

Device parameters for Wilcoxon's intrinsically safe certified sensors

An intrinsically safe system is composed of interconnected intrinsically safe apparatus, associated apparatus, and interconnecting cables. In the case of vibration sensors, the intrinsically safe apparatus is the sensor itself. The associated apparatus is the safety barrier.

When the sensor is approved as intrinsically safe for use in hazardous areas, there are certain limitations placed upon it. The sensor cannot be connected to "any old" safety barrier. Rather, the barrier must have intrinsically safe ratings that are compatible with those of the sensor. Apparatus have five rating parameters: Voltage, Current, Power, Capacitance, and Inductance.

The open-circuit voltage available at the terminals of the barrier is V_{oc} , or V_t . The short-circuit current available at the terminals of the barrier is I_{sc} , or I_t . The maximum capacitance that can be connected to the barrier apparatus is C_a while the maximum inductance that can be connected is L_a . The vibration sensor voltage rating, V_{max} or U_i , is the maximum voltage that can be applied to the terminals of the sensor. The current rating, I_{max} or I_i , is the maximum current that can be applied through the terminals of the sensor. The value of internal capacitance, C_i , and inductance, L_i , are also stated. When the sensor and barrier are connected together in a system, the cable capacitance, C_{cable} , and inductance, L_{cable} , must also be considered in the system. More recent approvals also factor in the total power applicable to the sensor, P_i , and the maximum power output, P_o , available from a barrier.

By comparing the ratings of the vibration sensors with those of the barrier and taking the cable values and power into account, an appropriate safety barrier can be selected. As long as the ratings satisfy the following equations, the system will meet the requirement for an intrinsically safe system.

V_{oc} (or V_t) must be equal to or less than V_{max} (or U_i)

I_{sc} (or I_t) must be equal to or less than I_{max} (or I_i)

C_a must be greater than or equal to $C_i + C_{cable}$

L_a must be greater than or equal to $L_i + L_{cable}$

P_i must be greater than or equal to P_o

$$\begin{aligned} V_{oc} &\leq V_{max} \\ I_{sc} &\leq I_{max} \\ C_a &\geq C_i + C_{cable} \\ L_a &\geq L_i + L_{cable} \\ P_i &\geq P_o \end{aligned}$$

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Wilcoxon intrinsically safe apparatus parameters

FM approved apparatus for U. S.

| Model | Device Parameters | | | | |
|-------------|-------------------|----------|------------------|---------|--------|
| | Gp A,B:Vmax | Vmax | I _{max} | Ci | Li |
| 766E | 30 Volts | 30 Volts | 180 mA | 0.03 μF | 0.0 mH |
| 793E | 30 Volts | 30 Volts | 180 mA | 0.03 μF | 0.0 mH |
| 793LE | 30 Volts | 30 Volts | 180 mA | 0.03 μF | 0.0 mH |
| 793VE | 30 Volts | 30 Volts | 180 mA | 0.32 μF | 0.0 mH |
| 793V-5E | 30 Volts | 30 Volts | 180 mA | 0.32 μF | 0.0 mH |
| 797E | 30 Volts | 30 Volts | 180 mA | 0.03 μF | 0.0 mH |
| 797LE | 30 Volts | 30 Volts | 180 mA | 0.03 μF | 0.0 mH |
| 797VE | 30 Volts | 30 Volts | 180 mA | 0.32 μF | 0.0 mH |
| 376E/CC726E | 26.6 Volts | 30 Volts | 180 mA | 0.14 μF | 0.0 mH |

CSA approved for Canada or U. S.

| Model | Device Parameters | | | | |
|---------------------------|--|--------|--------|----------|--------|
| | Ui | Ii | Pi | Ci | Li |
| 766-33 | 31.5 Volts | 68 mA | | | |
| 786A-IS | 28 Volts | 47 mA | 400 mW | 0.10 μF | 0.0 mH |
| 786F-IS | 28 Volts | 47 mA | 400 mW | 0.11 μF | 0.0 mH |
| 786T-IS | 28 Volts | 47 mA | 400 mW | 0.13 μF | 0.0 mH |
| 787A-IS | 28 Volts | 47 mA | 400 mW | 0.10 μF | 0.0 mH |
| 787A-M8-IS | 28 Volts | 47 mA | 400 mW | 0.10 μF | 0.0 mH |
| 793-33 | 31.5 Volts | 68 mA | | | |
| 793L-33 | 31.5 Volts | 68 mA | | | |
| 793V-33 | 31.5 Volts | 68 mA | | | |
| 793V-5-33 | 31.5 Volts | 68 mA | | | |
| 797-33 | 31.5 Volts | 68 mA | | | |
| 797L-33 | 31.5 Volts | 68 mA | | | |
| PC420---EX, all Models | Explosion Proof Model - Device Parameters do not apply | | | | |
| PC420---IS, all Models | 30 Volt | 106 mA | | 0.006 μF | 0.0 mH |
| PC421---IS, all Models | 30 Volt | 106 mA | | 0.006 μF | 0.0 mH |
| PC423---IS, all Models | 30 Volt | 106 mA | | 0.006 μF | 0.0 mH |

E.U. approved, meets ATEX requirements

| Model | Device Parameters | | | | |
|-----------|-------------------|-------|--------|---------|--------|
| | Ui | Ii | Pi | Ci | Li |
| 766-35 | 28 Volts | 47 Ma | 340 mW | 0.03 μF | 0.0 mH |
| 793-10-35 | 28 Volts | 47 Ma | 340 mW | 0.05 μF | 0.0 mH |
| 793-35 | 28 Volts | 47 Ma | 340 mW | 0.03 μF | 0.0 mH |
| 793V-35 | 28 Volts | 47 Ma | 340 mW | 0.72 μF | 0.0 mH |
| 793V-5-35 | 28 Volts | 47 Ma | 340 mW | 0.72 μF | 0.0 mH |
| 797-35 | 28 Volts | 47 Ma | 340 mW | 0.03 μF | 0.0 mH |
| 797-5-35 | 28 Volts | 47 Ma | 340 mW | 0.03 μF | 0.0 mH |
| 797L-35 | 28 Volts | 47 Ma | 325 mW | 0.05 μF | 0.0 mH |

Compatible barrier devices

Generally, the MTL 7778ac or 778ac zener barrier, or equivalent, will be the proper choice for all 700-series and 376 type dynamic sensors. The Wilcoxon LPS Series of 4-20 mA sensors can be used with the MTL 7787 or 787 zener barrier, or equivalent.

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Device specifications are subject to change, due to the research nature of the organization and our commitment to continuous improvement. Please contact a Wilcoxon customer sales and service representative to ensure accuracy.