# Marschalk
# Model #59000 Low Submergence and Model #59500 Standard Submergence Pump Controllers

Installation and Operation Manual

Rev. 06/06/12 Part # 11150306

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# DOCUMENTATION CONVENTIONS

This manual uses the following conventions to present information:

WARNING

An exclamation point icon indicates a WARNING of a situation or condition that could lead to personal injury or death. You should not proceed until you read and thoroughly understand the WARNING message.

CAUTION

A raised hand icon indicates CAUTION information that relates to a situation or condition that could lead to equipment malfunction or damage. You should not proceed until you read and thoroughly understand the CAUTION

NOTE

A note icon indicates NOTE information. Notes provide additional or supplementary information about an activity or concept.

This manual covers operation and maintenance of both the Model 59000 Low Submergence and Model 59500 Standard Submergence pump controllers.

Please read the entire manual prior to using the unit, as it contains information which can help you enjoy years of low maintenance use of not only the pump controller, but System 1 pump and compressor units as well.

# Chapter 1: System Description

## Function and Theory

The controller is an integral part of the Marschalk Low Flow dedicated and portable well sampling systems. It can also be used with virtually any other bladder pump system available. It performs several functions necessary for the efficient operation of any of the System 1 bladder and gas displacement pumps. System 1 pump controllers are designed to enable the operator to match the performance characteristics of System 1, as well as other gas displacement type pumps to the unique requirements of each sampling application. For purging or sampling, the operator can easily vary the pump flow rates from purging to sampling, with consistent, uniform flow rates down to ≤ 25 mls/min. Once the controller has been setup for a particular well, operation is completely automatic. The 59000 Series controller is a Low Submergence model. In addition to two cycle operation normally found on other controllers, the 59000 offers a third enhanced fill cycle which provides an overall system versatility that is unmatched by others. The Model 59500 Controller is a Standard Submergence 2 Cycle model of the series.

## Features

Automatic Operation
Easy set-up and operation with digital timers (one timer only on 59500)

Weatherized Construction, with 0-ring seal for protection in adverse environments.
All connections for air lines and power are located on the outside of the enclosure to enable operation with the cover closed.

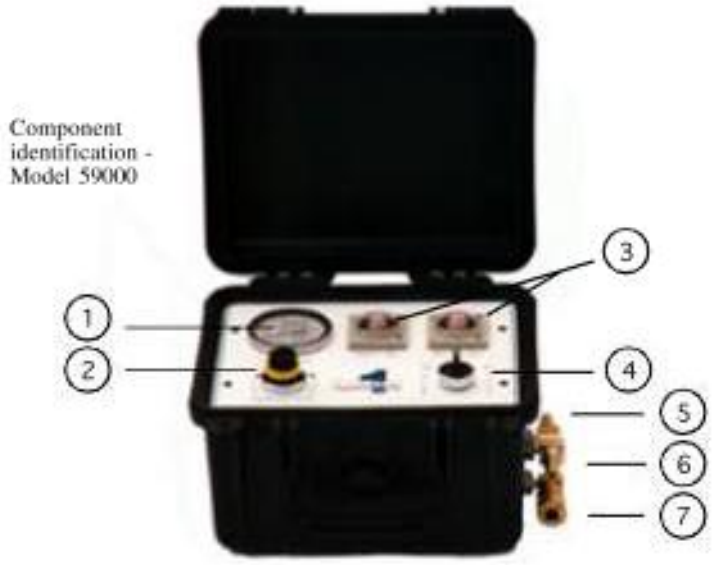
Solid State Timers provide an unmatched degree of precision and accuracy for setting and maintaining cycle times, whether in seconds, minutes, or hours. Low Power Consumption.

In addition to the use of the highest quality components, controllers have been extensively field tested for over 20 years in hundreds of applications worldwide, assuring you of dependable performance and reliability.

The major differences between the model 59000 and 59500 are;
59000
Provides Low Submergence pumping capability with a System 1 or other bladder or gas displacement pump. Low Submergence pumping enables the user to pump low yield wells to within a few inches of the bottom of the well; fill the pump faster where static water level is at or near the top of the pump; pump from the upper few inches of the water column; to connect a skimmer to the intake of the pump to pump product from the surface; and to pump from a small bucket at the surface to facilitate cleaning of the pump.

59500
Includes all capabilities of the 59000, with the exception of those where Low Submergence would be required. With the 59500, static water level must be 3 ft. or more above the intake (bottom) of the pump, and remain at this level during pumping. The 59500 can easily be upgraded to a 59000.

System Components



Model 59000

Compound Gauge - 30“ Hg to 160 psi, liquid filled

Pressure Regulator - 10 psi to 130 psi - regulator is used to set pumping pressure during pump cycle, and to adjust pump flow rate. Lock ring -down to lock regulator knob, up to unlock and adjust pressure. Turn knob clockwise to increase pressure & flow rate, and counter-clockwise to decrease pressure & flow rate

Solid State Cycle Timers (2 on 59000; 1 on 59500). Timer 1 (T1) on left controls pump on time and off, or fill, time; Timer 2 (T2) on right controls enhanced fill time when unit is operated in Low Submergence mode.

Power On/Off Selector Switch - On to the right powers unit on for 2 cycle, standard submergence operation; On to the left powers unit on for 3 cycle, Low Submergence operation. On 59500 unit operates with power switch on to standard submergence only.

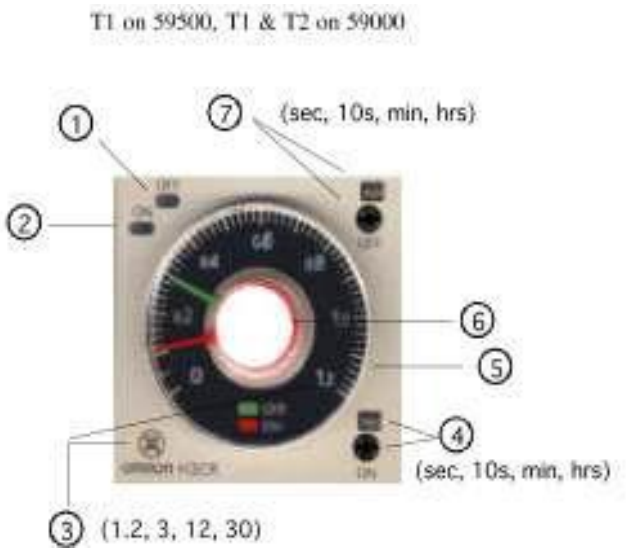
Vent/Silencer- right side lower rear

Air In from compressor/cylinder- right side forward top -brass male quick-connect plug

Air out to pump - right side forward lower-brass female quick-connect coupler

Right Side Fittings • 00th models

TIMER ILLUSTRATION




OFF Indicator (Green) - On when power is applied to controller, & during pump “Fill” cycle.
When in Standard Submergence, T1 green light only will illuminate
When in Low Submergence, T1 and T2 green lights will illuminate

ON Indicator (Orange) - On during “Pump” Cycle
ON indicator lamp on T2 (59000 model only) will illuminate during enhanced fill cycle in Low Submergence operating mode.

Rated Time Selector - use to change scale of numerals on face of timer,(0 to 1.2; 0 to 3; 0 to 12; and 0 to 30)

ON Time units selector - Use small phillips head screwdriver to change time units to seconds, minutes, or hours. Selected units appear in window above the screw.

Setting Dial for OFF (vent/fill) - green pointer

Setting Dial for ON (Pump time for T1/Enhanced Fill time for T2 in Low Submergence mode(Model 59000)

OFF Time unit selector - Use small phillips head screwdriver to change time units to seconds, minutes, or hours. Selected units appear in window above the screw.

Background-

Low Flow, Low Stress Purging and Sampling

Concept

The Low Flow purge and sample method for ground water monitoring is the result of many years of development, part of which has been undertaken by U.S. EPA. Because of the numerous advantages Low Flow offers over older, higher rate pumping methods, it has quickly become a standard for collecting high quality representative ground water samples. Low Flow procedures require pumping in a manner which minimizes stress, or water level drawdown, i.e. low-impact pumping. This is best achieved with dedicated sampling devices installed within the screened interval, and capable of producing continuous, uniform low flow rates on the order of 100 to 500 mls/min. for both purging and sample collection. The prescribed flow rates must be achieved ideally without creating any turbulence in the well, particularly at the sampling point. Primary objectives of this method are to 1) pump at a rate sufficiently low to ensure collection of samples which flow naturally across the screened interval, while minimizing or eliminating sampling induced turbidity associated with pump operation, 2) minimize or eliminate movement of the pump during pumping, The bladder pump has proven to be an ideal choice for accomplishing all of the objectives of the Low Flow method.

General

Although similar in operation to a standard System 1 dedicated well purge and sample system, operation of the Low Flow system varies slightly due to the need to purge at a relatively low, uniform rate of 100-500 mls/min.

Method Overview

One of the many advantages to the use of the Low Flow method is, if you've been using a System 1 bladder pump in the past, you do not have to replace your existing equipment. Although shorter pumps and smaller diameter tubing may be specified for new sites, higher volume pumps and tubing which may be installed at older sites can easily be used by merely changing the sampling method. Purge volumes and time may increase slightly, however these systems can still easily meet the objectives of the Low Flow method. To take full advantage of the many areas of savings associated with the method, and to ensure that the best quality samples are collected on a consistent basis, dedicated bladder pumps are preferred.

With the use of the Low Flow method, purge volumes are significantly reduced from older multiple well volume purging methods. Because the stagnant water found in a monitoring well is normally not a factor in a Low Flow application, the purge volume theoretically becomes the volume of water held in the bladder element of the pump and in the total length of the discharge tubing. When using the Low Flow method, if you are pumping at a rate which is usually considerably less than the recharge rate of the well, you will be drawing water into the pump from the aquifer through the well screen, rather than from the water column above or below the pump intake. If water in an aquifer flows horizontally, normally a given, and you pump at a rate which is less than the rate of water entering the well casing from the aquifer, the pump intake will see only that water which is moving across the screen, horizontally, from the aquifer. This being true, the only water volume which is considered stagnant when pumping begins, is the water that is theoretically held, or trapped, in the pump bladder and the discharge tubing from the previous sampling event. Water contained in the annular area between the pump intake and the wall of the screen itself may also be considered stagnant. In a typical 2" diameter well casing, the volume within this annular area is quite small. In practice it may take purging one to three or even more of these theoretical volumes before field analytes stabilize and you can collect a sample.

To meet the objectives of the Low Flow method as noted above, there are a few modifications which need to be made with respect to how the equipment is setup and operated.

For Low Flow, consideration should also be given to the rate at which the pump refills on the vent, or fill cycle. Ideally, this rate should be as low as possible to ensure that water is entering the pump at a low velocity.

# Chapter 2: System Installation

## Equipment Set-Up

Plug the filter end of the RED air supply hose into the “Air In” port on the right side of the controller. The other end of this hose connects to the air supply, which is typically an oil-less air compressor or an air or nitrogen cylinder.

Plug in the male quick-connect plug end of the YELLOW controller discharge hose to the female quick-connect coupler marked “Air Out” on the side of the controller. The other end of this hose connects directly to the pump air tubing via a push-type quick connector, or to the brass male quick-connect pump air supply fitting on the wellhead assembly for a dedicated system.

Plug the cigarette lighter male plug end of the coiled controller power cord into the 12 volt dc power pack, or into a vehicle cigarette lighter receptacle. Any 12 volt dc power supply having a capacity of 4 amp-hours or higher will adequately power the controller. Plug the other end, 5 pin amphenol plug, into the power receptacle on the left side of the controller.

Start the air compressor and allow it build up to set pressure. At this point the valve on the compressor air tank should be closed. The valve can be opened after set pressure has been reached and air hoses have been connected to the compressor and controller.

NOTE: During operation of the controller, compressed air supply at the inlet of the controller must be maintained at 40 psi minimum to ensure continuous operation of the controller.

NOTE: 12 V dc power source must be fully charged. If not, timer lamps will illuminate, but the solenoid will not function.

# Chapter 3: System Operation

## Controller Set-Up

Pull up the yellow lock-ring on the pressure regulator located in the lower left corner of the controller panel, and turn the regulator knob counter-clockwise until it turns loosely. This will set pumping pressure to a minimum.

NOTE: Adjustment of the pressure regulator to a minimum pressure setting should be done following sampling of every well to ensure that minimal pressure is applied initially to the pump in each subsequent well to be sampled.

## Setting Controller Timers

For the purpose of this discussion, assume that you will be using the Standard Submergence “On’ setting on the controller. When using the Low Flow method, it is best to use this setting whenever possible. For Standard Submergence, two cycle operation, the controller is powered on by turning the selector switch “On” to the right. For Standard Submergence, and for the 59500 controller, only the left timer, T1 is used. Please refer to the timer illustration on page 6 for details of the timer. The timer has 2 dials. The smaller center knob controls the dial which has an Orange pointer, while the larger outer dial has an Green indicator line on it. “T.on” controls the pump time. This is the time that pressure is applied to the pump to effect pumping. When the power switch is turned on, a green indicator lamp illuminates, indicating that the timer is now energized. The first cycle the timer enters is the “T.off”, or fill, cycle. During subsequent fill cycles, pressurized pumping air will be vented out the vent port on the right side of the controller. Once pressure has been vented to atmosphere during the fill cycle, the pump bladder begins to fill. This cycle will last as long a time as is indicated by the Green pointer. Immediately following the time-out of the fill cycle, the pump cycle will begin. At the start of the actual pumping cycle, an orange indicator lamp will illuminate, and this cycle’s duration will be as long as indicated by the Orange pointer. The timer increments and units can easily be changed as indicated on the illustration on page 6. The timer’s dial face settings can be changed using a small phillips head screwdriver from 0-1.2, 0-3, 0-12, and 0-30.The default dial face is set to 0-1.2. In most cases, for Low flow sampling, you will be operating the timer at either sec., 10 sec., or minutes.

## Setting Timers When In “Low Submergence” Mode Model (59000) Only

When the controller is operating in the Low Submergence, or 3 cycle mode, green power lamps on both timers, T1 & T2 will illuminate. The “Pump” knob (Orange indicator line) of T1 controls the duration of the pump or pressurization cycle. In this mode of operation, the “Fill” knob (Green indicator line) controls the entire duration that T2 operates. The “Fill” knob of T1 (Green Line) should be set greater than or equal to the sum of the “Enhanced Fill” and “Vent” times set on T2. For example, if it is determined that the “Pump” cycle (T1) should be 0.1 minute, or 6 seconds, and the “Enhanced Fill” time (T2) should also be 0.1 minute, the actual timer settings are as follows. The “Pump” (T1) time is set to 0.1. The “Vent” cycle of T1 is set to 0.2 (12 sec.), the “Enhanced Fill” time on T2 is set to 0.1 (6 sec.) with the Orange indicator line, and T2‘s vent time, the Green indicator line is set to “0.1”. With the Vent time on T1 set to 0.2, both indicator lines on T2 could also be set to 0.05 min. each. This setting would provide a different time for the “Enhanced Fill” cycle-only 0.05 min, or 3 seconds. It would also provide the same amount of time, 0.05 min. for the vent cycle of T2. The vent cycle of T2 is used to vent, or bleed off the pressurized air created during the pump cycle and begins following the pressure cycle on T1 (orange line). If the Fill setting on T1 is set greater than the sum of both settings on T2, there is a second Vent cycle that begins after the Vacuum cycle. This vent bleeds the vacuum prior to pumping. Minimize this time to increase flow rates.

When the “Enhanced Fill” cycle activates, the red lamp on T2 will illuminate, just as the red lamp on T1 illuminates during a pump cycle. Also, during the Enhanced Fill cycle, the needle on the controller pressure gauge will drop beyond “0” and into the vacuum range of the gauge until It reaches a maximum vacuum of approximately 15“ Hg. This is the equivalent of about 15 feet of water. It should be noted that there is no vacuum imposed on the sample during this cycle, as the vacuum merely makes the pump behave like it has up to 15 feet of water above the intake.

Always set the “Enhanced Fill” cycle time as short as possible, as the cycle uses a considerable amount of compressed air to create a vacuum. As with the pump and fill cycles, the enhanced fill cycle time is dependent on the depth of the pump intake. As a guide, set the enhanced fill time at first to about 6 seconds, or 0.1 min. When the Enhanced Fill cycle begins, watch the pressure gauge. After the needle reaches the maximum vacuum point of about 15“ Hg, wait about 3-5 seconds. At this point the controller should switch to the pump cycle, i.e. the Enhanced Fill cycle should stop (red indicator lamp on T2 will go off). If it takes more than 3-5 seconds for cycles to switch, shorten the Enhanced Fill cycle.


NOTE: If you are trying to pump at a high flow rate, for multiple well volume purging for example, your objective will be to keep all cycle times as short as possible. In this case Enhanced Fill should only be used where it offers a flow advantage, such as for enabling the pump to be filled faster. Remember that there is a trade-off however with Enhanced Fill. It may fill the pump faster, but it also takes up time.

For maximum efficiency, use the following as a guide in setting cycle times. When using 2 cycle mode of operation (T1 only), adjust the pump cycle time to switch off as soon as the discharge of water stops. But only if a full volume of water has been discharged. If less than a full volume of water has been discharged, the fill time may have to be increased to ensure that the pump has filled completely. Once the optimum cycle times and pressures have been established for a well, log in these settings on a well log sheet. Then next sampling event you won’t have to set up the controller again.

Timer Set-Up Example
In order to set the timer cycles properly, you need to know the following, considered constants:
A PTFE bladder on a 24“ Aquarius II pump holds about 250-300 mls.of water.
0.250” discharge tubing, typically used with Low Flow, holds about 9.7 mls/ft of water.


NOTE: For various reasons, including minimizing wear on the bladder element, and to ensure uniform flow rate, it is best for Low Flow sampling to empty only 100-170 mls of water per pump cycle.

Let’s assume you have a 32ft. 2“ diameter well, with the pump intake at 30 ft., and you wish to pump 100 mls/min. To pump 100 mls/min., the pump cycle time should be set for 1 minute. If you wanted to pump 200 mls/min. set the pump cycle time (Orange indicator, “T.on” to 30 seconds (0.5 mins. on the dial). 100 mls should be discharged during each pump cycle, and flow should be observed over the entire 30 second pump cycle. If 100 mls is discharged over less than the 30 second pump cycle, reduce the controller pumping pressure, as this will reduce the flow rate.

The Vent, or Fill, time set by the Green indicator, will vary as a function of several factors. Pump intake depth and height of the water column above the pump intake are two important variables for properly setting the pump fill time. For Low Flow sampling, the pump should fill slowly. Ideally, the pump intake should be submerged in the water column by less than 10 ft. submergence can be reduced if necessary, through the use of a drop tube pump configuration, or through the use of the Series 6000 Auto Controller, as the computer in the Auto Controller will automatically control the rate at which the pump fills, regardless of the height of water above the pump intake. As a guide, when the fill cycle begins, wait for the set pumping pressure to reach “0”, then wait another 3-5 seconds, then set the fill time to end and switch to the pump cycle. If you can not consistently obtain a 100 mls, or 150 mls, whatever your target volume is for a pump cycle, during a pump cycle, try increasing the fill time until you do.

IMPORTANT : When you first begin pumping, it is very important to apply pressure in small increments, until water is observed at the surface. Start out with a pumping pressure of 3-5 psi, regardless of what your calculated final pressure should be, and at the beginning of each subsequent pump cycle, increase the pressure by an additional 3-5 psi until water flow at the surface is observed. This is important to maintain the integrity of the PTFE bladder element in the pump. If you follow this rule, the bladder can last for 10 years or more.

DISCHARGING TO SAMPLE BOTTLES AND FLOW-THROUGH CELLS

In order to achieve consistent, uniform flows at the surface, the following recommendations are offered: System 1 discharge tubing leads are typically 1/8“ i.d. tubing, regardless of material, and about 30” in length. When pumping at rates of less than about 150 mls/min., a smaller diameter extension, or a reducing barbed nipple should be used. A chemical resistant, Kynar nipple is available for this purpose.

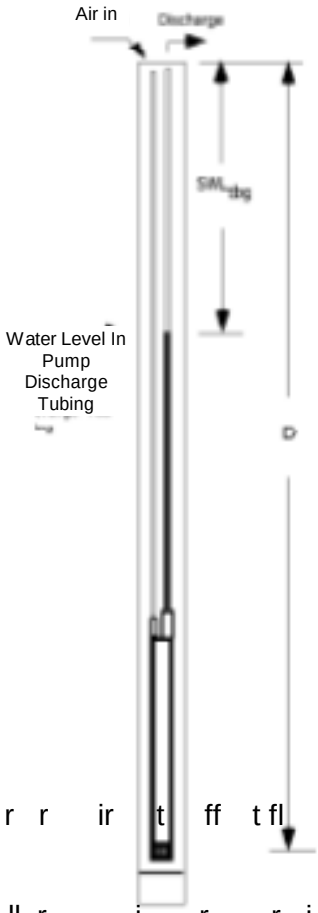
The barb simply slips inside of the 1/8“ tubing lead, and provides considerably more control for lower flow rates. This restricting device also minimizes the chance for air to get into the discharge tubing, and the sample, during the fill cycle.

When measuring flow rates, the end of the discharge tubing should be held up at an angle so the actual point of discharge is higher than the well. This will prevent water from simply falling out of the tubing. When connecting the discharge tubing to a flow cell that is full of water, this is not necessary.

The use of a “sampling tee” between the sample discharge tubing and the flow cell is recommended, if used. Through valving included on the tee, the water flow through the sample discharge tube can be easily diverted directly to a sample bottle when field analytes have stabilized.

## Setting Pumping Pressure At Controller

IMPORTANT: Always start pumping with controller pressure set at 3-5 psi as indicated on the controller pressure gauge. During each subsequent pumping cycle, increase controller (pumping) pressure by an additional 3-5 psi until water is observed at the surface. Then you can adjust to your optimum final pressure.




Formula for estimating pumping pressur :

P = D/2 -SWLt/2 + 5 *, where

P = Pressure, in PSI, as set with pressur regulator on controller panel.

D = Pump Depth, in feet, measured from t top of the well to the bottom (intake) of th pump.

SWLt = Distance, in feet, from the top of t well casing to the top of the water colum IN THE PUMP DISCHARGE TUBING (Not the Well Casing)

Note: that this value will change (decrea ) with every pump cycle until water is obser at the surface.

*The value of “5” in the formula will likely smaller, and closer to the theoretical pre r r ir t ff t fl f r Low Flow purging and sampling.

With the use of the series 6000 Auto Co tr ll r, i r r i t tomatically by the internal computer.

Please refer to the example provided on the following page for using the above formula to calculate the correct pumping pressure, as set on the controller, for any given well.

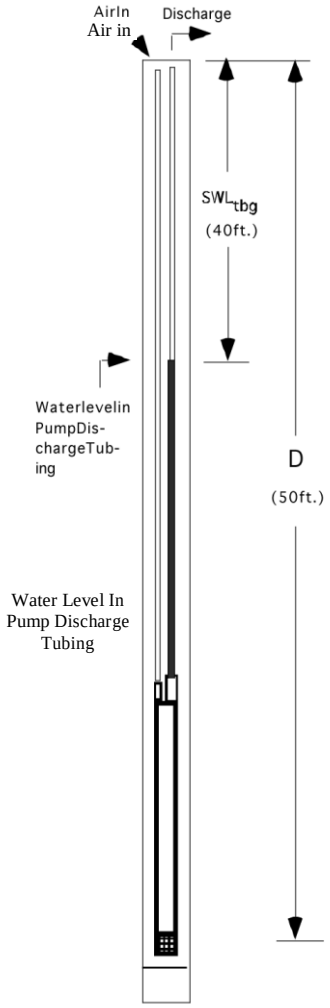
Setting Controller Pressure - Example

P = D/2 -SWLt/2 + 5

FOR THIS EXAMPLE:

D = 50 ft. & SWLt = 40 ft.

Note: In this example, the pump has just been installed in the well and pumping has not yet begun. At first, SWLt= SWL, the water level in the well casing, as measured from the top of the well to the top of the water column.




To set the initial pumping pressure, using the formula above:

P= D/2 - SWLt/2 + 5

P = (50/2) - (40/2) + 5

P= 25 - 20 + 5

P = 10 psig

To set this pressure at the controller, FIRST pull yellow locking ring on the pressure regulator up to unlock the adjustment knob. Turn regulator knob counter-clockwise until it turns loosely. This will set pressure at essentially “0” psi. When the pump cycle begins, turn the regulator knob clockwise until the pumping pressure calculated above is reached. As you turn the regulator knob, the increase in pressure will be evident on the pressure gauge on the controller panel. Please note that you can only see pressure increases/decreases on the gauge during the “Pump” cycle.

Now, as the pump operates and water rises in the pump discharge tubing, SWLt will decrease. As SWLt decreases, you can see from the formula above that “P” will increase. Every time a pump cycle is completed pressure must be increased in small increments at the controller until the maximum required pumping pressure is reached. At this point water will be coming out of the discharge tube at the surface. The recommended interval to increase the pumping pressure with each pumping cycle is 3-5 psi, until flow is observed at the surface.

IMPORTANT: Adjust the pumping pressure as described above in order to prevent excessive pumping pressures, which can over-collapse a PTFE bladder element, reducing its operating life, and making it difficult to achieve the objectives of low flow sampling.

If the pumping pressure is set in the recommended manner, PTFE bladder elements will last for several years - so far, 15 years and still going!

IMPORTANT: To ensure continuous satisfactory operation of the pump controller, we recommend that you adhere to the following recommendations

Keep air hose ends off the ground and out of the dirt. To keep internal surfaces and quick-connect ends of hoses free of loose dirt, prior to beginning pumping

Start compressor and allow air pressure to build up in tank -discharge valve should be closed during pressure ramp up.

Connect air hoses, one at a time, to the discharge fitting on the air compressor. The other end should be open to atmosphere -and pointed away from personnel.

After pressure has built up in tank, open tank valve and blow out hoses.

Keep air storage tank on compressor drained of condensate. Start draining at a rate of once per hour, then adjust as necessary. All System 1 compressors include a drain petcock on the bottom of the tank. Where shallow wells are being sampled, it may be possible to operate the compressor with the petcock cracked open to keep the tank drained.
Install a combination filter and water separator at the discharge point of the air compressor. This will minimize the possibility of condensate water and particulate matter from the air tank from going through the pump controller and possibly fouling controller valving. No. 91250 Red air supply hoses are provided with an in-line particulate filter on the controller end of the hose.

Controller will not operate consistently when ambient temperatures dips below about 32°F. When sampling at lower temperatures try to operate the controller inside a heated vehicle.

Make certain the Power Supply for the controller is fully charged and is outputting 11.5 volts dc or higher. At voltage values less than this, the controller timer lamps may illuminate, but power may not be adequate to shift internal valves that require 12 volt dc power. When the power supply is fully charged, it should operate the controller for over 20 hours before it requires recharging. Ambient temperatures lower than freezing, as well as the age of the power supply, i.e. the number of times it has been recharged, will affect the overall performance of the power supply. At the time the power supply appears to recharge properly, but does not last more than an hour or two, it is time to replace it. The controller can be operated from virtually any 12 volt dc power supply, including a vehicle battery, through the cigarette lighter receptacle. Replacement power supplies are available however, if you are stuck in the middle of a sampling event many different retail stores should have them; Wal-Mart, Target, auto supply stores, Sears, etc.

NOTE: Pressure at the discharge point of the air compressor must be maintained at a minimum of 40 psi, as read on the compressor gauge, to ensure satisfactory and consistent operation of the controller.

After each day of use with an air compressor as an air supply, purge the controller with clean, dry air.

Turn off the compressor and let it cool down. Drain the tank.

Disconnect the controller/wellhead air hose (yellow) from controller.

Restart the compressor and build up pressure in the tank. open drain petcock slightly.

Remove controller air silencer from the controller “Vent” port on the right side of the unit. The silencer should be hand-tight only, so removal should be easy.

Run controller for a few cycles, in 3 cycle mode if you are using a Model 59000, to purge out any dirt and/or moisture.

It is recommended that, if you do not already use one, have your field technicians maintain a log sheet, and keep it with the controller. This is something that would best be completed on a daily basis. Along with controller Serial Number, include any problems encountered and any field maintenance performed. Include a check box for completion of end of day purging of the controller, and a signature line.

If low pump output is being encountered it may be due to the 12V lighter receptacles or plugs. Make certain these connections are fully plugged in. Once fully plugged in, rotating the connection can help if there is a dead spot in the connector. Also, normal wear and tear on cables, receptacles and plugs could cause undesired operations. Check for fatigue, cracks, rust etc.
If you do require factory service, if it is at all possible, please have the person who experienced the problem while using it call our service department, as this will make it easier to diagnose the problem.
Call toll free at 1(800)833-7958

# Chapter 6: System Specifications

Both the 59000 and 59500 are housed in a field-tough polyethylene case. Both operate from an external 12 volt dc power supply and compressed air or nitrogen. Dimensions for both units are 10.6” x 9.8” x 7”. Weight is 7 lbs. for the 59000 and 6 lbs. for the 59500.

Consistent, uniform flow rates to < 25 mls/min. with System1 bladder pumps for Low Flow Sampling.

Pump low yield wells to within 2”-3” of the bottom (Model 59000).

| | |
|---|---|
| 11150275 | Regulator, Air, 10-130 PSI |
| 11150276 | Gauge, 160PSI,LF,1/4"MPT (59500) |
| 11150310 | Gauge, 30”HG 0-150PSI,LF,1/4”MPT |
| 11150280 | Switch, 3 Position |
| 11150281 | Switch, Oper, 3 Pos, 59000 |
| 11150282 | Solenoid, Valve, 12VDC 59000 |
| 11150284 | Elbow, Legris, 5/32Pushx1/8MPT |
| 11150285 | Elbow, Legris, 5/32x1/4 FPT |
| 11150286 | Reducer, Legris, 5/32Pushx1/4Tube |
| 17200014 | Amp. Conn., Pwr DC Panel Mount |
| 16600007 | Tubing, Nyl, 1/4ODx0.035W, Blk |
| 11150291 | Tubing, Nyl, .106"X.156", Yellow/Green |
| 17200351 | Qck Cnct, Brs, 1/4x1/8MPT |
| 17200277 | Qck Cnct, Brs, 1/4Mx1/8FPT |
| 11150294 | Muffler, 1/8" MPT,59000 |
| 57500008 | Power Cord, DC |
| 11150300 | Ejector Vac. |

| | |
|---|---|
| | 1/8 MPT 1/4 |
| 11150301 | Air Pilot Single 1/8 NPT |
| 11150302 | Elbow, Legris, 1/4Pushx1/8 MPT |
| 11150303 | Tee, Legris,1/4x1/4 PushpullxTube |
| 11150304 | Reducer, Legris, 1/4Pushpull x 5/16Tube |
| 11150306 | Manual, Marschalk 59000 |
| 10860 | Eight Pin, Timer Relay |

# Notes

# Notes

# Notes

## TheWarranty

For a period of one (1) year from date of first sale, product is warranted to be free from defects in materials and workmanship. Geotech agrees to repair or replace, at Geotech's option, the portion proving defective, or at our option to refund the purchase price thereof. Geotech will have no warranty obligation if the product is subjected to abnormal operating conditions, accident, abuse, misuse, unauthorized modification, alteration, repair, or replacement of wear parts. User assumes all other risk, if any, including the risk of injury, loss, or damage, direct or consequential, arising out of the use, misuse, or inability to use this product. User agrees to use, maintain and install product in accordance with recommendations and instructions. User is responsible for transportation charges connected to the repair or replacement of product under this warranty.

## EquipmentReturn Policy

A Return Material Authorization number (RMA #) is required prior to return of any equipment to our facilities, please call 800 number for appropriate location. An RMA # will be issued upon receipt of your request to return equipment, which should include reasons for the return. Your return shipment to us must have this RMA # clearly marked on the outside of the package. Proof of date of purchase is required for processing of all warranty requests.

This policy applies to both equipment sales and repair orders.

FOR A RETURN MATERIAL AUTHORIZATION, PLEASE CALL OUR SERVICE DEPARTMENT AT 1-800-833-7958 OR 1-800-275-5325.

Model Number: _____

Serial Number: _____

Date: _____

## EquipmentDecontamination

Prior to return, all equipment must be thoroughly cleaned and decontaminated. Please make note on RMA form, the use of equipment, contaminants equipment was exposed to, and decontamination solutions/methods used.
Geotech reserves the right to refuse any equipment not properly decontaminated. Geotech may also choose to decontaminate equipment for a fee, which will be applied to the repair order invoice.

Geotech Environmental Equipment, Inc
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