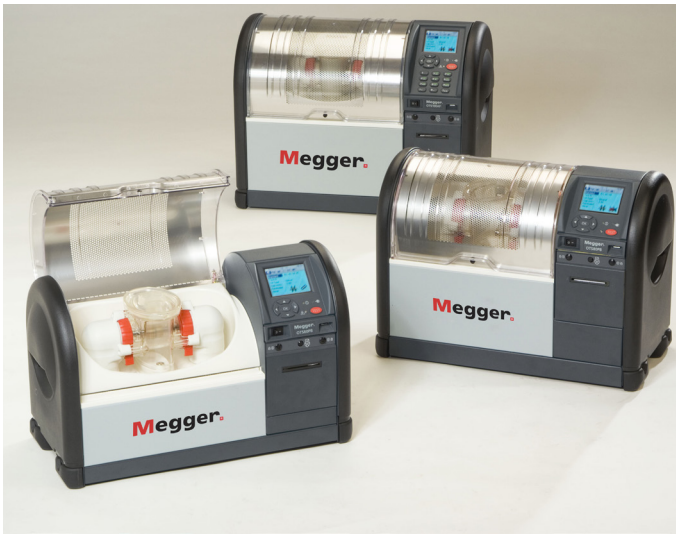
OTS PB and OTS AF Range
Fully automatic insulating oil dielectric breakdown testing



- **NEW – Pinyin Chinese Text Input**
- **NEW - IEC60156-2018**
- **NEW - IEC60156-2018 V for Viscous Oils**
- **NEW - IEC60156-2018 Annex A**
- **NEW - IEC60156-2018 Annex A (V) for Viscous Oils**
- **NEW - GBT 507-2002 - Chinese Standard**
- **NEW - Chinese language on screen**
- **NEW - Withstand tests**
- **Full Range to suit all user needs**
- **Easy adjust – locking electrode gap**
- **Fast precision breakdown detection**
- **Ultra-fast HV switch off time**
- **Suitable for mineral, ester and silicone oils**

DESCRIPTION

Megger's range of automatic oil test sets performs accurate breakdown and withstand voltage tests on mineral, ester and silicone insulating liquids. Common across the range precision, shatter proof test vessels are easy to clean and provide repeatable results, whether they are used in the field or laboratory featuring lock in precision electrode gap setting adjustment wheels. The transparent, shielded lid and large test chamber allows easy access to the test vessel, enabling users to see what is happening within the test chamber.

All of the current test standards world wide are preloaded in the instrument for convenient automatic operation, however should a new test standard or an existing standard be amended there are 3 custom tests that can be configured to the new requirements. This enables testing to continue to cover the short period while Megger updates the test procedure files. New updated files are then downloaded by the user and installed into the test instrument via a USB memory stick / flash drive.

Test results are identified either by a serial number or asset ID and are time and date stamped. The Megger asset and data management software, PowerDB Lite, is bundled at no extra cost providing an excellent tool for downloading and printing results.

An internal printer provides a hard copy of results. Ink based printout ensures durability at all temperatures. USB flash drive for easy transfer of test results, external USB printer and on the AF model a barcode scanner.

User safety is paramount and Megger have designed independent and dual redundant high voltage cut-off circuitry to ensure safety. During a test the operator can terminate by pressing any button on the keyboard which will remove high voltage immediately and abort the test. The transparent lid provides ample visibility within the chamber yet is protected and electrically shielded by a screen with multiple links to instrument ground.

OTS PB models

These 60 kV and 80 kV oil test sets are small and the lightest on the market with weight ranging from 16.8 kg to 20.8 kg depending on model configuration. The transport case and carry bag are optional accessories. The carry bag has pouches for electrode accessory pack, leads, quick user guide, paper roll etc. these units supplied mains powered and battery operated for additional flexibility in portable applications. All PBs are fitted with NiMH batteries.

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OTS AF models

These 60 kV, 80 kV and 100 kV models have a much larger test chamber for even easier access and cleaning, particularly useful in a lab environment. They are fitted with a 12 key alpha-numeric keypad to facilitate entry of test ID, file names, notes etc. Alpha characters are entered by repetitive pressing on a key. The AF models also have the ability to use a USB barcode reader to scan oil sample barcode labels, ideal for better integration within a laboratory.

APPLICATION

Monitoring and maintenance of oil quality is essential in ensuring the reliable operation of oil filled electrical equipment. Codes of practice have been established in many countries that include several different types of test on insulating oils.

One of the fundamental tests of oil quality is the breakdown voltage test, which is a measure of the oil's ability to withstand electric stress. A low breakdown voltage can indicate the presence of contaminants such as water or conducting particles.

In addition to the breakdown test, the withstand test is a measure of the oils ability to withstand a constant electrical stress. Failure to achieve this also indicates contaminants.

Care should be taken to ensure the process of sampling oil and subsequent testing does not in any way contaminate it with foreign objects. Cleaning vessels between oil tests should be a rinse with the next sample, never clean with fibrous materials. To ensure an accurate reading set gap carefully and lock adjusting wheels.

Refer to the OTSVesselPrep--2007-993_AN_en_V0# for more details.

FEATURES AND BENEFITS

COMMON ACROSS PB AND AF

- Lock in precision oil vessel - lockable gap setting
- Flat electrode gap gauges that will not damage electrodes
- Oil temperature is measured continuously so it can be determined whether the oil test sample is within the range allowed by the test standards before the test is started
- QVGA colour display with adjustable backlight (easy to read in sunlight or dark conditions)
- Large, easy clean test chamber with oil drain
- High visibility test chamber
- Safe operation with dual redundant micro switches
- Intuitive user interface
- Fully automatic operation with preloaded international test standards
- User configurable test sequences to cover transition period of new / updated test standards (standards maintained via USB updates from Megger)
- All instruments supplied with one 400 ml test vessel in the box as standard
- Built onto a rigid box section chassis to prevent flexing on impact that otherwise would damage the transformer
- Unique built in chamber drain pipe for easy removal of oil accidentally spilt in test chamber, this can easily be connected to a lab waste system
- Selecting favourite tests speeds up selection by only displaying the standards regularly used by the user

OTS PB ADDITIONAL FEATURES AND BENEFITS

- Small and lightweight, lightest on the market starting at 16.8 kg
- Mains and battery powered for portable applications

OTS AF ADDITIONAL FEATURES AND BENEFITS

- Barcode scanning capability for oil sample ID
- Extra large test chamber for ease of use in high productivity application
- 12 key alpha-numeric keypad to facilitate entry of test ID, file names, notes etc.

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COMMON PB AND AF OPTIONAL ITEMS

- Voltage check unit (VCM100D/VCM80D)
- 150 ml test vessel.

OTS60PB and OTS80PB OPTIONAL ITEMS

- Carry bag
- Transport case

OTS60AF, OTS80AF and OTS100AF OPTIONAL ITEMS

- Barcode scanner (USB)

AVAILABLE UPGRADE

To update your OTS to the new IEC60156-2018 standard please contact your local Megger Authorised Sevice Centre for details.

OTS PB and OTS AF Range

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* Optional item

** IEC 60156 recommends a separate test vessel is used for each type of fluid to be tested

*** Important future proof feature





		OTS60PB	OTS80PB	OTS60AF	OTS80AF	OTS100AF
Standard items						
Internal printer		■		■		
NiMH battery		■				
Power cord		■		■		
Full electrode set - IEC and ASTM		■		■		
OTS Range Differentiating Features						
Max test voltage	60 kV	■		■		
	80 kV		■		■	
	100 kV					■
Power Supply	Mains and NiMH battery operation	■				
	Mains only operation			■		
Data management	Internal test result memory	■		■		
	Download results to USB stick	■		■		
	Barcode scanning capability			■		
	Keypad for easy asset ID and memo entry			■		
Ruggedness	Tough display and chamber lid	■		■		
	Low cost shatter proof test vessel	■		■		
	Large corner protecting rubber feet	■		■		
	Rugged non-flex construction	■		■		
Transport	Transport case	■*				
	Protective carry case	■*				
	Light weight (<20.8 kg) one man carry	■				
Operating costs	Low cost test vessel (Vessel of each oil **)	■		■		
	Annual full calibration	■		■		
Test standards	Fast favourite list selection	■		■		
	Fully automatic test sequence	■		■		
	Test standards update via USB device ***	■		■		
	Custom tests	■		■		
Cleanliness	Easy pour / clean vessel design	■		■		
	Large test chamber (easy access)			■		
	Test chamber spilt oil drain	■		■		
Accuracy	Continuous oil temperature measurement	■		■		
	Lockable thumb wheel adjustable electrode gap	■		■		
	Voltage output verification unit available	■		■		

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SPECFICATIONS

Test voltage

OTS60PB	0 to 60 kV rms maximum (30 kV - 0 - 30 kV)
OTS80PB	0 to 80 kV rms maximum (40 kV - 0 – 40 kV)
OTS60AF	0 to 60 kV rms maximum (30 kV - 0 - 30 kV)
OTS80AF	0 to 80 kV rms maximum (40 kV - 0 - 40 kV)
OTS100AF	0 to 100 kV rms maximum (50 kV - 0 - 50 kV)

Voltage rise time

0.5 kV/s, 2.0 kV/s or 3 kV/s depending on selected test standard and 0.5 kV/s up to 10kV/s in custom test

Voltage rise time accuracy

better than 5%

Voltage resolution and accuracy

Up to 5 kV/s: 0.1 kV +/- 1% +/-2 digits
5 kV/s up to 10 kV/s: 0.1 kV
+/- 1% +/-4 digits

Programmed test sequences

- ASTM D 1816-12
- ASTM D 1816-12E (ester oil)
- ASTM D 877A-19
- ASTM D 877B-19
- AS1767.2.1
- BS EN 60156-96
- BS 5730a AD 30 kV
- BS 5730a AD 40 kV
- BS 5730a BCEF 22 kV
- BS 5730a BCEF 30 kV
- BS 148 / EN 60156
- CEI EN 60156-95
- Custom 5, 6 and 10
- GB/T 507-2002
- GOST 6581-75
- IEC 60156-95
- IEC 60156-2018
- IEC 60156-2018V
- IEC 60156-2018 Annex A
- IEC 60156-2018 Annex A (V)
- IRAM 2341
- IS 6792-2017
- IS 6792-2-2017
- JIS C 2101-99 (M)
- JIS C 2101-99 (S)
- NF EN 60156
- PA SEV EN60156
- SABS EN60156
- UNE EN 60156
- VDE0370 part 5
- Withstand A
- Withstand B

Vessels 400 ml (standard)
150 ml (accessory)

Carefully designed test vessels manufactured from the most chemical resistant clear polymer on the market provides tried and tested reliable test results. Featuring precision electrode alignment and adjustment wheels that lock electrodes in position, the option of a 150 ml vessel for low volume oil samples is also available

Temperature measuring range

10 °C to 65 °C (ASTM D877 requires oils to be within 20 °C and 30 °C) (IEC 60156 required oil to be within 15 °C and 25 °C)

Temperature sensor resolution

1 °C

Power supply Line voltage 85 to 265 VAC
Line frequency 50/60 Hz

Battery type NiMH 24 V 2 Ah (OTS60PB or OTS80PB ONLY)

Power source: 85 V – 265 V 50/60/400 Hz input. Portable unit can be powered from 85 V – 265 V or its internal battery.

Battery life: 10 test sequences up to 70 kV using 2 Ah battery

Charge retention at 20°C: NiMH 50% discharged after 1 month

Battery charging: Automatic when connected to power source. Charge time 16 hours slow or 2 hour fast charge to >90%

Interface 2 x USB type-A (Flash drive, printer) , 1 x USB type-B (Factory use)

Internal printer Matrix impact printer
Paper 57.5 mm wide

External printer: supports PCL3, PCL6, PS and EPS

Protection Dual safety micro switches on chamber cover

Display 3.5 in display. 320 x 240 QVGA colour display with backlight

Operating temperature range and humidity

0 °C to +50 °C.
80% RH at 40 °C
non-condensing conditions

Storage temperature range and humidity

-30 °C to +65 °C .
95% RH at 40 °C
non-condensing conditions

Maximum altitude

1000 m

IP rating IP30

Safety Designed in accordance with IEC61010

EMC Light industrial IEC 61326-1 Class B, CISPR 22, CISPR 16-1 and CISPR 16-2

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Dimensions

OTS60PB	520 mm x 340 mm x 250 mm
OTS80PB	520 mm x 380 mm x 250 mm
OTS60AF	580 mm x 420 mm x 290 mm
OTS80AF	580 mm x 420 mm x 290 mm
OTS100AF	580 mm x 420 mm x 290 mm

Weight

OTS60PB	16.8 kg
OTS80PB	20.8 kg
OTS60AF	30 kg
OTS80AF	30 kg
OTS100AF	30 kg
Test vessels	1.1 kg (400 ml and 150 ml)
Language	English, French, German, Spanish, Czech, Dutch, Finnish, Italian, Norwegian, Polish, Portuguese, Russian, Swedish and Chinese

PROGRAMMED TEST SEQUENCE OVERVIEW

	Oil types tested		Electrode gap options (mm)					Electrode shape options			Oil stirring options		Voltage rise rate options			Breakdown test sequence		
Standards complied with and programmed	Mineral Ester HMWH*	Silicone	1.0	2.0	2.5	2.54	4.0						0.5 kV/s	2 kV/s	3 kV/s	Number of tests	Intial stand time	Time between tests
AS1767.2.1	■	■			■			■	■		■	■		■		6	5 mins	2 mins
ASTM D 1816-12	■	■	■	■				■				■	■			5	3 mins	1 min 15s
ASTM D 1816-12E (Ester)	■	■	■	■				■				■	■			5	30 mins	1 min 15s
ASTM D 877A-19	■	■				■				■	■				■	5	2 mins	1 min
ASTM D 877B-19	■	■				■				■	■				■	1 x 5	2 mins (x5)	N/A
BS148 EN60156	■	■			■			■	■		■	■		■		6	5 mins	2 mins
BS 5730a AD 30 kV/40 kV	■	■	30 kV = 2.5 40 kV = 4.0					■	■	■	■	■		■		3	10s to 600s	N/A
BS 5730a BCEF 22 kV/30 kV	■	■	22 kV = 2.5 30 kV = 4.0					■	■	■	■	■		■		4	10s to 600s	N/A
BS EN 60156-96	■	■			■			■	■		■	■		■		6	5 mins	2 mins
CEI EN 60156-95	■	■			■			■	■		■	■		■		6	5 mins	2 mins
Custom 5, 6 and 10	■	■	1.0 to 7.0					■	■	■	■	■	0.5 kV/s to 10 kV/s			5, 6 or 10	10s to 600s	10s to 600s
GBT 507-2002	■	■			■			■	■		■	■		■		6	5 mins	2 mins
GOST 6581-75	■	■			■			■				■		■		6	10 mins	5 mins
IEC 60156-95	■	■			■			■	■		■	■		■		6	5 mins	2 mins
IEC 60156-2018	■	■			■			■	■		■	■		■		6	5 mins	2 mins
IEC 60156-2018 (V)	■	■			■			■	■		■	■		■		6	15 mins	6 mins
IEC 60156-2018 Annex A	■	■			■			■	■		■	■		■		10	5 mins	1 mins
IEC 60156-2018 Annex A (V)	■	■			■			■	■		■	■		■		10	15 mins	3 mins
IRAM 2341	■	■			■			■	■		■	■		■		6	5 mins	2 mins

* High Molecular Weight Hydrocarbon

...Continued	Oil types tested		Electrode gap options (mm)					Electrode shape options			Oil stirring options		Voltage rise rate options			Breakdown test sequence		
Standards complied with and programmed	Mineral Ester HMWH*	Silicone	1.0	2.0	2.5	2.54	4.0						0.5 kV/s	2 kV/s	3 kV/s	Number of tests	Intial stand time	Time between tests
IS6792 -2017	■	■			■			■	■			■		■		6	10 mins	2 mins
IS6792-2 -2017	■	■			■			■	■			■		■		6	10 mins	6 mins
JIS C 2101-99 (M)	■				■				■			■			■	5 x 2	2 mins	1 min
JIS C 2101-99 (S)		■			■				■		■				■	1 x 5	2 mins (x5)	N/A
NF EN 60156	■	■			■			■	■		■	■		■		6	5 mins	2 mins
PA SEV EN 60156	■	■			■			■	■		■	■		■		6	5 mins	2 mins
SABS EN 60156	■	■			■			■	■		■	■		■		6	5 mins	2 mins
UNE EN 60156	■	■			■			■	■		■	■		■		6	5 mins	2 mins
VDE 0370 part 5	■	■			■			■	■		■	■		■		6	5 mins	2 mins
Withstand A	■	■	2.5 to 4.0					■	■	■	■	■		■		1	10s to 600s	N/A
Withstand B	■	■	2.5 to 4.0					■	■	■	■	■		■		2	10s to 600s	N/A

* High Molecular Weight Hydrocarbon

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ORDERING INFORMATION

Description	Order Code
OTF PB Models	
OTS60PB	
OTS60PB-EU	1014-525
OTS60PB-UK	1014-526
OTS60PB-US	1014-527
OTS60PB-AU	1014-528
OTS80PB	
OTS80PB-EU	1014-529
OTS80PB-UK	1014-530
OTS80PB-US	1014-531
OTS80PB-AU	1014-532
Included accessories (OTS PB models)	
Vessel 400 ml assembly (stirrer lid fitted) Full electrode set - IEC and ASTM IEC and ASTM impeller Printer, NiMH battery, Electrode gauge set Calibration certificate Power DB guide Quick Start Guide OTS Vessel Preparation Guide	
OTF AF Models	
OTS60AF	
OTS60AF-EU	1014-533
OTS60AF-UK	1014-534
OTS60AF-US	1014-535
OTS60AF-AU	1014-536
OTS80AF	
OTS80AF-EU	1014-537
OTS80AF-UK	1014-538
OTS80AF-US	1014-539
OTS80AF-AU	1014-540
OTS100AF	
OTS100AF-EU	1014-541
OTS100AF-UK	1014-542
OTS100AF-US	1014-543
OTS100AF-AU	1014-544
Included accessories (OTS AF models)	
Vessel 400 ml assembly (stirrer lid fitted) Printer Full electrode set - IEC and ASTM Electrode gauge set IEC and ASTM impeller Calibration certificate Power DB guide Quick Start Guide OTS Vessel Preparation Guide	
If you wish to upgrade your existing OTS please contact your local Megger Authorised Service Center for prices and availability	

Description	Order Code
Optional accessories	
OTS IEC60156 Electrode set contents - supplied in accessory case 12.7 mm spherical electrodes (2) 36 mm mushroom electrodes (2) Magnetic stirrer bar (2) Magnetic stirrer bar retriever (1) Gap gauge set	1001-477
OTS ASTM D877/D1816 Electrode set contents – supplied in accessory case 25.4 mm standard (sharp edges) cylindrical electrodes (2) 25.4 mm non-standard (round edges) cylindrical electrodes (2) 36 mm mushroom electrodes (2) Magnetic stirrer bar (2) Magnetic stirrer bar retriever (1) Gap gauge set	1001-478
Full electrode set (covers IEC and ASTM standards) 12.7 mm spherical electrodes (2) 36 mm mushroom electrodes (2) 25.4 mm standard (sharp edges) cylindrical electrodes (2) 25.4 mm non-standard (round edges) cylindrical electrodes (2) Magnetic stirrer bar (2) Magnetic stirrer bar retriever (1) Gap gauge set	1001-479
Vessel lid mounted impeller (ASTM or IEC) for use with 400 ml vessel	1001-102
Carry bag (padded) OTS80PB	1001-476
Carry bag (padded) OTS60PB	1001-480
Vessel 400 ml assembly (no electrodes supplied)	1001-473
Vessel 150 ml assembly (no electrodes supplied)	1001-474
VCM100D digital voltage checker	1001-105
VCM80D digital voltage checker	1001-801
Printer paper, 20 rolls (4 rolls supplied if printer configured)	1008-030
Printer Ribbon Cassette	25995-002
Barcode reader, USB	1001-047
Transport case (with wheels)	1001-475
ASTM alternative propeller shaft assy	1007-153
IEC alternative propeller shaft assy	1007-154
Electrodes - Spherical (pair)	6220-484
Electrodes - Mushroom (pair)	6220-580
Electrodes - Cylindrical (pair)	6220-483
Electrodes - Non-standard cylindrical with 0,5 mm edge radius (pair)	6220-538
Electrode gauge set 1, 2, 2.5, 2.54, 4 mm	1002-144


EU Lead


UK Lead


US Lead


AU Lead

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ORDERING INFORMATION

Description	Order Code
Calibration certificates	
Calibration Certificate OTS AF	1001-921
Calibration Certificate OTS PB	1001-920
UKAS Calibration Certificate OTS60 AF	1000-089
UKAS Calibration Certificate OTS80 AF	1000-091
UKAS Calibration Certificate OTS100 AF	1000-088
UKAS Calibration Certificate OTS60 PB	1000-090
UKAS Calibration Certificate OTS80PB	1005-943

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