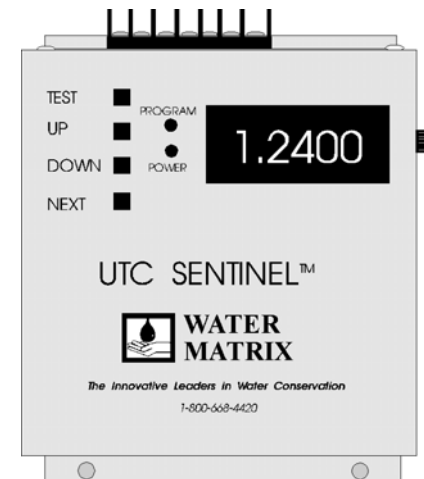


*The UTC Sentinel™
By Water Matrix*

Instruction Manual
for
**Installation
&
Operation**



Patent Pending

NOTE: ALL PLUMBING IS TO BE INSTALLED IN ACCORDANCE WITH APPLICABLE CODES AND REGULATIONS

CSA Certification Number LR 108233

The information in this publication has been carefully checked and is believed to be accurate. However, Water Matrix assumes no responsibility for any inaccuracies, errors or omissions that may be contained in this document. In no event will Water Matrix be liable for direct, indirect, special, incidental or consequential damages resulting from any defect or omission in this manual, even if advised of the possibility of such damages.

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Using This Manual

This manual introduces you to the Water Matrix UTC Sentinel™ and details operation and installation information for both new and retrofit applications.

This manual is divided into sections and subjects to make it easy to look up information using either the table of contents or the index.

The installation manual is organized into different sections for:

- a table of contents
- introductory information
- operational information
- assembly instructions
- troubleshooting
- appendices – showing operating specifications, and warranty information
- an index

This manual includes an index and a glossary to help you find information quickly and to look up unfamiliar terms.

Sections and subjects are listed in both the table of contents and the index. The index also lets you look up items by specific words.

Parts List:

The following is a list of parts included with your purchase of the UTC Sentinel™ System:

Urinal Tank Retrofit Kit – UTCS1A

- 1 Programmable Control Unit
- 1 Passive Infrared Motion Sensor
- 1 ½” Solenoid Valve
- 1 Bypass Valve
- 1 90 Degree Elbow Fitting
- 1 Flow Regulator
- 1 Flow Regulator Adapter
- 1 Screen Washer
- 1 ½” Copper to Copper Union

Flush Valve Retrofit – UTCS1B

- 1 Programmable Control Unit
- 1 Passive Infrared Motion Sensor
- 1 ¾” Solenoid Valve
- 1 Screen Washer
- 3 Polished Metal Flush Valve Inserts

New Construction – UTCS1C

- 1 Programmable Control Unit
- 1 Passive Infrared Motion Sensor
- 1 ¾” Solenoid Valve
- 1 Screen Washer

Benefits of the Water Matrix UTC Sentinel™ System

The UTC Sentinel™ is designed to automate urinal flushing and utilizes water for flushing in the most effective manner. Programmable delay options and controlled flushing based on patterns of urinal use make the UTC Sentinel™ the most cost effective solution available.

The UTC Sentinel™:

- eliminates odor problems and drain degradation due to lack of flushing
- drastically reduces water consumption associated with urinal tank operation
- offers safe low voltage operation
- meets all current conservation plumbing codes
- provides six modes of operation, including three test modes
- counts the number of cycles since installation

How the Water Matrix UTC Sentinel™ Works

The UTC Sentinel™ system monitors the area immediately in front of the urinals with a single passive infra-red motion sensor. When motion is detected in front of the urinals, a pre-selected count-down begins. At the end of the count-down, the system activates a solenoid valve. The valve opens and starts the flow of water to the urinals or urinal tank. The valve closes once the pre-selected flush time has elapsed. The urinals have now been flushed either directly or through the emptying of the urinal tank and the system is reset to begin this cycle again upon its next activation.

The UTC Sentinel™ prevents unnecessary flushing during periods when the urinals are not used. An additional feature allows the system to flush after a selected period of inactivity. This ensures that urinal traps remain primed.

All settings on the system are programmable to accommodate any washroom environment or traffic pattern. A delay setting is used to maximize savings by allowing more than one urinal to be used before flushing.

Assembly and Mounting Instructions

General

This manual consists of specific assembly and mounting instructions for the installation of the parts needed to support and run the UTC Sentinel™ system.

This manual includes information on:

- installing the solenoid valve
- mounting the motion sensor
- mounting the UTC Sentinel™ control unit

Installing the Solenoid Valve

The solenoid valve starts and stops the flow of water into the urinals after the sensor detects motion. The types of solenoid valve installations include:

- urinal tank bottom-feed water supply
- top-feed water supply
- flush valve retrofit
- new construction application

Urinal Tank Bottom-Feed Water Supply

See Figure 3.

To assemble and install the solenoid valve in a urinal tank with a bottom feed water supply:

1. Shut off the water supply to the urinal tank by using the isolating valve.

WATER MATRIX UTC Sentinel™

2. Disconnect the water supply line to the urinal tank.
 3. Remove the regulating valve from the urinal tank.
 4. Attach the copper piping, fittings and solenoid valve as per diagram.
 5. Ensure screen washer is installed in ½” union.
 6. Ensure that the assembled parts installed leave a gap of at least one inch (2.5 cm) above the critical water level in the urinal tank.
 7. Check that the water flow into the tank is unobstructed.
 8. Turn the water on.
 9. Check for leaks.
 10. Turn the by-pass valve on to fill the urinal tank.
 11. Check that:
 - siphon system is operating properly
 - urinal tank is empty
-



If the electrical installation work has been completed, turn the by-pass valve off.



If the electrical work is still to be completed, leave the by-pass valve partially open.

Top-Feed Water Supply

Same as above only:

1. Attach the copper piping, fittings and the solenoid valve to the water supply line at the top of the tank.

Flush Valve Retrofitting**See Figures 1, 2.**

To install the solenoid valve in a flush valve retrofit application:

1. Shut off the water supply to the urinals.



Note: If retrofitting flush valves, flush all urinals and toilets serviced by the water supply.

2. Unscrew the handle coupling and remove the handles from each flush valve.
3. Place the polished metal insert in each flush valve and screw the bonnets back into place. This now allows flushing to be controlled by the action of the solenoid.
4. Install the shut off valve (in the off position), screen washer (or optional Y strainer), unions and $\frac{3}{4}$ inch solenoid valve. Use reducing fittings if necessary to reduce the existing line to accommodate $\frac{3}{4}$ inch components. See Figures 4 and 5.
5. If the same water supply is used for toilets or sinks, install a separate branch line so that the urinal set up does not affect the toilets or sinks.
6. Turn on the water supply.
7. Turn the newly-installed shut-off valve to the ON position.
8. Initiate a test sequence once the system is operation and check for leaks.

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New Construction Application

1. Follow the instructions for Flush Valve Retrofitting above, skipping steps 2 and 3. See Figure 3.

Illustrations

The following illustrations help to ease the identification process of components and where they are located in the UTC Sentinel™ installation.

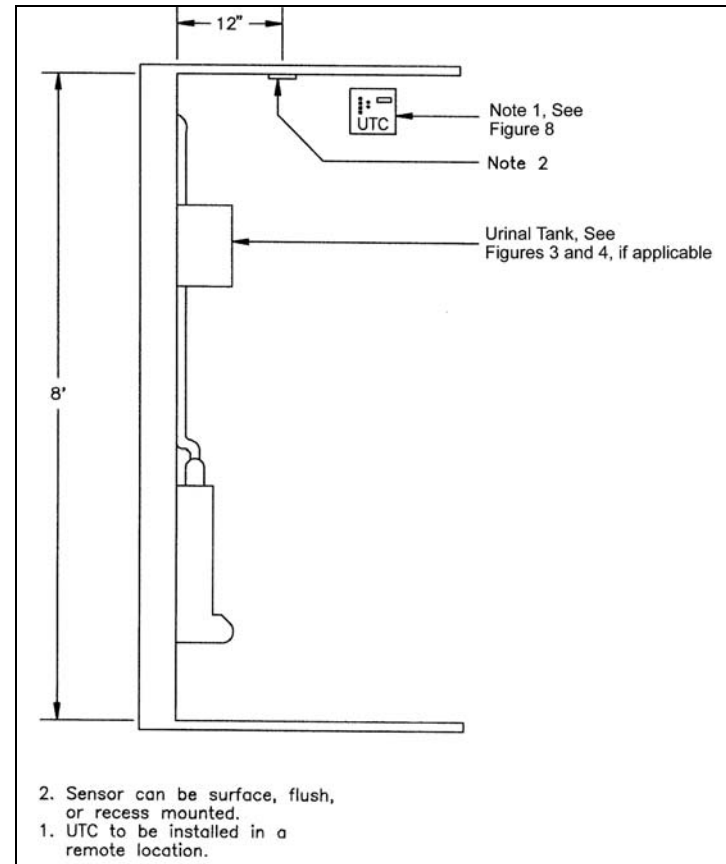


Figure 1: Completed Installation

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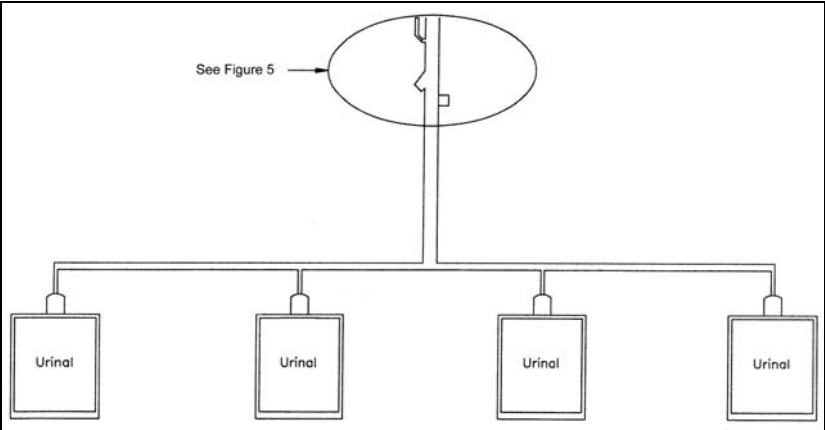


Figure 2: New Installation

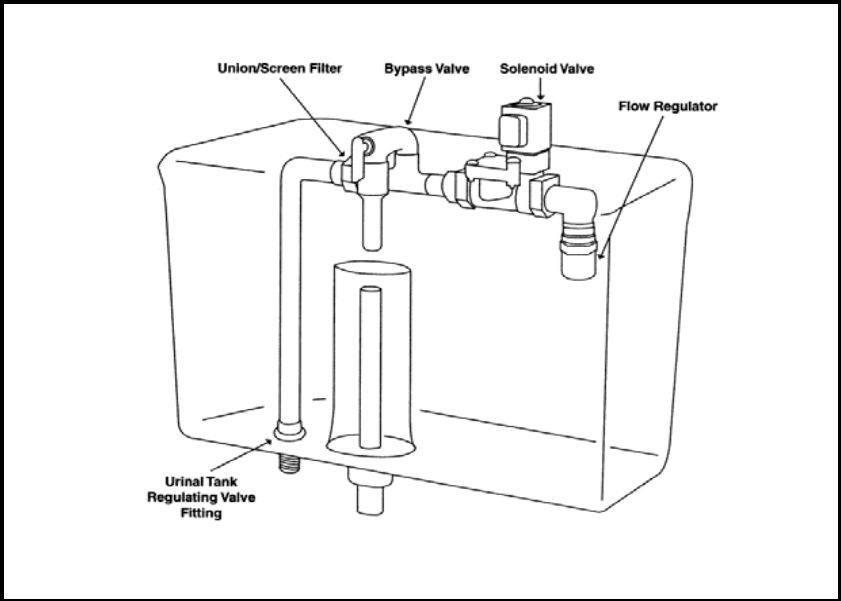


Figure 3: Urinal Tank Retrofit

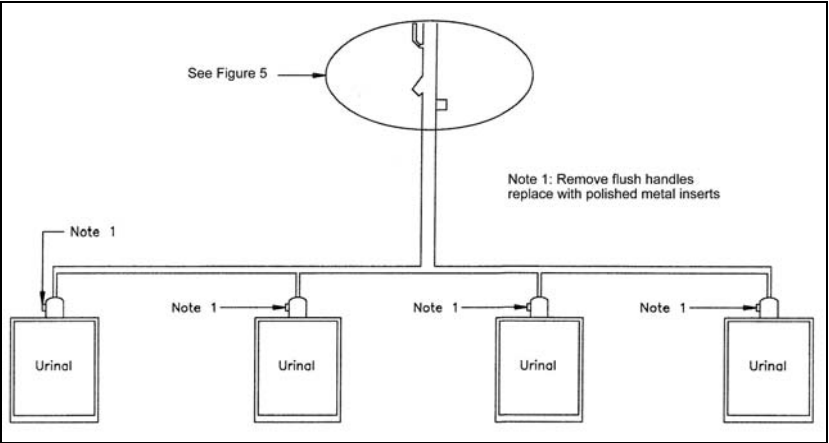


Figure 4: Flush Valve Retrofit

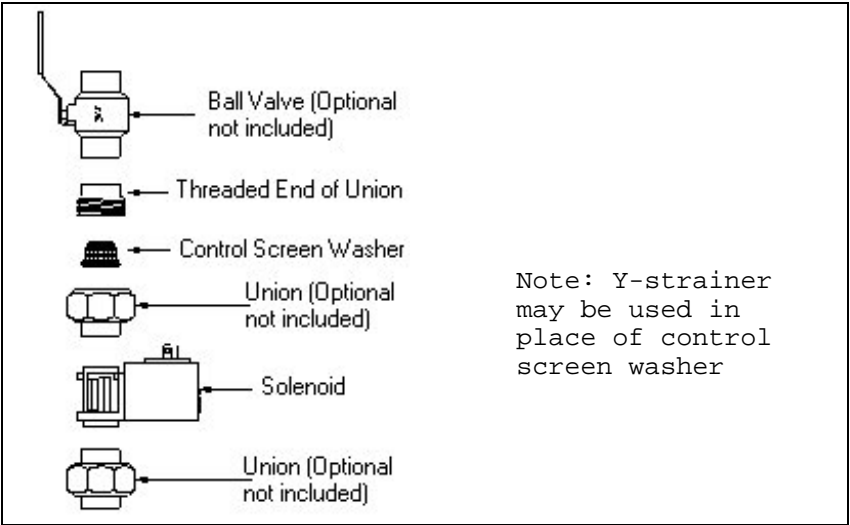


Figure 5: Flush Valve Retrofit/New Construction Details

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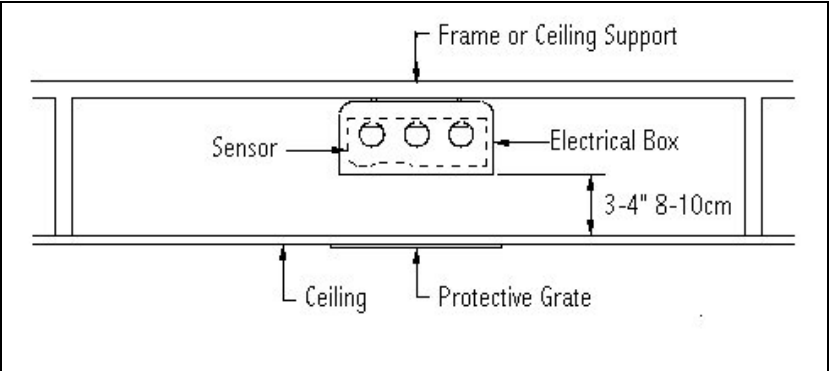


Figure 6: Recessed Sensor Mounting

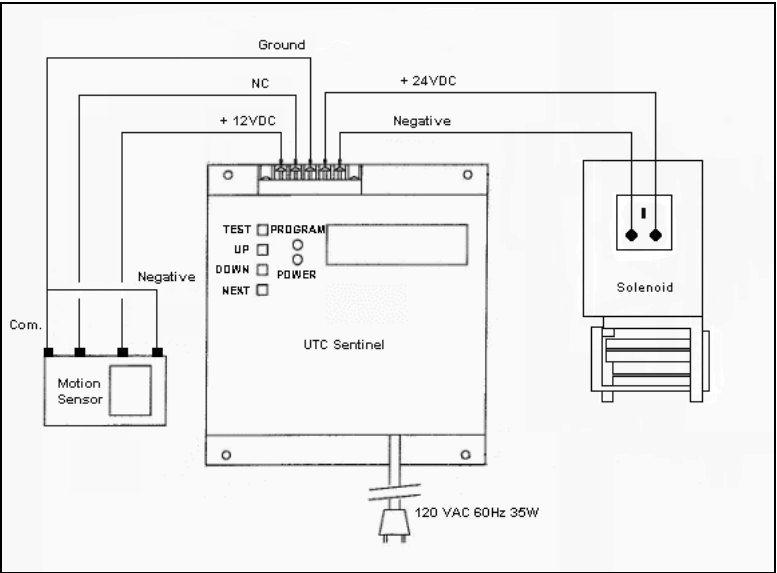


Figure 7: UTC Sentinel Control Unit & Wiring

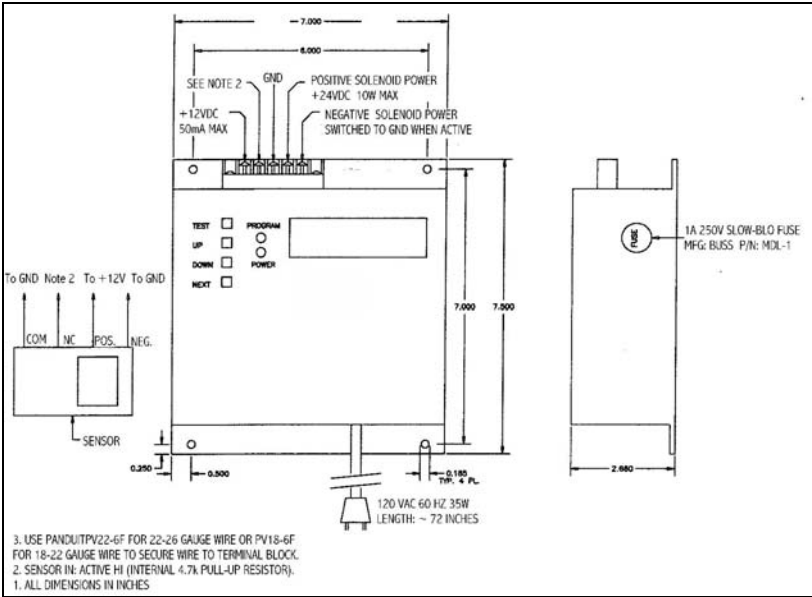


Figure 8: Detailed UTC Sentinel Control Unit & Wiring

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Mounting the Motion Sensor

This section provides information on:

- general mounting instructions
- special concerns for mounting the motion sensor

General Mounting Instructions

See Figures 1, 6, 7.

The motion sensor may be mounted in one of the following three ways:

- Recessed above the ceiling
- Flush mounted on the ceiling
- Surface mounted on the ceiling

When recessing the motion sensor a 6" x 8" grate must be installed to cover and protect the sensor. This grate, available through Water Matrix, is designed to allow the sensor to view the urinal area without obstruction.

A protective cage is also recommended for flush mount and surface mount applications. This cage, available through Water Matrix, is designed to allow the sensor to view the urinal area without obstruction.

Drywall and T-bar Ceilings

To mount motion sensors for drywall and t-bar ceilings:

1. Select a location on the ceiling which is centred and directly above the urinals to ensure optimal performance of the UTC Sentinel™ system.



The location must have an unobstructed line of sight to the urinals.

2. Cut an access hole in the ceiling large enough to accept a single gang electrical junction box, approximately 2.5” by 3.5 “ (6 by 9cm). This hole should be located approximately 1 foot (30 cm) out from the wall where the urinals are located and in the center-most position.
3. A larger hole is required for recessed installation on a drywall ceiling. The junction box must be fastened to a beam or bracket holding it approximately 3” to 4” (7.5 to 10 cm) above the ceiling. See Figure 6.
4. Run the two following low voltage wires above the ceiling:
 - a five conductor wire from the access hole to the location where the UTC Sentinel™ control unit is installed
 - a two conductor wire from the access hole to the solenoid valve



See Mounting UTC Sentinel™ Control Unit and Figure 7 for location instructions.

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5. Check that an extra 12" (30cm) of wire is left at both ends of each run.
6. Locate the two low voltage wires protruding from the access hole.
7. Pull them through an opening in the junction box.
8. Secure the low voltage wires in the junction box.
9. Insert the junction box into the access hole.
10. Mount junction box to the ceiling securely. See Figure 6.
11. Connect the five conductor and two low voltage wires at the motion sensor and solenoid valve as follows:
 - at the motion detector, 5-conductor wire:
 - #1 to negative on motion detector
 - #2 to positive on motion detector
 - #3 to NC on motion sensor
 - #4 to 2-conductor wire #1
 - #5 to 2-conductor wire #2






A jumper wire must be connected between the common and the negative terminals.

- At the solenoid valve, 2-conductor wire:
 - #1 to Left Lead #1 of valve
 - #2 to Right Lead #2 of valve
12. Select the proper lens curtain from the masking kit supplied with the Flush Mount SureShot Motion sensor.

13. Install the lens curtain on the inside of the motion sensor lens to define the area the sensor will monitor. (See instructions provided with sensor).
14. Mount the motion sensor in the electrical junction box with the hardware supplied.
15. Install the cover plate and the motion sensor as an integrated unit.

Concrete, Steel and Fire-rated Ceilings

To mount motion sensors for concrete, steel and fire-rated ceilings:

1. Determine whether the low voltage wires are to be run with the conduit or wire mould.
 -  If the ceiling is tiled or has a quality finish, use wire mould.
2. Select a location on the ceiling which is centred and directly above the urinals to ensure optimal performance of the UTC Sentinel™ system.
 -  The junction box accommodates the installation of the motion sensor.
3. Run the selected conduit or wire mould to the solenoid valve and to the UTC Sentinel™ control unit location from the junction box.
 -  For location instructions, see Mounting the UTC Sentinel™ Control Unit and Figure 7.
4. Run the following two low voltage wires, using the conduit or wire mould:

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- a five conductor wire running from the junction box to the UTC Sentinel™ box
 - a two conductor wire running from the junction box to the solenoid valve
5. Continue from point # 5 in Drywall and T-bar Ceilings, above.
-



The cover plate and the motion sensor must be installed as an integrated unit.

Special Concerns

Water Matrix recommends that the motion sensor be protected from vandalism with one of the grates mentioned in the General Mounting Instructions on page 16.

It is also recommended that in washrooms where the urinal tank is exposed to the public that a stainless steel protective cover be installed over the urinal tank to ensure no one can tamper with the electrical wires or plumbing by-pass. These protective covers are available through Water Matrix.

To reduce visibility of the sensor unit, put the slide cover over the sensor activation light once the sensor mounting and field of view is confirmed.

The UTC Sentinel™ Control Unit

This section provides information on:

- mounting the UTC Sentinel™ control unit
- notes on operating mode parameters

- adjustment of operating modes

Mounting the UTC Sentinel™ Control Unit

To mount the UTC Sentinel™ control unit:

1. Locate the control unit in a secure room near the washroom being serviced (utility room or alike).

If there is no suitable room available:

1. Locate the control unit above the ceiling immediately outside the washroom door.



This ensures only authorized personnel have access to the control unit.

2. Fasten the control unit securely to the wall by using appropriate wood, metal or masonry fasteners to guarantee a secure installation.
3. Connect the low voltage wires from the motion sensor to the proper leads on the control unit as follows:
 - #1 to control box lead #3
 - #2 to control box lead #1
 - #3 to control box lead #2
 - #4 to control box lead #4
 - #5 to control box lead #5

See Figure 7.

4. Identify an electrical circuit that is **not** a switched light circuit.
5. Install a standard 110V AC electrical outlet (if one is not readily available) within 4.5 feet (1.5 meters) of where the control box is to be mounted to utilize the identified circuit.

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6. Turn the solenoid valve assembly by-pass valve off when all required electrical installations are complete.
7. Plug in the control unit.
8. Check that the LED power light is lit.
The LED window displays five digit numeric read-out after a fifteen second delay.

Notes on Preset Modes of Operation

- The first digit in the L.E.D. display signifies the current mode of operation.

The inactivity delay (mode 1) is preset to flush once every 24 hours to re-prime urinal traps.

- The motion sensor delay (mode 2) is preset to activate the solenoid valve 10 minutes after the urinal has been used.
- **The solenoid cycle time (mode 3) must be programmed upon system installation.**

The set-up of cycle times and volumes is covered in the adjustment instructions outlined in Initial Set-up or Adjustment of Operating Modes.

Notes on Operating Mode Parameters

The UTC Sentinel™ has six distinct modes of operation available.

The first three modes are for normal operation and the remaining three modes are for set-up and test.

Pre-set times can be verified for each of the first three modes by pressing the **NEXT** button. This increases the brightness of the display and shows the values for each mode in sequence.

Cycle Counter

Pressing the NEXT button will also invoke the cycle counter. The number of cycles since installation (to a limit of 99,999) is displayed after the sequence of the three pre-set modes.

Mode 1

Mode 1 displays the inactivity timer.

The inactivity timer ensures that water flows to the urinals after an extended period of inactivity. This flow is designed to keep the urinal traps primed.

The numeric display shows the time remaining in hours and minutes before the solenoid valve is activated.

The control unit must be in Mode 1 when starting test and set-up sequences.

Mode 2

Mode 2 displays the motion sensor delay timer.

After urinal use is detected the numeric display shows the time remaining in minutes and seconds

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before the solenoid valve is activated. When the time elapses, the solenoid valve is activated and the numeric LED display shows Mode 3.

Mode 3

Mode 3 displays the solenoid valve cycle time.

The solenoid valve cycle is the length of time needed to flush the urinals (either by filling the urinal tank to siphon level, activating a flush or by direct feed flushing through the solenoid valve in the main supply line).

The numeric display shows the time remaining minutes and seconds before the solenoid valve shuts off. When the time elapses, the solenoid valve shuts off. The urinals have been flushed and the numeric LED display returns to Mode 1.

Mode 4

Mode 4 is accessible only in the set-up mode.

This mode allows the timing of Mode 3, the solenoid valve cycle, to be changed without cycling the solenoid valve. This is useful if modification is required after initial set-up. It allows the Mode 3 setting to be modified without restarting the timer at “0”.

Mode 5

Mode 5 is displayed to confirm that the test mode has been properly activated.

The motion sensor waits to detect motion.

The numeric LED display reads 5 0100 indicating that if motion is detected, a one minute count down begins. When motion is detected, the numeric LED display reads Mode 6 and the count down begins.

Instant Flush Feature

Pressing the test button a second time in Mode 5 before triggering the motion sensor initiates an “instant flush” by immediately opening the solenoid valve. Note that if any motion is detected by the sensor before the test button is pressed for the second time the one minute countdown timer will be initiated as part of the normal test procedure.

Mode 6

Mode 6 is displayed to confirm that the motion sensor has been activated in test mode.


The UTC Sentinel™ is designed to run a test of the system, reducing the existing Mode 2 time setting.

The numeric display shows the seconds remaining before the solenoid valve is activated. When the time elapses, the solenoid valve is activated and the numeric LED display reads Mode 3.

Initial Set-Up or Adjustment of Operating Modes

Upon initial set-up of operating modes the following steps should be followed:


1. Determine which mode the control unit is operating in by checking the first digit displayed in the LED window.
-

 If the control unit is not in Mode 1, reset the control unit to Mode 1 by unplugging the unit for 30 seconds and then plugging it in again or wait until system completes its cycle and returns to Mode 1.

2. Press the **UP** and **DOWN** buttons simultaneously to activate the set-up sequence.


The program LED light is activated. The set-up sequence now displays Mode 1

3. Press the **UP** or **DOWN** buttons to adjust the inactivity timer. It is factory set with a value of 1.2400 (24 hours, zero minutes, zero seconds).
-

 Changes to the Mode 1 timer can only be made in one hour increments.

4. Press the **NEXT** button once to continue the set-up sequence.


The set-up sequence now displays Mode 2. Press the **UP** or **DOWN** buttons to adjust the motion sensor delay timer. It is factory set with a value of 2.1000 (10 minutes, zero seconds).


 Changes to the Mode 2 timer can only be made in one minute increments.

5. Press the **NEXT** button once to continue the set-up sequence. The set-up sequence displays Mode 3. **The Mode 3 setting must be programmed by the installer.** It is factory set at “0” (3.0000). To set-up the solenoid valve operation timer on a urinal tank:
6. Ensure the urinal tank is completely drained.
7. Ensure the bypass valve is in the off position.
8. Press the **UP** button to start the flow of water to the urinal tank and start the timer.

The flushing will begin when the urinal tank is full and the siphon is activated. Once there is a flow of water to the urinals:

Allow another 10 to 15 seconds of flow and then press the **DOWN** button to stop the flow of water to the urinal tank and the mode timer. (The additional 10 to 15 seconds assists in compensating for water pressure fluctuation).


 Changes to the Mode 3 timer can only be made in one second increments.

 If the down button is not properly engaged, the control unit will operate for 99 minutes and then default to the last programmed cycle.

8. Press the **NEXT** button once to continue the set-up sequence.

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The set-up sequence now displays Mode 4. Adjustments to the solenoid valve operation timer time can be made.

 This sequence is used to increase or decrease the time programmed for Mode 3 without activating the solenoid valve.

When in the set up mode, the system returns to normal operation thirty seconds after the last change is entered. If no new settings have been entered, the system returns to normal operation with the previous settings unaltered.

Changes to the time settings are saved in the control unit memory and are used by the UTC Sentinel™ as the pre-set flush cycle times.

During a power outage, the system will not function. Upon resumption of power the system will resume normal operation with all programmed settings restored. There is no need to reset the after power interruptions.

Preventative Maintenance

Although the UTC Sentinel™ is designed for simple, trouble-free operation, periodic preventative maintenance will ensure proper operation of the solenoid valve and water flow.

The screen filter should be cleaned periodically. Frequency will be determined by local water quality.

Remove the sediment from the screen filter by:

- turning off the water at the isolation valve
- disassembling the union
- removing the screen washer
- back-washing the screen
- replacing the screen washer and assembling the union

Testing the system after cleaning the screen filter is described on page 30.

Troubleshooting

This section contains information on troubleshooting specific situations when using or installing UTC Sentinel™ equipment.

Common Problems

The following procedures should be completed if the system is not operating as outlined in the Notes on Operating Mode Parameters.



Complete these checks before calling Water Matrix at 1-800-668-4420 for help.

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Troubleshooting the UTC Sentinel™ Control Unit

Check the electrical power supply by:

1. Locating the UTC Sentinel™ control unit.
2. Check that:
 - the LED power light is on
 - there is a numeric display in the LED window

If the LED power light is not on:

1. Check for the following:
 - that the unit is plugged into an electrical outlet
 - that if the electrical outlet is controlled by a switch, it is in the on position
 - that the fuse is not burnt out – the fuse is located on the right hand side of UTC Sentinel™ control unit
 - that the breaker at the main electrical panel is set to on



When power is first applied to the control unit, there is a fifteen second delay before the LED window shows a numeric display.

Testing Operation by Completing the Test Sequence


To complete the test sequence:


1. Ensure the system is in Mode 1.
2. Press the test button on the control box once to activate the sequence.

The numeric display reads Mode 5 and indicates a 1-minute delay time (5.0100).

2. Enter the sensor's field of vision to activate the motion sensor.

The numeric display reads Mode 6. (6.0059) A 1-minute count down begins.

 If the numeric display does not go to Mode 6, verify that the motion sensor has been activated. To do this, check the red indicator light behind the cover plate on the sensor. Ensure it illuminates with motion in its field of vision.

 If the sensor does not trigger Mode 6 activation it is likely there is a problem with the sensor or its connections.

After the one minute count down timer has elapsed:

- the numeric display will read Mode 3
- the solenoid valve has now been activated
- the urinal tank begins to fill or the urinals begins to flush

If water does not begin to flow to the urinal tank or the urinals:

1. Check that the water supply is turned on by turning on the by-pass valve at the urinal tank. This should produce an immediate flow of water.

If the water flow from the by-pass valve is only a trickle, the screen washer in the union is plugged with sediment:

Remove the sediment from the union by:

- turning off the water at the isolation valve

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- disassembling the union
- removing the screen washer
- back-washing the screen
- replacing the screen washer and assembling the union

When the solenoid valve operation time has elapsed, the numeric display returns to Mode 1 and the water stops flowing to the tank or urinals.

If the system operates as described then the program is working as per specifications.

If water flows to the urinal tank but does not initiate a flush at the end of the Mode 3 sequence:

- Check the water level in the tank and adjust the solenoid activation time through the Mode 4 setting. This ensures sufficient water flow to fill the urinal tank to the siphon activation level on its next cycle.



See Adjustment of Operating Modes for Mode 4 timing changes.

Calling For Technical Assistance

If the troubleshooting instructions do not solve the problem encountered or if the problem is not outlined in this section, please contact the Electronics Division of Water Matrix by calling: 1-800-668-4420.

Appendices

This section contains information on:

- operating specifications
- warranty information

Operating Specifications

Transformer:

CSA/UL approved Class 2
Input: 120V AC/60 Hz/35W
Output: 24V DC/1.2 amps

Solenoid Valve:

10W rating 24V DC@500 mA
encapsulated coil with ground
CSA/UL approved
All brass construction

Motion Sensor:

16V DC@50mA rating
Normally closed operation
infra-red motion sensing

Warranty Information

LIMITED WARRANTY

Water Matrix, having its principal place of business at 331-3 Trowers Rd. Woodbridge, ON L4L 6A2 ("Manufacturer") warrants its UTC Sentinel™ product (the "Products") as follows:

1. Limited Warranty.

Manufacturer warrants that the Products sold hereunder will be free from defects in material and workmanship for a period of 2 years from the date of purchase. If the Products do not conform to this Limited Warranty during the warranty period (as herein above specified), Buyer shall notify Manufacturer in writing of the claimed defects and demonstrate to Manufacturer satisfaction that said defects are covered by this Limited Warranty. If the defects are properly reported to Manufacturer within the warranty period, and the defects are of such type and nature as to be covered by this warranty, Manufacturer shall, at its own expense, furnish, replacement Products or, at Manufacturer's option, replacement parts for the defective Products. Shipping and handling of the replacement Products or replacement parts shall be at Buyer's expense.

2. Other Limits.

THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A

PARTICULAR PURPOSE. Manufacturer does not warrant against damages or defects arising out of improper or abnormal use or handling of the Products; against defects or damages arising from improper installation (where installation is by persons other than Manufacturer), against defects in products or components not manufactured by Manufacturer, or against damages resulting from such non-Manufacturer made products or components. Manufacturer passes on to Buyer the warranty it received (if any) from the maker thereof of such non-Manufacturer made products or components. This warranty also does not apply to Products upon which repairs have been effected or attempted by persons other than pursuant to written authorization by Manufacturer.

3. Exclusive Obligation.

THIS WARRANTY IS EXCLUSIVE. The sole and exclusive obligation of Manufacturer shall be to repair or replace the defective Products in the manner and for the period provided above. Manufacturer shall not have any other obligation with respect to the Products or any part thereof, whether based on contract, tort, strict liability or otherwise. Under no circumstances, whether based on this Limited Warranty or otherwise, shall Manufacturer be liable for incidental, special, or consequential damages.

4. Other Statements.

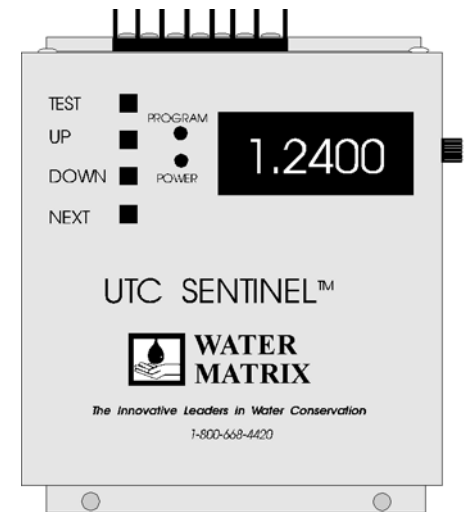
Manufacturer's employees or representatives' ORAL OR OTHER WRITTEN STATEMENTS DO NOT CONSTITUTE WARRANTIES, shall not be relied upon by Buyer, and are not a part of the contract for sale or this limited warranty.

5. Entire Obligation.

This Limited Warranty states the entire obligation of Manufacturer with respect to the Products. If any part of this Limited Warranty is determined to be void or illegal, the remainder shall remain in full force and effect.

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