



3 PHASE POWER CLAMP-ON METER (TRMS) WITH KWHR & HARMONICS MEASUREMENT & PC INTERFACE

MODEL - 2709



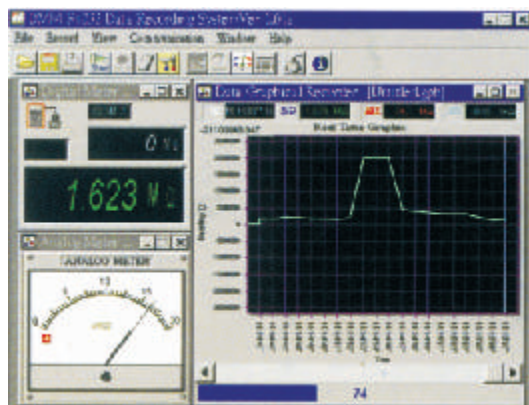
Preliminary Data

FEATURES :

- **Display :**
Voltage Function : 6000 counts LCD display
Power, Ohm & Hz functions : 9999 counts LCD display
ACA clamp-on function : 4000 counts LCD display
- **Update Rate :**
Power function : 2 per second nominal
Voltage, ACA clamp-on & Ohm functions : 2 per second nominal
Hz function : 1 per second nominal
- **Polarity :** Automatic
- **Low Battery :** Below approx 2.4V
- **Operating Temperature :** 0°C to 40°C
- **Relative Humidity :** Maximum relative humidity 80% for temperature upto 31°C decreasing linearly to 50% relative humidity at 40°C
- **Altitude :** Operating below 2000m
- **Storage Temperature :** -20°C to 60°C, < 80% R.H.
(With battery removed)
- **Temperature Coefficient :** nominal 0.15x (specified accuracy) / °C @ (0°C -18°C or 28°C - 40°C), or otherwise specified
- **Sensing :** True RMS sensing
- **Power supply :** Standard 1.5V AAA Battery x 2.
- **Power Consumption :** Voltage, ACA, Hz &
Power functions : 11mA typical
Ohm function : 5.5mA typical
- **APO Timing :** Idle for 30 minutes
- **APO Consumption :** 4µA typical
- **Dimension :** 224(L) x 78(W) x 40(H) mm
- **Weight :** approx. 224 gms
- **Jaw opening & Conductor diameter :** 45mm max
- **Special features :** Backlight display, AutoVA™ (Auto Selection on ACV, DCV or ACA functions); selectable Power parameters of KW, KVAR & KVA with Total Power Factor in dual-display; Total harmonic distortion THD%-F in dual-display; kWhr Recording; Display Hold; PEAK-rms HOLD; PC-Comm computer interface capabilities
- **Accessories :** Test leads (pair), batteries installed, user's manual & soft carrying case
- **Optional Accessories :** PC interface kit

SAFETY :

- Meets IEC61010-2-032(2002), EN61010-2-032(2002), UL61010B-2-032(2003)
- **Measurement Category :** CATIII 600Volts AC & DC
- **Transient Protection :** 6.5kV (1.2/50µs surge)
- **Pollution degree :** 2
- **E. M. C. :** Meets EN61326(1997, 1998/A1), EN61000-4-2 (1995,2000/A2), and EN61000-4-3(2002)
In an RF field of 3V/m :
Total Accuracy = specified Accuracy + 50 digits
Performance above 3V/m is not specified
- **Overload Protections :**
ACA Clamp-on jaws : AC 1000A rms continuous
+ & COM terminals : 600VDC/VAC rms



ELECTRICAL SPECIFICATIONS

Accuracy is \pm (% reading digits + number of digits) or otherwise specified at 23°C \pm 5°C & less than 75% R.H.

True RMS ACV & ACA clamp-on accuracies are specified from 0% to 100% of range or otherwise specified. Maximum Crest Factor are as specified below, and with frequency spectrums, besides fundamentals, fall within the meter specified AC bandwidth for non-sinusoidal waveforms. Fundamentals are specified at 50Hz and 60Hz.

ACA CURRENT (Clamp-on)

Range	Resolution	Accuracy ¹⁾²⁾
50Hz / 60Hz		
40.00A	0.01A	1.0% + 5d
400.0A	0.1A	
1000A	1A	
45Hz ~ 500Hz		
40.00A	0.01A	2.0% + 5d
400.0A	0.1A	
1000A	1A	
500Hz ~ 3.1kHz		
40.00A	0.01A	2.5% + 5d
400.0A	0.1A	
1000A	1A	

ACV AutoVA™ Threshold :

1A AC (40Hz ~ 500Hz only) nominal

Crest Factor : <2.5 :1 at full scale & <5.0 :1 at half scale for 40.00A & 400.0A ranges
<1.4 : 1 at full scale & <2.8 : 1 at half scale for 1000A range.

¹⁾ Induced error from adjacent current carrying conductor : <0.06A/A

²⁾ Specified accuracy is from 1% to 100% of range and for measurements made at the jaw center.

When the conductor is not positioned at the jaw center, position errors introduced are:

Add 1% to specified accuracy for measurements made WITHIN jaw marking lines (away from jaw Opening)

Add 4% to specified accuracy for measurements made BEYOND jaw marking lines (toward jaws Opening)

SINGLE-PHASE & 3-PHASE BALANCED-LOAD POWER

Range	Accuracy ¹⁾²⁾³⁾		
0 ~ 600.0kVA	F ~ 10th	11th ~ 45th	46th ~ 51st
@ PF = 0.99 ~ 0.1	2.0%+6d	3.5%+6d	5.5%+6d
Range	Accuracy ¹⁾²⁾⁴⁾		
0 ~ 600.0kW / kVAR	F ~ 10th	11th ~ 25th	26th ~ 45th
@ PF = 0.98 ~ 0.70	2.0%+6d	3.5%+6d	4.5%+6d
@ PF = 0.70~0.50	3.0%+6d		10%+6d
@ PF = 0.50-0.30		4.5%+6d	
@ PF = 0.30-0.20		10%+6d	15%+6d

¹⁾ Specified accuracy is for ACA clamp measurement at the center of jaws.

When the conductor is not positioned at the jaw center, position errors introduced are :

Add 1% to specified accuracy for ACA measurements made WITHIN jaw marking lines (away from jaw opening)
Accuracy is not specified for ACA measurement made BEYOND jaw Marking lines (toward jaws opening)

²⁾ Add 4d to specified accuracy for 3-Phase Balanced-load Power measurements.

³⁾ Add 1% to specified accuracy @ ACA fundamental <6A or ACV fundamental <90V. Accuracy is not specified @ ACA fundamental < 1A or ACV Fundamental <30V

⁴⁾ Add 1% to specified accuracy @ ACA fundamental <6A or ACV fundamental < 90V.
Accuracy is not specified @ ACA fundamental < 2A or ACV fundamental <50V

OHM

Range	Accuracy
999.9Ω	1.0% + 6d

Open Circuit Voltage :
0.4VDC typical

FREQUENCY

Range	Accuracy
5Hz ~ 500Hz	0.5% + 4d

Sensitivity (Sine RMS)

40A range : > 4A
400A range : > 40A
1000A range: >400A
600V range : >30V

TOTAL POWER FACTOR (PF)

Range	Accuracy ¹⁾	
	F ~ 21 st	22 nd ~51 st
0.10 ~ 0.99	3d	5d

Specified accuracy @ ACA fundamental > 2A;
ACV fundamental > 50V

A-lags-V Indication :

LCD annunciator "A-lags-V" turns on to indicate an inductive circuit, or Current A lags .Voltage V (i.e., Phase-shift angle θ is "+").

A-lags-V Indication is specified at 50/60Hz fundamental without the presence of harmonics, and at ACV > 90V, ACA>9A and PF < 0.95

Audible Continuity Tester

Audible threshold :
between 10Ω and 300Ω
Response time : 250μs

PEAK-rms HOLD (ACA & ACV only)

Response : 65 ms to >90%

KWhr (kilo-Watt-Hour Energy)

Time base accuracy : <30ppm
Non-volatile memory :
Separately stores one
3-Phase -Balanced-load and one
Single-Phase result.

THD%-F

Range	Harmonic order	Accuracy ¹⁾
0.0% ~ 50.0%	Fundamental	1.5% + 6d
	2nd ~ 3rd	7% + 6d
	4th ~ 21st	2.5% + 6d ²⁾³⁾
	22nd ~ 51st	10% + 10d ⁴⁾
50.0% ~ 100%	2nd ~ 3rd	Unspecified
	4th ~ 21st	2.5% + 6d ⁵⁾⁶⁾
	22nd ~ 51st	10% + 10d ⁴⁾
100% ~ 450% ⁷⁾	2nd ~ 3rd	Unspecified
	4th ~ 21st	7% + 6d ²⁾⁴⁾
	22nd ~ 51st	Unspecified

THD%-F is defined as : (Total Harmonic RMS / Fundamental RMS) x 100%

¹⁾ Accuracy specified @ fundamental \geq 70V & Total RMS \leq 600V for ACV THD%-F, fundamental \geq 6A & Total RMS \leq 1000A for ACA THD%-F, and Crest Factors @ :

<2.5 for 600V Range

<2.5 for 400A Range

< 3.0 for 400A Range

< 1.6 for 1000A Range

²⁾ Add 4d to specified accuracy @ 40A Range

³⁾ Add 4.5% to specified accuracy @ 1000A range

⁴⁾ Unspecified @ 1000A range

⁵⁾ Add 1% + 4d to specified accuracy @40A Range

⁶⁾ Add 4.5% to specified accuracy @ 400A ~ 750A;

Unspecified @ > 750A

⁷⁾ ~150% for 600V Range.

AC VOLTAGE

Range	Resolution	Accuracy
50Hz / 60Hz		
600.0V	0.1V	0.5% + 5d
45Hz ~ 500Hz		
600.0V	0.1V	1.5% + 5d
500Hz ~ 3.1kHz		
600.0V	0.1V	2.5% + 5d

CMRR : > 60dB @ DC to 60Hz, Rs=1kΩ

Input Impedance : 2MΩ, 30pF nominal

Crest Factor : < 2.3 : 1 at full scale & < 4.6 : 1 at half scale

ACV AutoVA™ Threshold : 30VAC
(40Hz ~ 500Hz only) nominal

DC VOLTAGE

Range	Resolution	Accuracy
600.0V	0.1V	\pm 0.5% + 5d

NMR : >50dB @ 50 / 60Hz

CMRR : >120dB @ DC, 50/60Hz, Rs=1kΩ

Input Impedance: 2MΩ, 30pF nominal

DCV AutoVA™ Threshold : 2.4VDC nominal

3-Phase Unbalanced-Load Power

This 3-Phase Unbalanced-Load Power measurement is achieved thru the calculation of discrete single - phase measurements that are taken one at a time manually. Since it is not real-time on all 3 phases simultaneously, it is intended only for stable power conditions without significant power fluctuations over the time of measurements. Result accuracy is hence the accumulated accuracy of the discrete single-phase measurements plus the associated fluctuations.

All specifications are subject to change without prior notice.



An ISO 9001:2000 Company

Industrial Supply Syndicate, 54, Ezra Street, Kolkata - 700001

Phone: (033) 2235 0923, 2235 6676 Fax: (033) 3022 2923

Email: info@industrialindia.com Website: www.industrialindia.com