



Warrick® Series DMS-470/570 Monitoring Panels Installation and Operation Bulletin

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Installation: Intrinsically Safe Sensing Circuits

This bulletin should be used by experienced personnel as a guide to the installation of the Series DMS-470/570 alarm panels. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact Warrick or its local representative if further information is required.

Important

Before proceeding to install and wire the control panel, read and thoroughly understand these instructions.

When the Series DMS 470/570 Monitoring Panel is installed according to these instructions, the panel will provide intrinsically safe sensing circuits for interface into Class I, II, Division 1, Groups C, D, E, F and G hazardous locations. Electrical equipment connected to Series DMS 470/570 Monitoring Panel should not exceed maximum ratings marked on product.

Mounting Location

The control must be situated in a non-hazardous area where an explosive atmosphere will not exist at any time.

Wiring: General Information

1. Intrinsically safe wiring must be kept separate from non-intrinsically safe wiring.
2. Intrinsically safe and non-intrinsically safe wiring may occupy the same enclosure or raceway if they are at least 2 inches (50mm) apart and separately tied down. Inside panels, field wiring terminals for intrinsically safe circuits must be separated by at least 2 inches (50 mm) from non-intrinsically safe terminals.
3. For sensor wiring, use #14 or #16 AWG type MTW or THHN wire. By using these wire types in conjunction with the following distance recommendations, you will not exceed the maximum capacitance for field wiring. Use **Table 1** as a guide for maximum wire runs.

Table 1

Model No.	Number of Sensor Wires	Distance Per Channel
DMS470/570	All 2 Wire Sensors	900 Feet
DMS470/570	All 3 Wire Sensors	450 Feet

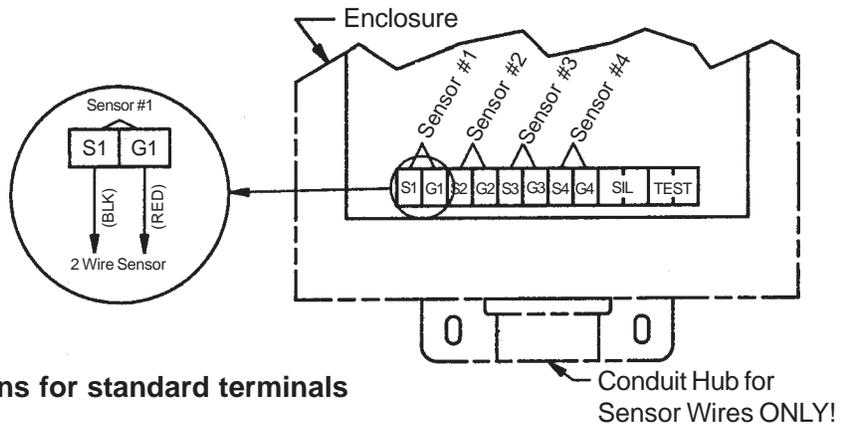
4. Intrinsically safe terminals can be connected to any non-energy generating or storing switch device such as a pushbutton, limit or float type switch or any Warrick electrode and fitting assembly.
5. All junction boxes and field wire terminations should be waterproof. Refer to appropriate sensor instructions for details on how to install sensors.
6. An approved seal should be used at the point where the intrinsically safe control circuit wiring enters the hazardous area.
7. For additional guidance on "Hazardous Location Installation" and "Intrinsically Safe Devices", consult ANSI/ISA standard RP 12-6 or NEC articles 500-516.

Sensor Wiring

Sensors: Wire the sensor devices to the Series DMS 470/570 Monitoring Panel as shown in figure 3-1 to 3-4. **(A separate rigid metallic conduit must be used to enclose the conductors of the intrinsically safe sensor circuit. A conduit hub is provided on the bottom side of the enclosure for intrinsically safe wiring.)**

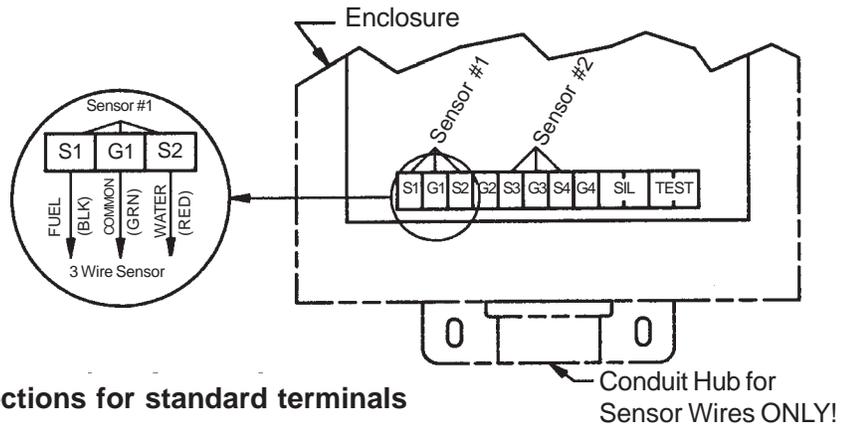
Installation: Intrinsically Safe Sensing Circuits

Figure 3-1



Two (2) wire sensor connections for standard terminals

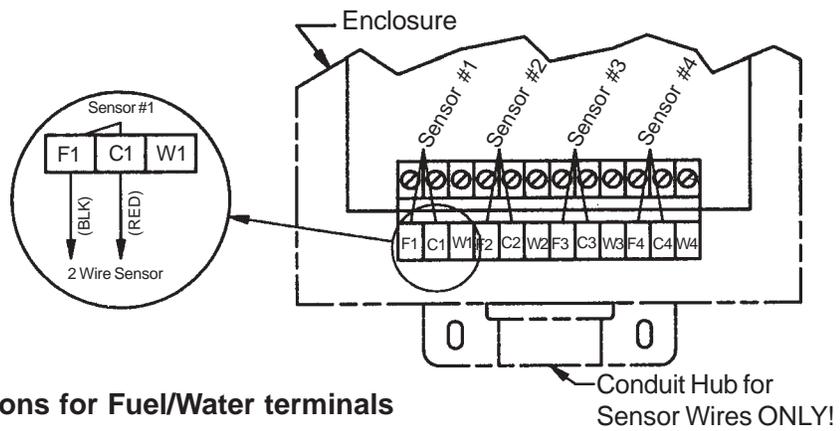
Figure 3-2



Three (3) wire sensor connections for standard terminals

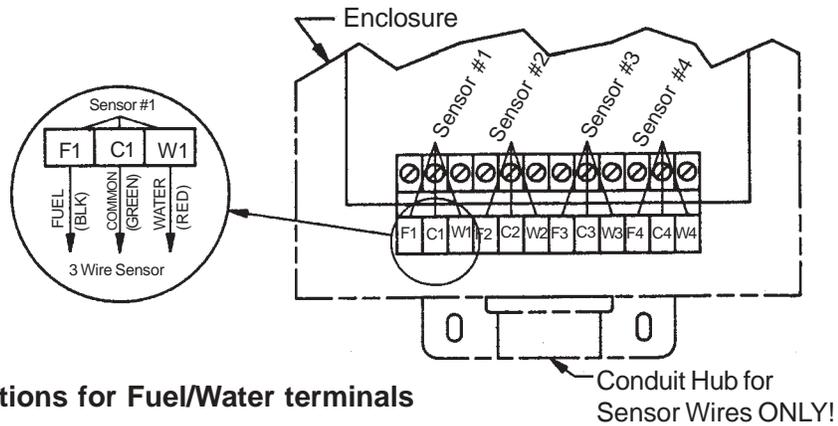
For those models using the optional “check” push buttons, wire sensors per Figures 3-3 and 3-4.

Figure 3-3



Two (2) wire sensor connections for Fuel/Water terminals

Figure 3-4



Three (3) wire sensor connections for Fuel/Water terminals

Operation Instructions

Control Panel Settings

Before putting system into operation, DIP switches and potentiometers (set point) must be set to correctly match the type of sensor you are using. (Ref to Table 4-1). The DIP switches and potentiometers are located above the sensor terminal strip. (Figure 4-1)

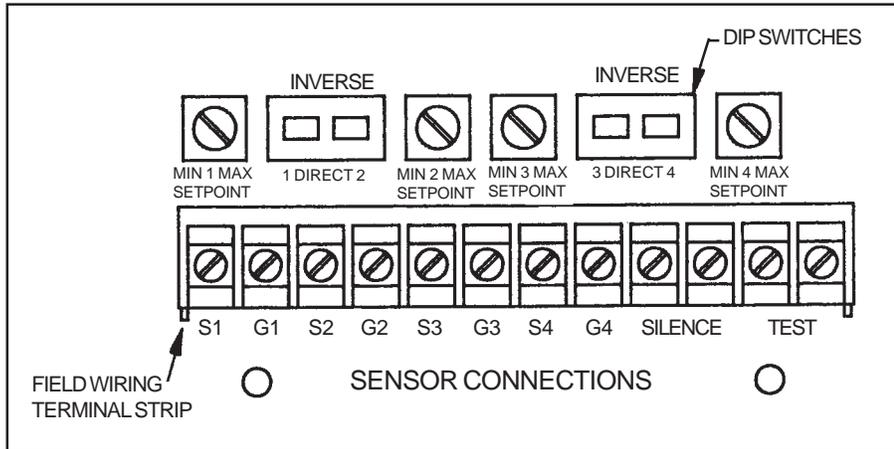


Figure 4-1

Setting the DIP Switches

Table 4-1 describes applications vs. DIP switch settings. Each channel will have its own setting corresponding to the type of sensor being used.

Table 4-1

APPLICATION	WARRICK SENSOR	ACTIVATION CONDITION	DIP SWITCH SETTING	SET POINT ADJUSTMENT
Double Wall Fiberglass Fuel Sensing	DFP-25	Closes on Detecting Fuel	Inverse ("ON")	NA
Double Wall Fiberglass Water Sensing	DWP-25	Closes on Detecting Water	Inverse ("ON")	NA
Double Wall Steel Hydrocarbon/Water Sensing	DSP-2	Closes on Detecting Hydrocarbon or Water	Inverse ("ON")	NA
Double Wall Steel Liquid Sensing	DLP-2	Closes on Detecting Liquid	Inverse ("ON")	NA
Product Level Alarm (Normally Closed Float)	LS-700/800	Opens on Rising Level	Direct ("OFF")	See Instructions on set point setting
Product Level Alarm (Normally Open Float)	LS-700/800	Closes on Rising Level	Inverse ("ON")	NA
Monitoring Well (Hydrocarbon Vapor) Detector	SVP-2	Resistance Increases on Detecting Vapors	Direct ("OFF")	See Instructions on set point setting
Unused Channel	None	NA	Inverse ("ON")	NA
Unknown	Unknown Normally Open Switch	Closed on Fault	Inverse ("ON")	NA
Unknown	Unknown Normally Closed Switch	Open on Fault	Direct ("OFF")	Consult Factory

Operation Instructions

Adjusting the Set Point Potentiometer

DIP Switch Set In Inverse (ON) Mode: When using a channel in Inverse(ON), there is no need to adjust the potentiometer. The channel is automatically set to the maximum sensitivity.

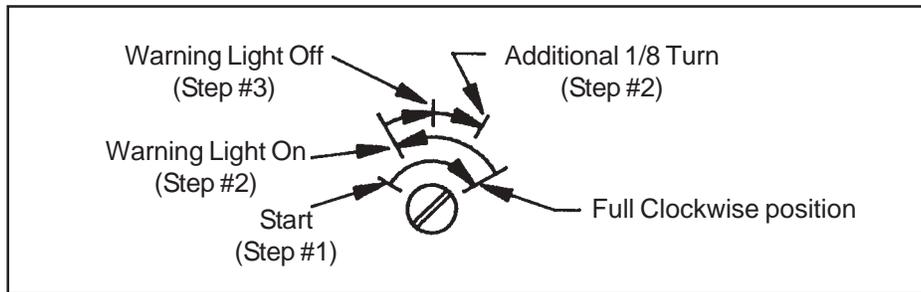
DIP Switch Set In Direct (OFF) Mode: Turn the potentiometer clockwise until it reaches the end of its rotation. *Do not force the rotation.* When the potentiometer is adjusted to this position, it is set to the maximum sensitivity. **When using SVP-2 Vapor Sensors, it may be necessary to reduce this sensitivity. Continue with the following instructions.**

The Following Adjustment Applies only to those channels using an SVP-2 Vapor Sensor.

This adjustment will allow the alarm point to be set at a level just higher than the existing background contamination, thus only indicating a potential new leak or spill condition.

CAUTION: As the Vapor sensor reacts over time (Months) to background (Existing) contamination, a false alarm may occur. If this occurs, repeat the adjustment procedure.

1. With all appropriate potentiometers set to full clockwise position, apply power to the panel and observe the state of the indicator lights. Silence the audible alarm if necessary.
2. Upon power-up, no warning lights (audible alarm) should be on. If the warning lights are lit, proceed to step 3. Starting with the first channel using a vapor sensor, turn the potentiometer counter-clockwise until the warning light turns on. (silence the audible alarm) Turn the potentiometer clockwise until the alarm light turn off. Turn the potentiometer an additional 1/8 turn. Repeat this procedure for the remaining channels using vapor sensors.
3. If an alarm light remains lit, determine which channel is activated. Check the position of the DIP switch for the sensor being used on that channel. Check the sensor wiring. Check for a true fault condition. Refer to troubleshooting guide for further details.



Supply Power

A weatherproof conduit hub is provided on the top of the enclosure for supply power wiring. Connect the incoming supply HOT lead to the L 1 terminal, NEUTRAL lead to the L2 terminal and EARTH GROUND lead to the "G" Terminal.

Grounding

Terminal "G" on the supply line/load side terminal strip is a redundant system ground terminal and must be connected to the earth ground buss of the panel's AC supply line feeder.

Remote Alarm Contact

A set of SPDT dry contacts activates on fault when any one of the four (4) channels alarms. Using the conduit hub on the top of enclosure, wire contacts to remote alarm or indicator, if applicable (terminals 7,8 and 9). For low voltage circuits, wiring should not be run in the same conduit as high voltage circuits. Conduit should be teed immediately after leaving enclosure.

Optional Auxiliary Contact Board

A SPDT auxiliary set of contacts are available for interfacing to remote alarms, computers, tank gauging systems, etc. One set of contacts per channel are provided. Wire through conduit hub on top of the enclosure. (See Figure 9-1)

Technical Information

Ordering Information

General

One set of auxiliary contacts is standard with every (4) four channels supplied. A common test button is included as standard for every (4) four channels supplied. The Fuel/Water check buttons listed below are used to distinguish water or hydrocarbon when three 1 wire sensors are used.

DMS-47X-X-X-X
DMS-57X-X-X-X

NO. OF CHANNELS		FUEL / WATER CHECK PUSH BUTTONS		AUXILIARY CONTACTS		ENCLOSURE	
1	1 CHANNEL	A	NO CHECK BUTTONS	1	NO AUX. CTS.	-	NEMA 3R
2	2 CHANNELS	B	CHECK BUTTONS 1-4	2	AUX. CTS. 1-4	N4	NEMA 4
3	3 CHANNELS	C	CHECK BUTTONS 1-8	3	AUX. CTS. 1-8	N4XFG	NEMA 4X FIBERGLASS
4	4 CHANNELS	D	CHECK BUTTONS 1-12	4	AUX. CTS. 1-12		
8	8 CHANNELS	F	CHECK BUTTONS 1	6	AUX. CTS. 1		
12	12 CHANNELS	G	CHECK BUTTONS 1-2	7	AUX. CTS. 1-2		
		H	CHECK BUTTONS 1-3	8	AUX. CTS. 1-3		

Specifications

Primary AC Supply Line: 120 VAC (plus) + 10%, (minus) -15%, 50/60 Hz.

Probe Voltage: Nominal 12 VAC @ 6ma RMS

Sensitivity Range: 0 -50,000 Ohms maximum specific resistance

Temperature: (minus) -400 to (plus) +150° F

Remote Alarm Contact: (Terminals 7 N.C., 8 com & 9 N.O.)

Contact Design: SPDT (1 form C): one normally open (N.O.) and one normally closed.

Contact Ratings: 120 VAC or 30 VDC, 5A 1/10 H.P.

Contact Life: Electrical @ rated load = 100,000 cycles minimum. Mechanical = 10 million cycles minimum.

Electronics Module: Solid state components epoxy encapsulated in a black nylon shell

Module Terminals:

Screw Terminal Torque Rating: 5 -6 Inch/ Pounds

Field Wiring: Removable terminal strip, containing a size 4 (four) pan head screw with a clamping plate. Will accept up to one #14 AWG wires per terminal.

Factory Wiring: Removable terminal strip will accept up to one #14 AWG wires per terminal.

Optional Auxiliary Board:

Auxiliary Contacts: One relay contact per channel.

Contact Design: SPDT (1 form C): one normally open (N.O.) and one normally closed (N.C)

Contact Ratings: 120 VAC or 30 VDC, 10A 1/3 H.P.

Contact Life: Electrical @ rated load = 100,000 cycles minimum. Mechanical = 10 million cycles minimum.

Auxiliary Board Terminals:

Field Wiring: Removable terminal strip will accept up to one #14 AWG wire per terminal.

Auxiliary Board Connection: Eight (8) pin wire harness connector.

Optional "Check" Pushbutton Board:

Terminals: Size four (4) pan head screw with a clamping plate, will accept up to one #14 AWG wire per terminal. "Check" pushbutton board and module strip should be removed as an assembly from electronic module.

Technical Information

Module Replacement

If the electronic module needs to be replaced:

1. Turn off power to the control panel.
2. Remove the metal barrier located across the center of module.
3. Remove all field wiring terminal blocks from the electronic module. The field wires do not need to be removed from the terminal blocks to do this. The terminal blocks separate at midpoint on the vertical as shown in Figure 7-1.

Module Replacement Diagram

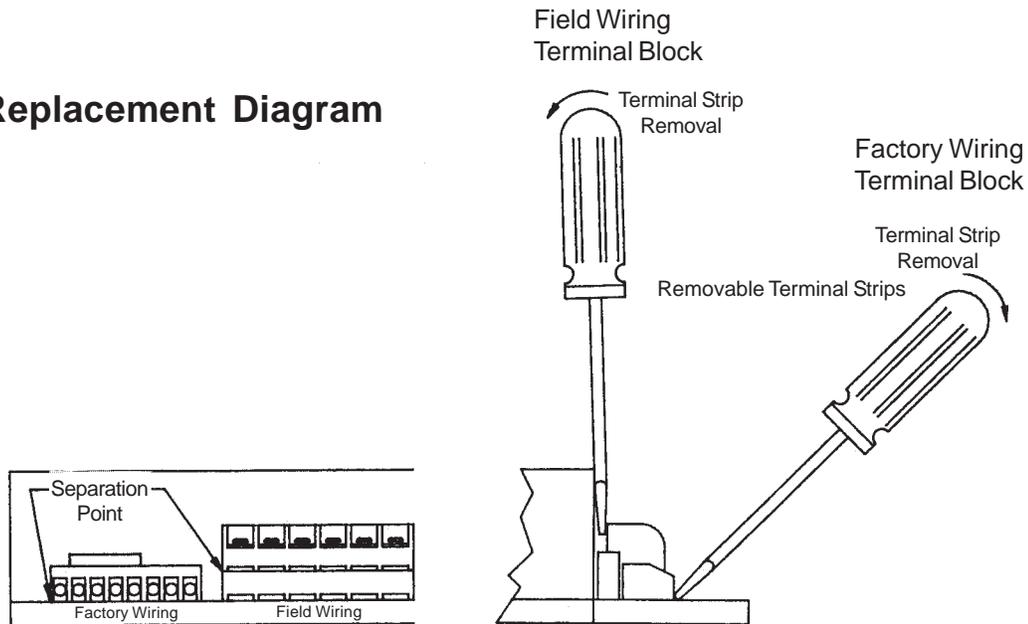


Figure 7-1

4. Remove the factory wiring terminal blocks from the electronic module. The factory wiring does not have to be removed to do this. The terminal blocks separate from the module at the board surface as shown in Figure 7-1.
5. Remove the four (4) machine screws from the base of the electronic module. The module can now be removed from the control panel.
6. Replacement Module: 47D1 BXXX
7. Install a new module and reinstall all of the terminal blocks. Make sure that all factory and field wiring is in place.
8. Reinstall the metal barrier across the center of the module.
9. Set all DIP switches and potentiometers according to previous instructions.

Operation Instructions

Panel Operation:

With sensors wired to control panel and power applied, the normal light (yellow) should be lit. Individual warning lights (amber) are provided for each channel. If a sensor detects a fault condition, the normal light will de-energize. The appropriate warning light will then energize and the audible alarm will sound. To silence the alarm, push the SILENCE pushbutton. The WARNING light will remain lit until the fault condition is cleared. If a second fault occurs before the first fault is cleared, the appropriate WARNING light will energize and the alarm will sound. Each successive fault will cause the alarm to sound.

A TEST button is supplied to test the circuitry in the panel. To perform a test, push the TEST pushbutton and hold. The NORMAL light will go off. All WARNING lights in that bank will light and the alarm will sound. Releasing the TEST pushbutton will return the system to a normal condition.

All panels contain a master fault contact, which will activate if any one of the channels sees a fault condition. This can be used to trigger a remote alarm or cash register. The master fault contact will reset when the SILENCE pushbutton is pressed.

If optional auxiliary contacts are used, a SPDT dry contact is provided for each channel. To reset these contacts, the fault condition must be cleared.

Fuel/ Water Pushbutton Operation:

If the audible alarm is energized, it can be silenced by momentarily depressing the SILENCE pushbutton. However, to determine if this is a FUEL or WATER leak, continue with the following instructions.

1. **WATER PUSHBUTTON:** (When audible alarm is already silenced.) Momentarily depress the WATER pushbutton. If, after release of the button the audible alarm energizes, this indicates a water leak. The audible alarm can be silenced again by depressing the SILENCE pushbutton. If pushing the fuel button has no effect, continue to step 2.
2. **FUEL PUSHBUTTON:** (When audible is already silenced.) Momentarily depress the fuel pushbutton. If after release of the button the audible alarm energizes, this indicates a fuel leak. The audible alarm can be silenced again by depressing the SILENCE pushbutton.

Troubleshooting Guide:

A test button is used on all models to test the control panel. If the system is powered up and there are no fault conditions, the normal contact should be lit. The warning lights and alarm should be de-energized. On pushing the test button, the normal lights go off, all warning lights in that bank should light up and the alarm should sound. Push the silence pushbutton to de-energize the alarm. Releasing the test pushbutton should return the system to a normal condition.

If a WARNING light has been activated and a true fault condition is not found:

1. Recheck position of DIP switch (Figure 4-1, Table 4-1). If correct continue.
2. If the DIP switch is in the Inverse Mode (“ON”) position, removing the sensor wiring at the terminal block should deactivate the alarm. Shorting the terminal points should activate the alarm. If this does not happen, replace the electronic module.
3. If the DIP switch is in the Direct Mode (“OFF”) position, removing the sensor wiring at the terminal block should activate the alarm. Shorting the terminal points should de-activate the alarm. If this does not happen, replace the electronic module.
4. If the above tests show the operation of the module is correct and the alarm condition persists, repeat steps 2 and 3 for all field terminal locations. This should isolate the problem to the appropriate area (field wiring, sensor). Replace or repair appropriate equipment.

Sample Wiring Diagram

DMS-474-A-2/DMS-574-A-2

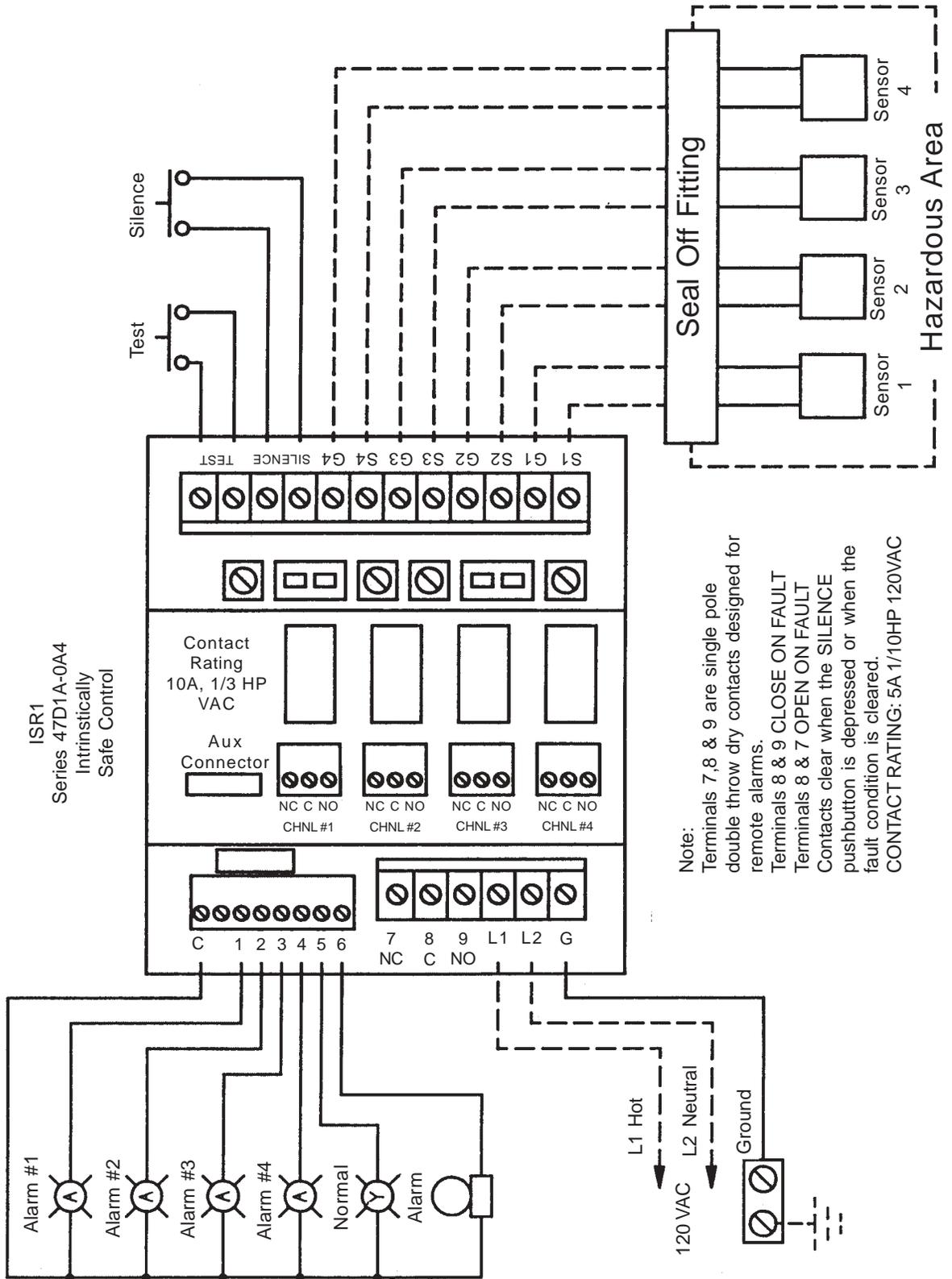


Figure 9-1

Sample Wiring Diagram

DMS-478-A-1 / DMS-578-A-1

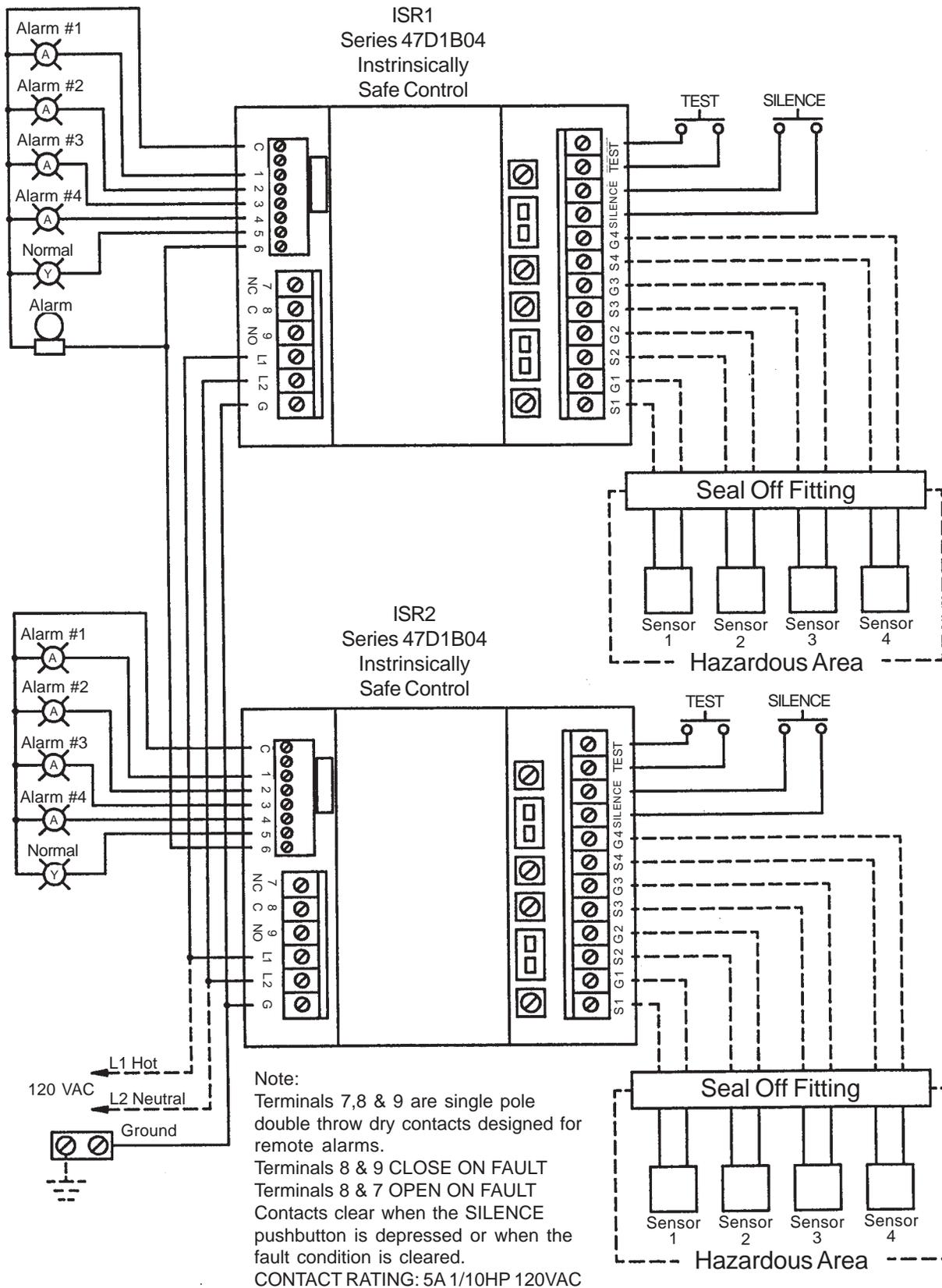


Figure 10-1

Panel Dimensions

DMS-474-A

NEMA 3R
10 X 8 X 6 ENCLOSURE

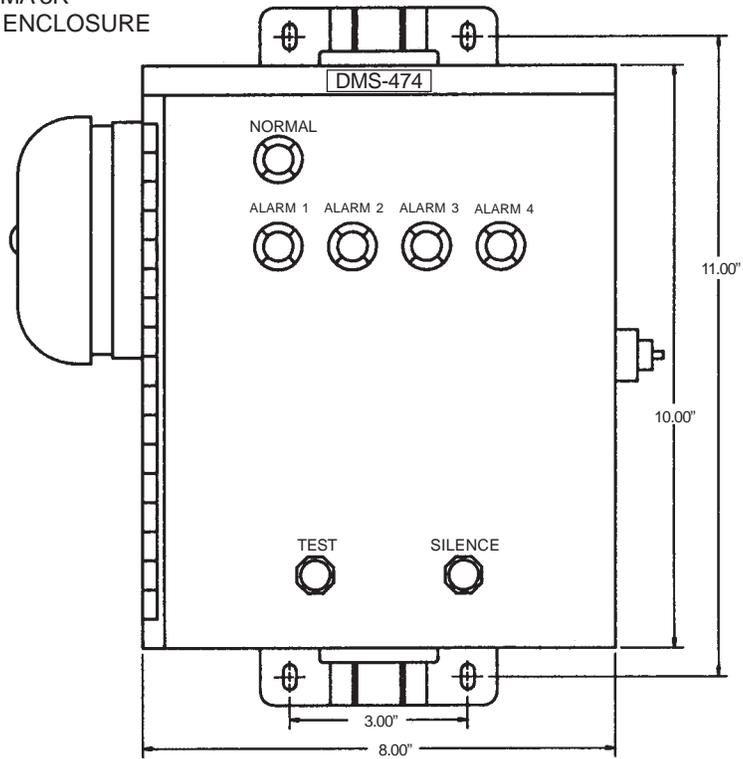


Figure 11-1

DMS-478-A

NEMA 3R
12 X 12 X 6 ENCLOSURE

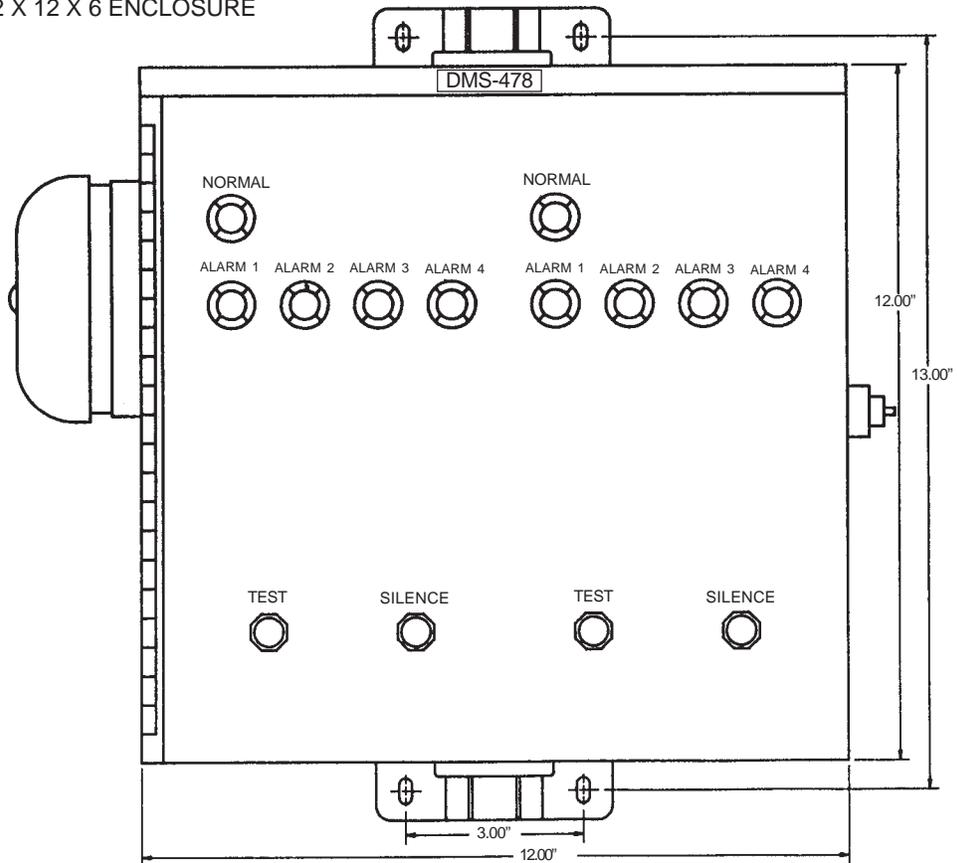


Figure 11-2

Panel Dimensions

DMS-574-A

NEMA 3R
10 X 8 X 6 ENCLOSURE

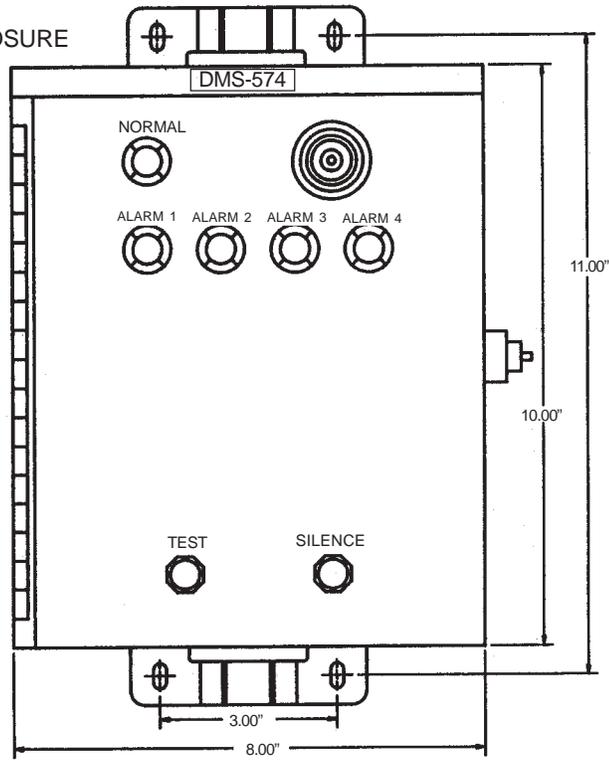


Figure 12-1

DMS-578-A

NEMA 3R
12 X 12 X 6 ENCLOSURE

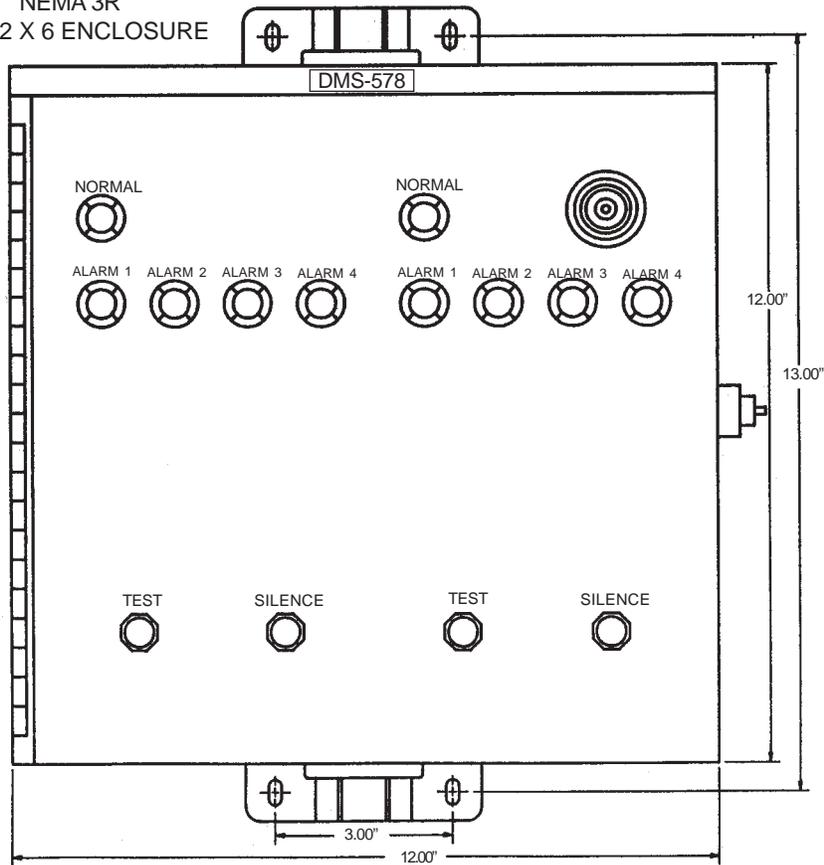


Figure 12-2



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