

# PRECISION ELECTRODYNAMIC TYPE WATTMETER

(D.C./A.C. TYPE) (LOW/HIGH- FREQUENCY)

## Introduction:

MKWM range of electrodynamic type kilowatt indicator is available in 10 different regular models apart from tailor made solutions. Virtually covering all industrial and research applications meeting all electrical, thermal, mechanical, and environmental specifications. These indicators are first choice for online power measurement of [high frequency/low frequency] at generation, transmission/distribution or at user end. These meters find application in heavy electrical engineering industries, defense, electrical/mechanical m/c testing, industrial electronics, railway, and avionics and many research and development activities. These meters are compatible to any standard CT/PT or hall/shunt sensor and display with very high degree of accuracy/repeatability/reliability. These indicators are available in different constructional material like ceramic-coated

## Operating Principle:

These meter has a inductive compensated high resistance copper/other moving coil moving radially under the influence of high current carrying current coil. Moving coil occupies proportional position when mutual inductance electromagnetic force balance spring force.

$$D = K1 \cdot V \times I \times \cos(\theta) \times dM/d(D),$$

Where D = angular displacement, V: VOLTAGE (A.C./D.C.), I: (D.C./A.C.), K1: spring, m: mutual Inductance between moving and stationary coil. Normally mutual inductance is linear function of angular displacement over +/- 45° movement. These are available for...1 Phase 1 Element /3 Phase 1 Element Balance Load only Phase 2 Element [3 Wire] Balance or Unbalance Load/3 Phase 3 Element [4 Wire] Balance or Unbalance Load.



MAEDM-0100



MAEDM-10000



MAEDM-80000

## WATTMETER

WATTS < 99999.9/Frequency < 50: p.f. < 0.2

Model	VOLTS AC/DC	Volts Signal/sensor	Voltage Coil- L/R	Ampere AC/DC	AMPERE Signal/sensor	Current Coil- L/R	Frequency Option	Movement range-DEGREE	Accuracy
MAEDM-00100	0220.0/1/option	Direct/PT/HALL	Proprietary	0.500	Direct/CT/HALLT	Proprietary	0-2000	+/-45/option	0.2/0.5/1%
MAEDM-00250	0220.0/1/option	Direct/PT/HALL	Proprietary	1.000	Direct/CT/HALLT	Proprietary	0-2000	+/-45/option	0.2/0.5/1%
MAEDM-01000	0220.0/1/option	Direct/PT/HALL	Proprietary	5.000	Direct/CT/HALLT	Proprietary	0-2000	+/-45/option	0.2/0.5/1%
MAEDM-02000	0220.03/option	Direct/PT/HALL	Proprietary	10.00	Direct/CT/HALLT	Proprietary	0-2000	+/-45/option	0.2/0.5/1%
MAEDM-05000	0220.0/3/option	Direct/PT/HALL	Proprietary	25.00	Direct/CT/HALLT	Proprietary	0-2000	+/-45/option	0.2/0.5/1%
MAEDM-10000	0220.0/3/option	Direct/PT/HALL	Proprietary	50.00	Direct/CT/HALLT	Proprietary	0-2000	+/-45/option	0.2/0.5/1%
MAEDM-10000	11000/3/option	Direct/PT/HALL	Proprietary	1.000	Direct/CT/HALLT	Proprietary	0-2000	+/-45/option	0.2/0.5/1%
MAEDM-30000	11000/3/option	Direct/PT/HALL	Proprietary	2.000	Direct/CT/HALLT	Proprietary	0-2000	+/-45/option	0.2/0.5/1%
MAEDM-80000	11000/3/option	Direct/PT/HALL	Proprietary	5.000	Direct/CT/HALLT	Proprietary	0-2000	+/-45/option	0.2/0.5/1%

NOTES: The numeral after product code indicates the watts range.

## General electrical/mechanical specifications:

- Operating voltage: self-excited
- Current range: 0-0.01/0.5/1.0/5.0/25.0 A.C./D.C. Amps or option
- Voltage: 0-25/250/500/1000/3000 Volt D.C. or option
- Power range: 1000 milli watt/100.0 watt/1000 watt/10.00 KW/100.0 watt/1000 k.w
- Power factor: 0.2/0.5/1.0
- TDH: 3%/5%/10% or as option for non-linear loads
- Burdon: 50 milli-watt/1.0 watts/5.0 Watt
- Voltage/current ripple (for D.C.) 3% of peak voltage/current
- Effect of Ripple: 3% of D.C. of frequency > 1/Tm
- Signal Frequency: 0-20,000 Hz
- Voltage transformer signal: 5/12 volts/100 volt/220 volts AC/DC
- Current transformer signal: 0-5 amps ac/50 Hz or option
- Accuracy: 0.2/ 0.5/1.0/2.0 % reading
- Sensitivity: 1.0 micro-amp/degree without scaling to higher ranges of wattmeter
- Resolution: 1/10 of least significant bit
- Repeatability/Resolution: 100% and 1:50/1:100/1:200
- TCV: 0.0002/°C
- Control: two set point control (low/high)
- Material: GLASS FILL NYLON/ABS
- Size: 72x72/96x96/144x144 or option/MOUNTING:

NOTES:  
The numeral after product code indicates the watt.



Explosion proof wattmeter

## MOTORON SEMICONDUCTORS CORPORATION

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**PRECISION ELECTRODYNAMIC TYPE WATTMETER****(D.C./A.C. TYPE)/****(LOW/HIGH- FREQUENCY)****WATTMETER****WATTS< 99999.9/Frequency<50: p.f. <0.5**

Model	VOLTS AC/DC	Volts Signal/sensor	Current Coil- L/R	Ampere AC/DC	AMPERE Signal/sensor	Current Coil- L/R	Frequency	Movement range	Accuracy
MAEDM-00100	0220.0/1	DIRE/PT/HALLT	Proprietary	0.500	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00250	0220.0/1	DIRE/PT/HALLT	Proprietary	1.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00500	0220.0/1	DIRE/PT/HALLT	Proprietary	5.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.03	DIRE/PT/HALLT	Proprietary	10.00	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.0/3	DIRE/PT/HALLT	Proprietary	25.00	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.0/3	DIRE/PT/HALLT	Proprietary	50.00	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00100	11000/3	DIRE/PT/HALLT	Proprietary	1.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00250	11000/3	DIRE/PT/HALLT	Proprietary	2.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00100	11000/3	DIRE/PT/HALLT	Proprietary	5.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%

**WATTMETER****WATTS< 99999.9/Frequency<50: p.f. < 0.9**

Model	VOLTS AC/DC	Volts Signal Volts.	Voltage Coil- L/R	Ampere AC/DC	AMPERE Signal/sensor	Coil Coil- L/R	Frequency	Movement range	Accuracy
MAEDM-00100	0220.0/1	DIRE/PT/HALLT	Proprietary	0.500	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00250	0220.0/1	DIRE/PT/HALLT	Proprietary	1.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00500	0220.0/1	DIRE/PT/HALLT	Proprietary	5.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.03	DIRE/PT/HALLT	Proprietary	10.00	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.0/3	DIRE/PT/HALLT	Proprietary	25.00	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.0/3	DIRE/PT/HALLT	Proprietary	50.00	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00100	11000/3	DIRE/PT/HALLT	Proprietary	1.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00250	11000/3	DIRE/PT/HALLT	Proprietary	2.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00100	11000/3	DIRE/PT/HALLT	Proprietary	5.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%

NOTES: The numeral after product code indicates the watts range.

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# PRECISION ELECTRODYNAMIC TYPE POWER FACTOR METER

**(D.C./A.C. TYPE)/ (LOW/HIGH- FREQUENCY)**

MKWM range of electrodynamic type kilowatt indicator is available in 10 different regular models apart from tailor made solutions. Virtually covering all industrial and research applications meeting all electrical, thermal, mechanical, and environmental specifications. These indicators are first choice for online power [high frequency/low frequency] at generation, transmission/distribution or at user end. These meters find application in heavy electrical engineering industries, defense, electrical/mechanical m/c testing, industrial electronics, railway, and avionics and many research and development activities. These meters are compatible to any standard CT/PT or hall/shunt sensor and display with very high degree of accuracy/repeatability/reliability. These indicators are available in different constructional material like ceramic-coated

**Operating Principle:**

These meter has a inductive compensated high resistance copper/other moving coil moving radially under the influence of high current carrying current coil. Moving coil occupies proportional position when mutual inductance electromagnetic force balance spring force.

$$D = k1. V \times I \times \text{Cos}(\theta) \times dM/d(D).$$

Where D = angular displacement, V: Voltage (A.C./D.C.), I: (D.C./A.C.), K1: spring, m: mutual inductance between moving and stationary coil. Normally mutual inductance is linear function of angular displacement over +/- 45° movement.

These are available for...1 Phase 1 Element /3 Phase 1 Element Balance Load only Phase 2 Element [3 Wire] Balance or Unbalance Load/3 Phase 3 Element [4 Wire] Balance or Unbalance Load.



MDPM-00999



MDPM-99999



MAEDM-00100

**WATTMETER**

**-0.2<Power factor<+0.2 D.C.<Frequency<500**

Model	VOLTS AC/DC	Volts Signal Volts.	Voltage Coil- L/R	Ampere AC/DC	AMPERE Signal/sensor	Coil Coil- L/R	Frequency	Movement range	Accuracy
MAEDM-00100	0220.0/1	DIRE/PT/HALLT	Proprietary	0.500	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00250	0220.0/1	DIRE/PT/HALLT	Proprietary	1.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00500	0220.0/1	DIRE/PT/HALLT	Proprietary	5.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.03	DIRE/PT/HALLT	Proprietary	10.00	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.0/3	DIRE/PT/HALLT	Proprietary	25.00	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.0/3	DIRE/PT/HALLT	Proprietary	50.00	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00100	11000/3	DIRE/PT/HALLT	Proprietary	1.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00250	11000/3	DIRE/PT/HALLT	Proprietary	2.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00100	11000/3	DIRE/PT/HALLT	Proprietary	5.000	DIRE/CT/HALLT	Proprietary	0-2000	+/-45/oCTion	0.2/0.5/1%

**General electrical/mechanical specifications:**

Operating voltage: self-excited  
 Current range: 0-0.01/0.5/1.0/5.0/25.0 A.C./D.C. Amps or option  
 Voltage: 0-25/250/500/1000/3000 Volt D.C. or option  
 Power range: 1000 milli watt/100.0 watt/1000 watt/10.00 KW/100.0 watt/1000 k.w  
 Power factor: 0.2/0.5/1.0  
 TDH: 3%/5%/10% or as option for non-linear loads  
 Burdon: 50 milli-watt/1.0 watts/5.0 Watt  
 Voltage/current ripple (for D.C.) 3% of peak voltage/current  
 Effect of Ripple: 3% of D.C. of frequency>1/Tm  
 Signal Frequency:0-20,000 Hz  
 Voltage transformer signal: 5/12 volts/100 volt/220 volts AC/DC  
 Current transformer signal:0-5 amps ac/50 Hz or option  
 Accuracy: 0.2/ 0.5/1.0/2.0 % reading  
 Sensitivity: 1.0 micro-amp/degree without scaling to higher ranges of wattmeter  
 Resolution: 1/10 of least significant bit  
 Repeatability/Resolution: 100% and 1:50/1:100/1:200  
 TCv: 0.0002/°C  
 Control: two set point control (low/high)  
 Material: GLASS FILL NYLON/ABS  
 Size: 72x72/96x96/144x144 or option  
**NOTES:** The numeral after product code indicates the (volt/ampere) range and Last digit corresponds to size of panel (48x48-1, 72x72 2, 96x96-3, 96x192-4 As for example, MDVM-999991 corresponds to 99999 volts (max) and panel body is ceramic coated mild steel.



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# PRECISION ELECTRODYNAMIC TYPE POWER FACTOR METER

## (D.C./A.C. TYPE)/ (HIGH/LOW FREQUENCY)

**WATTMETER****-0.2<Power factor<+0.2 <0500Frequency<1000**

Model	VOLTS AC/DC	Volts Signal Volts.	Voltage Coil- L/R	Ampere AC/DC	AMPERE Signal/sensor	Coil Coil- L/R	Frequency	Movement range	Accuracy
MAEDM-00100	0220.0/1	DIRE/PT/HALLT	Proprietary	0.500	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%
MAEDM-00250	0220.0/1	DIRE/PT/HALLT	Proprietary	1.000	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%
MAEDM-00500	0220.0/1	DIRE/PT/HALLT	Proprietary	5.000	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.03	DIRE/PT/HALLT	Proprietary	10.00	DIRE/CT/HALLT	Proprietary	0-20000	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.0/3	DIRE/PT/HALLT	Proprietary	25.00	DIRE/CT/HALLT	Proprietary	0-20000	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.0/3	DIRE/PT/HALLT	Proprietary	50.00	DIRE/CT/HALLT	Proprietary	0-20000	+/-45/oCTion	0.2/0.5/1%
MAEDM-00100	11000/3	DIRE/PT/HALLT	Proprietary	1.000	DIRE/CT/HALLT	Proprietary	0-20000	+/-45/oCTion	
MAEDM-00250	11000/3	DIRE/PT/HALLT	Proprietary	2.000	DIRE/CT/HALLT	Proprietary	0-20000	+/-45/oCTion	
MAEDM-00100	11000/3	DIRE/PT/HALLT	Proprietary	5.000	DIRE/CT/HALLT	Proprietary	0-20000	+/-45/oCTion	

**WATTMETER****-0.2<Power factor<+0.2 1000<Frequency<10000**

Model	VOLTS AC/DC	Volts Signal Volts.	Voltage Coil- L/R	Ampere AC/DC	AMPERE Signal/sensor	Current Coil- L/R	Frequency	Movement range	Accuracy
MAEDM-00100	0220.0/1	DIRE/PT/HALLT	Proprietary	0.500	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%
MAEDM-00250	0220.0/1	DIRE/PT/HALLT	Proprietary	1.000	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%
MAEDM-00500	0220.0/1	DIRE/PT/HALLT	Proprietary	5.000	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.03	DIRE/PT/HALLT	Proprietary	10.00	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.0/3	DIRE/PT/HALLT	Proprietary	25.00	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%
MAEDM-01000	0220.0/3	DIRE/PT/HALLT	Proprietary	50.00	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%
MAEDM-00100	11000/3	DIRE/PT/HALLT	Proprietary	1.000	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%
MAEDM-00250	11000/3	DIRE/PT/HALLT	Proprietary	2.000	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%
MAEDM-00100	11000/3	DIRE/PT/HALLT	Proprietary	5.000	DIRE/CT/HALLT	Proprietary	0-20,00	+/-45/oCTion	0.2/0.5/1%

**NOTES:**  
 The numeral after product code indicates the (volt/ampere) range and  
 Last digit corresponds to size of panel (48x48-1, 48x96-2, 96x96-3, 96x192-4 As for example, MAEDM-999991 corresponds to 99999 watt (max) and panel body is ceramic coated mild steel.

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