

WIRING DRAWING - TANK MANAGEMENT SYSTEM (TMS3000/TMS3000E)

INTERNAL TOP VIEW
(NOT ALL FEATURES ARE SHOWN TO SCALE)

WARNING
AVERTISSEMENT

NO COMPONENT SUBSTITUTION IS PERMITTED.
LA SUBSTITUTION DE COMPOSANTS N'EST PAS AUTORISÉE

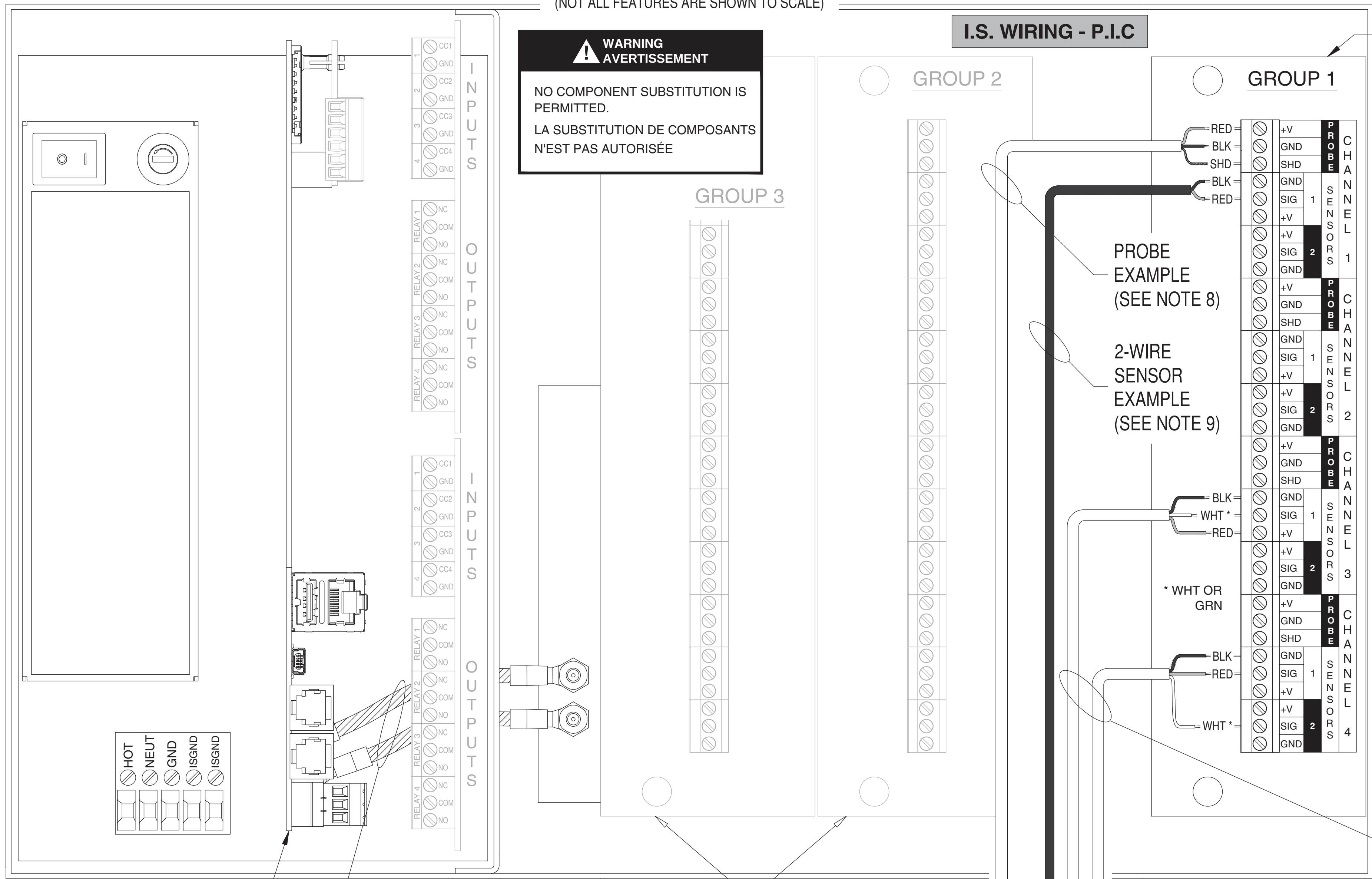
I.S. WIRING - P.I.C

I.S. SLOT #1
STANDARD PROBE INTERFACE CARD (P.I.C)
4-PROBE/8-SENSOR INPUTS

IMPORTANT NOTES - READ CAREFULLY BEFORE INSTALLATION

- UNLESS OTHERWISE SPECIFIED:
(NOTES 3-7 DO NOT APPLY TO THIS PAGE)
- CONSOLE MOUNTING: MOUNT AS CLOSE AS PRACTICAL TO DIVIDING BOUNDRY OF THE HAZARDOUS AND NON-HAZARDOUS AREAS. NEVER MOUNT INSIDE THE HAZARDOUS AREA.
 - INTRINSICALLY SAFE INPUT WIRING: INSTALLATIONS SHALL COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) AND THE CANADIAN ELECTRICAL CODE (CEC). NON-INTRINSICALLY SAFE WIRING CANNOT BE RUN IN CONDUIT OR OPEN RACEWAYS TOGETHER WITH INTRINSICALLY SAFE WIRING.
 - THE MAGNETOSTRICTIVE PROBE INPUTS AND THE SENSOR INPUTS ARE TWO DIFFERENT INTRINSICALLY SAFE CIRCUITS AND MUST BE INSTALLED IN SEPARATE CABLES OR IN ONE CABLE WHICH HAS SUITABLE INSULATION. REFER TO NEC ARTICLE 504-30 (b) OR CEC APPENDIX F6.3 FOR ADDITIONAL INFORMATION.
 - I.S. ELECTRO-OPTIC/DRY CONTACT AND MAGNETOSTRICTIVE-PROBE ENTITY PARAMETERS: (between ground and any ungrounded contact) $U_o = 29.4$ Volts; $I_o = 0.149$ Amps; $C_o = 0.88\mu F$; $L_o = 10$ mH.
 - IF THE ELECTRICAL PARAMETERS OF THE CABLE ARE UNKNOWN, THE FOLLOWING VALUES MAY BE USED. Capacitance = 60 pF/ft; Inductance = 0.20 μH /ft.
 - IN ORDER TO DETERMINE THE SUITABILITY OF THE CONNECTION BETWEEN THE TMS3000/TMS3000E AND INTRINSICALLY SAFE DEVICES, THE TOTAL PARAMETERS FOR EACH INTRINSICALLY SAFE SENSOR INPUT CIRCUIT MUST BE DETERMINED. First the C_c and L_c of each cable is calculated using length and the manufactures specified parameters or the values given in note (c). The C_c and L_c for each intrinsically safe circuit is then determined by adding the C_c and L_c for all cables used in each sensor input circuit. The C_i and L_i for each intrinsically safe circuit is then determined by adding the C_i and L_i for all devices connected to each sensor input circuit.
 - TMS3000/TMS3000E I.S. EQUIPMENT

U_o	$\leq$	U_{imax}	(smallest U_{imax} of any I.S. device in circuit)
I_o	$\leq$	I_{imax}	(smallest I_{imax} of any device in circuit)
C_o	$\geq$	$C_i + C_c$	(using C_i and C_c totals for each circuit)
L_o	$\geq$	$L_i + L_c$	(using C_i and C_c totals for each circuit)
 - SHIELDED PROBE FIELD CABLE IS REQUIRED. THE SHIELD WIRE MUST BE CONNECTED TO THE PROBE SHIELD TERMINAL IN THE CONSOLE I.S. COMPARTMENT AND SHOULD BE CUT BACK AND LEFT UNTERMINATED AT THE PROBE JUNCTION BOX.
 - SHIELDED SENSOR FIELD CABLE IS NOT REQUIRED, BUT IF USED, THE SHIELD WIRE MUST BE CONNECTED TO THE SENSOR GROUND TERMINAL IN THE CONSOLE I.S. COMPARTMENT AND SHOULD BE CUT BACK AND LEFT UNTERMINATED AT THE SENSOR JUNCTION BOX.



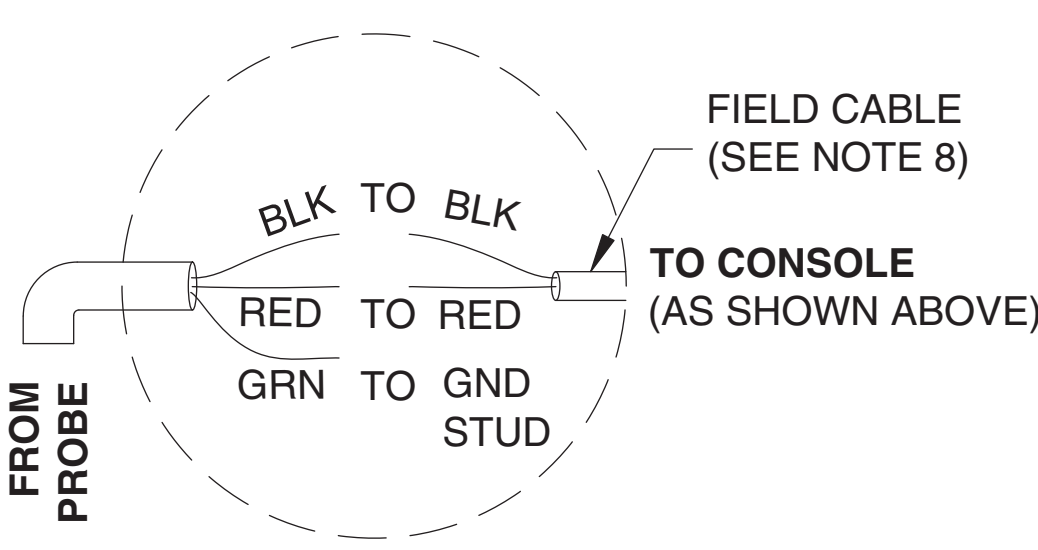
3-WIRE SENSOR EXAMPLES
(SEE NOTE 9)

VAPOR SEAL FITTING(S) AS REQ'D

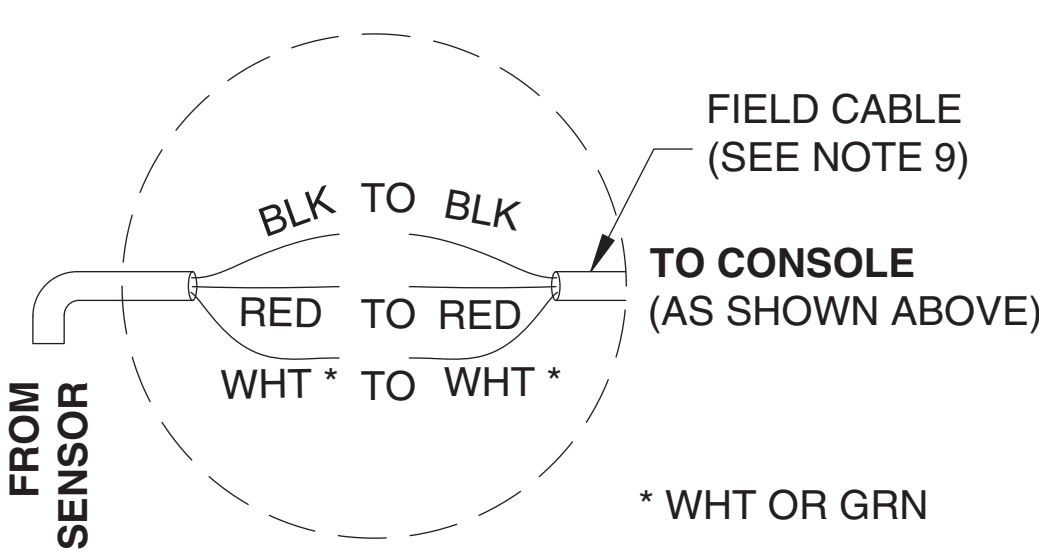
JUNCTION BOX(ES) AS REQ'D

WIRING MUST BE DONE IN WATERTIGHT RATED BOX/HOUSING

PROBE EXAMPLE



3-WIRE SENSOR EXAMPLE



NON-HAZARDOUS AREA
(SEE NOTE 1 ABOVE)

HAZARDOUS AREA
CLASS I, DIVISION 1, GROUP D
CLASS I, ZONE 0, GROUP IIA

WIRING DRAWING - TANK MANAGEMENT SYSTEM (TMS3000/TMS3000E)

INTERNAL TOP VIEW
(NOT ALL FEATURES ARE SHOWN TO SCALE)

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AVERTISSEMENT

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I.S. WIRING - S.I.C

2-WIRE
SENSOR
EXAMPLE
(SEE NOTE 9)

RED
WHT *
BLK

* WHT OR GRN

RED
BLK
WHT *

3-WIRE SENSOR EXAMPLES (SEE NOTE 9)

VAPOR SEAL FITTING(S) AS REQ'D

JUNCTION BOX(ES) AS REQ'D

WIRING MUST BE DONE IN WATERTIGHT RATED BOX/HOUSING

3-WIRE EXAMPLE

FROM
SENSOR

BLK TO BLK

RED TO RED

WHT * TO WHT *

* WHT OR GRN

FIELD CABLE
(SEE NOTE 9)

TO CONSOLE
(AS SHOWN ABOVE)

I.S. SLOT #2
OPTIONAL SENSOR INTERFACE CARD (S.I.C)
16-SENSOR INPUTS

⚠ IMPORTANT NOTES - READ CAREFULLY BEFORE INSTALLATION

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(NOTES 3-8 DO NOT APPLY TO THIS PAGE)
- CONSOLE MOUNTING: MOUNT AS CLOSE AS PRACTICAL TO DIVIDING BOUNDRY OF THE HAZARDOUS AND NON-HAZARDOUS AREAS. NEVER MOUNT INSIDE THE HAZARDOUS AREA.
 - INTRINSICALLY SAFE INPUT WIRING: INSTALLATIONS SHALL COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) AND THE CANADIAN ELECTRICAL CODE (CEC). NON-INTRINSICALLY SAFE WIRING CANNOT BE RUN IN CONDUIT OR OPEN RACEWAYS TOGETHER WITH INTRINSICALLY SAFE WIRING.
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 - I.S. ELECTRO-OPTIC/DRY CONTACT AND MAGNETOSTRICTIVE-PROBE ENTITY PARAMETERS: (between ground and any ungrounded contact) $U_o = 29.4$ Volts; $I_o = 0.149$ Amps; $C_o = 0.88\mu F$; $L_o = 10$ mH.
 - IF THE ELECTRICAL PARAMETERS OF THE CABLE ARE UNKNOWN, THE FOLLOWING VALUES MAY BE USED. Capacitance = 60 pF/ft; Inductance = 0.20 μH /ft.
 - IN ORDER TO DETERMINE THE SUITABILITY OF THE CONNECTION BETWEEN THE TMS3000/TMS3000E AND INTRINSICALLY SAFE DEVICES, THE TOTAL PARAMETERS FOR EACH INTRINSICALLY SAFE SENSOR INPUT CIRCUIT MUST BE DETERMINED. First the C_c and L_c of each cable is calculated using length and the manufactures specified parameters or the values given in note (c). The C_c and L_c for each intrinsically safe circuit is then determined by adding the C_c and L_c for all cables used in each sensor input circuit. The C_i and L_i for each intrinsically safe circuit is then determined by adding the C_i and L_i for all devices connected to each sensor input circuit.
 - | TMS3000/TMS3000E | | I.S. EQUIPMENT | |
|------------------|--------|----------------|---|
| U_o | $\leq$ | U_{imax} | (smallest U_{imax} of any I.S. device in circuit) |
| I_o | $\leq$ | I_{imax} | (smallest I_{imax} of any device in circuit) |
| C_o | $\geq$ | $C_i + C_c$ | (using C_i and C_c totals for each circuit) |
| L_o | $\geq$ | $L_i + L_c$ | (using C_i and C_c totals for each circuit) |
 - SHIELDED SENSOR FIELD CABLE IS NOT REQUIRED, BUT IF USED, THE SHIELD WIRE MUST BE CONNECTED TO THE SENSOR GROUND TERMINAL IN THE CONSOLE I.S. COMPARTMENT AND SHOULD BE CUT BACK AND LEFT UNTERMINATED AT THE SENSOR JUNCTION BOX.

I.S. SLOT #1
STANDARD PROBE INTERFACE CARD (P.I.C)
4-PROBE/8-SENSOR INPUTS

▲
NON-HAZARDOUS AREA
(SEE NOTE 1 ABOVE)

HAZARDOUS AREA
CLASS I, DIVISION 1, GROUP D
CLASS I, ZONE 0, GROUP IIA
▼

NON-INTRINSICALLY
SAFE WIRING
▲
INTRINSICALLY
SAFE WIRING
▼

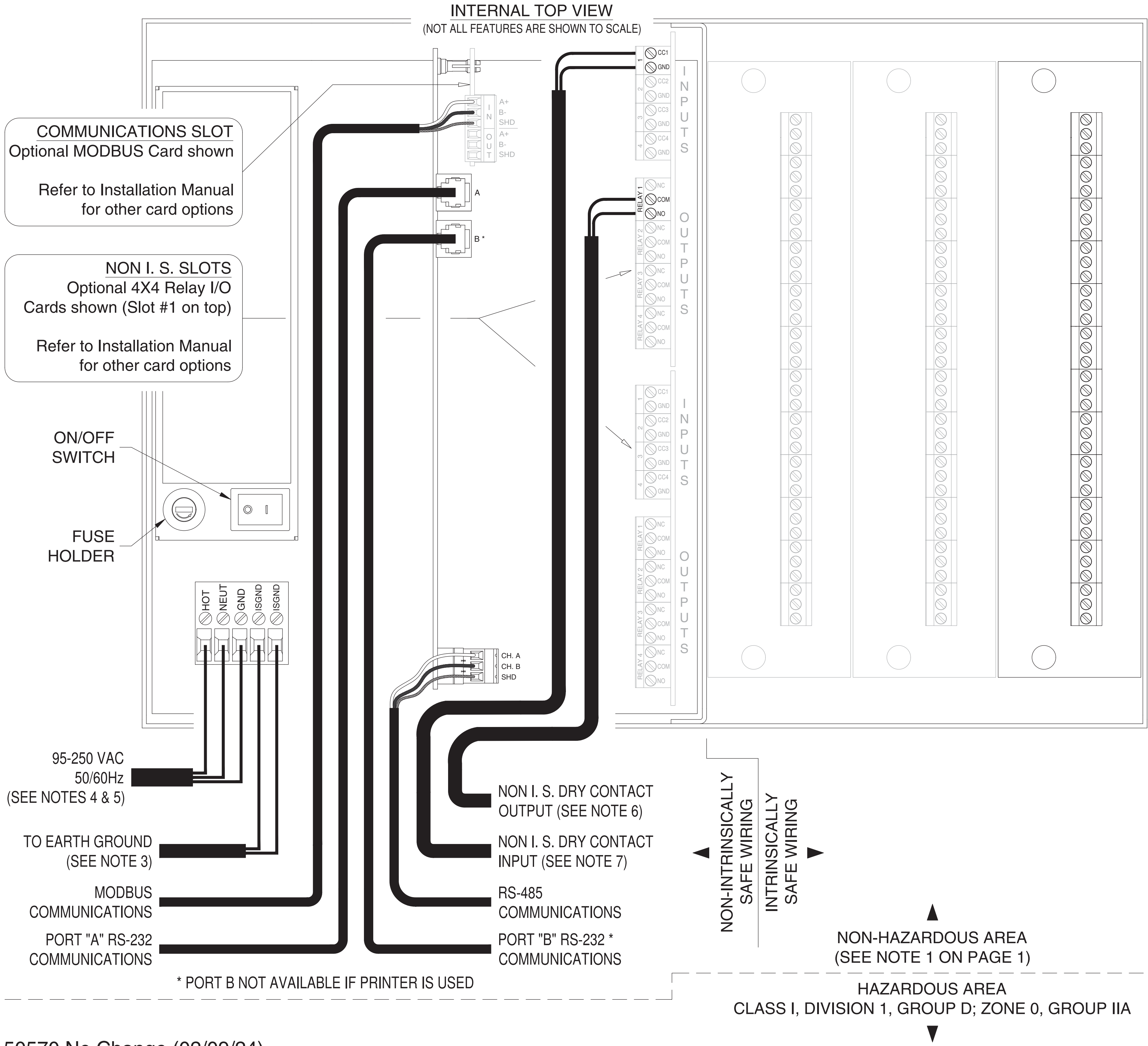
I.S. SLOT #3: For
optional P.I.C or S.I.C
(S.I.C shown)

PROCESSOR CARD
(NOT SHOWN AT
ACTUAL LOCATION)

I. S. GROUND
INTERCONNECTIONS

WIRING DRAWING - TANK MANAGEMENT SYSTEM (TMS3000/TMS3000E)

TMS3000 NON I.S. WIRING - AC INPUT



⚠ IMPORTANT NOTES - READ CAREFULLY BEFORE INSTALLATION

- UNLESS OTHERWISE SPECIFIED:
(NOTES 1,2, 8 & 9 DO NOT APPLY TO THIS PAGE)
3. WARNING: TO INSURE INTRINSIC SAFETY, A 12 AWG/4.0 MM² WIRE MUST BE CONNECTED TO EACH "ISGND" TERMINAL. EACH WIRE MUST THEN BE CONNECTED TO THE SYSTEM EARTH GROUND (GROUND BUSS BAR) IN THE SAME SERVICE PANEL AS TMS POWER. A GROUNDING ROD, COLDWATER PIPE OR OTHER CONNECTION SHOULD NOT BE USED. THE RESISTANCE BETWEEN THE EARTH GROUND TERMINAL BLOCK AND EARTH GROUND SHALL BE LESS THAN 1 OHM.
 4. CONSOLE CANNOT BE CONNECTED TO EQUIPMENT THAT USES OR GENERATES MORE THAN 250 VOLTS WITH RESPECT TO EARTH.
 5. POWER TO THE TMS3000/TMS3000E CONSOLE SHOULD BE PROPERLY WIRED TO A SEPARATE DEDICATED 115/230 VAC CIRCUIT BREAKER.
 6. DRY CONTACT SWITCH OUTPUT WIRING: WIRE TO COMMON AND EITHER NORMALLY OPEN OR NORMALLY CLOSED FOR DESIRED SWITCH CONTACT. OUTPUT RATED 10 AMPS AT 120 VAC, 6 AMPS AT 240 VAC (VOLTAGE MUST BE LESS THAN 120 VAC OR 240 VAC RESPECTIVELY).
 7. NEC CLASS 2 CIRCUITS.

WIRING DRAWING - TANK MANAGEMENT SYSTEM (TMS3000/TMS3000E)

COMMUNICATIONS SLOT
Optional MODBUS Card shown

Refer to Installation Manual
for other card options

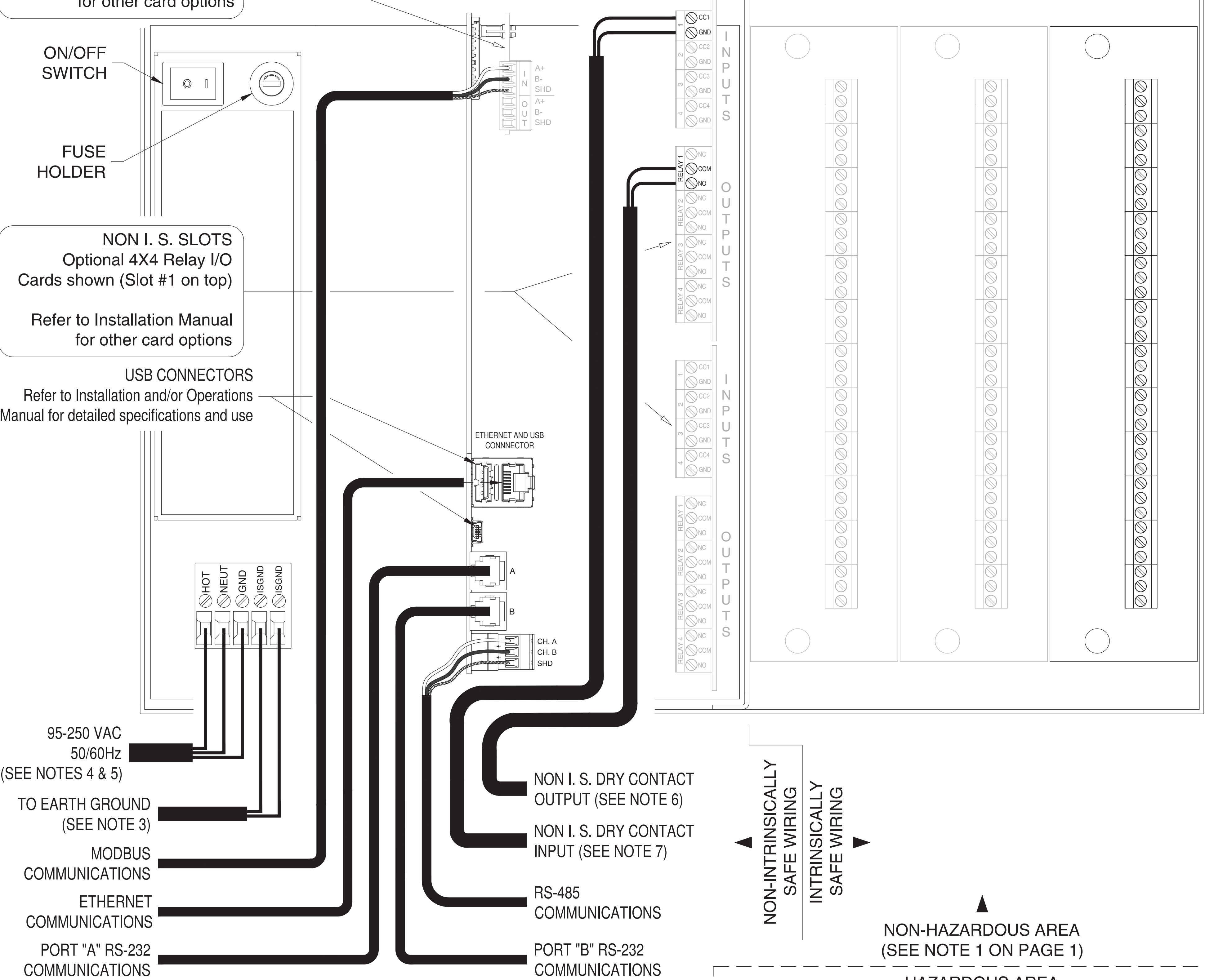
NON I. S. SLOTS
Optional 4X4 Relay I/O
Cards shown (Slot #1 on top)

Refer to Installation Manual
for other card options

USB CONNECTORS
Refer to Installation and/or Operations
Manual for detailed specifications and use

TMS3000/TMS3000E NON I.S. WIRING - AC INPUT

INTERNAL TOP VIEW
(NOT ALL FEATURES ARE SHOWN TO SCALE)



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