

## The LED versus LCD Decision

### Introduction

Users of contemporary digital panel meters (DPMs) have a variety of options available to them. While options are nice, they invariably mean more choices have to be made. After determining what meter resolution one requires, the next most basic decision is usually which type of display to use — liquid crystal or light emitting diode?

Traditionally, liquid crystal displays (LCDs) have been the obvious choice for outdoor/daylight applications and/or for applications requiring extremely low power consumption (current drains less than 15mA). Light emitting diode (LED) displays, with their comparatively low light intensities and relatively high current drains, have been excluded from these more demanding applications.

Recent DATEL innovations, most notably the introduction of extremely low-power LED displays, have complicated the once straightforward, LED/LCD decision.

### LED Displays

The majority of panel-meter applications can, and should, use LED displays for two reasons: LEDs can be read from virtually any angle (LCDs have much more restricted viewing angles), and LED displays can be easily read from greater distances (assuming comparable digit sizes). Additionally, LEDs are typically more durable than LCDs and can be used under more harsh environmental conditions. The response time of LCDs slows down noticeably as temperatures drop below 0°C (32°F). This effect is seen as a “ghosting” of segments (old data remains partially visible) after the display has been updated with new data. The response time of LEDs is not visibly affected even at temperatures below -20°C.

### LCD Displays

LCD digital panel meters should always be used when the meter has to be read in direct sunlight, i.e., when no shading of the display is possible. Even the newest, super bright, high-intensity, red LEDs (similar to those used in Murata Power Solutions LED meters with “RH” suffixes) get “washed out” when viewed in direct sunlight. These bright LEDs become easily visible, however, when hoods or other shading devices are used.



Backlit LCD displays should be used if the meter is to be operated in both high and low-light conditions. Murata Power Solutions uses reliable, long-life LEDs as the light source in all of our backlit LCD meters. A “B” suffix added to the end of the Murata Power Solutions model number specifies a backlit model.

Transflective displays (black segments on a light-green background) are featured on all backlit LCD meters. Reflective displays (black segments on a silver background) are used on non-backlit devices. Backlighting detracts from the low-power appeal of LCD meters. Backlit models of Murata Power Solutions’ LCD meters typically draw 35mA from their +5/9V supply. Non-backlit LCD models typically draw 100s of microamps. Current drains for backlit models can be reduced with the installation of current-limiting series resistors between the supply and the backlighting pin. This results in a proportionately dimmer backlighting effect, however, effective compromises can usually be found. Refer to the individual product data sheets for more information on backlight dimming.

### Portable Applications

Portable instruments, specifically battery-powered designs requiring continuous operation, should use LCD meters. This is particularly true if the current drain on the battery must be maintained below 1mA. As mentioned above, Murata Power Solutions now offers low-power LED panel meters with current drains less than 10mA from a single +5V power supply. These low-power LED models usually have red displays and are designated with an “RL” suffix added to the end of the part number.

If continuous display operation is not required, the DMS-20PCRL (3 1/2 digits, subminiature package, low-power red LED display) has a DISPLAY ENABLE feature allowing users to dim or totally darken the LEDs. In the dark mode, current drain of this meter is reduced to less than 0.5mA (500µA). Even at full brightness, the DMS-20PC-RL draws a mere 7mA. Low-power LED meters are available in both 3 1/2 and 4 1/2 digit resolutions and only from Murata Power Solutions!