

This Bulletin covers GEMS 54800 Series Programmable SAFE-PAKS for use as "INTRINSICALLY-SAFE-OUTPUT" TYPE SWITCHING UNITS for hazardous locations with non-voltage-producing sensors. When SAFE-PAK installation is in accordance with this Bulletin, these field sensors are suitable for Class I, Divisions 1 and 2, Groups A, B, C, D; and Class II, Divisions 1 and 2, Groups E, F, G as defined by Article 500 of the National Electrical Code.

IMPORTANT: READ THIS BULLETIN CAREFULLY AND COMPLETELY BEFORE INSTALLING OR CONNECTING SAFE-PAK SWITCHING UNITS.

*** Warning: To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

The instructions in this Bulletin cover GEMS Programmable SAFE-PAK Models P/N 54820, P/N 54825, P/N 54845, P/N 54850 and P/N 54860.

1. **Associated Equipment — Caution:** The Safe-Pak can be installed in panel assemblies in Class I, Div. 2, Groups A, B, C & D or in non-hazardous location; only the sensor terminals provide an intrinsically safe output (see Figs. 1, 2, 3A, 3B, [Exia] means associated equipment; "Appareillage connexe", located in safe area.

2. Mounting and enclosure considerations:

- A. Field wiring of Intrinsically safe circuits is to be segregated from non-intrinsically safe wiring by use of suitable barriers, separate wireways or trays. (See Fig. 4.)
- B. Intrinsically safe and non-intrinsically safe connection points should be located sufficiently apart to prevent any possibility of bypassing or miswiring during installation or servicing of equipment.
- C. The enclosure shall contain a cautionary statement as follows:

CAUTION: ANY SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

AVERTISSEMENT: LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE.

CAUTION: MOUNT OUTSIDE OF HAZARDOUS AREA.

ATTENTION: INSTALLER A L'EXTERIEUR LA ZONE DANGEREUSE.

- D. The SAFE-PAK mounting bracket must be grounded to ensure intrinsic safety. Resistance between bracket and ground chassis should be below one ohm. See Figs. 5 and 6 for recommended selection of grounding hardware, and refer to Article 250 of the National Electrical Code for methods and practice.

3. Installation of sensor switch and running of field wiring:

- A. The nature of the sensor switch must be such that it is a non-voltage-producing, essentially resistive termination or other device specifically examined and approved for use with the SAFE-PAK.
- B. The conductors of the intrinsically safe circuit should be sealed in a rigid metal conduit at the point where the wiring enters the hazardous area. The wiring and contacting device should be such that conductive dusts in the area will not close the circuit in place of the contacts.

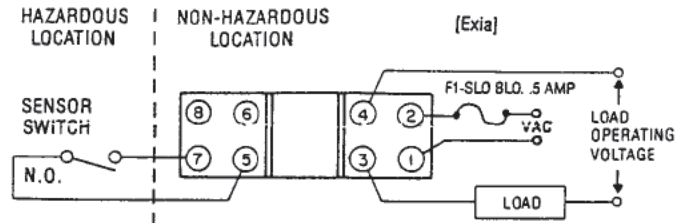


FIG. 1. Connection diagram, GEMS Programmable SAFE-PAK, N.O. mode.

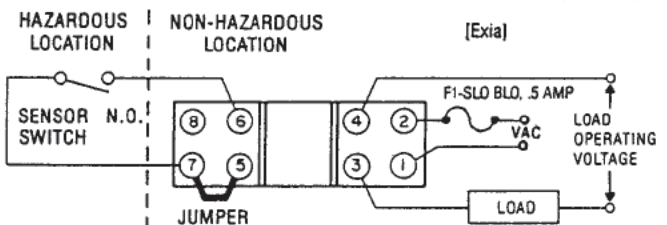


FIG. 2. Connection diagram, GEMS Programmable SAFE-PAK, N.C. mode.

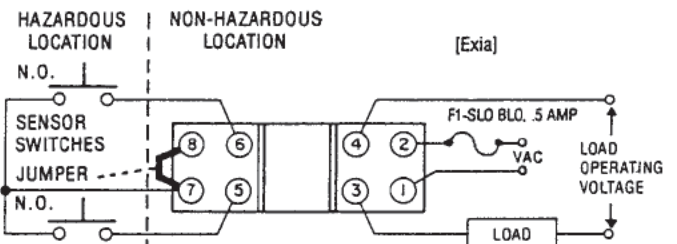


FIG. 3A. Connection diagram, GEMS Programmable SAFE-PAK, latching "A" mode.

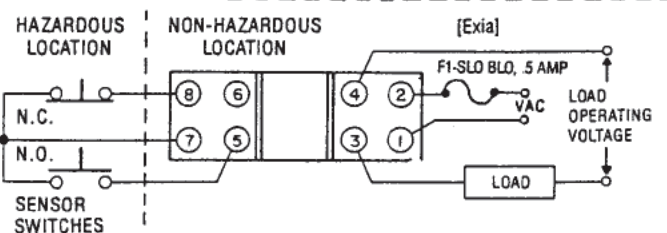
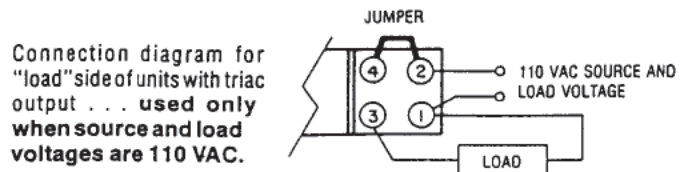
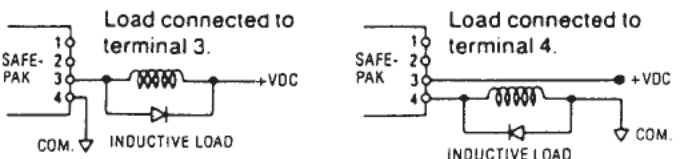


FIG. 3B. Connection diagram, GEMS Programmable SAFE-PAK, latching "B" mode.



Connection of suppression diode across inductive load, as required with the specific Programmable SAFE-PAK model P/N 54845 . . . typical diagrams.



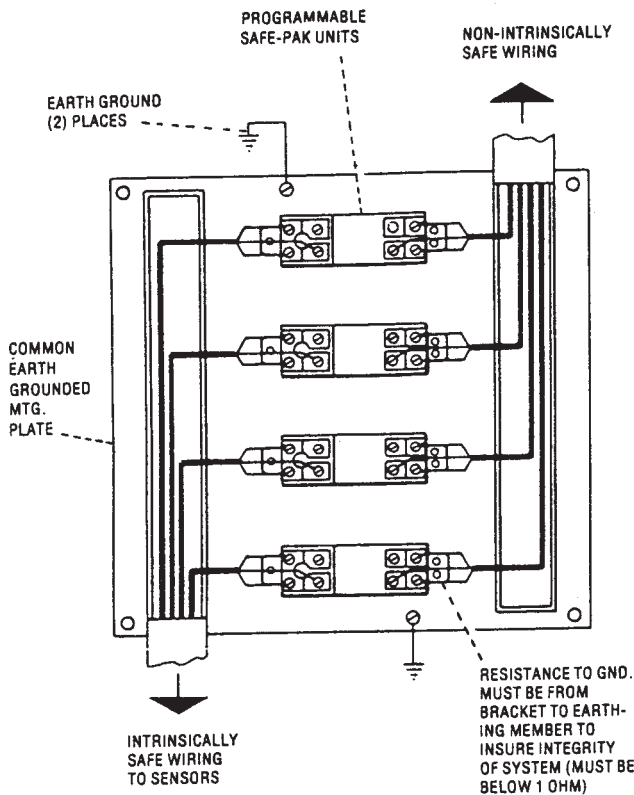


FIG. 4. Multiple SAFE-PAK units grouped on common, earth-grounded mounting plate.

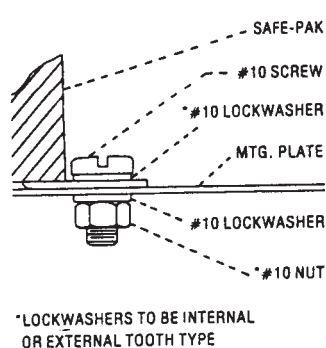


FIG. 5. Unit mounting detail.

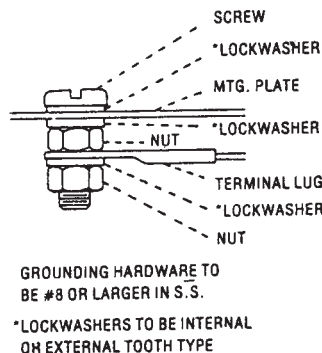


FIG. 6. Mounting plate grounding detail.

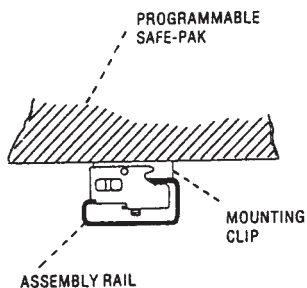


FIG. 7. Optional "assembly rail" method of mounting the Programmable SAFE-PAK.

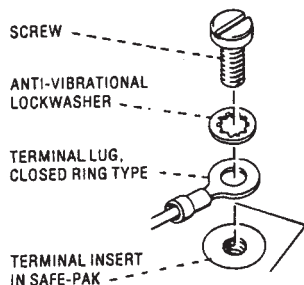


FIG. 8. Recommended method of connection to electrical terminals. All terminal hardware, including lugs, supplied with unit.

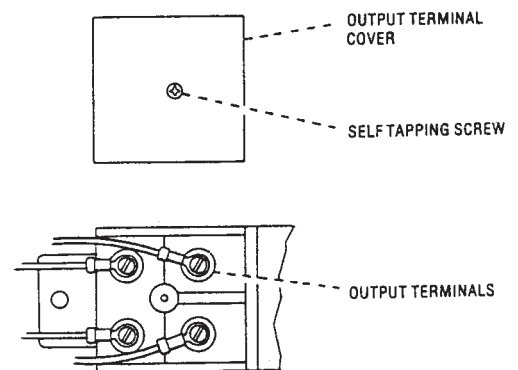


FIG. 9. Mounting of protective cover over output terminals of unit.

C. Hazardous area field wiring will store energy due to distributed capacitance and inductance in proportion to its length. It is therefore recommended that the characteristics (available from the manufacturer) of the cable be known and judged against the length of run and atmosphere of exposure. The following conservative chart is presented as a **guideline** in determining the limits of reactance for signal loops in the hazardous area wiring for the SAFE-PAK series.

GROUP	CAPACITANCE	INDUCTANCE
A&B	0.2 uf	7 mh
C	0.4 uf	25 mh
D	0.5 uf	50 mh

Example:
 Typical values of capacitance for a twisted pair of copper wires is between 20 and 60 pf per foot. Using the maximum value of 60 pf/ft., groups A & B could have a run of 3000+ feet with safety. Inductance of a typical twisted pair is between 0.10 and 0.20 uh/ft., thus making a cable run in this example essentially determined by the capacitance.

D. Whenever possible, the actual measured parameters should be used in making the determination of allowable length.

E. Shielded cable is not required, but if used in the application, the shield must be returned to ground the same as the SAFE-PAK mounting bracket.

F. Non-intrinsically-safe wiring cannot be run in conduit or open raceways together with intrinsically safe wiring.

G. Refer to Fig. 7 for detailed connection to terminal insert in the SAFE-PAK. All hardware, including terminal lugs, is supplied with unit.