

## 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 connection is that the voltage ( $V_{max}$ ), the current ( $I_{max}$ ) and the power ( $P_i$ ) that intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal to or greater than the voltage ( $U_o$ ,  $V_{oc}$ ,  $V_t$ ), the current ( $I_o$ ,  $I_{sc}$ ,  $I_t$ ), and the power ( $P_o$ ) that can be provided by the associated apparatus (supply unit). In addition, the maximum unprotected residual capacitance ( $C_i$ ) and inductance ( $L_i$ ) of each apparatus (other than the terminators) connected to the Fieldbus must be less than or equal to 5 nF and 10  $\mu$ H, 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 ( $U_o$ ,  $V_{oc}$ ,  $V_t$ ) of the associated apparatus used to supply the bus must be limited to the range of 14V dc to 24V dc. In this instance, the RPC10120Ex and RPC49-10265Ex have  $V_{oc}$  as given in the table below. All other equipment connected to the bus cable must be passive, meaning that the apparatus is not allowed to provide energy to the system, except to a leakage current of 50  $\mu$ A for each connected device. Separately powered equipment needs a galvanic isolation to ensure that the intrinsically safe Fieldbus circuit remains passive.

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

Loop resistance  $R'$ : 15 - 150  $\Omega$ /km

Inductance per unit length  $L'$ : 0.4 - 1 mH/km

Capacitance per unit length,  $C'$ : 80 - 200 nF/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: 30m maximum

Length of trunk cable: 1km maximum

Length of splice: 1 m maximum

Terminators:

At each end of the trunk cable an approved line terminator with the following parameters is suitable:  $R = 90 - 100 \Omega$ ms  $C = 0 - 2.2 \mu$ F

The RPC49-10120Ex and RPC49-10265Ex each have a built-in line terminator that may be switched in or out of the circuit.

System evaluation:

The number of passive devices, such as transmitters or 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 may either be used in FISCO systems, or in I/S systems using the entity concept.

Installation Notes for FISCO only:

- 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:

$$U_o \text{ or } V_{oc} \text{ or } V_t \leq V_{max}, I_o \text{ or } I_{sc} \text{ or } I_t \leq I_{max}, P_o \leq P_i.$$

FISCO Power Supply Model	$V_{oc}$ (V)	$I_{sc}$ (I)	$P_o$ (W)
RPC49-10120Ex	14.0	180	2.52
RPC49-10265Ex	14.8	359	5.31

Installation Notes for Entity Concept only:

- 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:

$$U_o \text{ or } V_{oc} \text{ or } V_t \leq V_{max}, I_o \text{ or } I_{sc} \text{ or } I_t \leq I_{max}, P_o \leq P_i.$$

$$C_a \text{ or } C_o \geq \sum C_i + \sum C_{cable}$$

$$\text{For inductance use either } L_a \text{ or } L_o \geq \sum L_i + \sum L_{cable} \text{ or}$$

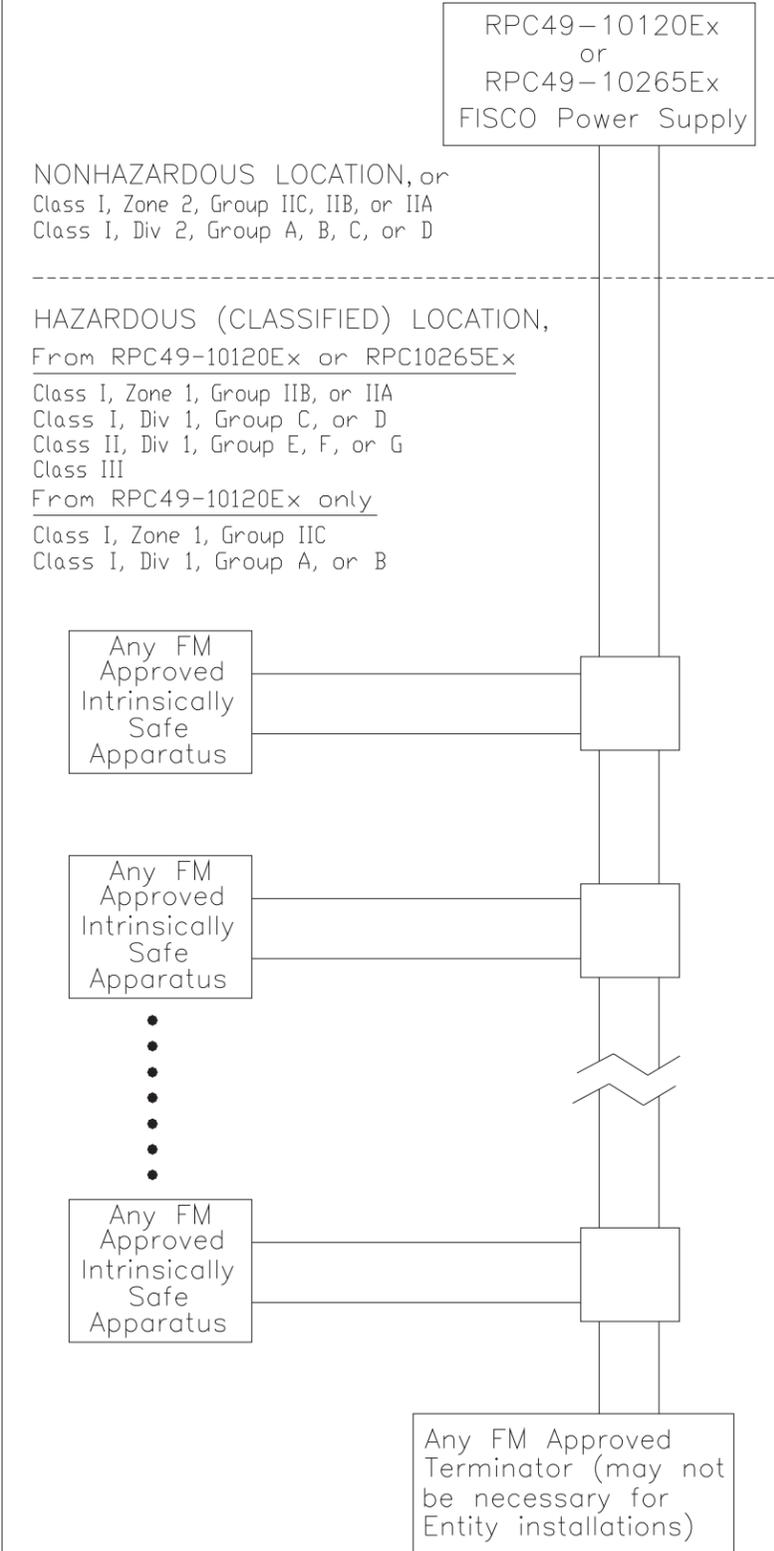
$$L_c/R_c \leq (L_a/R_a \text{ or } L_o/R_o) \text{ and } L_i/R_i \leq (L_a/R_a \text{ or } L_o/R_o)$$

RPC49-10120Ex					
Groups	$C_a$ ( $\mu$ F)	$L_a$ ( $\mu$ H)	$V_{oc}$ (V)	$I_{sc}$ (I)	$P_o$ (W)
IIC/AB	0.2	300	14.0	180	2.52
IIB/CE	1.32	1300			
IIA/DFG	5.05	2100			

RPC49-10265Ex					
Groups	$C_a$ ( $\mu$ F)	$L_a$ ( $\mu$ H)	$V_{oc}$ (V)	$I_{sc}$ (I)	$P_o$ (W)
IIB/CE	0.5	550	14.0	359	5.31
IIA/DFG	1.62	900			

Installation Notes common to FISCO and Entity Concepts:

- Dust-tight conduit seals must be used when installed in Class II and Class III environments.
- Control equipment connected to the Associated Apparatus must not use or generate more than 250Vrms or Vdc.
- Installations should be in accordance with ANSI/ISA RP12.06.01 (except Chapter 5 for FISCO installations) "Installations of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70) Sections 504 and 505.
- All field apparatus must be FM approved.
- Field apparatus manufacturer's installation drawing must be followed when installing this equipment.
- The RPC49-10120Ex and RPC49-10265Ex are approved as [AEx ib] apparatus. The I/S circuit is only suitable for Class I, Zone 1 or Class I, Zone 2, and is not suitable for Class I, Zone 0 hazardous (classified) locations.
- This drawing forms part of the FM Certification Documentation and must not be modified without reference to FM Approvals.



Drawing No.:  
IS-1.902

**TURCK**  
3000 Campus Drive  
Plymouth, MN 55441  
Phone: (763) 553-7300

Title: Control Drawing for RPC49-10120Ex and  
RPC49-10265Ex FISCO Power Supplies

Scale: NONE

Sheet 1 of 1

A	Release	BVL	2/8/06
Rev	Description	Drft	Date