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TABLE 1 - FM ENTITY PARAMETERS

Input Parameter	Output Parameter
V_i (Vmax) = 50 Vdc	V_o or Vdc of loop must be ≤ 30 Vdc
I_i (Imax) = 200 mA	US (N500) = 1.8 Vdc
P_i (Pmax) = 1 W	I_o (Im) = 32 mA
C_i = 0 uF	P_o = 81 mW
L_i = 0 mH	C_o = 100 uF
	L_o = 5500 mH

Classification: T4
Max. Ambient Temp: -10°C less than or equal to Ta 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

Notes:

- No revision to this drawing without prior FM Approval and CSA Interim Approval.
- Associated Apparatus manufacturer's installation drawing must be followed when installing the equipment.
- Associated Apparatus and Model 475 Communicator must be installed in accordance with the following:
 - V_o, V_{dc} or V_{dc} of the barrier plus V_{dc} of the Model 475 Communicator must be less than or equal to V_i (Vmax)
 - I_o, I_{dc} or I_{dc} of the barrier plus I_{dc} of the Model 475 Communicator must be less than or equal to I_i (Imax)
 - Control equipment connected to Associated Apparatus must be less than or equal to P_i (Pmax)
 - Ca of barrier must be greater than or equal to Ci of the Model 475 Communicator plus Ci of the HART Transmitter plus Cable
 - Model 475 Communicator plus Li of the HART Transmitter plus Cable
 - Model 475 Communicator must be greater than or equal to Li of the HART Transmitter plus Cable
 - Ca of Model 475 Communicator must be greater than or equal to Ci of the HART Transmitter plus Cable
- FM:
- The Associated Apparatus must be FM Approved.
- HART Transmitter must be FM Approved for use with the installation should be in accordance with 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 (CEC).
- 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.

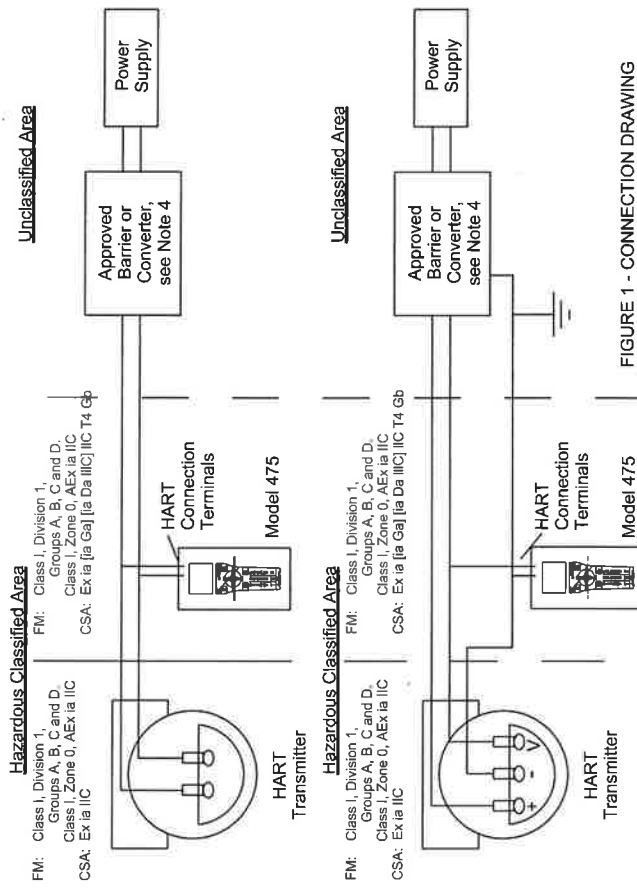


FIGURE 1 - CONNECTION DRAWING FOR HART DEVICE CONNECTION

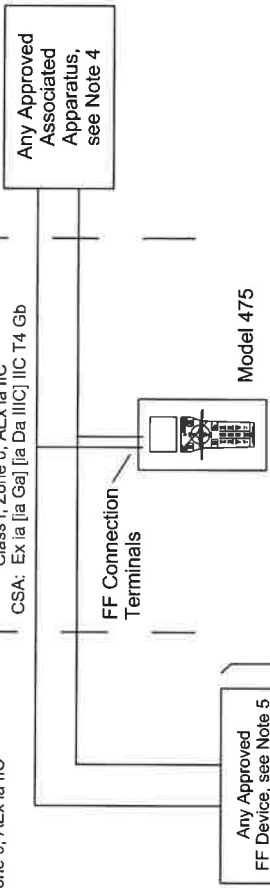
EMERSON Process Management Emerson Process Management USA		TITLE Model 475 IS Installation Drawing		SCALE 1 of 4
DATE 1 April 09	DRAWN BY Wayne Hardin	DATE 16 April 15	CHECKED BY Wayne Hardin	DATE 1 April 09
DIMENSIONS ARE IN INCHES TOLERANCES DECIMALS: X ± 0.00 XX ± 0.02 XXX ± 0.10 FRACTIONS: ± 1/32 ANGULAR: ± 0°-30'		DO NOT SCALE THIS DRAWING		
UNLESS OTHERWISE SPECIFIED		APPROVALS		
DESIGNED BY Wayne Hardin		DATE 1 April 09		
MANUFACTURING ENG Wayne Hardin		DATE 1 April 09		
DOCUMENT CONTROL Wayne Hardin		DATE 1 April 09		
PART NO. / REV. NO. / QTY. 475-1130_SHT1.dwg / 1 / 4		DRAWING NO. / PART NO. 00475-1130		

Hazardous Classified Area

FM: Class I, Division 1, Groups A, B, C and D
 Class I, Zone 0, AEx ia IIC
 CSA: Ex ia IIC

Unclassified Area

FM: Class I, Division 1, Groups A, B, C and D
 Class I, Zone 0, AEx ia IIC
 CSA: Ex ia [Ga] [Ia Da IIC] IIC T4 Gb



For Non-FISCO installation

U_i (Vmax) = 30 Vdc
I_i (Imax) = 360 mA
P_i (Pmax) = 1.3 W
C_i = 0 uF
L_i = 0 mH
U_o (Voc) = 1.9 Vdc
I_o (Isc) = 32 uA
P_o = 61 uW
C_a = 100 uF
L_a = 5600 mH
Leakage current: less than or equal to 50 uA
Classification: T4
Max. Ambient temp: -10°C less than or equal to T_a less than or equal to +50°C

MULTIPLE FF DEVICES
 (Number is limited by the requirement to meet all other IS requirement for the network.)

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:
- 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 , Voc or Vi of the barrier plus Voc of the Model 475 Communicator must be less than or equal to U_i (Vmax).
 - Leakage current must be less than or equal to I_i (Imax).
 - Power of the barrier plus Po of the Model 475 Communicator must be less than or equal to P_i (Pmax).
 - Ca of barrier must be greater than or equal to C_i of the Model 475 Communicator plus C_i of the HART Transmitter plus Cable.
 - La of barrier must be greater than or equal to L_i of the Model 475 Communicator plus L_i of the HART Transmitter plus Cable.
 - Associated Apparatus must be FM Approved, Model 475 Communicator must be greater than or equal to U_i of the HART Transmitter plus Cable.
 - Ca of Model 475 Communicator must be greater than or equal to C_i of the HART Transmitter plus Cable.
- FM:
- The Associated Apparatus must be FM Approved.
 - FF Device must be FM Approved for use with the Model 475 Communicator.
 - Installation must be in accordance with ANS/ISA 818.01, Intrinsic Safety 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 Intrinsic Safety 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 Intrinsic Safety Ground and Earth Ground must be less than 1.0 Ohm.

Emerson Process Management
 USA

EMERSON
 475-1130-SH2-0406

00475-1130
 2 of 4

SCALE
 1:1

REVISION LEVEL
 B

WARNING - BATTERIES MUST BE CHARGED IN A NONHAZARDOUS LOCATIONS ONLY

WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY

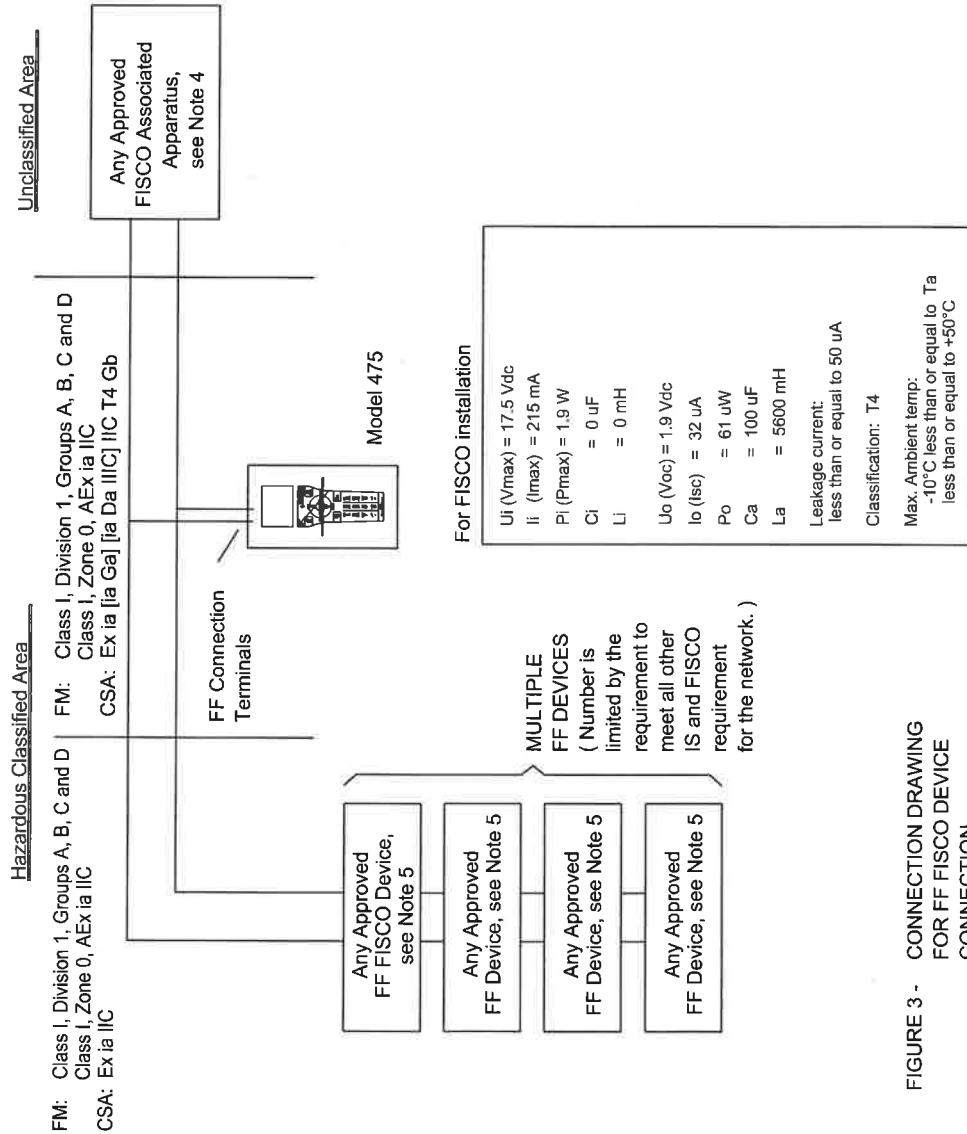


FIGURE 3 - CONNECTION DRAWING FOR FF FISCO DEVICE CONNECTION

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 conditions of the

"FISCO CONCEPT"
 see notes on Page 4

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 RP-12.06.01 "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.

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) AND THE INDUCTANCE (L) OF EACH APPARATUS (OTHER THAN THE TERMINATION) CONNECTED TO THE FIELDBUS 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 FIELDBUS 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 FIELDBUS 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' line/line + 0.5C' line/screen, if both lines are floating, or	
C' = C' line/line + C' line/screen, if the screen is connected to one line	less than or equal to 1000m
Length of trunk cable:	less than or equal to 30m
Length of spur cable:	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 Ohm C = 0.....2.2 μ 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 Power Management Solutions	Emerson Process Management USA	DOCUMENT PART NO	SCALE	SIZE
475-1130_S14.dwg		00475-1130	4	C
REVISION LEVEL	B		4	4