

FISCO rules

The Fieldbus Intrinsically Safe Concept (FISCO) allows the interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criterion for such interconnection is that the voltage (Vmax), the current (Imax) and the power (Pi) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (Uo, Voc, Vt), the current (Io, Isc, It), and the power (Po) which can be provided by the associated apparatus (supply unit). In addition, the maximum unprotected residual capacitance (Ci) and inductance (Li) of each apparatus (other than the terminators) connected to the Fieldbus must be less than or equal to 5nF and 10µH respectively.

In each I.S. Fieldbus segment only one active source, normally the associated apparatus, is allowed to provide the necessary power for the Fieldbus. The allowed voltage (Uo, Voc, Vt) of the associated apparatus used to supply the bus must be limited to the range of 14V d.c. to 24V d.c. All other equipment connected to the bus cable has to be passive, meaning that the apparatus is not allowed to provide energy to the system, except to a leakage current of 50 µA for each connected device. Separately powered equipment needs a galvanic isolation to insure that the intrinsically safe Fieldbus circuit remains passive.

The cable used to interconnect the devices needs to comply with the following parameters:

- Loop resistance R': 15...150Ω/km
- Inductance per unit length L': 0.4...1mH/km
- Capacitance per unit length C': 80...200nF/km
- C' - C' line/line + 0.5 C' 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 : max. 30m
- Length of trunk cable : max. 1km
- Length of splice : max. 1m 9321-SC is a suitable device.

Terminators

At each end of the trunk cable an FM approved line terminator with the following parameters is suitable : R = 90...100Ω C = 0...2.2µF.
The FBT1-IS is a suitable device.

System evaluation

The number of passive devices like transmitters, actuators, connected to a single bus segment is not limited due to I.S. reasons. Furthermore, if the above rules are respected, the inductance and capacitance of the cable need not be considered and will not impair the intrinsic safety of the installation.

These FISCO power supplies can either be used in FISCO systems, or in IS systems using the entity concept.

Installation Notes For FISCO only :

1. The Intrinsic Safety FISCO concept allows the interconnection of FM Approved Intrinsically safe devices with FISCO parameters not specifically examined in combination as a system when :
Uo or Voc or Vt ≤ Vmax, Io or Isc or It ≤ Imax, Po ≤ Pi.

FISCO Parameters

Vmax = 17.5V, Imax = 380mA
Pi = 5.32W, Ca = 0µF, La = 0mH

Installation Notes For IS Entity Concepts only :

2. The Intrinsic Safety Entity concept allows the interconnection of FM Approved Intrinsically safe devices with entity parameters not specifically examined in combination as a system when :
Uo or Voc or Vt ≤ Vmax, Io or Isc or It ≤ Imax, Po ≤ Pi .
Ca or Co ≥ ∑ Ci + ∑ Ccable,
For inductance use either La or Lo ≥ ∑ Li + ∑ Lcable or Lc/Rc ≤ (La/Ra or Lo/Ro) and Li/Ri ≤ (La/Ra or Lo/Ro)

Entity Parameters (Terminator)


Vmax = 30V, Imax = 250mA,
Pi = 1.2W, Ci = 0µF, Li = 0mH

Installation Notes common to FISCO and IS Entity concepts :

3. Dust-tight conduit seals must be used when installed in Class II and Class III environments.
4. Control equipment connected to the Associated Apparatus must not use or generate more than 250 Vrms or Vdc.
5. Installation should be in accordance with ANSI/ISA RP12.06.01 (except chapter 5 for FISCO Installations) " Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code® (ANSI/NFPA 70) Sections 504 and 505.
6. All field apparatus must be FM Approved.
7. Field Apparatus manufacturer's installation drawing must be followed when installing this equipment.
8. This drawing forms part of the FM Certification Documentation and must not be modified without reference to the certifying authority.

Certifying Authority : FM Approvals

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Iss	Date	Drawn	Chkd	Modification			Copyright Reserved Written Permission To Copy Should Be Obtained	Measurement Technology Ltd Power Court, Luton, England		Title Control Drawing for FBTI-IS Terminator for FISCO & Entity Systems	Drg. No SCI-988
1	11.03	CMB		Scale	N/A	Tolerance					