

Instructions and Operating Manual

SERIES X76S

LEAK DETECTOR MONITOR SYSTEM



 **RONAN**

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Warranty: Ronan warrants equipment of its own manufacture to be free from defects in material and workmanship under normal conditions of use and service, and will repair or replace any component found to be defective, on its return, transportation charges prepaid, within one year of its original purchase. This warranty carries no liability, either expressed or implied, beyond our obligation to replace the unit which carries the warranty.

1.0 INTRINSIC SAFETY

Hazardous atmospheric mixtures include all explosive or ignitable air mixtures involving gases or vapors at an atmospheric pressure and with ambient temperatures between zero and 120°F. The order of ignitability of materials generally corresponds to the National Electrical Code groupings. The workable categories and test materials used as typical for each are:

- Group A: acetylene (8.7% by volume)
- Group B: hydrogen (21.0% by volume)
- Group C: ethylene (7.8% by volume)
- Group D: methane (8.2% by volume)

The ignition capability of an electrical circuit is determined by the electrical energy available and the manner in which such energy is released. Energy may be released in the form of a spark, by resistive heating effects or a combination of the two. There are three basic mechanisms by which electrical energy may be released in the form of spark discharge: discharge of a capacitive circuit, interruption of current in an inductive circuit and make-break of a resistive circuit.

The minimum ignition energy for any flammable mixture is the smallest amount of energy released as a spark and sufficient to ignite the mixture at 0 psig.

The most easily ignited air mixture is that mixture of a flammable material in air, which requires the minimum amount of energy for ignition. The flammables are usually designated in percent by volume in air.

Normal operating conditions include maximum supply voltage and the extreme environmental conditions which fall within the ratings given for the specific equipment under investigation.

Abnormal operating conditions usually refer to any two mechanical or electrical faults occurring in combination. The faults are independent and include accidental damage to, and failure of, components or wiring.

Intrinsically safe electrical equipment and the associated wiring are incapable of releasing into the air sufficient electrical or thermal energy (under normal or abnormal operating conditions) to ignite a specific hazardous mixture in its most concentrated, easily ignitable form. The flammable material may be a gas or vapor.

Underwriters Laboratory and Factory Mutual approvals are based on examination and tests of samples of production-quality equipment and inspection of manufacturing and quality-control facilities. Of particular consideration are the adequacy of design and workmanship, uniformity and dependability of production, effectiveness of quality control, functional suitability, assurance of availability of service and replacement of parts.

Installation of intrinsically safe annunciators makes it mandatory to maintain complete isolation between the field contact wiring and any other potential source of voltage.

General-purpose external horn relays, horns and bells can be used if wiring is isolated, provided they all use the power from the intrinsically safe power supply.

If the power to the horns is to be supplied from a source other than the intrinsically safe power supply, isolation of the other voltage source must be maintained by using the Model KV-700 or X53-1014 Horn Relay or any other approved horn relay.

To be completely assured of an intrinsically safe installation, all equipment used must be approved by an agency, and the installation, including the wiring, plus all the contact inputs, must meet requirements of isolation to avoid any failures that may occur in the system.

CAUTION: The X76S Monitor enclosure may be mounted in a Class I, Division 2, Groups C, D hazardous area as defined by the National Electrical Code.

Power input maximum is 115 VAC, 60 Hz.

All wiring to sensors (i.e. Level Switches LS-3, LS-7, LS-10, LS-20, LS-30 and Pressure Switches JT-2P and JT-2V), must be installed in separate dedicated conduit to comply with the intrinsically safe requirements.

All wiring to auxiliary relays KV-700 and X53-1014 must comply with drawings.

All external equipment used with system must comply with National Electrical Code for the area where the equipment is being installed. This is particularly important when selecting external horns, pushbuttons and relays to be used with the X76S System.

The X76S chassis must be properly grounded including the intrinsically safe ground.

NOTE: Ronan Engineering Company does not accept the responsibility of the installation of intrinsically safe equipment.

2.0 SPECIAL CAUTIONARY NOTES—INTRINSICALLY SAFE MONITORS

Before applying power and beginning the test procedure, it is important to review all the elements of the monitor system, including the cabinet itself, to verify that each component meets the requirements of the National Electrical Code for the area in which it is installed. Particular attention must be paid to reviewing the selection of any externally supplied pushbuttons, horn relays, horns and bells, to assure that they are of an appropriate classification.

2.1 Alarm Contact Inputs

Each alarm contact of the intrinsically safe system must be brought to the alarm contact inputs, labelled "1A" and "1B," as the discrete pair of wires. The common practice of running

one A(+) wire to many field contacts is not permitted if intrinsic safety is to be preserved. This is due to the nature of the barrier design, in which only a limited current, insufficient to actuate more than one B input, is made available to the field wiring through each A terminal. The jumpering of A terminals must be avoided, as it also defeats the current-limiting properties of the barrier.

Each active input may be wired to a contact that either opens or closes with an alarm condition. Selection of the input contact type is accomplished on each module by the position of a resistor-type jumper, identified as "NO" and "NC" for the normally open and normally closed positions, respectively. Using this terminology, a field contact that opens with an alarm condition is termed a "normally closed" alarm input and, conversely, the field contact that closes with an alarm condition is termed a "normally open" alarm input.

2.2 Power Source

The success of an intrinsically safe system depends upon a resistive barrier to limit the current that can be supplied from a controlled (maximum) voltage. To insure that this voltage is not exceeded, an intrinsically safe power supply (or battery) must be used and care must be taken to see that no other source of power can enter the system. Connection of the power source to the monitor system should be checked for proper polarity and adequate wire size.

2.3 Optional External Pushbutton Wiring

Each pushbutton input terminal of the intrinsically safe monitor should be wired to one side of the normally open contact of an external pushbutton, the other side being connected to V+. This wiring must be physically isolated from any wiring not powered by the intrinsically safe power source. Ordinarily, this will preclude using the spare poles of the external pushbuttons for any auxiliary function.

The most frequently encountered wiring error in pushbutton wiring is the use of normally closed, rather than normally open, pushbutton contacts. This, of course, has the same effect as having the operator pressing the pushbutton continuously. The resulting confusion is often interpreted to be a major system malfunction.

2.4 Optional External Horn and Bell Wiring

If electronic horns are used as the system audibles, they may be directly driven by the horn driver outputs of the monitor. In this case, the Ronan Model X36 Electronic Horn should be installed with its V- terminal tied to the A1 terminal of the annunciator and its V+ terminal tied to the V+ of the intrinsically safe power source.

Systems using conventional vibrator-type horns and bells must use an interposing relay with a suitable contact rating. If the horn or bell is to be powered from any supply other than the intrinsically safe power supply, this relay must be an intrinsically safe relay, such as the Ronan Model KV-700 or X53-1014, with its foreign voltage wiring segregated from that of the monitor.

2.5 Alarm Contact Wiring

Alarm contact wires must be routed through the special intrinsically safe compartment in pairs and wired to 1A and 1B, 2A and 2B, 3A and 3B, and 4A and 4B accordingly. The entry for the alarm contact wiring is located on the left, bottom of the enclosure.

The auxiliary relay contact outputs from the alarm modules should be wired from terminals C, NO and NC to the field, routed through the middle entry provided on the bottom of the enclosure. This is general-purpose wiring and must be totally separated from the wiring to the hazardous area.

2.6 Power Supply Wiring

The 115 VAC source wiring must be routed through the entry at the right, bottom of the enclosure and connected to the terminals identified with "H," "N" and "GROUND" accordingly.

3.0 GENERAL INSTALLATION— SERIES X76S LEAK DETECTOR MONITOR SYSTEM

The Series X76S Leak Detector Monitor System is available in a wall-mounted, NEMA Type 1 enclosure. The enclosure holds the monitor modules and the approved Model X53-2000 Field Isolator module, with the associated power supply, all accessible through the front door. The clearly identified wire terminations, located on the interior rear wall, provide ease of wiring for sensor and power connection.

3.1 Field Wiring

The system's field wiring is shown in schematic X76C53 and **must be followed explicitly**. The system requires 115 VAC, 60 Hz, supply voltage, terminated to the appropriate terminals, to power the intrinsically safe power supply. All field wires of the sensors to be monitored (e.g., tank levels) that are in a Class I, Division 1 area, are to be terminated to the input of the system.

CAUTION: The field wires from the hazardous area must be connected to the system, separated from any circuits carrying high voltage (115 VAC) to avoid accidental connection

of the high voltage or current to the hazardous area. This is an Underwriters Laboratory and Factory Mutual requirement.

4.0 TROUBLESHOOTING/REPAIR

4.1 X76S Leak Detector Monitor System

CAUTION: The system's internal terminations are powered by 115 VAC. Touching these terminals can cause electrical shock.

The Series X76S Leak Detector Monitor System is designed for trouble-free operation and should not require troubleshooting in the field. Since the system consists of individual plug-in modules, the initial repair should be limited to the exchange of modules and verification of proper wiring of all incoming field connections.

4.2 Alarm Module

Troubleshooting of the alarm module should be carried out systematically, since this module operates in conjunction with the X53-2000 Barrier Module and the intrinsically safe 24 VDC power supply.

In the event of a malfunction of this module, check field wiring to the input terminal connector of the X53-2000 Barrier Module (schematic X76C53). Check fuse in the power supply and measure with a DC voltmeter the voltage across the output of the power supply, confirming 21.6 to 30 VDC.

Replace the X53-2000 Barrier module. If this does not solve the problem, the cause is in the alarm module, which will have to be replaced.

5.0 GENERAL SYSTEM DESCRIPTION

The Ronan Series X76S Leak Detector Monitor is a four-point monitor system of general-purpose design equipped with certified, intrinsically safe barriers to interface with field contacts that are located within a hazardous area as described in section 1.0. The field contact, when transferring from normally open or normally closed to its off-normal state, will be visually indicated via the light-emitting diode and the audible buzzer will sound. The front-panel-mounted pushbutton allows the operator to acknowledge the alarm, thereby changing the flashing LED to steady-on and silencing the audible alarm. The test pushbutton, if pressed, will actuate all alarm points to verify proper operation of the logic and the LEDs.

6.0 TYPICAL APPLICATION— SECONDARY CONTAINMENT LEAK MONITOR

The Model X76S provides the necessary monitoring of secondary containment applications in gasoline and oil storage facilities to detect leaks in time to prevent leakage of hazardous liquid into the underground water table.

The secondary containment tank leak monitor consists of liquid-level sensors and alarm modules, located in the Ronan X76S system. The liquid-level sensor monitors the area between the inner and outer tank for possible spillage. Should a leak occur, the product will be contained in the outer shell and the X76S alarm module will indicate an alarm via the system's buzzer and flashing LED, specifying which tank has a leak. The X76S will also indicate an alarm should the outer shell leak and allow ground water to seep into the tank.

7.0 SPECIFICATIONS

7.1 System, Model X76S

Power: 115 VAC, 60 Hz



Power Consumption: 100 VA

Operating Temperature: 32° to 165°F (0° to 75°C)

Dimensions:

9 × 9.5 × 4.2 inches (22.86 × 24.13 × 10.67 cm)

Mounting: General purpose area; wall-mount

 **Approved,**  **Listed 48RO**

7.2 Intrinsically Safe Barrier Module X53

Number of Inputs: Two per module



Sensors Voltage: 24 VDC, current limited

Sensor: Dry contact

Output interface to Alarm Module: Relay contact; normally open/normally closed; selectable

Power Consumption: 750 mW per input

Supply Voltage: 24 VDC from I.S. power supply

 **Approved,**  **Listed 48RO**

7.3 Alarm Module

Input Signal: Dry contact from X53 Barrier Module

Contact Voltage: 24 VDC (supplied by X76S)



Number of Inputs: One per module

Output: Auxiliary contact; Form C, one per module

Contact Rating: 120 VAC, 0.5 amps, 24 VDC, 1 amp resistive. Relay outputs shall use the same potential and same polarity only.

Power Consumption: 1W per module



Supply Voltage: 24 VDC from I.S. power supply

 **Approved,**  **Listed 48RO**

7.4 Power Supply I.S. (Intrinsically Safe)

Power Input: 115 VAC

Output Voltage: 24 VDC

 **Approved,**  **Listed 48RO**

7.5 Tank Leak Sensor, Model LS-3

Housing: 304 stainless steel

Mounting: 1/2" NPT male thread or extension cable

Switch:

Type: Single pole, single throw N.C.

Rating: 10 VA

Float material: Buna-N

Pressure: 50 psi maximum

Leads: 20 AWG

 **Listed 48RO**

7.6 Tank Leak Sensor, Model LS-7

For steel and fiberglass double-wall tanks.

Housing Material: PVC (Geon 87241)

Liquid SpG: .70 minimum

Switch:

Type: Single pole, single throw N.C.

Rating: 10 VA

Leads: 20 AWG

 **Listed 48RO**

7.7 Hydrostatic Leak Sensor, Model LS-10 or LS-20

Reservoir:

Volume:

LS-10, two gallons (7.57 liters)

LS-20, four gallons (15.14 liters)

Material: Polyethylene plastic

Switch: Model LS-3 N.O. and LS-30

Type: LS-3 N.O., single pole, single throw; LS-30, DPDT

Rating: 10 VA

Float material: Buna-N

Pressure: 50 psi maximum

Leads: 20 AWG

 **Listed 48RO**

7.8 Tank Leak Sensor, Model JT-2

Housing: Stainless steel, explosion proof, hermetically sealed, NEMA Types 7 and 9

Classification:

Class 1: Groups A, B, C and D

Class 2: Groups E, F and G

Switch:

Type: Single pole, double throw N.O. (shelf condition)

Rating: 10 VA

Electrical Connection: 1/2" – 14 NPT with PVC-insulated 18 AWG leads

Pressure:

Setpoint: JT-2 Positive Pressure Leak Sensor, .5 psig; JT-2V Vacuum Leak Sensor, .5 inches of mercury

Connection: 1/4" – 18 NPT

Adjustment: 1/8" Allen wrench through port

Temperature Range: –40° to 180°F (–40° to 82°C)

 **Listed 48RO**

CSA Approved: File 34146

8.0 INTRINSICALLY SAFE INTERFACE SYSTEM

8.1 Applications

The Series X53BA-2000 Barriers are designed to handle the following functions associated with intrinsically safe annunciators and logic systems.

A method of *accepting intrinsically safe input contact signals* from the hazardous area via an approved barrier to *provide output contacts* that can be used for operating general-purpose annunciators or logic systems.

8.2 Mechanical Features

Input and output terminals are physically separated.

The input terminal compartment has conduit knockouts, as do the output terminal compartments and power wiring input.

No passageways exist between the two compartments, so it is impossible to inadvertently intermix the input and output wiring.

8.3 Special Installation Instructions

Equipment and associated wiring approved as intrinsically safe may be installed in any hazardous location for which it is approved. The provisions of Articles 500-517 of the National Electrical Code need not apply to such installations.

As the intrinsically safe portion of the system is made up of the field contacts and associated wiring, all field contact wiring is to be run in conduit reserved for the exclusive use of this field contact wiring.

The field contact wiring for any particular field contact is to be of such size that the total loop resistance is less than 1,000 ohms.

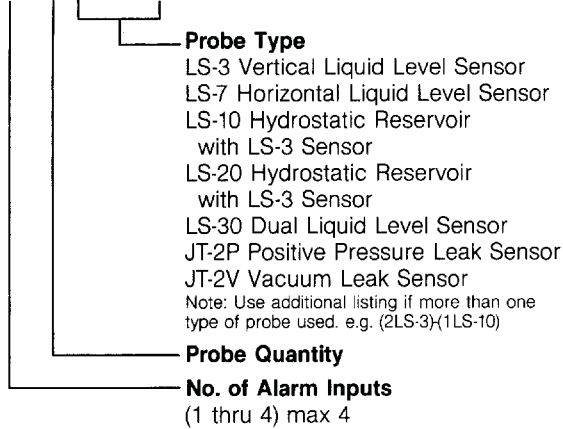
The system is to be grounded at the input voltage terminals. The ground connection shall be such that the resistance to ground shall be less than 1.0 ohm.

9.0 ORDERING INFORMATION

The Ronan Model X76S Leak Detector Monitor System can be configured to meet the different local and state codes for underground storage by proper selection of sensors and monitor modules. For example, a particular local code and/or type of facility may require leak detection of a tank annulus. The monitor system would be Model #X76S-1-1LS-3.

Model

X76S-()-()-()



9.1 Spare Parts

Model Number	Description
LS-3	Vertical Liquid Level Sensing Probe
LS-7	Horizontal Liquid Level Sensing Probe
LS-10	Hydrostatic Reservoir
LS-20	Reservoir System
LS-30	Dual Liquid Level Sensor
X17AM-2000	Sensor Alarm Module
X53BA-2000	Intrinsically Safe Barrier
115-24-20-IS	Intrinsically Safe Power Supply
JT-2P	Positive Pressure Sensor
JT-2V	Vacuum Leak Sensor
KV-700	Intrinsically Safe Relay
X53-1014	Intrinsically Safe Relay
350W	Weatherproof External Horn

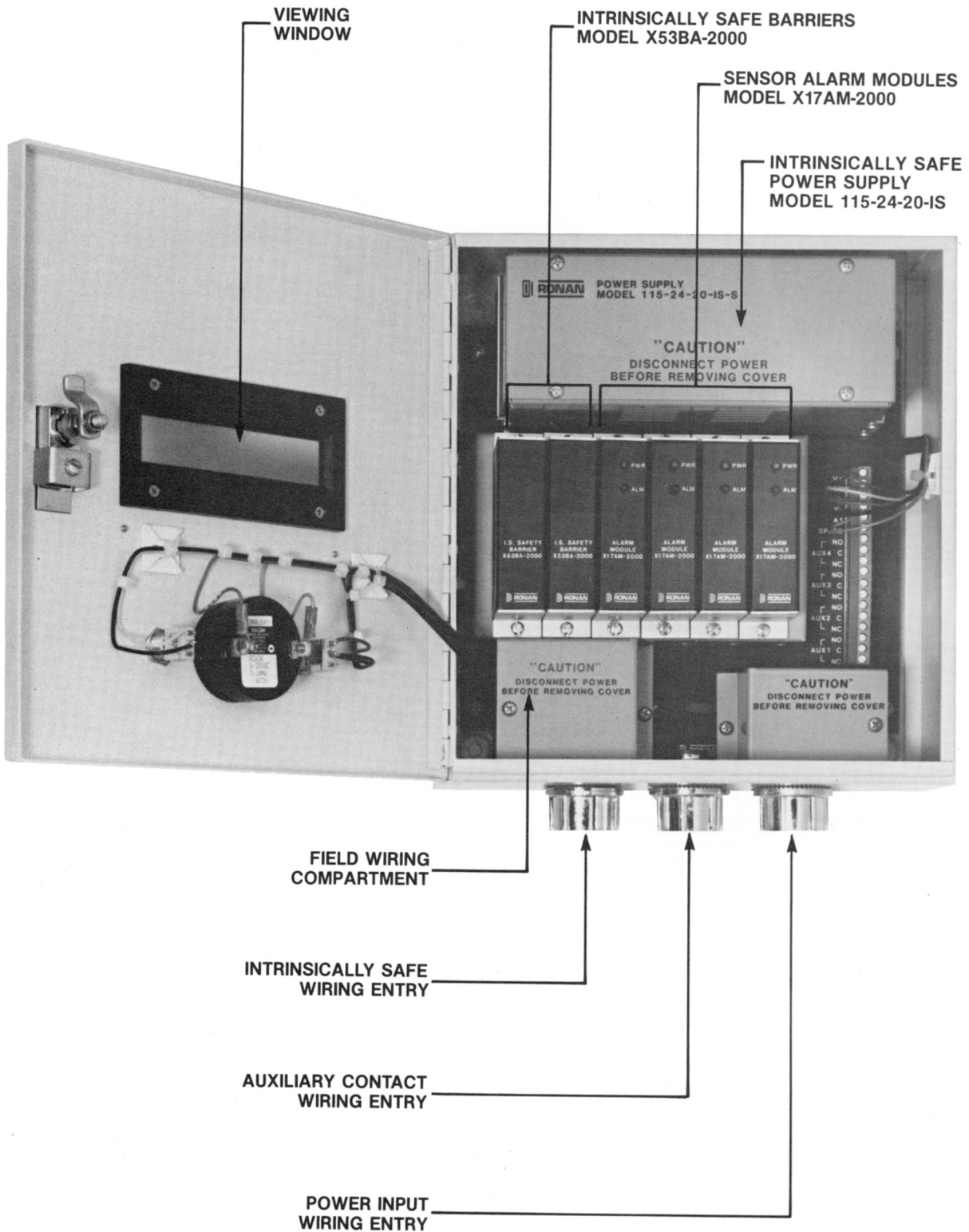
10.0 ELECTRICAL CHARACTERISTICS

(V+ = 24 VDC, +25%, -10% unless otherwise noted.)

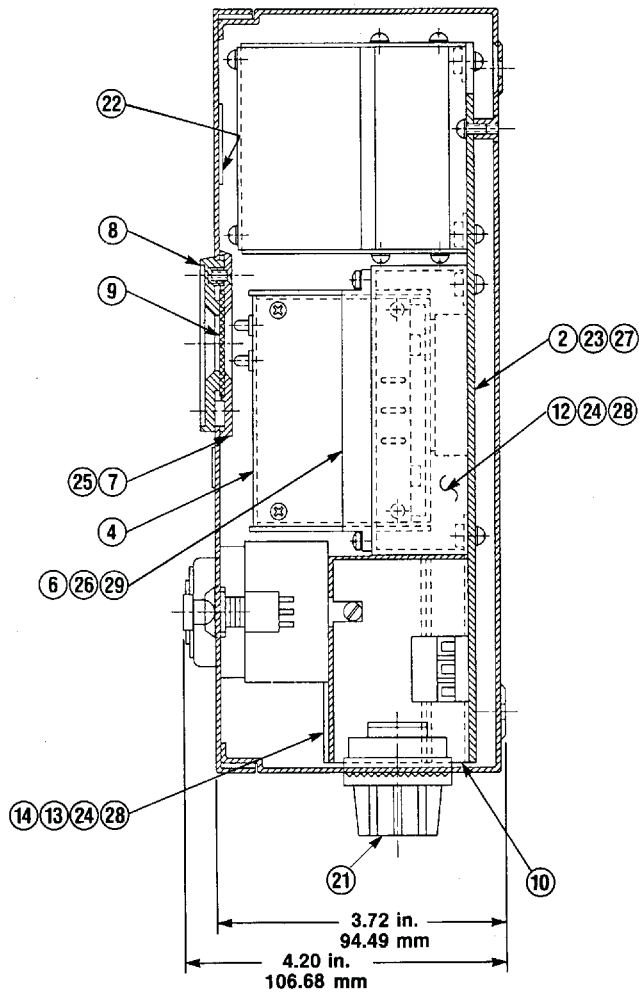
Parameter	Condition	Min.	Typ.	Max.	Unit
Alarm module supply current	Excluding input current	12.1	19.3	26.0	mA
Alarm module input current	Closed contact from V+ to FC	18.8	24.8	38.9	mA
I.S. interface module supply current	Open contact (both inputs)		0	0.1	mA
	Closed contact (both inputs)	42.0	51.9	65.0	mA
I.S. field contact voltage	Open contact		V+	30	V
	Closed contact	0	0	2.0	V
I.S. field contact current	Open contact		0	0.2	mA
	Closed contact	0.65	1.15	2.0	mA
I.S. field contact wiring resistance	Measured between field contact terminals of each input			1 k	ohm
Pushbutton contact voltage	When not pressed		9.86	9.99	V
	When pressed		0		V
Pushbutton contact current	When not pressed		0	0.2	mA
	When pressed	0.72	0.93	1.06	mA
Pushbutton wiring resistance	Measured between pushbutton terminal and V-			200	ohm
Audible output voltage	Off		V+	30	V
	On		1.2	1.95	V
Audible output current sink	Off			<0.01	mA
	On			500	mA

NOTES:

- All voltages are defined with respect to V-.
- Typical values are at T_A = 25 °C, nominal voltages with field wiring resistance = 100 ohms.



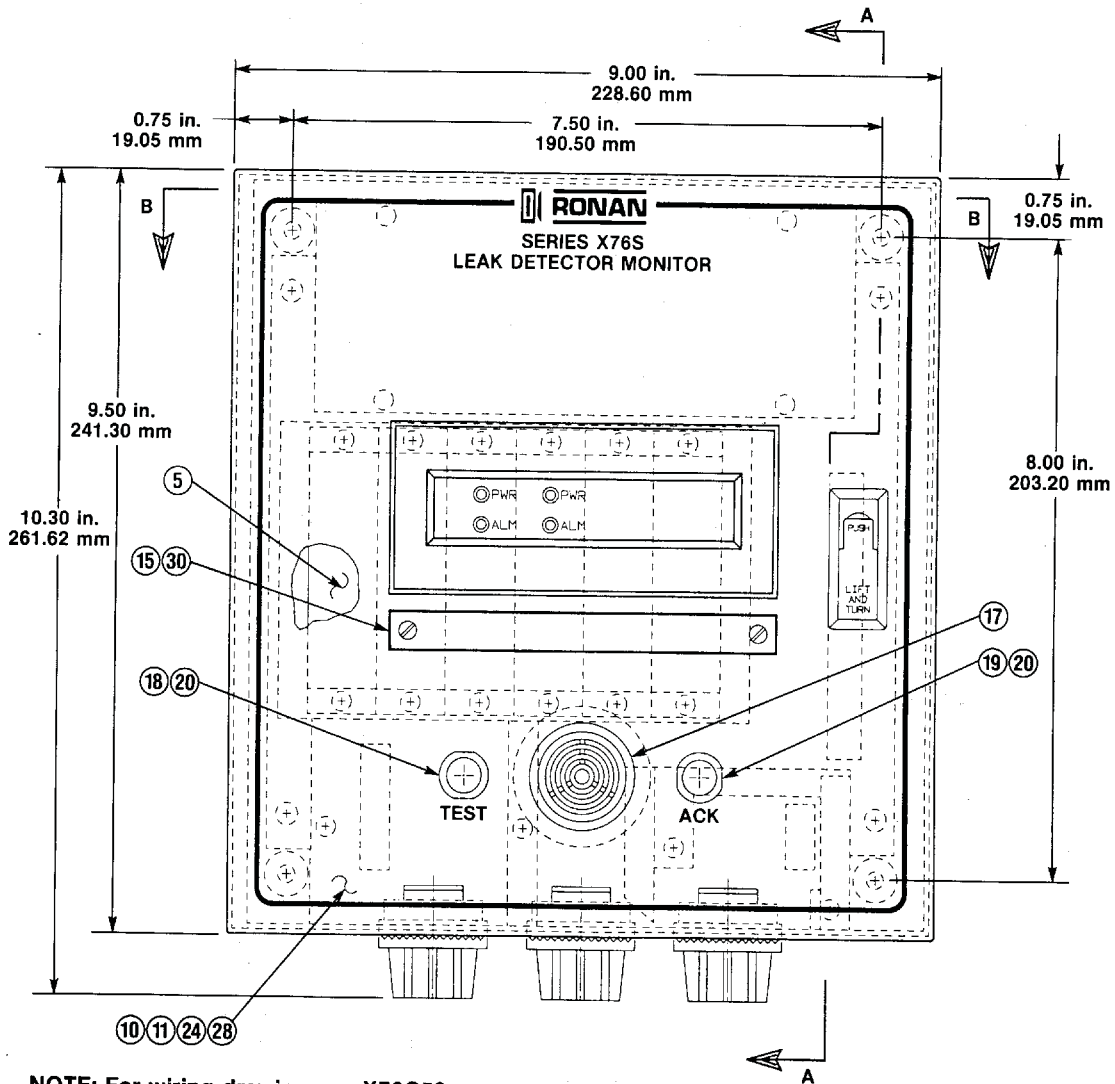
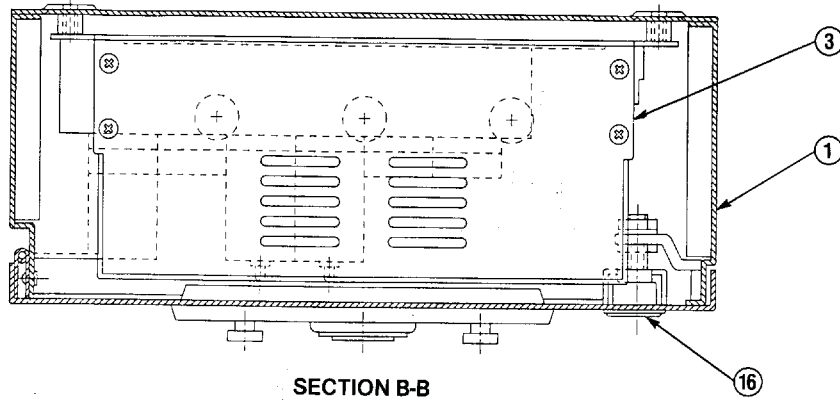
Model X76S Internal View



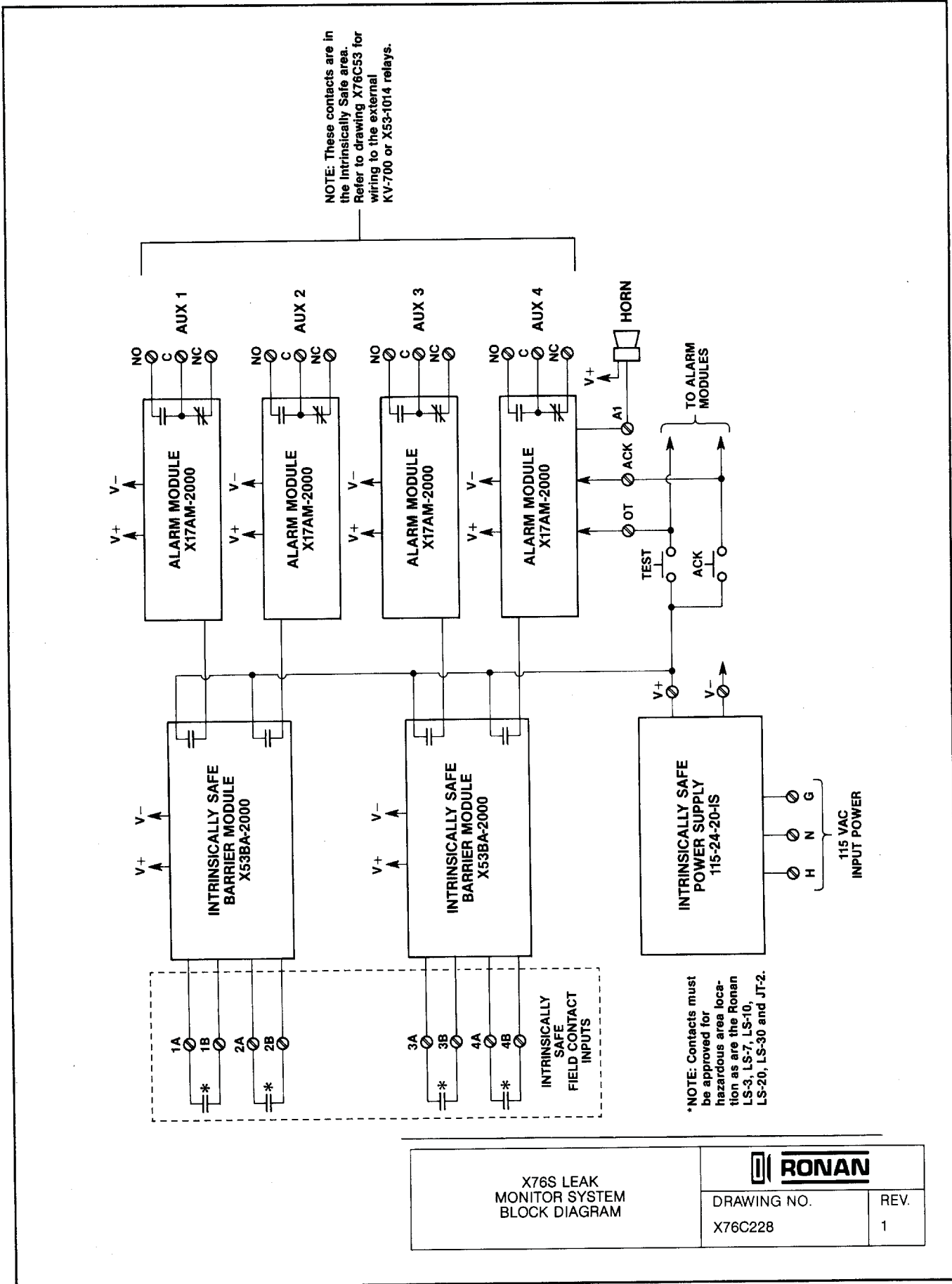
SECTION A-A

List of Materials				
Item	Qty.	Part No.	Description	Spec
1	1	X76D42	Enclosure Assy.	Ronan
2	1	X76C51	Mother PCB Assy.	Ronan
3	1	X53D110	Power Supply 115-24-20-IS Assy.	Ronan
4	As Req'd	X17D600	X17AM-2000 Assy.	Ronan
5	As Req'd	X53D100	X53BA-2000	Ronan
6	As Req'd	X53C106	Blank Cover	LBM
7	1	X76D46	Window Holder	LBM
8	1	X96D10-2	Bezel	LBM
9	1	X96B39	Window	Ronan
10	1	X76C47	Cover	Ronan
11	1	X76C48	Cover	Ronan
12	1	X76C49	Chassis	Ronan
13	1	X76C229	Bottom Cover	Ronan
14	1	X76X230	Top Cover	Ronan
15	1	LBL-0002	Label	Ronan
16	1	62-10-701-10	Flush Latch	Southco

List of Materials				
Item	Qty.	Part No.	Description	Spec
17	1	SC628	Horn	Sonalert
18	1	MPG106F-0	Micro Switch w/Black Cap	Alco Switch
19	1	MPG106F-2	Micro Switch w/Red Cap	Alco Switch
20	2	N45	Nut	Alco Switch
21	3	3104120	Hub	Meyer
22	1	79-665848	FM Label	Nat. Printing
23	4		8-32 x 1/4" PH RD HD MS	
24	16		6-32 x 5/16" PH RD HD MS	
25	4		4-40 x 1/4" PH FLAT HD MS	
26	As Req'd	63730	Captive Screw, 4-40 x 1/4"	
27	4		#8 Inter Tooth Lkwr.	
28	16		#6 Inter Tooth Lkwr.	
29	As Req'd		#4 Inter Tooth Lkwr.	
30	2		#4-40 x 1/4" Slot Oval HD MS	



MODEL X76S ASSEMBLY	RONAN	
	DRAWING NO. X76D41	REV. 3



NOTE: These contacts are in the Intrinsically Safe area. Refer to drawing X76CS3 for wiring to the external KV-700 or X53-1014 relays.

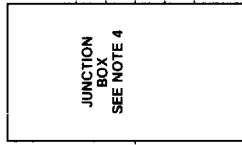
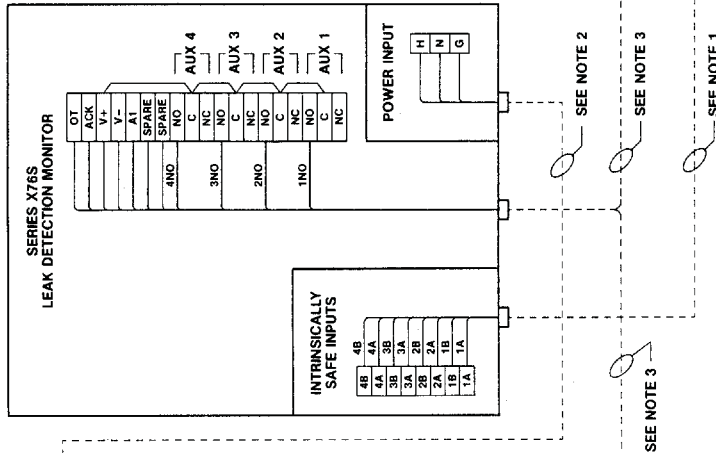
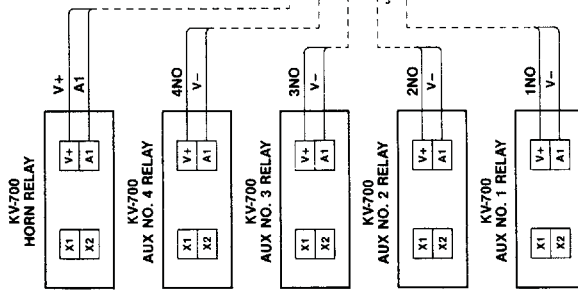
*NOTE: Contacts must be approved for hazardous area location as are the Ronan LS-3, LS-7, LS-10, LS-20, LS-30 and JT-2.

NON-HAZARDOUS LOCATIONS

CLASS I, DIVISION 2, GROUPS C, D
HAZARDOUS LOCATIONS

CLASS I, DIVISION 1, GROUPS C, D
HAZARDOUS LOCATIONS

SUPPLY
115 VAC, 60 Hz



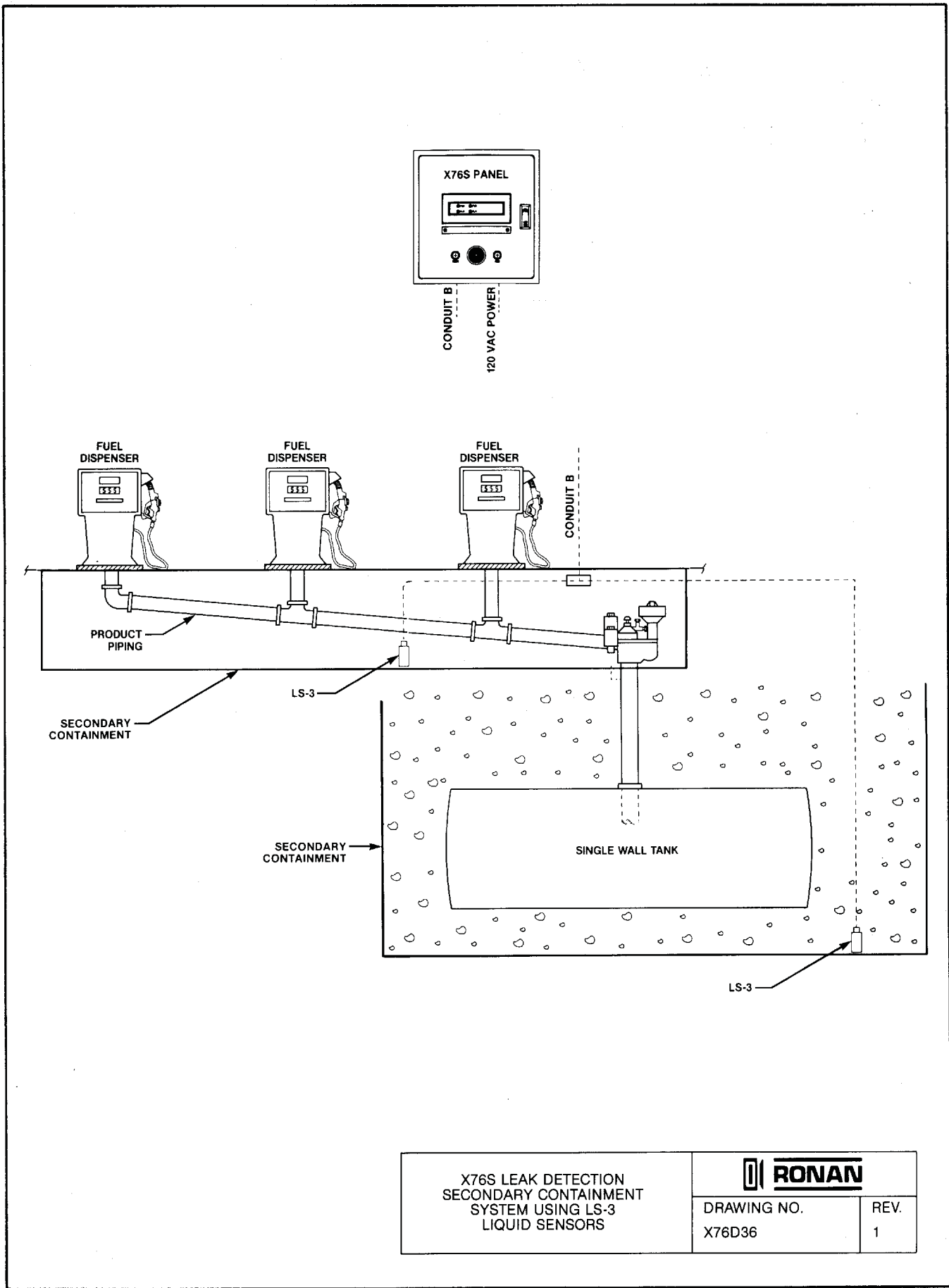
MODEL X76S
INTRINSICALLY SAFE
FIELD WIRING DIAGRAM




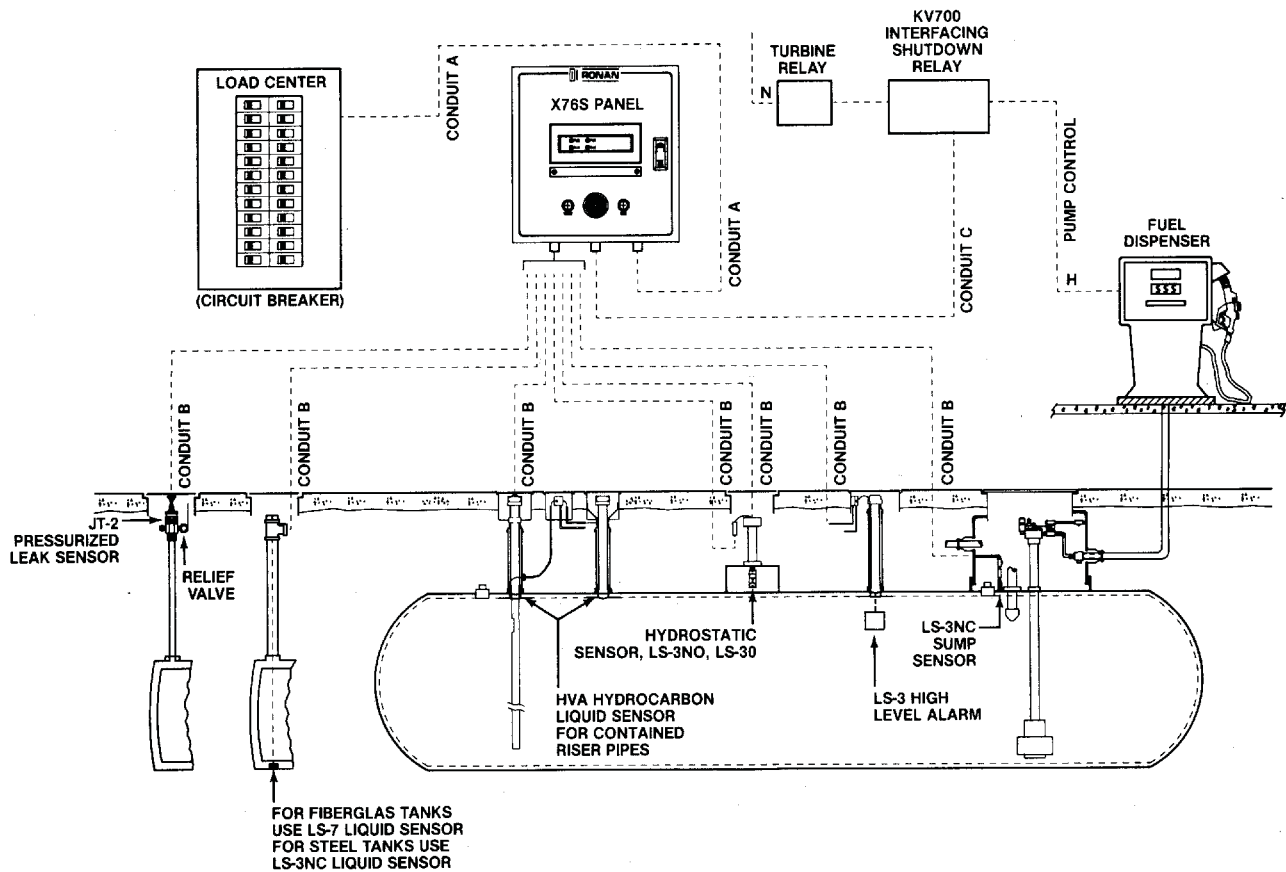
DRAWING NO.
X76C53

REV.
5


- NOTES**
- WARNING**—This is intrinsically safe wiring and must be separated from all other wiring and installed in conduit. Maximum cable length between monitor and sensors is 1,165 ft.
 - This wiring must be separated from all other wiring and installed in conduit.
 - WARNING**—To maintain intrinsic safety, this wiring must be separated from all other wiring and installed in conduit.
 - WARNING**—To maintain intrinsic safety, the junction box must contain only wiring splices, wiring and conduit runs required for connection of Ronan Model X53-1014 Relay.
 - WARNING**—To maintain intrinsic safety, the junction box must contain only wiring splices, wiring and conduit runs required for the connection of Ronan Model KV-700 Horn Relay.
 - Any combination of the following sensors may be used with this X76S Monitor: JT-1, JT-2, LS-3, LS-7, LS-10, LS-20 and LS-30.
 - For LS-30 two alarm modules are required.

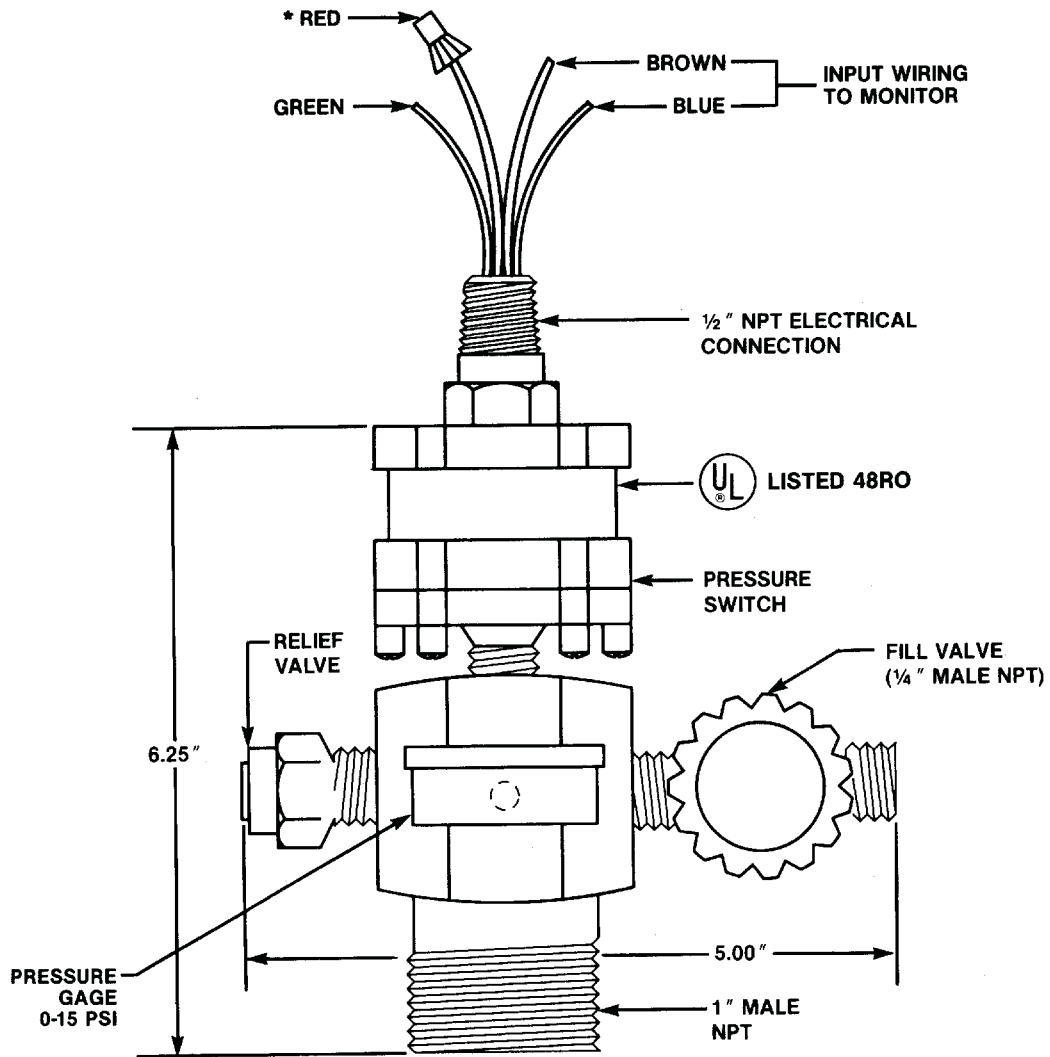


X76S LEAK DETECTION SECONDARY CONTAINMENT SYSTEM USING LS-3 LIQUID SENSORS		
	DRAWING NO. X76D36	REV. 1



Conduit	Number of Wires	Purpose
A	3	X76S power (hot, neutral, ground, 120 VAC)
B	2	Liquid sensor intrinsically safe circuit sensor (separate conduit must be used)
C	2	Isolated contact available for computer or interlock shutdown purposes

TRS-76S LEAK DETECTION SYSTEM BLOCK DIAGRAM		
	DRAWING NO. X76D125	REV. 4



INSTALLATION INSTRUCTIONS**

Install JT-2P Positive Pressure Leak Sensor on riser from four inch or six inch tank port. All other tank ports must be sealed with #150 class pipe fittings. Teflon paste type sealer is suggested for all threaded joints. Provide electrical conduit, two each eighteen AWG type wire to input terminals of X76S, X76VS, X76LV or X76LVC. Hook up to brown and blue wires (normally open position). Intrinsically safe wiring must be in dedicated conduit only. No 115 VAC or other wiring allowed in the same conduit. LED(s) or alarm points should be in alarm condition. Pressurize the tank via air compressed through JT-2 fill and relief valve manifold (provided with sensor) to 2.9 psig. At this time the alarm condition should clear and the system is now in service.

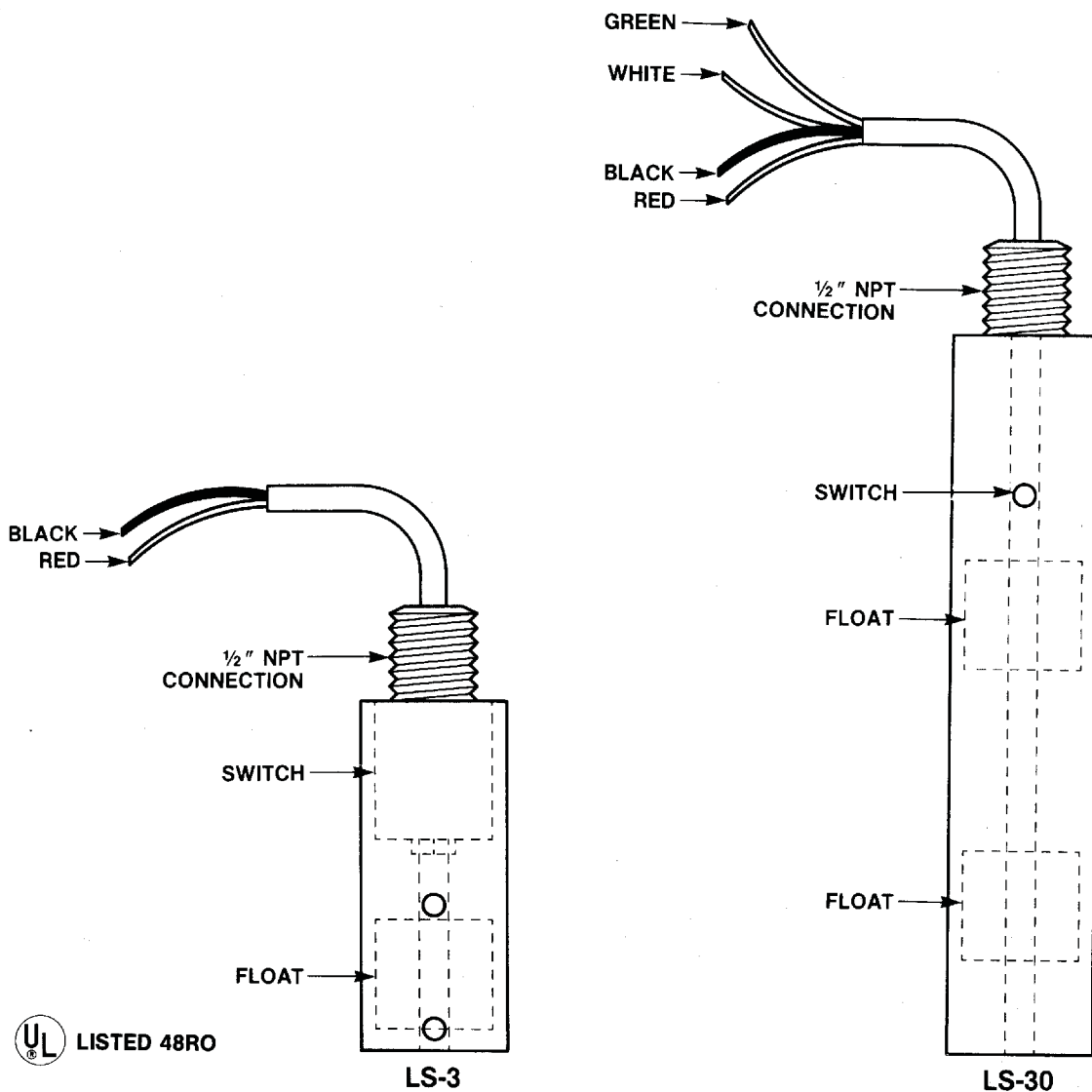
JT-2V follows same procedures as the positive sensor except use as a vacuum source to evacuate, to at least 5 inches mercury.

Note: When filling tank annulus with compressed air, the relief and fill manifold must be utilized. Never exceed 3 psig or warranty of tank may be void.

*Red wire N.C. signal must be capped off to prevent short circuit to ground.

**Consult tank manufacturer before installation of sensor. Some doublewall tanks cannot withstand any pressure conditions within the annular space.

POSITIVE PRESSURE TANK LEAK SENSOR ASSEMBLY MODEL JT-2		
	DRAWING NO. X76C34	REV. 4



INSTALLATION INSTRUCTIONS LS-3 (For Steel Double-Wall Tank)

Lower sensor on cable until it rests on bottom of tank annulus in vertical position. Pull remaining cable into junction box and cut off excess length. Secure cable to prevent slipping into tank annulus. Connect leads to wire from tank monitor terminal strip.

Other Applications

High level alarm for overflow tank and manhole's liner or secondary containment liquid level monitor.

INSTALLATION INSTRUCTIONS LS-30 (For Steel Double-Wall Tank)

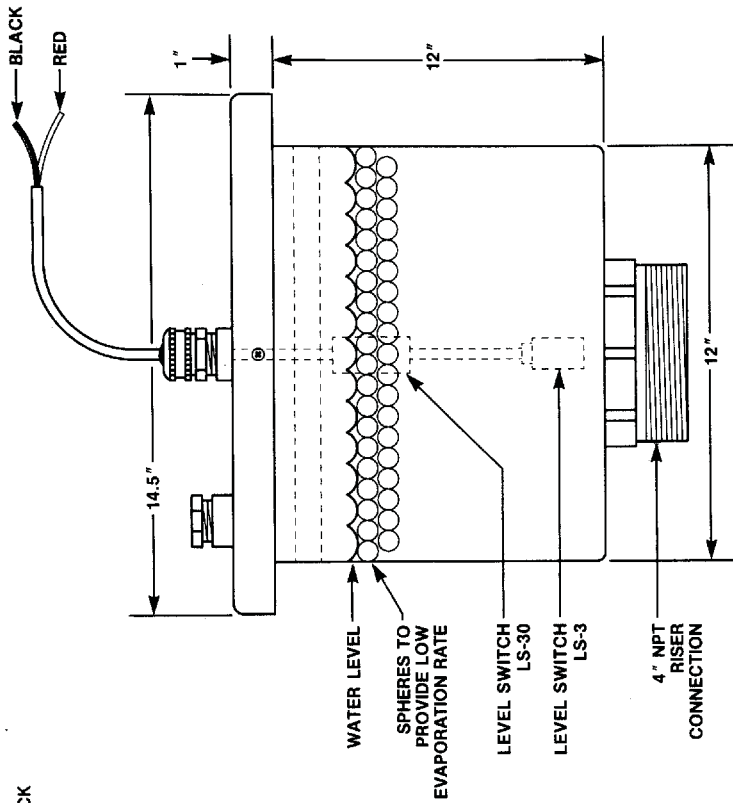
Lower sensor on cable until half of sensor is submerged in liquid. Pull remaining cable into junction box and cut off excess length. Secure cable to prevent slipping into tank annulus. Connect leads to wire from tank monitor terminal strip.

Other Applications

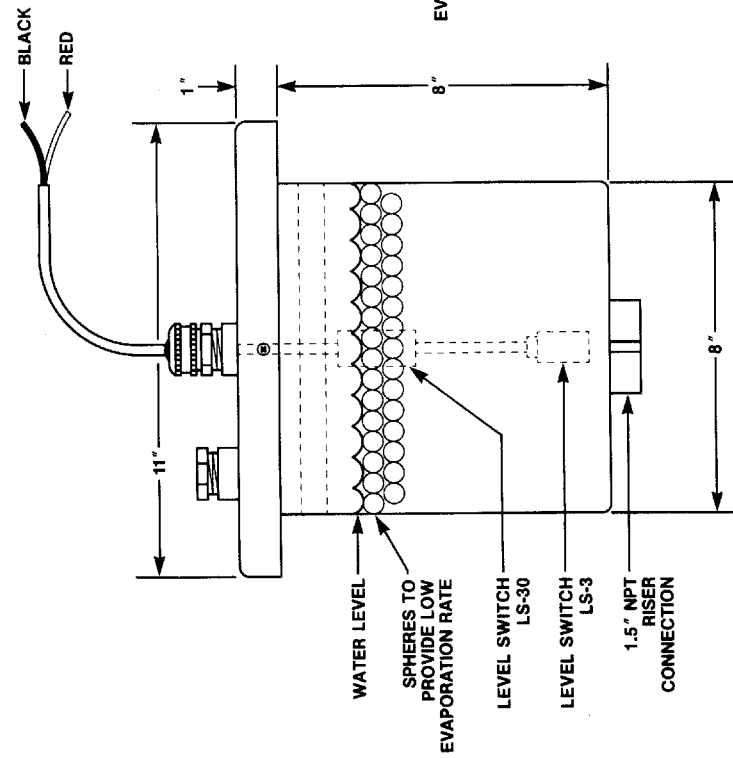
High/high, low/low or high/low level sensor.

Note: Bottom float red and black wire, top float white and green. For single alarm return white and black wires to panel, jump green and red. For dual alarm return four wires to panel.

TANK LEAK SENSORS MODELS LS-3 AND LS-30	RONAN	
	DRAWING NO. X76C227	REV. 3



LS-20




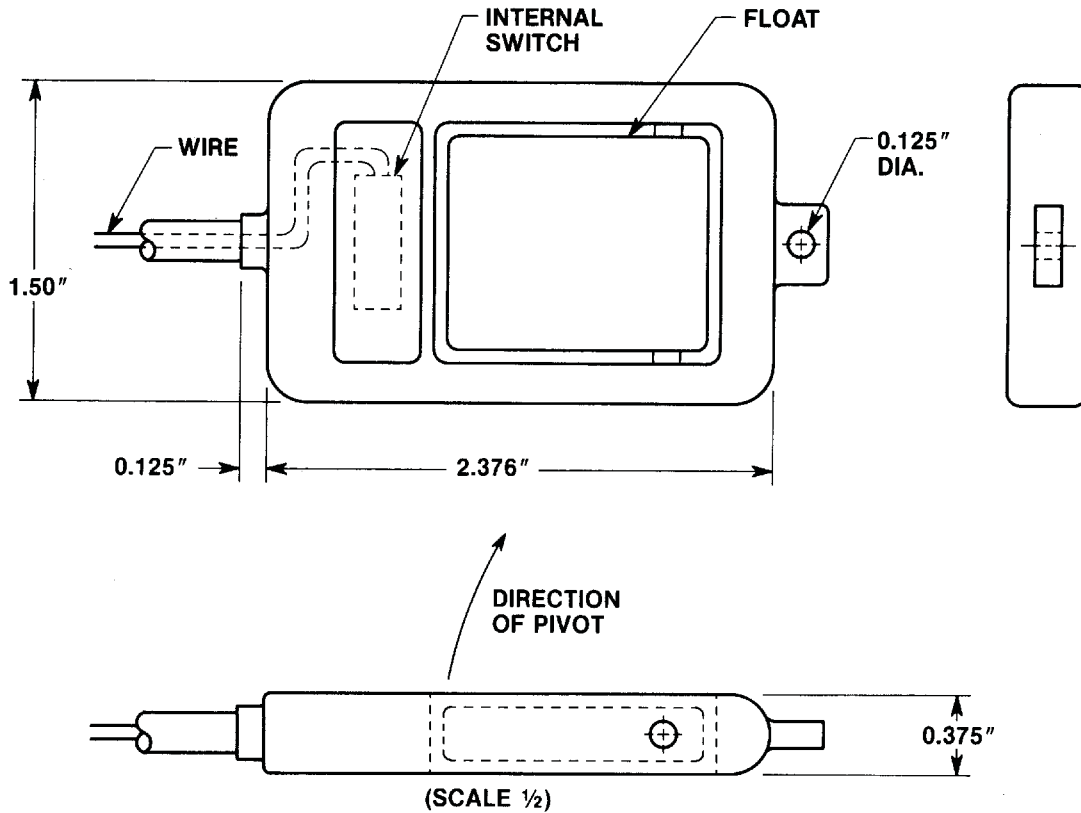
LS-10

 LISTED 48RO

INSTALLATION INSTRUCTIONS

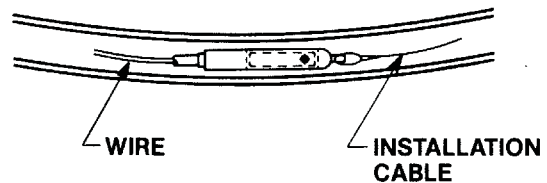
Mount reservoir on tank annulus riser, at least one foot above tank with maximum height not to exceed two feet. Install conduit to electrical connection. Connect leads to tank monitor wiring. Fill tank annulus and reservoir completely with water (refer to tank manufacturer's filling procedure).

HYDROSTATIC LEAK SENSOR MODEL LS-10 (2 GALLON) OR MODEL LS-20 (4 GALLON)		
DRAWING NO. X76C240	REV. 2	



**INSTALLATION INSTRUCTIONS
(For Fiberglass Tank)**

1. Insert fish tape through annular space.
2. Attach pull-string to LS-7.
3. Tag signal cable and pull-string each 18 feet from LS-7 (typical for 8 foot diameter tank).
4. Attach fish tape to pull-string.
5. Pull LS-7 through annulus.
6. Match tag mark on signal cable and pull-string.
7. LS-7 now positioned bottom centerline of tank.

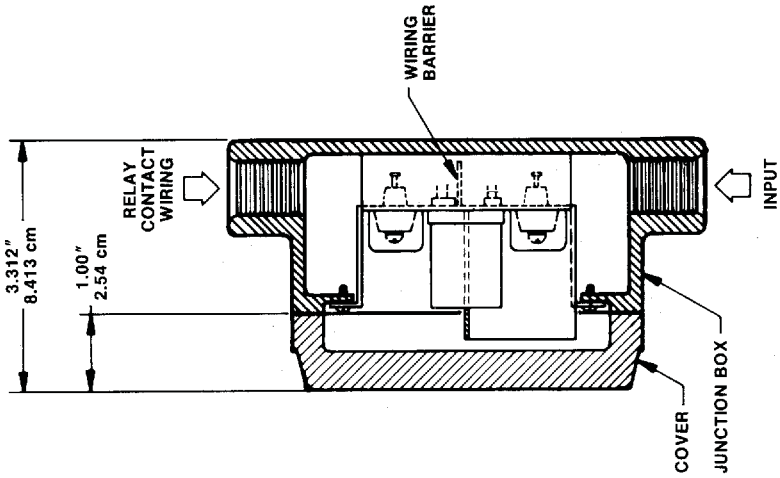


**TYPICAL INSTALLATION IN
DOUBLE-WALL TANK**



LISTED 48RO

TANK LEAK SENSOR MODEL LS-7		
	DRAWING NO. X76C241	REV. 0



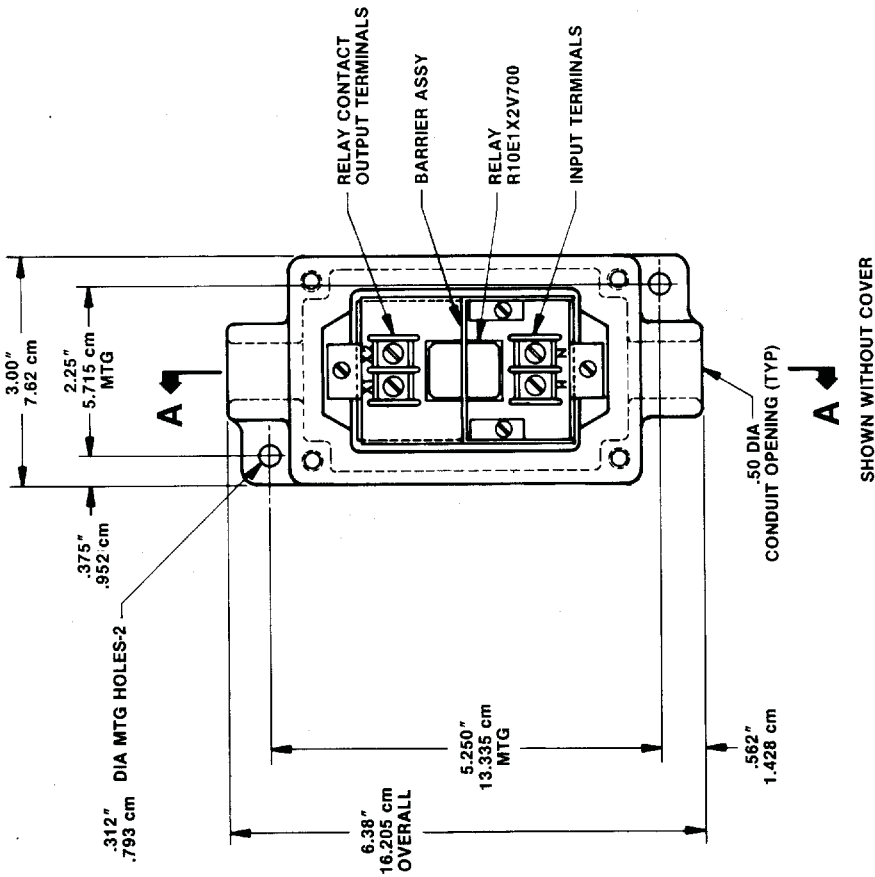
SECTION A-A



APPROVED

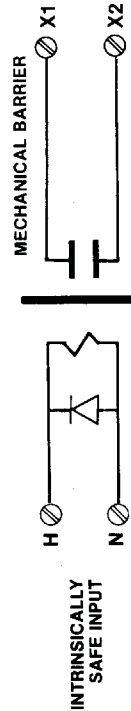


LISTED 48RO

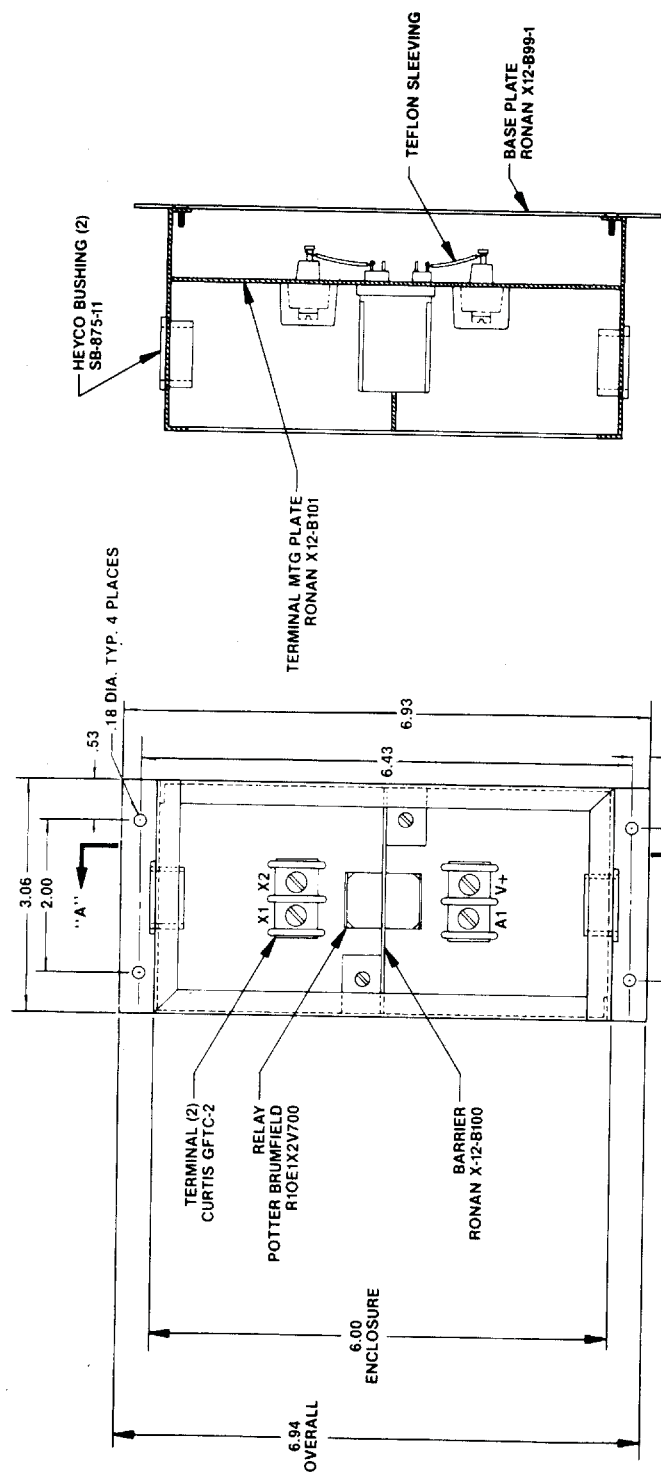


SHOWN WITHOUT COVER

WIRING DIAGRAM

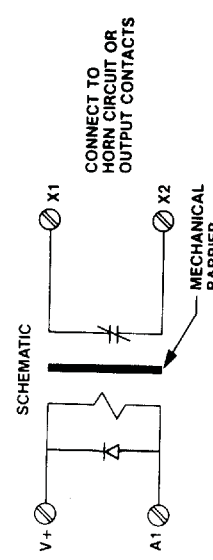
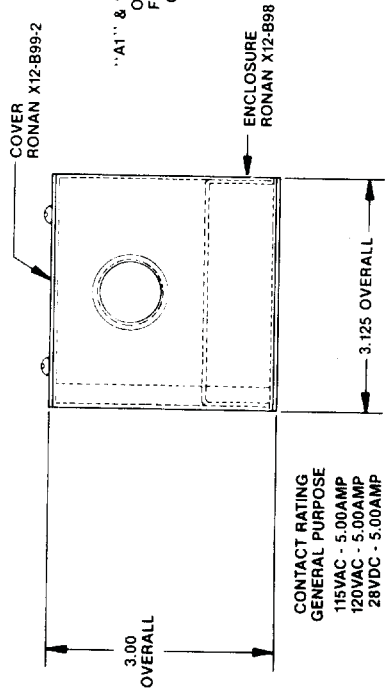


ASSEMBLY EXPLOSION PROOF INTRINSICALLY SAFE INTERFACE SWITCH		
	DRAWING NO. X53-1014-1	REV. 3



TOP VIEW-LESS COVER

VIEW "A"-"A"



KV700-24VDC
 HORN RELAY WIRING INSTRUCTIONS
 Wiring from each terminal block shall be run through adjacent conduit openings. In no cases shall wiring be allowed to cross the center barrier.

NOTE: From system powered by Intrinsicly Safe Power Supply.

UL LISTED 48RO
 FM APPROVED

INTRINSICALLY SAFE HORN RELAY ENCLOSURE MODEL KV-700-24		RONAN	
		DRAWING NO. SS2109	REV. 1

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