



Application Note AN-1005

LCD Display Cold Temperature Operating Characteristics on the Loop Leader™ Series.

Precision Digital Corp. offers two different environmental temperature specifications for the Loop Leader™ product series. The first is an Operating Temperature Range (OTR) which is the range recommended for optimum operation. The second is Allowable Temperature Range (ATR), which is the allowed temperature exposure limits with degraded performance. On the Loop Leader™ series, the ATR is -40° to 65°C . The only difference between these two specifications is that the LCD display becomes less readable (contrast diminishes and the update rate slows) as it approaches the -40°C temperature stated in the ATR. Some users find this acceptable. While all LCD displays have this characteristic at very cold temperatures, the Loop Leader™ series is more affected since it has a 120-segment LCD display (vs. 28-segment on our PD686, for example). Each segment on the LCD display has a liquid crystal that begins to freeze at those temperatures. However, once the display warms back up, readability improves once again. Neither the display nor the rest of the indicator suffers any permanent damage from this low temperature exposure and the warranty is not affected.

So why not publish the Operating Temperature specification and be done with it? With the ATR the product has greater utility to those who may need a product that tolerates low temperature exposure, down to -40°C ; especially if the indicator is not being read or observed at those times (i.e. outside overnight). Without an ATR, it would appear to our customers that this product could not be used in such applications; hence the reason for the specification.

Customers are encouraged to take advantage of the lower temperature capabilities offered by the ATR, but caution those customers to carefully evaluate the performance of this or any other indicator using an LCD display when it is used in any application where display update time and high contrast are critical at low temperatures.

Below are some examples of what you might expect to see for display performance at different ambient temperatures:

	-30°C	-35°C	-37°C	-40°C
Contrast	Very Good	Good	Poor	Poor
Approximate Update Time	9 sec	15 sec	25-28 sec	40-46 sec

Note: For optimum cold temperature performance, set the “contrast” to max, increase the “filter” setting, and set “bypass” to minimum (advanced menu, see manual).

Please contact customer support if you need any additional information.

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