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INSTALLATION AND OPERATING INSTRUCTIONS

Congratulations upon your purchase of the world's first gravity operated meter intended for installation permanently in a wastewater gravity pipeline! If properly installed, this City Meter product will provide many years of dependable, reliable and accurate flow measurement service.

The meter measuring mechanism operates entirely using the principals of gravity. **It is therefore essential for its accurate and reliable operation that it be installed exactly level in a horizontal plane. Proper installation requires the meter to be level front to back and side to side.**

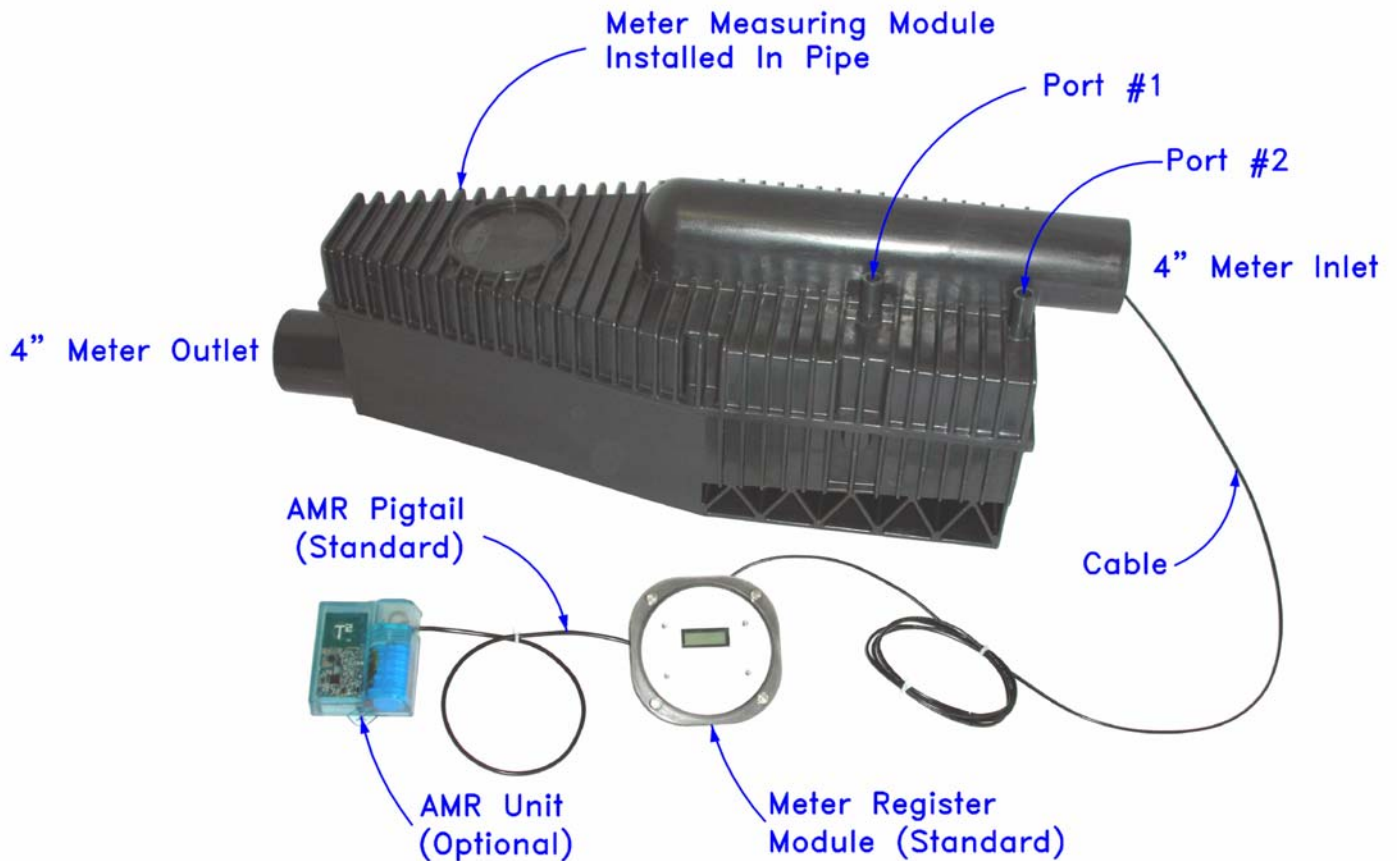
Please review and develop a complete understanding of these installation instructions before beginning field installation of the metering system.

Note: The meter register display is turned on by swiping the magnet (provided) across the area to the left of the LCD display screen. The meter register is shipped to the customer powered on ready for operation and configured for your application per your direction.

Preliminaries:

First let us become familiar with the meter measuring module. The meter measuring module measures wastewater flow volumes directly by a gravity operated internal mechanism and is the larger of the two cable connected units. It is formed by molding PVC plastic and is uniformly 1/4" thick throughout. It is 42-3/8 inches long, 15-5/16 inches wide and 14-5/8 inches high. The empty meter measuring module has a weight of approximately 42 pounds. The meter measuring module is connected to the meter register module by cable and has a combined weight of approximately 45 pounds. Either module may be damaged if dropped onto a hard surface. Please handle the units with care. Inspect both modules for damage prior to installation. Do not install any meter which has been dropped or damaged in shipment. The meter measuring module is connected to the meter register module via a cable designed and intended for direct soil bury. The standard cable length is 12 feet, but longer lengths are available through special order at the time the meter is manufactured. Do not lift or carry the meter measuring module or the meter register module by the cable connecting the two units. Excessive force applied to the cable connecting the two modules can damage the meter. The meter measuring module and the meter register module are delivered from the factory fully assembled and ready for installation. Any field modification of the meter system components voids the manufacturer's warranty.

FIGURE 1: THE COMPLETE METERING SYSTEM:



The bottom and top of the meter measuring module are parallel to each other. This parallel feature allows the bed upon which the meter is to be placed to be leveled in all directions before the meter measuring module is placed into its service position. The fins located on upper meter measuring module are intended for use in checking the leveling of the meter during installation. The meter must be installed exactly horizontal or flow measurement register errors will be introduced. The meter measuring module is provided with two standard 4 inch diameter schedule 40 PVC pipe sized connection nipples. The upper, or influent (in-flow) nipple, extends for a distance across the top of the meter. The lower effluent (outlet) nipple extends out of the lower portion of the meter module case. FIGURE 1 above shows the meter inlet and outlet nipples. For reference purposes, the bottom surface of the influent (or incoming flow) pipe nipple is 10.12 inches above the bottom of the meter measuring module. The effluent pipe nipple is located level with the bottom of the meter measuring module. This dimension will be useful later in the preparation of the foundation bed for the meter measuring module. The fall between the inlet nipple (incoming) and the outlet (ex-flow) nipple is 10.12 inches. Sloped surfaces within the meter measuring module provide positive drainage inside the meter case when installed horizontally level as required.

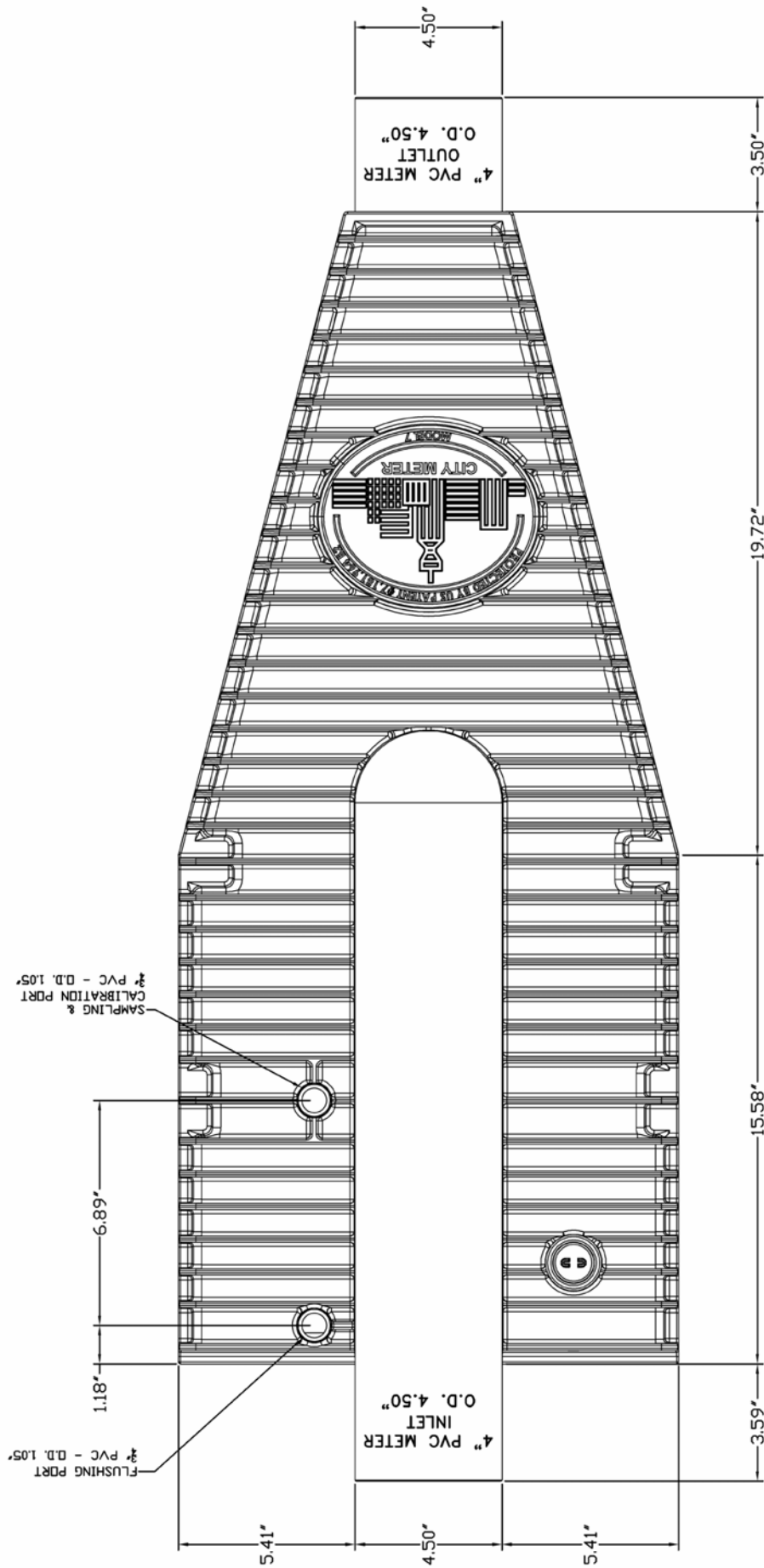
Before installation is begun, it is important to become more familiar with the features and options available during installation of the meter measuring module. There are two additional pipe nipples located on the top of the metering measuring module, again as shown in FIGURE 1, both of schedule 40 PVC pipe sizes. The 3/4 inch diameter pipe nipple is known as Port #1 and is located closest to the discharge end of the meter measuring module. Port #1 is provided to allow the installation of an extension pipe of the same size to the ground surface. This Port #1 can be useful in checking the calibration of the meter measuring module after it is installed by the introduction of a known quantity of water, then checking the meter register to determine it is within calibration. The most common cause of meter calibration error is incorrect initial installation caused by the meter module being out of level. Once correctly installed on a level and sound base material, further calibration of the meter is not required. However, in situations where customers question the accuracy of their meter's registers, the availability of Port #1 at ground level will allow convenient accessibility for "in place" confirmation of the meter's calibration. The secondary use of Port #1 is to allow direct access to the waste stream of the service's discharge for waste stream qualitative sampling. By inserting a sampling tube into the meter measuring module through Port #1, a direct qualitative sample of the waste stream may be taken. This secondary use of Port #1 allows the identification of sources of wastewater quality violations in the discharged waste stream. The decision to pipe Port #1 to the ground's surface is the meter owner's responsibility. If Port #1 is not piped to the ground's surface, it must be capped and sealed prior to meter installation. The ability to test the accuracy of the meter in place in response to customer concerns coupled with the ability to easily take waste stream samples without requiring excavation makes extension of Port #1 to the ground surface and equipping it with a screwed cap highly desirable. It is therefore recommended by City Meter as a standard installation practice.

Port #2 is a 3/4 inch schedule 40 PVC pipe nipple located closest to the inflow side of the meter which allows the area under the metering mechanism to be flushed after meter installation. Flushing the area under the metering mechanism should only be necessary when the sewer collection system backs up, washing debris under the measuring mechanism, causing fouling of the meter's correct operation. The reverse flow of sewage in the collection system will only occur when the collection system flow is blocked or during a pump station failure. The decision to pipe Port #2 to the ground's surface is the meter owner's responsibility. If Port #2 is not piped to the ground's surface, then it must be capped and sealed prior to meter installation. The ability to flush the meter after installation without requiring excavation makes extension of Port #2 to the ground surface and equipping it with a screwed cap highly desirable. It is therefore recommended by City Meter as a standard installation practice. The flushing of fowling material in the meter measuring module caused by the collection system's reversed flow is a normal maintenance activity and is not valid cause for replacement of the meter measuring module. This flushing should only be necessary as a result of failure of the collection system to drain down stream of the meter.

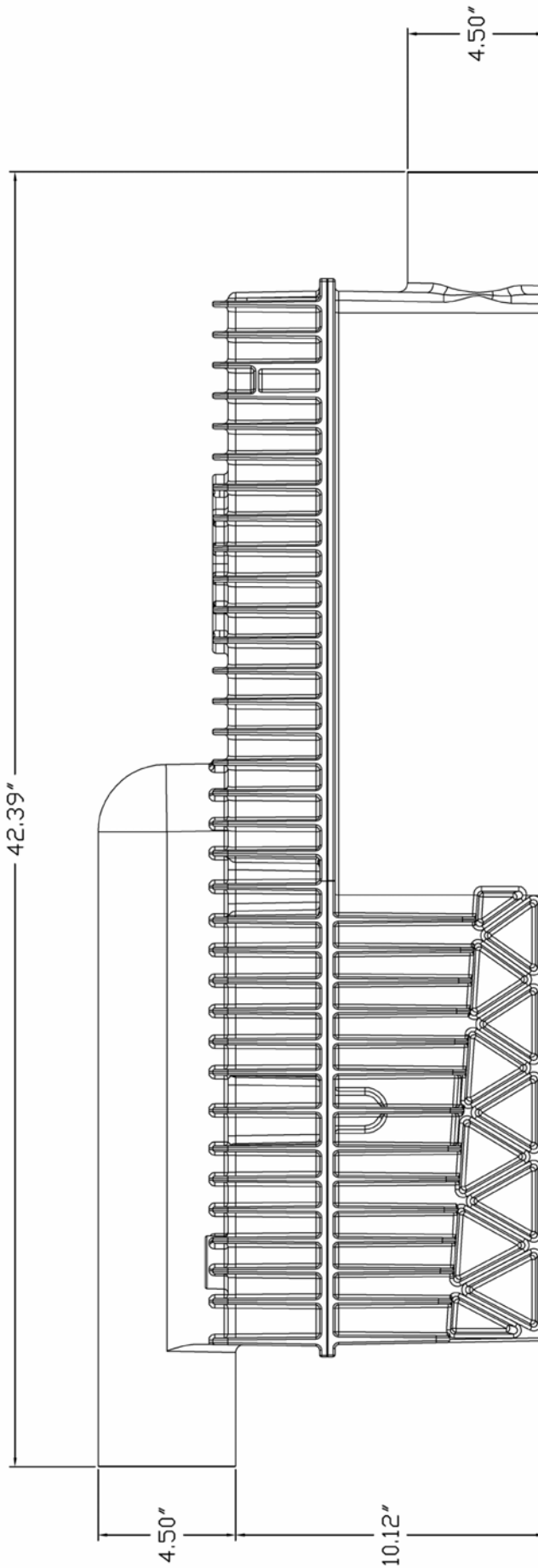
The meter measuring module is structurally designed to provide satisfactory operation when buried at depths of up to ten feet below ground surface when installed in accord with these instructions. Special installation provisions should be made if the meter is intended to be installed at depths over ten feet deep or where installed in areas expected to be exposed to vehicular loading. For special installation instructions applicable for deeper depths and vehicular overburden exposure, please consult City Meter's engineering staff.

UNIT DIMENSIONAL DRAWINGS:

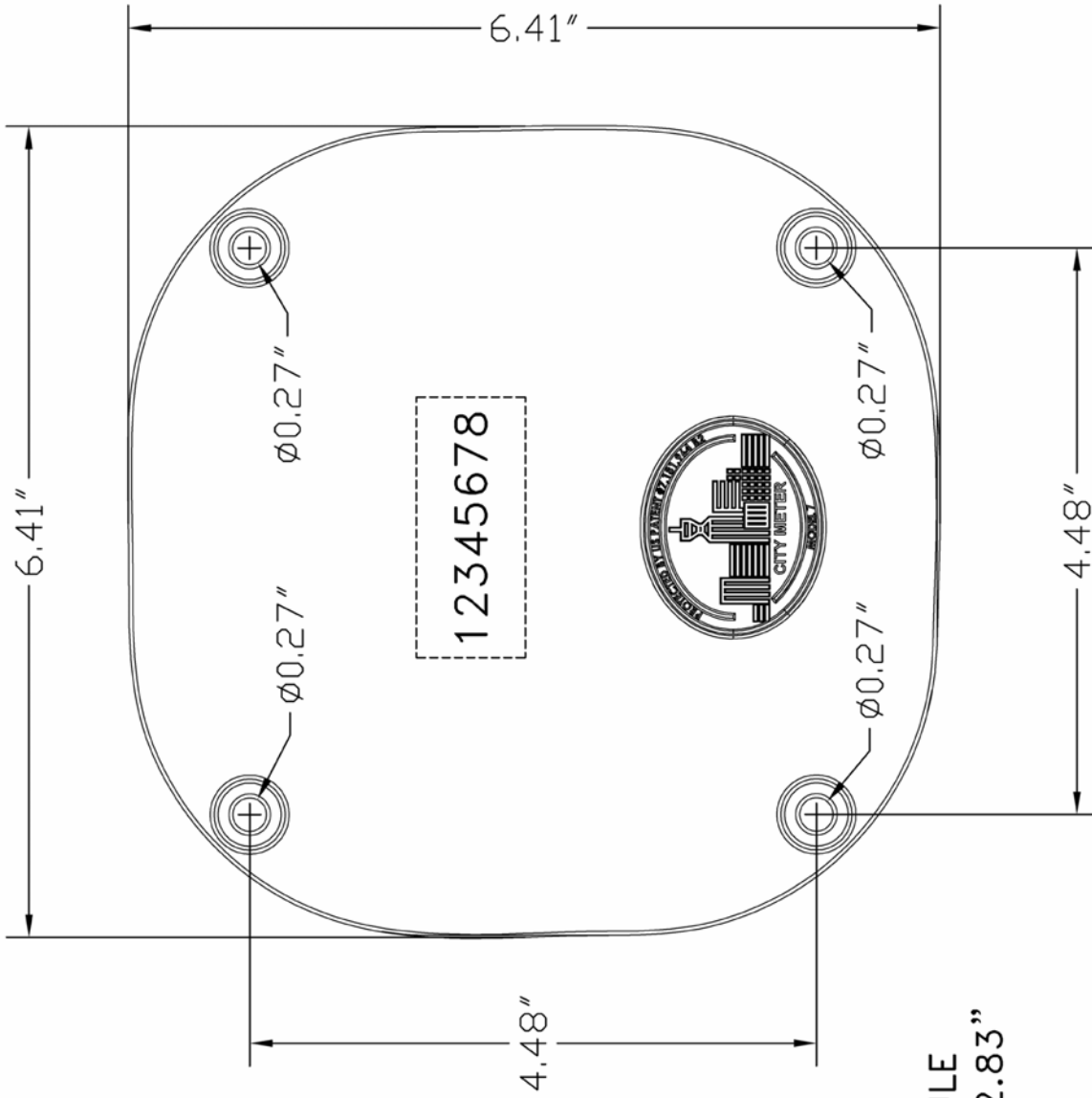
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CITY METER SEWER SERVICE METER
METER MEASURING MODULE
TOP VIEW
 N.T.S.



CITY METER SEWER SERVICE METER
METER MEASURING MODULE
LEFT SIDE VIEW
N.T.S.



REGISTER MODULE
THICKNESS = 2.83"

CITY METER SEWER SERVICE METER
REGISTER MODULE
TOP VIEW
N.T.S.

INSTALLATION INSTRUCTIONS (RETROFIT INSTALLATIONS):

Once the decisions have been made with regard to extending or capping Ports # 1 and #2, the field installation of the metering system is straight forward. The recommended location for installation of the sewer service meter in central sewer collection systems is immediately adjacent to the owner's property line where the sewer service piping of the private property owner meets the utility system owned collection system and in alignment with the existing sewer service piping serving the structure. In septic tank system installations, the meter measuring module should be placed ahead of the septic tank with adequate cover or protection to prevent freezing or physical damage to the measuring module. Before excavation to uncover the existing sewer service piping, locate all existing underground utilities in the area of the proposed work. The installer should first determine the existing sewer service pipe's location, depth, existing pipe size, existing pipe material, and existing pipe condition.

In order to avoid working in an active sewer during retrofit installations, first advise the property occupants the water service is about to be terminated and request they turn off the energy supply to their water heater. Next, terminate or turn off the water service or request the utility turn off water service to the structure as is locally appropriate. Once the water service is terminated, request the residents of an occupied structure to flush all toilets in the structure and to refrain from discharging any liquid wastes while the meter is being installed. These actions are recommended to prevent a surprise flood while the sewer service pipe is cut.

The meter measuring module should not be installed in locations subjected to below freezing temperatures. Typically sewer service piping is located sufficiently below ground level or protected to prevent freezing in winter. The sewer service metering module should not freeze if installed in the same conditions as the sewer service piping. During installation of the metering module in existing sewer service piping, the most difficult requirement to meet is the attainment of the 10.12 inches of vertical drop across the 42 3/8 inch horizontal length of the meter measuring module. In some situations it will be possible to attain the required fall through the meter simply by cutting the service piping at the point of installation and reworking the connection to the sewer collection system. In other situations with steeply graded piping tying directly to the collection system piping, it may be necessary to re-grade a portion of the privately owned sewer service piping. In other circumstances, it may be necessary to use a combination of both techniques. The determination as to how best obtain the required fall across the meter should be made by the installer; keeping in mind the local code requirements for minimum pipe grades, the need for freeze protection, and the need for physical protection from overburden traffic in shallow bury situations.

Existing septic system meter retrofits may find the best meter measuring module location is in the crawl space of the structure where a crawl space exists. The meter measuring module installed in a crawl space should be insulated to prevent freezing and to reduce the noise level caused by the meter's internal bucket stops being impacted during each measuring cycle of the meter. Meter retrofits where a crawl space does not exist or will not accommodate meter installation can be achieved by installing a meter in the existing service line. In this scenario, the meter discharges into a pump basin such as Polylok's preassembled pump basin. The pump basin in turn batch pumps the sewage effluent into the septic tank without major design alteration of the existing onsite treatment system. Again each installation will have unique requirements. The installer should determine the best method of installation based upon existing field conditions.

Once the installer determines the best location to obtain the required fall to allow installation of the meter, an elevation may be determined for the influent (in-flow) and effluent (ex-flow) pipe. With these know elevations, the required finished elevation of the level bed to support the meter may be determined by constructing a level bed for the meter at the elevation of the effluent (ex-flow) pipe's bottom elevation.

When properly prepared, the level bed upon which the meter will rest should be firm and solidly compacted in place. The foundation bed upon which the meter module rests must be level and stable. Movement or settling of the foundation bed after meter installation will affect the accuracy of the meter. The final elevation of the level bed should be 10.12 inches below the bottom exterior of the 4 inch PVC schedule 40 incoming pipe and level with the bottom exterior of the 4 inch PVC schedule 40 outgoing pipe nipple. The distance between the bottom exterior of the incoming pipe and the bottom exterior of the outgoing pipe should be slightly more than 43 1/2 inches as measured horizontally between the two points. Sufficient flexibility of the incoming pipe, outgoing pipe, or both must be provided to allow full insertion of the pipe into glued couplings if they are required for connection to the meter. This adequate flexibility is required when glue attached couplings are used. If "Fernco" or other flexible couplings secured by stainless bands are used, they may be slid completely onto the influent (incoming) and effluent (ex-flow) pipes and flexibility of the pipes for installation is not be required.

PREPARING THE METER BED:

The bed upon which the meter rests must be level, solid and stable. If loose, unstable or wet soils are encountered at the desired elevation, they should be excavated from the meter's location a minimum of six inches below the desired finished grade for the meter's bottom. In the excavated area, apply one layer of geologic fabric if the material there is loose or wet. Backfill the excavated area using dry Sack-Crete or crushed limestone and thoroughly compact in place until the desired elevation of the level bed for the meter is achieved. Minor variations in the bearing surface for the meter may be corrected with not more than 1/4 inch of masonry sand. Level and compact the bed thoroughly, and check the EXACT level condition and EXACT elevation of the bed in all directions before attempting to set the meter into position. Check the elevations of the influent (inflow) and effluent (ex-flow) pipe to be certain they have not been moved by construction of the meter bed. Once satisfied that all elevations are correct, carefully set the meter into position on the prepared and level bed, confirming the correct fit of the meter to both pipes. If adjustments are required, remove the meter from the bed and adjust the pipe locations as required. Carefully reset the meter upon the bed to determine if the desired fit to the pipes have been achieved. Repeat this process as needed. Correct installation of the meter measuring module on a firm and immovable foundation is essential for long term accurate service. The effort to construct a proper stable foundation will be rewarded with years of trouble free and accurate meter service.

If glued couplings are to be used, glue and install both couplings to the meter's four inch nipples. Confirm the bed for the meter is exactly level. Move the more flexible pipe laterally or vertically and secure it into position so it will not interfere with initial installation of the meter module. Glue and install the meter on the least flexible pipe first adjusting the meter while the glue is wet to rest EXACTLY level on the bed. Allow adequate time for the glued joint to set. After the first joint has adequately set, gently lift the meter to allow insertion of the more flexible pipe connection. If necessary, trim the end of the pipe to allow the connection to be made. Excavation of the pipe for some distance away from the meter module may be required to obtain adequate flexibility in the pipe for the connection to be made. Apply glue to both clean mating surfaces and make the connection only after determining adequate flexibility in the system exists to allow the connection.

If "Fernco" couplings are to be used, loosen the stainless straps on the coupling and slide the couplings with strap bands over the ends of the influent (inflow) pipe and the end of the effluent (ex-flow) pipe until they are clear of the pipe ends. Set the meter into position then slide the couplings to center them over the ends of the pipe. Do not tighten the straps yet. Check that the meter is EXACTLY level in all horizontal directions. Make any minor adjustments required until the meter is EXACTLY level. Once EXACTLY level, tighten the straps on the couplings.

BEFORE BACKFILLING or INSULATING:

Extend the pipes from Port #1 and/or Port #2 or insure the Ports are properly capped. Extend the cable and register module to its final installation location. The cable between the meter measuring module and the meter register module should be loosely installed to avoid system damage caused by physical strain on the cable. The provided cable is rated for direct soil bury.

BACKFILLING:

Begin backfilling operations only after confirming the meter is EXACTLY level. Once confirmed, carefully and by hand fill under and around pipes and compact only to the effluent pipe's spring line (mid way of the pipes' diameter) and mid height of the meter. Course builder's sand is the preferred initial backfill material. Check the EXACT level of the meter again before proceeding further with backfilling operations. Meter pit shall be hand backed filled and tamped by hand. If compaction moved the meter, it must be readjusted to EXACTLY level. Backfill the trench to finished grade in lifts not exceeding 6 inches in initial depth, compacting each layer by hand as the work proceeds. Do not use equipment tires or vibratory equipment to compact backfill within four feet vertically of the pipe or the meter.

Note: Meter measuring body PVC material is not UV stabilized. Extended exposure to direct sunlight may cause the meter body to crack or warp. Take appropriate measures to protect the meter from the elements (sunlight and potential freezing) in applications where the meter is not buried. Meters damaged by exposure to the elements are not covered by warranty.

INSTALLING THE METER REGISTER MODULE:

The meter register module comes completely serviced and ready for operation. It is connected to the meter register by a cable intended for direct soil bury. The register module is typically installed in a protected location such as an ordinary water meter box set flush with finished grade. The register module comes from the factory programmed to register in the units the purchaser specifies. The third digit in the unit's serial number from the left indicates the units of measure.

For reference purposes the unit codes are as follows:

- 0 = US Gallons
- 1 = Imperial Gallons
- 2 = Liters
- 3 = Cubic Feet

Manual reading of the meter register module is activated by passing a permanent magnet over the face of the register module. The passing magnet activates a switch which turns on the display unit for 10 seconds. This is a power saving feature, since there is little need to constantly display a meter register reading. During the display period the meter continues to count all flow, but the display is fixed with the last register reading for the display period.

The meter register module is factory equipped with a sealed "pigtail" cable containing three conductors. This cable is provided in order to deliver readings to an automated meter reading system. It is not necessary that this cable be connected. It is simply provided for use by those opting to use an automated meter register (AMR) system. If an automated meter reading system is not to be used, the factory installed cable end seal should be left in place to prevent degradation and corrosion of the enclosed conductors.

The register module contains no user serviceable components. It is factory sealed to prevent the intrusion of moisture which could be detrimental to its electronic components. The memory of the register module is non-volatile; meaning if power is disconnected, the unit will retain its programming and its last registered reading.

When installing a companion AMR system, the box protecting the meter register module should be non-metallic to prevent interference with radio wave reception and transmissions. Metallic enclosures, unless magnetized, will have no effect on the meter register module. Radio transmissions from the AMR unit can be attenuated by the use of metallic enclosures. Consult with your AMR provider for their meter box requirements and recommendations.

INSTALLATION INSTRUCTIONS (NEW INSTALLATIONS)

Sewer service meter installation in new sewer service lines and new onsite wastewater treatment system plumbing is much simpler than retrofit installations as described above. While similar considerations must be given to new installations as given in retrofit installation, the designer and installer have far more flexibility since pipes and other hardware are not already in place. The elevation of the structure to be served by the sewer service or onsite wastewater system should be set to allow local code required pipe slopes to the wastewater collection main or onsite wastewater treatment system plus the 10.12" vertical drop over the 42 3/8" horizontal measurement through the meter. If adequate fall is provided for a structure to be served, installation is a simple matter. New meter & service lines installations are simpler than retrofits due to the fact that the 10.12" vertical drop can be plumbed directly into the service line configuration as the new lines are installed.

Follow the practices recommended in **Installation Instructions (Retrofit Installations)**. Consideration should be given to protecting the meter measuring module from traffic overburdens in shallow installations. Similar traffic pathway consideration should be given when locating the meter register module and meter register box.

TYPICAL AMR CONNECTION:

All meter register modules manufactured by City Meter, Inc. are capable of providing output to drive an AMR unit. The standard automated meter register "pigtail" provides three color coded conductors to deliver the current meter register to an automated meter register unit. The output protocol is ECR II and is widely compatible with most automated meter register systems. For reference purposes, the color code of the three conductors contained in the City Meter register module "pigtail" is:

White = Ground Red = Clock/power Green = Data

The various AMR system manufacturers utilize differing color coding for AMR module inputs. Check the literature of the AMR unit being used to determine the correct connection color combinations for your installation. The incorrect connection of the AMR or the shorting of the conductors may result in damage to the AMR system or to the meter register module.

The electrical current output of the meter register module "pigtail" is very low, making it critical that connections be made clean and free of corrosion. After the connections are made, it is critical for long term satisfactory service for the connections to be insulated and sealed with water tight and air tight insulating sealant to prevent corrosion of the connections or the entry of moisture. Use IDEAL UnderGround Wire Connectors Model 60 or other suitable connectors designed for underground wet environments to make a permanent waterproof electrical connection between the meter register and AMR unit.

REGISTER MODULE

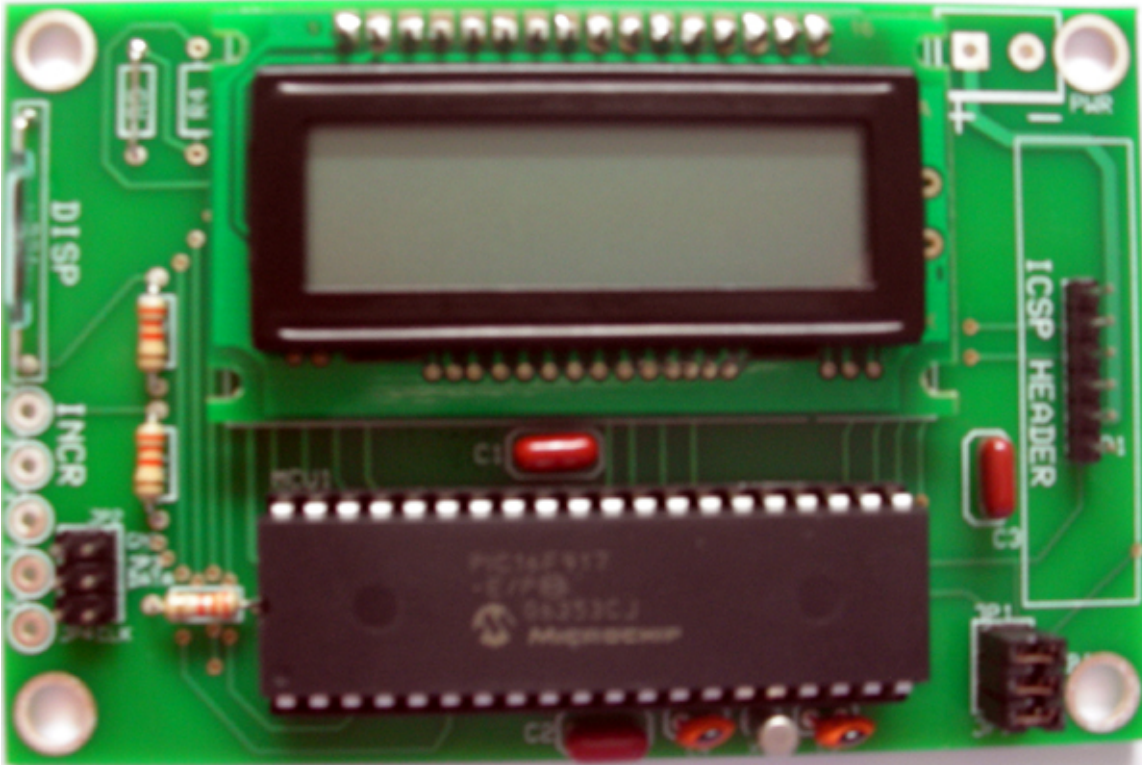
The register module is sealed using four stainless steel bolts and self locking stainless steel nuts which compress an "O ring" in the groove cast into the meter register housing. The housing contains one custom manufactured printed circuit board with the display unit. The unit is powered by one "D" cell sized, special lithium 3.6 volt battery. The battery is specially designed to provide an extremely long shelf life, and is particularly well suited for long term low power service. The battery when removed from service should be disposed of as hazardous material. It should never be exposed to water. The battery is encapsulated in a water proof material at the factory. Replacement batteries, encapsulation and desiccant materials are available from City Meter by special order.

The register module's display is activated for 10 seconds to allow reading by passing a permanent magnet to the left of the clear window in the register module's cover lens. The displayed reading will not change during an activated display period, but all flows will continue to be measured and recorded.

WARNING: EXPOSURE OF BATTERY TO WATER MAY CAUSE THE BATTERY TO EXPLODE VIOLENTLY WITHOUT WARNING. NEVER OPEN OR SERVICE THE METER REGISTER MODULE IN A WET ENVIRONMENT. METER REGISTER MODULES WHERE THE O-RING SEAL OR LENS HAS FAILED AND ALLOW WATER TO ENTER THE REGISTER MODULE CASE SHOULD BE HANDLED WITH EXTREME CAUTION AND CARE. NEVER HEAT BATTERY OR REGISTER MODULE IN AN ATTEMPT TO DRY COMPONENTS. NEVER SHORT CIRCUIT BATTERY LEADS AS THIS MAY CAUSE BATTERY TO OVERHEAT, CAUSE A FIRE OR EXPLODE. NEVER STORE BATTERIES REMOVED FROM METER REGISTER(S). PROMPTLY DISPOSE OF DISCHARGED OR DAMAGED BATTERIES USING PROPER HAZARDOUS MATERIAL DISPOSAL FACILITIES.

DISABLED AMR CIRCUIT BOARD:

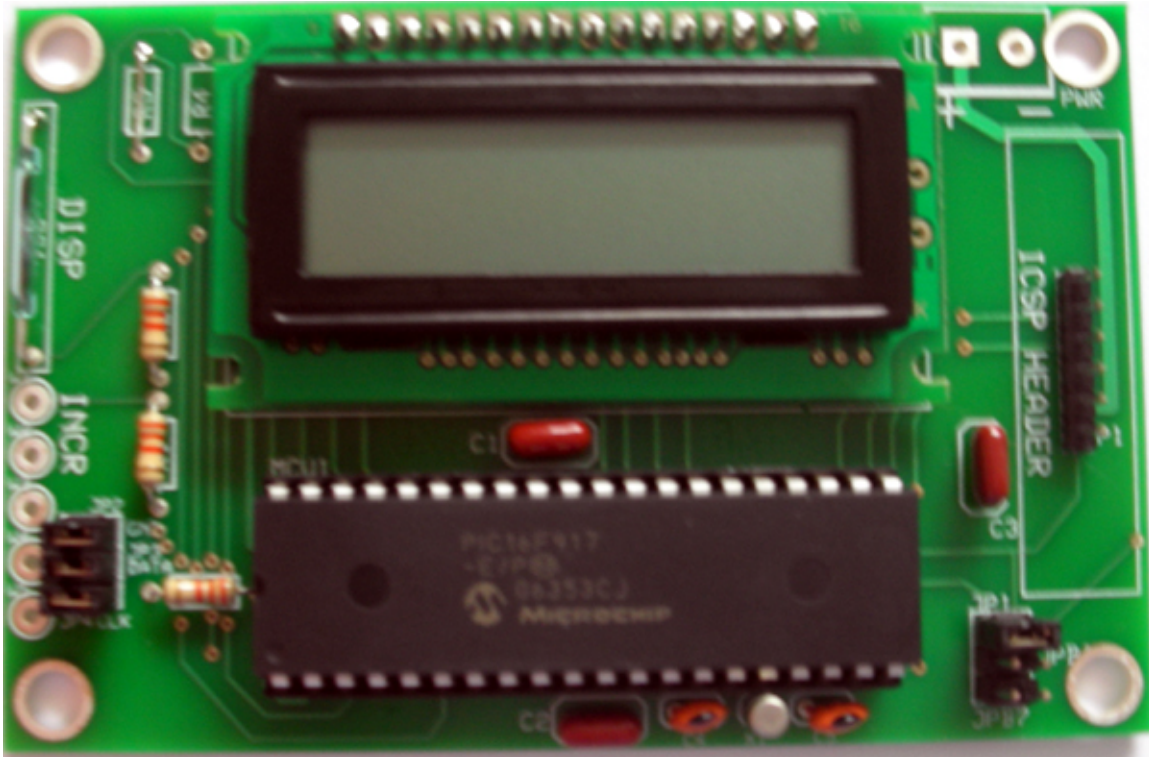
Meters are shipped from the factory with AMR outputs "enabled" or "disabled" as specified by the purchaser. Disabling the AMR circuit is recommended where the purchaser does not intend to immediately connect an AMR system to the meter register module. Disabling the AMR circuit eliminates the possibility of shorting the conductors in the AMR "pigtail", inducing stray currents to the read module and reduces the power consumption of the unit. The AMR feature is disabled by removing three "slip on" post jumpers from the register module circuit board (jumpers JP2, JP3 and JP4) and insertion of three jumpers (JP1, JPB6 and JPB7). A picture of a disabled AMR circuit board is shown below:



WARNING: ALL SERVICE PERSONELL SHOULD USE PROPER ELECTRICAL GROUNDING PRIOR TO OPENING THE REGISTER MODULE. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE REGISTER ELECTRONICS DUE TO STATIC ELECTRICTY DISCHARGES. REPLACE DESSICANT PRIOR TO RESEALING REGISTER.

ENABLED AMR CIRCUIT BOARD:

Meters are shipped from the factory with AMR outputs "enabled" or "disabled" as specified by the purchaser. The AMR circuit may be enabled at some future date by reconfiguring the jumpers on the register module circuit board. Gaining access to the circuit board requires removal of the four bolts holding the lens on the register module. The lens is sealed to the register module using an "O-ring" gasket lubricated with silicon grease. Lifting the lens vertically from the register housing will reveal the printed circuit board. The circuit board is not attached to the lower housing. It simply rests on four posts and is held in place by pins cast into the rear of the lens. Enabling the AMR circuit requires the installation of four jumpers (JP1, JP2, JP3 and JP4) and the removal of two jumpers (JPB6 and JPB7). The jumpers used are commonly available from any electronics store serving the computer industry. A picture of an AMR enabled circuit board is shown below:



WARNING: ALL SERVICE PERSONELL SHOULD USE PROPER ELECTRICAL GROUNDING EQUIPMENT PRIOR TO OPENING THE REGISTER MODULE. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE REGISTER ELECTRONICS DUE TO STATIC ELECTRICITY DISCHARGES. RECHARGE OR REPLACE DESSICANT PRIOR TO RESEALING REGISTER.

METER REGISTER MODULE SERVICING:

The register module is factory sealed with a desiccant pack inserted to absorb any moisture contained within the air captured within the unit upon assembly. This desiccant pack should be replaced with a new pack of like size any time the register module is opened. The electronic circuit board may be carefully lifted from its resting post to allow removal and reinsertion of the desiccant pack, taking care that electrical leads are not pinched or broken. All O-ring seals in good serviceable condition should be re-lubricated with silicone grease and carefully reinstalled in the groove of the lower housing. Any defective O-ring (pinched, cracked or split) should be replaced with a new O-ring. The four stainless steel bolts securing the lens against the lower register housing should be installed by alternately step tightening until a torque of 40 to 50 inch pounds is achieved. *Caution: Do not over tighten register module bolts. Over tightening bolts may cause register lens to crack and fail.*

CHANGING REGISTER READ UNITS:

Meters are shipped preprogrammed to read in the units selected by the purchaser. The read units from any register module may be changed only by replacing the microprocessor in the meter register assembly. Replacement microprocessor modules are available from the factory on special order upon authorization by the original meter purchaser. All modules are encoded with the original meter serial number for security purposes, then internal fuses are permanently blown to prevent tampering or reprogramming. It is therefore not possible to reprogram the internal microprocessor.

CHANGING CABLE LENGTHS:

Meters are shipped with the cable length specified by the purchaser. The cable is continuously sheathed and suitable for direct ground bury. Field splicing of the cable is not recommended because the water tightness of the sheathing may be compromised and the ability to transmit the low voltage signals may be lost. If field splice is necessary use IDEAL UnderGround Wire Connectors Model 60 to make a waterproof splice.

Important Note: Do not solder field spliced connections unless using an electrically isolated soldering station such as a Metcal Soldering Station. Stray AC voltages in non-electrically isolated soldering equipment will damage the register electronic circuit board. Use IDEAL's UnderGround Wire Connectors Model 60 or equal to make a waterproof splice where necessary.

INSTALLATION IN PUMPED SYSTEMS:

Meters are suitable for use in pumped wastewater systems operating within the approved meter flow range. When pumped volumes exceed the flow range of the meter, the meter should be installed ahead of the pump in the gravity flow portion of the collection system if possible. It should be noted that the meter is intended to operate in partial pipe gravity flow conditions within the specified GPM ratings of the meter.

REMOTE REGISTER MODULE INSTALLATION:

Register modules may be located remote from the meter measuring module by ordering the meter with up to 100 feet of cable between the register module and the meter module.

CAPACITY AND ACCURACY:

The City Meter sewer service meter has:

1. A flow capacity rating of zero to 10 US gallons per minute with an accuracy of plus or minus 2 %.
2. A flow capacity rating of 10 to 15 US gallons per minute with an accuracy of plus or minus 4 %.
3. A useful battery service life in our system of 32 years as estimated by the battery manufacturer.
4. The ability to pass three inch spherical solids.
5. A fail safe design with built in meter by-pass.
6. Bypass flow indication: Alerts meter owner of wastewater flows in excess of meter rated flows.

BYPASS FLOW INDICATION

At each meter reading, the meter register will display "BYP:XXXX" for ten seconds prior to displaying the current totalized meter reading. The "XXXX" portion of the above string indicates the number of times a bypass event has occurred. The meter register is originally set to display "BYP:0000" as the initial setting. Flows in excess of 15 gallons per minute will cause the internal metering mechanism to pin down due to the higher than designed flow rate. If the meter experiences high flows for more than five seconds, the meter register will record and increment the bypass counter. For Example: "BYP:0001" after the first bypass event.

This functionality is included to detect meter installations where a meter is being used to measure flows outside of the designed 0 to 15 GPM flow range. Use of a meter to measure flows in excess of 15 GPM will underestimate the actual flow through the meter and is not an acceptable use of the meter. A flow divider and multiple meters properly installed in parallel may be used to divide and measure flow in excess of 15 GPM. City Meter recommends the installer consult a local engineer for site specific design and installation instructions should a parallel meter installation be required.

DURABILITY

The City Meter Sewer service meter operates with only one internal moving part. The moving part is mounted using pure Teflon bearings to provide many years of trouble free service. The single metallic material in the meter measuring module is a permanent magnet set into rigid PVC and sealed in place to prevent corrosion.

SERVICING & CALIBRATION:

The meter requires no routine servicing or calibration. Calibration may be checked in service through the calibration port #1 by introducing a known volume of water through a very accurate water meter. Be certain no other water enters the meter during the test period. The meter contains only one moving part which is operated by gravity, is factory lubricated and runs on sealed Teflon bearings. Correct installation means the metering module should accurately perform for its useful life. Should the metering module fail to operate, the cause can only be that the operation of the measuring assembly has become blocked. Flushing of the metering module through the ports provided should remove any fouling materials. Cycling of the metering module can be detected by listening for the impact of the measuring assembly upon its stops. Failure of the registering module will result in the failure to display or the failure to display increasing readings. Please contact City Meter, Inc. should any meter fail in service for any reason within 10 years of being placed into service.

SEWER LINE CLEANING & INSPECTION:

The sewer service meter is a precision formed and balanced operating assembly. Sewer snakes and sewer pressure washers should not be allowed to enter the metering module because they may break or seriously damage the metering module. Ordinary household cleaning chemicals including drain cleaners will have no effect upon the meter. High strength industrial cleaners operating to produce high heat exothermic reaction temperatures may deform the rigid PVC and therefore should not be used. Sewer cameras will pass through the meter from the service side, but will hang in the meter internals when extraction is attempted. Forced removal of the camera will permanently damage the metering module. It is therefore recommended that no internal inspection or cleaning equipment be allowed to enter the meter measuring module.

WARRANTY:

This sewer service meter is warranted by City Meter, Inc. to be free from defects in materials or workmanship for a period of one year by replacement. Please consult the warranty form provided with your meter for warranty details.