

January 1997

Data Sheet 10.00

Description

Moore Industries' family of programmable, digital meters features four, panel-mount units designed to provide easy-to-read, highly accurate displays of AC, DC, RTD, and Thermocouple (T/C) process inputs.

The ADD, DDD, RDD, and TDD come standard in impact-resistant, thermoplastic housings made to fit 1/8 DIN panel cutouts. Each comes with high and low alarm indication capability (contact closure output optional), input overload or sensor failure warning, and a "display hold" to manually freeze display readout.

Each type of display is capable of accepting inputs in several ranges. The easy-to-use, 3-button keypad on the unit front-panel provides simple access to operating parameters. Users can designate engineering unit readouts (ADD and DDD), °C or °F readouts (RDD and TDD), alarm trip points and deadband (hysteresis).

All operating parameter information is stored in unit non-volatile memory—safe from power outage, and protected by a security access code.

Standard Housing Dimensions make unit installation into existing 1/8 DIN panel cutouts simple. All mounting hardware is included. Removable terminal blocks mean that Moore Industries' panel meters are excellent replacement modules, ideal in areas where available mounting space is scarce, and where standard mounting holes already exist.



Moore Industries' Panel Meters are compact, 1/8 DIN, panel-mount units that are easy to configure, install, and operate.

Features

- **User configurability.** Choose current or voltage input and configure for actual or digitally scaled readouts (ADD, DDD). Select °C or °F display (RDD, TDD). Everything is set with the simple, front-panel keypad.
- **High/Low alarm capability.** All units come standard with both a high and a low alarm display. Trip points and deadband are user-set.
- **Microprocessor control.** Our meters are exceptionally accurate and reliable. During operation, unit readout is refreshed at a rate of twice per second. All operating parameters are stored in internal, non-volatile memory, protected by a two-digit security code.
- **Auto-calibration.** Input is continually sampled and compared to an internal, electronic reference, then "re-calibrated" without operator intervention.
- **Additional output flexibility.** Options are available for an additional analog output (4-20mA or 0-10V), Binary Coded Decimal (BCD) output, and dual relays for contact closure output.

Unit Type	Input	Display (Output)	Factory-Set Display Range	User-Set Display Range
ADD	AC	Actual Input or True RMS	✓	✓
DDD	DC	Actual Input or Engineering Units		✓
RDD	2-, 3-, or 4-wire RTD	°F or °C	✓	
TDD	J-, K-, E-, or S-type T/C	°F or °C	✓	

ADD, DDD, RDD, TDD

Programmable Digital Panel Meters

Specifications

<p>Display: Range: 3 1/2- or 4-digit, display, depending on type of unit chosen; refer to Table 3 for specific ranges</p> <p>Type: 7-segment, vacuum-fluorescent available in green (standard) or red characters 13mm (0.5 in) high</p> <p>Indicators: All units display "HI" and "LO" messages when input trips alarm setting; ADD, DDD, and TDD flash "OFLO" when input is overrange; RDD and TDD flash "OPEn" in the event of a sensor break</p>	<p>Performance: Response Time: 500 milliseconds (msec) for 25% step change on the ADD and DDD; 750 msec for 25% step change on RDD and TDD</p> <p>Display Update: Integrating differential A/D converter; RDD 2 per sec; ADD 2 per sec typical, 5 per sec maximum; DDD and TDD 3 per sec nominal</p> <p>Overload Protection: ADD and DDD 300V peak (750V peak for 0-600.0 VAC ADD, and 7.5A for the 0-5.000A ADD); RDD and TDD 150V peak</p> <p>Normal Mode Rejection: 60dB @ 50/60 Hz, typical</p> <p>Common Mode Rejection Ratio: 120dB @ 50/60 Hz, input-to-power line</p>	<p>Performance: Common Mode Voltage: ±2500V peak, input-to-power line</p> <p>Transmitter Excitation: Unregulated, 24Vdc, 25mA output, available in addition to analog output provided with -AO option (available in DDD only)</p> <p>Ambient Temperature Range: Operating: 0°C to 50°C (32°F to +122°F) Storage: -40°C to 85°C (-40°F to +185°F)</p> <p>Ambient Humidity: Operating/Storage: 20-80%, non-condensing</p> <p>Front Panel: NEMA 12, high-impact plastic</p> <p>Weight: 553 g (1.22 lbs)</p>
<p>Performance: Accuracy & Ambient Temperature Effect: Refer to Table 3</p>		

Ordering Information

Unit	Input	Output (Display)	Power	Options	Housing
ADD (AC Input)	0-199.9VAC (100kΩ impedance) 0-600VAC (1MΩ impedance) 0-5A (0.1Ω shunt, included, externally mounted)	DIS (ADD only) Factory-set to scale according to input range selected (not field-programmable)	117AC 230AC ±10%, 10VA Internally fused. Internal jumpers on DDD permit field reconfiguring	-C Dual, 5A relays rated for 125Vac maximum, 0.6A @ 110Vdc; 0.1A maximum @ 50Vdc inductive -AO Isolated analog output 4-20mA or 0-10V, proportional to display for ADD/DDD or to portion of input span for RDD/TDD; Accuracy: ±.35% @ 25°C ±.02%/°C -BCD Binary Coded Decimal output -N4 Front panel fitted with flexible boot affords NEMA 4 protection -RD Display with red characters	P Panel mount, corrosion-resistant molded plastic, complete with mounting hardware
DDD (DC Input)	PRG (available on DDD only): Field programmable; terminal block provides connections for any settings listed under "Factory Configured" (below); default setting is 4-20mA Factory Configured: Specify one of the following bold-faced ranges for PRG units preset at the factory for: 4-20MA , 0-20MA , 1-5V , 0-5V , or 0-10V (current inputs are both 50Ω shunt; voltage inputs are all 1MΩ minimum impedance; factory-configured units can be re-scaled in the field)	PRG (ADD/DDD only): Field programmable scaling and offset for engineering units readout; Factory default setting is 000.0-100.0			
RDD (RTD Input)	2-, 3-, or 4-wire, 100Ω Platinum RTD; choose PT1 0.00385/°C coefficient or PT1A 0.00392/°C coefficient 20Ω maximum lead wire resistance	C or F (RDD/TDD only) Factory-set; can be changed in the field for either °C or °F readouts			
TDD (T/C Input)	Standard, ISA T/C types E, J, K, S, or T				

When Ordering, Specify: Unit / Input / Display / Power / Option(s) [Housing]
Model Number Example: DDD / 4-20MA / PRG / 117AC / -C -N4 [P]

ADD, DDD, RDD, TDD

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Table 3. Range, Accuracy, and Temperature Effects

Unit	Range	Accuracy	Ambient Temperature Effect
ADD (AC Input)	<p>Units can be ordered factory-set to display selected input span (DIS), or field-programmable (PRG - see NOTE below).</p> <p>Units with 0 199.9 VAC input selected (see Ordering Specifications) are capable of displaying -1999 to +1999 (counts); 0-600.0 VAC and 0-5A units can display -9999 to +9999</p> <p>PRG Factory default setting: 0-100.0</p>	<p>0-199.9Vac Input Units: 0.3% of input span, $\pm 0.05\%$ of display range, ± 1 count</p> <p>0-600.0Vac Input Units: 0.2% of input span, $\pm 0.01\%$ of display range, ± 1 count</p> <p>0-5A Input Units: 0.2% of input span, $\pm 0.005\%$ of display range, ± 1 count</p> <p>(All specs at 40Hz minimum to 1kHz maximum)</p>	<p>0-199.9Vac Input Units: ± 80ppm of reading per $^{\circ}\text{C}$ change</p> <p>0-600.0Vac Input Units: ± 75ppm of reading per $^{\circ}\text{C}$ change</p> <p>0-5A Input Units: ± 90ppm of reading per $^{\circ}\text{C}$ change</p> <p>(All specs at -2 to +23$^{\circ}\text{C}$)</p>
DDD (DC Input)	<p>-9999 to +9999 Decimal point positioning and scale/offset programmed by the user (see NOTE below). Factory default setting: 0-100.0</p>	<p>$\pm 0.02\%$ of input span, $\pm 0.01\%$ of display range, ± 1 count</p>	<p>Current Input Units: ± 80ppm of reading per $^{\circ}\text{C}$ change</p> <p>Voltage Input Units: ± 75ppm of reading per $^{\circ}\text{C}$ change</p> <p>(All specs at -2 to +23$^{\circ}\text{C}$)</p>
RDD (RTD Input)	<p>-9999 to +9999 The displays of RDDs are set at the factory for the range of a 100Ω Platinum RTD, -200.0 to +850.0 when user-set for readings in $^{\circ}\text{C}$, -340.0 to +1562.0 for readings in $^{\circ}\text{F}$</p>	<p>$\pm 0.3\%$ for units configured to display $^{\circ}\text{C}$</p> <p>$\pm 0.5\%$ for units configured to display $^{\circ}\text{F}$</p> <p>(\pmleast significant digit @ 23$^{\circ}\text{C}$. Lead wire resistance 20Ω, maximum)</p>	<p>50ppm of reading per $^{\circ}\text{C}$ change</p>
TDD (T/C Input)	<p>-9999 to +9999 The displays of TDDs are set at the factory for the range of selected T/C input (see Ordering Specifications table):</p> <p>Type E T/Cs: -0170 to +1000 when user-configures for readings in $^{\circ}\text{C}$, -0274 to +1832 for readings in $^{\circ}\text{F}$</p> <p>Type J T/Cs: -0167 to +1120 for readings in $^{\circ}\text{C}$, -0269 to +2048 for readings in $^{\circ}\text{F}$</p> <p>Type K T/Cs: -0184 to +1372 for readings in $^{\circ}\text{C}$, -0299 to +2502 for readings in $^{\circ}\text{F}$</p> <p>Type S T/Cs: 0000 to +1768 for readings in $^{\circ}\text{C}$, +0032 to +3214 for readings in $^{\circ}\text{F}$</p> <p>Type T T/Cs: -0180 to +0400 for readings in $^{\circ}\text{C}$, -0292 to +0752 for readings in $^{\circ}\text{F}$</p>	<p>Type E T/Cs: $\pm 1^{\circ}\text{C}$, $\pm 1.3^{\circ}\text{F}$</p> <p>Type J T/Cs: $\pm 1^{\circ}\text{C}$, $\pm 1.3^{\circ}\text{F}$</p> <p>Type K T/Cs: $\pm 1^{\circ}\text{C}$, $\pm 1.7^{\circ}\text{F}$</p> <p>Type S T/Cs: $\pm 2^{\circ}\text{C}$, $\pm 3^{\circ}\text{F}$</p> <p>Type T T/Cs: $\pm 1^{\circ}\text{C}$, $\pm 1.3^{\circ}\text{F}$</p> <p>(0.5% of least significant digit)</p>	<p>50ppm of reading per $^{\circ}\text{C}$ change</p>

NOTE: User-programmed offset and scaling limited to a 3.2 times actual input span. Refer to User's Manual for detailed instructions.

ADD, DDD, RDD, TDD

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Figure 1. Panel Meters' Dimensions

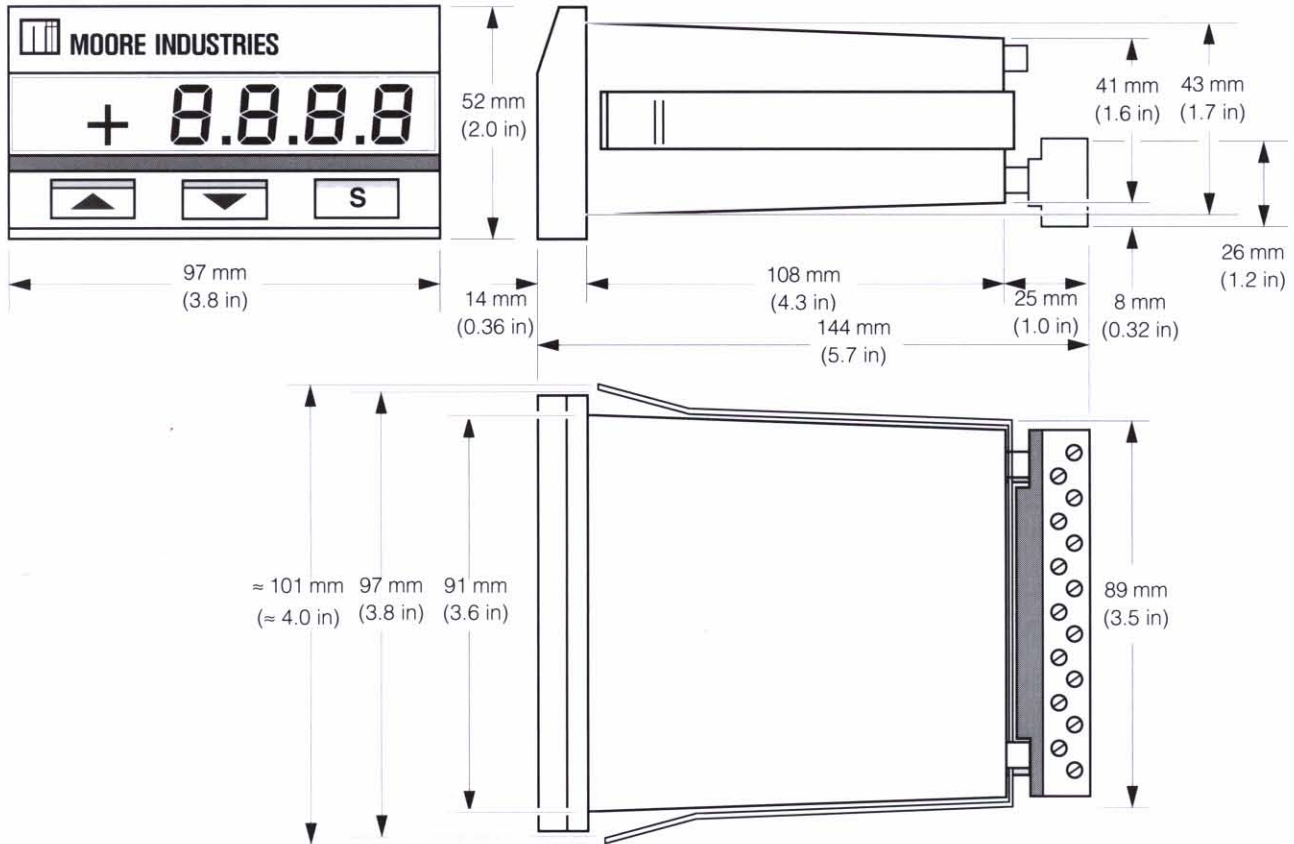
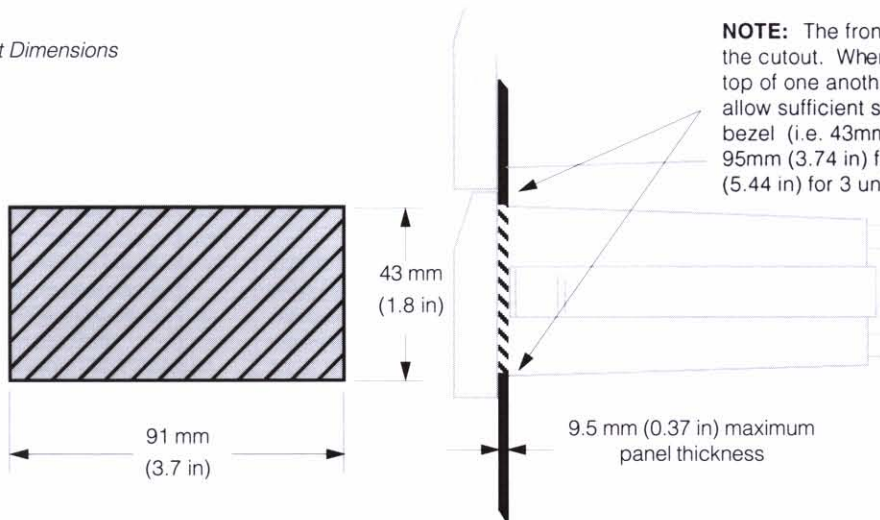


Figure 2. Panel Cutout Dimensions



NOTE: The front bezel is larger than the cutout. When installing units on top of one another in a single panel, allow sufficient space for the front bezel (i.e. 43mm (1.69 in) for 1 unit, 95mm (3.74 in) for 2 units, 138mm (5.44 in) for 3 units, etc.).



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