norweco®

SINGULAIR® BIO-KINETIC®

WATER REUSE TREATMENT SYSTEM WITH SERVICE PRO® CONTROL CENTER

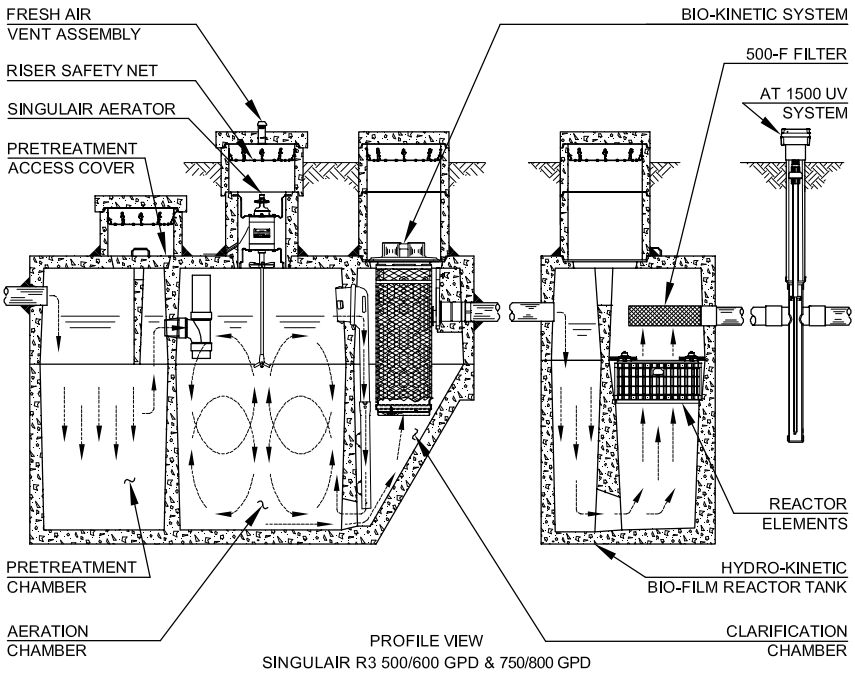
MODEL R3 OWNER'S MANUAL

INTRODUCTION

The Singulair R3 system is the finest water reuse treatment technology available. It is a sound investment that protects you and the environment. Please take the time to familiarize yourself with the contents of this manual.

HOW THE SINGULAIR R3® SYSTEM WORKS

Developed to serve homes and small businesses beyond the reach of city sewers, the Singulair R3 system employs the extended aeration process to treat wastewater and features innovative water reuse treatment technology.



PROFILE VIEW
SINGULAIR R3 500/600 GPD & 750/800 GPD

Wastewater enters the pretreatment chamber where anaerobic bacterial action combines with the effects of gravity to precondition the waste before it flows into the aeration chamber. Once in the aeration chamber, aerobic bacteria utilize the organic matter in the wastewater to biologically convert the waste into stable substances. Following aeration, flow is transferred to the clarification chamber where the effects of gravity settle out biologically active material. The Bio-Static sludge return, located in the clarification chamber, creates hydraulic currents that gently transfer settled particles back to the aeration chamber. As clarified liquids pass through the Bio-Kinetic system, they are filtered, settled and flow equalized. Effluent then passes through the Bio-Film Reactor where the liquid is treated to a near pristine state before passing through the 500-F filter. Finally, the AT 1500 UV disinfection system reduces bacteria levels to meet strict water quality standards. The Singulair R3 system reliably protects you, your property and the environment.

FEATURES AND ADVANTAGES

Singulair R3 tanks are reinforced precast concrete, manufactured by the licensed Norweco distributor. Internal walls and baffles are cast-in-place to insure uniformity and maximum strength. Risers and access covers are either heavy duty plastic or concrete construction. All components that will contact the wastewater are constructed entirely of molded plastic, stainless steel or rubber.

The Singulair aerator is powered by a 1725 RPM, 115 volt, 60 hertz, single-phase, fractional horsepower motor. The aerator has been designed specifically for use in the Singulair system. It costs less to operate and consumes fewer kilowatt hours of electricity than most major appliances.

System operation is directed by a Service Pro control center with MCD technology. The NEMA rated control center contains a power switch and time clock that control aerator operation. The local distributor's name, address and telephone number are displayed on the control center cover. All system controls and necessary owner information are conveniently located at your fingertips. Non-mechanical flow equalization and final filtration are accomplished by the patented Bio-Kinetic system installed in the clarification chamber.

The Hydro-Kinetic Bio-Film Reactor and 500-F filter assembly provide polishing and fine particulate removal from plant effluent. The dual pass design of the AT 1500 allows for extended treatment time and exposure to UV light for maximum disinfection. All Singulair R3 components work together to assure complete pretreatment, aeration, clarification, final filtration, effluent polishing and disinfection.

SINGULAIR R3® SYSTEM PERFORMANCE

The Singulair R3 water reuse treatment system meets the requirements of NSF/ANSI Standards 40, 245 and 350. Rated Class R for residential applications after successfully completing the 6 month NSF/ANSI Standard 350 test protocol, the Singulair R3 system averaged effluent of 5.0 mg/L CBOD, 4.6 mg/L TSS, 2.3 NTU turbidity, and disinfected E. coli to a geometric mean of 2 MPN/100 ml. The system met all requirements of NSF/ANSI Standard 245 by reducing total nitrogen 66% to an average of 14.4 mg/L. Per local regulations, uses for treated effluent are indoor restricted water use, such as toilet flushing or laundry, and outdoor unrestricted water use, such as irrigation, decorative fountains or car washing.

OPERATIONAL REQUIREMENTS

The Singulair R3 system is designed to treat only domestic wastewater. Domestic wastewater is defined as the waste generated from a typical residence. This includes flows originating from: bathtubs, clothes washers, dishwashers, drinking fountains, water coolers, food grinders, lavatories, mop basins, service sinks, shower stalls, sinks and water closets. While the use of bio-degradable detergents is recommended, the Singulair R3 system has been designed to handle any reasonable amount of bathroom, kitchen or laundry waste. However, some care should be taken to insure that non-biodegradable and/or toxic materials are not disposed of via the domestic wastewater plumbing. Do not use the plumbing system for disposal of lint, cooking grease, scouring pads, diapers, sanitary napkins, cotton balls, cotton swabs, cleaning rags or wipes, dental floss, strings, cigarette filters, rubber or plastic products, paints and thinning agents, gasoline, motor oil, drain cleaners or other harsh chemicals. These items could plug portions of the plumbing and/or adversely affect system performance. Never connect roofing down spouts, footer drains, sump pump piping, garage and basement floor drains or water softener backwash to the domestic wastewater plumbing or the treatment system. Water softener backwash will interfere with biological treatment and must be disposed of separately.

ELECTRICAL REQUIREMENTS

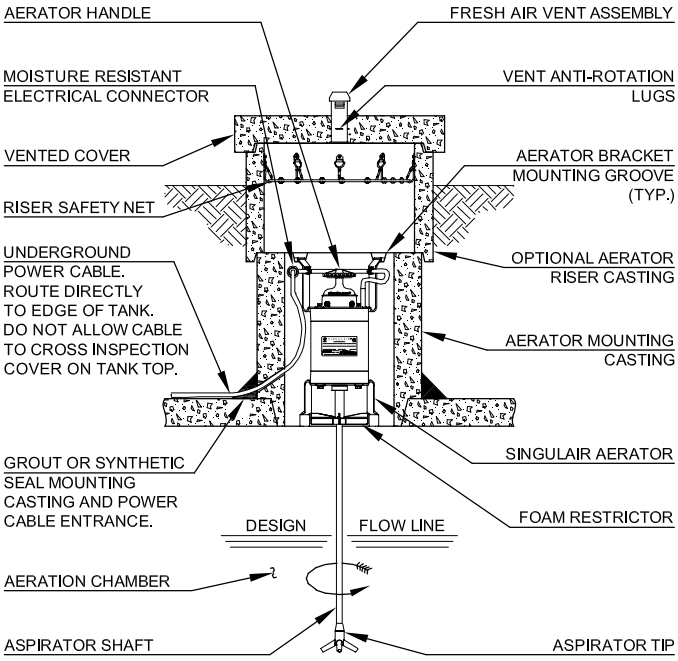
Each Singulair control center must be wired to a dedicated 115 VAC, single-phase circuit at the main electrical service panel. A 15 amp circuit is recommended (10 amp minimum). A pictorial wiring diagram is provided inside the control center enclosure. All electrical work must be performed in accordance with the requirements of the National Electrical Code and all applicable local codes. Electrical connections should be made only by a qualified electrician following proper procedures and using safe tools.

CAUTION: Any time service is required, first shut off the dedicated circuit breaker in the main electrical service panel. Next, shut off the power switch in the Singulair control center. Failure to do so could result in personal injury or equipment damage.

SINGULAIR® AERATOR

The aerator has been specifically designed for use in the Singulair R3 system and includes special alloy and molded plastic parts to prolong aerator life. Aerator bearings are pre-lubricated and sealed. Singulair aerators are installed in a concrete mounting casting above the aeration chamber. Fresh air enters the aerator through four intake ports located under the aerator handle. The air is drawn down the hollow aspirator shaft where it is introduced below the liquid surface. Only the molded plastic aspirator and the lower portion of the stainless steel aspirator shaft are submerged.

The aerator is not designed to run under water and will automatically shut off if a high water condition occurs. If the liquid rises to the level of the foam restrictor, the control center will shut off power to the aerator. Next, an automatic diagnostic sequence begins, as outlined in the section titled “Service Pro Control Center”.

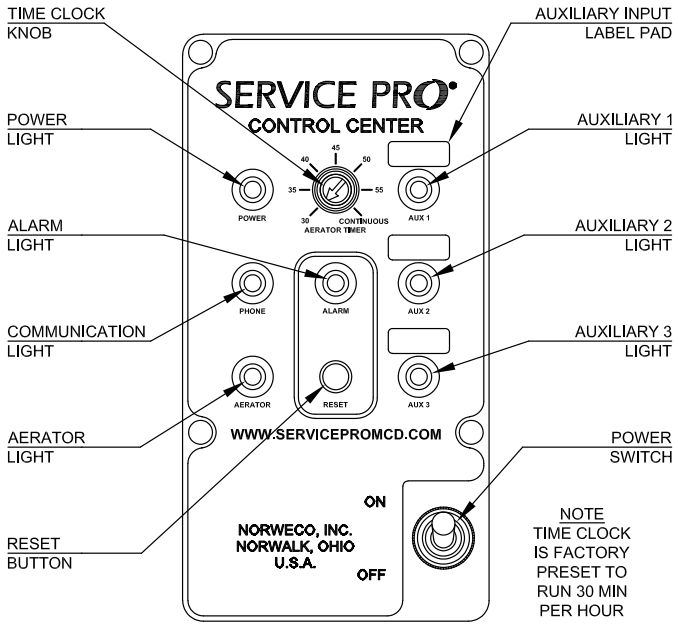


Each Singulair aerator is a precision engineered electro-mechanical device. Do not remove it from its installed position. Do not attempt any type of repair. Contact your Singulair service provider if service is needed. Unauthorized tampering or repair will void important provisions of the limited warranty and exchange program.

FRESH AIR VENTING SYSTEM

An aerator vent assembly is cast into the concrete access cover above each aerator. The vent assembly supplies fresh air to the aerator, which is drawn through the aspirator and into the wastewater. Finished landscaping should be maintained six inches below the top of the vented access cover and graded to drain runoff away from the cover. Do not allow plants, shrubbery, mulch or landscaping of any type to restrict the flow of air to the vent assembly or obstruct the access cover.

SERVICE PRO® CONTROL CENTER



Prewired controls are supplied in a sealed NEMA rated enclosure for your safety and the protection of components and wiring. The controls should be located so the alarm light can be seen and the audible alarm heard, while minimizing exposure to harsh weather or conditions that might prevent routine access. If an issue with the aerator is detected, the red alarm light will flash and the control center will attempt to restart the aerator every five minutes for two hours. For an open motor or under current condition, the alarm light will display two short flashes followed by a pause. For an over current condition, the alarm light will flash evenly. If the aerator does not restart after two hours, the audible alarm will sound. To silence the audible alarm and attempt to restart the aerator, push the reset button. If the alarm condition is not resolved, the audible alarm will be silenced for 48 hours, but the alarm light will continue to flash. In this case, contact your service provider. Singulair R3 systems are supplied with a time clock adjustable in five minute increments up to continuous run. This clock is factory preset to run 30 minutes per hour and should only be adjusted by an authorized Singulair R3 service provider.

SERVICE PRO® MONITORING CENTER

The Service Pro MCD control center(s) directs the operation of the Singulair R3 system. Designed to connect to a standard telephone, internet or cellular connection, this control center provides MONITORING, COMPLIANCE and DIAGNOSTIC functions complete with telemetry for communication with the Service Pro monitoring center. Once your Service Pro MCD control center is connected to a telephone, internet or cellular connection, commissioned, and covered by a remote monitoring agreement, your service provider will be immediately notified of any alarm condition. The Service Pro monitoring center will automatically log the time and date of alarm conditions, as well as service performed, and store them in your system history record for viewing at **www.servicepromcd.com**.

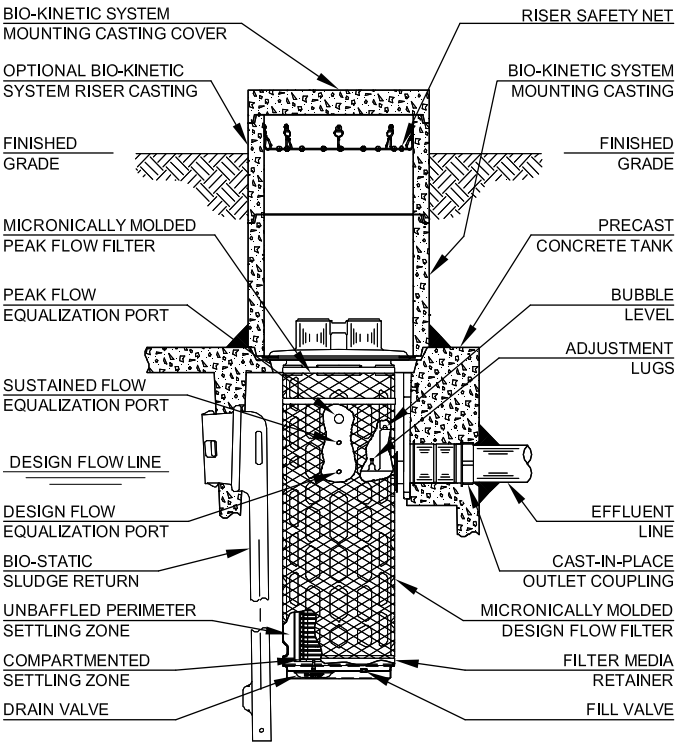
NOTE: The control center regularly communicates with the Service Pro monitoring center using your telephone, internet or cellular connection. If the control center is using the telephone line when you attempt to place a call, a high pitched digital communication signal will be heard. Hang up all telephones sharing the line and wait a few seconds. This will automatically disconnect the control center and make the line available for use.

BIO-STATIC® SLUDGE RETURN

Each Bio-Static sludge return is installed in the aeration/ clarification chamber wall. Aeration chamber hydraulic currents enter the sludge return(s) and transfer solids from the clarification chamber back to the aeration chamber for additional treatment. The Bio-Static sludge return accomplishes resuspension and return of settled solids without disturbing the contents of the clarification chamber.

BIO-KINETIC® SYSTEM

Bio-Kinetic systems provide non-mechanical flow equalization through all plant processes. The Bio-Kinetic system contains 3 separate filtration zones and 8 independent settling zones. Clarified liquids enter through the filter media and are held in the baffled perimeter settling zone. Liquids exit the perimeter settling zone through flow equalization ports. These ports control the flow and regulate the liquid level in all upstream and downstream treatment processes. All components are manufactured from plastic or rubber. Your service provider has the necessary training, tools and equipment for removal and cleaning. If your Bio-Kinetic system is in need of service, contact your service provider. During each semi-annual service inspection, your service provider will remove and clean the Bio-Kinetic system or replace it with a unit from their service stock.



NON-MECHANICAL FLOW EQUALIZATION

The patented design of the Bio-Kinetic system provides non-mechanical flow equalization for the Singulair R3 water reuse system. Equalization reduces incoming hydraulic surges (e.g. typical shower of 10 minutes duration, bathtub discharge of 5 minutes duration, clothes washer discharge of 2 minutes duration and dishwasher discharge of 2 minutes duration) throughout the system. The flow equalization provided by the Bio-Kinetic system causes wastewater to be held upstream of the final outlet during hydraulic surges, which preserves treatment integrity and enhances system operation. The actual rate of equalization varies and depends upon specific loading patterns and the duration of each flow surge. At the design loading pattern used during the NSF/ANSI Standard 350 performance evaluation, the Singulair R3 system equalizes all flow an average of 50%. As a result, hydraulic surges and periods of high wastewater flow are automatically reduced to protect the environment and all treatment plant processes on a demand use, as needed, basis.

HYDRO-KINETIC BIO-FILM REACTOR®

This innovative, non-mechanical device reduces CBOD and TSS as flow is evenly distributed beneath the Reactor Elements where proprietary attached growth media provides final effluent polishing. The 500-F filter accomplishes fine particulate removal for water reuse. During each semi-annual service inspection, your service provider will pump the accumulated solids from the Bio-Film Reactor and clean or replace the 500-F filter.

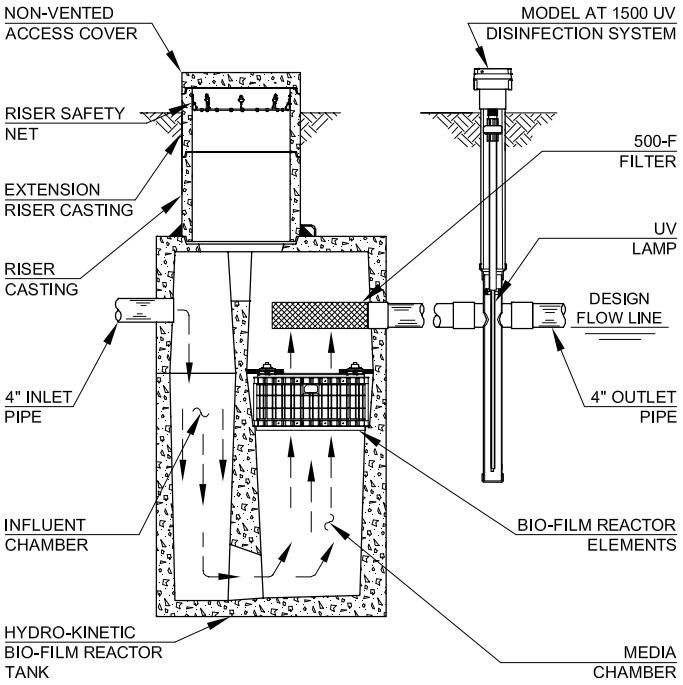
AT 1500 ULTRAVIOLET DISINFECTION SYSTEM

The AT 1500 ultraviolet (UV) disinfection system reduces bacteria levels from secondary effluent to meet strict water quality standards. It is the only UV treatment system listed by Underwriters Laboratories to Standard UL 979 for residential applications. All electrical components are contained in a NEMA 4X weatherproof enclosure with a built-in safety interlock switch to disable power and prevent UV exposure. An internal current sensing circuit continuously monitors the UV bulb and automatically provides notification if system operation is interrupted.

CAUTION: Ultraviolet rays can cause permanent eye and skin damage. UV blocking safety glasses and protective clothing must be worn during installation, service or any time the bulb may be illuminated. Do not modify or bypass the safety interlock switch. Disconnect power prior to service.

ACCESS RISERS AND COVERS

Concrete access covers and safety nets are recommended and must be secured after each service visit. A concrete plug should be installed in the access openings of the tank to prevent accidental entry. Access covers should be inspected during service visits and replaced as necessary.



If plastic risers and/or covers are utilized, they must be approved for your application and secured as instructed by the manufacturer. Refer to state and local regulations for applicable codes that may apply to your installation.

DANGER: Make sure your service provider does not leave access risers uncovered or partially covered. Failure to properly secure access covers and safety nets could result in bodily injury, illness or death. Do not allow children to play on or around the treatment system. Riser safety nets are available from Norweco for concrete or plastic risers.

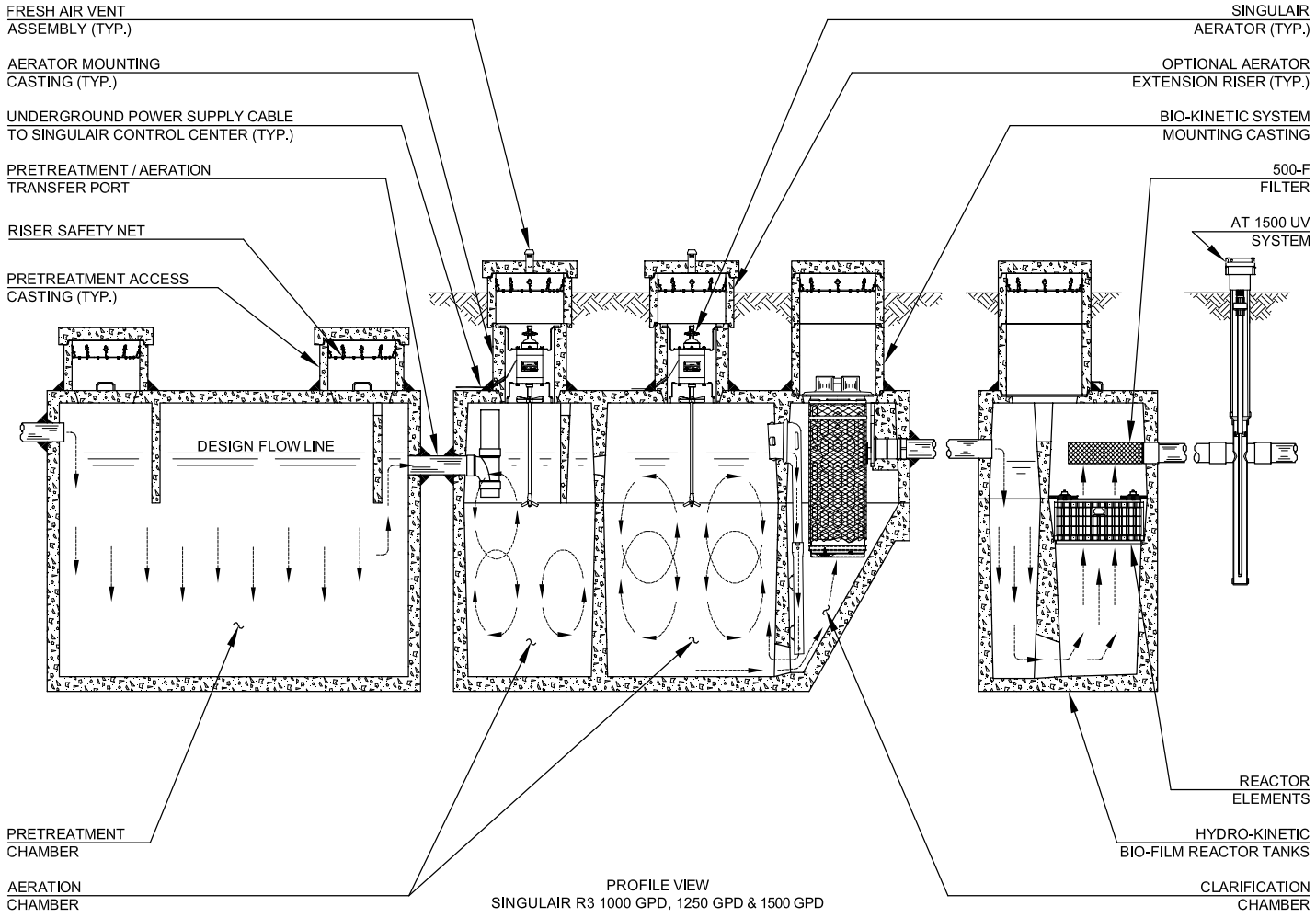
NO OWNER MAINTENANCE

The Singulair R3 system is inspected and serviced by a local, factory-trained service provider, therefore, no owner maintenance is required during the warranty period. The Singulair R3 system does not require pumping as often as a septic tank. Under normal use only the pretreatment chamber and the solids from the Bio-Film Reactor should be pumped. How often pumping is necessary depends on system use. The local service provider will inspect the system at six month intervals to determine if the pretreatment chamber is discharging excessive solids. Inspect the pretreatment chamber every three years. The pretreatment chamber will normally require pumping at three to five year intervals. Contact your local service provider prior to tank pumping for complete information on removal of equipment, access to individual chambers, coordination of services and proper disposal of tank contents.

If a period of intermittent use or an extended period of non-use of the system is anticipated, contact your service provider for instructions. Your service provider has detailed service instructions and has been factory-trained in troubleshooting procedures. Contact your service provider if you require service or tank pumping information.

SINGULAIR R3® SERVICE PROGRAM

Semi-annual service inspections, at six month intervals for the first two years of system operation, are provided by your local Norweco distributor and are included in the original purchase price of the Singulair R3 system. Costs for travel and labor are not charged to the owner. During an inspection, each mechanical aerator, Bio-Kinetic system and other plant components are serviced as outlined in the Singulair R3 Product Manual and effluent quality is evaluated for color, turbidity, scum overflow and odor. After the initial two year service program is completed, the local service provider will provide continued service at the owner's option. The service program should be renewed by the owner to insure maximum system performance.



Ask your Singulair R3 service provider about a renewable service contract. If you allow service coverage to expire, you can still obtain the professional assistance of a factory-trained technician. However, these special service calls will be performed on a time and materials basis. Professional service is important to proper system operation and should not be allowed to lapse. Be sure to consider the advantages of a renewable service contract.

The Singulair R3 service provider will perform the following services during each service inspection:

- ✓ Check aerator operation
- ✓ Check aerator power consumption
- ✓ Check aerator air delivery
- ✓ Clean stainless steel aspirator shaft
- ✓ Clean aspirator tip
- ✓ Clean fresh air vent in concrete cover
- ✓ Inspect aeration chamber contents
- ✓ Check operation of control center
- ✓ Adjust time clock if required
- ✓ Remove the Bio-Kinetic system
- ✓ Scrape the clarification chamber
- ✓ Inspect the Bio-Static sludge return
- ✓ Install a clean Bio-Kinetic system
- ✓ Inspect Bio-Film Reactor
- ✓ Pump solids from Bio-Film Reactor
- ✓ Clean Bio-Film Reactor Elements
- ✓ Clean 500-F filter assembly
- ✓ Inspect and clean AT 1500 UV disinfection system
- ✓ Inspect effluent quality
- ✓ Inspect outlet line
- ✓ Inspect ground water relief point
- ✓ Inspect effluent disposal system
- ✓ Complete 3-part service record
- ✓ Hang owner's record on front door
- ✓ Enter record into **www.servicepromcd.com**
- ✓ Mail health department notification

WARRANTY REGISTRATION

A Warranty Registration Card was included with the Model 206C aerator before it was shipped from the factory. If this card has not been returned to Norweco, complete and mail it immediately. If it is not returned within thirty days of the installation date, the three year limited warranty and lifetime aerator exchange program will begin on the date of component shipment from the factory.

Remove the aerator model number and serial number record card and store it in a safe location with this Owner's Manual for future reference. If it is necessary to call your service provider for service, make note of the information on the control center data plate and the aerator serial number before calling. Warranty and service records are cross-indexed by owner name, aerator serial number or control center serial number. Supplying the aerator serial number and control center serial number with the service request will give the service provider a ready reference so that changes in system ownership will not delay service.

SERVICE PRO® SECURITY LOG IN

For your convenience, record your **www.servicepromcd.com** access information here:

User name:
Password:

SINGULAIR R3® LIMITED WARRANTY

The Singulair aerator enjoys the distinction of being the only aerator on the market today backed by a lifetime warranty and exchange program. Each Singulair aerator, Service Pro control center and Bio-Kinetic system are warranted to be free from defects in material and workmanship, under normal use and service, for a period of three years from the date of purchase. The three year limited warranty is included in the original purchase price of every Singulair R3 system. The comprehensive aerator exchange program offers Singulair R3 owners a lifetime of protection. Owners may exchange any aerator of any age for a replacement unit at a prorated cost. All other system components manufactured by Norweco are backed by a two year limited warranty. If any components fail, do not use or dismantle the unit. The local, licensed distributor has detailed warranty and exchange information and should be contacted for service or replacement instructions.

SUPPLEMENTAL SERVICE RECORD

For your reference, please document service performed on the following chart:

DATE	DESCRIPTION

norweco®

Engineering the future of water and wastewater treatment

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