

OTS100AF, OTS80AF and OTS60AF

Laboratory oil testers



- **Laboratory instruments for measuring insulating oil breakdown voltage**
- **Lock in precision – oil vessel with lockable adjustment**
- **Bright 3.5" colour display visible out doors**
- **Suitable for mineral, ester and silicon oils**
- **Trip detection circuit with direct measurement of voltage and current**
- **Ultra fast (< 10 us) HV switch off time**

DESCRIPTION

Megger's automatic laboratory oil test sets perform accurate breakdown voltage tests on mineral, ester and silicon insulating liquids. Moulded test vessels give repeatable results with lock in precision electrode gap setting adjustment wheels. The transparent, shielded lid and large test chamber enable easy access to the test vessel.

All three laboratory models are fitted with a 12 key alphanumeric keypad to facilitate entry of test ID, filenames, notes etc. Alpha characters are entered by repetitive pressing on a key, the same way as text is entered modern cellular telephones.

Test standards are preloaded in the instrument and new versions can be uploaded via USB flash drive. All laboratory models support the creation of user defined custom tests. Test results are identified either by a serial number or asset ID and are time and date stamped. Megger's 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 interfaces (x3) support PC connection, USB flash drive, external USB printer and 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.

FEATURES AND BENEFITS

- Test voltages : 60 kV, 80 kV and 100 kV
- Lock in precision oil vessel - lockable gap setting
- Flat electrode gap gauges that will not damage electrodes
- Automatic oil temperature measurement
- QVGA colour display with backlight visible in sunlight
- Large, easy clean test chamber with oil drain
- High visibility test chamber
- Safe operation with dual redundant micro switch
- Intuitive user interface

OPTIONAL FEATURES

- Internal printer
- Motorised lid impeller
- Voltage check unit (VCM100D)
- Transport case

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.

SPECIFICATIONS

Test voltage

OTS60AF -30 to +30 kVrms

OTS80AF -40 to +40 kVrms

OTS100AF -50 to +50 kVrms

Voltage resolution and accuracy

0.1 kV \pm 1% \pm 2 digits

Programmed test sequences

ASTM D 1816-04

ASTM D 877A-02

ASTM D 877B-02

IEC 60156-95

Vessels 400 ml (standard) 150 ml (option)

Nylon 12 chamber provides precision electrode alignment, adjustment wheels lock electrodes in position, option of 150 ml vessel for low volume oil samples

Temperature sensor resolution

1 °C

Power supply

Line voltage 85 to 265 VAC

Line frequency 50/60 Hz

Interfaces

USB 2.0 compatible

2 x USB type-A (Flash drive, printer, other)

1 x USB type-B (PC)

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 320 x 240 QVGA colour display with backlight

Environment

Operating temperature 0 °C to +50 °C

Storage temperature -30 °C to +65 °C

Humidity 80% RH at 40 °C operation

95% RH at 40 °C storage

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

All models 580 mm x 420 mm x 290 mm

Weight

All models 30 kg with printer option fitted



400 ml vessel assembly (with electrodes fitted)














VCM100D

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-		-				
Select Model	100 kV	100							Weights 29.5 kg
	80 kV	80							29.5 kg
	60 kV	60							29.5 kg
Select Power Cord		EU Lead	EU						
		UK Lead	UK						
		US Lead	US						
		Australian Lead	AU						
		No Plug Lead	BL						
Select Electrode Set			ASTM Set	A					
			IEC Set	E					
			Full Set	U					
Select Printer Option				Internal Printer	P				0.54 kg
				No Printer	X				0.08 kg
Select Stirrer Option				Stirrer Lid Assembly Fitted	4				0.3 kg
				Stirrer Lid Assembly Not Fitted	X				

ORDERING INFORMATION

Product	Order Code	Product	Order Code
Included Accessories (on all configurations)		Optional accessories	
Vessel 400 ml assembly		Vessel 400 ml assembly (no electrodes supplied)	1001-473
Magnetic bead stirrers (2 off)		Vessel 150 ml assembly (no electrodes supplied)	1001-474
Magnetic bead retriever		VCMD Digital calibration meter	1001-105
Feeler gauge set 1, 2, 2.5, 2.54 mm		Printer paper, 1 roll (MOV applies) (4 rolls supplied if printer configured)	25995-001
User manual			
PowerDB Lite software			
Configured accessories (to order additional or spares)			
IEC60156 Electrode Set - 12.7 mm spherical (2), 36 mm mushroom (2)	1001-477		
ASTM D877/1816 electrode set - 25.4 mm cylindrical (2 std, and 2 none std), 36 mm mushroom (2)	1001-478		
Full electrode set ASTM and IEC electrodes	1001-479		
Vessel lid mounted impeller (ASTM D1816) for use with 400 ml vessel	1001-102		

OTS80PB and OTS60PB

Portable oil test sets



- **Light-weight, rugged, portable instruments for measuring insulating oil breakdown voltage**
- **Lock in precision - oil vessel with lockable adjustment**
- **Bright 3.5 inch colour display visible out doors**
- **Suitable for mineral, ester and silicon oils**
- **Trip detection circuit with direct measurement of voltage and current**
- **Ultra fast (<10 μ s) HV switch off time**

DESCRIPTION

Megger's automatic portable oil test sets perform accurate breakdown voltage tests on mineral, ester and silicon insulating liquids. Moulded test vessels give repeatable results in the field and laboratory with lock in precision electrode gap setting adjustment wheels. The transparent, shielded lid is a key feature enabling users to see what is happening within the test chamber.

Megger portable 60 kV and 80 kV oil test sets are the lightest on the market ranging from 16 kg to 23.5 kg depending on model and 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.

The units are mains powered with optional lead acid or NiMH batteries. In addition, an internal 12 V DC charger and vehicle adaptor cable is standard with either battery option.

Test standards are preloaded in the instrument and new versions can be uploaded via USB flash drive. Both portable instruments support the creation of user defined custom tests. Test results are identified either by a serial number or asset ID and are time and date stamped.

An optional internal printer provides a hard copy of results. Ink based printout ensures durability at all temperatures. USB interfaces (x3) support PC connection, USB flash drive and external USB printer.

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.

FEATURES AND BENEFITS

- Test voltages up to 60 kV or 80 kV
- Lock in precision oil vessel - lockable gap setting
- Flat electrode gap gauges that will not damage electrodes
- Automatic oil temperature measurement
- QVGA colour display with backlight
- Easy clean chamber with oil drain
- Safe operation with dual redundant micro-switch HV cut off, zero volt touch bar and screened lid
- Transparent lid results in highly visible test chamber and vessel
- Intuitive user interface supports fully automatic operation with preloaded international test standards plus user configurable test sequences

OPTIONAL ITEMS

- Factory fitted lead-acid (OTS80PB only) or NiMH battery with 12 V charger and vehicle lead
- Internal printer
- Motorised lid impeller
- Voltage check unit (VCM100D/VCM80D)
- Carry bag
- Transport case

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.

SPECIFICATIONS

Test voltage

OTS 60PB -30 to +30 kVrms

OTS 80PB -40 to +40 kVrms

Voltage resolution 0.1 kV, $\pm 1\%$, ± 2 digits

Programmed test sequences

ASTM D 1816-04	BS EN 60156-96	SABS EN60156
ASTM D 877A-02	CEI EN 60156-95	VDE0370 part 5
ASTM D 877B-02	IRAM 2341	AS1767.2.1
IEC 60156-95	UNE EN 60156	PA SEV EN60156
	NF EN 60156	JIS C 2101-99 (M)
		JIS C 2101-99 (S)
		plus 3 custom test sequences

Vessels 400 ml (standard) 150 ml (option)

Nylon 12 chamber provides precision electrode alignment and adjustment wheels lock electrodes in position, option of 150 ml vessel for low volume oil samples

Oil temperature measuring range

10 °C to 65 °C

Oil temperature sensor resolution

1 °C

Power supply

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

Batteries (option)

Lead acid 2 x 12 V 4 Ah,
or NiMH 24 V 2 Ah

Interfaces

USB 2.0 compatible
2 x USB type-A (memory stick)
1 x USB type-B (printer or PC)

Internal printer (option)

Matrix impact printer
Paper 57.5 mm wide

External printer

Any printer with USB interface and PCL3 driver

Protection

Safety interlock on cover

Display

320 x 240 QVGA colour display with backlight

Dimensions

OTS 60PB 520 mm x 340 mm x 250 mm

OTS 80PB 520 mm x 380 mm x 250 mm

Weight

OTS 60PB

16 kg (printer, no battery),
16.8 kg (printer, NiMH battery)

OTS 80PB

20 kg (printer, no battery),
20.8 kg (printer, NiMH battery),
23.2 kg (printer, lead acid batteries)

Test vessels

1.1 kg (400 ml and 150 ml)

Environmental

Operating temperature

0 °C to +50 °C

Storage temperature

-30 °C to +65 °C

Humidity

80% RH at 40 °C operation
95% RH at 40 °C storage

Safety

Designed in accordance with IEC61010

EMC

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

Langauges

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



VCM100D/CM80D



400 ml vessel assembly (electrodes fitted)
















Programmed test sequence overview

Standards complied with and programmed	Oil types tested		Electrode gap options (mm)				Electrode shape options			Oil stirring options			Voltage rise rate options			Breakdown test sequence		
	Mineral Ester HMWH	Silicon	1.0	2.0	2.5	2.54							0.5 kV/s	2 kV/s	3 kV/s	Number of tests	Initial 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 1816-04	■	■	■					■			■		■		5	3 mins	1 min 15s	
ASTM D 877A-02	■	■				■			■						5	2 mins	1 min	
ASTM D 877B-02	■	■				■			■						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

ORDERING CONFIGURATION

Example of an ordering configuration:-

OTS80PB-EU2-EP-4C = This order is for an OTS80PB with EU power lead, NiMH battery, IEC electrode set, internal printer, lid stirrer and carry bag.

Model:	OTS	PB-	-	-	-	-	-	Weights
Select model	80 kV	80						19.4 kg
	60 kV	60						15.3 kg
Select power cord		EU lead	EU					
		UK lead	UK					
		US lead	US					
		Australian lead	AU					
		No Plug lead	BL					
Select battery option		Sealed lead acid	1	OTS80PB ONLY				3.3 kg
		NiMH	2					0.8 kg
	NONE	No battery	X					0 kg
Select electrode set			ASTM set	A				
			IEC set	E				
			Full set	U				
Select printer option			Internal printer	P				0.54 kg
			No printer	X				0.08 kg
Select stirrer option			Stirrer lid assembly fitted	4				0.3 kg
			Stirrer lid assembly not fitted	X				
Select carry case option			Carry case	C				1.3 kg
			No carry case	X				

ORDERING INFORMATION

Product	Order Code	Product	Order Code
OTS60PB	configured*	Full electrode set ASTM and IEC electrodes	1001-479
OTS80PB	configured*	Vessel lid mounted impeller (ASTM D1816) for use with 400 ml vessel	1001-102
Included accessories		Carry bag (padded) OTS80PB	1001-476
Vessel 400 ml assembly		Carry bag (padded) OTS60PB	1001-480
12 V vehicle charger lead (supplied only on instruments configured with a battery)		Optional accessories	
Magnetic bead stirrers (2 off)		Transport case (with wheels)	1001-475
Magnetic bead retriever		Vessel 400 ml assembly (no electrodes supplied)	1001-473
Electrode gauge set 1, 2, 2.5, 2.54 mm	1002-144	Vessel 150 ml assembly (no electrodes supplied)	1001-474
User manual		VCM100D digital voltage checker	1001-105
Configured accessories (to order additional or spares)		VCM80D digital voltage checker	1001-801
IEC60156 electrode Set - 12.7 mm spherical (2), 36 mm mushroom (2)	1001-477	Printer paper, 1 roll (MOV applies) (4 rolls supplied if printer configured)	25995-001
ASTM D877/1816 electrode set - 25.4 mm cylindrical (2 standard, and 2 none standard), 36 mm mushroom (2)	1001-478	* See ordering configuration on previous page	