

# Controls / Functions / International Symbols

TPI offers a complete line of...

CO, Combustibles & Combustion (CEA)  
Refrigerant Leak Detectors

Digital Manometers

Temperature Contact & IR Instruments

IAQ: Air Flow / Humidity

Handheld Oscilloscopes

Digital Multimeters & Clamp-on Meters

Accessories & Kits

**Test Products International, Inc.**  
Headquarters:  
9615 SW Allen Blvd.  
Beaverton, OR 97005  
USA  
503-520-9197  
Fax: 503-520-1225  
email:  
info@tpi-thevalueleader.com

**Test Products International, Ltd.**  
342 Bronte St. South  
Unit 9  
Milton, Ontario L9T  
5B7  
Canada  
905-693-8558  
Fax: 905-693-0888  
email:  
info@tpicanada.com

**Test Products International UK Ltd.**  
Longley House, East Park  
Crawley, West Sussex  
RH10 6AP England  
Tel: +44 (0)1293 561212  
Fax: +44 (0)1293813465  
contactus@tpieurope.com

## Controls and Functions

### Push Buttons

- REC** Activates the Min/Max/Record mode
- NCV** Activates non-contact voltage detection mode
- REL** Activates the REL% mode
- RANGE, R-H** Activates manual ranging
- FUNC** Toggles between AC and DC volts, and or functions
- PEAK HOLD, P-H** Activates peak capture mode
- HOLD, D-H** Holds the reading on the display until the button is pushed a second time
- TRIM** Activates TRIM, PEAK, and HDR functions (except on frequency range)

### Rotary Switch

- $\bar{V}$  Used to measure DC volts
- $\bar{V}$  Used to measure AC volts
- $\bar{A}$  Used to measure AC and DC amps
- $\bar{A}$  Used to measure AC amps
- OFF** Turns the clamp-on completely off
- $\bar{V}$  Used to measure AC and DC volts
- TEMP** Used to measure temperature
- DUTY** Used to measure duty cycle
- $\mu A$  Used to measure DC microamps with test leads

### Rotary Switch cont'd

- $\rightarrow$  Used to measure diodes
- $\Omega$  Used to measure resistance and use continuity buzzer
- $\mu F$  Used to measure capacitance
- Hz** Used to measure frequency of current through jaws

### Input Jacks

- COM** Black test lead connection for all functions
- V/ $\Omega$**  Red test lead connection for all ACV, DCV, Continuity Buzzer, and Diode Test functions

## International Symbols

- CAUTION: RISK OF ELECTRICAL SHOCK
- AC (ALTERNATION CURRENT)
- DC (DIRECT CURRENT)
- REFER TO INSTRUCTION MANUAL
- GROUND
- DOUBLE INSULATION
- EITHER DC OR AC



To learn about the entire line of TPI products visit:

[www.tpi-thevalueleader.com](http://www.tpi-thevalueleader.com)

L TAW DCM-0305  
Copyright © 2005 Test Products International, Inc.

# DCM FAQ

## 1. How does the non-contact voltage feature of the TPI 270 benefit me?

The non-contact feature of the TPI 270 allows you to detect live circuits without using the test leads, which enables faster checks for the presence of voltage.

## 2. Which of the TPI clamp-on meters will measure temperature?

All TPI clamp-on meters can measure temperature. The 270 and 290 have this feature built in and the others can measure temperature by using the optional A301 K-Type thermocouple temperature adapter.

## 3. Which TPI clamp-on can measure DC microamps?

The TPI 270 and 290 have the capability to measure DC microamps by using the test leads. This is very useful for making flame safety control current measurements.

## 4. Does a clamp-on meter measure anything besides amps?

All TPI clamp-on meters measure AC/DC volts and resistance. Models are available with temperature, frequency, capacitance, and non-contact voltage detection capability as well as many other features. Various adapters including temperature (A301), carbon monoxide (A771), and pressure (A620/630) are available. Contact TPI for additional information.

## 5. Is it possible to measure AC amps on a device that uses a power cord?

Yes, to accomplish this you can use the TPI line splitter (A202). AC amps must be measured by isolating a single wire and the A202 line splitter does this without damaging the power cord.



# Digital Clamp-On Meter Selection Guide

**DC Amps**  
296

**DC  $\mu A$**   
270, 290

**Frequency**  
270, 290, 293, 296

**Capacitance**  
270, 290

**True RMS**  
293, 296

**Non-contact Voltage**  
270

**Temperature**  
270, 290

**% Harmonic Distortion**  
296

**Duty Cycle**  
270



## Selecting your Digital Clamp-On Meter

- Determine the maximum over voltage installation category (CAT I ~ CAT IV) the clamp-on will be used in and narrow your choice to those meters meeting the requirement. The Category rating for each meter is listed in the specifications table on page 3.
- Narrow your choice by selecting meters with the features required for your intended applications. For example, if your applications require a CAT III meter with frequency and capacitance measurement capability, the TPI 270 or TPI 290 would be good choices.
- Finally, select a meter with enough range, accuracy, and resolution for the tests you will perform. For example, if you have narrowed your choice to the TPI 270 or TPI 290 and your applications require the highest possible accuracy, the 0.5% basic DC accuracy of the TPI 270 makes it the better choice.



Model 291 is CE only

## APPLICATIONS

	Market	Function	255	270	290	291	293	296
	HVAC/R	Electrical						
Thermocouples in furnaces and gas appliances	•	DCmV	•	•	•	•	•	•
Heat anticipator current in thermostats	•	ACA	•	•	•	•	•	•
Line voltages	• • •	ACV	•	•	•	•	•	•
Control voltages	• • •	ACV/DCV	•	•	•	•	•	•
Flame safety control current	•	DCuA	•	•				
Heating element resistance	•	Ohms	•	•	•	•	•	•
Compressor winding resistance	•	Ohms	•	•	•	•	•	•
Contact and relay coil resistance	• •	Ohms	•	•	•	•	•	•
Motor and compressor startup current	• •	ACA	•	•	•	•	•	•
Motor run and start capacitors	• •	CAP	•	•				
Bar graph indicator of rapid fluctuations	• • •	All	•	•	•	•	•	•
Continuity of wiring	• • •	Ohms	•	•	•	•	•	•
Measure frequency on control and line voltage	• • •	Hz		•	•	•	•	•
Record minimum and maximum of measurements	• • •	REC	•	•	•	•		•
Measure temperature	• • •	DCV	•*	•	•	•*		
Measure True RMS of distorted or non-linear signals	• • •	ACV/ACA					•	•
Measure line current	• • •	ACA	•	•	•	•	•	•
Test continuity of circuit breakers and fuses	• •	Ohms	•	•	•	•	•	•
Measure voltage of direct drive DC motors	•	DCV	•	•	•	•	•	•
Measure power supply voltage	• • •	ACV/DCV	•	•	•	•	•	•
Measure power supply current	• • •	ACA/DCA	•	•	•	•		•
Non-Contact Voltage Detection	• • •	NCV		•				

\*Requires A301 adapter

The Value Leader™

See page 3 inside for ranges, specifications, and features.

# TPI DIGITAL CLAMP-ON METER TERMINOLOGY

# TPI DIGITAL CLAMP-ON METER SPECIFICATIONS

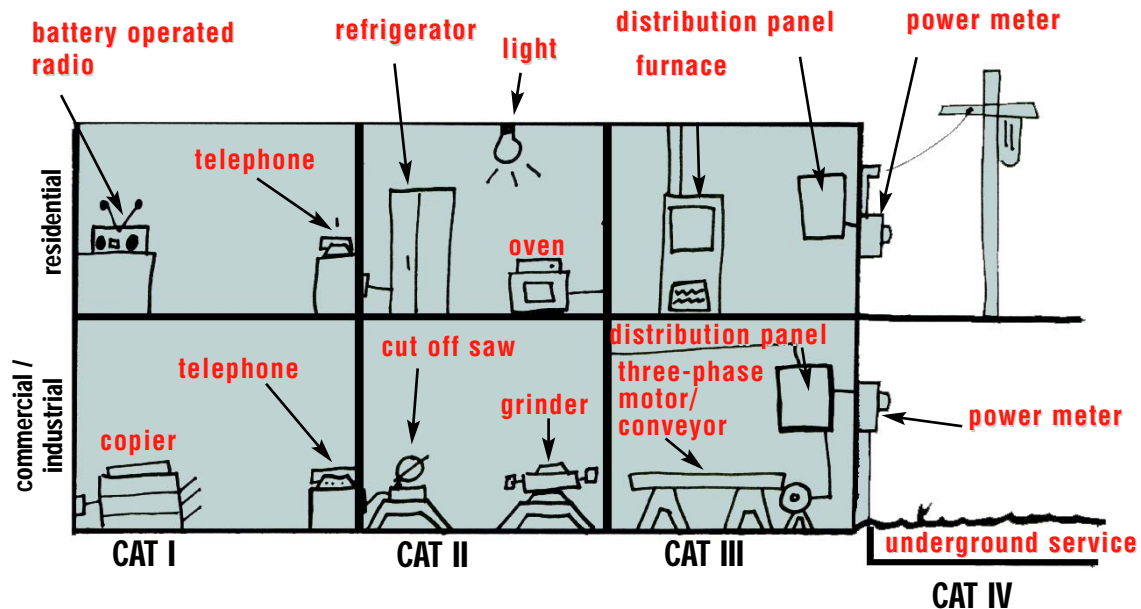
## CATEGORY RATINGS

>> **Category I:** Usually electronic equipment or equipment where measures have been taken to limit transient over voltages.

>> **Category II:** Single phase loads like appliance personal computers, television sets, and other household loads. Outlets located more than 30 feet from a CAT III source or more than 60 feet from a CAT IV source.

>> **Category III:** Distribution level fixed installations like distribution panel devices, short branch and feeder circuits, three phase loads, and single phase commercial lighting.

>> **Category IV:** Equipment and lines located on the power line side of a service panel or where a low voltage connection is made to utility power



## Terminology

>> **Agency Approval:** Test equipment with the CE or UL mark have passed through tests and are designed with operators safety in mind.

>> **Auto Range:** Meter automatically selects the appropriate range after the function has been selected.

>> **Trim Mode:** A feature that stabilizes the display when measuring unstable or fast moving signals.

>> **Basic DC Accuracy:** Important specification affecting the overall accuracy of all functions on a DMM.

>> **Resolution:** A measurement of how small of a signal a meter can display. This specification must be taken into account with accuracy to determine the overall capability of a DMM.

>> **True RMS:** Allows accurate measurement of non-sinusoidal AC voltage and current found in many control and switching power supply circuits.

>> **Analog Bar Graph:** Provides the ability to see rapidly changing signals too fast for the digital display to see.

>> **Min/ Max/ Peak:** Record and display the minimum and maximum readings measured. Also display the peak voltage or current reading. This feature is useful when looking for trends over a long period of time or when measuring in rush current.

>> **Sleep/Auto Off:** Automatically powers instrument down after 30 minutes of inactivity to preserve battery life. Meters with sleep mode will still acquire data during this time

>> **Data Hold:** Freezes the reading on the display. This feature is useful when recording readings on paper or when in hard to see locations. Triple display meters can hold two readings on the display at the same time.

>> **Peak Hold:** Measure and freeze on the display the maximum voltage or current reading. This feature is useful when measuring in rush current.

>> **Relative Mode:** Displays measured value as a percentage of the stored value. This feature is useful for component checking.

>> **Audible Continuity:** Audible beep indicating a complete circuit connection

>> **Non-Contact Voltage Detection:** Meters with this capability have a sensor that detects the presence of voltage when the meter is held next to a voltage source.

>> **% Harmonic Distortion:** Indicates if the signal under test is clean or distorted

Clamp-on Model #	255	270	290	291	293	296
<b>Range Selection</b>						
Manual				•		
Auto/Manual	•	•	•		•	•
<b>Display Specifications</b>						
4,000 Count	•	•	•	•	•	•
Analog Bar Graph		•	•		•	•
<b>Basic Features</b>						
AC Volts	•	•	•	•	•	•
DC Volts	•	•	•	•	•	•
AC Amps	•	•	•	•	•	•
DC Amps						•
DC Microamps*		•	•			
Resistance	•	•	•	•	•	•
Diode Test		•	•	•	•	•
Audible Continuity	•	•	•	•	•	•
<b>Additional Features</b>						
True RMS					•	•
Frequency		•	•		•	•
Capacitance		•	•			
Temperature		•	•			
% Harmonic Distortion						•
Non-Contact Voltage Detection		•				
Trim Mode			•		•	
Data Hold	•	•	•	•	•	•
Relative Mode		•				
Min / Max / Peak	•	•	•			•
Peak Hold		•		•	•	
Sleep Mode / Auto Off	•	•	•		•	•
<b>Range &amp; Resolution</b>						
Basic DC Accuracy	0.3%	0.5%	0.75%	0.75%	0.75%	0.75%
DC Voltage (maximum)	600V	600V	600V	600V	750V	600V
Resolution (maximum)	0.001V	0.1mV	0.001mV	0.001V	0.01V	0.01V
AC Voltage (maximum)	600V	600V	600V	600V	750V	600V
Resolution (maximum)	0.001V	0.1mV	0.001V	0.001V	0.01V	0.01V
DC Amps (maximum)	-	400µA	20µA*	-	-	700A
Resolution (maximum)	-	0.01µA	0.1µA	-	-	0.01A
AC Amps (maximum)	400A	400mA	700A	700A	700A	700A
Resolution (maximum)	0.01A	0.01A	0.1µA	0.01A	0.01A	0.01A
Resistance (maximum)	40MΩ	40MΩ	40MΩ	4KΩ	40KΩ	40KΩ
Resolution (maximum)	0.1Ω	0.1Ω	0.1Ω	1Ω	0.1Ω	0.1Ω
Frequency (maximum)	-	400MHz	10KHz	-	10KHz	10KHz
Resolution (maximum)	-	0.001KHz	0.1Hz	-	0.1Hz	0.1Hz
Capacitance (maximum)	-	40,000µF	10,000µF	-	-	-
Resolution (maximum)	-	0.001nF	0.001µF	-	-	-
Temperature (maximum)	-	1,000°F	2,372°F	-	-	-
<b>Agency Approval</b>						
CE IEC 1010	CAT III 600V	CAT III 600V	CAT III 600V	CAT III 600V	CAT III 600V	CAT III 600V
cULus 3111	•	pending	•		•	•

\* DC microamps measured using the test leads