

TWT® BREAKTHROUGH TECHNOLOGY!

Technologically Advanced Method For Water & Fluid Management-Chemical-Free

Triangular Wave Technologies *Battery Powered* Microprocessor Deposit Control

Control Scale and Biological Deposits in Homes, Mobile Homes, RV's, Boats, Trucks, Off Road Equipment & more.
Plumbing Systems • Coolant Systems & Fuel Systems



Water/Fluid Treatment and Conditioning: Patented Triangular Wave Deposit Control System

The *Triangular Wave Deposit Control System* is an advanced method for controlling scale and bio-fouling. The patented *Triangular Wave System*, solenoid wrap and/or factory-wrapped and protected TWT Reaction Chamber (solenoid coil) connects to the TWT Deposit Controller and power supply, which *constantly changes the polarity, frequency and amplitude* of the current being sent to the solenoid. This forms an ever-changing electrical current, which induces a constantly changing magnetic field that treats the particles in the water 100% of the time.

How the Triangular Wave Systems Control Scale, and Biological Deposits.

Scale and biological deposits form when these elements "stick" to the surfaces of tubes/pipes, water tanks, heat exchangers, plumbing fixtures and other water-fed equipment. The Triangular Wave Deposit Controller charges the particles in the water so that they will not stick together or stick to any surfaces.

Simply Said... In effect, a clean, corrosion-free delivery system is restored and maintained in an environmentally safe and chemical-free manner. The result is clean pipes, water tanks and tubing with no bio-film and reduced bacterial contamination.

Breakthrough Technology Means...

- Provide the effects of softened water/fluid, neutralizes calcium hardness effects
- Prevents scale & slime buildup on tubes/piping and equipment surfaces
- Controls Algae and Bacteria
- Reduces Corrosion
- Uses no salts or other chemicals
- Service and **MAINTENANCE-FREE!**
- Improves efficiency of all water/fluid appliances & extends their life cycle
- Quickly pays for itself and continues saving (energy, water, fluid & maintenance)
- Extends Life of Heating Elements
- Designed for safety: The output is safe to both personnel and equipment.

There is **NO ELECTRICAL CONTACT WITH THE PIPE**

Highly Cost Effective:

- Savings in maintenance include reduced cleaning, monitoring, and chemical costs.
- Savings in electrical/fuel expenses, due to cleaner system components and better heat transfer, can also be significant.
- Protects expensive capital equipment; cleaner systems, with less chemicals added, will operate more efficiently, and will have a longer working life.
- Operating costs of TWT System is very small and the system requires no maintenance.
- TWT Deposit Control Systems enhance other treatment technologies as well, including engine additives, ozone, ultraviolet, and other filtration systems, keeping them clean and enhancing their operation. In this way, their full treatment benefits are realized, with reduced maintenance requirements. Consider using TWT Deposit Control Systems in conjunction with any fluid treatment systems as a complementary technology.
- Easy to follow illustrated application and installation instructions
- **GUARANTEED**



TWT-5C8-163-12VDC



Engine Coolant System Application Benefits

- Maintains cooling efficiency of the radiator
- Extends the useful life of the coolant
- Keeps deposits from forming on the radiator core
- Helps extend the life of the radiator core
- Reduces wear and abrasion of cylinder walls due to heat stress
- Cooler running temperatures retard oil deterioration and carbonization; enhancing ring performance, and helps eliminate oil blowby from the cylinder rings
- Keeps block water jacket and ports clean and improves the cooling efficiency of the cooling system
- Reduces equipment downtime, coolant additives and maintenance

Most Engine Failures Originate in the Fuel Tank

Contaminated fuel results in clogged filters, sludge build-up in the tanks and corroded injectors, frequently leading to smoking engines, costly downtime and maintenance. Diesel engines continually re-circulate the fuel, the surplus not used in combustion goes back to the tank through the return line, aggravating the process of fuel degradation.

Symptoms of clogged and dirty tanks!

- Clogged and slimy filters
- Dark, hazy fuel
- Sludge build-up in tank
- Excessive smoke
- Loss of power and RPM
- Corroded, pitted injectors
- Foul odor

Development of Microbial Growth in Fuels

Microbial contamination is not specific to any fuel type— marine, aviation, automotive and home fuels are all susceptible. Similarly there is no single specific organism that can be identified as being responsible for degradation and spoilage. As a general rule, wherever fuel and water come into contact in a storage or distribution system microbial contamination is likely to occur. No matter how well maintained a vehicle system is, a water bottom is almost invariably present.

Consequences of Microbial Growth

Once a microbial population becomes established fuel quality rapidly deteriorates. Problems such as fuel haziness, degradation of additives, microbial induced corrosion failure to meet specifications, corrosion, sludge formation, filter plugging and failure to meet specifications. All of these problems are related directly to the presence of microorganisms or their associated by-products.

Clogged Filters, Dirty Tanks!

Fuels and oils are susceptible to natural deterioration, like any other organic fluid. Oxidation, chemical incompatibility, water and microbes all contribute to the process of polymerization and stratification. This results in poor fuel quality, tank sludge, bio-film and acids. These by-products of the process of fuel breakdown cause clogged filters, corroded injectors, pumps and tanks, incomplete combustion, carbon build-up and loss of power, which ultimately leads to complete engine failure.

Fuel Treatment Technology

In general, the quality of the fuel delivered to the end user is the best any supplier has available, in particular when it concerns large customers. However, the continuous process of bio-deterioration and fuel break down in our tanks determines the fuel quality our engines have to deal with.

This quality is mainly determined by the “bio-reactor” in the bottom of the tank. During normal operations, we never completely empty the tank. With each new fuel delivery we keep adding water, particles, oxygen and biological contaminants to the residual fuel, while water continuously accumulates from condensation. As a result, acid and tank sludge develop in fuel systems as a by-product of “Fuel Breakdown”. These by-products cause filtration problems, sludge build up in tanks, and bacterial corrosion on injectors, nozzles, pumps and tanks, which lead to incomplete combustion, excessive harmful emissions (smoke), and ultimately to equipment failure.

Chemical treatment requires the continuous use of costly toxic additives and only effects microbial contamination. Triangular Wave Technology does much more, its inductive effects on the fuel result in the continuous supply of “clear & bright” stabilized fuel in tanks and delivery systems.

Two options to solve problems associated with fuel deterioration

1. Chemical Treatment (biocides):

When properly applied and monitored, the continuous use of specific, expensive toxic chemicals can be effective in controlling microbial contamination. However, if the maintenance routine of religiously adding the chemicals fails and microbes proliferate, the resultant formation of sludge and acids will damage equipment and require other chemical treatment as well as extremely costly physical cleaning.

2. Non-Chemical TWT® Deposit Control Fuel Treatment Technology:

Triangular Wave Technologies, Inc. provides maintenance-free systems, that is installed to continuously protect the **total coolant/fuel system**. This technology improves stability, while it prevents and reverses the process of build-up in tanks and filters. TWT technology has proven to be reliable and effective in providing **optimal treatment and conditioning**, which enhances engine performance and significantly reduces fuel consumption & emissions (smoke).

Benefits of the TWT fuel treatment system:

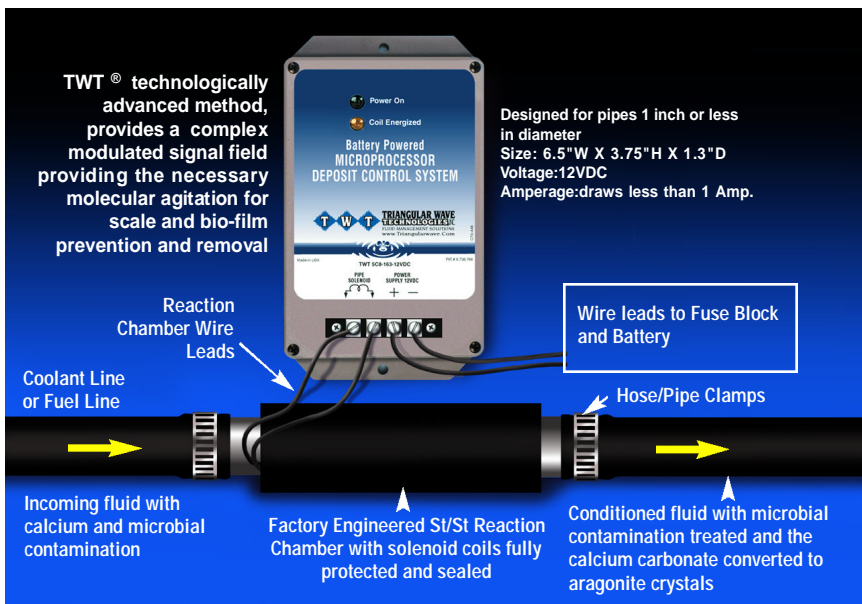
- Alignment of fuel molecular structure to achieve greater percentage of combustion
- Prevents clogged and slimy filters
- Improves fuel stability
- Reverses sludge build-up in tanks
- Helps stop corrosion and pitted injectors
- Prevents clogged filters and tank cleaning
- Provides optimal fuel quality
- Extends the life of engines, injectors and fuel
- Reduces costly toxic chemicals
- TWT treatment system is virtually maintenance free, has no moving parts, no electrical hook-up and lasts the lifetime of the installation

The results are immediate and easily recognized, TWT Deposit Controllers extend the life of filter elements, pumps, injectors, nozzles, engines, tanks and of the fuel itself, in short engines run better and smoke less.

These benefits translate into lower operating cost of capital intensive equipment, less maintenance and downtime, reduced smoke and other harmful emissions.

Coolant & Fuel (Diesel) System Application & Installation Guidelines

RV's, Boats, Trucks, Off Road Equipment & more.



TWT-5C8-163-12VDC Deposit Controller System.

TWT® Deposit Controllers and Reaction Chambers for larger pipe size applications available upon request

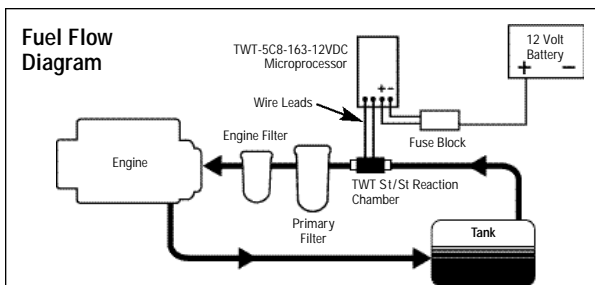
Installation Instructions

The TWT-163 Microprocessor should be mounted inside the vehicle at any location which will provide access to the vehicle fuse block and for the Reaction Chamber/ solenoid coil wiring into the engine bay. The Deposit Controller requires 12vdc to power the circuit. Select a fused circuit in the fuse panel which is switched by the ignition switch. The Controller is to be on (12vdc) when the engine is running. Connect one wire (+12vdc), to the switched fuse panel and then to the input barrier strip on the Controller. The 2nd wire lead to the ground connection (-) may be connected at any convenient chassis ground, then connected to the Controller barrier strip (-) terminal. This completes the power connection.

The Reaction Chamber, if required is a stainless steel tube that is to be installed "in-line" in the coolant/fuel engine system. Standard hose clamps will secure the Reaction Chamber to the coolant hoses as illustrated. Secure the reaction Chamber to prevent the Reaction Chamber from moving around during operation.

The Reaction Chamber/solenoid coil wires should be fed through the firewall to the Controller's location. Connect the two wires leads to the terminals on the Controller as illustrated. Be sure the wires clear the fan blades or any other moving parts. Secure the wires to the engine bay to ensure they remain in place and cannot come into contact with any moving parts.

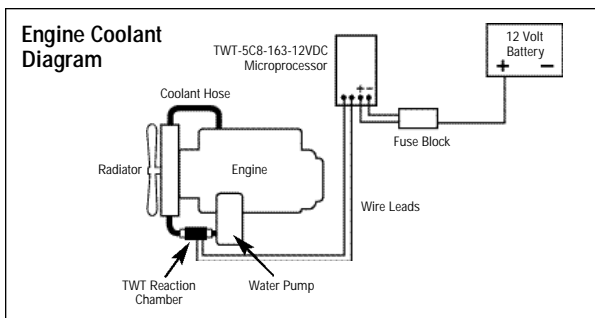
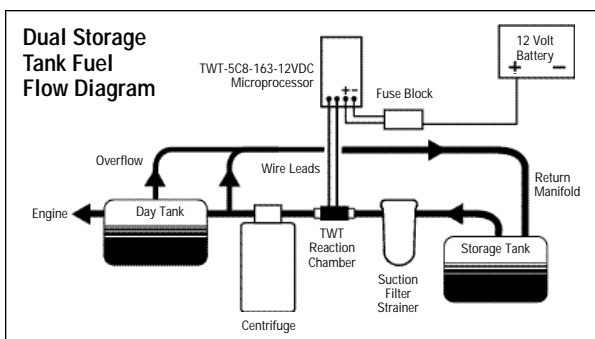
When the ignition is turned on the green led lamp on the deposit Controller will light up, indicating the system is in operation. The yellow led lamp will alternate on and off, indicating Reaction Chamber, solenoid coil is energized. The yellow lamp will go out if the load circuit is broken or open.



Some Basic Application Guidelines

Optional Application:

If there is no fused circuit "switched" position in the fuse panel, then you may choose to use a relay switch. The relay switch should have a fuse, and an on off control.



Illustrated diagrams are not to scale, for reference only, licensed mechanic recommended for all applications & installations



TWT Recommended Residential, Boating & RV Application Water Line –Point-of-Entry/Point-of-Use

TWT® technologically advanced method, provides a complex modulated signal field providing the necessary molecular agitation for scale and bio-film prevention and removal

Designed for pipes 1 inch or less in diameter
Size: 6.5" W X 3.75" H X 1.3" D
Voltage: 12VDC (battery not included)
Amperage: draws less than 1 Amp.
Solenoid coil wrapping length 4" (double layer, see diagram below)

Battery Powered MICROPROCESSOR DEPOSIT CONTROL SYSTEM

Power On
Coil Energized

TRIANGULAR WAVE TECHNOLOGIES
FLUID MANAGEMENT SOLUTIONS
www.TriangularWave.com

TWT SCB-160-12VDC
POWER SUPPLY 12VDC

Rechargeable Battery Power Supply

12 Volts

Specially designed Reaction Chamber with solenoid coils fully protected and sealed

Incoming water/fluid supersaturated with calcium, minerals and colloids

Conditioned water/fluid with minerals, colloids treated and the calcium carbonate converted to aragonite crystals

Freed water molecules dissolving existing scale



PVC Reaction Chamber



St/St Reaction Chamber

Reaction Chamber—Refer to product list for item numbers and sizes

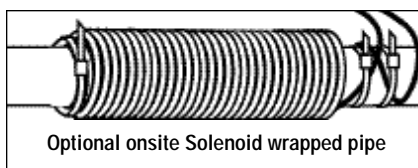
The TWT Reaction Chamber is part of the patented TWT Deposit Control Technology, the function of which is to control scale and bio-film in the plumbing infrastructure, fixtures, and water-fed appliances. The Reaction Chamber provides a chamber through which the water/fluid flows and is exposed to the triangular wave signal that lies at the heart of the deposit control technology. As the fluid passes through, it is treated and then carries that treatment downstream, to condition the rest of the plumbing system, non-chemically and reliably.

HARD WATER PROBLEMS SOLVED EASILY! TWT® Your Simple and Safe Solution!

TWT® Deposit Controllers and/or Reaction Chambers for larger pipe size applications available upon request

Using modern integrated circuitry and signal processing techniques, the patented TWT Deposit Control Technology works by producing a complex frequency-modulated waveform. This creates a deionizing effect, induced by physical means, which increases the solubility of the minerals, and colloids in the liquid and changes the shape, size and texture of the calcium carbonate crystals. By this reaction, the minerals, colloids and crystals lose their adhesive properties and remain in suspension in the liquid. Pre-existing scale is taken back into solution and removed in the same way. The effects are immediate and long lasting down stream.

In effect, a clean, corrosion-free delivery system is restored and maintained in an environmentally safe and chemical-free manner. The result is clean pipes, water tanks and tubing with no bio-film and reduced bacterial contamination.



Optional onsite Solenoid wrapped pipe

Copper pipes, although acceptable, are one of the more difficult of materials to work with. To overcome this difficulty when manually wrapping the solenoid coil on-site ... Triangular Wave Technologies has designed its Copper Pipe Signal Enhancer To use in conjunction with the TWT Deposit Control Systems when required. This unit is placed between the controller and the cop-

per pipe solenoid. The function of the signal enhancer is to provide a proper impedance match and to ensure maximum energy transfer between the controller and the solenoid, which ensures enhanced treatment of the fluid. The Copper Pipe Signal Enhancer must be used in all copper pipe applications to maximize the performance, and provide a boost to your application.



Water Feed Line Application Benefits

- Removes and prevents scale build-up and mineral deposits; controls algae and bacteria; biofilm is removed and prevented from re-occurring
- Improves efficiency of all water-fed appliances
- Provides the effects of softened water without chemicals
- Water and energy savings
- The combined reduction of water and chemical costs is enough to pay for the Triangular Wave System in as little as 9-18 months.

Triangular Wave Technologies (TWT®) Battery Powered TWT-163-12VDC Deposit Control Systems



The Triangular Wave System represents a significant breakthrough in electromagnetic technology. The triangular wave has made possible the use of electromagnetic technology in applications of all sizes.

TWT-5C8-163-12VDC

Designed for pipes 1 inch or less in diameter
Microprocessor size: 6.5"W X 3.75"H X 1.3"D
Voltage: 12VDC (battery not included)
Amperage: draws less than 1 Amp.

Solenoid coil wrapping length: 4 inch wrap–The solenoid is wound in two overlapping layers, approx. 60 turns per layer

High Temperature Applications for Triangular Wave Technologies Deposit Control Systems 176°F and above (Teflon Wire Required)

Solenoid coil wrapping length: 3.5 inch wrap– The solenoid is wound in two overlapping layers, approx. 60 turns per layer

Application Guidelines

1. Onsite solenoid wrap wire included (Teflon special order)
2. Copper pipe: TWT-CSE-0227 copper signal enhancer (not included)
3. Reaction Chamber (not included): Refer to product list for item numbers and sizes

Item

Applications

TWT-5C8-163-12VDC For hose/pipe 1" or less in diameter

TWT® Deposit Controllers for larger pipe size applications available upon request

Kit Packaging:

Kits include: TWT-5C8-163 Microprocessor • Wire Spool
Hose Clamps • Wire Fasteners & Installation Manual

IMPORTANT REMINDER:

To ensure the maximum effect and results of the Deposit Control System please follow these guidelines

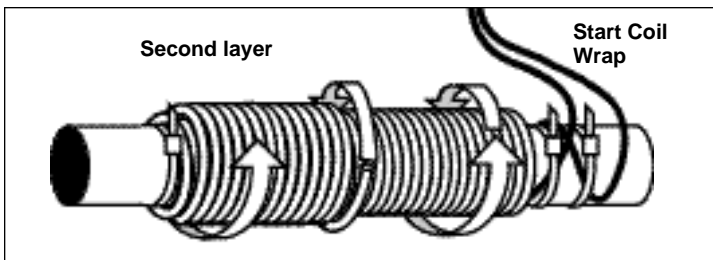
The Triangular Wave Deposit Control System creates an electromagnetic field which is used to address the fluids in the pipe.

Do not install the wire coil on any magnetic pipe, such as **STEEL, GALVANIZED STEEL, DUCTILE IRON, OR CAST IRON.**

When the coil is applied to such a pipe, the pipe becomes a shield and prevents the magnetic field from entering the fluid path.

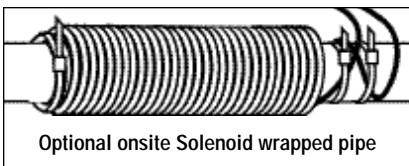
To address such pipe environments, use the appropriate TWT reaction chamber (for copper pipes use the copper pipe signal enhancer) Visit the TWT website—www.triangularwave.com for the product list and additional technical information

ON SITE SOLENOID INSTALLATION



Do Not Twist or Cut Wire or the System WILL NOT Function. Place the second layer directly on top of the first layer. Be careful to wind the second layer tightly in the same clockwise manner as the first layer back in the direction of the starting point.

COPPER PIPE SIGNAL ENHANCER (For copper pipes only)



Enhancer To use in conjunction with the TWT Deposit Control Systems when required.

This unit is placed between the controller and the copper pipe solenoid. The function of the signal enhancer is to provide a proper impedance match and to ensure maximum energy transfer between the controller and the solenoid, which ensures enhanced treatment of the fluid. The Copper Pipe Signal Enhancer must be used in all copper pipe applications to maximize the performance, and provide a boost to your application.



TWT FACTORY WRAPPED REACTION CHAMBERS



PVC Reaction Chamber



St/St Reaction Chamber

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For additional specific instructions regarding the application and installation of the TWT systems, please refer to your Owner/Installation Manual before any installations are performed with our products & systems.



TWT® Technologically Advanced Methods for Water & Fluid Management “The Competitive Edge”

TWT® products and systems provide technologically advanced methods for water and fluid management that are both efficient and cost-effective. Components and subsystems chosen from across the range of treatment methods can be combined in different configurations to provide custom solutions specific to GPM requirements and to any industry, site or application. TWT systems work to consistently deliver high quality water, reduce scale and bio-fouling in Plumbing Systems, Coolant Systems, Fuel Systems, and to increase efficiency of both once-through and re-circulating HVAC, process cooling, agriculture, industrial processing, waste water and other fluid based systems. Each product line offers a variety of both stand-alone and comprehensive treatment solutions for end-to-end fluid management, for all types of applications.

**To learn more about TWT products & systems
visit our website at www.Triangularwave.com**



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