UL Control Document for OP-750 Safe Module Plus

SAFETY DESCRIPTION:

The Safety Module Plus apparatus is to be installed in an Unclassified Location while providing intrinsically safe output for Class I, Division 1, Groups A, B, C and D Hazardous Locations in the US and Canada. Additionally, the product is marked with [AEx ia Ga] IIC in the US and [Ex ia Ga] IIC X in Canada. The apparatus is intended for use in ambient temperature range of -20C to 60C.

WARNINGS

OP-750 series must be installed, operated and maintained only by qualified personnel, in accordance to the relevant national/ international installation standards (e.g. ANSI/ISA RP12.06.01 Installation of Intrinsically Safe System for Hazardous (Classified) Locations, National Electrical Code NEC ANSI/NFPA 70 Section 504 and 505, Canadian Electrical Code CEC) following the established installation rules, particular care shall be given to segregation and clear identification of I.S. conductors from non I.S. ones.

De-energize power source (turn off power supply voltage) before plugging or unplugging the terminal block (J4) when float is installed in Hazardous Locations or unless area is known to be nonhazardous.

Warning: Explosion Hazard: to prevent ignition of flammable or combustible atmospheres, disconnect power before servicing or unless area is known to be nonhazardous.

Danger d'Explosion: pour prévenir une inflammation de l'atmosphère inflammable ou combustible, couper l'alimentation avant de réparer à moins de savoir que l'emplacement n'est pas dangereux.

Units must be protected against dirt, dust, extreme mechanical (e.g. vibration, impact and shock) and thermal stress, and casual contacts.

If enclosure needs to be cleaned use only a cloth lightly moistened by a mixture of detergent in water.

Electrostatic Hazard: to avoid electrostatic hazard, the enclosure must be cleaned only with a damp or antistatic cloth.

Danger électrostatique: pour éviter le danger électrostatique, l'enveloppe doit être nettoyée au moyen d'un chiffon humide ou antistatique. Any penetration of cleaning liquid must be avoided to prevent damage to the unit.

Failure to properly install or use the equipment may risk damage to the unit or severe personal injury. The unit cannot be repaired by the end user and must be returned to the manufacturer or his authorized representative. Any unauthorized modification must be avoided.

Warning: substitution of components may impair Intrinsic Safety.

Avertissement: le remplacement des composants peut dégrader la Sécurité Intrinsèque.

It is tested for a maximum for AC power supply (Um) of 120 VAC. Control equipment must not use or generate more than 120 V rms or dc with respect to earth.

Selected intrinsically safe equipment must be third party listed as intrinsically safe for the application, and have intrinsically safe entity parameters conforming with Table 1 (see next page).

SPECIAL CONDITIONS FOR SAFE USE

The device does not meet the 500V rms dielectric requirement between the IS circuit and earth.

ASSOCIATED APPARATUS

In sewer lift station applications, the high level float (located in the sump) including the cable is in a hazardous location. This simple apparatus as defined and installed in accordance with Article 504.2 and with Article 504.10(D) of the National Electrical Code (ANSI/NFPA 70), or other local codes, must comply with the entity parameters described in Table 1 (see next page).

Capacitance and inductance of the field wiring from the associated apparatus to the Safe Module Plus shall be calculated and must be included in the system calculations as shown in Table 1. Cable capacitance, Ccable, plus intrinsically safe equipment (float switch) capacitance, Ci must be less than the marked capacitance. Likewise, cable inductance plus intrinsically safe equipment (float switch) inductance (Li) must be less than the marked inductance.

Where the cable capacitance and inductance per foot are not known, the following values shall be used: Ccable = 60 pF/ft. (200 pF/m), Lcable = 0.2 µH/ft (1.0 µH/m.) These calculated maximum lengths do not allow for any switch capacitance or inductance. (The cable length must be less than 800 feet not including allowances for the switch.)

For installations in which both the Ci and Li of the intrinsically safe apparatus exceeds 1% of the Ca (or Co) and La (or Lo) parameters of the associated apparatus (excluding the cable), then 50% of Ca (or Co) and La (or Lo) parameters are applicable and shall not be exceeded. The reduced capacitance shall not be greater than 1 µF for Groups C and/or D (IIB and/or IIA), and 600 nF for Groups A and B (IIC).

The values of Ca (or Co) and La (or Lo) determined by this method shall not be exceeded by the sum of all of Ci plus cable capacitances and the sum of all of the Li plus cable inductances in the circuit respectively.

This associated apparatus has not been evaluated for use in combination with another associated apparatus.

Where multiple circuits extend from the same piece of associated

apparatus, they must be installed in separate cables or in one cable having suitable insulation.

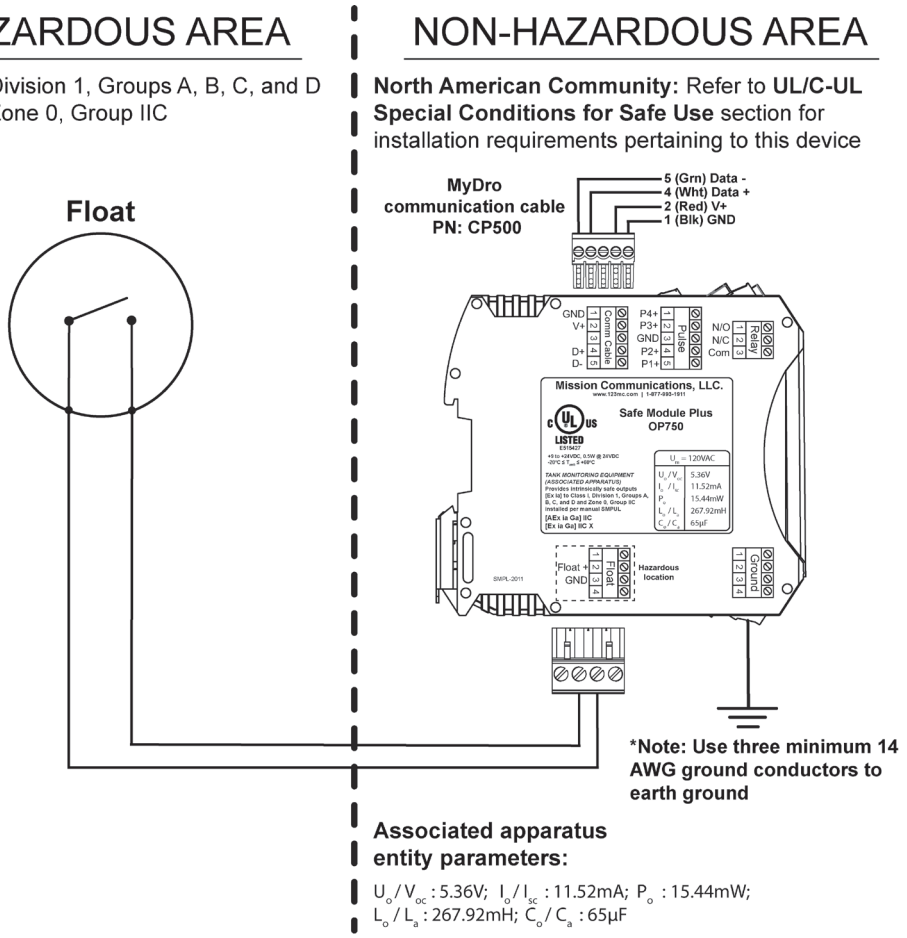
The output current of this associated apparatus is limited by a resistor such that the output voltage-current plot is a straight line drawn between open-circuit voltage and short-circuit current.

Installation

The Safe Module Plus Part No. OP750 must be installed in an enclosure suitable for the application in accordance with the National Electrical Code (ANSI/NFPA 70) for installation in the United States, the Canadian Electrical Code for installations in Canada, or other local codes, as applicable.

Intrinsically safe circuits must be wired and separated in accordance with Article 504.20 of the National Electrical Code (ANSI/NFPA 70) or other local codes, as applicable.

Refer to Article 504.30(B) of the National Electrical Code (ANSI/NFPA70) and Instrument Society of America Recommended Practice ISA RP12.06 for installing intrinsically safe equipment.



Mount included DIN rail to back of control cabinet with included sheet metal screws. Snap Safe Module Plus on the DIN rail by hooking the upper back receiver onto the top of the DIN rail. Push lower section of the enclosure until you hear the spring loaded catch snap into place.

Install signal cabling per Table 1 to the right.

The Safe Module Plus Part No. OP750 must be connected to a suitable Earth /via three independent conductors with a minimum AWG of 14 AWG per the National Electrical Code (ANSI/NFPA 70), the Canadian Electrical Code or other local installation codes, as applicable. The resistance of the ground path must be less than 1 ohm as shown in the figure above.

Maintenance and Repair

There are no user serviceable parts inside. Contact factory for repair.

To remove, disconnect all terminals from SafeModule Plus. Pull DIN rail latch from bottom of SMP to relieve the spring latch. Tilt upward to remove the module.

Requirement	Common Description	Simple Apparatus (Float and cable)	Value
Vmax/Ui	Voltage rating of cable and float switch assembly	≥ (greater than or equal to)	5.36V
Imax/Ii	Current rating of cable and float switch assembly	≥ (greater than or equal to)	11.52mA
Pmax/Pi	Power rating of cable and float switch assembly	≥ (greater than or equal to)	15.44mW
Ci + Ccable	Total capacitance of cable and float switch	≤ (less than or equal to)	65µF
Li + Lcable	Total Inductance of cable and float switch	≤ (less than or equal to)	267.92mH

Table 1 Intrinsically Safe Entity Parameters