

MODEL 40 TYPE W TANK OVERFILL ALARM

WEATHERPROOF



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*Manufacturers of Quality Liquid Level Measurement and Controls
Systems since 1926.*



SYSTEM GUIDE



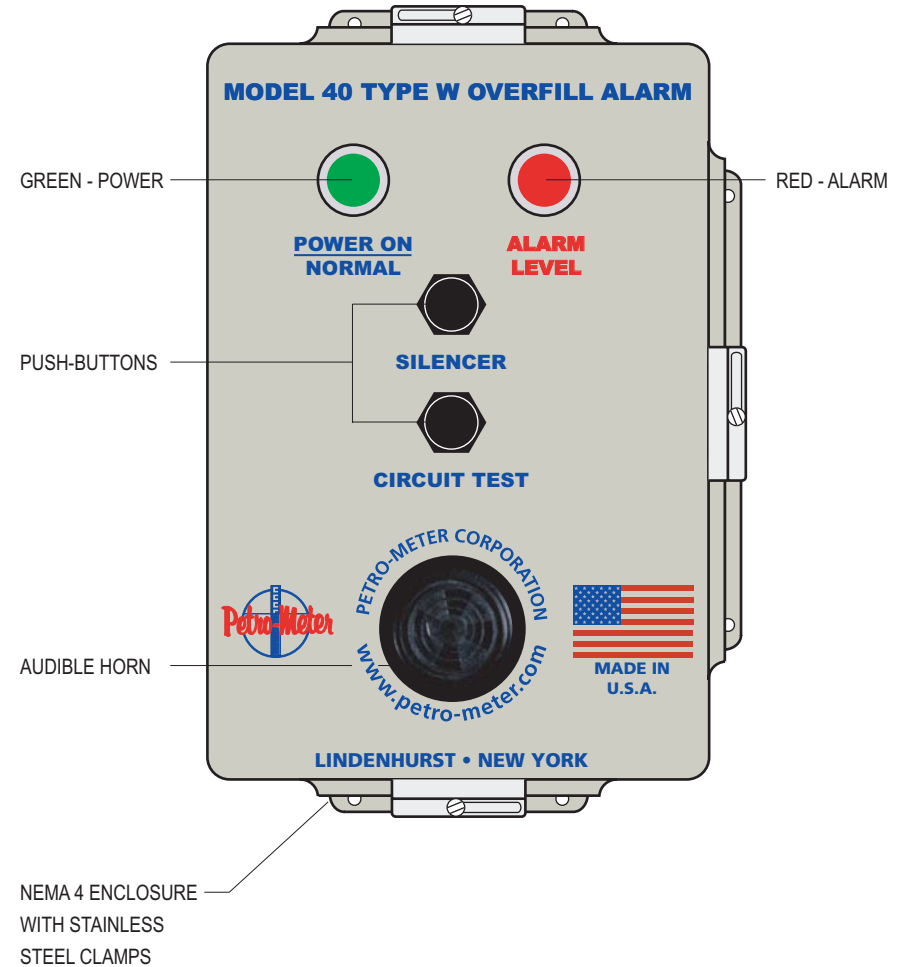
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PETRO-METER MODEL 40 TYPE W ALARM CONSOLE



DESCRIPTION

The Model 40 Type W Overfill Alarm System is fully automatic, has no moving parts or electricity within the vessel that it monitors and operates strictly on the principles of hydrostatics. This Overfill Alarm System is capable of detecting an ascending liquid level within a tank or sump. The sensing device used in this system consists of an open-ended "air bell" connected to a pressure switch via a TRANSMISSION LINE (HIGH or ascending liquid level pressure) and an EQUALIZING LINE (LOW differential pressure). These components are normally installed on top of the tank or within the manway/riser of an underground tank as applicable. The "air bell" also referred to as TANK ASSEMBLY UNIT transmits increasing hydrostatic pressure to the pressure switch through a short segment of 1/4" OD copper tubing (TRANSMISSION LINE). In tanks or vessels that are not atmospherically vented, the variations in gas pressure are routed to the pressure switch via a short length of 3/16" OD copper tubing, however it is applied to the opposite side of the diaphragm of this switch in order to obtain an adjusted differential pressure reading. All Model 40 Type W Overfill Alarm Systems are configured in this manner regardless of the venting status of the tank. In cases where atmospheric vents are present, the EQUALIZING LINE does not perform any appreciable function.

THE SYSTEM CONSISTS OF THE FOLLOWING:**1. THE ALARM UNIT:**

The Model 40 Type W Alarm Console featured a NEMA 4 enclosure complete with Stainless Steel Clamps, Gasket, Status Lights (Green - Power On/Normal and Red - Alarm Level), 95dB Audible Horn, Push-Button Silencer and Test Switches with Weatherproof Rubber Boots and an internal printed circuit board with components.

2. THE PRESSURE SWITCH:

A Dwyer Series 1950 Differential Pressure Switch enclosed in a Weatherproof and Explosion Proof Housing approved for use in Class I Groups C & D, Class II Groups E, F, G and Class III hazardous atmospheres. The switch should be mounted vertically at the top of a tank or in the manway of the same and in an area that does not run the risk of flooding as this Pressure Switch is NOT SUBMERSIBLE. Electrical connections to the Pressure Switch should include the use of a proper EYS fitting (not included). Adequate wiring for these connections include the use of (3) lengths of #16 AWG wires color coded per the wiring diagram illustration on Page 7. Pneumatic connections are facilitated by compression fittings provided on the Pressure Switch and on the Tank Assembly Unit (see illustration on Page 8).

**MANUFACTURER'S LIMITED WARRANTY**

Petro-Meter Corporation guarantees all hydrostatically operated alarm systems for a period of 90 days from the date of shipment from our factory, to be free from any defects in material or workmanship, and to conform to the requirements of the applicable specification.

No allowance will be made for repairs, alterations, or replacements unless made by written consent. Petro-Meter Corporation shall not be responsible for work done, material or parts furnished or repairs made by others. There are no warranties, expressed or implied except the above. Petro-Meter Corporation shall not be liable on any other ground whatsoever, except as herein stated.

NOTES:

3. THE TANK ASSEMBLY UNIT:

The Model 42 consists of a 2" NPT carbon steel tank-top bushing with a 1" IPS x 3" long downpipe welded to it in an absolute air-tight union. The lower extremity of this downpipe is threaded and a 1" IPS coupling is provided to extend the reach of the active "air bell" of this kit to the desired actuation height by adding an additional length of 1" IPS pipe. Please note that the system actuation or ALARM level can be roughly calculated to be 1" above the open end of extension pipe added. In other words it requires approximately 1" of trapped air within this assembly to effectively trip the micro-switch within the Pressure Switch and produce an ALARM condition. Although determining the proper system actuation height is not a difficult task, some thought should be given to this setpoint for optimal performance at the desired liquid level height.

Additionally this assembly uses (2) lengths of copper tubing supplied with each kit; (1) 1/4" OD x 5' long and (1) 3/16" OD x 5' long. Brass compression fittings are supplied with the Model 42 Tank Assembly Unit and on the Pressure Switch to ensure an air-tight pneumatic connection. Once again, it is **absolutely critical** that all pneumatic connections and unions be made air-tight for the proper functioning of this system.

OPTIONAL HARDMOUNTED PRESSURE SWITCH

As an option to ease installation efforts and depending on the application, Petro-Meter can provide a HARDMOUNTED Pressure Switch consisting of all of the components already listed with exception to the (2) copper tube lengths. Instead the Pressure Switch will be firmly mounted to Model 42 Tank Assembly Unit by a robust pipe nipple. This nipple will then function as the pneumatic passage for any increase in hydrostatic pressure caused by an ascending tank level while sustaining the mass of the Pressure Switch at the same time. This arrangement is designed to save the installer the additional effort of locating and mounting the Pressure Switch accordingly.

In this type of arrangement, the EQUALIZING LINE (differential pressure) connection is established by a short, fixed jumper tube that conveys increases in gas pressure as typically accomplished by a conventional 5' length of 3/16" OD copper line.

INSTALLATION INSTRUCTIONS

WARNING:

The Model 40 Type W Overfill Alarm System is to be installed in four different steps. With consideration to all of the differing varieties of manways used with tanks, the actual mounting of the Pressure Switch may vary. It is imperative that the following instructions be followed exactly in regard to the electrical and pneumatic connections required. All electrical wiring must be in accordance with NFPA 70 of the National Electrical Code, Flammable and Combustible Liquids Code NFPA 20, the Automotive and Maritime Service Code NFPA 30A, and all applicable local codes. Please read these instructions in their entirety before beginning installation.

1. THE ALARM CONSOLE:

The Model 40 Type W Alarm Console can be mounted outdoors on a wall or other vertical surface using suitable fasteners. The 115 VAC electrical connections are to be brought into this enclosure after drilling an adequate size hole to further accept the proper conduit connector fittings.

CAUTION



This NEMA 4 enclosure does not feature knockouts in order to preserve the integrity of its weatherproof rating. When drilling this enclosure to provide electrical access, please ensure the proper clearance of all internal components.

DRILL WITH CAUTION IN ORDER TO AVOID IRREPAIRABLE DAMAGE TO THE SYSTEM.

2. THE PRESSURE SWITCH:

The Dwyer Series 1950 Differential Pressure Switch will normally be mounted at the tank top or manway:

A. Select a location that is free from excessive vibration, risk of submersion in any liquid, corrosive atmospheres and where ambient temperature remains within -40°F and 140°F.

This pressure switch may be installed indoors, outdoors or where the hazard of explosion exists.

B. Mount Pressure Switch with circular plane in an upright or vertical orientation (note: the switch lettering on the Dwyer nameplate should remain legible in an upright position).

SPARE PARTS

A complete selection of replacement parts are offered in support of the Model 40 Type W Overfill Alarm System and available through your local Petro-Meter distributor.

Parts available as described are limited to the following items:

DESCRIPTION	PETRO-METER PART NO.
Audible Piezoelectric Horn	40-HRN
Push-Button Switch with Rubber Boot	40-PBW
Indicator Lamp Bulb Kit (5 each)	40-LMP
Green Lamp Lens	40-LLG
Red Lamp Lens	40-LLR
Lamp Base with Nut (Colored Lenses Listed Above)	40-LMB
Replacement Printed Circuit Board	40-PCB
Replacement Pressure Switch	40-PSX
Replacement Model 40-Type-W Console Complete	40-TYPE-W-CB

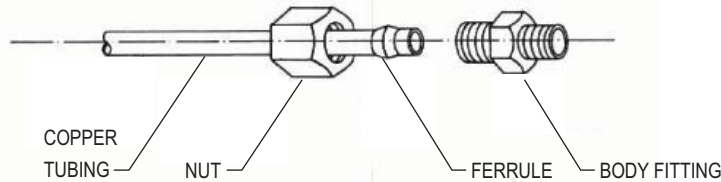
NOTE:

Repairs beyond those that can be made with any of the available components listed above **should not be attempted** under any circumstances.

Please consider contacting us at Petro-Meter for any questions that you might have on your existing Model 40 Type W System. We will gladly help to troubleshoot and diagnose any issues with you. Repair services are available should you like to consider sending your unit back to us for a thorough evaluation and repair estimate.

Please contact us at **1.800.935.8257** or by Email at **info@petro-meter.com**.

IMPORTANT:



AIR TIGHTNESS OF ALL UNIONS AND CONNECTIONS IS ABSOLUTELY CRITICAL FOR THE PROPER FUNCTIONING OF THIS SYSTEM.

OPTIONAL HARDMOUNTED PRESSURE SWITCH

As an option to ease installation efforts and depending on the application, Petro-Meter may provide a HARDMOUNTED Pressure Switch consisting of all of the components already listed with exception to the (2) copper tube lengths described above. Instead the Pressure Switch may be firmly mounted to Model 42 Tank Assembly Unit by a robust pipe nipple. This nipple will then function as the pneumatic passage for any increase in hydrostatic pressure caused by an ascending tank level while sustaining the weight of the Pressure Switch at the same time. This arrangement is designed to save the installer the additional effort of locating and mounting the Pressure Switch accordingly. The EQUALIZING LINE (differential pressure) connection is then established by a short, fixed jumper tube that conveys increases in gas pressure as typically accomplished by a conventional 5' length of 3/16" OD copper line.

INSTALLATION INSTRUCTIONS (continued):

C. Connect the Pressure Switch HIGH pressure port to the TRANSMISSION LINE (1/4" OD copper line) and LOW pressure port to the EQUALIZING LINE (3/16" OD copper line) according to the compression fittings provided for this purpose.

3. THE TANK ASSEMBLY UNIT:

The Model 42 Tank Assembly Unit consists of a 2" NPT carbon steel tank top bushing with a short segment of downpipe and a 1" IPS coupling as already described. It is highly recommended that some consideration be given to the desired **HIGH** level setpoint of this system as this will be specifically determined by the overall length of the additional segment of 1" IPS piping added for this purposes. In general terms, it requires about 1" of trapped air within the assembly to accomplish the task of activating the system's Pressure Switch. In short, once the desired actuation height of the product within the vessel is determined, insure that the overall length of the final downpipe is approximately 1" below this height.

The Tank Assembly Unit should NOT be installed until the system is tested (see SYSTEM TEST), and all other system components are in place. Once testing is complete, remove the 1/4" OD copper TRANSMISSION LINE and 3/16" EQUALIZING LINE from the brass compression fittings featured on the 2" NPT tank top bushing. Insert the Model 42 Tank Assembly Unit into an available 2" NPT tank top opening and tighten securely. Reconnect 1/4" OD and 3/16" OD TRANSMISSION and EQUALIZING lines respectively.

IMPORTANT: ALL PNEUMATIC CONNECTIONS MUST REMAIN ABSOLUTELY AIR-TIGHT IN ORDER FOR THIS ALARM SYSTEM TO FUNCTION CORRECTLY.

In instances where an optional hardmounted pressure switch is used, all pneumatic connections **SHOULD BE LEFT INTACT AS FACTORY PROVIDED.**

Additional care should be observed while installing a Hardmounted Tank Assembly Unit into a 2" NPT tank top opening in an effort to not damage or distort any of the hardmounted components: Pressure Switch, Transmission Pipe Nipple, Equalizing Jumper.

PETRO-METER MODEL 40 TYPE W OVERFILL ALARM

PHYSICAL DATA -

ELECTRICAL: 15A 125, 250, 480 V.A.C.

1/8 HP 115 V.A.C., 1/4 HP 250 V.A.C. (see note below)

Model 1950 Switches: Operating ranges and dead bands.

To order specify Model Number	Operating Range Inches, W.C.	Approximate Dead Band	
		At Min. Set Point	At Max. Set Point
1950-04	0.03 to 0.35	0.02	0.09
1950-00	0.07 to 0.15	0.04	0.05
1950-0	0.15 to 0.5	0.10	0.15
1950-1	0.4 to 1.6	0.15	0.20
1950-5	1.4 to 5.5	0.3	0.4
1950-10	3.0 to 11.0	0.4	0.5
1950-20	4.0 to 20.0	0.4	0.6
Model Number	Operating Range PSI	Approximate Dead Band	
		Min. Set Point	Max. Set Point
1950P-2	.5 to 2.0	0.3 PSI	0.3 PSI
1950P-8	1.5 to 8.0	1.0 PSI	1.0 PSI
1950P-15	3.0 to 15.0	0.9 PSI	0.9 PSI
1950P-25	4.0 to 25.0	0.7 PSI	0.7 PSI
1950P-50	15.0 to 50	1.0 PSI	1.5 PSI

Temperature Range: -40° to 140° F.
UL and CSA Listed, FM Approved For
 Cl. I GR. C,D – Cl. II GR. E,F,G
 – Cl. III
 (Models 1950-04 and 1950P-50
 UL/CSA only)

Pressure Connections: 1/8" N.P.T.

Conduit: 1/2" N.P.T.

Weather Proof includes O-Ring Seal
 in Cover and Drain Plug.

Set Point Adjustment: Screw type
 outside of enclosure.

Response Time: Because of restrictive effect of flame arrestors, switch
 response time may be as much as 10-15 seconds where applied pressures are
 near set point.

Diaphragm: Molded Fluorosilicone
 Rubber

Housing: Anodized Aluminum
 Casting

Size: Height 3-3/8", Dia. 5-3/32"
 (4-11/32" H. x 7-3/4" D. Model
 1950-04).

Weight: 3-1/4 lbs. (4 lbs., 9 oz.
 Model 1950-04.)

Wiring Connection: Screw type
 terminals – common, normally
 open, and normally closed.

**WARNING: DO NOT INSTALL PRESSURE SWITCH IN AN AREA
 WHERE THE POSSIBILITY OF BEING SUBMERGED EXISTS. PRESSURE
 SWITCH IS NOT WATER-TIGHT AND THEREFORE NON-SUBMERSIBLE.**

PETRO-METER MODEL 40 TYPE W OVERFILL ALARM

INSTALLING TRANSMISSION AND EQUALIZING LINES

TRANSMISSION and EQUALIZING LINES are copper conduits designed to transmit changes in hydrostatic and/or gas pressure within a vessel and should never contain liquid or tank product. These lines can be cut to suit however a single continuous run is **always** recommended in each case to eliminate any possibilities of leaks at unions or joints. To insure the integrity of any of the pneumatic connections needed, please observe the following tips:

- 1) When cutting copper lines, always use an adequate tube cutter to obtain a flush, square cut. Factory supplied lines will always be furnished this way and are user ready for connections to be made.
- 2) If cutting of factory supplied tubing is necessary, carefully deburr the OD and ID of any cut tubes to help preserve the sealing integrity of the fittings provided.
- 3) Slide compression nut and ferrule onto copper tube and insert tube end into compression fitting. Tubing ends should enter fittings completely and meet with the counterbore at the base of the fitting prior to tightening.
- 4) First tighten compression nut "finger tight" until temporarily secure. Follow-up with a wrench and tighten each fitting securely.

TRANSMISSION LINES are always supplied as 1/4" OD x 5' lengths of copper tubing while EQUALIZING LINES are always 3/16" OD x 5' length. Always uncoil both TRANSMISSION and EQUALIZING lines carefully to avoid bending or kinking. Adequate brass compression fittings are supplied with the Model 42 Tank Assembly Unit and on the Pressure Switch to ensure an air-tight pneumatic connection. Once again, it is **absolutely critical** that all pneumatic connections and unions remain air-tight for the system to function as intended.

PETRO-METER MODEL 40 TYPE W OVERFILL ALARM

INSTALLATION INSTRUCTIONS *(continued)*:

4) FIELD WIRING

The field wiring from the Model 40 Type W console to the Pressure Switch at the tank must be run in a suitable conduit with a sealed EYS fitting at each end. A total of (3) #16 AWG stranded wires, Gas and Oil resistant type THHN or THWN is recommended in lengths not to exceed 500 feet. For the ease of installation and the prevention of the crossing of wires, it is advised that (3) different colors be used conforming to the wiring diagram provided: **PURPLE, RED** and **BLUE**. Electrical connections to the circuit board terminal block should be completed as follows:

1. **PURPLE** to TERMINAL A
2. **RED** to TERMINAL B
3. **BLUE** to TERMINAL C

Electrical connections of the above wires to the Pressure Switch should be completed as follows:

1. **PURPLE** to **COMMON** CONTACT
2. **RED** to **NORMALLY OPEN** CONTACT
3. **BLUE** to **NORMALLY CLOSED** CONTACT

SYSTEM TEST

It is important to test the system for proper operation using the following test procedure:

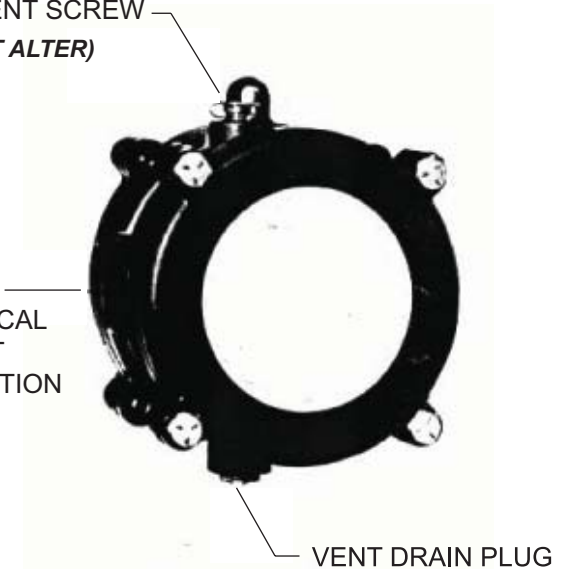
Prior to installing the Tank Assembly Unit in the tank and with TRANSMISSION and EQUALIZING LINES securely connected to the PRESSURE SWITCH and all electrical connections completed at the Console and Pressure Switch, with 115 V.A.C. supplied to the console the GREEN light should illuminate. Slowly immerse the Tank Assembly Unit downpipe into a container cover its end with 1" to 2" of water. The tank overfill alarm should activate (RED light and HORN ON, GREEN light OFF). Depress the Push-Button Silencer switch (HORN OFF, RED light ON). Wait 5 minutes to check that Console does not reset prematurely.

PETRO-METER MODEL 40 TYPE W OVERFILL ALARM

SERIES 1950 INTEGRAL EXPLOSION-PROOF PRESSURE SWITCH

SET POINT ADJUSTMENT SCREW
(FACTORY SET - DO NOT ALTER)

1/2" NPT
ELECTRICAL
CONDUIT
CONNECTION



SPECIFICATIONS, INSTALLATION AND OPERATING INSTRUCTIONS

The Model 1950 Explosion-Proof Switch combines the best features of this Dwyer Switch with a compact and Explosion-Proof housing. The unit is U.L. and CSA listed, FM approved for use in Class I, Groups C & D, Class II Groups E, F & G, and Class III atmospheres. It is also weatherproof for outdoor installations.

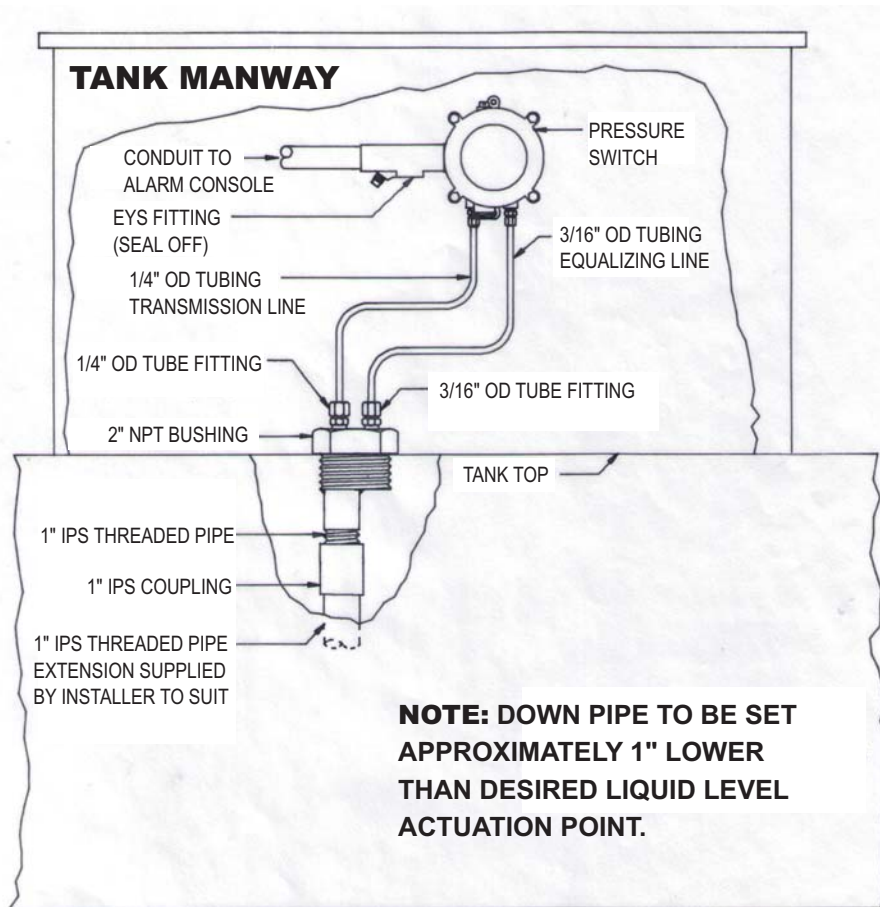
Easy access to the SPDT switch for electrical hook-up is provided by removing the top plate of the three-part aluminum housing.

PETRO-METER MODEL 40 TYPE W OVERFILL ALARM

MODEL 42 TANK ASSEMBLY UNIT DETAIL

This Tank Assembly Unit consists of a 2" NPT carbon steel tank-top bushing with a 1" IPS x 3" long downpipe welded to form an air-tight union. The end of this downpipe is threaded and a 1" IPS coupling is provided for the purpose of extending it to the desired "actuation set point". Please note that the actual Alarm actuation level can be determined to be approximately 1" above the level of the open end of this extension.

Conventional systems employ (2) copper line lengths of tubing x 5' each: TRANSMISSION LINES are always 1/4" OD while EQUALIZING LINES are always 3/16" OD. Brass compression fittings are outfitted on both the Pressure Switch and Model 42 Tank Assembly Unit to ensure an error-free pneumatic connection. It is absolutely critical that all pneumatic connections are made air-tight for the proper functioning of this system.



PETRO-METER MODEL 40 TYPE W OVERFILL ALARM

