
Instruction Manual



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Instrument Model Number _____

Instrument Serial Number _____

CONDUCTIVITY BASED POINT LEVEL SYSTEM

Section I - General Operation

- The typical Anderson conductance probe-type liquid level system consists of two major components - the switching module and a sanitary probe having one or more electrodes (switch points). Switching modules are connected to the probes via water-tight plug. The module provides Form-C relay contacts for switching or alarming, and may be ordered with Single Pole / Double Throw (SPDT) or Double Pole / Double Throw (DPDT) contacts. Modules are designed for single point level or differential operation, and are available in fixed or field adjustable sensitivity. A NEMA 4 enclosure may be specified for mounting the switching module local to the probe. The fixed length electrodes are installed vertically with their lower ends positioned at the levels which the switch is to be actuated. Electrodes are 1/4" type 316 stainless steel, and may be optionally specified with Teflon coating for all but the exposed tip. Various probe fittings are available to match your existing process connection.
- The system works on the principal of signal conductance through a given product medium. Either a dedicated probe, or a tank ground connection is used to provide the reference point. Desired switch points are simply specified by the length of the actual electrodes. As an example of typical operation, when there is either no product, or product touching only the reference point, the switch module remains in it's steady state (energized or de-energized depending on type of module ordered). When product is introduced into the vessel, depending on various modules specified, an action will occur when "conductance" is achieved from the module, through the reference point, product medium, specific switch point electrode, and back to the module.
- It is recommended that prior to installation and start-up, Section II - Features and Specifications, be used as a reference to become familiar with the version of Module and Probe that is being utilized. As there are many options available, determining the exact specifications of the model supplied will allow for easier installation and start-up.
- Section III - Installation and Start-up, will illustrate the final hookup of the system using sample diagrams and detailed wiring instructions.

Section II - Features and Specifications

- As there are many versions of the Anderson "Point Level" components available, this detailed section has been provided so that easy identification may be made prior to installation and startup. To identify the parameters of a specific module, you must first obtain the modules Marix Code Number. This data is located on the sticker directly affixed to the module.

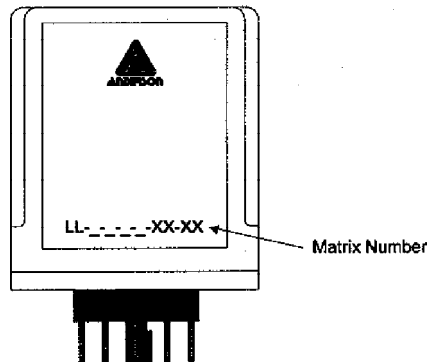
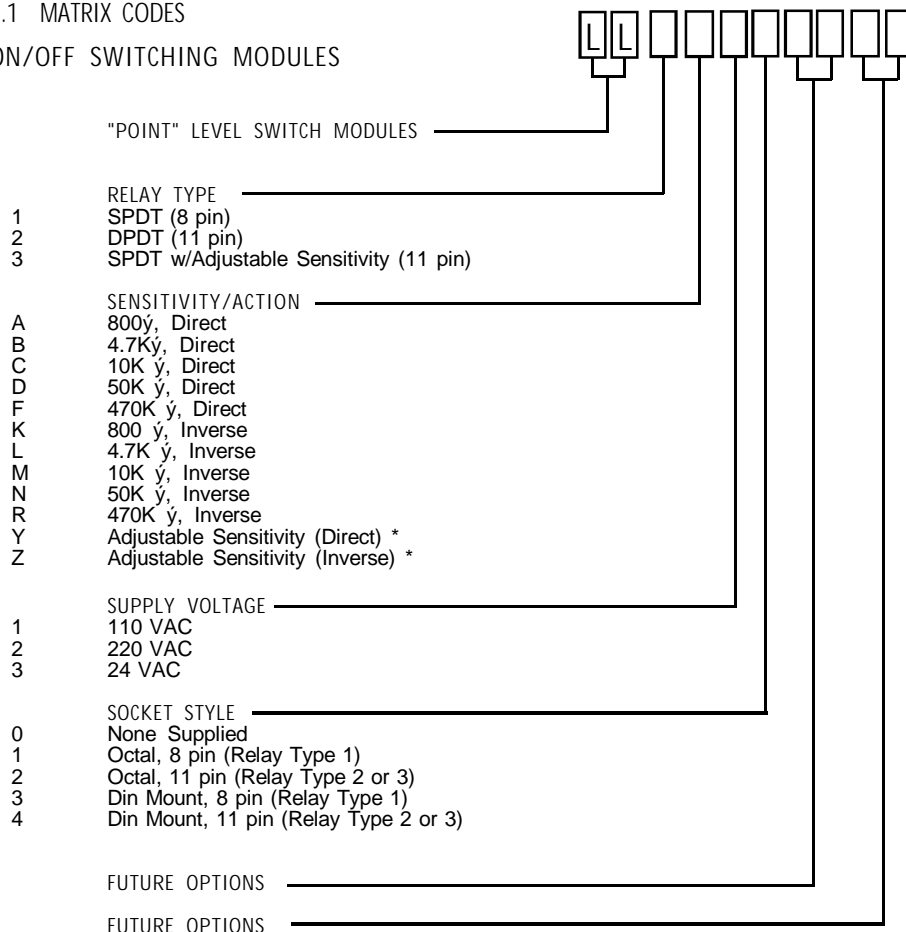


Figure 1 - Matrix Location

- As no Matrix Numbers are present on the Level Jack assembly or the Probe assembly, a visual identification may be performed using the detailed information provided in this section.

2.1 MATRIX CODES

ON/OFF SWITCHING MODULES



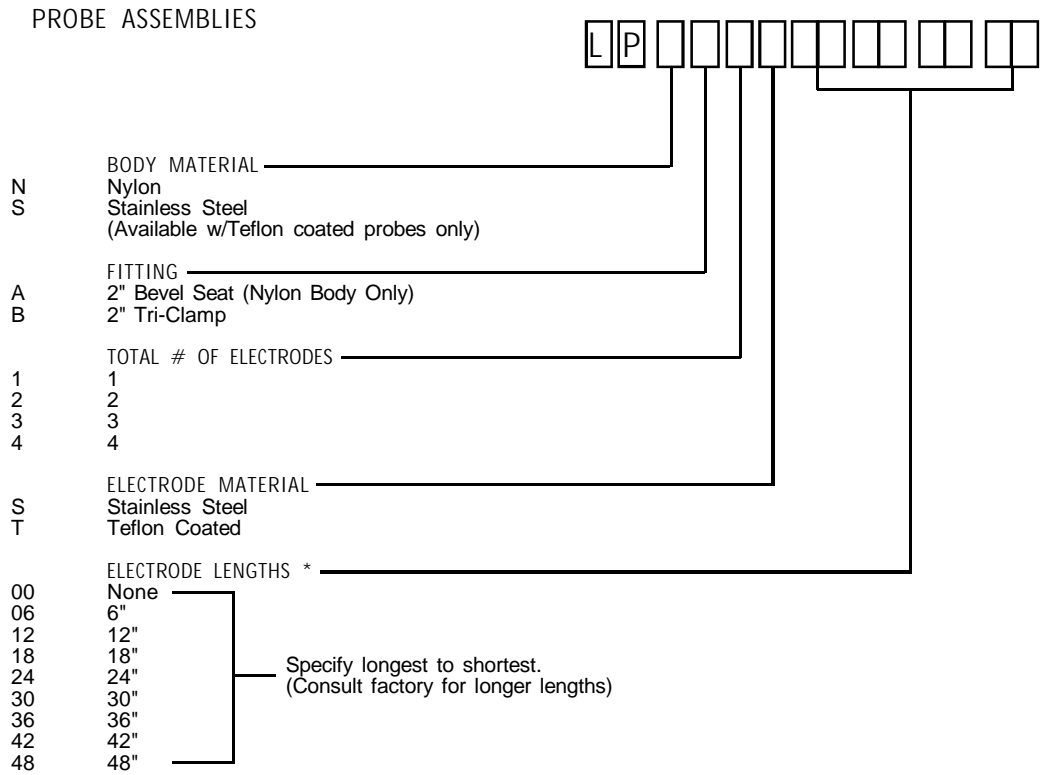
Accessories:

NEMA 4 Enclosure (includes mounting plate)	PN 73220-A1
Spring Clip for Module	PN 44930-A1
Adjustable Sensitivity Board (Relay Type 3, Socket Style 2 only)	PN 56014-R0070

Note: Some multiple probe applications may require more than one Relay Module. Contact the Anderson Technical Service Department for additional assistance.

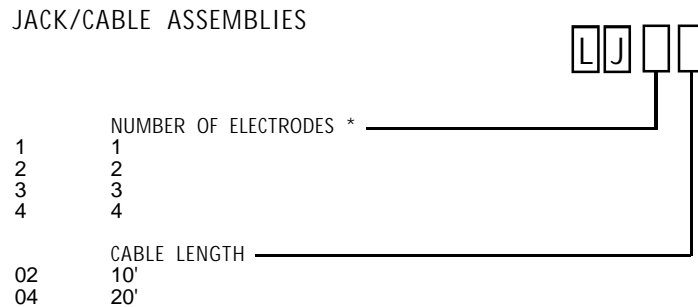
* Unit supplied as 4.7K, adjustable sensitivity by customer supplied resistors, or p/n 56014-R0070, adjustable sensitivity board (provides 5K to 700K Ω sensitivity adjustment).

Figure 2 - Module Matrix



* If a "reference" electrode is required, specify length to equal the longest "point" electrode.

Figure 3 - Probe Matrix



* Note: Be sure to count total number, including reference electrode, if required.

Figure 4 - Jack Matrix

2.2 MODULE SPECIFICATIONS

	Relay Type 1 (As specified in matrix)	Relay Type 2 (As specified in matrix)	Relay Type 3 (As specified in matrix)
Control Design	Solid state components enclosed in clear Lexan plug-in style housing. Housing carries no NEMA rating.	Solid state components enclosed in clear Lexan plug-in style housing. Housing carries no NEMA rating.	Solid state components enclosed in clear Lexan plug-in style housing. Housing carries no NEMA rating.
Contact Design	SPDT (1 form C): one normally open (N.O.) and one normally closed (N.C.) non-powered contacts.	DPDT (2 form C): two normally open (N.O.) and two normally closed (N.C.) non-powered contacts.	SPDT (1 form C): one normally open (N.O.) and one normally closed (N.C.) non-powered contacts.
Contact Ratings	10A @ 120, 240 VAC resistive, 1/3 H.P. @ 120, 240 VAC.	5A @ 120, 240 VAC resistive, 1/10 H.P. @ 120, 240 VAC.	10A @ 120, 240 VAC resistive, 1/3 H.P. @ 120, 240 VAC.
Contact Life	Mechanical - 5 million operations. Electrical - 100,000 operations minimum at rated load.	Mechanical - 5 million operations. Electrical - 100,000 operations minimum at rated load.	Mechanical - 5 million operations. Electrical - 100,000 operations minimum at rated load.
Supply Voltage	24, 120 or 240 VAC models, plus 10%, minus 15%, 50/60 Hz.	24, 120 or 240 VAC models, plus 10%, minus 15%, 50/60 Hz.	24, 120 or 240 VAC models, plus 10%, minus 15%, 50/60 Hz.
Supply Current	120, 240, 24 VAC, Relay energized 4.4 VA.	120, 240, 24 VAC, Relay energized 4.4 VA.	120, 240, 24 VAC, Relay energized 4.4 VA.
Secondary Circuit	12 VAC RMS voltage on probes, 1.5 milliamp current.	12 VAC RMS voltage on probes, 1.5 milliamp current.	12 VAC RMS voltage on probes, 1.5 milliamp current.
Sensitivity	Models operate from 0-1,000,000 ohm maximum specific resistance.	Models operate from 0-1,000,000 ohm maximum specific resistance.	Models operate from 0-1,000,000 ohm maximum specific resistance. Field adjustable via shunt resistor.
Temperature	-40° to 150° F, ambient.	-40° to 150° F, ambient.	-40° to 150° F, ambient.
Terminals	All connections #6-32 screw type terminals with pressure clamps.	All connections #6-32 screw type terminals with pressure clamps.	All connections #6-32 screw type terminals with pressure clamps.
Time Delays	Standard, .5 seconds on rising level.	Standard, .5 seconds on rising level.	Standard, .5 seconds on rising level.
Listing	U.L. listed, Industrial Motor Control (508).	U.L. listed, Industrial Motor Control (508).	U.L. listed, Industrial Motor Control (508).

2.3 DIMENSIONS

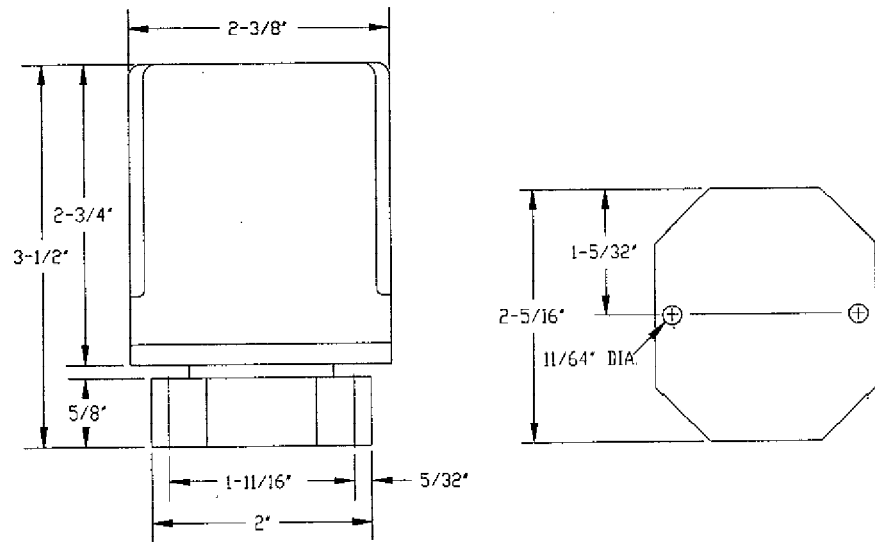


Figure 5 - 8 Pin Octal Socket Dimension

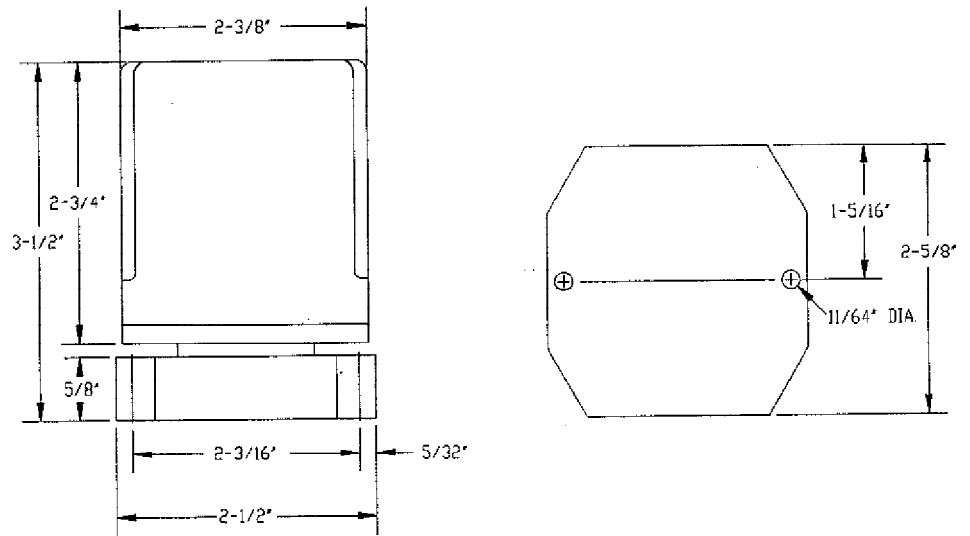


Figure 6 - 11 Pin Octal Socket Dimension

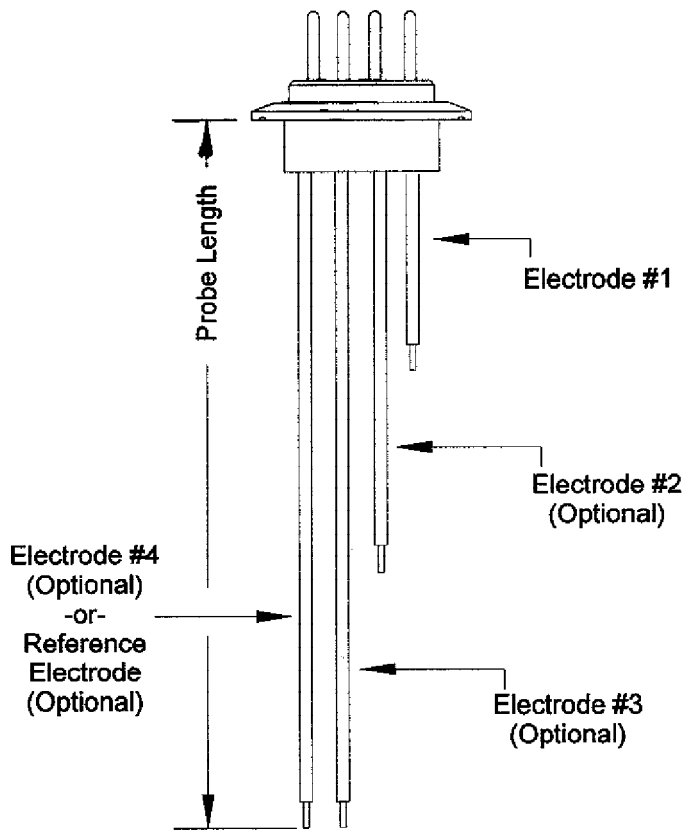
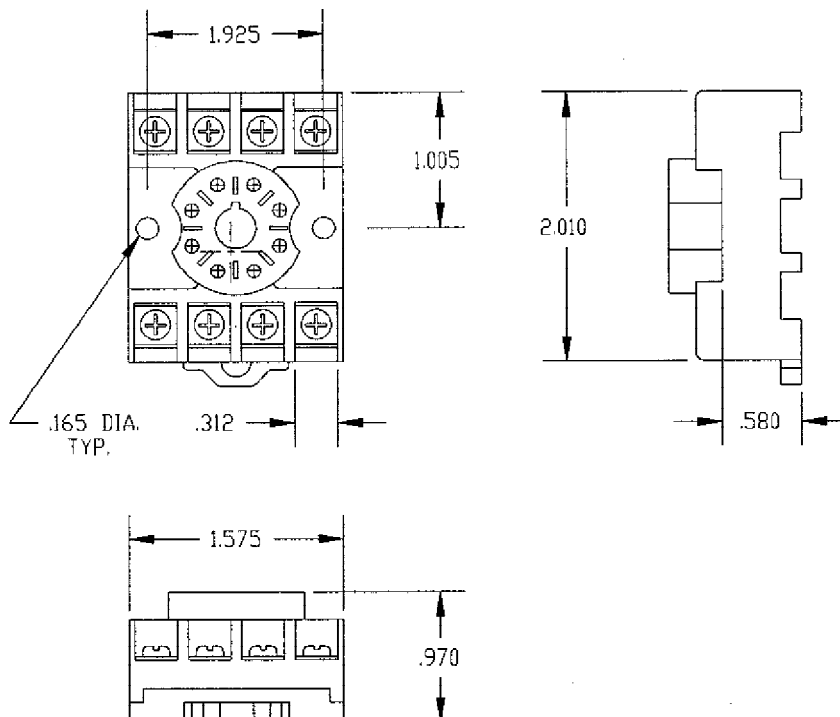


Figure 7 -
Probe Dimensions

Shown with Tri-Clamp connection
and Teflon coated Electrodes

Figure 8 -
8 Pin DIN Socket
Dimension



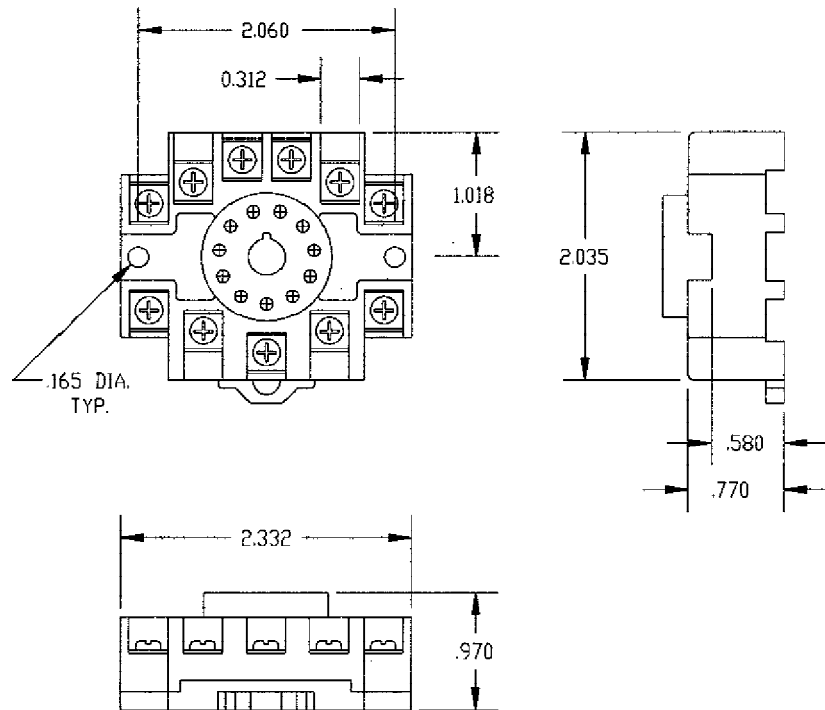


Figure 9 - 11 Pin Din Socket Dimension

2.4 TYPICAL FLUID SENSITIVITY VALUES

<u>Liquid or Material</u>	<u>Sensitivity (Ohms/cm)</u>	<u>Liquid or Material</u>	<u>Sensitivity (Ohms/cm)</u>
Baby Foods	1K	Molasses	10K
Beer	2.2K	Mustard	1K
Bourbon	200K	Oil - Soluble	10K
Buttermilk	1K	Soap Foam	18K
Cake Batter	5K	Soups	1K
Catsup	2.2K	Starch Solutions	5K
Cream	1K	Sugar Solutions	90K
Cream (foam)	4.7K	Vinegar - Aqueous	2.2K
Coffee	2.2K	Carbonated Water	3K
Corn Syrup	45K	Condensated Water	18K
Corn - Cream Style	2.2K	Chlorinated Water	5K
James / Jellies	45K	Distilled Water	450K
Juices - Fruit / Veg.	1K	De-ionized WAter	2.0M
Mayonnaise	5K	Hard / Natural Water	5K
Milk	1K	Wine	2.2K

Note: Under normal conditions, select a module sensitivity just higher than appropriate for the liquid. For low sensitivity liquids (Milk, Cream), when foam is normally present, use 800 ohm module sensitivity to ignore foam and 4.7K ohm sensitivity to sense foam.

Section III - Installation and Startup

- The following section will illustrate the procedures required for final installation and startup of the Anderson Point Level System. If you have not already done so, review Section II to become more familiar with the exact model to be installed. Each of the following sections will be tagged with the type of module that applies to that specific section. They are as follows:



Module Type 1 - SPDT w/Factory Sety Sensitivity



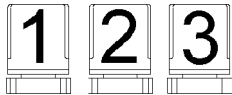
Module Type 2 - DPDT w/Factory Set Sensitivity



Module Type 3 - SPDT w/Field Selectable Sensitivity

- Before installation, be sure to verify that the sensitivity of the module to be installed is correct for the actual product that it will be used with. Refer to section 2.4 to check the sensitivity of your product, and section 2.1 to verify the sensitivity of the actual module to be installed. Only a "Type 3 - Variable Sensitivity" module may be changed in the field.

3.1 OPERATION DESCRIPTIONS



- Each of the modules is supplied from the factory in a Direct or Inverse mode of operation. Referring to Section 2.1, you may determine the configuration of your specific unit. The following definitions explain the action that will occur with each of the specific modules.

This action is factory set, and may not be changed in the field.

Single Level Service - Direct Mode Operation

When the liquid rises to the desired switch point (electrode on terminal 3) the module energizes, changing the state of the load contacts. At this time, the internal LED will be lit. The module remains energized until the liquid recedes below the desired switch point (electrode on terminal 3). The module then de-energizes, turning off the internal LED, and returning the switch contacts to their original shelf state.

Single Level Service - Inverse Mode Operation

The module energizes with power, changing the state of the load contacts. At this time, the internal LED will be lit. When the liquid rises to the desired switch point (electrode on terminal 3) the module de-energizes, turning off the internal LED, and returning the switch contacts to their original shelf state. The module remains de-energized until the liquid level recedes below the desired switch point (electrode on terminal 3). The module then energizes, changing the state of the load contacts.

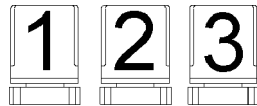
Differential Service - Direct Mode Operation

When the liquid rises to the "High" setpoint (electrode on terminal 3) the module energizes, changing the state of the load contacts. At this time, the internal LED will be lit. The module remains energized until the liquid recedes below the "Low" setpoint (electrode on terminal 4). The module then de-energizes, turning off the internal LED, and returning the switch contacts to their original shelf state.

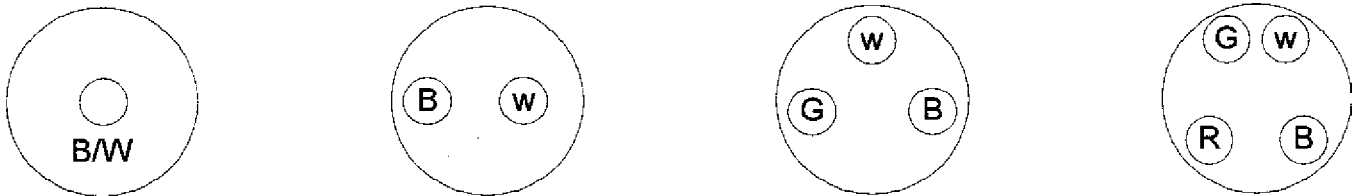
Differential Service - Inverse Mode Operation

The module energizes with power, changing the state of the load contacts. At this time, the internal LED will be lit. When the liquid rises to the "High" setpoint (electrode on terminal 3) the module de-energizes, turning off the internal LED, and returning the switch contacts to their original shelf state. The module remains de-energized until the liquid level recedes below the "Low" setpoint (electrode on terminal 4). The module then energizes, changing the state of the load contacts.

3.2 - WIRING OF JACK CABLE



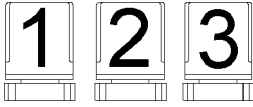
Top View Shown



- B = Black Wire Always shortest electrode
- G = Green Wire Next electrode if multiple switch points
- R = Red Wire Next electrode if multiple switch points
- W = White Wire Always longest electrode

Figure 10 - Jack Wiring

3.3 - MODULE WIRING FOR TYPICAL APPLICATIONS



- The following section will illustrate wiring for typical applications using the Anderson Point Level System. Please be sure to follow the appropriate section pertaining to your specific module.

3.3.1 - Type 1 Module Wiring

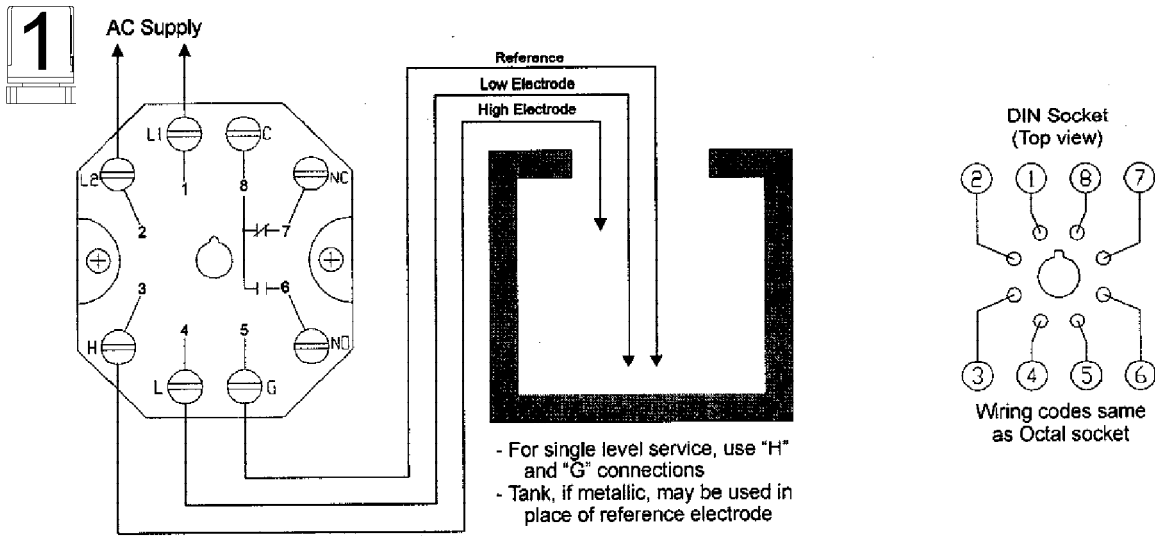


Figure 11 - Type 1 Relay Module Wiring

3.3.2 - Type 2 Module Wiring

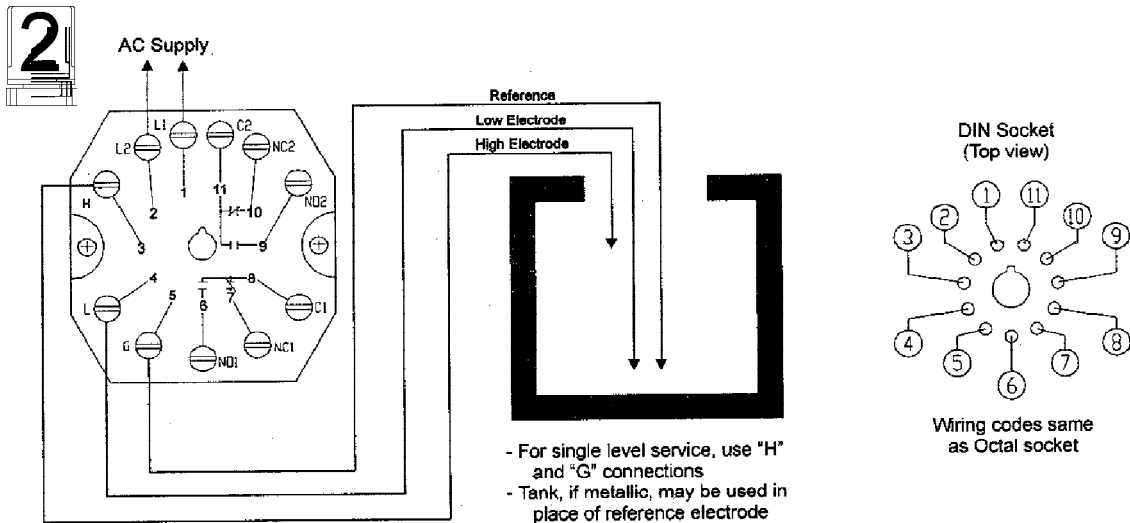


Figure 12 - Type 2 Relay Module Wiring

3.3.3 - TYPE 3 MODULE WIRING

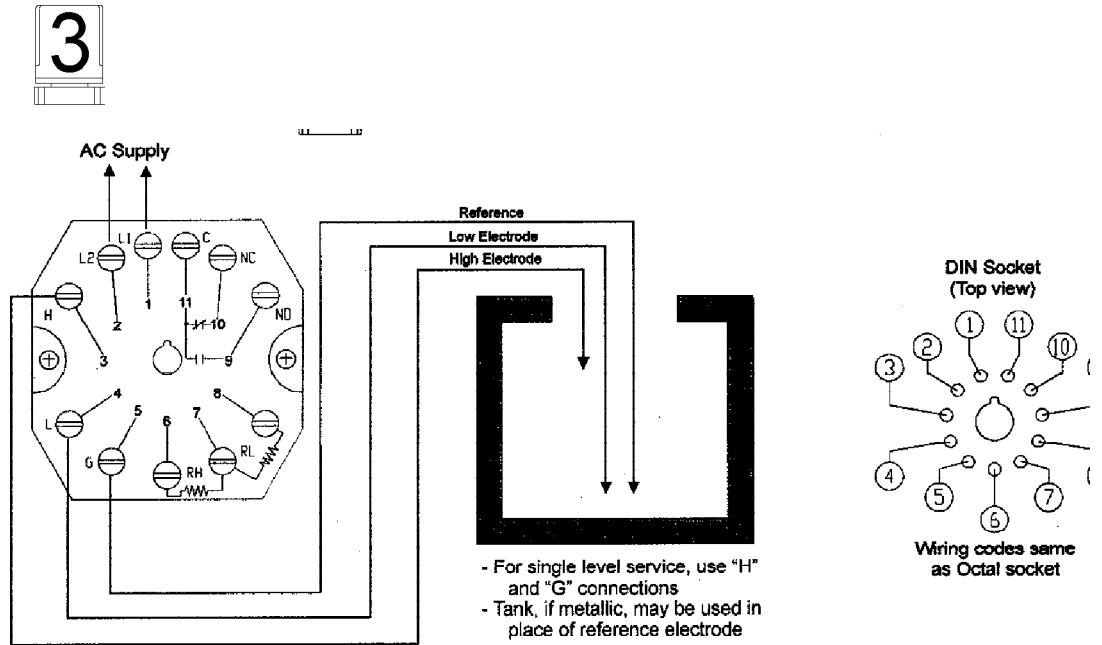


Figure 13 - Type 3 Relay Module Wiring

3.4 - TYPE 3 MODULE SENSITIVITY ADJUSTMENT



- The following section illustrates the procedures required to adjust the sensitivity of a Type 3 Module. To determine the proper sensitivity, refer to the chart in Section 2.4 for typical values.

Tool / Items Required: Small Phillips Screwdriver
 Appropriate Shunt Resistors - 1/2 watt
 (Available from electronics supply house)

3.4.1 - Sensitivity / Resistor Chart

- To achieve the appropriate sensitivity for the product being used, refer to the following chart for selection of proper shunt resistor values. Two resistors will be required for the value selected.

<u>Sensitivity Required (Kohm)</u>	<u>Resistor Value Required (Kohm)</u>
4.7	5.1
10.0	10.0
26.0	27.0
50.0	51.0
100.0	100.0
470.0	390.0
1,000.0	680.0

3.4.2 - Installation of Sensitivity Resistors

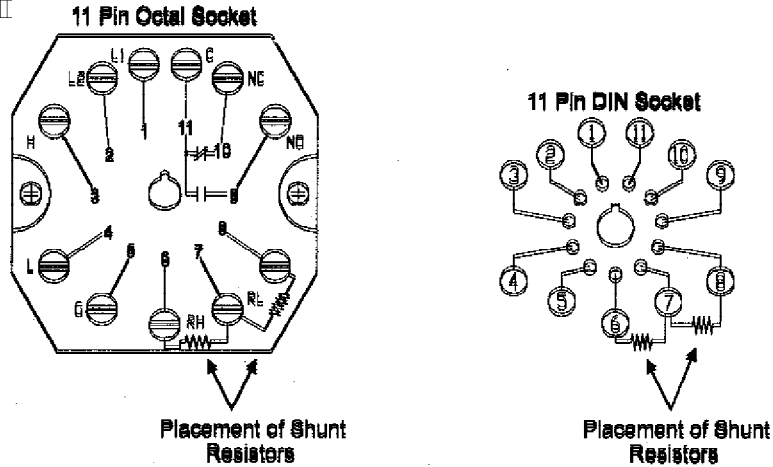


Figure 14 - Shunt Resistor Terminals

3.4.3 - Installation of Optional Variable Sensitivity Resistor Board



Variable Sensitivity Resistor Board: Part Number: 56014-R0070

Variable Sensitivity Point Level Module: Part Number: Type 3 Module (Variable Sensitivity) Only
Octal Socket Style Only

Installation

Caution: Before proceeding, be sure to disconnect all AC power to the Point Level Relay Module. This should include all power across switch contacts.

Note: If two fixed resistors are already present across terminals 6-7 and 7-8, remove before proceeding. These resistors will not be used, and may be discarded.

Install the Variable Sensitivity Resistor Board on terminals 6-7-8 as shown in the following diagram.

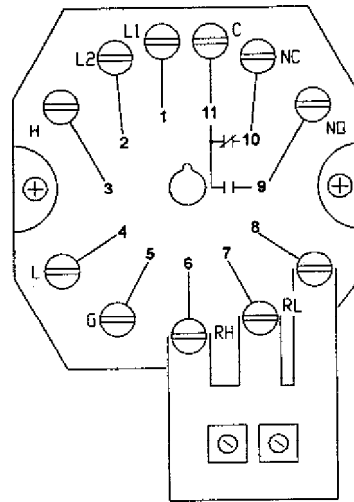


Figure 15 - Installation of VSR Board

Operation

The sensitivity range of the VSR Board is from 5K ohm to 700K ohm. These settings are achieved via the dual "One Turn" potentiometers located on the board. As the sensitivity increases in a nonlinear ohm/turn ratio, you may use the following diagram to achieve proper settings.

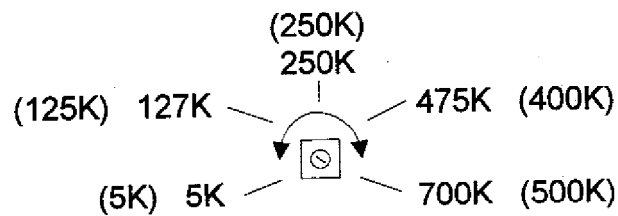


Figure 16 - Setup of VSR Board

BOTH potentiometers should be set to equal position for proper operation. Setting should be at a value approximately 5% greater than that necessary for the liquid product. You may refer to the chart shown in figure 2.4 for specific values.

Warranty and Return Statement

These products are sold by the Anderson Instrument Company (Anderson) under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to a purchase of these products, as new merchandise, directly from Anderson or from an Anderson distributor, representative or reseller, and are extended only to the first buyer thereof who purchases them other than for the purpose of resale.

Warranty

These products are warranted to be free from functional defects in materials and workmanship at the time the products leave the Anderson factory and to conform at that time to the specifications set forth in the relevant Anderson instruction manual or manuals, sheet or sheets, for such products for a period of one year.

THERE ARE NO EXPRESSED OR IMPLIED WARRANTIES WHICH EXTEND BEYOND THE WARRANTIES HEREIN AND ABOVE SET FORTH. ANDERSON MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE PRODUCTS.

Limitations

Anderson shall not be liable for any incidental damages, consequential damages, special damages, or any other damages, costs or expenses with the exception of the cost or expense of repair or replacement as described above.

Products must be installed and maintained in accordance with Anderson instructions. Users are responsible for the suitability of the products to their application. There is no warranty against damage resulting from corrosion, misapplication, improper specifications or other operating conditions beyond our control. Claims against carriers for damage in transit must be filed by the buyer.

This warranty is void if the purchaser uses non-factory approved replacement parts and supplies, or if the purchaser attempts to repair the product themselves, or through a third party, without Anderson authorization.

Returns

Anderson's sole and exclusive obligation and buyer's sole and exclusive remedy under the above warranty is limited to repairing or replacing (at Anderson's option), free of charge, the products which are reported in writing to Anderson at its main office indicated below.

Anderson is to be advised of return requests during normal business hours, and such returns are to include a statement of the observed deficiency. The buyer shall pre-pay shipping charges for products returned, and Anderson, or its representative, shall pay for the return of the products to the buyer.

Approved returns should be sent to:

ANDERSON INSTRUMENT COMPANY INC.
156 AURIESVILLE ROAD
FULTONVILLE, NY 12072 USA

ATT: REPAIR DEPARTMENT

Call Anderson Customer Service for a Return
Authorization Number (RMA).