



## PanelView 1400e CRT Maintenance

### Maximizing the life of your PanelView 1400e, CRT Terminals

To maximize the life of a CRT, the following is strongly recommended:

- Adjust the external brightness and contrast potentiometers to the minimum acceptable levels.
- Only increase those adjustments over time to compensate for the natural aging process.
- Turn the power to the PanelView off whenever it is not in use.
- Use the screen saver feature set to activate in as short a time as as your application will allow.

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**ATTENTION**

The screen saver is set at the factory to activate after 30 minutes of terminal inactivity. See configuration screen to modify this setting.

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- Select the darker colors when designing the screens.
  - Install the PanelView terminal in a sealed enclosure to protect sensitive electronic components from contaminants.
  - Keep the temperature inside the enclosure as much below the 50°C (122°F) maximum as possible.
  - Make sure that the entire installation is well grounded
  - Keep the PanelView 1400e terminal away from strong magnetic fields.

## **Factors Affecting the Life of Your CRT Based Product**

### **CRT Tube Degradation**

A CRT gradually reduces in light output over time. 15,000 hours (between 1 ½ and 2 years continuous operation) is considered the standard “half life” (half brightness) of a CRT within the industry. There are two major components within the CRT that age and cause this reduction, the electron guns and the phosphor face of the tube.

The electron guns (red, green and blue) almost literally have a finite number of photons that they can deliver over the life of the CRT. This degradation is directly related to the number of hours that the screen has a picture on it, and the brightness of that picture. The degradation is uniform across the entire screen, and thus is a gradual decrease in total brightness.

Phosphor degradation however, is on a pixel by pixel basis. Unlike a television, where the image is dynamic and constantly changing, or a computer, where the image changes and a screen saver is usually used, PanelView terminals can have the same image, pixel for pixel for the entire 24 hour day, 7 days a week. This will selectively age or burn the phosphor on a CRT over time. For example, if that image had a white box in the middle of the screen, those pixels would reduce their response to the electron beam hitting them, while the pixels right next to the box, could be “just like new” as they have virtually never been turned on. This is called a “burned image” as even a 20% reduction in relative brightness is very visible to the naked eye when the different brightness levels are adjacent to each other.

Electron beam bombardment of the face of the CRT also discolors the glass over time, contributing to the dimming appearance of the image.

The larger the CRT, the higher the amount of power and energy used to display the larger brighter, high-resolution image. Currents are higher in large (14” and above CRTs) and the bell voltage can be as high as 35K volts. Smaller monitors and those that are monochrome use much less energy to display an image and will typically have a longer life than larger color CRTs.

### **User Selected Brightness and Contrast**

Set the external brightness and contrast controls to the minimum acceptable levels at all times. Adjusting for a higher brightness than needed will result in a shortened CRT life. The higher these controls are set, the faster the CRT aging rate. These controls are intended to compensate for the natural aging process over time. Only increase these settings in the future to bring the screen brightness back up to minimum levels again.

**ATTENTION**

Internal factory settings now allow for higher external adjustment brightness and contrast. If the user adjusts these for maximum before this is necessary, the life of the CRT could be significantly reduced.

**PanelView Power**

If the PanelView is not being used during all shifts or on weekends, removing power to the unit will extend the life of the CRT.

**Screen Saver**

When activated, the Screen Saver will turn the electron beam off for the majority of the screen and a blue A-B octagon moves around the screen so the operator will be assured that the PanelView terminal is still operating properly. This reduces the aging process for both the electron guns and the phosphor screen.

The screen saver is deactivated whenever there is operator input, an alarm is triggered, a screen is selected by the PLC, or a fault is detected. See the Operator Terminal Manual for details (OpTerm.PDF on 2711E-ND1 CD).

The screen saver “Timeout” is set for 30 minutes at the factory. This means that it will activate after 30 minutes without any input. The “Timeout” can be changed from the configuration screen (under terminal response) for up to 60 minutes of inactivity, or totally turned off (by entering 0 for the Screen Saver Time-out). It is recommended that the screen saver be used and set for the minimum acceptable time to minimize the CRT aging process.

**Color Selections**

Bright colors, along with white, turn on the various color pixels with a high intensity. Bright colors on a screen for a long period of time will burn an image and permanently damage the pixels in a CRT.

Use Black and Blue as much as possible for background and fill colors. Basic (non-bright) colors should be used next, with bright colors reserved for foreground text and graphics that will not be on a screen for long periods of time.

**TIP**

A screen saver is even more important when bright colors are used.



## **Industrial Contaminants**

Modern electronic circuitry packs a lot of functionality in a smaller circuit board space with fewer components. Traces and components are smaller and more tightly packed. Conductive dust contamination settling on the circuit boards, can allow currents to flow between adjacent circuit board traces and components, causing malfunction, including a poor image. Insulating dust or contamination can insulate components and prevent adequate heat dissipation. Some contaminants can eat away silver conductors. In a contaminate filled environment, the control cabinet should be sealed and/or positive air pressure applied in the cabinet.

## **Operating Temperature**

The PanelView 1400"e" is tested and qualified to operate at 50° C (122°F). However, as is true for all electronic devices, a lower operating temperature will result in a longer product life.

If cooling is an option for the control cabinet, this will extend the life of the PanelView product, and the life of other electronic components as well. However, cooling will not significantly improve the life of the CRT tube itself.

## **Magnetic Influences**

Magnetism and the presence of magnetic fields can cause the image on a CRT to become distorted or incorrect colors to be displayed. (i.e. reds appear as greens). Depending on the strength of the magnetic field, the distortion effects will be noticed slowly over time (over time the earth's magnetic field will affect a CRT image) or immediately for a strong magnetic field.

External magnetic sources include:

- High current cables next to or around the CRT (welding current supply cables)
- Transformers
- Isolation transformers
- Power conditioners where the transformer or enclosure is near the PanelView CRT.

Caution should be exercised when installing CRT based product near these devices.

Fortunately, almost all CRT products, including the PanelView CRT based products have “degaussing coils”. These coils are designed to erase the built up magnetic fields immediately in and around the CRT structure. When the coils activate depends on the model of PanelView.

For PanelView 1400”e” the degaussing coil activates on power up. The activation is based on thermistor action. If multiple degauss cycles are desired, the PanelView 1400”e” must be powered up, powered down for 10 minutes and then powered up again for two degauss cycles. Multiple degauss cycles may be needed if the unit has not been powered down periodically and shows extreme color distortion which may be due to external magnetic influences.

## **Effective Grounding**

Enough cannot be said about effective system grounding for maximum product life and trouble free operation. Most noise and surge suppression circuitry operates by shorting noise and surge energy to ground. If a ground is absent or insufficient, noise and surge energy will be dissipated into other components, causing damage or malfunction. Ground loops can cause unwanted currents to flow in communications cables and enclosures leading to dangerous and erratic operation.

Review publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines, available at The Automation Bookstore, <http://www.theautomationbookstore.com/>.

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Allen-Bradley Spares

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