

THIS DRAWING IS PROPERTY OF AND PROPRIETARY TO EMERSON PROCESS MANAGEMENT. THIS DRAWING AND THE INFORMATION CONTAINED HEREIN SHALL NOT BE REPRODUCED NOR DISCLOSED TO ANYONE EXCEPT THOSE REQUIRING ITS USE FOR CSI AUTHORIZED PURPOSES. THIS DOCUMENT SHALL BE DESTROYED OR RETURNED TO EMERSON WHEN NO LONGER REQUIRED FOR THOSE PURPOSES.

REV	ECO NO.	DATE
P0	N/A	4-01-09

TABLE 1 - FM ENTITY PARAMETERS

Input Parameter		Output Parameter	
U _i (V _{max}) = 30 Vdc	V _t or V _{oc} of loop must be <= 30 Vdc	U _o (V _{oc}) = 1.9 Vdc	
i _i (I _{max}) = 200 mA	I _t or I _{sc} of loop must be <= 200 mA	I _o (I _{sc}) = 32 uA	
P _i (P _{max}) = 1 W		P _o = 61 uW	
C _i = 0 uF	Device does not add capacitance to the loop	C _a = 100 uF	
L _i = 0 mH	Device does not add inductance to the loop	L _a = 5600 mH	

Classification: T4

Max. Ambient temp:
-10°C less than or equal to T_a
less than or equal to +50°C

WARNING - BATTERIES MUST BE CHARGED
IN A NONHAZARDOUS LOCATIONS ONLY

WARNING - SUBSTITUTION OF COMPONENTS
MAY IMPAIR INTRINSIC SAFETY

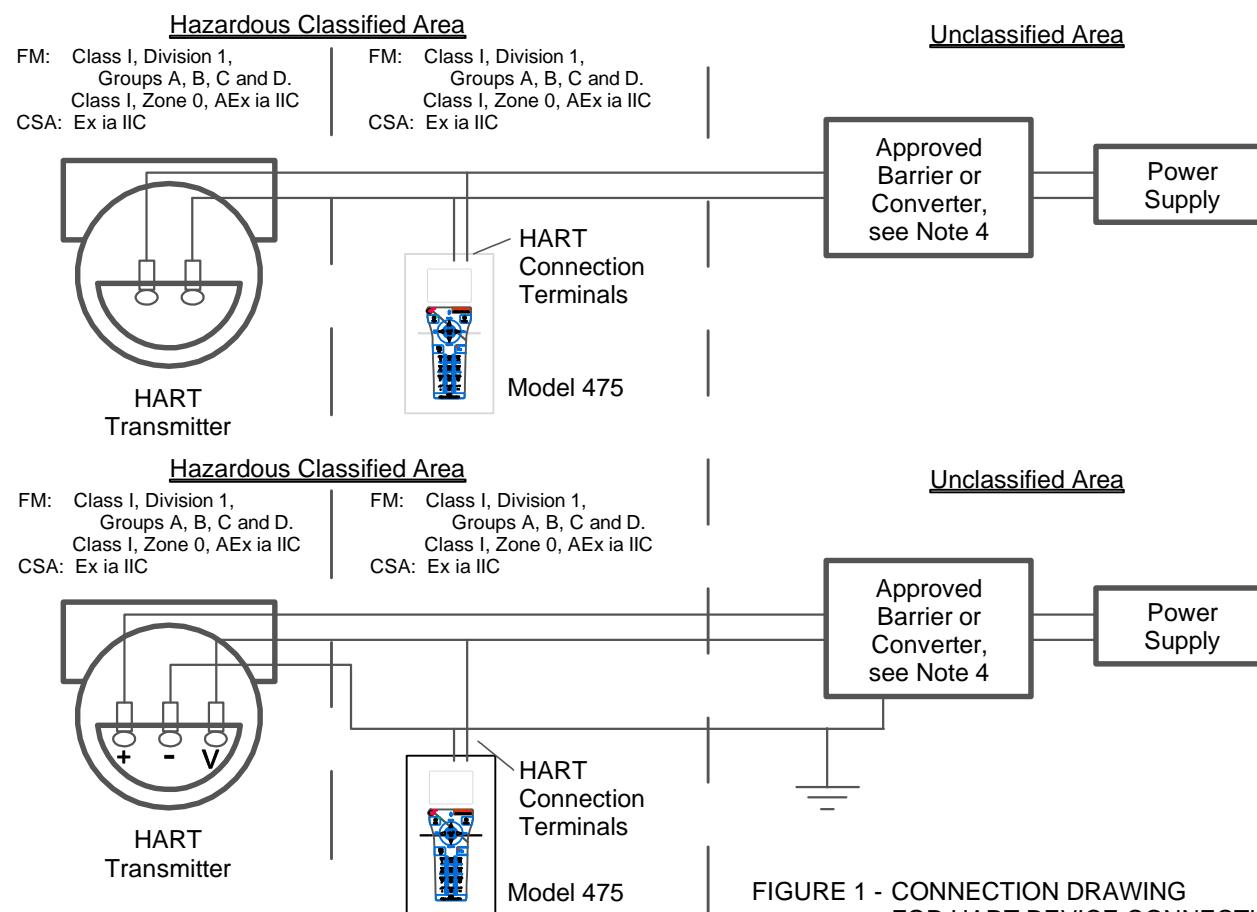


FIGURE 1 - CONNECTION DRAWING FOR HART DEVICE CONNECTION

Notes:

- No revision to this drawing without prior FM Approval and CSA International Approval.
- Associated Apparatus manufacturer's installation drawing must be followed when installing the equipment.
- Associated Apparatus and Model 475 Communicator must meet the following parameters:
 - U_o, V_{oc} or V_t of the barrier plus V_{oc} of the Model 475 Communicator must be less than or equal to U_i (V_{max})
 - I_o, I_{sc} or I_t of the barrier plus I_{sc} of the Model 475 Communicator must be less than or equal to I_i (I_{max})
 - P_o of the barrier plus P_o of the Model 475 Communicator must be less than or equal to P_i (P_{max})
 - C_a of barrier must be greater than or equal to C_i of the Model 475 Communicator plus C_i of the HART Transmitter plus C _{Cable}
 - L_a of barrier must be greater than or equal to L_i of the Model 475 Communicator plus L_i of the HART Transmitter plus L _{Cable}
 - L_a of Model 475 Communicator must be greater than or equal to L_i of the HART Transmitter plus L _{Cable}
 - C_a of Model 475 Communicator must be greater than or equal to C_i of the HART Transmitter plus C _{Cable}

FM:

- The Associated Apparatus must be FM Approved.
- HART Transmitter must be FM Approved for use with the Model 475 Communicator.
- Installation should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically safe systems for Hazardous (classified) Locations" and the National Electrical Code (ANSI/NFPA 70).
- Control equipment connected to Associated Apparatus must not use or generate more than 250V.
- Resistance between Intrinsically Safe Ground and Earth Ground must be less than 1.0 Ohm.

CSA:

- The Associated Apparatus must be CSA certified.
- HART Transmitter must be CSA certified for use with the Model 475 Communicator.
- Installation should be in accordance with Canadian Electrical Code, CSA 22.1, Part 1.
- Control equipment connected to Associated Apparatus must not use or generate more than 250V.
- Resistance between Intrinsically Safe Ground and Earth Ground must be less than 1.0 Ohm.

MATERIAL:	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	APPROVALS		Emerson Process Management USA	
FINISH:	TOLERANCES DECIMALS: .X ± .030 .XX ± .020 .XXX ± .010 FRACTIONS: ± 1/32 ANGULAR: ± 0°-30' FINISH: 32	DESIGNED BY: Wayne Hardin	DATE 1 April 09	Model 475 IS Installation Drawing	
ARTWORK FILENAME/REVISION LEVEL:	DO NOT SCALE THIS DRAWING	LAST REVISED BY:	DATE		
		RESP. ENGINEER	DATE		
		MANUFACTURING ENG. Wayne Hardin	DATE 1 April 09		
		DOCUMENT CONTROL	DATE	CAD FILENAME 475-1130_sht1.dwg	DRAWING NO./PART NO. 00475-1130
				FIRST USED MODEL NO. 475	SCALE 1 OF 4
					SIZE C

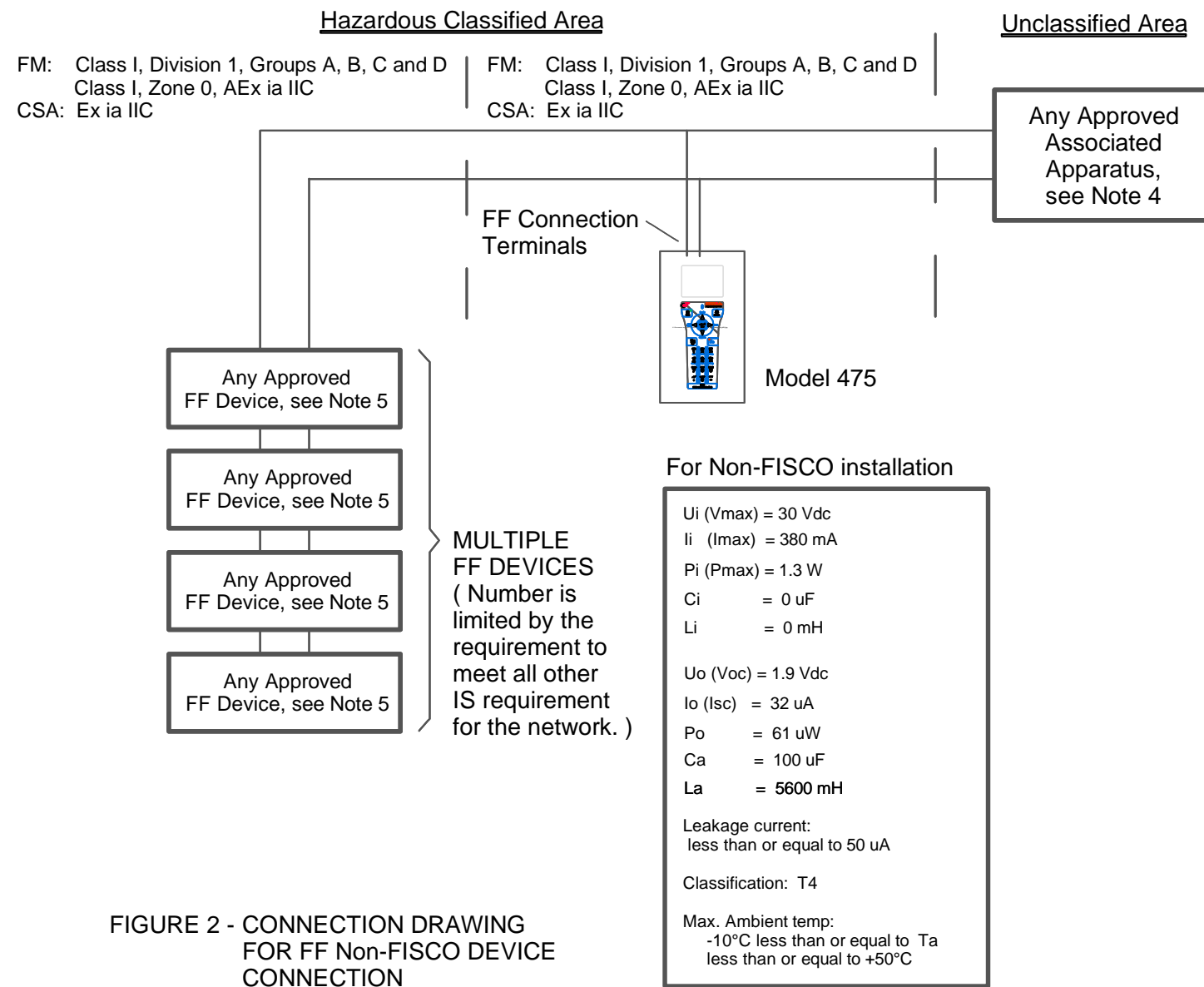


FIGURE 2 - CONNECTION DRAWING FOR FF Non-FISCO DEVICE CONNECTION

WARNING - BATTERIES MUST BE CHARGED IN A NONHAZARDOUS LOCATIONS ONLY

WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY

Notes:

1. No revision to this drawing without prior FM Approval and CSA International Approval.
2. Associated Apparatus manufacturer's installation drawing must be followed when installing the equipment.
3. Associated Apparatus and Model 475 Communicator must meet the following parameters :
 - a) U_o, V_{oc} or V_t of the barrier plus V_{oc} of the Model 475 Communicator must be less than or equal to $U_i (V_{max})$
 - b) I_o, I_{sc} or I_t of the barrier plus I_{sc} of the Model 475 Communicator must be less than or equal to $I_i (I_{max})$
 - c) P_o of the barrier plus P_o of the Model 475 Communicator must be less than or equal to $P_i (P_{max})$
 - d) C_a of barrier must be greater than or equal to C_i of the Model 475 Communicator plus C_i of the HART Transmitter plus C_{cable}
 - e) L_a of barrier must be greater than or equal to L_i of the Model 475 Communicator plus L_i of the HART Transmitter plus L_{cable}
 - f) L_a of Model 475 Communicator must be greater than or equal to L_i of the HART Transmitter plus L_{cable}
 - g) C_a of Model 475 Communicator must be greater than or equal to C_i of the HART Transmitter plus C_{cable}

FM:

4. The Associated Apparatus must be FM Approved.
5. FF Device must be FM Approved for use with the Model 475 Communicator.
6. Installation should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically safe systems for Hazardous (classified) Locations" and the National Electrical Code (ANSI/NFPA 70).
7. Control equipment connected to Associated Apparatus must not use or generate more than 250V.
8. Resistance between Intrinsically Safe Ground and Earth Ground must be less than 1.0 Ohm.

CSA:

4. The Associated Apparatus must be CSA certified.
5. FF Device must be CSA certified for use with the Model 475 Communicator.
6. Installation should be in accordance with Canadian Electrical Code, CSA 22.1, Part 1.
7. Control equipment connected to Associated Apparatus must not use or generate more than 250V.
8. Resistance between Intrinsically Safe Ground and Earth Ground must be less than 1.0 Ohm.

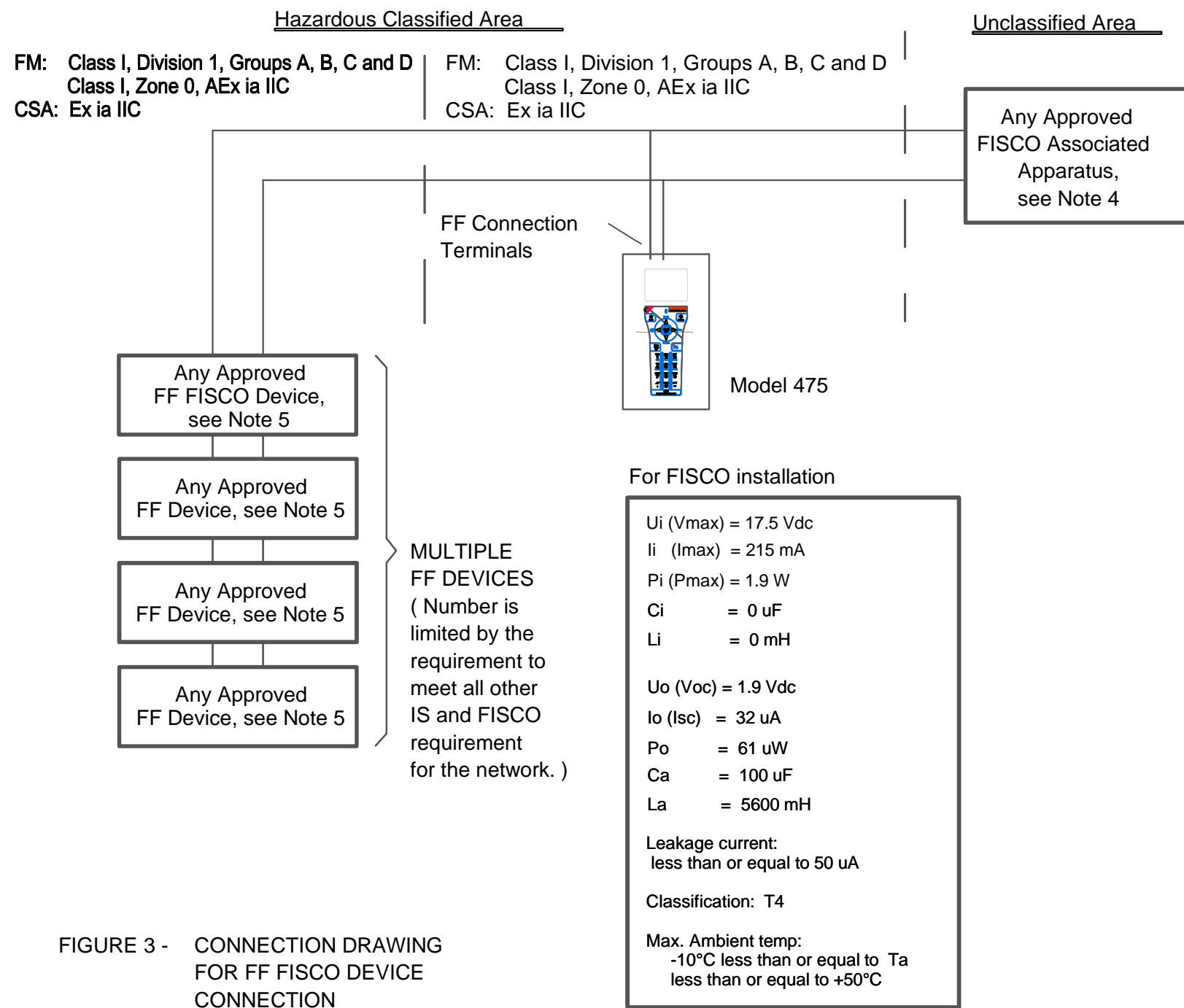


FIGURE 3 - CONNECTION DRAWING FOR FF FISCO DEVICE CONNECTION

WARNING - BATTERIES MUST BE CHARGED IN A NONHAZARDOUS LOCATIONS ONLY

WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY

Notes:

- No revision to this drawing without prior FM Approval and CSA International Approval.
- Associated Apparatus manufacturer's installation drawing must be followed when installing the equipment.
- Associated Apparatus and Model 475 Communicator must meet the conditions of the "FISCO CONCEPT" see notes on Page 4

FM:

- The Associated Apparatus must be FM Approved.
- FF Device must be FM Approved for use with the Model 475 Communicator.
- Installation should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically safe systems for Hazardous (classified) Locations" and the National Electrical Code (ANSI/NFPA 70).
- Control equipment connected to Associated Apparatus must not use or generate more than 250V.
- Resistance between Intrinsically Safe Ground and Earth Ground must be less than 1.0 Ohm.

CSA:

- The Associated Apparatus must be CSA certified.
- FF Device must be CSA certified for use with the Model 475 Communicator.
- Installation should be in accordance with Canadian Electrical Code, CSA 22.1, Part 1.
- Control equipment connected to Associated Apparatus must not use or generate more than 250V.
- Resistance between Intrinsically Safe Ground and Earth Ground must be less than 1.0 Ohm.

FISCO CONCEPT

THE FISCO CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIALLY EXAMINED IN SUCH COMBINATION. THE CRITERIA FOR INTERCONNECTION IS THAT THE VOLTAGE (U_i OR V_{max}), THE CURRENT (I_i OR I_{max}) AND THE POWER (P_i OR P_{max}) WHICH AN INTRINSICALLY SAFE APPARATUS CAN RECEIVE AND REMAIN INTRINSICALLY SAFE CONSIDERING FAULTS, MUST BE EQUAL OR GREATER THAN VOLTAGE (U_o , V_{oc} OR V_t), THE CURRENT (I_o , I_{sc} OR I_t) AND THE POWER (P_o OR P_{max}) LEVELS WHICH CAN BE DELIVERED BY THE ASSOCIATED APPARATUS, CONSIDERING FAULTS AND APPLICABLE FACTORS. IN ADDITION, THE MAXIMUM UNPROTECTED CAPACITANCE (C_i) AND THE INDUCTANCE (L_i) OF EACH APPARATUS (OTHER THAN THE TERMINATION) CONNECTED TO THE FIELD BUS MUST BE LESS THAN OR EQUAL TO 5 nF and 10 μ H RESPECTIVELY.

IN EACH SEGMENT ONLY ONE ACTIVE DEVICE, NORMALLY THE ASSOCIATED APPARATUS, IS ALLOWED TO PROVIDE THE NECESSARY ENERGY FOR THE FIELD BUS SYSTEM. THE VOLTAGE U_o (OR V_{oc} OR V_t) OF THE ASSOCIATED APPARATUS IS LIMITED TO A RANGE OF 14 V TO 24 Vdc ALL OTHER EQUIPMENT CONNECTED TO THE BUS CABLE HAS TO BE PASSIVE, MEANING THAT THEY ARE NOT ALLOWED TO PROVIDE ENERGY TO THE SYSTEM, EXCEPT A LEAKAGE CURRENT OF 50 μ A FOR EACH CONNECTED DEVICE. SEPARATELY POWERED EQUIPMENT NEEDS GALVANIC ISOLATION TO ASSURE THAT THE INTRINSICALLY SAFE FIELD BUS CIRCUIT REMAINS PASSIVE.


THE CABLE USED TO INTERCONNECT DEVICES NEEDS TO HAVE THE PARAMETERS IN THE FOLLOWING RANGE:

Loop Resistance R' :	15.....150 Ohm/km
Inductance per unit length L' :	0.4.....1 mH/km
Capacitance per unit length C' :	80.....200 nF
$C' = C' \text{ line/line} + 0.5C' \text{ line/screen}$, if both lines are floating, or	
$C' = C' \text{ line/line} + C' \text{ line/screen}$, if the screen is connected to one line	
Length of trunk cable:	less than or equal to 1000m
Length of spur cable:	less than or equal to 30m
Length of spur splice:	less than or equal to 1m

AT EACH END OF THE TRUNK CABLE AN APPROVED INFALLIBLE LINE TERMINATION WITH THE FOLLOWING PARAMETERS IS SUITABLE:

$$R = 90.....100 \text{ Ohm} \qquad C = 0.....2.2 \text{ } \mu\text{F}$$

ONE OF THE ALLOWED TERMINATIONS MIGHT ALREADY BE INTEGRATED IN THE ASSOCIATED APPARATUS. THE NUMBER OF PASSIVE APPARATUS CONNECTED TO THE BUS SEGMENT IS NOT LIMITED DUE TO I.S. REASONS. IF THE ABOVE RULES ARE RESPECTED, UP TO A TOTAL LENGTH OF 1000 m (SUM OF TRUNK AND ALL SPUR CABLES) OF CABLE IS PERMITTED. THE INDUCTANCE AND THE CAPACITANCE OF THE CABLE WILL NOT IMPAIR THE INTRINSIC SAFETY OF THE INSTALLATION.

		Emerson Process Management USA	
CAD FILENAME 475-1130_sht4.dwg	DRAWING NO./PART NO. 00475-1130	SCALE -	SIZE C
REVISION LEVEL P0		SHEET 4 OF 4	