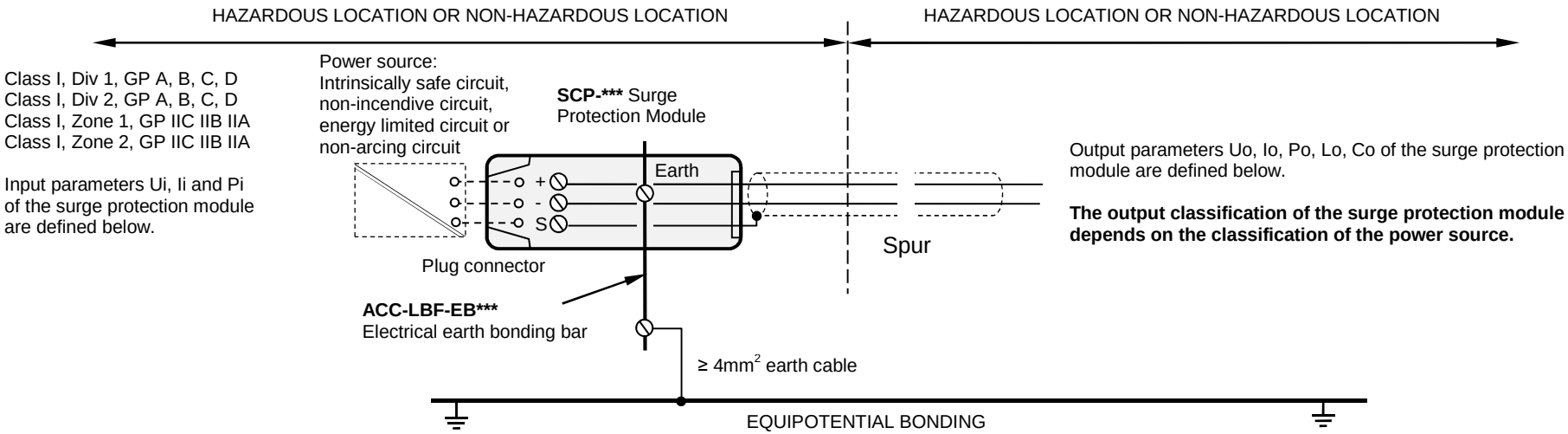
SCP-*** Surge Protection Module



Class I, Div 1, GP A, B, C, D or Class II, Div 1, GP E, F, G or Class III, Div 1 or Class I, Zone 0, GP IIC IIB IIA or Class I, Zone 1, GP IIC IIB IIA:

For connection to a certified intrinsically safe circuit:

Maximum allowed input values of the surge protection module:	Ui ≤ 24 V Ii ≤ 500 mA
or	
maximum allowed input values of the surge protection module, if connected to a FISCO circuit:	Ui ≤ 17.5 V Ii ≤ 380 mA Pi ≤ 5.32 W
Maximum output values of the surge protection module:	Uo = Uo (power source) Io = Io (power source) Po = Po (power source) Lo = Lo (power source) – 100 nH Co = Co (power source) – 2 nF

Class I, Zone 2, GP IIC IIB IIA (Ex ic or Ex nL):

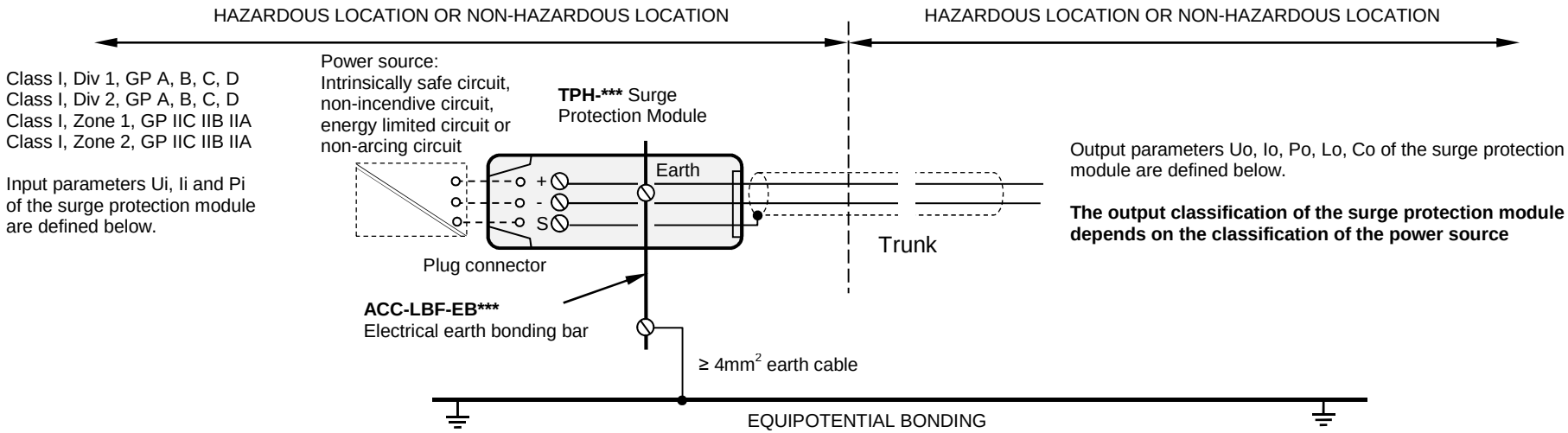
For connection to a certified intrinsically safe circuit:

Maximum allowed input values of the surge protection module:	Ui ≤ 33 V Ii ≤ 600 mA
Maximum output values of the surge protection module:	Uo = Uo (power source) Io = Io (power source) Po = Po (power source) Lo = Lo (power source) – 100 nH Co = Co (power source) – 2 nF

Class I, Div 2, GP A, B, C, D or Class II, Div 2, GP E, F, G or Class III, Div 2 or Class I, Zone 2, GP IIC IIB IIA (Ex nA):

Maximum allowed input values of the surge protection module:	Ui ≤ 33 V Ii ≤ 600 mA

TPH-*** Surge Protection Module



Class I, Div 1, GP A, B, C, D or Class II, Div 1, GP E, F, G or Class III, Div 1 or Class I, Zone 0, GP IIC IIB IIA or Class I, Zone 1, GP IIC IIB IIA:

For connection to a certified intrinsically safe circuit:

Maximum allowed input values of the surge protection module:	Ui ≤ 24 V Ii ≤ 500 mA
or	
maximum allowed input values of the surge protection module, if connected to a FISCO circuit:	Ui ≤ 17.5 V Ii ≤ 380 mA Pi ≤ 5.32 W
Maximum output values of the surge protection module:	Uo = Uo (power source) Io = Io (power source) Po = Po (power source) Lo = Lo (power source) – 100 nH Co = Co (power source) – 2 nF

Class I, Zone 2, GP IIC IIB IIA (Ex ic or Ex nL):

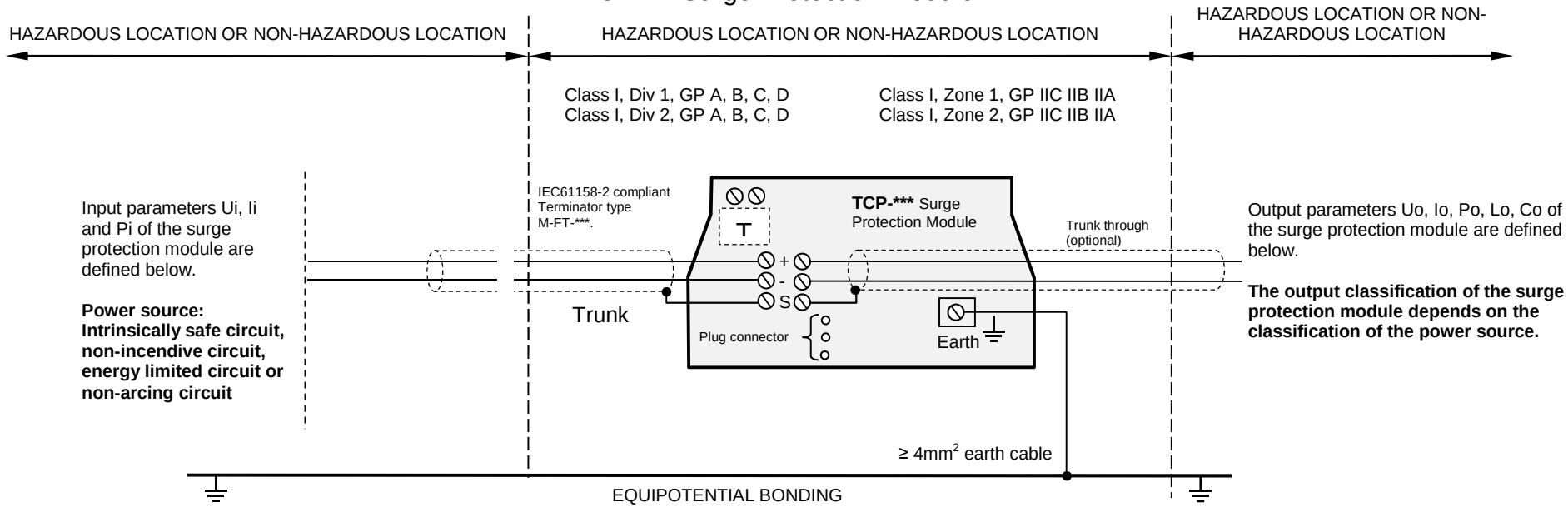
For connection to a certified intrinsically safe circuit:

Maximum allowed input values of the surge protection module:	Ui ≤ 33 V Ii ≤ 600 mA
Maximum output values of the surge protection module:	Uo = Uo (power source) Io = Io (power source) Po = Po (power source) Lo = Lo (power source) – 100 nH Co = Co (power source) – 2 nF

Class I, Div 2, GP A, B, C, D or Class II, Div 2, GP E, F, G or Class III, Div 2 or Class I, Zone 2, GP IIC IIB IIA (Ex nA):

Maximum allowed input values of the surge protection module:	Ui ≤ 33 V Ii ≤ 600 mA

TCP-*** Surge Protection Module



Class I, Div 1, GP A, B, C, D or Class II, Div 1, GP E, F, G or Class III, Div 1 or Class I, Zone 0, GP IIC IIB IIA or Class I, Zone 1, GP IIC IIB IIA:

For connection to a certified intrinsically safe circuit:

Maximum allowed input values of the surface protection module:	Ui ≤ 24 V Ii ≤ 500 mA
or	
maximum allowed input values of the surface protection module, if connected to a FISCO circuit:	Ui ≤ 17.5 V Ii ≤ 380 mA Pi ≤ 5.32 W
Maximum output values of the surface protection module:	Uo = Uo (power source) Io = Io (power source) Po = Po (power source) Lo = Lo (power source) – 100 nH Co = Co (power source) – 2 nF

Class I, Zone 2, GP IIC IIB IIA (Ex ic or Ex nL):

For connection to a certified intrinsically safe circuit:

Maximum allowed input values of the surface protection module:	Ui ≤ 33 V Ii ≤ 600 mA
Maximum output values of the surface protection module:	Uo = Uo (power source) Io = Io (power source) Po = Po (power source) Lo = Lo (power source) – 100 nH Co = Co (power source) – 2 nF

Class I, Div 2, GP A, B, C, D or Class II, Div 2, GP E, F, G or Class III, Div 2 or Class I, Zone 2, GP IIC IIB IIA (Ex nAc or Ex nA):

Maximum allowed input values of the surface protection module:	Ui ≤ 33 V Ii ≤ 600 mA

A) General (for IS Systems)

- The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus not specifically examined in combination as a system when the approved values of Uo, Io and Po for the associated apparatus are less than or equal to Ui, Ii and Pi for the intrinsically safe apparatus and the approved values of Co and Lo for the associated apparatus are greater than Ci + Ccable and Li + Lcable, respectively, for the intrinsically safe apparatus.

  The parameters for Lo and Co provided on pages 1 to 3 apply when one of the two conditions below is given:
  - The total Li of the external circuit (excluding the cable) is ≤ 1 % of the Lo value or
  - The total Ci of the external circuit (excluding the cable) is ≤ 1 % of the Co value.

  The parameters for Lo and Co provided on pages 1 to 3 are reduced to 50 % when both of the two conditions below are given:
  - The total Li of the external circuit (excluding the cable) is > 1 % of the Lo value and
  - The total Ci of the external circuit (excluding the cable) is > 1 % of the Co value.

  Note: The reduced capacitance of the external circuit (including cable) shall not be greater than 1 µF for C, D (IIA, IIB) and 600 nF for A, B (IIC).

  The Entity Parameters of the Surge Protection Devices are provided on pages 1 to 3.

- Simple Apparatus: An electrical component or combination of components of simple construction with well-defined electrical parameters that does not generate more than 1.5 volts, 100 milliamps, and 25 milliwatts, or a passive component that does not dissipate more than 1.3 watts and is compatible with the intrinsic safety of the circuit in which it is used (USA). A switch or non-inductive resistive device or thermocouple (Canada).

B) Special Conditions for Safe Use

- Pay attention to avoid electrostatic discharges while operating the installed device. Avoid electrostatic charge.
- Intrinsically safe circuits must be suitable for the ambient temperature and be wired and separated in accordance with the wiring methods of National Electrical Code ANSI/NFPA 70, Canadian Electrical Code C22.1 or in accordance with the authority having jurisdiction.
- The Surge Protection Devices are open type devices and shall be installed in a tool-secured enclosure suitable for the application in accordance with the National Electrical Code ANSI/NFPA 70, the Canadian Electrical Code C22.1 or in accordance with the authority having jurisdiction.

Class I, Division 1

- The Surge Protection Devices do not meet the requirement of CAN/CSA-C22.2 No. 157-92 or UL913 (ANSI/UL 60079-11), Dielectric Strength Requirements, between the intrinsically safe circuit and the parts that may be earthed, due to presence of Gas Discharge Tubes.

Class I, Zone 0

- Equipment shall be installed in accordance with IEC 60079-25 or ISA 60079-25 (12.02.05), clause 12, ‘Protection against lightning and other electrical surges’.

Class I, Zone 1, Intrinsic safety 'ia' and 'ib'

- The Surge Protection Devices do not meet the requirement of CAN/CSA-C22.2 No. 60079-11 or ANSI/UL 60079-11, Dielectric Strength Requirements, between the intrinsically safe circuit and the parts that may be earthed, due to presence of Gas Discharge Tubes.
- Equipment shall be installed in accordance with IEC 60079-25 or ISA 60079-25 (12.02.05), clause 12, 'Protection against lightning and other electrical surges'.

Class I, Zone 2, Intrinsic safety 'ic'

- The Surge Protection Devices do not meet the requirement of CAN/CSA-C22.2 No. 60079-11 or ANSI/UL 60079-11, Dielectric Strength Requirements, between the intrinsically safe circuit and the parts that may be earthed, due to presence of Gas Discharge Tubes.
- The Surge Protection Devices shall be fitted in a protective enclosure providing a degree of protection of at least IP54, which shall comply with CAN/CSA-C22.2 No. 60079-0 or ANSI/UL 60079-0.
- Equipment shall be installed in accordance with IEC 60079-25 or ISA 60079-25 (12.02.05), clause 12, 'Protection against lightning and other electrical surges'.

Class I, Zone 2, Non incendive 'nAc' and nA'

- The Surge Protection Devices do not meet the requirement of CAN/CSA-C22.2 No. 60079-15 or ANSI/UL 60079-15, Electric Strength, Insulation from Earth or Frame, due to presence of Gas Discharge Tubes.
- The Surge Protection Devices shall be fitted in a protective enclosure providing a degree of protection of at least IP54, which shall comply with CAN/CSA-C22.2 No. 60079-0 or ANSI/UL 60079-0 and CAN/CSA-C22.2 No. 60079-15 or ANSI/UL 60079-15.
- Connection or disconnection of energized non-intrinsically safe circuits is only permitted in the absence of hazardous atmosphere.
- The field wiring connections shall either be mechanically secured or shall require a separation force of at least 15 N.
- Equipment shall be installed in accordance with IEC 60079-25 or ISA 60079-25 (12.02.05), clause 12, 'Protection against lightning and other electrical surges'.

Class I, Zone 2, Energy Limited 'nL'

- The Surge Protection Devices do not meet the requirement of CAN/CSA-C22.2 No. 60079-15 or ANSI/UL 60079-15, Electric Strength, Insulation from Earth or Frame, due to presence of Gas Discharge Tubes.
- The Surge Protection Devices shall be fitted in a protective enclosure providing a degree of protection of at least IP 54, which shall comply with CAN/CSA-C22.2 No. 60079-0 or ANSI/UL 60079-0 and CAN/CSA-C22.2 No. 60079-15 or ANSI/UL 60079-15.
- Equipment shall be installed in accordance with IEC 60079-25 or ISA 60079-25 (12.02.05), clause 12, 'Protection against lightning and other electrical surges'.

C) FISCO

The FISCO concept allows interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combinations as defined in ANSI/ISA-60079-27 (12.02.04)-2006.

The criteria for the interconnection is that the voltage Ui, Ii and Pi which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage Uo, the current Io and the power Po levels which can be delivered by the associated apparatus, considering faults and application factors. In addition, the maximum unprotected capacitance (Ci) and inductance (Li) of each apparatus (other than the termination) connected to the Fieldbus must be less than or equal to 10 µH and 5 nF respectively.

In each segment only one active device, normally the associated apparatus is allowed to provide the necessary energy for the Fieldbus system. The voltage Uo of the associated apparatus has to be limited to the range 14 to 17.5 Vdc. All other equipment connected to the bus cable has to be passive meaning that they are not allowed to provide energy to the system, except for a leakage current of 50 µA for each connected device. Separately powered equipment needs a galvanic isolation to assure that the intrinsically safe Fieldbus circuit remains passive.

The cable used to connect the devices needs to have the parameters in the following range:

Loop Resistance Rc: 15 to 150 Ω/km
Inductance per unit length Lc: 0.4 to 1.0 mH/km
Capacitance per unit length Cc: 45 to 200 nF/km

C' = C' line/line + 0.5' line/screen if both lines are floating, or
C' = C' line/line + C' line/screen if the screen is connected to one line.

Length of Spur Cable: ≤ 60 m
Length of Trunk cable: ≤ 1 km

At each end of the trunk cable, an approved termination with the following parameters is suitable:

R ≥ 90 Ω and C ≤ 2.2 µF.

The number of passive devices connected to the bus segment is limited to a maximum of 32 devices. If the above rules are respected, up to a total length of 1,000 m (sum of the trunk cable and all spur cables), the inductance and capacitance of the cable will not impair the intrinsic safety of the installation.

The inductance and capacitance of each Simple Apparatus connected to a FISCO system shall not be greater than 10 µH and 5 nF respectively.

WARNING: Substitution of components may impair intrinsic safety and suitability for hazardous (classified) locations.