CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY

REVISIONS

REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AN	REMOVE T5	RTC1024820	H.G.	10/23/07
AP	UPDATE CURRENT FOR HART DIAGNOSTICS SUITE AND 300S; REMOVE OUTPUT 'B'; UPDATE FISCO CURRENT AND POWER	RTC1027772	T.T.S.	2/6/09
AR	UPDATE REMOTE METER CABLE PARAMETERS	RTC1030428	R.L.	11/18/10

ENTITY APPROVALS FOR MODELS 3051S & 300S

OUTPUT CODE A (4-20 mA HART) I.S. SEE SHEETS 2-4
REMOTE DISPLAY (4-20 mA HART) I.S. SEE SHEET 5
OUTPUT CODE F/W (FIELDBUS/PROFIBUS) I.S. SEE SHEET 6
FISCO SEE SHEETS 7-8
ALL OUTPUT CODES NONINCENDIVE SEE SHEET 9

THE ROSEMOUNT TRANSMITTERS LISTED ABOVE ARE F.M. APPROVED AS INTRINSICALLY SAFE WHEN USED IN CIRCUIT WITH F.M. APPROVED BARRIERS WHICH MEET THE ENTITY PARAMETERS LISTED IN THE CLASS I, II, AND III, DIVISION 1 GROUPS INDICATED.

TO ASSURE AN INTRINSICALLY SAFE SYSTEM, THE TRANSMITTER AND BARRIER MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURER'S FIELD WIRING INSTRUCTIONS AND THE APPLICABLE CIRCUIT DIAGRAM.

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UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125

-TOLERANCE-
.X ± .1 [2,5]
.XX ± .02 [0,5]
.XXX ± .010 [0,25]

FRACTIONS ± 1/32
ANGLES ± 2°

DO NOT SCALE PRINT

CONTRACT NO.

DR. Myles Lee Miller 2/23/01

CHK'D

APP'D. Paul C. Sundet 3/9/01

APP'D. GOVT.

EMERSON. Process Management

ROSEMOUNT®

8200 Market Boulevard • Chanhassen, MN 55317 USA

TITLE INDEX OF I.S. & NONINCENDIVE F.M. FOR 3051S

SIZE A | FSCM NO | DWG NO. 03151-1006

SCALE N/A | WT. ——— | SHEET 1 OF 10

Form Rev AC

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AR				

ENTITY CONCEPT APPROVALS

THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM. THE APPROVED VALUES OF MAX. OPEN CIRCUIT VOLTAGE (Voc, Uo OR Vt) AND MAX. SHORT CIRCUIT CURRENT (Isc, Io, OR It) AND MAX. POWER Po(Voc X Isc/4) OR (Vt X It/4), FOR THE ASSOCIATED APPARATUS MUST BE LESS THAN OR EQUAL TO THE MAXIMUM SAFE INPUT VOLTAGE (Vmax, OR U_i), MAXIMUM SAFE INPUT CURRENT (Imax OR I_i), AND MAXIMUM SAFE INPUT POWER (Pmax OR P_i) OF THE INTRINSICALLY SAFE APPARATUS. IN ADDITION, THE APPROVED MAX. ALLOWABLE CONNECTED CAPACITANCE (Ca) OF THE ASSOCIATED APPARATUS MUST BE GREATER THAN THE SUM OF THE INTERCONNECTING CABLE CAPACITANCE AND THE UNPROTECTED INTERNAL CAPACITANCE (C_i) OF THE INTRINSICALLY SAFE APPARATUS, AND THE APPROVED MAX. ALLOWABLE CONNECTED INDUCTANCE (La) OF THE ASSOCIATED APPARATUS MUST BE GREATER THAN THE SUM OF THE INTERCONNECTING CABLE INDUCTANCE AND THE UNPROTECTED INTERNAL INDUCTANCE (L_i) OF THE INTRINSICALLY SAFE APPARATUS.

NOTE: ENTITY PARAMETERS LISTED APPLY ONLY TO ASSOCIATED APPARATUS WITH LINEAR OUTPUT.

FOR OUTPUT CODE 'A' MODEL 3051S SUPERMODULE CLASS I, DIV. 1, GROUPS A, B, C AND D

U_i or V_{MAX} = 30V	Uo, V_T or V_{OC} IS LESS THAN OR EQUAL TO 30V
I_i or I_{MAX} = 300mA	Io, I_T or I_{SC} IS LESS THAN OR EQUAL TO 300mA
P_i or P_{MAX} = 1.0 WATT	$(\frac{V_T \times I_T}{4})$ or $(\frac{Voc \times Isc}{4})$ IS LESS THAN OR EQUAL TO 1.0 WATT
C_i = 38nF	C_A IS GREATER THAN 38nF
L_i = 0	L_A IS GREATER THAN 0 H
T4 (Ta=-50°C to +70°C)	

FOR OUTPUT CODE 'A' MODEL 300S JUNCTION BOX, 300S PLANTWEB HOUSING, OR 3051S QUICK CONNECT CLASS I, DIV. 1, GROUPS A, B, C AND D

U_i or V_{MAX} = 30V	Uo, V_T or V_{OC} IS LESS THAN OR EQUAL TO 30V
I_i or I_{MAX} = 300mA	Io, I_T or I_{SC} IS LESS THAN OR EQUAL TO 300mA
P_i or P_{MAX} = 1.0 WATT	$(\frac{V_T \times I_T}{4})$ or $(\frac{Voc \times Ios}{4})$ IS LESS THAN OR EQUAL TO 1.0 WATT
C_i = 11.4nF	C_A IS GREATER THAN 11.4nF
L_i = 2.4 μH	L_A IS GREATER THAN 2.4 μH
T4 (Ta=-50°C to +70°C)	

FOR OUTPUT CODE 'A' WITH HART DIAGNOSTICS SUITE AND MODEL 300S PLANTWEB HOUSING CLASS I, DIV. 1, GROUPS A, B, C AND D

U_i or V_{MAX} = 30V	Uo, V_T or V_{OC} IS LESS THAN OR EQUAL TO 30V
I_i or I_{MAX} = 300mA	Io, I_T or I_{SC} IS LESS THAN OR EQUAL TO 300mA
P_i or P_{MAX} = 1.0 WATT	$(\frac{V_T \times I_T}{4})$ or $(\frac{Voc \times Ios}{4})$ IS LESS THAN OR EQUAL TO 1.0 WATT
C_i = 11.4nF	C_A IS GREATER THAN 11.4nF
L_i = 0	L_A IS GREATER THAN 0
T4 (Ta=-50°C to +70°C)	

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SIZE	FSCM NO	DWG NO.	
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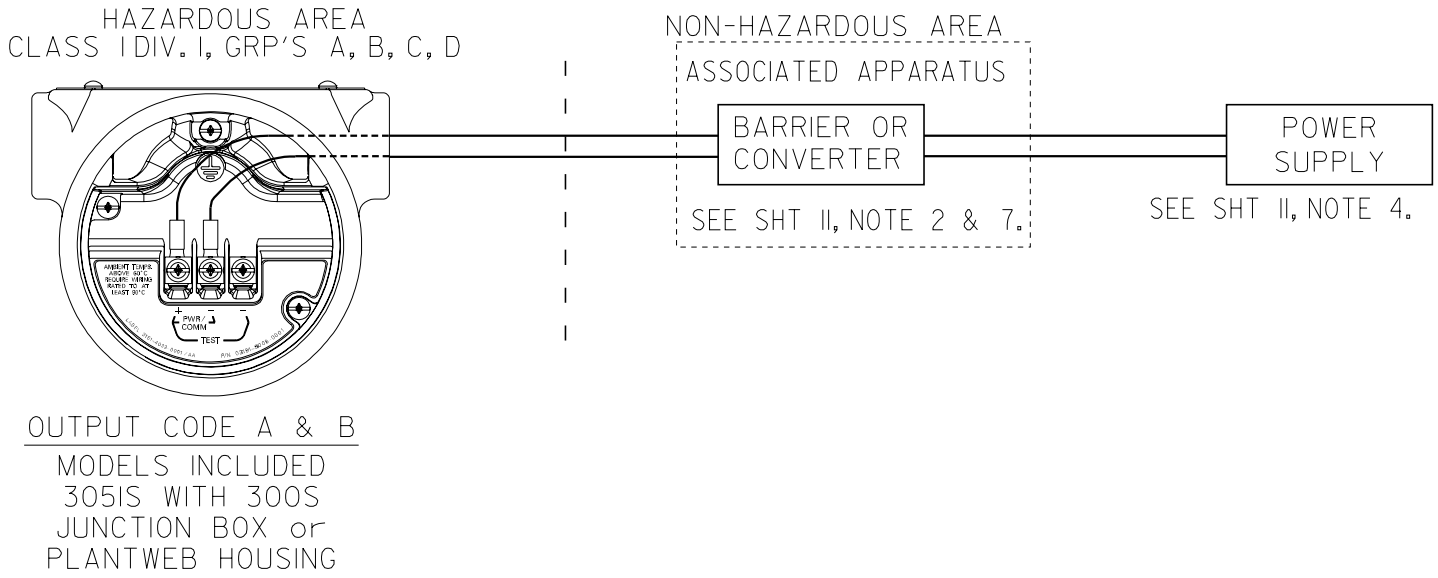
SCALE N/A WT. SHEET 2 OF 10

Form Rev AC

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AR				

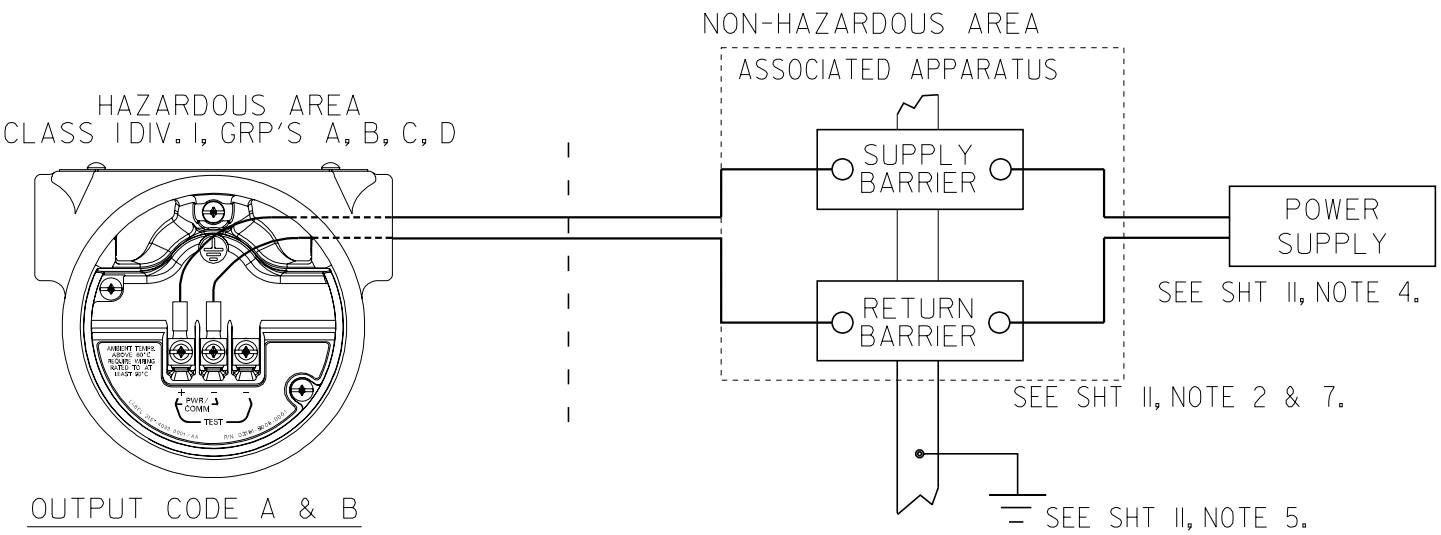
CIRCUIT DIAGRAM 1
ONE BARRIER OR CONVERTER: SINGLE OR DUAL CHANNEL



OUTPUT CODE A & B

MODELS INCLUDED
3051S WITH 300S
JUNCTION BOX or
PLANTWEB HOUSING

CIRCUIT DIAGRAM 2
SUPPLY AND RETURN BARRIERS
(ONLY FOR USE WITH BARRIERS APPROVED IN THIS CONFIGURATION)



OUTPUT CODE A & B

MODELS INCLUDED
3051S WITH 300S
JUNCTION BOX or
PLANTWEB HOUSING

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REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
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CIRCUIT DIAGRAM 1
ONE BARRIER OR CONVERTER:
305IS QUICK CONNECT

HAZARDOUS AREA
CLASS 1 DIV. 1, GRP'S A, B, C, D

NON-HAZARDOUS AREA

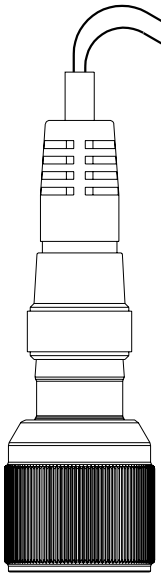
ASSOCIATED APPARATUS

BARRIER OR CONVERTER

SEE SHT II, NOTE 2 & 7.

POWER SUPPLY

SEE SHT II, NOTE 4.



OUTPUT CODE A
305IS QUICK CONNECT

CIRCUIT DIAGRAM 2
SUPPLY AND RETURN BARRIERS
(ONLY FOR USE WITH BARRIERS APPROVED IN THIS CONFIGURATION)

HAZARDOUS AREA
CLASS 1 DIV. 1, GRP'S A, B, C, D

NON-HAZARDOUS AREA

ASSOCIATED APPARATUS

SUPPLY BARRIER

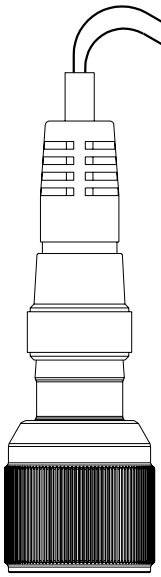
RETURN BARRIER

POWER SUPPLY

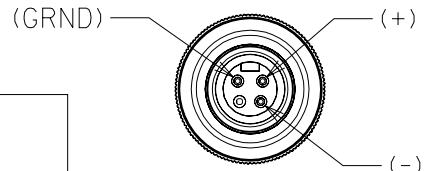
SEE SHT II, NOTE 4.

SEE SHT II, NOTE 2 & 7.

SEE SHT II, NOTE 5.



OUTPUT CODE A
305IS QUICK CONNECT



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SIZE	FSCM NO	DWG NO.	
A		03151-1006	
SCALE N/A	WT.	SHEET 4 OF 10	

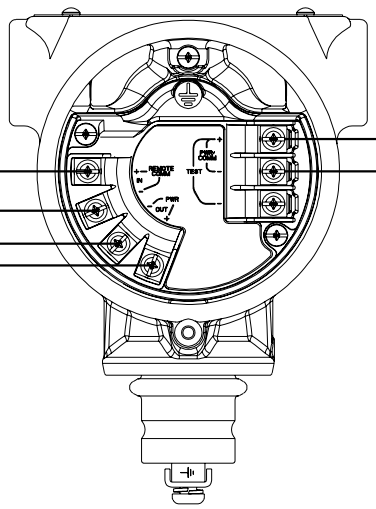
Form Rev AC

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AR				

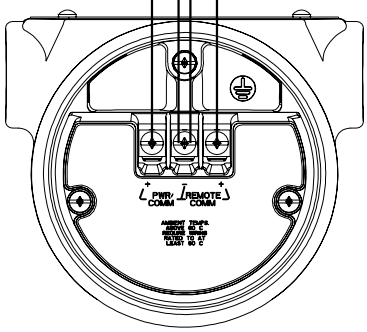
OUTPUT CODE A WITH M8 or M9 OPTION
CLASS I, DIV. 1, GROUPS A, B, C AND D

U_1 or V_{MAX} = 30V
I_1 or I_{MAX} = 300mA
P_1 or P_{MAX} = 1.0 WATT
C_1 = 0
L_1 = 58.2μH
T4 (Ta=-50°C to +70°C)

MAXIMUM CABLE PARAMETERS
CAPACITANCE - 24 nF INDUCTANCE - 47μH LENGTH - 100 Ft
RECOMMENDED CABLE: MADISON 04ZZXLF015



MODELS INCLUDED
3005 WITH
PLANTWEB HOUSING



MODELS INCLUDED
3051S WITH 3005
JUNCTION BOX

HAZARDOUS AREA
CLASS I DIV. I, GRP'S A, B, C, D

BARRIER OR
CONVERTER

ASSOCIATED APPARATUS
SEE SHT II, NOTE 2 & 7.

NON-HAZARDOUS AREA

POWER
SUPPLY

SEE SHT II, NOTE 4.

REMOTE MOUNT METER

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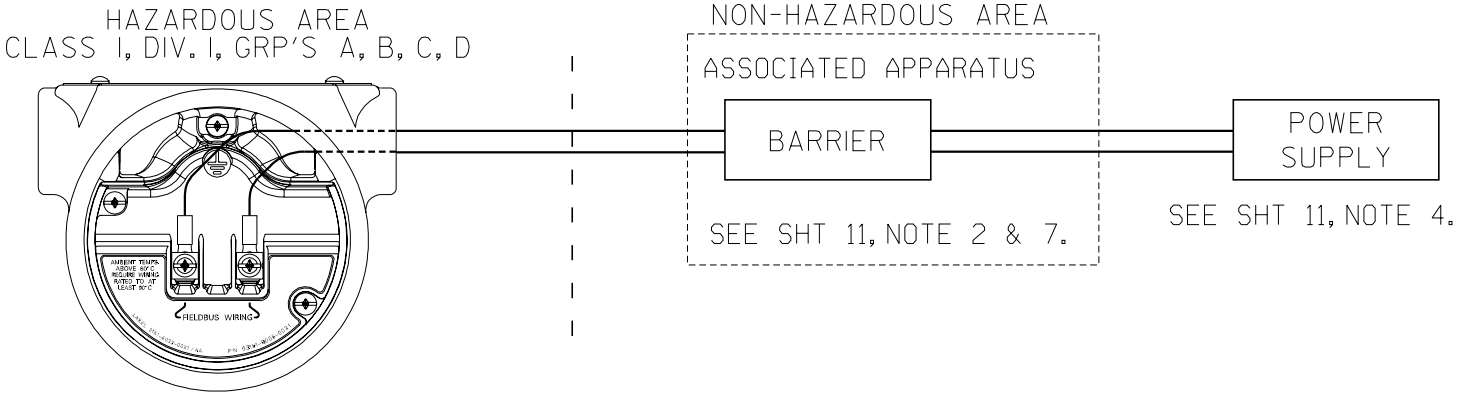
FOR OUTPUT CODE F or W (MODEL 300S)

CLASS I, DIV. 1, GROUPS A, B, C AND D

U_1 or V_{MAX} = 30V	U_o, V_T, OR V_{OC} IS LESS THAN OR EQUAL TO 30V
I_1 OR I_{MAX} = 300mA	I_o, I_T, OR I_{SC} IS LESS THAN OR EQUAL TO 300mA
P_1 OR P_{MAX} = 1.3 WATT	P_1 ($\frac{V_T \times I_T}{4}$) OR ($\frac{V_{OC} \times I_{SC}}{4}$) IS LESS THAN OR EQUAL TO 1.3 WATT
C_I = 0 μf	C_A IS GREATER THAN 0 μf
L_I = 0 μH	L_A IS GREATER THAN 0 μH
T4 (Ta = -50°C TO +60°C)	

CIRCUIT DIAGRAM I
ONE BARRIER OR CONVERTER:
SINGLE OR DUAL CHANNEL



OUTPUT CODE F or W

MODELS INCLUDED
3051S WITH 300S
PLANTWEB HOUSING

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ISSUED	SCALE N/A	WT.	SHEET 6 OF 10

Form Rev AC

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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 Vmax), THE CURRENT (I_i OR Imax), AND THE POWER (P_i or Pmax) WHICH AN INTRINSICALLY SAFE APPARATUS CAN RECEIVE AND REMAIN INTRINSICALLY SAFE CONSIDERING FAULTS, MUST BE EQUAL OR GREATER THAN VOLTAGE (Uo, Voc, OR Vt), THE CURRENT (Io, Isc, OR It) AND THE POWER (Po OR Pmax) 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 FIELDBUS MUST BE LESS THAN OR EQUAL TO 5 nF AND 10 µH 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 Uo (OR Voc OR Vt) OF THE ASSOCIATED APPARATUS IS LIMITED TO A RANGE OF 14V TO 24Vd.c. 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 50uA 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

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.....100Ohm C = 0.....2.2uF

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 PERMITED.
THE INDUCTANCE AND THE CAPACITANCE OF THE CABLE WILL NOT IMPAIR THE INTRINSIC SAFETY OF THE INSTALLATION.

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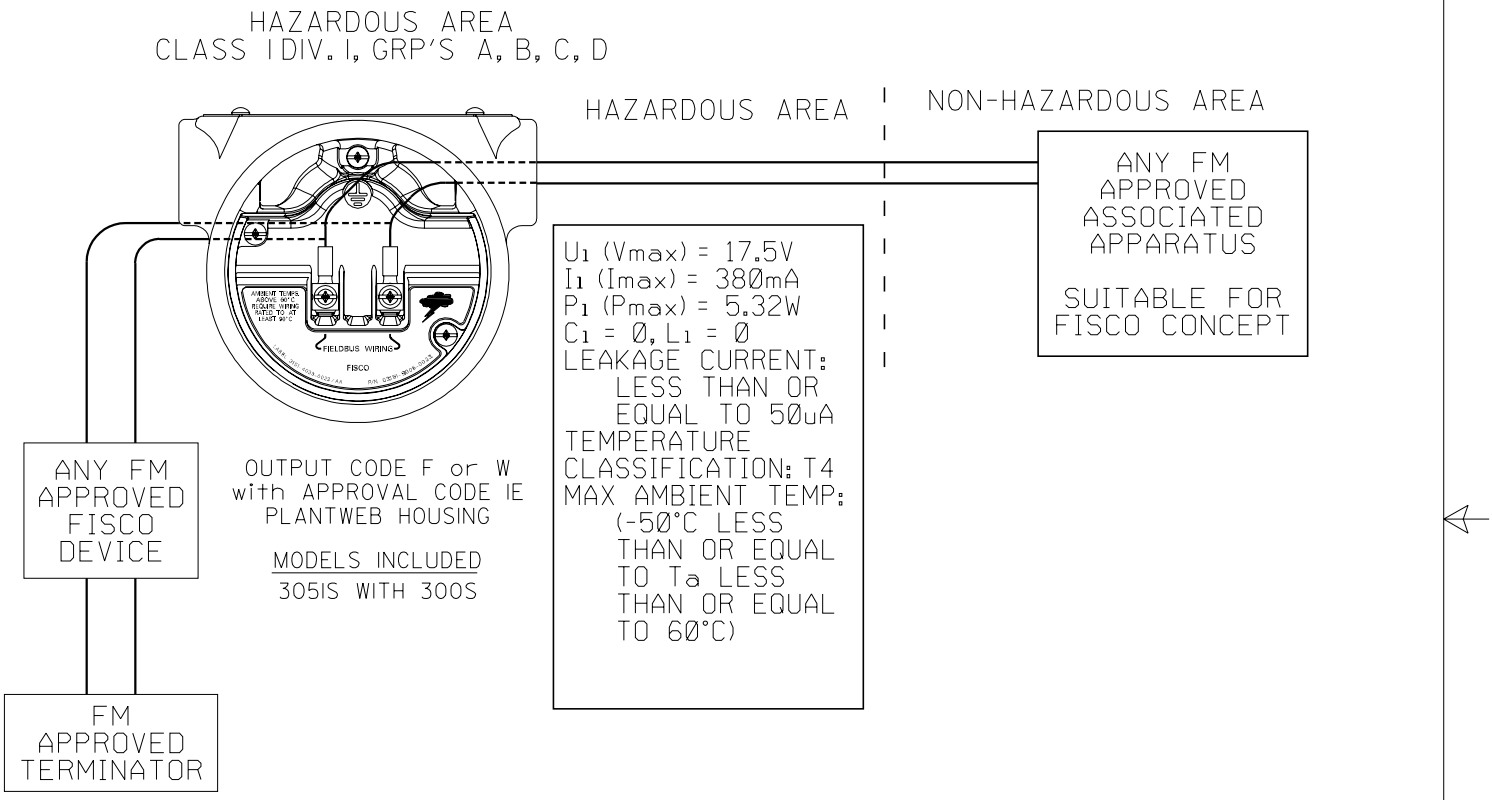

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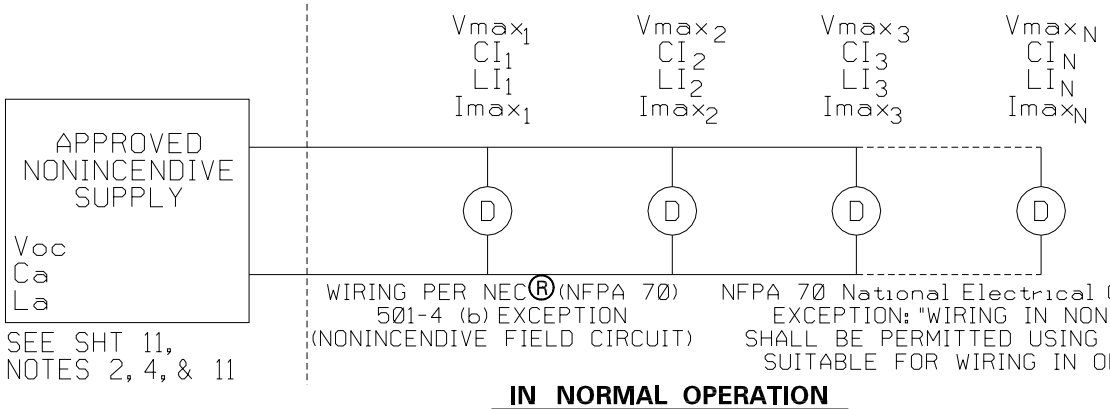
NONINCENDIVE FIELD CIRCUIT
CLASS I, DIV. 2 LOCATIONS

NON-CLASSIFIED LOCATION

HAZARDOUS (CLASSIFIED) LOCATION
CLASS I, DIV. 2, GRP'S A, B, C, D



SEE SHT 11, NOTES 2, 4, & 11

WIRING PER NEC® (NFPA 70) 501-4 (b) EXCEPTION (NONINCENDIVE FIELD CIRCUIT)

NFPA 70 National Electrical Code® ARTICLE 501-4(b) EXCEPTION: "WIRING IN NONINCENDIVE CIRCUITS SHALL BE PERMITTED USING ANY OF THE METHODS SUITABLE FOR WIRING IN ORDINARY LOCATIONS."

IN NORMAL OPERATION

DEVICES CONTROL THROUGH-CURRENT

PARAMETERS (NON-INCENDIVE FIELD WIRING)	DEVICE	ROSEMOUNT 3051S/300S					
		3051S 4-20mA / HART	MODEL 300S REMOTE METER	3051S QUICK CONNECT OR 300S OUTPUT CODE 'A' 4-20mA / HART	MODEL 300S HART DIAGNOSTICS OUTPUT CODE 'A' 4-20mA / HART	300S OUTPUT CODE 'B' (SAFETY CERTIFIED) 4-20mA / HART	FIELDBUS (F or W)
Vmax		42.4v	42.4v	42.4v	42.4v	42.4v	35v
Maximum normal operating current		22mA	22mA	22mA	22mA	22mA	27mA
	C_i	38nF	0nF	11.4nF	11.4nF	11.4nF	0uF
	L_i	0uH	58.2μH	2.4μH	0uH	570μH	0uH

$Imax_N >= Iq_N + Isignal_N$

ROSEMOUNT 3051 TRANSMITTERS ARE CURRENT CONTROLLERS ON INDIVIDUAL PARALLEL BRANCHES WITH RESPECT TO THE POWER SUPPLY. IN NONINCENDIVE INSTALLATIONS THE Imax FOR EACH TRANSMITTER IS NOT RELATED TO THE MAXIMUM CURRENT OF THE POWER SUPPLY (Isc) IN THE SAME MANNER AS FOR TRANSMITTER INSTALLED PER I.S. REQUIREMENTS, BECAUSE NONINCENDIVE REQUIREMENTS INCLUDE ONLY NORMAL OPERATING CONDITIONS.

REFERENCE: APPENDIX A7 (FM3611 1999)

Imax for an individual device = Iq + Isignal

Iq = Quiescent current through device (Maximum quiescent current for the device)

Isignal = Signaling current through device (Protocol may limit signaling to one device at a time)

Operating Imax = $Iq_1 + Iq_2 + ... + Iq_N + I_{signal\ max}$

$I_{signal\ max}$ = Max. of ($Isignal_1$, $Isignal_2$, ..., $Isignal_N$)

TEMP CODE: T4 (Ta = -50°C TO +70°C

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NOTES:

1. NO REVISION TO THIS DRAWING WITHOUT PRIOR FACTORY MUTUAL APPROVAL.
2. ASSOCIATED APPARATUS MANUFACTURER'S INSTALLATION DRAWING MUST BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT.
3. DUST-TIGHT CONDUIT SEAL MUST BE USED WHEN INSTALLED IN CLASS II AND CLASS III ENVIRONMENTS.
4. CONTROL EQUIPMENT CONNECTED TO BARRIER MUST NOT USE OR GENERATE MORE THAN 250 Vrms or Vdc.
5. RESISTANCE BETWEEN INTRINSICALLY SAFE GROUND AND EARTH GROUND MUST BE LESS THAN 1 OHM.
6. INSTALLATION SHOULD BE IN ACCORDANCE WITH ANSI/ISA-RP12.6 "INSTALLATION OF INTRINSICALLY SAFE SYSTEMS FOR HAZARDOUS (CLASSIFIED) LOCATIONS" AND THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70).
7. THE ASSOCIATED APPARATUS MUST BE FACTORY MUTUAL APPROVED.
8. WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC AND NON-INCENDIVE SAFETY.
9. ASSOCIATED APPARATUS MUST MEET THE FOLLOWING PARAMETERS:
   Uo or Voc or Vt LESS THAN or EQUAL TO U_i (Vmax)
   Io or Isc or It LESS THAN or EQUAL TO I_i (Imax)
   Po or Pmax LESS THAN or EQUAL TO P_i (Pmax)
   Ca IS GREATER THAN or EQUAL THE SUM OF ALL C_i's PLUS Ccable
   La IS GREATER THAN or EQUAL THE SUM OF ALL L_i's PLUS Lcable
10. WARNING - TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING.
11. THE ASSOCIATED APPARATUS MUST BE A RESISTIVELY LIMITED SINGLE OR MULTIPLE CHANNEL FM APPROVED BARRIER HAVING PARAMETERS LESS THAN THOSE QUOTED, AND FOR WHICH THE OUTPUT AND THE COMBINATIONS OF OUTPUTS IS NON-IGNITION CAPABLE FOR THE CLASS, DIVISION AND GROUP OF USE.
12. FIELD WIRING SHOULD BE RATED TO 70°C.

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DR. Myles Lee Miller	SIZE A	FSCM NO	DWG NO. 03151-1006	
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Form Rev AC