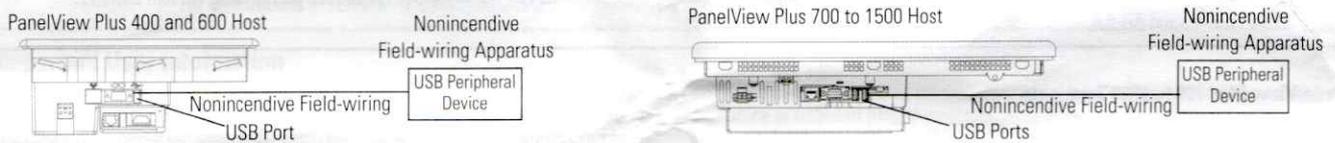


## USB Ports

The PanelView Plus terminals contain universal serial bus (USB) ports that comply with hazardous location requirements. The PanelView Plus 700 to 1500 terminals have two USB host ports; the PanelView Plus 400 and 600 terminals have one USB host port. Field-wiring compliance requirements are provided in compliance with the National Electric Code, Article 500.

**Figure 1 - PanelView Plus Terminals Control Drawing - Associated Nonincendive Field-wiring Apparatus**



**Table 1 - PanelView Plus USB Port Circuit Parameters**

| PanelView Plus Terminal Type                  | $V_{oc}$ | $I_{sc}$ | $C_a$          |                | $L_a$          |                |
|---|----------|----------|----------------|----------------|----------------|----------------|
|   |          |          | Groups A and B | Groups C and D | Groups A and B | Groups C and D |
| PanelView Plus 400 and 600, Series A and B    | 5.25V DC | 1.68 A   | 10 $\mu$ F     | 10 $\mu$ F     | 15 $\mu$ H     | 15 $\mu$ H     |
| PanelView Plus 400 and 600, Series C or later | 5.25V DC | 1.68 A   | 10 $\mu$ F     | 10 $\mu$ F     | 3.5 $\mu$ H    | 15 $\mu$ H     |
| PanelView Plus 700 to 1500                    | 5.25V DC | 1.68 A   | 10 $\mu$ F     | 10 $\mu$ F     | 15 $\mu$ H     | 15 $\mu$ H     |

Selected nonincendive field wiring apparatus must have nonincendive circuit parameters conforming with Table 2.

**Table 2 - Required Circuit Parameters for the USB Peripheral Device**

|           |        |          |                   |        |       |
|-----------|--------|----------|-------------------|--------|-------|
| $V_{max}$ | $\geq$ | $V_{oc}$ | $C_i + C_{cable}$ | $\leq$ | $C_a$ |
| $I_{max}$ | $\geq$ | $I_{sc}$ | $L_i + L_{cable}$ | $\leq$ | $L_a$ |

### Application Information

The circuit parameters of the PanelView Plus 700 to 1500 USB port are given in Table 1. The USB peripheral device and its associated cabling shall have circuit parameters with the limits given in Table 2 for them to remain nonincendive when used with the PanelView Plus 700 to 1500 USB port. If cable capacitance and inductance are not known, the following values from ANSI/ISA-RP 12.06.01-2003 may be used:

$$C_{cable} = 197 \text{ pF/m (60 pF/ft)}$$

$$L_{cable} = 0.7 \text{ } \mu\text{H/m (0.20 } \mu\text{H/ft)}$$

Nonincendive field wiring must be wired and separated in accordance with 501.10(B)(3) of the National Electrical Code (NEC) ANSI/NFPA 70 or other local codes as applicable. This associated nonincendive field-wiring apparatus has not been evaluated for use in combination with another associated nonincendive field-wiring apparatus.

**Table 3 - Symbol Definitions**

|           |   |
|-----------|---|
| $V_{oc}$  | Open circuit voltage of the host USB port.  |
| $I_{sc}$  | Maximum output current of the host USB port.  |
| $V_{max}$ | Maximum applied voltage rating of the USB peripheral device. $V_{max}$ shall be greater than or equal to $V_{oc}$ in Table 1 ( $V_{max} \geq V_{oc}$ ).   |
| $I_{max}$ | Maximum current to which the USB peripheral device can be subjected. $I_{max}$ shall be greater than or equal to $I_{sc}$ in Table 1 ( $I_{max} \geq I_{sc}$ ).   |
| $C_i$     | Maximum internal capacitance of the USB peripheral device.  |
| $C_a$     | Maximum allowed capacitance of the USB peripheral device and its associated cable. The sum of $C_i$ of the USB peripheral device and $C_{cable}$ of the associated cable shall be less than or equal to $C_a$ ( $C_i + C_{cable} \leq C_a$ ). |
| $L_i$     | Maximum internal inductance of the USB peripheral device.   |
| $L_a$     | Maximum allowed inductance of the USB peripheral device and its associated cable. The sum of $L_i$ of the USB peripheral device and $L_{cable}$ of the associated cable shall be less than or equal to $L_a$ ( $L_i + L_{cable} \leq L_a$ ).  |