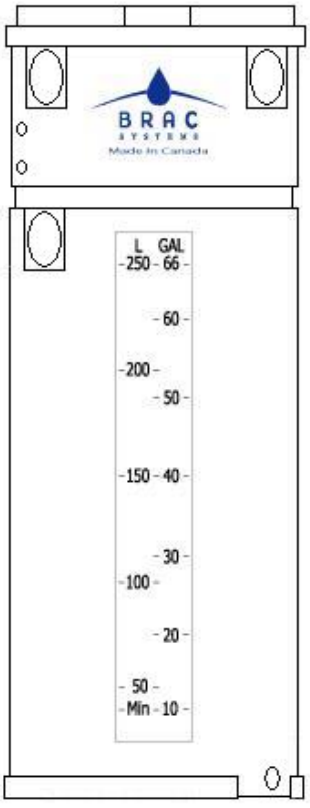
INSTRUCTION MANUAL

BRAC SYSTEMS

GREYWATER RECYCLING

RESIDENTIAL
Series

RGW-150
RGW-250
RGW-350
RGW-450



2009

V1.05

I. Table of Contents

We here at **BRAC SYSTEMS INC.** are very proud of our products and we are completely committed to providing you with the best service possible. Your satisfaction is our #1 priority.

PLEASE COMPLETE AND MAIL IN THE PRODUCT REGISTRATION CARD FOUND AT THE BACK OF THIS MANUAL.

II. General Safety Rules

Your **BRAC SYSTEM** requires connection to your home's sanitary drain, and should only be installed by a licensed plumber. This installation guide is intended for general information purposes only.

WARNING: THIS GREYWATER SYSTEM IS FOR INDOOR USE ONLY. DO NOT USE IN DAMP LOCATIONS OR EXPOSE ELECTRICAL CONNECTIONS TO RAIN.

WARNING! The greywater from this unit is not fit for human consumption.

Note: Before beginning installation, carefully read these instructions. This will simplify the installation and ensure that the Brac greywater recycling system is installed correctly and safely. Leave these instructions near the system after installation for future reference.

WARNING!!! Water that has been recycled through the **BRAC SYSTEM** is not intended for drinking purposes! For this reason, do not install a permanent connection to the greywater spout (faucet). This outlet is only provided so you can connect a garden hose temporarily to water your garden, or to prime the system pump. Do not use a sprinkler or spray directly onto your vegetables with greywater. Always clearly mark any greywater outlet. **BRAC SYSTEMS INC.**, and its Representatives or Distributors are absolved of any responsibility, either real or intended, for the misuse of greywater by the consumer.

WARNING! To reduce the risk of fire, electric shock or personal injury, read all the instructions before using this unit. This system is intended for household use only as described in this manual. Any other use including but not limited to commercial, agricultural, or outdoor use, is not recommended by the manufacturer and may cause fire, electric shock, injury and/or damages.

WARNING: To avoid pump failure, double check that the pipe for the fresh water make-up has been connected to the right port on the unit, and that the pump is properly primed.

WARNING: Failure to properly vent the **BRAC SYSTEM** could cause an excessive amount of condensation to form inside the upper portion of the tank, which could cause some parts to rust and possibly fail.

WARNING: Changes or modifications made to this equipment, not expressly approved by **BRAC SYSTEMS INC.,** or parties authorized by **BRAC SYSTEMS INC.,** could void the user's warranty.

III. Introduction

Congratulations on the purchase of your new **BRAC SYSTEM**. The **BRAC SYSTEM** can help you save over 30% on your indoor water consumption, which will help sustain our most precious resource and provide for a better future for our generations to come.

When integrated into the plumbing of your home, the **BRAC SYSTEM** captures the water used in your shower, bathtub and clothes washing machine, and recycles it to flush your toilets. **(See figure 1)**

The greywater from your shower, bath and laundry enters the **BRAC SYSTEM** through the greywater inlet pipe where it passes through a 100-micron filter, and collects in the lower portion of the **BRAC SYSTEM** tank. A 3" overflow pipe connected to your sewer line prevents the tank from overfilling.

A potable water inlet pipe, controlled by an electronic float switch and solenoid valve, assures a minimum level of water in the tank, preventing the pump from running dry and making sure there is always water to flush your toilets.

The collected water is drawn through a foot valve by a pump which provides greywater at pressure to the greywater outlet and the irrigation/ priming faucet, supplying greywater to your toilets and, if allowed, your garden.

An electronic chlorination system circulates the greywater through the filter housing and over a chlorine tablet at programmable intervals, allowing the greywater to be treated to a safe level without becoming over-chlorinated.

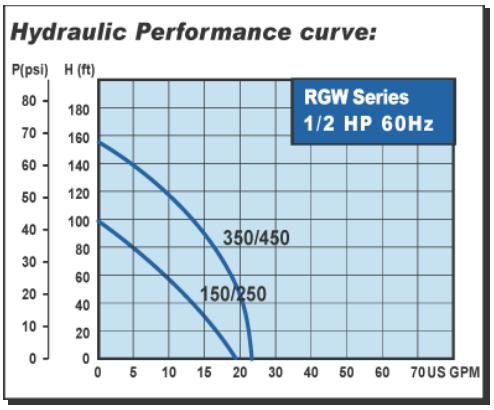
The filter is easily accessed for cleaning, and a clean-out valve is provided for flushing the tank.

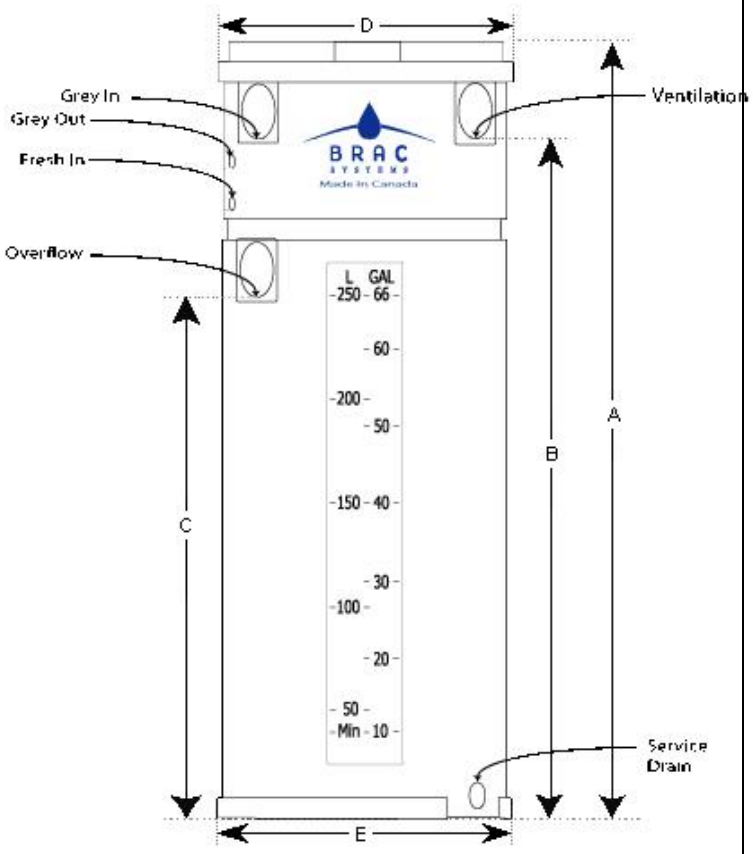
Only a licensed plumber should install the **BRAC SYSTEM**. We recommend that your plumber also install a fresh water bypass and shutoff valve to provide backup clean water to your toilets in the event of a power failure, or should your system require removal for servicing. We also recommend a greywater bypass, so that in the event of a filter obstruction, your bath and shower drains will not back up.

Laundry option: While laundry water is suitable for reuse, the presence of lint may increase the frequency of filter cleanings required. Research and testing has shown that in the average household, with each member taking an average of one shower per day, sufficient quantities of greywater are generated by bathing alone to match the amount of average flushes per day in the same household. So you may choose to omit capturing the laundry water when installing your system. You may also consider installing both a traditional drain alongside a greywater drain to the **BRAC SYSTEM** behind your washing machine. This will allow you to include or exclude your laundry water from greywater collection simply by moving the hooked drain hose behind your washer from one hole to the other. Just be sure to refasten the hose securely.

IV. Technical Data

RGW Residential Models:





Suction Lift Performance Table:

Model RGW	Discharge Pressure in P.S.I.	Capacity in US Gallons per Minute Suction Lift in Feet						Max Pump Boost Pressure (psi)
		0	5	10	15	20	25	
150/250	10	16.6	15.6	14.6	13.6	12.7	11.7	40
	20	12	11	10	9	7.8	6.6	
	30	7.1	5.8	4.5	3.2	2	0.6	
350/450	10	22.4	22.1	21.7	21.3	20.8	20.5	67
	20	20.7	20.2	19.8	19.2	18.8	18.2	
	30	18.3	17.8	17.1	16.2	15.3	14.2	
	40	14.7	13.8	12.9	12.1	11.1	10.2	
	50	10.5	9.3	8.1	6.9	5.6	4.3	

Specification:

Model RGW	Power (H.P.)	Cycle (Hz)	Phase (O)	Voltage (V)	Amp's (A)	H max. (Ft.)	Q max. (GPM)
150/250	1/2	60	1	115/230	6.0/3.0	92	18.5
350/450	1	60	1	115/230	11/5.5	154	23.8

Model	Capacity		Dimensions (inches)					Weight		Max People	Estimated Annual Consumption in Kw/h (by number of people)				Power (H.P.)	Start-up (watts)	IAPMO Approved
	Litres	Gallons	A	B	C	D	E	kg.	lbs.		2	4	6	8			
RGW-150	150	40	45.5	38.25	25	22.5	22.75	41	90	2	41	82	123	164	1/2	2100	YES
RGW-250	250	66	60	52.5	39.5	22.5	22.75	43	95	4	41	82	123	164	1/2	2100	YES
RGW-350	350	93	53	45.5	33	22.5	30.5	47.5	105	6	53	105	158	212	1	2800	YES
RGW-450	450	119	60	52.5	39.5	22.5	30.5	50	110	8	53	105	158	212	1	2800	YES

V. Plumbing Diagram 1

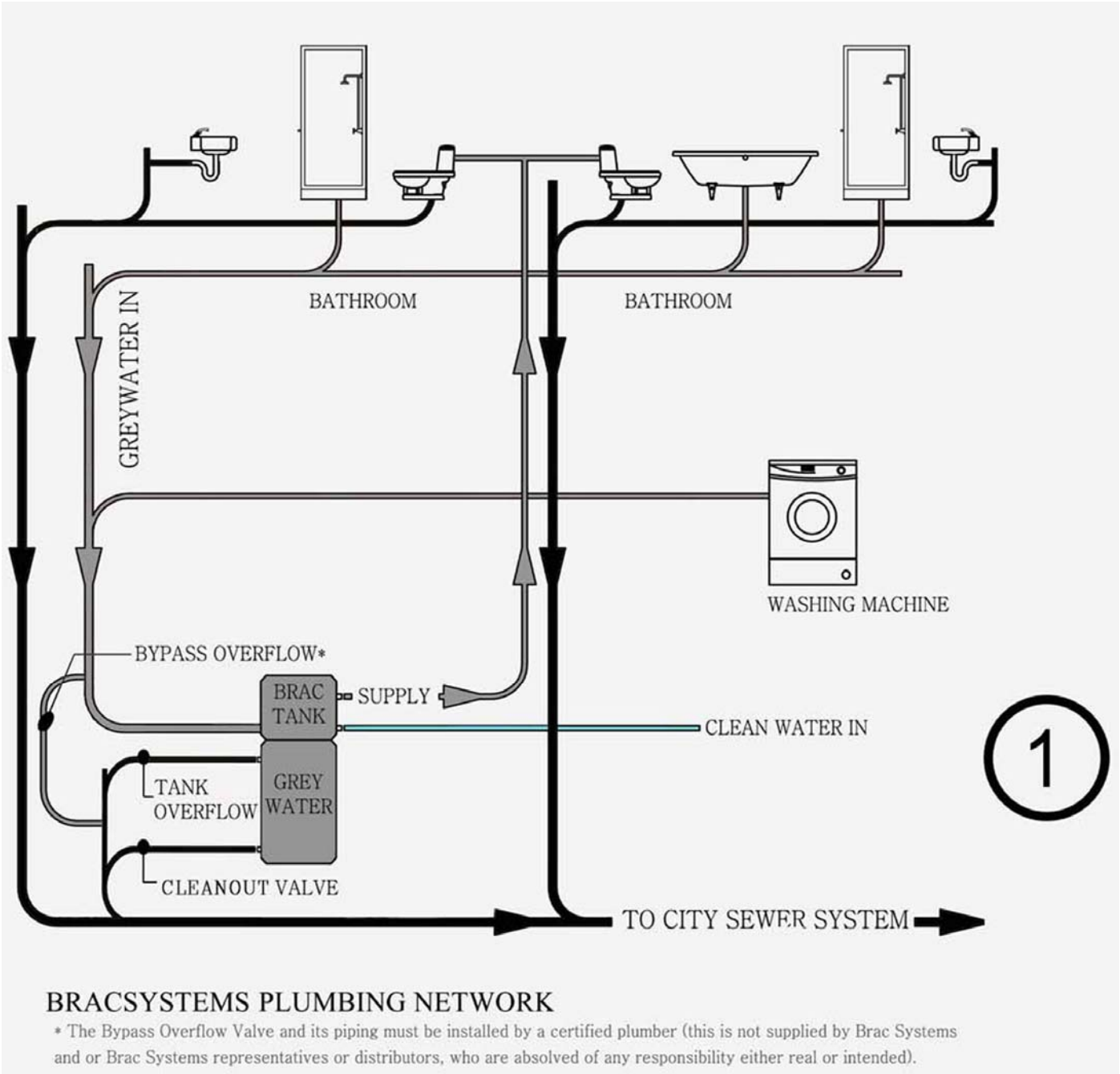


Figure 1

VI. Pre-Installation Assembly

To prevent damage due to shipping vibration, several components of the system have been uninstalled after testing and must be reinstalled prior to system installation and start-up. These components are:

Foot Valve Pipe
Level Switch Pipe
Power Transformer
Drain Valve

Tools and materials needed:
12mm wrench
Phillips head screwdriver
Liquid Teflon (preferred) or Teflon tape.

Foot Valve Pipe: This assembly is identified by a plastic foot valve on one end and a PVC elbow with a stainless steel flange attached at the other end. Fill the pipe with approximately 2 litres (.5 gal.) of water through the elbow. Place the foot valve end of the pipe through the 2" hole closest to the centre of the black platform disk, and lower the pipe until the steel flange aligns with the corresponding mating surface on the pump. Securely attach the flange to the pump with the two bolts provided, using a 12 mm wrench.

Level Switch Pipe: The level switch pipe is identified as a long grey pipe with electrical wires and a connector exiting from one end. Place the end opposite of the wires through the 1-3/8" hole near the edge of the platform disk, and lower the pipe until the PVC flange rests on the platform disk. Be sure not to damage the float switch mechanism. Align the screw holes in the flange with the screw holes in the platform disk, and secure with the screws provided using a Phillips head screwdriver. Connect the level switch pipe's electrical connector to the vacant connector on the wiring harness.

Power Transformer: Remove the power transformer from its box. One of the power cables exiting from the side of the tank has spade connectors attached. Connect each of these connectors to a separate A/C terminal on the power transformer. The grounding terminal is not used. Route the wires through the tension-relief channels adjacent to the terminals, to prevent the connectors from being pulled off of the terminals.

Drain Valve: The drain valve is a 1" female threaded PVC ball valve, and is shipped in the bag with your extra filter and warning tape. It connects to the tank via a threaded 1" PVC nipple, which will either be installed in the valve, or in the tank. Apply Teflon to the exposed threads of the nipple, and screw the ball valve into the bottom of the tank by hand, being careful not to cross-thread, until it is snug, and the valve handle is on top.

VII. Installation Overview

Your **BRAC SYSTEM** requires connection to your home's sanitary drain, and should only be installed by a licensed plumber. This installation guide is intended for general information purposes only. Further discussion and diagrams of plumbing particulars, such as the bypass, cross connection contamination prevention, and backflow prevention, are included in Section VIII – Installation Instructions. For a diagram of the system components, see figure 4 on page 12.

Tank Connections: (fittings present on the Brac tank)

Greywater inlet: 3“ ABS-DWV fitting. Water from your showers, bathtubs, and laundry that is being recycled enters the **BRAC SYSTEM** here.

Ventilation Grate: This allows for air to circulate to and from the sealed upper portion of the tank to cool the pump’s motor.

Greywater outlet: A 3/4“ male threaded fitting. Greywater flows out of the BRAC SYSTEM under pressure, to provide water to your toilets.

Fresh water inlet: A 3/4“ male threaded fitting. Fresh potable water enters the BRAC SYSTEM here, to provide a backup volume of water, should your bathing and laundry activities periodically fail to provide the minimum volume of water necessary to operate the system.

The threads of the greywater outlet and fresh water inlet should be wrapped several times with Teflon tape before connecting. **DO NOT** over-tighten these connections and always use a back-up wrench on the fitting located inside the tank.

NOTE: To bypass electronic float switch, gently insert a 2-3mm. Allen-wrench into the small hole adjacent to the wires on the float switch’s flange. Applying gentle pressure will open the solenoid valve and allow water to pre-fill the storage tank to a minimum level. This must be done prior to plugging in the pump.

Priming and irrigation faucet: This faucet accepts a standard garden hose connector, to provide water at pressure for use in your garden. This faucet is also used to prime the system pump, and to release pressure from the system prior to servicing the pump.

Overflow: 3“ ABS-DWV drainpipe fitting. Connects to sewer line. A bypass line and vent pipe should be connected to the overflow pipe.

Cleanout valve: 1” PVC ball valve, female threaded. Used to drain the tank. Connects to the sewer line (if required by local codes), or drains into an open trapped floor drain. To prevent damage during shipping, the ball valve has been removed and placed in the bag with the extra filter. It must be reinstalled prior to system installation.

Fittings and materials referred to in this document may be subject to change.

VIII. Installation Instructions

Plumbing codes vary by jurisdiction. Your certified plumber will know the codes for your area. These notes are provided for informational purposes only, and as a general guide for your plumber to follow. About Cross Connection Control Devices (CCCD). CCCD is a generic term that refers to devices or methods that prevent potable water supplies from being contaminated by non-potable water. A CCCD can be as simple as an air gap, or as complex as a Reduced Pressure Back Flow Assembly (RPBA). Other common types of CCCD's include Double Check Valve Assemblies (DCVA), and simple check valves. Your local plumbing official will determine which type of CCCD is required for your particular installation.

Plumber's Installation Instructions:

1. Position the **BRAC SYSTEM** in a location so that all connections will remain accessible.
2. Calculate the fixture units for the tubs & showers that will drain into the **BRAC SYSTEM**, then size the inlet, vent and overflow pipes accordingly.
3. Following local plumbing codes, connect the drain lines from the fixtures to the greywater inlet port of the **BRAC SYSTEM. (See figure 1).**, Install a bypass and vent pipe to the overflow drain. For bypass piping, install a Tee "standing up" upstream of the greywater ball valve with a minimum of 6" horizontally between the bypass and vent Tee's, and then connect to the overflow piping upstream of the backwater valve. The 6" horizontal length will prevent the loss of greywater through the bypass during normal operation. **(See figure 5).**
4. Install a backwater valve (such as a swing check valve) down stream of the overflow port, and connect the overflow pipe directly to the building drain. **(See figure 2).**
5. The vent port must terminate to open air, or be connected to another vent that terminates to open air. **(See figure 5).**
6. Install a cross-connection control device (CCCD) on the potable water pipe to the "fresh water in" port of the **BRAC SYSTEM**. **(See figure 3).**
7. For reasons such as power failure, it is recommended that a bypass line with shut-off valves be installed between the "potable water in" and the "greywater out" lines, downstream of the CCCD. This will ensure that the toilets are supplied with pressurized water for normal operations at all times. **(See figure 3).**

IX. Priming and Start-Up

After the **BRAC SYSTEM** has been completely installed, follow these steps to prime and power up the system.

- Open the ball valve on the freshwater IN pipe to allow the line to pressurize.
- Plug in the transformer. The fresh water solenoid valve should open, and the tank should begin to fill with clean water.
- When the water level reaches the minimum amount required for the pump to operate safely, the valve will automatically close and shut-off the fresh water supply.
- Remove the small red cap from the top of the pump housing. Fill the small compartment revealed under the red cap with water then replace the cap.
- **TIP:** If a freshwater bypass line has been installed, open the bypass shut-off valve to allow the lines to pressurize. Place a bucket under the irrigation/priming faucet and open faucet to expel any remaining air in the lines. Close the bypass shut-off valve.
- Plug in the pump's power cord.
- The pump should begin drawing water and pressurizing the service lines. If the pump fails to prime, unplug the pump, and repeat the three previous steps. Do not let the pump continuously run when not primed. It may take multiple repeats of this step to get the pump primed.
- Place a bucket under the irrigation faucet, and open the faucet to test for adequate flow and proper pump function. This will also release any air trapped in the system.
- Flush the toilets to test their function, and to release any air trapped in the service lines.
- If the pump fails to start or stop, the pressure switch may need to be adjusted. The instructions for the location and adjustments of the pressure switch can be found in Section XV – Pump Manual.

IF YOU ARE STILL EXPERIENCING PROBLEMS WITH THE START-UP PROCEDURES AND HAVE FOLLOWED ALL INSTRUCTIONS THOROUGHLY, CALL OUR SUPPORT LINE AT 1.514.856.2722 OR IN CANADA CALL OUR TOLL-FREE NUMBER AT 1.866.494.2722.

X. Safety Components

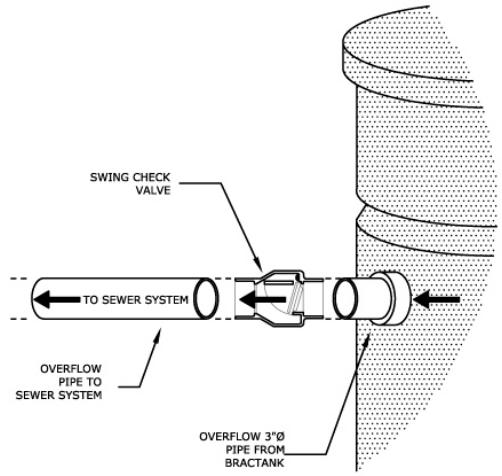


Figure 2

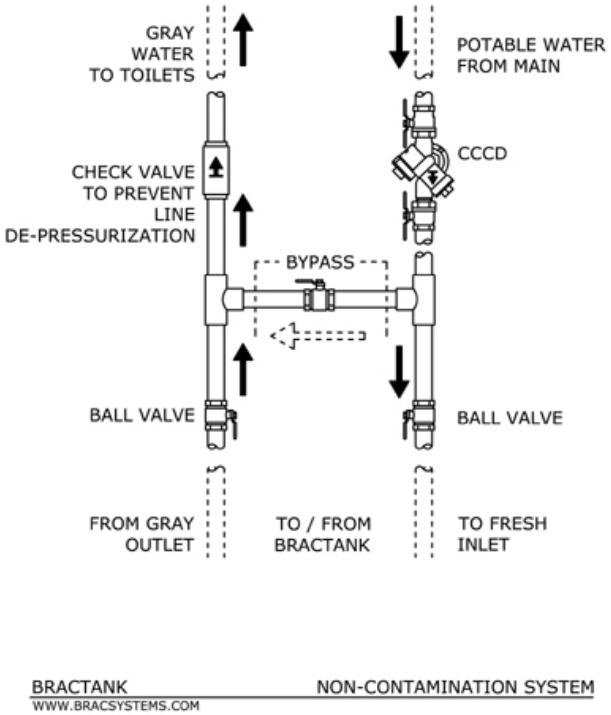


Figure 3

XI. System Components

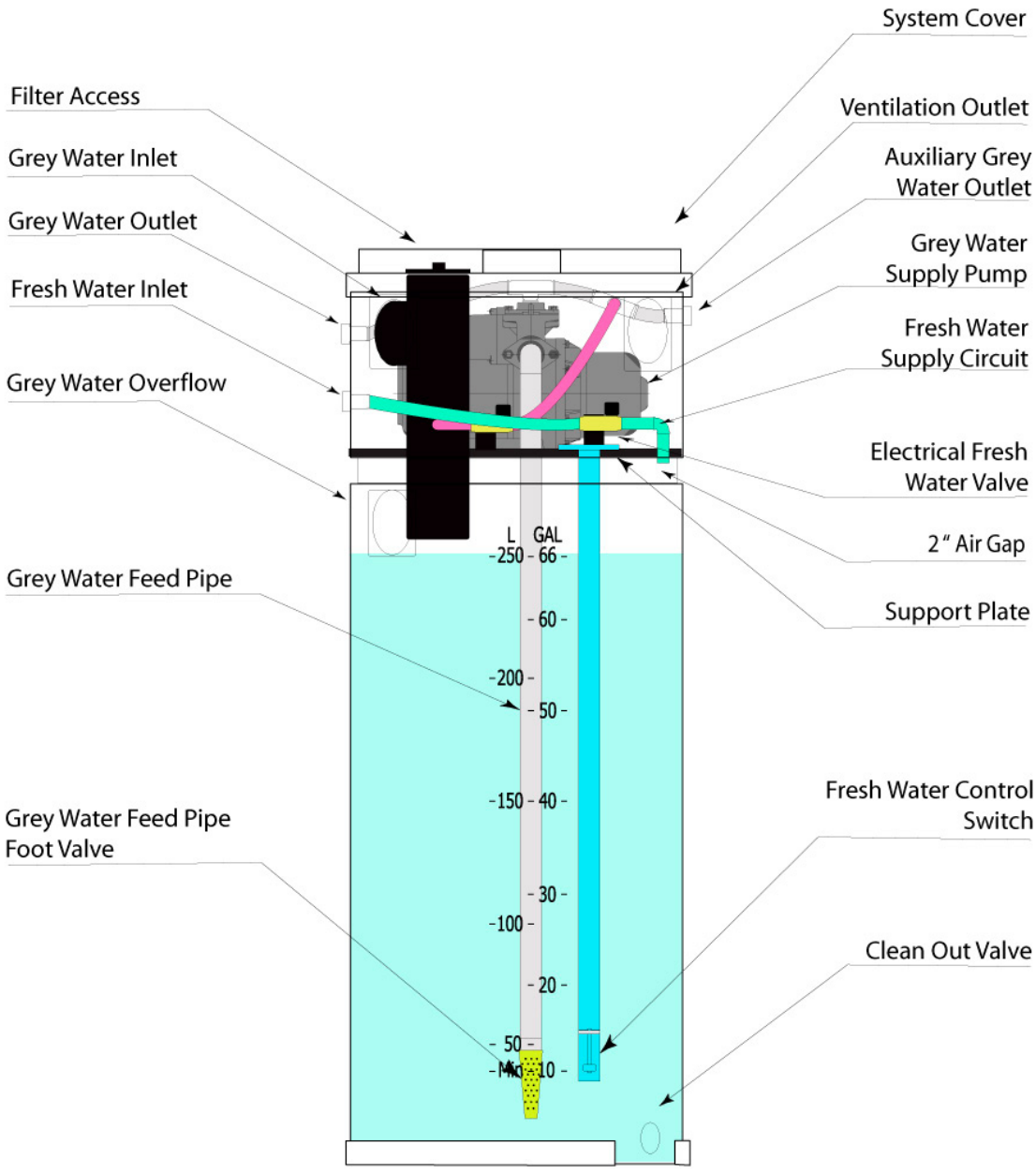
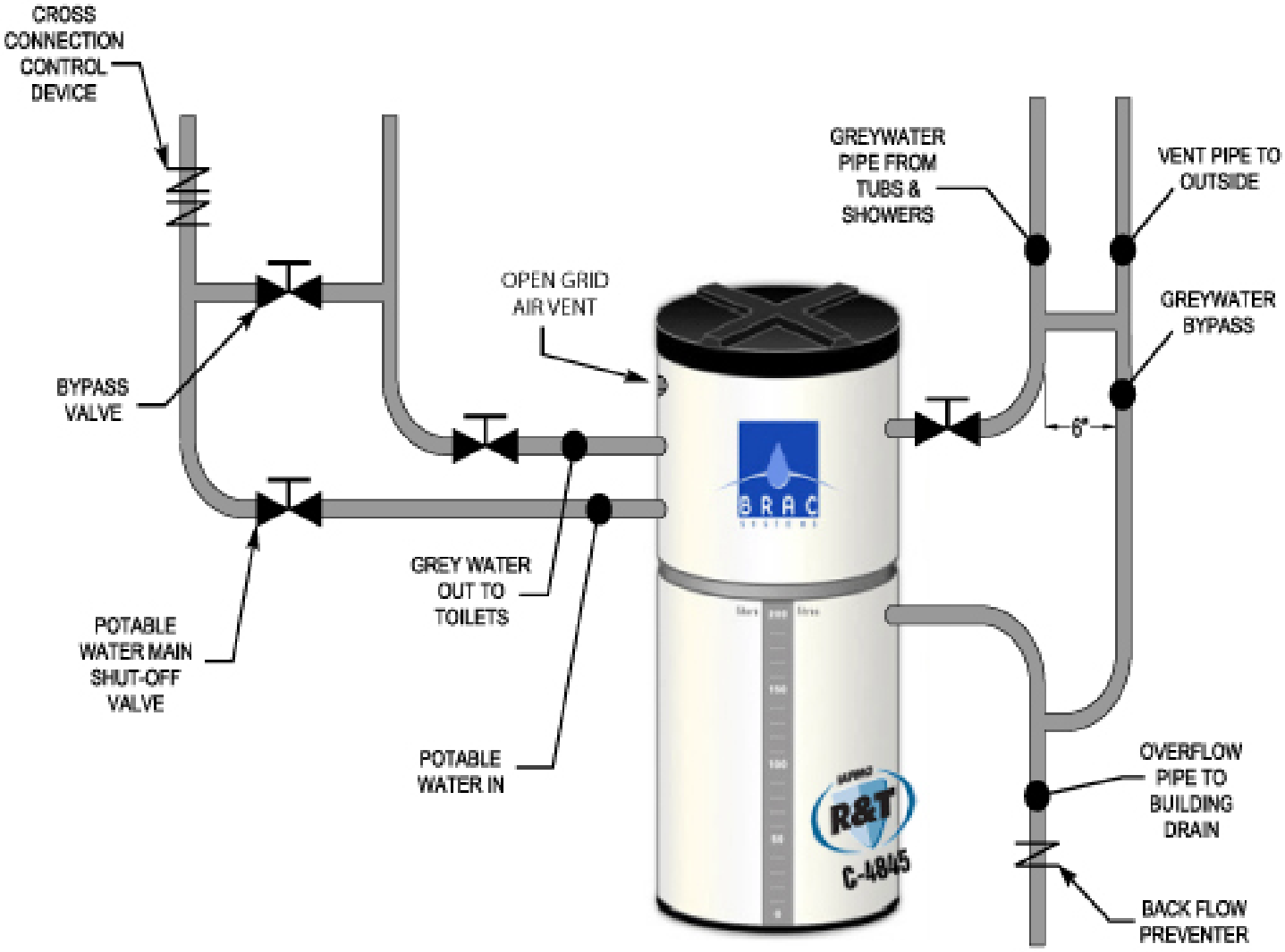


Figure 4

XII. Plumbing Diagram 2



The cross-connection control device and built-in airgap prevent contamination of the potable water system. The bypass valve provides water to toilets incase of power failure. The greywater bypass prevents the drains from backing-up incase of filter obstruction. The backflow preventer prevents contamination in the event of a sewage back-up. The vent and overflow pipes must be at least the same size as the inlet pipe (maximum 3").

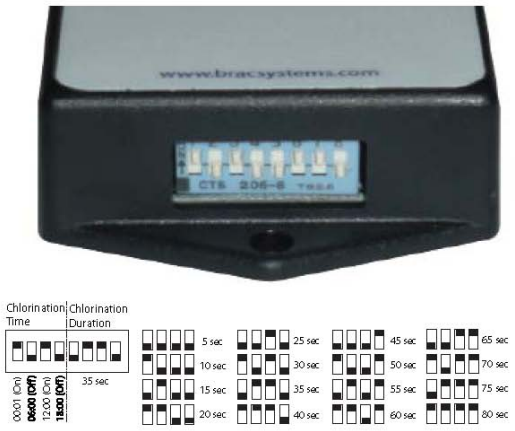
Figure 5

XIII. Chlorination Timer Set-Up

Brac Controller BC-100

Attention: Your 2009 **BRAC SYSTEM** is equipped with the new BC-100 Water Management Controller. This page supersedes all previous user guides' Section XIII – Chlorination Timer Set-Up.

The Chlorination Controller in your system has been factory pre-set for two – forty second cycles per day. The number of cycles per day and duration of the chlorination cycle may be increased or decreased to attain a target chlorination of the stored greywater between 0.5ppm to 1.0ppm of residual chlorine. (Tested using chlorine test strips for pools.)



The BC-100 controller is real time (24 hours) based and will start counting in seconds from the time it is turned on. The four left mini switches control the chlorination event time. The four right mini switches control the duration of the chlorination event. See the chart above for settings.

XIII. Chlorination Timer Set-Up

The chlorination cycle can also be manually operated by pressing the blue “Chlorinator” button on the BC-100 controller. The chlorination valve will operate only while the “Chloriantor” button is pressed.

The fresh water make-up circuit is automatically managed by the BC-100 controller. It too can also be manually operated by pressing the blue “Fresh Water” button on the BC-100 controller.

Do not depress the bue buttons on the BC-100 controller for an extended period of time. This could cause damage to the controller. Either the “Fresh Water” button or the “Chlorination” button should not need to be pressed for more than one minute at a time.

XIV. Care and Maintenance

There are three main areas of routine maintenance that must be attended to:

- **Maintenance of the chlorinating system**
- **Filter cleaning**
- **Tank cleaning**

Chlorinating system
When left untreated, greywater can quickly turn to black water. The **BRAC SYSTEM** features an automated programmable chlorinating system, which re-circulates the greywater in the holding tank through the filter housing and over a long lasting chlorine tablet at pre-programmed intervals. While the timer controlling this system is preset at the factory, proper chlorinating requires the user to visually inspect the chlorine tablet, and replace it when necessary. This is most conveniently done during the filter cleaning procedure. (See next section – "Cleaning the filter").
The chlorine tablet rests at the bottom of the filter housing on top of a screen, and is visible when the filter housing cap and filter are removed. When the tablet is consumed, simply drop a new tablet into the filter housing and replace the filter and cap.
Some jurisdictions require that greywater be dyed blue or green before being served to toilet fixtures. In this case, the dye tablet can be dropped into the filter housing with the chlorine tablet.
Replacement tablets can be obtained directly from **BRAC SYSTEMS INC.**, or from most pool supply vendors.

Cleaning the filter
As we are unable to determine the number of family members in each particular household, we recommend that you inspect and clean the filter every week. If you realize that the build up of residue in the filter does not warrant cleaning the filter every week, we recommend that you decrease the frequency of inspecting and cleaning of the filter by three days at a time, (every ten days, every thirteen days, every sixteen days, and so on…), until you determine the proper time interval for your particular situation. To reduce the frequency of required filter cleanings, it is recommended that users install an inexpensive hair filter in the bath and shower drains. Also bear in mind that the capture of laundry water will cause the filter to clog more frequently, due to laundry lint.

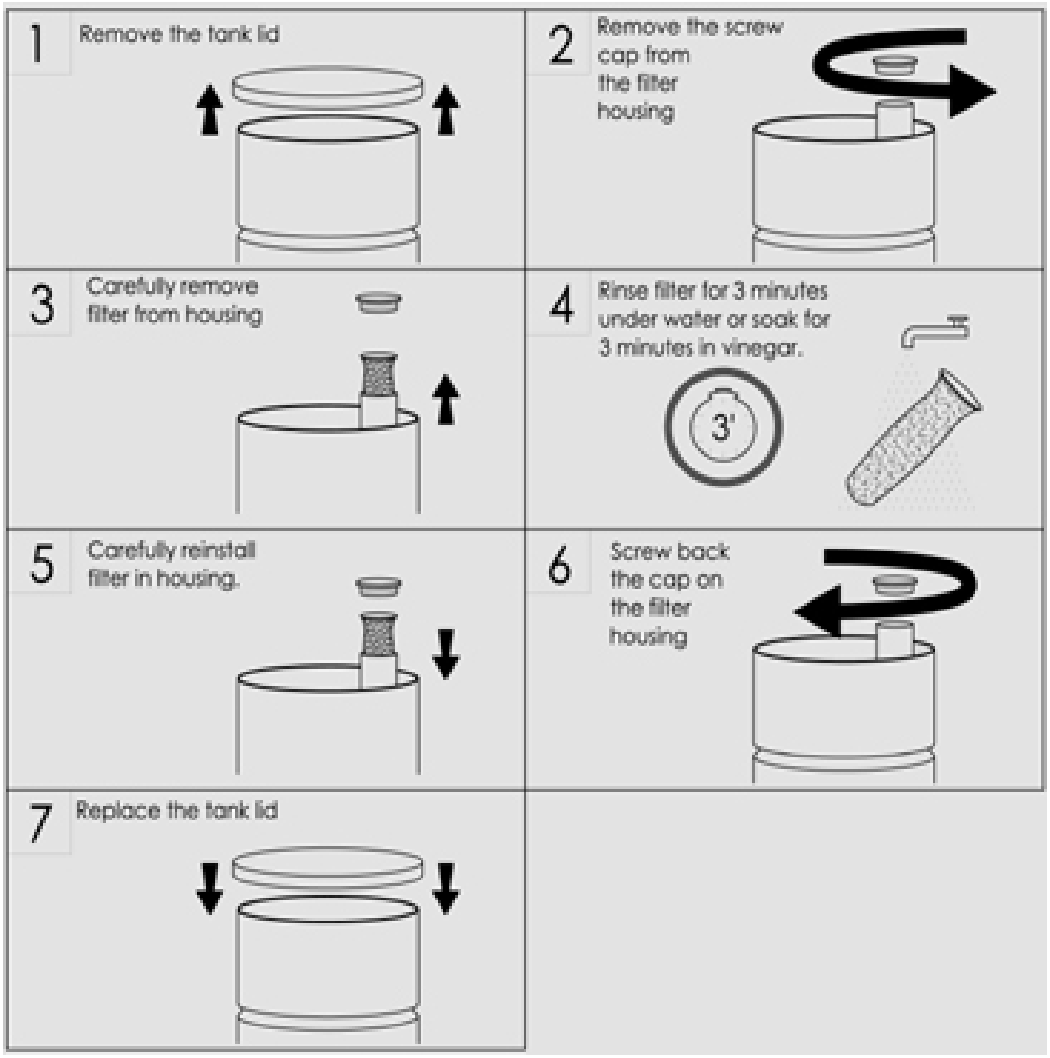
Procedure:
1. If the potable water bypass is installed, open the bypass valve to allow the toilets to operate on potable water during this procedure.
2. If the greywater bypass is installed, close the bypass valve to divert any bath drainage to the sewer during this procedure.
3. Unplug both the pump power cable and the transformer from the power source to secure the system.
4. Remove the tank lid.
5. Remove the screw cap from the filter housing.
6. Carefully remove filter from housing.
7. If necessary, soak filter in a 50% water and 50% vinegar solution and then rinse with water.
8. Inspect Chlorine tablet in filter housing, replace if necessary.
9. Replace filter in filter housing.

XIV. Care and Maintenance

10. Apply a thin layer of petroleum jelly to the rubber o-ring on the screw cap to ensure a proper seal, and replace cap.
11. Replace tank lid.
12. Close potable bypass valve, if applicable.
13. Open greywater bypass valve, if applicable.
14. Plug in transformer and power cable.

If the filter is damaged, or has to be replaced for some other reason, please use the extra filter, which has been supplied by **BRAC SYSTEMS**. We recommend that you purchase new filters from your Brac distributor or your local Brac dealer, so that you always have an extra filter on hand.

Tip: Some users have found it convenient to alternate the use of the factory-installed filter and the extra filter provided at each cleaning procedure, and to wash the dirty filter in the laundry after it has been thoroughly rinsed. There is no need to run the filter through the dryer.



XIV. Care and Maintenance

Cleaning the tank

Note: It has been our experience that with a properly chlorinated system there will be no sludge build-up in the bottom of the tank and this procedure is unnecessary. However, we leave the procedure in place in the event that a user does find it necessary to clean the tank.

The same principal used for determining the time interval of cleaning the filter holds true for the cleaning of the tank. Under normal circumstances, it should be sufficient to clean the tank once a year. Initially, we recommend that you inspect and clean the tank every three months until you have determined the proper cleaning interval.

IMPORTANT: If a greywater bypass has not been installed, do not use the bath, shower or laundry while cleaning the tank.

Procedure:

1. Unplug the pump power cable and the transformer from the power source.
2. If a greywater bypass is installed, close the bypass valve to direct any bath drainage to the sewer during this procedure.
3. If a potable water bypass is installed, open the bypass valve to provide potable water service to the toilets during this procedure.
4. Make sure that the clean-out valve is connected to your sewer pipe, or drains into an open trapped drain.
5. Open clean-out valve and empty tank.
6. Close clean-out valve.
7. Open the filter housing, remove the filter, and remove the chlorine tablet, with a rubber-gloved hand, from the bottom of the filter housing. Place the tablet inside the inverted filter-housing cap, and set aside in a safe place for the remainder of this procedure. This tablet is highly corrosive, do not touch!
8. Pour a minimum of five litres of household vinegar through the filter housing, and allow to stand in the tank for fifteen to twenty minutes. **DANGER!** - Do NOT pour vinegar directly over the chlorine tablet.
9. Pour a glass of water into the filter housing to flush out any accumulated vinegar at the bottom of the housing. Drop the chlorine tablet into the housing. Replace the filter. Rinse off any chlorine residue from the filter-housing cap, and replace snugly on the filter housing.
10. Plug in the transformer to the power source, but do not plug in the pump cable yet. Potable water should start flowing into the tank.
11. Open the clean-out valve to allow the vinegar to drain as fresh water is added to the tank. Allow the tank to self-flush with potable water for five minutes.
12. Close clean-out valve, and with the fresh water supply still running, allow the tank to fill until the float valve turns off the fresh water.
13. Close the fresh water bypass valve, and open the greywater bypass valve.
14. Plug in the pump power cable.
15. Replace the tank lid.

XIV. Care and Maintenance

After cleaning the tank, flush each toilet once to ensure proper function. During the cleaning process of the tank, do a visual inspection of all fittings, connections and the tank to ensure there are no leaks anywhere.

The overall time required for this procedure is approximately 30 minutes.

XV. Pump Manual

TQ Series Instruction Manual

Please read all instructions carefully before installing your new systems, as failures caused by incorrect installation or operation are not covered by the warranty.

I. Product

The TQ series are designed for the pumping of non-aggressive water, or water not containing solid particles.

II. Operating conditions:

1. Ambient temp. : Max. +104°F (40°C)
2. Liquid temp. : +39°F(4°C) ~ +104°F(40°C)Max.
3. System pressure: Max. 120 PSI
4. Relative humidity: Max. 85%(RH)

III. Installation

1. The pump foundation should be rigid enough to absorb any vibration from the motor, and the pump should be securely bolted to the foundation.
2. It is recommended that the plumber/installer provides an adequate draining system to avoid damage in case of leakage, particularly when installed indoors. When it is installed outside, it should be covered by a weather-proof housing, well ventilated to allow motor heat to escape.
3. The pump should be installed as close as possible to the liquid source.
4. When use with water heaters, a check valve should be installed between pump (discharge) pipeline and water heater (suction) to avoid high-pressure steam backflow.
5. It is recommended to shut off the pump when the liquid source is unavailable; although it has the dry run cut off function.
6. The pump has a built-in check valve. Please do not install any other valve on the suction.

IV. Piping

1. The suction line should be installed as short and straight as possible, with a minimum of bends. The internal diameter of the suction pipe must be equal to, or greater than the ports of the pump.
2. The connection between the suction line and pump must be airtight, and the suction pipe must be positioned so it has an upward slope to the pump (thus avoiding the formation of air pockets).
3. When used on a suction lift, a foot valve should be fitted on the suction line, below the liquid level.
4. If hose is used as the suction pipe, it must be non-collapsible.
5. To minimize pressure drop, the discharge pipe should be at least the same size as the discharge port of the pump.
6. For long suction pipes or high suction lifts over 13 ft, the suction pipe should be of greater diameter than the suction port.
7. Ensure all connections are completely sealed using thread tape only.

V. Electrical connection

1. Ensure the mains voltage is the same as the value shown on the motor plate and that the pump is safely connected to ground/earth.
2. The single phase models are supplied with plug and lead and can be connected directly to the mains supply. The 3 phase models should hook up with a circuit breaker.

VI. Wiring diagram

WARNING:

Risk of Electric Shock - This pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded, grounding-type receptacle".

Before operation, please ensure the voltage is correct and the circuit breaker and grounding connectors are all connected in accordance with local regulations.

Single-phase power supply

3-phase power supply (check if rotation is correct)

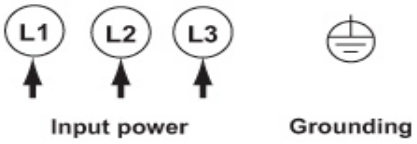
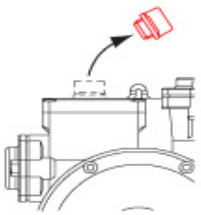


Fig. 1

VII. Starting

1. Before starting, the pump must be primed. Please follow the procedure as shown in Fig 3.

a. Remove the filling plug



XV. Pump Manual

b. Fill water in chamber

c. Replace the filling plug

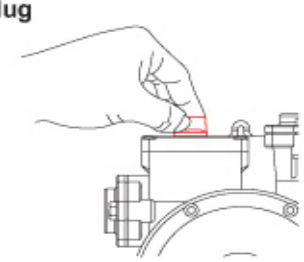


Fig. 2

2. Installation where the pump inlet is below the water supply, remove the priming plug and allow the water to flow into the priming chamber until all air is expelled.
3. The priming procedure should be repeated until all air is expelled and the pump delivers a full stream of water without air bubbles.
4. The pump must always be checked for prime if not used for a prolonged period. It is imperative to fill the pump with liquid before operation as dry running causes irreparable damage to the mechanical seal.
5. When 3-phase motor is supplied, please ensure if the rotation is correct. You can switch any of the 2 wires to get your desired rotation.

VIII. Precautions

1. The pump should be shut down and the trouble corrected if the pump is running at speed and found to have any of the following problems:
   - No liquid discharged - Not enough liquid discharged
   - Excessive vibration - Motor runs hot
2. Do not allow the pump to continually start and stop (cycling) as this will reduce the motor life.
3. Cycling can occur on pressure units when the pressure tank pre-charge drops, or where there is a leak in the discharge plumbing.

IX. Operation and maintenance

Under normal operating conditions, the pump does not require any maintenance as long as the following points are observed:

1. Periodically check the condition of the check value and strainer (if used).
2. If the pump is to be inactive for long periods, it should be rinsed thoroughly with clean water, then, drained and stored in a dry place.
3. If the pump sticks after periods of inactivity, a screw driver slot is provided on the motor shaft end to free up the pump/motor. To do so, insert a screw driver in the slot in the motor shaft as shown in Fig 3 and turn to free the rotor. If this does not remedy the problem, the unit will need dismantling.

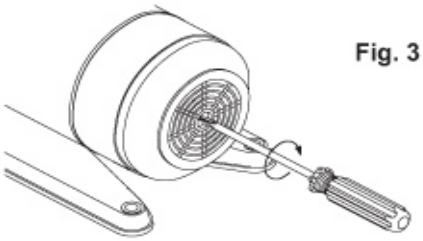


Fig. 3

4. Pressure tank air charge should be checked at regular intervals of every 3 months and after the pump has not been used for a prolonged period.To check the Pressure Tank air pressure, turn off power, open a tap on the discharge line to release pressure from the pump, unscrew the black plastic cover and apply an accurate pressure gauge to the valve as shown in Fig 4.

Pressure should be adjusted to the original pre-charge as follows:

TQ200: 14 psi (1.0 Kg/cm²)
TQ400: 21 psi (1.5 Kg/cm²)
TQ800: 28 psi (2.0 Kg/cm²)
TQ1500 up to TQ3700: 36 psi (2.5 Kg/cm²)

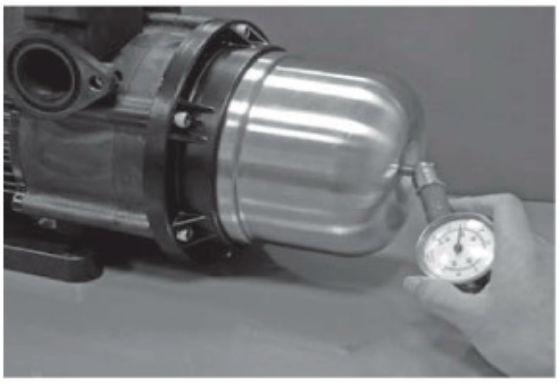


Fig. 4

X. Adjustments and Reset procedures

For most applications TQ pumps need no adjustment to operate under normal conditions. It is only necessary when the inlet pressure is higher than the factory preset range. It is highly recommended that the adjustment is performed by the professional personnel.

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The factory preset activation point is as follows:

Model	Power (HP)	Preset activation point (psi)
TQ200	¼	17
TQ400	½	26
TQ800	1	36
TQ1500	2	43
TQ2200	3	43
TQ3700	5	43

XI. Adjust pressure switch

Adjust the pressure switch setting (according to the pump models) as shown in Fig 5. Make sure the system is primed.

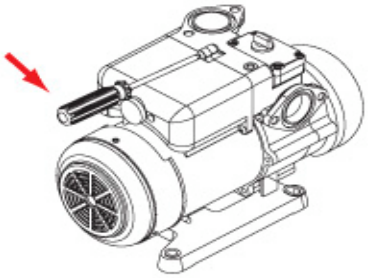
The pump is supplied with a preset pressure in the pressure switch. For most applications, it will be satisfactory. In some cases a different pressure may be required. This can be achieved by following the instructions below. However, it is highly recommended that the adjustment is only done by the professional personnel.

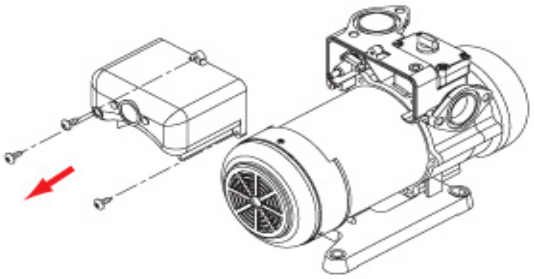
Instructions for pressure adjustment (Fig. 5):

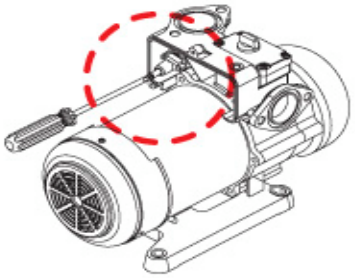
1. If pump does not start when tap is on, adjust clockwise ("+") till it starts.
2. If pump does not stop when no water is consumed, adjust counterclockwise ("-") till it stops.
3. After adjustment is made, turn it on and off several times to make sure it operates normally.

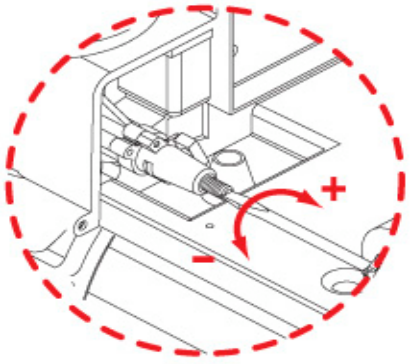
TQ 200/400/800

Open the cover to adjust the pressure





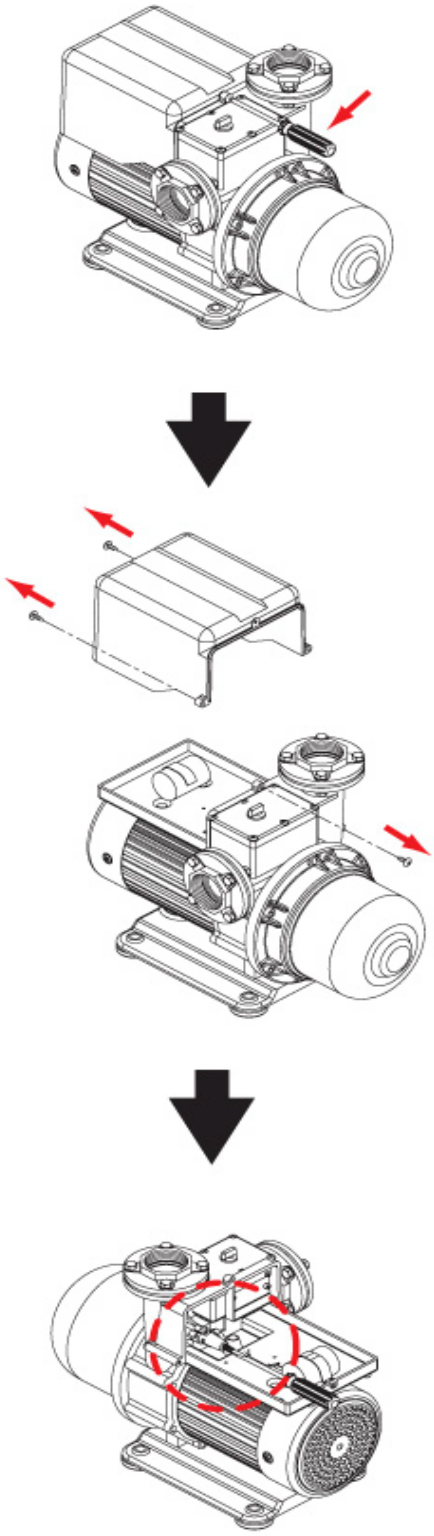




XV. Pump Manual

TQ 1500/2200/3700

Open the cover to adjust the pressure



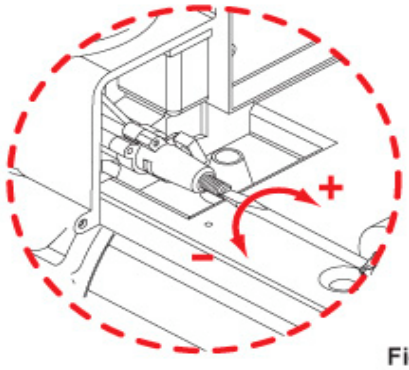


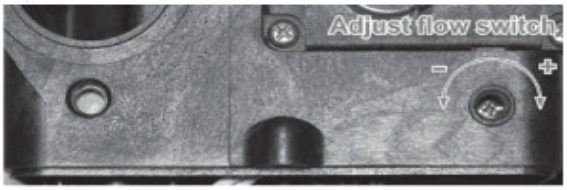
Fig. 5

XII. Adjust flow switch

Following the adjustment of the pressure switch, and with the unit running, close all tapes on the discharge. If the pump cuts out, no adjustment is necessary. If the pump does not cut off, open the black plastic cap as shown in Fig 6 and use a screw driver to adjust the flow switch clockwise (+) until the pump stops.

Open and close a tap on the discharge several times to ensure that the pump starts and stops normally. No further adjustments are necessary.

TQ 200/400/800



TQ 1500/2200/3700

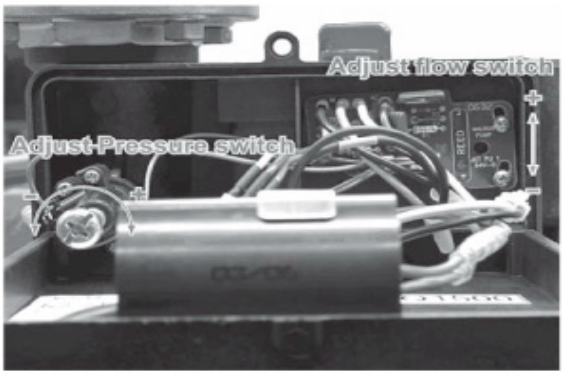


Fig. 6

Warning

The pump is not designed for continuous operation under low discharge flows such as slow closing float valves, slow running taps. Under this application, please install an extra tank of adequate volume to avoid "cycling". Leaking discharge line and leaking taps will damage the unit through causing the pump to repeatedly start and stop.

XV. Pump Manual

XIII. Frequently asked questions:

1. What causes the TQ to start?

The TQ has the built-in pressure switch and internal flow switch. Each of these can turn the pump on depending on water consumption. The pump will start when:

- The pressure is BELOW the pressure switch activation point. OR
- The flow rate is greater than 0.7 GPM.

The preset activation point for each model is provided in the pump specifications. The cut in pressure must be lower than the preset activation pump; otherwise the pump will not start.

2. What is the maximum pressure switch activation point?

Adjust the pressure only when the cut in pressure is higher than the preset activation point. Do not adjust the pressure to exceed the maximum pressure range as below because too high pressure may cause the pump not stop:

TQ200 - 31 psi
TQ400 - 40 psi
TQ800 - 67 psi
TQ1500 - 58 psi
TQ2200 - 60 psi
TQ3700 - 72 psi

3. What causes the TQ to stop?

The flow switch is designed to automatically stop the TQ pump when flow drops to below 0.7 GPM. The pump will shut off in a few seconds after flow stops (TQ1500-3700 is programmed to stop after 15 seconds). In addition, the TQ will be turned off in the event of dry-run or over temperature alarm.

4. What is the purpose of the built-in pressure tank?

The pressure tank comes from the factory pressurized at approximately 14-36 psi (with the pump pressure at zero). It is designed to minimize motor startup due to small flow demand or minor leak of the pipeline.

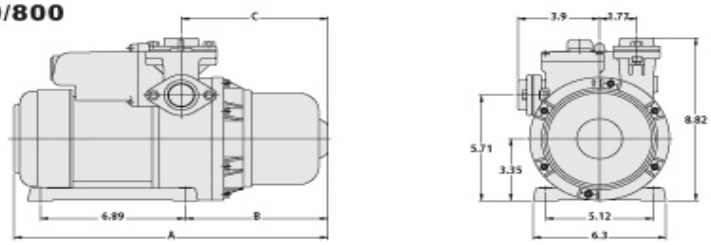
TQ200 - 14 psi (1.0 Kg/cm²)
TQ400 - 21 psi (1.5 Kg/cm²)
TQ800 - 28 psi (2.0 Kg/cm²)
TQ1500 up to 3700 - 36 psi(2.5 Kg/cm²)

5. How is the dry-run condition determined and the protection provided?

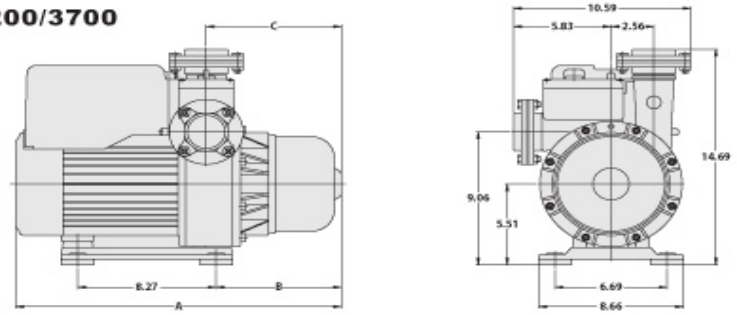
The dry-run is defined when the motor is running AND the flow rate is less than 0.3 GPM AND when pressure is less than the pressure switch setting. The protection is provided:
TQ200 up to 3700 - by temperature sensor which will cut off the pump when the temperature reaches to 131°F (55°C). It will attempt to restart when the temp. drop to 104°F (40°C)

XIV. Dimensions: (in.)

TQ200/400/800



TQ1500/2200/3700



Model	A (in.)	B (in.)	C (in.)
TQ 200	14.37	6.26	6.46
TQ 400	14.92	6.77	6.97
TQ 800	17.76	7.40	7.99
TQ1500~3700	19.72	7.76	8.35

XV. Pump Manual

XV. Specification:

Model	Power (HP)	Cycle (Hz)	Phase (Ø)	Voltage (V)	Amp's (A)	Inlet (NPT)	Outlet (NPT)	H max. (ft)	Q max. (GPM)
TQ200	¼	60	1	115 or 230	4.0/2.0	1"	1"	72	16.9
TQ400	½	60	1	115 or 230	6.0/3.0	1"	1"	92	18.5
TQ800	1	60	1	115 or 230	11/5.5	1"	1"	154	23.8
TQ1500	2	60	1	230	9.5	2"	2"	134	66.0
			3	230	6.5				
TQ2200	3	60	3	230	9.5	2"	2"	138	71.3
TQ3700	5	60	3	230	12	2"	2"	167	71.3

XVI. Troubleshooting

Before starting work on the pump, make sure that the electricity supply has been switched off and that it cannot be accidentally switched on.

Problem	Cause	Remedy
1. pump does not start	a. No power supply	Connect the electricity supply
	b. Too low/high voltage	Check if supply voltage is within ± 10%
	c. Inadequate pressure at suction or discharge	Follow IX of the Operation Manual
	d. Seized-up pump	Place a screwdriver against the shaft end of the motor to check it the rotor will spin freely, and contact your pump supplier.
2. Pump cuts out during operation	a. Seized-up pump	Same as above
	b. Overloaded motor	Turn off the power supply and restart or contact your pump supplier.
	c. Poor water supply	Check if pump suction inlet is blocked.
	d. Overheating due to excessive water temperature	1. Wait till water temp. cool down before restarting the pump. 2. For rapid restart, fill cold water to the chamber to quickly cool down the liquid temp.
3. Pump starts when no water is consumed	a. Existing pipe is leaking	Fix the leakage
	b. Defective check valve	Clean or replace with a new valve.
4. Pump starts and stops too frequently	a. Leakage in suction pipe or air in the water.	Check the suction pipe and water supply.
	b.Discharge flow is too low.	Set your tap on a higher water flow.
5. Electric shock	a.Ineffective grounding	Reactivate grounding.
6. Pump does not stop when water is not consumed	a. Poor water supply or air suck in.	1. Turn off the power supply and open the refilling plug to release the air. Then restart. 2. In case of long suction pipes, turn off the power and make sure if water supply is adequate.
	b. Pressure set is too high	Adjust pressure per XI
	c. Flow set is too small.	Adjust flow switch per XII
7. Pump runs normal but with very low discharge flow	a. 3-phase motor runs in wrong rotation.	Switch any of the 2 wires from motor terminal to correct rotation.
	b. Poor water supply	check if water supply is adequate and if the suction pipe is blocked.

XVI. Frequently Asked Questions

What is greywater? Greywater is the water generated from the use of the shower, bathtub, hand sink, laundry, kitchen sink, and dishwasher.

Is greywater different from wastewater? Yes. Household wastewater, also known as sewage, is composed of two distinct sources:

- **"Black water"** is wastewater contaminated by feces or urine, and includes wastewater arising from toilet, urinal, or bidet.
- **"Greywater"** is the remaining wastewater coming from the laundry, bathroom and kitchen.

Why should I reuse greywater? Greywater is a significant water resource, provided it is managed in an environmentally responsible manner, and public health and the health of the household are protected. By capturing greywater and using it in an appropriate manner as an alternative to your water supply, you can reduce your water consumption. Your water account will reflect this reduction in water use and there will also be positive environmental outcomes.

Is it safe to reuse greywater? Yes, if used in an appropriate way. Greywater can contain disease-causing micro-organisms such as bacteria, protozoa, viruses and parasites. It may also contain fats, oils, detergents, soaps, salt, nutrients, food and hair derived from household and personal cleaning activities. These constituents can pose both health and environmental risks. However, the public health risks associated with onsite reuse of domestic greywater are considered low, as the source of the contamination would be from the immediate family. Other sources of transfer of pathogens around the immediate family are considered a higher risk, such as direct contact or sharing of food and utensils. Similarly, the risk of environmental damage from the careful use of greywater is low.

How can I reduce the risks associated with greywater reuse? The following measures will reduce the health and environmental risks associated with the use of greywater:

- Do not use sprinklers to distribute greywater;
- Use subsurface irrigation systems;
- Do not spray greywater directly onto food plants;
- Do not put greywater on lawns where children are likely to play;
- Do not irrigate with greywater during periods of wet weather;
- Do not allow greywater to enter the storm water system;
- Make sure greywater does not create a nuisance, for example through odors or ponding.

Do I need a plumber? If your greywater system requires connection to the sewage system, i.e. to the pipes below your sinks, shower or bath, a licensed plumber must do this work. If you intend to intercept greywater before it enters the sewage system, i.e. before it enters the drain hole of a sink, you can do this yourself. This may be a simple set-up in which you bucket water from a sink, or direct the water from your washing machine to your garden.

Can greywater from all parts of the house be reused?

Kitchen: Kitchen wastewater could be heavily polluted with food particles, oils, fats, and other wastes. It can also contain high concentrations of micro-organisms. It is often polluted with detergents and cleaning agents, particularly those from dishwashers, which are very alkaline and may be harmful to soils and plants by altering their characteristics in the long term. For these reasons kitchen greywater is not recommended for use.

XVI. Frequently Asked Questions

Bathroom: Chemical constituents of bathroom greywater include soap, shampoo, hair dyes, toothpaste and cleaning chemicals. Greywater from hand basins is more polluted than bath or shower greywater, but is much lower in volume.

Some of these contaminants act as plant nutrients and can be beneficial in the garden, but others can adversely affect plants or soil structure. Concern is often expressed about people urinating in showers and baths and the associated health aspects of using greywater in the garden. However, urine in a healthy person is sterile. While some bladder infections may pass micro organisms in urine, the potential for these organisms to survive and cause infection is considered remote. Greywater from the bathroom is suitable for reuse.

Laundry: Greywater from the laundry improves in quality from wash water to first rinse water to second rinse water. Bacterial loads in laundry greywater are not usually high, except when diapers are washed. Chemical contaminants of the wash cycle water are soap, salt, sediment and organic material. If used for garden watering, the wash cycle water can damage plants and soils and create bad odors. Rinse water contains a much lower pollutant load and the use of this water poses a much lower threat to the environment and to the public health. Domestic pets, which are washed in the laundry tub, can be a further source of contamination for greywater. Greywater from the laundry, particularly rinse water is suitable for reuse.

Can I store greywater on my property before I use it? It is recommended that untreated greywater is not stored for more than 24 hours. When the immediate reuse of greywater is not practical, for instance during periods of wet weather, greywater should be directed to the sewer system.

What is a greywater treatment system? A treatment system will remove the bacterial load and chemical pollutants from greywater so that it can be stored. However, satisfactory treatment tends to be neither simple nor cheap. Treatment processes can include filtering, settling of solids, anaerobic or aerobic digestion, chemical removal of pollutants, and disinfection.

My neighbour is reusing greywater, is my property still safe? Appropriate reuse of greywater is not considered a health threat to neighbouring properties.

What are the environmental risks associated with reusing greywater? Soil or plants can process many of the contaminants in greywater if the system is not overloaded, including organic material, nutrients, salt and sediment. Nutrients can even be beneficial in moderate concentrations, for example, on lawns but not on native plants.

Some greywater contaminants are not capable of being treated or degraded in the soil. Principal among these is salt, which can comprise up to 30% of some laundry detergents and can cause soil degradation.

How much greywater do households generate? The amount of greywater generated by a household will vary greatly depending on the number of occupants, their age, and their water usage patterns. As a general rule of thumb, the average detached household generates approximately 110,000 litres of greywater per year from the bathroom and laundry. This is equivalent to 300 litres of water per day.

How can I improve greywater quality by using different types of soaps, detergents etc.? The choice of cleaning products can reduce the environmental impact of greywater. Common washing powders contain sodium salts as bulking agents that produces a saline (salty) greywater. Some detergents and powder cleansers contain boron that can be toxic to plants in high concentration. It is recommended that for clothes washing you select products low in sodium - either liquid concentrates or powdered products that use potassium salts. There are websites that list the sodium content of a range of laundry products.

XVI. Frequently Asked Questions

How much water will the BRAC SYSTEM save me?
The **BRAC SYSTEM** will save approximately one third of your total water usage.
What is involved in cleaning the BRAC SYSTEM?
There are two simple cleaning procedures: Cleaning the filter, and flushing the holding tank.
How do I clean the filter? And how often?
Every two to four weeks depending on usage, simply remove the filter and rinse it. Soaking the filter in a vinegar solution on occasion is also recommended.
How do I flush out the tank? And how often?
Drain the holding tank through the cleanout valve, add a vinegar solution, allow to soak for a short time, and drain again. This may be done once every year.
Will the chlorine tablets cause problems with my septic tank?
Considering the concentration of chlorine in the volumes of water involved, the chlorine in your greywater shouldn't cause any problems in a modern, healthy septic system. While we haven't had any reports of problems, there could be issues with older, smaller septic systems that are already operating on the edge of failure. In such cases, there are a variety of products available, such as "Septic Miracle" and "Organica Cesspool/Septic Treatment", to name two, that can help boost the bacterial culture of a struggling septic system. Consult with a waste professional if you have concerns about your septic system. Not using tablets at all is not recommended, as unpleasant odors will almost certainly result after a few weeks.
How hard is it to install a BRAC SYSTEM?
While the connections are not difficult, your Brac System should only be installed by a qualified professional plumber. In new construction, it is easy to design the system into the plumbing of the home. In an existing home, new water supply lines for the toilets will need to be installed, and some of your drains will need to be rerouted. You should consult a plumber for an evaluation of your existing construction to determine the feasibility/difficulty of installing a **BRAC SYSTEM** in your particular situation.
What happens in the event of an extended power outage, or if my BRAC SYSTEM needs to be removed for some reason?
When your plumber installs your **BRAC SYSTEM**, he should install a fresh water bypass with ball and check valves between the fresh water supply and the grey water outlet lines. This will allow you to easily supply your toilets with fresh water (and prevent the contamination of your fresh water with grey water) in the event of an extended power outage or removal of the tank. If the tank must be removed, a drain pipe can be easily fitted between where the grey water inlet and over flow drain entered the tank, diverting your bath water to the sewer.
Is a basement necessary to use the BRAC SYSTEM?
Not necessarily. The transportation of grey water to your **BRAC SYSTEM** is by gravity, so as long as the bathtub/shower/laundry drains are above the inlet of the filter housing, the system will function. For those who have a single-level home on a slab foundation, or who wish to utilize the **BRAC SYSTEM** in a "flat", **BRAC SYSTEM INC.** offers a Sump and Pump kit (BSP kit), which consists of a sump basin and fully submersible sump pump. The basin is installed in the foundation or floor to collect greywater from bathing fixtures, and the sump pump automatically pumps the greywater up to the level of the **BRAC SYSTEM** inlet.

XVI. Frequently Asked Questions

You state that use of laundry water in the BRAC SYSTEM is optional. What issues should I be aware of when considering this option?

Based upon customer usage, we have found that on average, if every member of a household bathes once per day, the amount of greywater generated nearly matches the amount of water used to flush the toilets in that household. In addition, laundry water contains a great deal of lint, which will clog your filter quicker, requiring more frequent filter cleanings. So you should balance your family's bathing habits against the increased maintenance that will be required. Since the drain hose of a washing machine can be easily moved, you may even consider having both a traditional sewage drain and a greywater drain behind your washing machine, so that you can switch back and forth as your needs and convenience dictate.

Why does the Brac Treated Greywater Recycling System have a potable water connection?

The jet pump in the system can be severely damaged by allowing it to run dry. While an average household will produce enough greywater to keep plenty of water in the tank, there will be occasions when the demand will exceed the supply. The fresh water system insures that there is always enough water in your tank to prevent the pump from running dry. An electronic float switch connected to a fresh water valve will add potable water from your home's plumbing system when the level of water in your tank reaches a minimum level, and will automatically stop adding water when the water reaches a safe level.

XVII. Troubleshooting Guide

Pump runs continuously, or with only brief pauses - level of water in lower tank is at or above "Minimum" level:

- Irrigation faucet is in use - normal condition. Hose pressure is provided by the pump and pressure tank.
- Toilet leaking - check toilet flapper valves. A leaking toilet will cause the pump to run continuously.
- Pump has lost it's prime – Reprime pump following priming instructions located on page 10 of this manual.

Pump runs continuously, or with only brief pauses - water level in lower tank is below "Minimum" level:

- No fresh water supply - unplug pump to prevent damage to pump. Check fresh water connections to the tank, and make sure that all the valves are open. If all valves are open, and there is still no fresh water supply, let the water in your shower or bath run until there is an adequate supply of water in the tank, and contact your Brac service person.
- Pump has lost it's prime – Reprime pump following priming instructions located on page 10 of this manual.

Lower tank is full, and draining out of overflow pipe

- Greywater supply exceeds usage - normal condition. Confirm by flushing toilets several times, without running any showers, baths, or laundry, and observing that the water level in the tank drops, and does not immediately rise again.

Lower tank is not filling with greywater when tub/shower is draining

- Filter is clogged - check filter by carefully opening filter housing cap. Rinse filter following recommended cleaning procedure then replace filter back into filter housing. For extra filters call **Brac Systems** or your Brac service rep.

Toilet water emanates noxious odors

- Chlorination tablet expended - check and replace chlorination tablet. If clorination tablet is fine: Malfunction of chlorination recirculation system, call **Brac Systems** or your Brac service rep.

XVIII. Consumer Warranty

BRAC SYSTEMS
CONSUMER WARRANTY

1. Your warranty is valid for a period of 2 years, from date of purchase.
2. This coverage applies against failure, due to factory defects and workmanship. Should the unit fail it will be repaired or replaced F.O.B. our factory without charge, provided that the unit is returned to our factory prepaid.
3. This warranty does not include labour or service charges incurred by removing or reinstalling the unit and damage caused by abuse or a faulty installation.
4. The company shall not be responsible for or have any obligation whatsoever for direct or indirect loss, consequential damage or otherwise inconvenience arising from any failure of the equipment.

BRAC SYSTEMS INC. assumes no responsibility whatsoever if the greywater recycling system should fail during the warranty period by reason of:

- Misuse, negligence, physical damage or accidents.
- Lack of maintenance (see instruction for proper maintenance).
- Repair by any unauthorized party during the warranty period.
- Damage caused by connection to an improper source or for improper use.

IMPORTANT NOTICE
TO THE CONSUMER

If you require any additional information or warranty service with the product you have purchased, please call 1-514-856-2722, before advising or returning the product to the original point of purchase.

This product is warranted two (2) years from date of purchase.

All warranty claims must be directed to the factory. The product will be repaired or replaced at our option. Units covered under warranty will be returned to sender freight “prepaid”. Units no longer on warranty will be returned to sender freight “collect”.

Please be advised that 99% of system problems are caused by an improper installation. By simply contacting our customer service department, we will be pleased to help you with any questions you may have.

Thank you for choosing **BRAC SYSTEMS**, the product purchased has been designed to give you years of trouble free service.

All of us at **BRAC SYSTEMS** are committed in building the highest quality product available, and to give our customers the satisfaction they deserve.

The **BRAC SYSTEMS** Team

YOU CAN MAKE A DIFFERENCE

XIX. Consumer Warranty Card

PLEASE MAKE A PHOTCOPY OF THIS PAGE THEN COMPLETE THE REGISTRATION INFORMATION AND RETURN TO BRAC SYSTEMS INC.

Consumer name:

_____

Consumer address:

_____

_____

Consumer telephone and/or email address:

_____

Dealer or distributor name:

_____

Dealer or distributor address:

_____

BRAC SYSTEMS MODEL Serial number Purchase date

_____ _____ _____

IMPORTANT: To activate your warranty and register your product, this card must be filled out and returned within thirty (30) days of purchase.

_____
Consumer's signature

Mail to:
Brac Systems Inc.
4034 Poirier Blvd.
St. Laurent, Montreal
Quebec H4R 2A5