

## DOBLE OFF-LINE TESTING & ASSESSMENT

# M7100™

## High-Voltage Asset Analyzer

### M7100™ TECHNICAL SPECIFICATIONS

POWER SUPPLY	
AC Input	90...264 VAC Single Phase, 47...63 Hz, Portable Generator or Inverter Compatible
AC Power Consumption	4 kW, 16 A max
GFI/RCBO Compatibility	Class A & B
MECHANICAL FUNCTIONALITY/PERFORMANCE	
Size	32.75" x 21" x 16.5"
Weight	175 lbs
Shipping Container	Integrated
Shipping Weight of Cables, Accessories	Cable kit only - 124 lbs. Including case - 185 lbs
DIAGNOSTIC & CALIBRATION FUNCTIONALITY	
Diagnostic Capabilities	Integrated server for remote diagnostics
Source & Measurement Validation	Integrated diagnostic tests for all measurement circuits
HIGH VOLTAGE OUTPUT	
AC	
Voltage Range	0.250...12 kV RMS
AC Frequency Range	15...500 Hz
AC Current Range Maximum	300 mA
Accuracy (Voltage)	0.5%
LOW VOLTAGE OUTPUT	
Voltage Range	AC: 1...250 V RMS DC: 1...175 V
AC Frequency Range	0.1 mHz...1000 Hz
AC Current Maximum	35 A RMS
DC Current Maximum	35 A
Accuracy	0.1%
ELECTRICAL I/O SPECIFICATIONS	
OLTC	OLTC control by clip connections
Temperature & Humidity Module	External Integrated Temp & Humidity Module Interface
Control Connection	USB 2.0 Ethernet – PC

ENVIRONMENTAL & DURABILITY SPECIFICATIONS	
Operating Temperature	-20°C to +50°C
Storage Temperature	-40°C to +70°C
Relative Humidity	5% to 95% (non-condensating)
Altitude	Operational < 10,000 ft above sea level
Dry Heat	IEC 60068-2-2
Cold	IEC 60068-2-1
Damp Heat	IEC 60068-2-30
Shock	IEC 60068-2-27: 15g/11ms, half-sinusoid, each axis
Transport Shock	ASTM D999.75
Vibration	IEC 60068-2-6: 10...150 Hz, acceleration 2g continuous [20 m/s²]; 10 cycles per axis
Drop Test	IEC 60068-2-31
Safety	EN 61010-1:2001 (2nd Edition)
Safety Switches	IP66 [A4EG-C000041] IP65 [A4EG-BE2R041, A4EG-BM2B041] IP66 [A4EG-C000041] EN 60947-5-1, UL 508, CSA C22.2 No.14, GB 14048.5, EN60947-5-1
EMC Emissions	FCC 47 CFR Part 15 Class A Emissions requirements (USA) EN 55011:1998/A1:1999/A2:2002 Group 1 Class A ISM Emissions requirements [Europe] AS/NZS CISPR 11:2004 Class A ISM Emissions requirements (Australia)
EMC Immunity	EN 61326:1997/A1:1998/A2:2001/A3:2003 IEC 61000-4-2/3/4/5/6/11 Electrostatic Discharge

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MEASUREMENT ACCURACIES (HV LEADS, LV LEADS, M LEADS)		
AC HV INSULATION TESTS/EXCITATION/DOBLE TTR		
f: 45-65Hz, accuracy parameters assume 0.1mA-1A measured at 10kVAC		
Power Factor/ Tan Delta/QF	Range Accuracy	0-100% 0.04%
Voltage	Range Accuracy	250V-12kV 0.5% ± 5V
Current	Range Accuracy	100µA-5A 0.25%
Watts	Range Accuracy	0.01µW-3.6kW 0.5%
Capacitance	Range Accuracy	10pF-1µF 0.5% ± 1pF
Inductance	Range Accuracy	10mH-1MH 0.5%
AC Variable Frequency Power Factor/Tan Delta		
f: 15-400Hz, accuracy parameters assume 0.1mA - 0.3mA measured at 4kVAC ≥ 40Hz, 3.5kVAC < 40Hz		
Power Factor/ Tan Delta/QF	Range Accuracy	0-100% 0.04%
Current	Range Accuracy	100µA-5A 0.25%
Watts	Range Accuracy	0.01µW-3.6kW 0.5%
Capacitance	Range Accuracy	100pF-0.5µF 0.5% ± 1pF
AC Low Voltage Turns Ratio		
f: 45-65Hz, accuracy parameters assume driving voltage measured at 250VAC		
Turns Ratio	Range Accuracy	1:1 - 50,000:1 0.25%
Voltage	Range Accuracy	5mV-250V 0.25% ± 0.1
Phase Angle	Range Accuracy	+180° to -180° 0.01°
AC Leakage Reactance		
f: 45-65Hz		
Voltage	Range Accuracy	5-250V 0.25%
Resistance & Reactance	Range Accuracy	0.1-700Ω 1% of reading ±10mΩ
Current	Range Accuracy	10µA-20A 0.25%
Watts	Range Accuracy	0.01µW-3.6kW 0.5%
Inductance	Range Accuracy	1mH-10H 0.5% ±10µH
DC Winding Resistance		
Current	Range Accuracy	35A 0.5%
Voltage	Range Accuracy	5mV-175V 0.5%
Resistance	Range Accuracy	0.5mΩ-10Ω 0.5% ± .05 mΩ

INCLUDED ACCESSORIES	
SYSTEM CABLES	
Type	Quantity
High Voltage Cables 65' (19.8M)	2
Low Voltage Cables (Red, Blue, Yellow, Black) 65' (19.8M)	4
Measurement Cables (Red, Blue, Yellow) 65' (19.8M)	3
Ground Lead (Copper)	1
OLTC Control Cable	1
USB Cable	1
Ethernet Cable	1
AC Power Cord (20A AC)	1
External Temperature & Humidity Module w/Cable	1
External LED Strobe Lamp w/Cable	1
8' (2.4M) Integrated Safety Switch/Cable	1
65' (20M) Integrated Safety Switch/Cable	1
Doble Bushing Tap Adapters	4
Hot Collar Straps	7
5 ft Copper Jumpers	5
OPTIONAL ACCESSORIES	
M7 Truck	
MFL Liquid Insulation Test Cell	
Type C Resonator (Up to 12 kV)	
Doble Universal Controller (DUC)	
M140 Capacitor Bank Kit <i>Coming in 2017</i>	
IEC 61850 Adapter Kit <i>Coming in 2017</i>	
M110: AMPDC <i>Coming in 2017</i>	
M120: AMPAC <i>Coming in 2017</i>	
TEST CAPABILITIES	
Power Factor/Tan Delta	
Variable Frequency Power Factor/Tan Delta	
Demagnetization Feature	
3 Phase Turns Ratio	
10 kV Turns Ratio	
Leakage Reactance 1Ø and 3Ø equivalent	
3 Phase Winding DC Resistance	
3 Phase 10kV (Single Phase) Exciting Current and Loss	
FUTURE ENHANCEMENTS	
OLTC Dynamic Resistance Measurement (DRM)	
External Reference	
Capacitor Bank	
Primary Injection	
µΩ Meter	



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Specifications are subject to change without notice.  
 Doble is ISO certified.  
 Doble is an ESCO Technologies Company.  
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