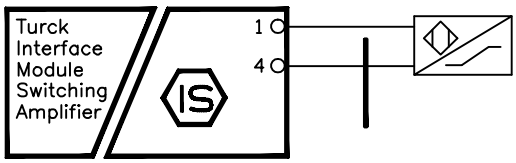
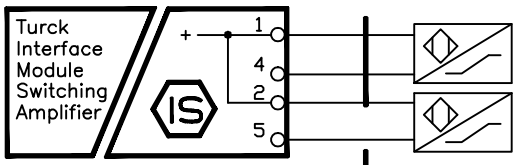
Discrete Input Devices with Intrinsically Safe Field Circuits

NON–HAZARDOUS LOCATION

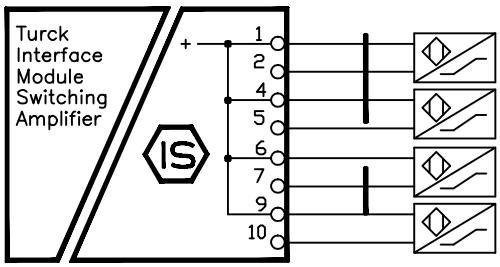
HAZARDOUS (CLASSIFIED) LOCATION
Class I, Div. 1, Group A, B, C or D;
Class II, Div. 1, Group E, F or G;
Class III, Div. 1; or
Class I, Zone 0, Group IIC, IIB or IIA



IM1–12Ex–R
IM1–12Ex–MT
IM1–12Ex–T
IM1–121Ex–R
IM1–121Ex–T



IM1–22Ex–R
IM1–22Ex–T
IM1–22Ex–MT
IM12–22Ex–R



IM1–451Ex–R
IM1–451Ex–T

Entity Parameters: Class I, Division 1; Class II, Division 1; Class III, Division 1
Class I, Zone 0, 1, or 2
Circuit Characteristic: Linear

Model 1	Terminals	V_{oc}/U_o (V)	I_{sc}/I_o (mA)	P_o (mW)	C_a/C_o (uF)		L_a/L_o (mH)	
					AB/IIC	CDEFG/IIB,IIA	AB/IIC	CDEFG/IIB,IIA
IM1–12Ex–R, IM1–12Ex–MT, IM1–12Ex–T, IM1–121Ex–R, IM1–121Ex–T	1–4	9.6	11	26	1.1	5.2	1	2
					0.83	3.8	5	10
IM1–22Ex–R, IM1–22Ex–T, IM1–22Ex–MT, IM12–22Ex–R	1–4, 2–5				0.74	3.4	10	20
IM1–451Ex–R	1–2, 4–5, 6–7, 9–10	11.3	13	36	0.84	4	1	2
					0.62	2.8	5	10
IM1–451Ex–T					0.55	2.5	10	20

P_o of the barrier is calculated using the formula $P_o = (V_{oc} * I_{sc})/4$

LISTED

Associated Apparatus, Nonhazardous Locations, providing intrinsically safe circuits for use in hazardous locations Cl I, Div 1, Grps A, B, C, D; Cl II, Div 1, Grps E, F, G; Cl III, Div 1; Cl I, Zone 0, [AEx ia] IIC when installed per Turck control drawing IS–1.301. $-25°C \leq T_a \leq +60°C$

Notes:

1. The symbol designates third party approved with correct entity parameters meeting the relations shown in Table 1, or simple apparatus.
2. Multiple circuits extending from the same piece of Associated Apparatus equipment must be installed in separate cables or in one cable having suitable insulation. Refer to Instrument Society of America Recommended Practice ISA RP12.6 for installing intrinsically safe equipment.
3. A simple apparatus is defined as an electrical component or combination of components of simple construction with well–defined electrical parameters that does not generate more than 1.5V, 100mA, and 25mW, or a passive component that does not dissipate more than 1.3W and is compatable with the intrinsic safety of the circuit in which it is used.
4. Capacitance and inductance of the field wiring from the intrinsically safe equipment to the barrier should be calculated and should be included in the system calculations as shown in Table 1. Cable capacitance (Cc) plus intrinsically safe equipment capacitance (Ci) must be less than the marked capacitance (Ca) shown on any barrier used. The same applies for inductance (Lc, Li and La, respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used: Cc = 60 pF/ft, Lc = 0.2 uH/ft.

Table 1

I.S. Equipment		Barrier	
V_{max}	≥	V_{oc}	(or V_t)
I_{max}	≥	I_{sc}	(or I_t)
$C_i + C_c$	≤	C_a	
$L_i + L_c$	≤	L_a	
U_i	≥	U_o	
I_i	≥	I_o	
$C_i + C_{cable}$	≤	C_o	
$L_i + L_{cable}$	≤	L_o	
P_i	≥	P_o	

5. Barriers must be installed in accordance with barrier manufacturer's control drawing and Article 504 of the National Electrical Code, ANSI/NFPA 70, for installation in the United States.
6. Control equipment must not use or generate more than 250V rms or dc with respect to earth.
7. WARNING: To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.
8. WARNING: Substitution of components may impair intrinsic safety.

Rev	Description	Drft	Date
C	Standard update evaluation	BVL	11/2/12
B	Remove Obsolete Models	BVL	5/25/10
A	Release	BVL	6/6/07

Drawing No.: IS–1.301

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

Title: Control Drawing for UL Listed IM1–..Ex–. and IM12–..Ex–. Isolator Barriers with I/S (Entity) Field Circuits

Scale: NONE

Sheet 1 of 1