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

- **Fully compliant with international and national standards**
- **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 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 optional 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 kg to 23.5 kg depending on model configuration. They come complete with optional carry bag and transport case. The carry bag has pouches for electrode accessory pack, leads, quick user guide, paper roll etc. these units can be supplied mains powered only, or mains powered and battery operated for additional flexibility in portable applications. The optional batteries are NiMH, or if selecting an 80 kV model a lead acid battery can be specified. In addition, an internal 12 V DC charger and vehicle adaptor cable is standard when any battery option is fitted.

OTS AF models

These 60 kV, 80 kV and 100 kV models have much a 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 with a LIM system.

Megger.

OTS PB and OTS AF Range

Fully automatic insulating oil dielectric breakdown testing

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.

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.

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 commenced
- QVGA colour display with 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, unless the super user kit is specified (see below)
- Built onto rigid box section chassis to prevent flexing on impact that otherwise would damage 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
- Test standards favorites list 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 kg
- Battery options for portable use

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.

COMMON PB AND AF OPTIONAL ITEMS

- Superuser Kit. This cost effective solution supplies everything you need to carry out effective oil testing.
  Includes:
  - A 150 ml test vessel for low volume testing.
  - A standard 400 ml test vessel.
  - A stirrer lid with choice of three impellers. Additional impellers focused on ASTM and IEC standards
  - A useful guide booklet to provide essential advice on how to get the best from you new OTS , FREE.
  - All supplied in a FREE durable Megger case to easily and safely transport your test essentials.

- Internal printer
- Voltage check unit (VCM100D/VCM80D)
- Motorised lid impeller
- Megger supplies as standard with the stirrer lid assembly three impellers. Firstly there's the large red impeller which is useful for very dirty oil. This has larger blades to help ensure the effective circulation of any particulates between the electrodes during the test so that the full potential of their effect on breakdown voltage may be assessed. The other two impellers are alternative impellers. The Impeller on the left is optimised for IEC 60156, whilst the one on the right is ideal for ASTM D1816.
- 150 ml test vessel

OTS60PB OPTIONAL ITEMS

- Factory fitted NiMH battery with 12 V charger and vehicle lead
- Carry bag
- Transport case

OTS80PB OPTIONAL ITEMS

- Factory fitted lead-acid or NiMH battery with 12 V charger and vehicle lead
- Carry bag
- Transport case

OTS60AF, OTS80AF and OTS100AF OPTIONAL ITEMS

- Barcode scanner (USB)

* 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**
Configured to order options						
Printer (built in) or not		■		■		
Internal battery fitted or not		■				
Mains / Line supply lead (plug)		■		■		
Electrode set supplied (IEC ASTM or Universal)		■		■		
Soft Padded carry case		■				
OTS Range Differentiating Features						
Max test voltage	60 kV	■		■		
	80 kV		■		■	
	100 kV					■
Power supply	Lead acid battery option		■			
	NiHM battery option	■				
	Vehicle 12 V skt lead option	■				
	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 (<23 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	■		■		

Megger

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

Voltage rise time accuracy
better than 5%

Voltage resolution and accuracy
0.1 kV ±1% ±2 digits

Programmed test sequences

ASTM D 1816-12	BS EN 60156-96	SABS EN60156
ASTM D 1816-12E (ester oil)		
ASTM D 877A-13	CEI EN 60156-95	VDE0370 part 5
ASTM D 877B-13	IRAM 2341	AS1767.2.1
IEC 60156-95	UNE EN 60156	PA SEV EN60156
BS148/EN60156	NF EN 60156	JIS C 2101-99 (M)
IS 6792	GOST 6581-75	JIS C 2101-99 (S)
IS 6792-2		

plus 3 custom test sequences

Vessels 400 ml (standard)
150 ml (superuser pack / option)
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 150ml 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 Lead acid 2 x 12 V 4 Ah, (OTS80PB ONLY)
Or NiMH 24 V 2 Ah (OTS60PB or OTS80PB ONLY)

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

Internal printer (Option)
Matrix impact printer
Paper 57.5 mm wide

External printer Any printer with USB interface and PCL3 driver

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

Storage temperature range and humidity
-30 °C to +65 °C
95% RH at 40 °C

Maximum altitude
2000 m

Safety Designed in accordance with IEC61010

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

Dimensions

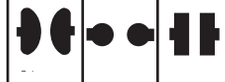
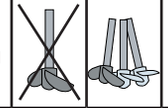
OTS60PB	520 mm x 340 mm x 250 mm
OTS80PB	520 mm x 380 mm x 250 mm
OTS60AF	580 mm x 420 mm x 290 mm
OTS80AF	580 mm x 420 mm x 290 mm
OTS100AF	580 mm x 420 mm x 290 mm

Weight

OTS60PB	16 kg (printer, no battery), 16.8 kg (printer, NiMH battery)
OTS80PB	20 kg (printer, no battery), 20.8 kg (printer, NiMH battery), 23.2 kg (printer, lead acid batteries
OTS60AF	30 kg with printer option fitted
OTS80AF	30 kg with printer option fitted
OTS100AF	30 kg with printer option fitted
Test vessels	1.1 kg (400 ml and 150 ml)

Language English, French, German, Spanish, Czech, Dutch, Finnish, Italian, Norwegian, Polish, Portuguese, Russian and Swedish

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						0.5 kV/s	2 kV/s	3 kV/s	Number of tests	Intial stand time	Time between tests
IEC 60156-95	■	■			■		■	■		■	■		■		6	5 mins	2 mins
BS EN 60156-96	■	■			■		■	■		■	■		■		6	5 mins	2 mins
CEI EN 60156-95	■	■			■		■	■		■	■		■		6	5 mins	2 mins
IRAM 2341	■	■			■		■	■		■	■		■		6	5 mins	2 mins
UNI EN 60156	■	■			■		■	■		■	■		■		6	5 mins	2 mins
NF EN 60156	■	■			■		■	■		■	■		■		6	5 mins	2 mins
SABS EN 60156	■	■			■		■	■		■	■		■		6	5 mins	2 mins
VDE 0370 part 5	■	■			■		■	■		■	■		■		6	5 mins	2 mins
AS1767.2.1	■	■			■		■	■		■	■		■		6	5 mins	2 mins
PA SEV EN 60156	■	■			■		■	■		■	■		■		6	5 mins	2 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
ASTM D 1816-12	■	■	■	■			■				■	■			5	3 mins	1 min 15s
ASTM D 1816-12E (Ester)	■	■	■	■			■				■	■			5	30 mins	1 min 15s
ASTM D 877A-13	■	■				■			■	■				■	5	2 mins	1 min
ASTM D 877B-13	■	■				■			■	■				■	1 x 5	2 mins (x5)	N/A
Custom tests (x3) (Programmable)	■	■	1.0 to 7.0				■	■	■	■	■	0.5 kV/s to 5 kV/s			5, 6 or 10	10s to 600s	10s to 600s
IS6792	■	■			■		■	■			■		■		6	10 mins	2 mins
IS6792-2	■	■			■		■	■			■		■		6	10 mins	6 mins
GOST 6581-75	■	■			■		■				■		■		6	10 mins	5 mins

ORDERING INFORMATION

Description	Order Code
OTS60PB	Configured* Page 8
OTS80PB	Configured* Page 8
OTS60AF	Configured* Page 7
OTS80AF	Configured* Page 7
OTS100AF	Configured* Page 7

Included accessories (On all configurations)

Vessel 400 ml assembly
12 V vehicle charger lead (OTS PB battery configurations only)
Magnetic bead stirrers (2 off)
Magnetic bead retriever
User manual CD

Electrode gauge set 1, 2, 2.5, 2.54 mm	1002-144

Configured accessories (to order additional or spare)

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

Description	Order Code
Optional accessories	
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 mm	1002-144

OTS Super-user kit:
400 ml vessel kit
150 ml vessel kit
Additional IEC impeller
Additional ASTM impeller
Standard impeller
Vessel lid mounted impeller (ASTM D1816) for use with 400 ml vessel
'Megger Guide to break down testing' booklet
Oil testing application note

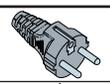
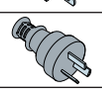
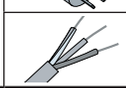
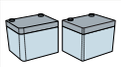
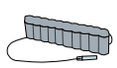
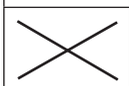
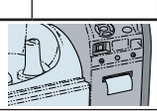
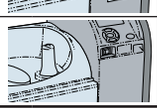
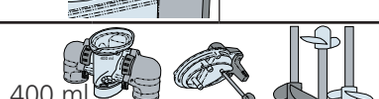
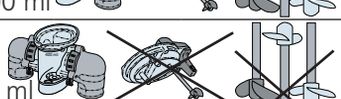
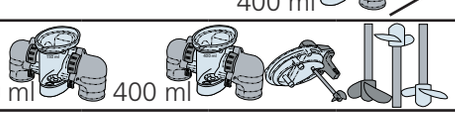
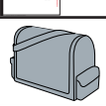
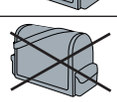
Carry case	1007-467

* See ordering configuration on previous page

ORDERING CONFIGURATION

Example of an ordering configuration:-

OTS80PB-UK-1-A-P-S-C = This order is for an OTS80PB with UK power lead, Sealed LEAD ACID battery, ASTM electrode set, internal printer, super user kit and carry case.

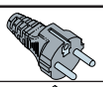
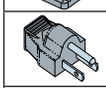
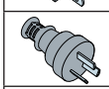
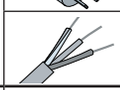
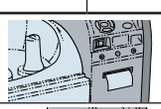
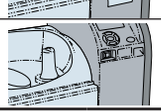
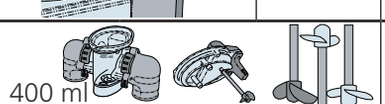
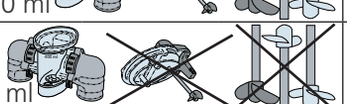
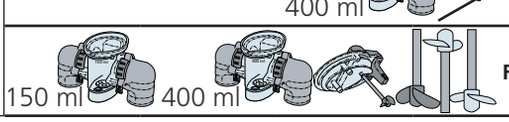
Model:	**OTS**	**PB-**	-	-	-	-	-		
Select a model	60 kV	60PB							16 kg
	80 kV	80PB							20 kg
Select Power Cord		EU Lead	EU						
		UK Lead	UK						
		US Lead	US						
		AU Lead	AU						
		NO Plug	BL						
Battery options		Sealed LEAD ACID (OTS80PB ONLY)		1					3.3 kg
		NiMH (OTS60PB and OTS80PB ONLY)		2					0.8 kg
		No Battery		X					
Electrode options		ASTM set			A				
		IEC set			E				
		Full set			U				
Printer		Internal printer				P			0.54 kg
		No printer				X			0.08 kg
Stirrer options	 400 ml	Stirrer lid fitted					4		0.3 kg
	 400 ml	Stirrer lid not fitted					X		0.3 kg
	 150 ml 400 ml **FREE**  Case	Super user kit					S		3.6 kg
Carry case		Carry case (PB Models only)						C	1.3 kg
		No carry case						X	

ORDERING CONFIGURATION

Example of an ordering configuration:-

OTS100AF-USA-P4 = This order is for an OTS100AF with US power lead, ASTM electrode set, internal printer and lid stirrer.

Model:	**OTS**	**AF-**	-		-	-		

							Weight
Select a model	60 kV	60AF					29.5 kg
	80 kV	80AF					29.5 kg
	100 kV	100AF					
Select Power Cord		EU Lead	EU				
		UK Lead	UK				
		US Lead	US				
		AU Lead	AU				
		NO Plug	BL				
Electrode options				ASTM set	A		
				IEC set	E		
				Full set	U		
Printer				Internal printer	P		0.54 kg
				No printer	X		0.08 kg
Stirrer options	 400 ml				Stirrer lid fitted	4	0.3 kg
	 400 ml				Stirrer lid not fitted	X	0.3 kg
	 150 ml 400 ml FREE  Case				Super user kit	S	3.6 kg

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