

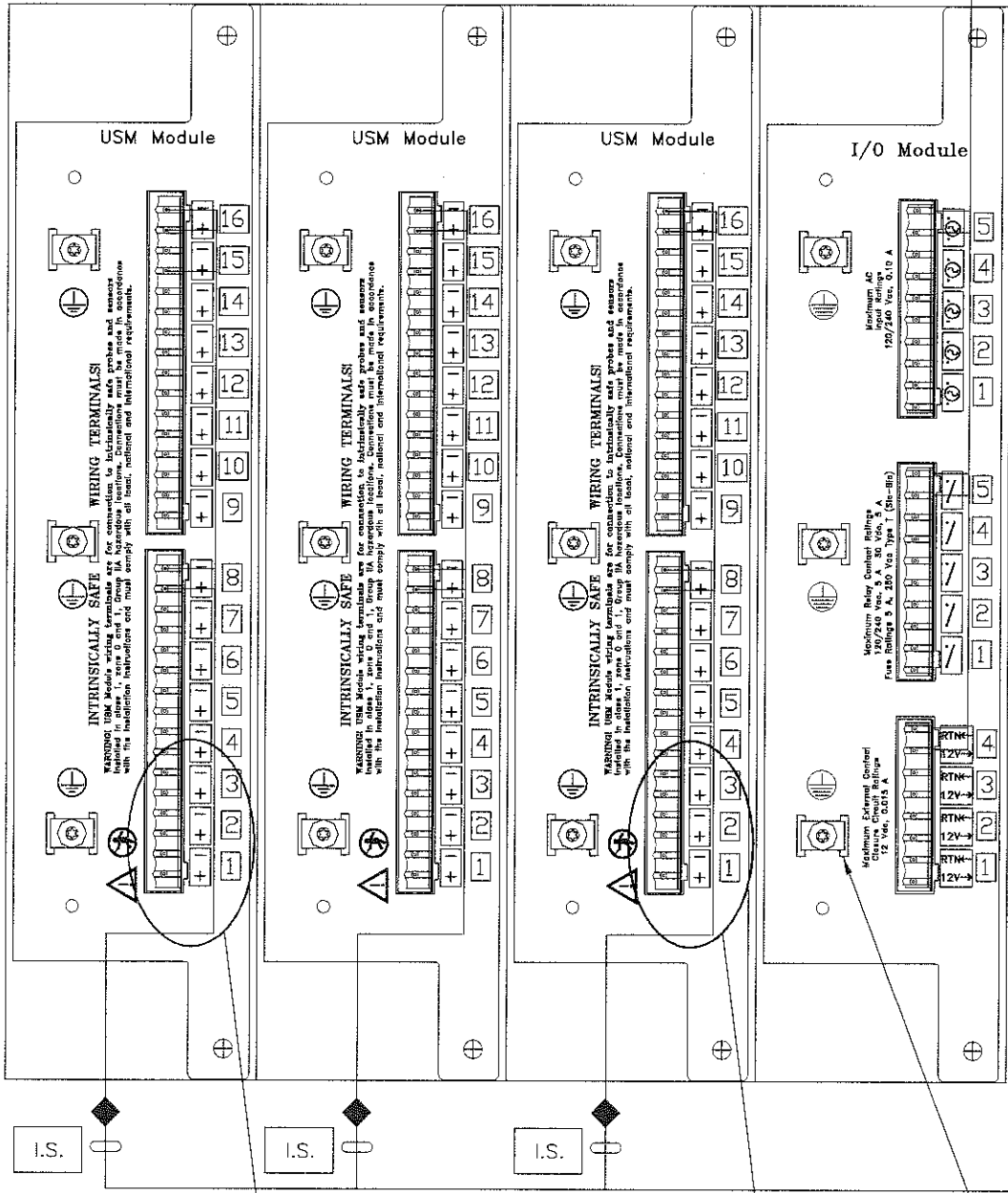
CONTROL DRAWING
INTRINSICALLY SAFE SYSTEM

NON-HAZARDOUS LOCATION

ASSOCIATED APPARATUS

TLS-450/450 PLUS CONSOLE

0°C ≤ Ta ≤ 40°C



UNSPECIFIED
RECEIVER

AC NEUTRAL
CHASSIS GROUND
AC LINE

TLS RF CONSOLE

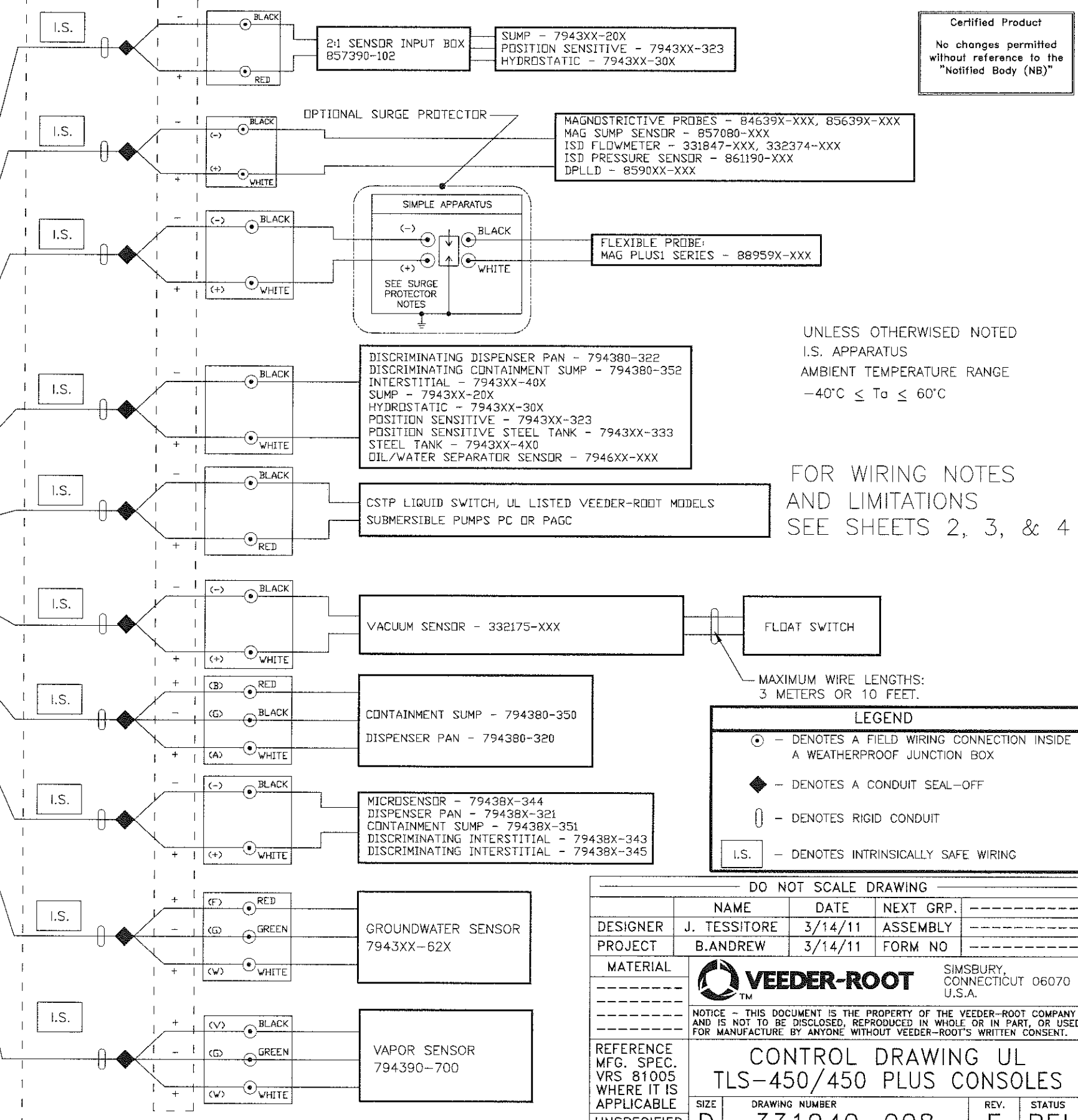
OPTICALLY
ISOLATED
INTRINSICALLY
SAFE CIRCUITS

UNSPECIFIED
EQUIPMENT
SEE SHEET 2

I.S. TERMINAL
(CONSOLE)

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

INTRINSICALLY SAFE (I.S.) APPARATUS



Certified Product
No changes permitted
without reference to the
"Notified Body (NB)"

MAGNETOSTRICTIVE PROBES - 84639X-XXX, 85639X-XXX
MAG SUMP SENSOR - 857080-XXX
ISD FLOWMETER - 331847-XXX, 332374-XXX
ISD PRESSURE SENSOR - 861190-XXX
DPLLD - 8590XX-XXX

FLEXIBLE PROBE:
MAG PLUS1 SERIES - 88959X-XXX

DISCRIMINATING DISPENSER PAN - 794380-322
DISCRIMINATING CONTAINMENT SUMP - 794380-352
INTERSTITIAL - 7943XX-40X
SUMP - 7943XX-20X
HYDROSTATIC - 7943XX-30X
POSITION SENSITIVE - 7943XX-323
POSITION SENSITIVE STEEL TANK - 7943XX-333
STEEL TANK - 7943XX-4X0
OIL/WATER SEPARATOR SENSOR - 7946XX-XXX

CSTP LIQUID SWITCH, UL LISTED VEEDER-ROOT MODELS
SUBMERSIBLE PUMPS PC OR PAGC

VACUUM SENSOR - 332175-XXX

CONTAINMENT SUMP - 794380-350
DISPENSER PAN - 794380-320

MICROSENSOR - 79438X-344
DISPENSER PAN - 79438X-321
CONTAINMENT SUMP - 79438X-351
DISCRIMINATING INTERSTITIAL - 79438X-343
DISCRIMINATING INTERSTITIAL - 79438X-345

GROUNDWATER SENSOR
7943XX-62X

VAPOR SENSOR
794390-700


UNLESS OTHERWISE NOTED
I.S. APPARATUS
AMBIENT TEMPERATURE RANGE
-40°C ≤ Ta ≤ 60°C

FOR WIRING NOTES
AND LIMITATIONS
SEE SHEETS 2, 3, & 4

LEGEND

- - DENOTES A FIELD WIRING CONNECTION INSIDE A WEATHERPROOF JUNCTION BOX
- ◆ - DENOTES A CONDUIT SEAL-OFF
- - DENOTES RIGID CONDUIT
- I.S. - DENOTES INTRINSICALLY SAFE WIRING

DO NOT SCALE DRAWING

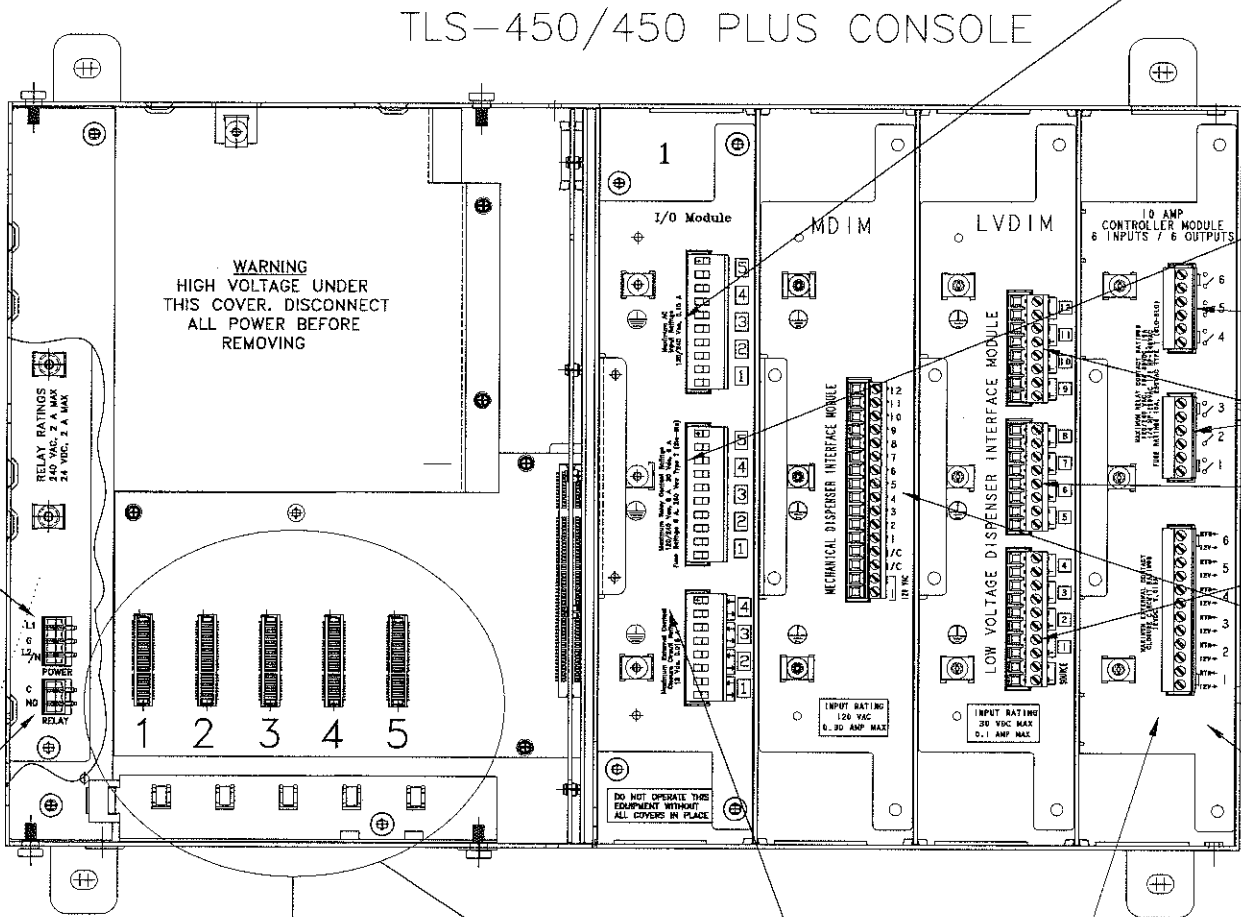
NAME		DATE	NEXT GRP.	-----
DESIGNER	J. TESSITORE	3/14/11	ASSEMBLY	-----
PROJECT	B.ANDREW	3/14/11	FORM NO	-----
MATERIAL	 VEEDER-ROOT TM			SIMSBURY, CONNECTICUT 06070 U.S.A.
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REFERENCE MFG. SPEC. VRS 81005 WHERE IT IS APPLICABLE	CONTROL DRAWING UL TLS-450/450 PLUS CONSOLES			
UNSPECIFIED TOLERANCES +/- N/A	SIZE	DRAWING NUMBER	REV.	STATUS
	D	331940-008	F	REL
SCALE		NONE	SHEET 1 OF 4 Number: 331940-008 Version: F 4	

DESCRIPTION

THIS CONTROL DRAWING DESCRIBES THE INTRINSICALLY SAFE EQUIPMENT AND ASSOCIATED APPARATUS THAT TOGETHER FORM AN INTRINSICALLY SAFE SYSTEM.

TLS-450/450 PLUS CONSOLES ARE IDENTIFIED BY FORM NUMBERS 8600. A TLS-450/450 PLUS CONSOLE CANNOT BE CONNECTED IN PARALLEL WITH ANOTHER TLS-450/450 PLUS OR ANY OTHER ASSOCIATED APPARATUS. TLS-450/450 PLUS CONSOLES AND OPTIONAL EXPANSION BOXES MUST BE INSTALLED IN INDOOR NON-HAZARDOUS AREAS.

Date: 05, Jun 2014 Time: 12:53PM State: In Work Name: Tim Breen



Maximum AC Input Ratings
120/240 Vac, 0.10 A

Maximum Relay Contact Ratings
120/240 Vac, 5 A 30 Vdc, 5 A
Fuse Ratings
5 A, 250 Vac Type T (Slo-Blo)

Maximum Relay Contact Ratings
120/240 Vac, 10 A 30 Vdc, 10 A
1/4 HP-120 VAC 1/2 HP-240 VAC
Fuse Ratings
10 A, 250 Vac Type T (Slo-Blo)

Maximum DC Input Ratings
30 VDC, 0.1 A
Class 2 Circuits

Maximum AC Input Ratings
120/240 Vac, 0.30 A

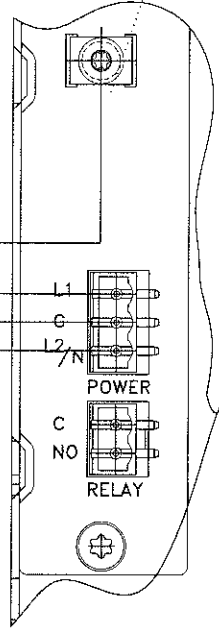
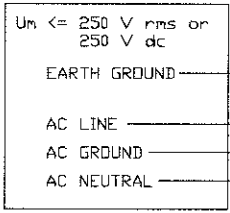
Each Console Is Limited
to a Maximum of Two
10 Amp Dispenser
Controller Modules

Maximum External Contact
Closure Circuit Ratings
12 Vdc, 0.015 A
Class I wiring is required for these
12 Volt contact closure circuits.

AC POWER
INPUT CONNECTOR
120/240 Vac,
50/60 Hz,
2A maximum

OVERFILL ALARM
RELAY CONNECTOR
120/240 Vac,
2A maximum

CIRCUIT BREAKER
PANEL



TLS-450 CONSOLE

COMM MODULES	PERMISSABLE SLOT(S)
SITEFAX MODEM MODULE	1, 2 OR 3
USB MODULE	5 ONLY
USB/ETHERNET MODULE	5 ONLY
ETHERNET MODULE	4 OR 5
SINGLE SERIAL PORT MODULE	1, 2 OR 3
DUAL SERIAL PORT MODULE	1, 2 OR 3
ELECTRONIC DISPENSER INTERFACE MODULE (EDIM)	1, 2 OR 3
CURRENT LOOP DISPENSER INTERFACE MODULE (CDIM)	1, 2 OR 4

NOTE: Limited single port capability in slot 3.

TLS-450 PLUS CONSOLE

COMM MODULES	PERMISSABLE SLOT(S)
SITEFAX MODEM MODULE	1, 2 OR 3
USB/WIRELESS MODULE	5 ONLY
ETHERNET INTERFACE MODULE	4 ONLY
SINGLE SERIAL PORT MODULE	1, 2 OR 3
DUAL SERIAL PORT MODULE	1, 2 OR 3
ELECTRONIC DISPENSER INTERFACE MODULE (EDIM)	1, 2 OR 3
CURRENT LOOP DISPENSER INTERFACE MODULE (CDIM)	1, 2 OR 4

NOTE: Limited single port capability in slot 3.

SIMSBURY, CONNECTICUT 06070 U.S.A.

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CONTROL DRAWING UL
TLS-450/450 PLUS CONSOLES

SIZE	DRAWING NUMBER	REV.	STATUS
D	331940-008	F	REL

SCALE NONE SHEET 2 OF 4
Number: 331940-008 Version: F.4

Name: Tim Breen Date: 05, Jun 2014 Time: 12:53PM State: In Work

WARNINGS

SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

WIRING NOTES

INTRINSICALLY SAFE (I.S.) WIRING MUST BE INSTALLED IN ACCORDANCE WITH ARTICLE 504-20 OF THE NEC (NATIONAL ELECTRICAL CODE), ANSI/NFPA 70 OR OTHER APPLICABLE LOCAL CODES. ALL OTHER WIRING MUST BE INSTALLED ACCORDING TO LOCAL CODES.

THE MAXIMUM CABLE LENGTH ALLOWED, USED TO CONNECT ANY INTRINSICALLY SAFE DEVICE TO THE TLS-450/450 PLUS CONSOLE IS LIMITED TO A TOTAL OF 24,000 FEET PER USM (UNIVERSAL SENSOR MODULE).

EACH CABLE (OR I.S. WIRING), USED TO CONNECT INTRINSICALLY SAFE DEVICES TO THE TLS-450/450 PLUS CONSOLE, MUST BE RATED 100 PF/FOOT (OR LESS CAPACITANCE PER FOOT) AND MUST BE RATED 0.2 μH/FOOT (OR LESS INDUCTANCE PER FOOT).

I.S. GROUNDING POINTS MUST BE CONNECTED TO A SUITABLE GROUND ELCTRODE THROUGH LESS THAN ONE OHM DC RESISTANCE TO THE EARTH GROUND BUS AT THE DISTRIBUTION PANEL IN ACCORDANCE WITH THE NEC/CEC OR OTHER LOCAL CODES.

CABLES (OR I.S. WIRING) USED TO CONNECT SEPARATE I.S. DEVICES TO THE ASSOCIATED APPARATUS MUST HAVE SUITABLE INSULATION AS REQUIRED BY ARTICLE 504.30(B) OF THE NEC.

ASSOCIATED APPARATUS MUST BE INSTALLED IN ACCORDANCE TO THIS CONTROL DRAWING AND ARTICLE 504 OF THE NEC OR SECTION 18 OF THE CEC.

THE MAXIMUM SAFE AREA VOLTAGE (Um) OF THIS EQUIPMENT IS 250V RMS OR DC. PERIPHERAL EQUIPMENT CONNECTED TO THE TLS-450/450 PLUS CONSOLE MUST NOT USE OR GENERATE MORE THAN 250V RMS OR DC WITH RESPECT TO EARTH GROUND.

INSIDE THE MODULE AREA OF BOTH THE TLS-450/450 PLUS CONSOLE, ANY COMBINATION OF UP TO FOUR MODULES MAY BE INSTALLED. MDIM, LVDIM AND I/O MODULES PROVIDE WIRING TERMINALS FOR THE CONNECTION OF EQUIPMENT INSTALLED IN NON-HAZARDOUS LOCATIONS. THE USM (UNIVERSAL SENSOR MODULE) PROVIDES WIRING TERMINALS FOR THE CONNECTION OF INTRINSICALLY SAFE APPARATUS.

THE ELECTRONICS LOCATED IN THE BARRIER CIRCUIT OF THE USM MODULE FORMS AN INTRINSICALLY SAFE ENERGY LIMITED SYSTEM. PROBE AND SENSORS CONNECTED TO THE OUTPUT TERMINALS OF THE USM MODULE ARE CONSIDERED INTRINSICALLY SAFE APPARATUS AND ARE APPROVED FOR USE IN CLASS I, GROUP D OR CLASS I ZONE 0 GROUP IIA HAZARDOUS (CLASSIFIED) LOCATIONS.



WARNING: IN INSTALLATION AND USE OF THIS PRODUCT, COMPLY WITH ALL ELECTRICAL CODES. IN ADDITION, TURN OFF POWER AND TAKE OTHER NECESSARY PRECAUTIONS DURING INSTALLATION, SERVICE AND REPAIR TO PREVENT PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.



WARNING: DISCONNECT ALL POWER BEFORE MAKING ANY CONNECTIONS TO PREVENT DEATH, SERIOUS INJURY, EXPLOSION, OR ELECTRICAL SHOCK. CONSOLE MUST NEVER BE OPERATED UNLESS THE FRONT COVER IS CLOSED OVER THE BARRIER TERMINALS IN THE INTRINSICALLY SAFE AREA.

LIMITATIONS

A MAXIMUM OF 2 TLS RF CONSOLES AND UP TO 16 INTRINSICALLY SAFE DEVICES MAY BE CONNECTED TO THE USM MODULE LOCATED IN A TLS-450/450 PLUS CONSOLE.

MAGNETOSTRICTIVE PROBE – ENCLOSURE CONTAINS ALUMINUM. CARE MUST BE TAKEN TO AVOID IGNITION HAZARD DUE TO IMPACT OR FRICTION.

VAPOR FLOW METERS, PART NUMBERS 331847-001 AND 332374-001 ARE ONLY SUITABLE FOR USE INSIDE THE BASE OF A FLAMMABLE LIQUID DISPENSER WHEN FACTORY INSTALLED BY THE RESPECTIVE ORIGINAL EQUIPMENT MANUFACTURER.

VAPOR FLOW METERS, PART NUMBERS 331847-002 AND 332374-002 ARE SUITABLE FOR IN-THE-FIELD INSTALLATIONS, WHEN MOUNTED INSIDE FLAMMABLE LIQUID DISPENSERS THAT ARE EVALUATED AS A PART OF A LISTED BY REPORT RETROFIT KIT.

LISTED VAPOR PRESSURE SENSORS, PART NUMBERS 861190-001, 861190-002 AND 861190-003 ARE SUITABLE FOR USE INSIDE THE BASE OF A FLAMMABLE LIQUID DISPENSER WHEN INSTALLED BY THE RESPECTIVE ORIGINAL EQUIPMENT MANUFACTURER. VAPOR PRESSURE SENSORS, PART NUMBERS 861190-001, 861190-002 AND 861190-003 ARE ALSO SUITABLE FOR USE WHEN MOUNTED TO THE VAPOR VENT STACK THAT IS USED FOR VENTING FLAMMABLE VAPORS.

VAPOR PRESSURE SENSORS, PART NUMBER 861190-001, 861190-002 AND 861190-003 ARE SUITABLE FOR IN-THE-FIELD INSTALLATIONS, WHEN MOUNTED INSIDE FLAMMABLE LIQUID DISPENSERS THAT ARE EVALUATED AS A PART OF A LISTED BY REPORT RETROFIT KIT.

SURGE PROTECTION

SURGE PROTECTION COMPONENTS MUST BE GAS TUBE TYPE, UL RECOGNIZED, CATEGORY CODE VZC42, PER UL 1449 AND WITH AN Imax RATING OF AT LEAST 10kA 8/20us OR GREATER WHEN INSTALLED AT THE TANK ENTRY.

CONNECT THE SURGE PROTECTOR IN ACCORDANCE WITH NFPA 780, CLAUSE 4.18.3.2.

CONSULT THE LOCAL AUTHORITY HAVING JURISDICTION PRIOR TO INSTALLING ANY SURGE PROTECTION DEVICES. SOME INSTALLATIONS MAY REQUIRE A 5 FOOT SPACING DISTANCE BETWEEN SURGE PROTECTOR AND ANY TANK ACCESS POINT OR VENT. REFERENCE NFPA 30.

THE SURGE PROTECTION DEVICE MUST BE A SIMPLE APPARATUS ONLY (NFPA 70, CLAUSE 504.2) SUITABLE TO THE AUTHORITY HAVING JURISDICTION.



VEEDER-ROOT

SIMSBURY,
CONNECTICUT 06070
U.S.A.

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CONTROL DRAWING UL
TLS-450/450 PLUS CONSOLES

SIZE	DRAWING NUMBER	REV.	STATUS
D	331940-008	F	REL

SCALE NONE SHEET 3 OF 4
Number: 331940-008 Version: F.4

EVALUATED IN CONJUNCTION WITH AN APPROVED AND COMPATIBLE ASSOCIATED APPARATUS
ie, ASSOCIATED APPARATUS BEARS THE UL/cUL MARK AND THE SYSTEM IS INSTALLED IN ACCORDANCE WITH APPROVED
INSTALLATION INSTRUCTIONS.

- CLASS I, DIVISION 1, GROUP D
- UL 1238 CONTROL EQUIPMENT FOR USE WITH FLAMMABLE LIQUID DISPENSING DEVICES.
 - UL 913 INTRINSICALLY SAFE APPARATUS
 - CSA C22.2 No.0 CANADIAN ELECTRICAL CODE, PART II
 - CSA C22.2 No.0.4M BONDING AND GROUNDING OF ELECTRICAL EQUIPMENT
(PROTECTIVE GROUNDING)
 - CSA C22.2 No.142-M PROCESS CONTROL EQUIPMENT
 - CSA C22.2 No.157 INTRINSICALLY SAFE AND NONINCENDIVE EQUIPMENT FOR USE IN
HAZARDOUS LOCATIONS, CONSUMER AND COMMERCIAL PRODUCTS.

**VEEDER-ROOT**TM

SIMSBURY,
CONNECTICUT 06070
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CONTROL DRAWING UL
TLS-450/450 PLUS CONSOLES

SIZE	DRAWING NUMBER	REV.	STATUS
D	331940-008	F	REL

SCALE NONE

SHEET 4 OF 4

Number: 331940-008 Version: F.4