

# DISCONTINUED!!!!!!!!!!!!!!!!!!!!!! SEE MODEL:NTM-0

## TRUE R.M.S. WATTMETER (MULTIPLIER) DIGITAL PANEL METER

MODEL  
213

- RS232/422 · Peak & Hold · 3-State BCD · Digital Limit
- Excitation/Compliance · Analog Output · PC Compatible



### FEATURES

- Unlimited Power Measurement
- Uses External Standard 50, 100mV Shunts
- 120, 240, or 480V Ranges Easily Scaled to Engineering Units
- 30Hz to 20KHz Frequency Response
- 1.0% Accuracy & Linearity
- 1/8 DIN & NEMA Compatible Cut-Out
- 3½ Digit LED with/wo Dummy Digit
- 7 Power Inputs

**DESCRIPTION:** WARNING - NO ISOLATION The Model 213 contains an Ultra-stable RMS analog multiplier to perform the watts conversion (Ix E) into a 0-2VDC full scale signal that is digitized by the A/D converter on the mainframe.

Flexibility of applications and power measurements are only limited to the external (customer supplied) current shunts, you can order a calibrated unit for various range or solve by the following equation:

$$VRMS \times IRMS \times \cos \phi = \text{WATTS}$$

$$= E - I \text{ Difference PHASE}$$

Since the 213 is designed to accept mVRMS at its "current" input (from a shunt) and VRMS at its "voltage" input (but the display will read in watts) select the proper current shunt to have the product of Ix E fall within the 2000 or 20,000 counts (2V FS) of the display.

**CONNECTOR(S):** A standard screw type connector for power and signal input is used. The I/O ports (top board) have industry standard flat cable connectors according to the function. All mating connectors are supplied at no charge.

**DISPLAY:** High efficiency ±3½ LED with or without dummy digit. Dummy digit is programmable as a x10 multiplier or alpha A, C, F, H, E, L, P, etc.

**INPUT RANGES:** Industry's most popular ranges are standard. Contact Otek for special input ranges or scaling.

**EXCITATION (COMPLIANCE) AND ANALOG CONTROL OUTPUTS:** The most popular combinations to match transducers are available, see Specifications & Ordering Information. The 4-20mA outputs are ideal for Proportional Control.

### DIGITAL CONTROL OUTPUT OPTIONS

- Option 1: BCD PARALLEL TRISTATE NON-ISOLATED, TTL compatible, bit addressable, with a 34 Pin Flat Ribbon connector.
- Option 2: BCD PARALLEL TRISTATE OPTO-ISOLATED to 1500VDC, TTL compatible bit addressable, with a 34 Pin Flat Ribbon connector.
- Option 3: DIGITAL PEAK & HOLD WITH RECALL holds and recalls the greatest positive and negative peak when enabled, otherwise it displays current data. A 34 Pin Flat Ribbon connector is included.
- Option 4: DIGITAL LIMIT compares internal BCD data to an external BCD word (Multiplex Format) from Thumbwheel Switches or any TTL source. Its two 1 amp SPDT relays (for over and under) control external loads. It is field programmable for hysteresis of 10 or 100 counts. A 34 Pin Flat Ribbon connector is supplied.
- Option 5: RS232C converts the "ULTIMA 200" to a data acquisition system. Up to 32 stations and baud rates from 150-19,200, see Section 7, Model A81-2450.

Option 6: RS422 This is the high-speed, longer distance version of RS232C with same features, Section 7, Model A81-2450.

Option 7: PARALLEL BCD WITH PEAK & HOLD: This option combines both options (1 & 3) on the same board.

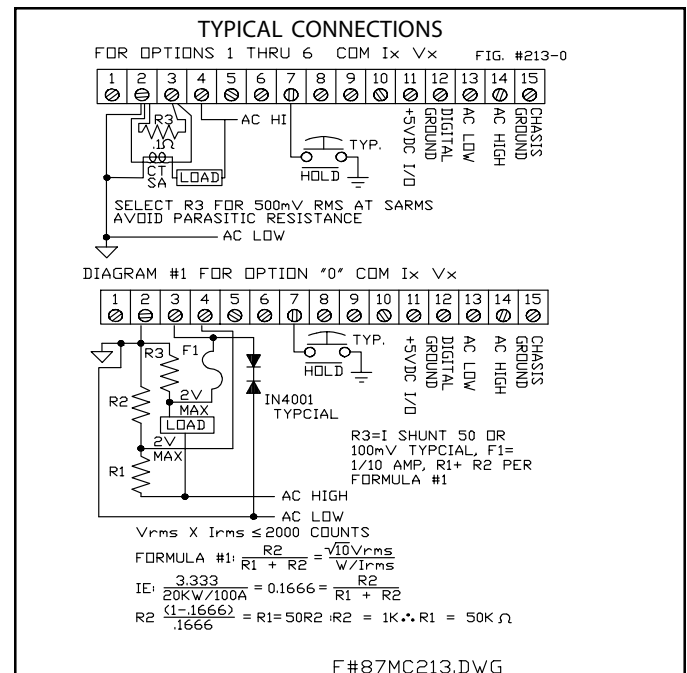
Option 8: 8-BIT ENCODED BCD MUX: The output of the A/D (same as display) is presented on an 8 bit BUS containing the BCD (1, 2, 4, 8) plus over-range, under-range, and sign are encoded in 3 lines. A separate strobe BCD word line is included. This system is compatible to any 8 bit BUS system. Address selection is available.

Option 9: 8-BIT ENCODED BCD OPTO-ISOLATED: Same as option 8 except it is opto-isolated to 1500VRMS. Power requirement is 5VDC at 100mA.

**POWER INPUTS:** Seven options are available: 5VDC non-isolated, 120VAC, 50-60Hz & 240VAC, 50-60Hz isolated to 1200VDC or RMS, 10VAC, 40-400Hz non-isolated, 12VDC non-isolated, 7-32VDC non-isolated and 7-32VDC isolated.

**CASE:** U.L. approved ABS Polycarbonate 94VO rated. Meets 1/8 DIN and NEMA panel cut out requirements.

**FULL SCALE, DECIMAL POINTS, AND OTHER ADJUSTMENTS** are easily accessible by removing the bezel and filter.



TRUE RMS AC

# DISCONTINUED!!!!!!!!!!!!!!!!!!!!!! SEE MODEL: NTM-0

SPECIFICATIONS AT 25°C

## MAINFRAME

Accuracy and Linearity ..... 1% of F.S. ±1 Digit  
 Frequency Response ..... 30-20KHz  
 Lead/Lag Compensation ..... None  
 Max. Input Signal  $I_x$  : ..... 1VRMS  
 Max. Input Signal  $V_x$  : ..... 100% F.S.  
 Drift vs. Temperature ..... 0.001% F.S./°C  
 Operating/Storage Temperature.....-10° to +60°C/-20 + 70°C

## DISPLAY

LED ±3½ ..... 0.6"  
 MTBF (LED) ..... 100,000 Hours

## EXCITATION (COMPLIANCE)/ANALOG OUTPUTS (Non-isolated from digital ground)

5VDC Excitation ..... 5VDC ±0.1% 30mA Max.  
 0-5VDC Output ..... ±1% Accuracy, Max. Load: 5mA  
 24VDC Compliance ..... 24VDC ±10% @ 30mA Max.  
 4-20mA Output ..... ±1% Accuracy, 24VDC Compliance  
 20 4mA Output ..... ±1% Accuracy, 24VDC Compliance  
 1.8mA Excitation ..... ±1% at 24VDC Compliance

NOTE: All outputs are short circuit protected.

## DIGITAL CONTROL OUTPUTS (All Positive True Logic)

Tristate Parallel BCD ..... 10LPTTL Loads

3-State Par, BCD Opto-Isolated ..... 10LPTTL Loads, 1500VDC  
 ..... isolation, 20mA at 5VDC  
 Digital Limit ..... Absolute comparison, 1 amp relays at 120VAC  
 ..... resistive, parallel BCD serial digit select type (multiplexed)  
 Thumbwheel Switches ..... BCD w/Diodes  
 Peak & Hold ..... + or - peaks, user recall/clear  
 ..... by logic or switch contact  
 BCD Multiplex ..... Parallel digit BCD, serial digit  
 ..... select MSD to LSD scan  
 Parallel BCD with Peak & Hold is the combination of options 1 & 3 (same specifications).  
 RS232/422 ..... See Model A81-2450

## POWER INPUTS

5VDC ..... 50mA  
 Display ..... LED: 140mA  
 Plus ..... Excitation option of 150mA, plus digital control output  
 ..... of 100mA. Worst case requirements (Fully Loaded): 500mA  
 120VAC ..... 100mA  
 240VAC ..... 50mA  
 7-32VDC ..... 300mA  
 12VDC ..... 300mA

## ORDERING INFORMATION (08-02-05)

MODEL **2** **1** **3** **0**

### DISPLAY TYPE (7)

0 ... 3½ LED w/Dummy Zero  
 5 ..... 3½ LED

### INPUT RANGE F.S.

0 ..... Customer Selected (1)  
 1 ..... 50mV for  $I_x$ : 120VAC  
 For  $V_x$  (Line Power) (2)  
 2 ..... 50mV for  $I_x$ : 240VAC  
 For  $V_x$  (Line Power) (2)  
 3 ..... 50mV for  $I_x$ : 480VAC  
 For  $V_x$  (Line Power) (2)  
 4 ..... 100mV for  $I_x$ : 120VAC(3)  
 5 ..... 100mV for  $I_x$ : 240VAC(3)  
 6 ..... 100mV for  $I_x$ : 480VAC(3)

### EXCITATION & ANALOG OUTPUTS

0 ..... None  
 1 ..... 10VDC & 0-5VDC  
 3 ..... 24VDC & 0-5VDC  
 4 ..... None & 4-20mADC  
 5 ..... None & 20-4mADC  
 7 ..... 1.8mADC & 0-5VDC

### POWER INPUT

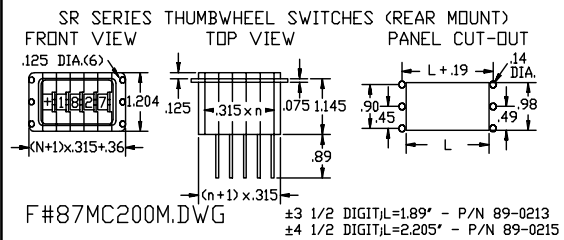
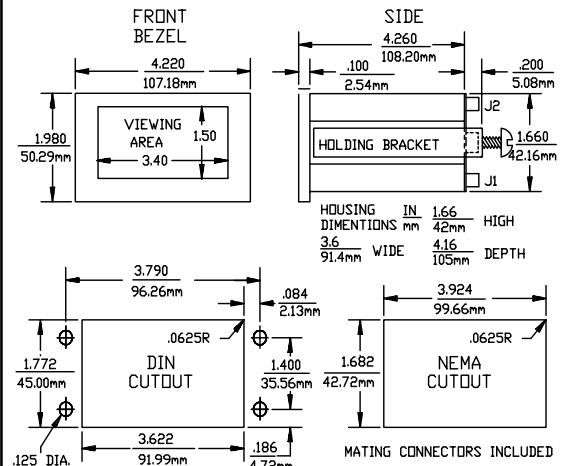
0 ..... 5VDC  
 1 ..... 120VAC  
 2 ..... 240VAC  
 3 ..... 10VAC  
 4 ..... 12VDC  
 5 ..... 7-32VDC  
 6 ..... Isolated 7-32VDC

### DIGITAL CONTROL OUTPUTS (6)

0 ..... None  
 1 ..... BCD Parallel  
 2 ..... BCD Parallel Opto-Isolated  
 3 ..... Peak & Hold  
 4 ..... Digital Limit  
 5 ..... RS232C  
 6 ..... RS422  
 7 ..... Parallel BCD with Peak & Hold  
 8 ..... BCD Encoded  
 9 ..... BCD Encoded Optoisolated

- (1) Customer to select and mount externally  $R_2$  &  $R_3$  per Diagram #1 and Formula #1
- (2) 50mV at either 10, 100 or 1000 Amps full load
- (3) 100mV at either 10, 100 or 1000 Amps full load.
- (4) Select Decimal Point as required, by removing Bezel & Filter
- (5) Absolute maximum input signals:  $I_x$ : 1VRMS;  $V_x$ : 2VRMS for Option 0, 550 VRMS for Options 1 thru 6
- (6) Thumbwheel Switches are available for the Digital Limit Option, Order P/N 89-0213 (±3½).
- (7) 4 1/2 digit on request.

## MECHANICAL



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**520-748-7900**

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