (set of 3)	670505	K	Temperature humidity probe with 20 ft (7 m) lead	2002-138
F	3m (10ft) non-insulating shorting lead	2014-136-10			

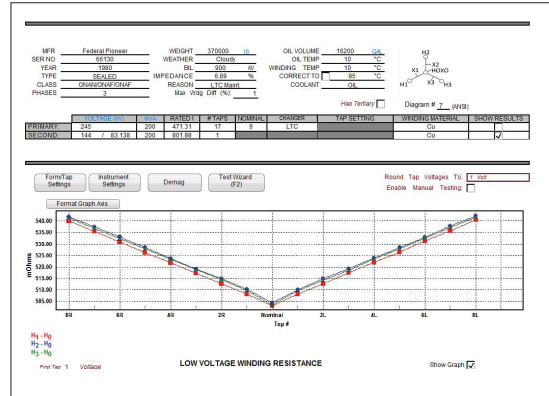
DATA MANAGEMENT SOFTWARE

PowerDB Pro and Advanced

PowerDB Pro software is a relational database with formatted test forms for data entry and reporting. Over 300 test forms are comprised in the standard forms library. Data is entered, or gathered, by remote users in "field" databases and then merged into a central master database for access by all users. Data can be imported from various sources, acquired directly from test instruments, or entered manually. Assets are efficiently organized in the database and can be searched for by location, serial number or asset ID number.

Another optional software program is PowerDB Advanced, which gives customers access to all forms within PowerDB Pro but without the relational database. The forms and ability to edit the results allow customers easy access to useful forms that can be used as a platform to develop a reliable test program.

- PowerDB Pro software on USB dongle Cat. No. DB1001S-A
- PowerDB Pro software via soft key Cat. No. DB1001-A
- PowerDB Advanced Cat. No. DB1011



EXTENDED WARRANTY

Extended Warranty Program

An extended warranty is offered as a safeguard against unexpected instrument repairs. This also helps to ensure that repair costs are covered without undue financial stress. Megger offers an extended warranty beyond the standard 12-month increments of 6 additional months, followed by 12 months, 24 months and 36 month terms. Customers are only responsible for proper return to Megger Authorized Centers, and for their shipment back.

- Additional 6-month product warranty Y6-WARRANTY
- Additional 12-month product warranty Y12-WARRANTY
- Additional 24-month product warranty Y24-WARRANTY
- Additional 36-month product warranty Y36-WARRANTY



ORDERING INFORMATION			
Item [Qty]	Cat. No.	Item [Qty]	Cat. No.
DELTA4110 Insulation Diagnostic System (DELTA4100 control unit and DELTA4010B HV unit)	DELTA4110		
DELTA4310A Insulation Diagnostic System with onboard computer (DELTA4300A control unit and DELTA4010B HV unit)	DELTA4310A		
Included Accessories			
High voltage lead: 21 m (70 ft), double shielded	30012H-11		
Measurement lead, color-coded red, 21 m (70 ft)	25572H-1		
Measurement lead, color-coded blue, 21 m (70 ft)	25572H-2		
Ground lead: 9 m (30 ft)	2002-131		
Input power cable 16A EU	17032-29		
Input power cable 16A US	17032-28		
Input power cable 16A UK	17032-30		
Safety hand switch, Interlock #1, 21 m (70 ft)	1001-850		
Safety foot interlock, 3m (10 ft)	1001-852		
HV unit power cable, 1 m (3 ft)	2002-132		
HV unit control cable, 1 m (3 ft)	2002-133		
Ground lead interconnect cable, 1 m (3 ft)	2002-134		
USB cable, 2 m (7 ft)	CA-USB		
Ethernet cable, CAT 5, 2 m (7 ft)	36798		
Backpack lead bag	2012-180		
Software DELTA manual control	1001-981		
PowerDB Lite software			
Optional Software			
PowerDB Pro software, on USB dongle	DB1001S-A		
Advanced PowerDB software, on USB dongle	DB1011		
Optional Extended Warranty and Annual Support			
Priority Access annual support plan	D4K-P-ACCESS		
Additional 6-month product warranty	Y6-WARRANTY		
Additional 12-month product warranty	Y12-WARRANTY		
Additional 24-month product warranty	Y24-WARRANTY		
Additional 36-month product warranty	Y36-WARRANTY		
Optional Accessories			
<i>For more details on DELTA4000 Accessories, please refer to the DELTA accessories brochure.</i>			
Standard accessory kit, includes:		670501	
<ul style="list-style-type: none"> ▪ Hot collar straps [set of 3] P/N 670505 ▪ Thermometer - hygrometer - clock [1] P/N 670504 ▪ Temperature and humidity probe, complete with 7 m (20 ft) lead, P/N 2002-138 ▪ 0.75" bushing tap adapter [1] P/N 30918-000 ▪ 1" bushing tap adapter [1] P/N 30918-100 ▪ "J" probe bushing tap adapter [1], P/N 30917 ▪ Bushing tap adapter - ABB (older style bushings) P/N 2006-375 ▪ Bushing tap adapter, female-to-female P/N 90014-353 ▪ Bushing adapter, male to female P/N 90021-216 ▪ 3m (10ft) non-insulating shorting lead P/N 2014-136-10 ▪ 6m (20ft) non-insulating shorting lead P/N 2014-136-20 			
Safety hand switch, Interlock #2, 2.4 m (8 ft)		1001-851	
1m (3ft) non-insulating shorting lead P/N 2014-136-3			
2m (6ft) non-insulating shorting lead P/N 2014-136-6			
Mini bushing tap connectors [set of 2] P/N 670506			
External HV strobe P/N 90009-210, complete with 18 m (60 ft) detachable lead P/N 1004-532		1004-639	
Soft padded carrying case for control or HV unit [2 required]		2001-766	
PFDF-10 Field & Laboratory Verification Tool		PFDF-10	
Transport case [2 required]		2005-115	
Transport cart / trolley		2009-071	
Calibration kit (CAL4000)		2002-137	
High-voltage reference standard		670500-1	
Transit case for 670500-1		670635	
HV TTR transducer for measuring transformer turns ratio		1013-060	
HV CVT/VT ratio transducer for measuring CVT/VT ratio & phase		1013-061	
HV TTR capacitor, single phase (10 nF, 10 kV)		36610	
HV reference capacitor (100 pF, 10 kV)		36610-1	
HV reference capacitor (1000 pF, 10 kV)		36610-2	
Transit case for capacitor set of 3 above		36610-CC	
Capacitor kit (TTR cap, 2 ref caps, transit case)		36610-KIT2	
Resonating inductor		670600-1	
Adapter kit for DELTA4000 and competitor's resonating inductor		1002-455	
Oil test cell, field model, complete with transit case		670511	
Oil test cell, high-temperature lab model, complete with transit case		1004-716	
Factory upgrade: DELTA4110 to DELTA4310A <i>Note: only available for DELTA4110 units built after August 1, 2017</i>		1010-297	
Factory upgrade: DELTA4010 to DELTA4010B. <i>Note: DELTA4010B required for HV TTR & HV CVT/VT ratio accuracy of ±0.1%</i>		DELTA4010B-UPGRADE	



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