

# High Efficiency Sand Filters CW120 Series

# Table of Contents

## Preface

1. Installation	2
i. Unpacking Filter System	2
ii. Rigging	2
iii. Locating Filter System	2
iv. Filter System Assembly	3
i. Placing, Arranging, and Leveling Vessel(s)	3
ii. Assembling Manifolds	4
iii. Valve Control Wiring	4
v. Electrical Connections	4
i. General	4
ii. Control / Motor Starter Package	5
iii. Control Package	5
vi. Pipe Connections	6
i. Supply & Return Lines	6
ii. Backwash Supply	7
iii. Waste Line	7
vii. Media Installation	7
2. Documentation	9
i. Media MSDS	9
ii. Installation Check List	16
iii. Request for Startup	17
iv. Startup Data Sheet	18
v. Filter Log Sheet	19
vi. AmeriWater Warranty	20
3. Operation	21
i. Seasonal Startup	21
ii. Seasonal Shutdown	22
iii. Freeze Protection	23
iv. Sequence of Operation	24

4. Maintenance	
i. Maintenance Schedule	29
ii. Control Functions	29
iii. Media (Level & Condition)	30
iv. Pump Service	30
v. Troubleshooting Guide	31
5. Drawings	32
6. System Component Cut Sheets	41

# Installation, Operation, Maintenance AmeriWater Filter Systems Series CW

This Installation, Operation, and Maintenance manual contains instructions for the AmeriWater filter series CW. Check the model number on your filter system (located on the inside of control enclosure door).

**If CW is not present in model number - Do Not Proceed.  
Contact AmeriWater at 800.535.5585 for instructions.**

**Read and understand each section of this manual before proceeding with installation and operation of your AmeriWater Filter System.**

**CAUTION: All WARNINGS AND CAUTIONS MUST BE FOLLOWED TO AVOID PERSONAL INJURY!**

This filter system has been factory assembled and tested before shipping. The filter system may be broken down for shipping, with major components remaining assembled.

**Report damage or missing parts immediately to AmeriWater at 800.535.5585.  
This filter system must be started by a Factory Authorized Representative.**

**START UP BY ANYONE OTHER THAN AN AUTHORIZED AGENT WILL VOID  
WARRANTY!**

**Contact AmeriWater (800.535.5585) at least two (2) weeks in advance to arrange start up.**

Specifications subject to change without notice. Local codes supersede instructions in this manual. Contact AmeriWater 800.535.5585 with questions or to report significant deviations between local code and instructions.

## **System Description**

AmeriWater High Efficiency Filter System series CW are composed of the following major components: (Ref: Drawing CW)

Filter Vessel(s)

Filter Pump

Backwash Pump (optional, not shown)

Pre-assembled pipe manifolds (may be packed loose)

Valves

Control / Motor Starter Panel (Ref: CP)

Skid

# 1 Installation

## 1.1 Unpacking Filter System

**NOTE: Filter components may be attached to sides of crate or packed in boxes within shipping crate. Be sure to remove all components before disposing of crate.**

**DO NOT LIFT OR PULL FILTER VESSELS BY SIDE PORTS; INTERNAL COMPONENTS MAY BE DAMAGED!**

- a) Inspect shipping crate(s) and packages for damage. Before signing bill of lading, report any damage to AmeriWater 800.535.5585.
- b) Remove top of crate then break down sides as necessary to remove contents. Report any damage immediately to AmeriWater 800.535.5585
- c) Unpack filter system as close as possible to installation location.
- d) Flange gaskets, bolts, and pipe stand hangers (if applicable) are contained in cardboard boxes packed in crate(s).

## 1.2 Rigging

- a) Pallets should be lifted by a forklift or crane. Filter systems should be rigged from lift points. **Do not allow rigging straps to contact system components.**

## 1.3 Locating Filter System

- a) Filter should be located on a level floor or housekeeping pad.
- b) Vibration pads (not included) may be used under components and pipe stands for vibration isolation.

**NOTE: Vibration pads, if used, should be placed under all components to ensure proper alignment.**

- c) Floor load rating must be sufficient to accept filter weight. (Ref: Drawing CW)
- d) Place system in close proximity to water to be filtered. Factory representative should be consulted if filter will be over 20 feet from water source.
- e) Protect system from water temperatures below 32 degrees F and above 140 degrees F unless filter is designed for those temperature applications.

## 1.4 Filter System Assembly

### Placing, Arranging, and Leveling Vessel(s)

#### Skid mounted systems:

- a) Place system skid in desired location and level skid.

**NOTE: If system was shipped assembled, the pipe assembly may be loose at flanges to avoid flex damage. Some systems will be shipped broken down to avoid damage from flexing.**

- b) Arrange vessels with valves front.
- c) Multi vessel systems are labeled and should be arranged in order from left to right. (Use lower pipe manifold as guide for spacing and leveling vessels.)

**CAUTION!**

**WARNING!**

**CAUTION!**

**PERSONAL INJURY MAY RESULT!**

**READ FOLLOWING CAREFULLY BEFORE PROCEEDING!**

**TIPPING HAZARD** may exist on empty, freestanding, multi-vessel systems with upper manifold attached.

#### **READ THE FOLLOWING PARAGRAPH BEFORE PROCEEDING!**

With vessels properly aligned and leveled and with lower manifold and pipe stands attached, add base (stone) media. (See media addition sec 6 in this manual).

This will counter balance the system and reduce tipping hazard.

**NOTE:** Be sure that vessels are properly placed and aligned before adding base media. Vessels will be difficult to move with media added.

## Assembling Manifolds

**NOTE: Flange bolts, and gaskets are packed in separate cardboard box contained in filter shipping crate.**

- a) Align upper and lower manifolds with vessels. Install flange gaskets and bolt manifold flanges to vessel(s). Do not tighten flange bolts at this time. Minor adjustments in vessel alignment may be necessary at this time.
- b) Assemble all interconnecting manifold flanges and secure unions. Tighten all connecting bolts at this time.

**WARNING:**

**DAMAGE TO MANIFOLD MAY RESULT IF THE MANIFOLD IS PLACED UNDER STRESS OR IF FLANGE BOLTS ARE OVER TIGHTENED!**

## Valve Control Wiring

**For single vessel systems: valve wiring is pre-wired at factory.**

**For multi-vessel systems: valve wiring for vessel A is pre-wired at factory. Wiring for remaining vessels is coiled at each vessel. Wires are tagged with number corresponding to the output number on the PLC. (Ref: drawing TBIO)**

## 1.5 Electrical

**General:**

**NOTE: Filter control panel and all pumps must have a solid earth ground. Conduit and water pipe are NOT acceptable ground.**

- a) All wiring must be properly sized, rated, and connected in accordance with local, state, and national electrical codes.
- b) Filter system should be on a dedicated circuit originating at a service disconnect panel.

**NOTE: If filter pump motor starter is not factory supplied it must be wired with a dedicated disconnect.**

- c) Penetrations to filter control panel should be made with watertight connectors to preserve panel NEMA 4X rating.

## Control / Motor Starter Package (Ref: Drawing CPMS)

- a) Factory installed motor starter package includes a service disconnect, motor starter, and transformers pre-wired to the PLC. These systems require a single point electrical connection to the service disconnect. Line service must be rated to pump motor requirements.

**Standard systems are factory set for 460V, 3ph service. Optional power supply factory wired as ordered.**

- b) Wire the pump motor from the motor starter with seal tight (provided).

**NOTE: If optional backwash booster pump is used and a second motor starter is factory supplied, refer (drawing CPMS) for proper connection points.**

**NOTE: Do not operate pump(s) dry. Damage to pump seal and shaft may occur.**

## Control Package (Ref: Drawing CPIO)

- a) The control package is pre-wired at factory
- b) Two sets of terminals, located in the control panel, are provided for pump control. Reference drawing CPMS for terminals.
- c) Power for motorized valves is supplied from control panel terminal strip. (See Section 1.4 for instructions).
- d) Fuse holders connected to output terminals 9 & 11 are intentionally left with no fuses. **Fuses should not be installed or removed unless specific instructions are received from AmeriWater 800.535.5585.**  
Output #9 will be fused, (if applicable), at start up to convert from city water to system water backwash.
- e) Output #11 will be fused, (if applicable) to change timed backwash from 24 hours to 7 days. **Timed backwash should be changed only for systems operating on a closed loop and only after consultation with AmeriWater.**

**NOTE: Changes to these options without instructions from AmeriWater may void the filter warranty.**



## 1.6 Pipe Connections

**Recommended pipe size for all pipe connections are noted in schedule.**

(Ref: Drawing CW)

Connecting pipe should be of materials compatible in construction to filter manifold.  
Dielectric fittings are highly recommended if dissimilar metals are used.

For pipe runs exceeding 20 feet from filter system consult AmeriWater for pipe size recommendations.

**The companion full-face flange to the suction side of the filter pump is to be provided by end-user or contractor.**

**Basket or Y strainer (with gauges before and after strainer) is recommended ahead of filter pump.**

Ref: Drawing CWT for typical installation.

**Properly secure all pipe runs with M & F clamps (or similar). Pipe movement may cause filter and / or pipe damage.**

## Supply and Return Lines

NOTE: Isolation valves are recommended convenient to filter.

- a. Connect influent (supply) line from pre-selected point in cooling system to suction side of filter pump.

**NOTE: A foot valve / check valve should be installed on suction side of self-priming pump to prevent loss of pump prime.**

- b. Connect effluent (return) line from the outlet connection to the pre-selected point in the cooling system (downstream of inlet connection).

**NOTE: Filter return must be connected to a point in the cooling system where cooling system pressure is equal to or less than pressure to filter pump suction.**

**NOTE: Filter supply and return lines should be connected to the cooling system where they are in an area of 'common' flow.**

## Backwash Supply

**NOTE: If filter is designed to use cooling system water for backwash, no backwash supply pipe is required in this section. (Skip to waste line section)**

**NOTE: Clean water supply is always recommended for closed loop filters.**

Backwash supply requires min / max 30/70 psig. An isolation valve is recommended, convenient to filter. Backflow preventer is recommended and commonly required by local codes when potable water is used for backwash. A pressure gauge is recommended at the discharge of the backflow preventer.

**NOTE: An efficient backflow preventer will create approximately 12 psig loss in line pressure. A minimum of 30 psig must be available at outlet side of backflow preventer. If backwash and cooling tower make up are connected to the same supply, be sure 30 psig is available when tower is calling for water.**

Connect properly sized backwash supply line to inlet side of backwash flow control device.

## Waste Line

**NOTE: Ensure drain is adequately sized and free flowing to handle backwash flow.**

A swing check valve is recommended for waste lines with a vertical lift. Check valve should be installed immediately after the filter waste line connection.

**Ball Type or Spring Type Checks Are Not Acceptable.**

For drainpipe runs exceeding 20 feet or an 8-foot lift from filter system, consult AmeriWater for pipe size recommendations.

Connect properly sized drain line to filter backwash drain.

## 1.7 Media Installation

**WARNING!**

**WARNING!**

**WARNING!**

**PROPER PROTECTIVE EQUIPMENT MUST BE WORN WHEN INSTALLING MEDIA. PERSONNEL HANDLING MEDIA MUST WEAR A DUST MASK OR RESPIRATOR FOR LUNG PROTECTION AND GOGGLES FOR EYE PROTECTION. REFER TO ENCLOSED MATERIAL SAFETY DATA SHEET (MSDS) FOR COMPLETE INFORMATION (Section 2).**

- a) Media containers are labeled (Ref: ML). Separate containers according to vessel and order of addition. Before installing media, inspect media containers for loss during shipping. Notify

AmeriWater if media loss is suspected. All losses must be verified by authorized factory representative.

**NOTE: For multi-vessel systems be sure that each vessel has the same number of media containers per layer and same number of layers.**

- b) b. Remove top filter vessel closure.

**NOTE: Fill vessel 1/3 full with water to cover under drain before adding media. This will help to level the media, expel air, and reduce dust exposure.**

- c) c. Add media in the order as indicated on media container label. (Ref: ML)

**NOTE: To avoid displacement of water in multi vessel systems, follow this example.**

**Example: Add layer #1 to all vessels, then add layer #2 to all vessels, and continue until all media has been added to all vessels. Level each layer before adding next layer.**

- d) d. Fill vessel(s) to top with water.
- e) e. Replace and secure vessel gasket and closure.

**NOTICE:**

**Contact AmeriWater at 800.855.5535 to arrange for factory authorized technician to do startup and training.**

**TWO WEEKS ADVANCE NOTICE IS REQUIRED.**

**START UP BY UNAUTHORIZED PERSON MAY VOID WARRANTY!**

## 2 Documentation

### 2.1 Media MSDS

**THE PARRY COMPANY**  
**33630 Old US Route 35**  
**Chillicothe, OH 45601**  
**Ph: 740-884-4893**  
**Fax: 740-884-4892**

## Material Safety Data Sheet

### I. PRODUCTION IDENTIFICATION

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**Trade Name as Labeled:** Silica Gravel; 6x12 Mesh  
**Chemical Name and Formula:** Silica, in the form of quartz; SiO<sub>2</sub>

### II. HAZARDOUS INGREDIENTS

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**CAS Number:** 14808-60-7  
**Chemical Name:** Quartz  
**Percent:** >90

**ACGIH-TLV:** .05mg/m<sup>3</sup> (Exposure limits are for  
**OSHA-PEL:**  $\frac{10\text{mg}/\text{m}^3}{\% \text{SiO}_2 + 2}$  respirable fraction or  
particles 10 microns or  
smaller)

NIOSH recommends a Permissible Exposure Limit (PEL) of .05-mg/m<sup>3</sup> respirable free silica. ACGIH-TLV and OSHA PEL are not interchangeable limit values.

The exposure limits are time-weighted average concentrations for an eight-hour workday and a 40-hour work week.

Crystalline silica exists in several forms, the most common of which is quartz. If crystalline silica (quartz) is heated to more than 870°C, it can change to a form of crystalline silica known as tridymite, and if crystalline silica (quartz) is heated to more than 1470°C, it can change to a form of crystalline known as cristobalite. The OSHA PEL for crystalline silica as tridymite and cristobalite is one-half of the OSHA PEL for crystalline silica (quartz).

### III. HAZARD IDENTIFICATION

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**Emergency Overview:** The crystalline silica produced by The Parry Company material is a white or tan, and is primarily used as water filter media. It is not flammable, combustible, or explosive. It does not cause burns or severe skin or eye irritation. A single exposure will not result in serious adverse health effects. Crystalline silica (quartz) is not known to be an environmental hazard. Crystalline silica (quartz) is incompatible with hydrofluoric acid, fluorine, chlorine trifluoride or oxygen difluoride.

**Potential Health Effects:**

**Silicosis:** Respirable crystalline silica (quartz) may cause silicosis, a fibrosis (scarring) of the lungs.

Silicosis may be progressive; it may lead to disability and death.

**Cancer:** Crystalline silica (quartz) inhaled from occupational sources is classified as carcinogenic to humans.

**Autoimmune Diseases:** There are some studies that show excess numbers of cases of scleroderma and other connective tissue disorders in workers exposed to respirable crystalline silica.

**Tuberculosis:** Silicosis increase the risk of tuberculosis.

**Nephrotoxicity:** There are some studies that show an increased incidence of chronic kidney disease and end-stage renal disease in workers exposed to respirable crystalline silica.

**Eye Contact:** Crystalline silica (quartz) may cause abrasion of the cornea.

**Skin Contact:** Not applicable

**Ingestion:** Not applicable

**Chronic Effects:** The adverse health effects-silicosis, cancer, autoimmune diseases, tuberculosis, and nephrotoxicity-are chronic effects.

**Signs and Symptoms of Exposure:** Generally, there are no signs or symptoms of exposure to crystalline silica (quartz).

**Medical Conditions Generally Aggravated by Exposure:** The condition of individuals with lung disease (e.g., bronchitis, emphysema, chronic obstructive pulmonary disease) can be aggravated by exposure. See section 11, Toxicological Information, for additional detail on potential adverse health effects.

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## IV. FIRST AID MEASURES

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### Symptoms of Overexposure:

**Inhaled:** Shortness of breath, coughing, reduced pulmonary function. Prolonged inhalation of respirable silica may result in permanent lung damage, silicosis. No specific first aid is necessary since the adverse health effects associated with exposure to crystalline silica (quartz) result from chronic exposures. If there is a gross inhalation of crystalline silica (quartz), remove the person immediately to fresh air, give artificial respiration as needed, seek medical attention as needed.

**Swallowed:** May cause gastrointestinal discomfort. Give one or two glasses of water. If discomfort persists, see a physician.

**First Aid:** Emergency procedures.

**Eye Contact:** Wash with water for at least fifteen (15) minutes. If irritation or redness persists see a physician.

**Skin Contact:** Wash with soap and water. If irritation persists see a physician.

**Ingestion:** Not applicable.

**Suspected Cancer Agent:** Yes    **Federal OSHA:** No    **NTP:** Yes    **IARC:** Yes

**NTP:** Respirable crystalline silica has been listed in the Sixth Annual Report on Carcinogens.

**IARC:** Monographs on the Evaluation of the Carcinogenic Risk of Chemical to Humans (vol. 68, 1997) concludes that there is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica in the forms of quartz and cristobalite (Group 1) in certain industrial circumstances, but that carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs.

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## V. FIRE FIGHTING MEASURES

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Crystalline silica (quartz) is not flammable, combustible, or explosive.

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## VI. ACCIDENTAL RELEASE MEASURES

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**Spill Response Procedures (including employee protection measures):** Clean up using approved, dustless methods (water or vacuum) to minimize generation of respirable silica particles.

**Waste Disposal:** Dispose of in a facility approved for silica (also see Section 13).

## VII. HANDLING AND STORAGE

**Ventilation and Engineering Controls:** Local mechanical to reduce respirable silica to below safe levels.

**Respiratory Protection (Type):** Use NIOSH approved equipment. Positive pressure supplied air-type recommended. Appropriate respiratory protection for respirable particulates is based on consideration of air borne workplace concentrations and duration of exposure arising from the intended end use. Please refer to the most recent standards of ANSI (Z88.2), OSHA (29CFR 1910.134), MSHA (30 CFR Parts 56 & 57), and NIOSH RDL. IF you are unsure as to the type of respirator to be used please consult your employer.

**Eye Protection (Type):** Safety Glasses

**Gloves (Specify Material):** Not normally required.

**Other Protective Clothing and Equipment:** Not normally required.

**Work Practices, Hygiene Practices:** Clean up spills promptly. Do not engage in activities that will generate respirable silica particles.

**Other handling and Storage Requirements:** Avoid generating dust. There are no special storage requirements. Train all exposed persons in all sections of this MSDS and the proper handling of silica before they work with this product.

See OSHA Hazard Communication Rule CFR 1910.1200, 1915.99, 1917.28 and 1928.21, state, local worker, or community "Right to Know" laws and regulations. We recommend that smoking be prohibited in all areas where respirators must be used. Warn your employees (and your customer users in case of resale) by posting and other means of the hazard and OSHA precautions to be used. Provide training about the OSHA precautions. See control measures in Section 8.

## VIII. EXPOSURE CONTROL/PERSONAL PROTECTION

Local Exhaust: Use sufficient local exhaust to reduce the level of respirable crystalline silica to below the PEL. See ACGIH "Industrial Ventilation, A Manual of Recommended Practice" (latest edition).

Respiratory Protection: The following chart specifies the types of respirators, which may provide respiratory protection for crystalline silica:

PARTICULATE CONCENTRATION	MINIMUM RESPIRATORY PROTECTION*
10 x PEL or Less	Any particulate respirator, except single-use or quarter-mask respirator. Any fume respirator or high efficiency particulate filter respirator. Any supplied-air respirator. Any self-contained breathing apparatus.
50 x PEL or Less	A high efficiency particulate filter with a full-face piece. Any supplied-air respirator with a full-face piece, helmet, or hood. Any self-contained breathing apparatus with a full-face mask.
500 x PEL or Less	A type C supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode.
Greater than 500 x PEL or Entry and Escape from Unknown Concentrations	Self-contained breathing apparatus with a full-face piece operated in pressure-demand mode. A combination respirator which includes a Type C supplied-air respirator with a full-face piece operated in pressure-demand or other positive pressure continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.

Use only NIOSH-approved or MSHA-approved equipment. See 29 CFR § 1910.134 and 42 CFR § 84. See also ANSI standard Z88.2 (latest revision) "American National Standard for Respiratory Protection."

**Exposure Guidelines:**

Component	CAS No.	Percent age (by wt.)	OSHA (TWA)	OSHA (STEL)	ACGIH (TWA)	ACGIH (STEL)	NIOSH (TWA)	NIOSH (STEL)	Unit
Crystalline Silica (Quartz)	14808-60-7	99.0-99.9	$\frac{10}{\% \text{ SiO}_2 + 2}$	None	.05	None	.05	None	Mg/m <sup>3</sup>

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IX. PHYSICAL AND CHEMICAL PROPERTIES

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**Vapor Density:** Not applicable**Specific Gravity:** 2.65**Solubility in Water:** Insoluble**Vapor Pressure:** 10mm @ 1730°C**Melting Point:** 1710°C**Boiling Point:** 2230°C**Evaporation Rate:** None**Appearance and Color:** White to tan; odorless

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X. STABILITY AND REACTIVITY

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**Stability:** Stable**Hazardous Polymerization:** Will not occur**Incompatibility (materials to avoid):** Contact with powerful oxidizing agents such as fluorine, chlorine trifluoride, manganese trioxide, oxygen difluoride.**Hazardous Decomposition Products:** Silica will dissolve in hydrofluoric acid and produce a corrosive gas (silicon tetrafluoride).

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XI. TOXICOLOGICAL INFORMATION

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**Silicosis:** The major concern is silicosis, caused by inhalation and retention of respirable crystalline silica dust. Silicosis can exist in several forms, chronic (or ordinary), accelerated, or acute.

**Chronic or Ordinary Silicosis (often referred to as Simple Silicosis)** is the most common form of silicosis, and can occur after many years of exposure to relatively low levels of airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis. Lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter characterize simple silicosis, primarily in the upper lung zones. Often, simple silicosis is not associated with symptoms, detectable changed in lung function or disability. Simple silicosis may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF). Complicated silicosis or PMF is characterized by lung lesions (shown as radiographic opacities) greater than 1 centimeter in diameter. Although there may be no symptoms associated with complicated silicosis or PMF, the symptoms, if present, are shortness of breath, wheezing, cough and sputum production. Complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease (cor pulmonale).

**Accelerated Silicosis** can occur with exposure to high concentrations of respirable crystalline silica over a relatively short period; the lung lesions can appear within five (5) years of the initial exposure. The progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that the lung lesions appear earlier and the progression is more rapid.

**Acute Silicosis** can occur with exposures to very high concentrations of respirable crystalline silica over a very short period of time, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis can be fatal.

**Cancer:**

**IARC:** The International Agency of Research on Cancer (IARC) concluded that there was “sufficient evidence in humans for the carcinogenicity of crystalline silica in the forms of quartz and cristobalite from occupational sources”, and that there is “sufficient evidence in experimental animals for the carcinogenicity of quartz and cristobalite.” The overall IARC evaluation was that “crystalline silica inhaled in the form of quartz or

cristobalite from occupational sources is *carcinogenic to humans (Group 1)*.” The IARC evaluation noted that “carcinogenicity was not detected in all industrial circumstances studies. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of it polymorphs.” For further information on the IARC evaluation, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 68, “Silica, Some Silicates...” (1997).

**NTP:** The National Toxicology Program, in its Ninth Annual Report on Carcinogens, classified “silica, crystalline (respirable)” as a known human carcinogen.

**OSHA:** Crystalline silica (quartz) is not regulated by the US Occupational Safety and Health Administration as a carcinogen.

There have been many articles published on the carcinogenicity of crystalline silica, which the reader should consult for additional information. The following are examples of recently published articles:

“Crystalline Silica and Lung Cancer: The Problem of Conflicting Evidence”, Indoor Built Environ, Volume 8, pp.121-126 (1998);

Crystalline Silica and the Risk of Lung Cancer on the Potteries”, Occup. Environ. Med., Volume 55, pp.779-785 (1998);

Is Silicosis Required for Silica-Associated Lung Cancer?” American Journal of Industrial Medicine, Volume 37, pp. 252-259 (2000);

Silica, Silicosis, and Lung Cancer: A Risk Assessment”, American Journal of Industrial Medicine, Volume 38, pp. 8-18 (2000);

Silica, Silicosis, and Lung Cancer: A Response to a Recent Working Group Report”, Journal of Occupational and Environmental Medicine, Volume 42, pp. 704-720 (2000).

**Autoimmune Diseases:** There is evidence that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis is associated with the increased incidence of several autoimmune disorders, --scleroderma, systemic lupus erythematosus, rheumatoid arthritis and diseases affecting the kidneys. For a review of the subject, the following may be consulted:

Occupational Exposure to Crystalline Silica and Autoimmune Disease”, Environmental Health Perspectives Volume 107, Supplement 5, pp. 793-802 (1999);

Occupational Scleroderma”, Current Opinion in Rheumatology, Volume 11, pp. 490-494 (1999).

**Tuberculosis:** Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to persons with tuberculosis. The following may be consulted for further information:

Occupational Lung Disorders, Third Edition, Chapter 12, entitled “Silicosis and Related Diseases”, Parkes, w. Raymond (1994);

Risk of pulmonary tuberculosis relative to silicosis and exposure to silica dust in South African gold miners,” Occup. Environ. Med., Volume 55, pp. 496-502 (1998).

**Kidney Disease:** There is evidence that exposure to respirable crystalline silica (without silicosis) or that the disease silicosis is associated with the increased incidence of kidney diseases, including end stage renal disease. For additional information on the subject, the following may be consulted:

“Kidney Disease and Silicosis”, Nephron, Volume 85, pp. 14-19 (2000).

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## XII. ECOLOGICAL INFORMATION

Crystalline silica (quartz) is not known to be ecotoxic; i.e., there is no data that suggests that crystalline silica (quartz) is toxic to birds, fish, invertebrates, microorganisms or plants. For additional information on crystalline silica (quartz), see Sections 9 (physical and chemical properties) and 10 (stability and reactivity) of this MSDS.

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## XIII. DISPOSAL CONSIDERATIONS



**General:** The packaging and material may be land filled; however, material should be covered to minimize generation of airborne dust.

**RCRA:** Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et. seq.

The above applies to materials as sold by Fairmount Minerals, LTD. The material may be contaminated during use, and it is the responsibility of the user to assess the appropriate disposal of the used material.

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#### XIV. TRANSPORT INFORMATION

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Crystalline silica (quartz) is not a hazardous material for purposes of transportation under the US Department of Transportation Table of Hazardous Materials, 49 CFR §172.101.

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#### XV. REGULATORY INFORMATION

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##### United States (Federal and State):

**TSCA No:** Crystalline silica (quartz) appears on the EPA TSCA inventory under the CAS No. 14804-60-7.

**RCRA:** Crystalline silica (quartz) is not classified as hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq

**CERCLA:** Crystalline silica (quartz) is not classified as a hazardous substance under regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 40 CFR §302.

**Emergency Planning and Community Right to Know Act:** Crystalline silica (quartz) is not an extremely hazardous substance under Section 302 and is not a toxic chemical subject to the requirements of Section 313.

**Clean Air Act:** Crystalline silica (quartz) mines and processed by Fairmount Minerals, Ltd. was not processed with or does not contain any Class I or Class II ozone depleting substances.

**FDA:** Silica is included in the list of substances that may be included in coatings used in food contact surfaces, 21 CFR §175.300 (b) (3) (xxvi).

**NTP:** Respirable crystalline silica (quartz) is classified as a carcinogen.

**OSHA Carcinogen:** Crystalline silica (quartz) is not listed.

**California Proposition 65:** Crystalline silica (quartz) is classified as a substance known to the State of California to be a carcinogen.

##### Canada:

**Domestic Substances List:** Fairmount Minerals, Ltd's products, as naturally occurring substances, are on the Canadian DSL.

**WHMIS Classification:** D2A

##### Other:

**EINECS No:** 238-878-4

**EEC Label (Risk/Safety Phrases):** R 48/20, R 40/20, S22, S38

**IARC:** Crystalline silica (quartz) is classified in IARC Group I.

National, state, provincial or local emergency planning, community right-to-know or other laws, regulations or ordinances may be applicable—consult applicable national, state, provincial, or local laws.

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#### XVI. OTHER INFORMATION

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##### H.M.I.S. Rating:

Health Hazard Rating 1\*

Reactivity Hazard Rating 0

Flammability Hazard Rating 0

Personal Protective Equipment E\*\*

**DOT:** Not Regulated

**SARA Title III:** Not listed.

\*Chronic exposure to respirable size silica will result in silicosis. \*\*Comply with special OSHA respiratory protection if sandblasting.

## XVII. ACRONYM LIST

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**CAS:** Chemical Abstract System  
**ACGIH:** American Conference of Governmental Industrial Hygienists  
**OSHA:** Occupational Safety and Health Administration  
**PEL:** Permissible Exposure Limit  
**TLV:** Threshold Limit Value  
**NIOSH:** National Institute of Occupational Safety and Health  
**NTP:** National Toxicology Program  
**IARC:** International Agency of Research on Cancer  
**ANSI:** American National Standards Institute  
**MSHA:** Mine Safety Health Administration  
**RDL:** Respiratory Decision Logic  
**TWA:** Time Weighted Average  
**STEL:** Short Term Exposure Limit  
**RCRA:** Resource Conservation and Recovery Act  
**TSCA:** Toxic Substance Control Act  
**CERCLA:** Comprehensive Enviro Response Compensation and Liability Act  
**FDA:** Food and Drug Administration  
**WHMIS:** Workplace Hazardous Materials Information System  
**EINECS:** European Inventory of Existing Commercial Substances  
**EEC:** European Economic Community  
**HMIS:** Hazardous Materials Information System  
**DOT:** Department of Transportation  
**SARA:** Superfund Amendments and Reauthorization Act

## 2.2 Installation Check List

- \_\_\_\_\_ All flange bolts and unions tightened.
- \_\_\_\_\_ Media installed. (Sec 1.7)
- \_\_\_\_\_ Vessel caps installed and secured.
- \_\_\_\_\_ All recommended components installed per Typical Installation Sketch. (Drawing CWT)
- \_\_\_\_\_ Filter effluent (return) line connected to cooling system at point where  
pressure is equal to or lower than filter influent (supply) line.
- \_\_\_\_\_ All pipes properly secured to avoid movement.
- \_\_\_\_\_ Valve control wiring connected. (Sec 1.4)
- \_\_\_\_\_ Power to control panel disconnect from dedicated supply w/ correct voltage (Sec 1.5)
- \_\_\_\_\_ Pump(s) wired from motor starter(s). (Sec 1.5)
- \_\_\_\_\_ Pump(s) rotation correct.
- \_\_\_\_\_ Backwash supply connected. (Sec 1.6)
- \_\_\_\_\_ Drain connected. (Sec 1.6)

## 2.3 Request for Startup

### Request for Startup

**Please complete this form and return via fax to schedule startup date.**

**2 Weeks advance notice is required for startup.**

AmeriWater Fax: 937.461.1988

**Please have a factory authorized technician contact me to arrange startup for the AmeriWater Sand Filter System.**

**System location:** \_\_\_\_\_

**Note:** All items listed below must be complete before startup personnel arrive. Should installation not be complete, additional charges may be incurred, including but not limited to, additional labor hours, travel expenses, and materials provided for startup.

\_\_\_\_\_ All flange bolts and unions tightened.

\_\_\_\_\_ Media installed.

\_\_\_\_\_ Vessel caps installed and secured.

\_\_\_\_\_ Isolation valves, check valves, and pump strainer installed.

\_\_\_\_\_ Filter effluent (return) line connected to cooling system at point where pressure is equal to or lower than filter influent (supply) line.

\_\_\_\_\_ All pipes properly secured to avoid movement.

\_\_\_\_\_ Valve control wiring connected.

\_\_\_\_\_ Power connected to panel.

\_\_\_\_\_ Pump(s) wired from motor starter(s).

\_\_\_\_\_ Pump(s) rotation correct.

\_\_\_\_\_ Control panel wired with dedicated power supply of correct supply.

\_\_\_\_\_ Backwash supply connected.

\_\_\_\_\_ Drain connected.

Authorized Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: \_\_\_\_\_ Phone #: \_\_\_\_\_

## 2.4 Startup Data Sheet

# STARTUP Data AmeriWater Filter System



To Be Completed by Factory Authorized Representative at Start up

Customer:		Start up date:	
Address:			
Contact :			
Tel/Fax/Email			

### Filter Data:

Model #:	
Serial #:	
Pump Model:	
Pump Serial #:	
Motor HP:	
Valves:	

### Connection

<b>Data:</b> Electrical:	Control Power:		M, S, D, Xfmr by:	
	Pump Power:		AmeriWater	
			Brand	
			Heater Setting	
			Others	
PLC Brand				
System Water:	PSI to Pump		PSI across filter	In
	Suction PSI to		after backwash	Out
	Cooling System			
Backwash Supply:	Potable		Pressure	
	System			
	Other			
	Backwash Count:			

### Notes:

--	--	--	--	--

Tech:	Customer:
-------	-----------

## 2.5 Filter Log Sheet

Company:  
Filter Model:  
Serial Number:  
Start up Date:



## AmeriWater Filter Log Sheet

[illegible]

## 2.6 AmeriWater Warranty

AmeriWater warrants the Product to be free from defects in materials and workmanship. The warranty period shall not exceed (a) twelve (12) months from the date of startup (b) eighteen (18) months from the date of shipment, whichever occurs first. AmeriWater's obligation under this warranty is limited to repair or replacement of any part or parts found to be defective. AmeriWater shall not be required to incur expenses for labor outside of the place(s) of business of AmeriWater, nor travel expenses to fulfill its obligations hereunder. AmeriWater neither assumes nor authorizes any person to assume for it, any other liability in connection with the sale of Products.

This warranty shall not apply to any Product that has been subjected to abuse, misuse, alteration, neglect, or accident, nor to any Product that has been damaged as a result of any unusual force of nature such as flood, hurricane, tornado, or earthquake. All implied warranties, including any implied warranty of merchantability or of fitness for a particular purpose are disclaimed to the extent they extend beyond the above periods.

## 3 Operation

**Note: Initial Startup must be performed by an Authorized Factory Technician.**

### 3.1 Seasonal Startup

#### Media

- a) Check all bolts and fittings for tightness. Initiate filter backwash.

**Note: Stop backwash cycle before last vessel has completed cycle (about 4 minutes into last vessel backwash) by de-energizing system at service disconnect on control panel.**

**Perform the following steps with the filter system isolation valves closed and power to service disconnect secured.**

- b) Start to drain filter system through lower manifold drain valve. **Note: Check filter gauges to ensure pressure is reading zero before proceeding to next step.**
- c) Remove filter vessel cover. Inspect cover and cover gasket, replace if necessary.
- d) **Note: Drain water to top of sand then close drain.** Inspect filter media. Sand should appear clean and loose. Manually remove any debris from top of sand.
- e) Level of sand in the filter vessel should be approximately 7.5" – 8.5" from bottom of filter inlet. If media level is below normal or appears other than loose sand, contact AmeriWater 800.855.5535.

**Note: Media may appear colored. This condition is common and usually due to the presence of iron oxide or organics in the system water.**

- f) If sand is at normal operating level and clean, refill vessel with water.
- g) Replace filter access cover gasket and cover, and secure cover bolts.

#### Pump

- a. Remove basket strainer or 'Y' strainer cover (if applicable).
- b. Inspect cover gasket. Replace or lubricate as needed and reinstall.
- c. Remove and clean strainer basket.
- d. Replace basket and secure cover(s).
- e. Lubricate pump motor and pump shaft (if required).
- f. Turn pump by hand, if possible, to ensure ease of movement.



## Manifolds

- a. Open isolation valves and check for leaks in fittings and pipe before energizing filter system.

## System Automation

- a. Energize control system.
- b. Engage manual backwash by depressing and holding manual backwash button (Ref: **Drawing CP**) until backwash light illuminates (approx. 20 seconds).
- c. Allow system to backwash for full cycle. After last vessel backwashes allow system to return to filter mode.
- d. Pressure differential should now be close to that indicated on startup data sheet (typically 8 – 12 PSI).
- e. Check voltage and amperage on pump motor leads. Current /amp draw should not exceed rating on motor nameplate.
- f. Check system for unusual noise or vibration. **Contact AmeriWater 800.535.5585 if any unusual conditions are noted.**

## 3.2 Seasonal Shutdown

If the filter system will be shut down for a prolonged period of time (over 1 week), the following procedures should be performed:

- a. Backwash the system to remove debris from media.
- b. Isolate and secure the filter system.
- c. Drain system from system drain (Ref: **Drawing CW**) and leave drain open.
- d. Open filter vessels and inspect media. Clean or replace as necessary.
- g. Replace filter access cover gasket and cap. Leave bolts loose.

## 3.3 Freeze Protection

If filter is to be installed in an area where freezing is likely, all wetted surfaces should be heat traced and insulated to protect equipment from freezing. Follow shutdown procedures to reduce the likelihood of damage during winter shutdown periods.

## **SEQUENCE OF OPERATION**

**This section describes the operation of standard High Efficiency Filter Systems as they are shipped from the factory. It is intended to be an aid to understanding the general operation of the unit for the equipment operator and should not be considered a technical reference.**

### **Modes of operation**

There are two modes of operation for the CW Series.

Service mode – Incoming water is pumped into the top of the filter tank(s), through the filtering media, out the bottom of the tank(s) and returned to the cooling system.

Backwash mode – This is the CW Series self-cleaning mode. Water is directed to enter the bottom of the tank at a controlled flow rate. The media bed is lifted and separated loosening the trapped particles. The water exits the top of the tank carrying away the previously filtered particulates to the drain.

### **Start-up**

When power is applied to the CW Series filter, the filter cycle valves will advance to the service mode. In service mode, all service valves (1&2) will be open and all backwash valves (3&4) will close. The filter pump will be disabled for a period of 60 seconds to allow the cycle valves to move into proper position.

Applying power to the control box also starts a timing mechanism that initiates automatic backwash cycles at predetermined intervals.

### **Initiating the backwash cycle**

There are three ways to initiate the backwash cycle.

Automatic – The PLC has a built-in timer that is designed to initiate a backwash cycle every 24 hours.

On-demand – A differential pressure gauge monitors the input and output water pressures and sends a signal to the PLC to start a backwash when the difference between inlet and outlet water pressure reaches the preset threshold. This feature is also automatic.

Manual – The backwash cycle can be initiated manually at any time by pressing and holding the “manual backwash” pushbutton on the front of the control box, for a period of 20 seconds. Once initiated, the backwash cycle will commence without operator assistance.

### **Backwash sequence of operations**

Once a backwash has been initiated by any of the above methods, the sequence of events that follows will always be the same. The sequence is as follows:

- 1) If a filter is using city water for backwash, the pump goes off. If the filter uses system water for backwash, the pump will be deactivated until the cycle valves turn , and the pump is reactivated.
- 2) On single and multiple tank filters, all service valves (1&2) close at the same time. Event time is 60 seconds.
- 3) Tank #1 backwash indicator light is illuminated.
- 4) Tank #1 backwash valves (3&4) open. Backwash duration is 5 minutes.
- 5) When Tank #1 backwash is complete the indicator light is extinguished.
- 6) Backwash valves (3&4) close.
- 7) Steps 3 through 7 are repeated for each additional tank for multi-tank systems.
- 8) After all tanks have been backwashed, all service valves open. Event time is 60 seconds.
- 9) The pump returns to run mode and the CW Series Filter returns to service mode.

### **Aborting the backwash**

In certain situations, it may be desirable to abort a backwash. A backwash in progress can be aborted by pressing and holding the “manual backwash” pushbutton for a period of 10 seconds.

**NOTE: If the backwash is being initiated by demand from the differential pressure switch, the backwash will be delayed only briefly. Demand for a backwash will continue until the differential pressure is brought below the preset threshold.**

### **Automatic backwash timer**

The backwash timer will automatically initiate a backwash at pre-determined intervals. The standard interval is every 24 hours. This can be changed to a 7-day interval by installing a fuse in the fuse holder labeled 7 for closed loop systems. Consult your AmeriWater representative for information.

### **Setting the automatic timer**

The 24 hour or 7 day automatic backwash timer can be reset to zero by pressing and releasing the “manual backwash” pushbutton on the control box 5 times within a 5 second interval. All backwash indicator lights will flash twice to confirm the change. Thereafter, the CW Series will backwash 24 hours or 7 days from the time you reset the timer, unless a manual or on demand backwash is initiated.

Note: In the event that electrical power is removed from the control box, the timer cannot continue counting but will maintain the count it held when power was lost and continue counting when power is restored. The backwash schedule will be delayed by the amount of time the power was off. If the backwash time is important, the timer will need to be reset to bring it back on schedule. See above paragraph for timer resetting instructions.

### **System Backwash Pump Enable**

The CW Series is a pressurized filter system designed to operate at a specific water flow rate. To achieve the specified flow rate, a pump is integrated into the CW Series . Normally, this pump runs continuously whenever the system is in service mode and is turned off during backwash. Optionally, the controls can be set up to operate the pump during backwash, as described in the backwash sequence of operations (Step 1). This is accomplished by installing a fuse at the appropriate location in the control box labeled P. Consult your AmeriWater representative for information. To disable (turn off) the pump for maintenance, etc., rotate the pump selector switch on the control box to the "off" position. This will disable the pump in all modes of operation.

### **External interface options**

#### **Inputs**

- 1) Remote Pump Disable to turn off the pump remotely from external source, i.e. BMS (Building Management System). Signal is sent from external source to filter PLC controller to disable pump.
- 2) Backwash Interlock input - locks out initiation of a backwash cycle in a multiple paired system. When one system is in backwash, all other paired units in a multi system are locked out of going into a backwash cycle until the previous system finishes the backwash cycle.
- 3) Backwash/Storage Tank Abort – Utilized for filter systems using a backwash storage tank. An input signal is sent from the float switch in the storage tank to the system to abort the backwash cycle in the event the storage tank is approaching an overflow condition. Once aborted, the filter system will return to normal service mode. Once the storage tank drains to a sufficient level; the abort signal is reset to allow the filter to backwash.

#### **Outputs**

- 1) Dry contact connection activated when unit is in backwash.
- 2) Backwash Counter contact to read the number of backwash cycles the filter system has cycled through.
- 3) Pump On contact to alert external monitors, when pump is operational.
- 4) Dry contact to other paired units for Backwash Interlock to prevent more than one system from backwashing at same time.
- 5) Dry contact to signal external monitors in the event that a pump overload is present.
- 6) 120 volt powered contact when filter is in backwash.

### **Electrical Component Description**

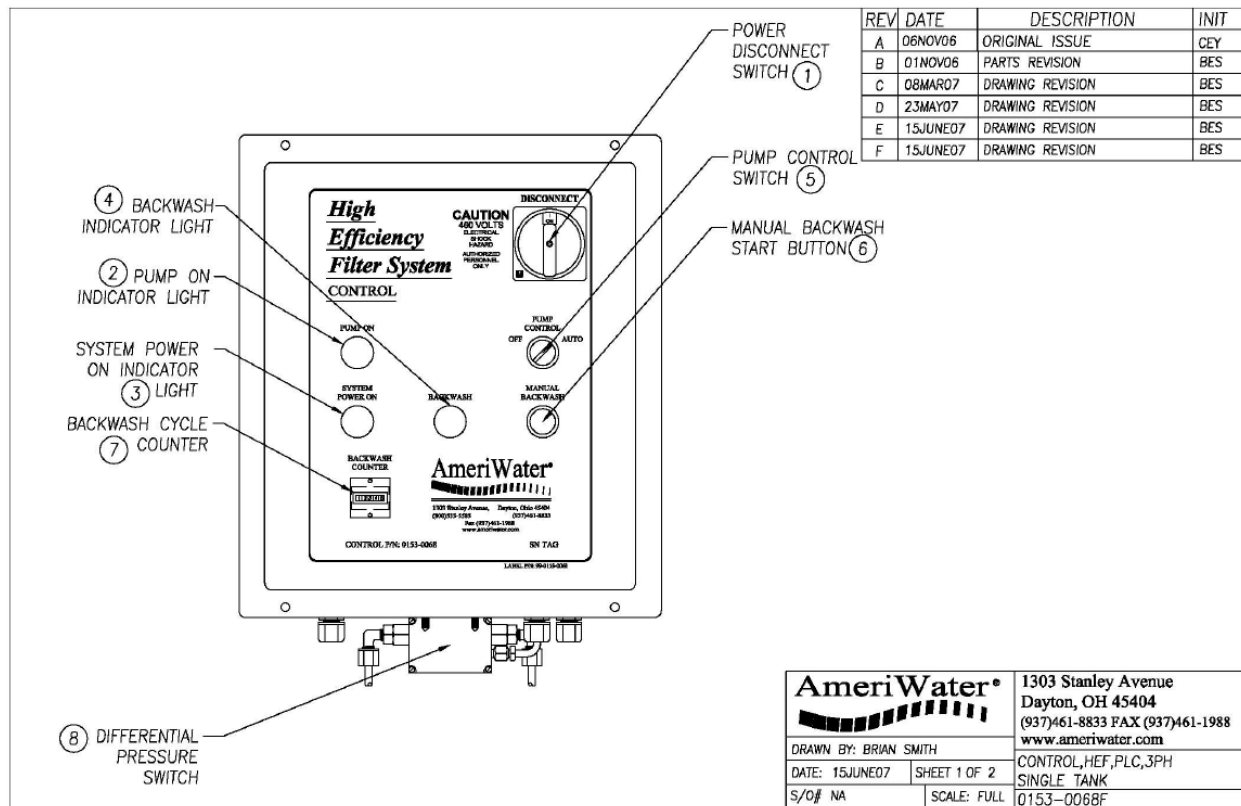
- 1) Power Disconnect Switch – Main power supply to filter ON/OFF switch.
- 2) Pump On Indicator Light – Illuminated when filter pump is ON.
- 3) System Power On Indicator Light – Illuminated when disconnect switch is in the on position and power is to the filter.
- 4) Backwash Indicator Light – Illuminated when filter is in backwash. Light indicates which specific vessel is in backwash on a multiple tank system.
- 5) Pump Control Switch – Manual switch to deactivate the filter pump.
- 6) Manual Backwash Start Button – Manually initiates a backwash when pressed and held for approximately 20 seconds.
- 7) Backwash Cycle Counter - Totalizes the number of times the filter has backwashed.
- 8) Differential Pressure Switch – Monitors the operating differential pressure of the filter and initiates a backwash at 18 PSID.

### **Fuse and Input/Output Terminal Description**

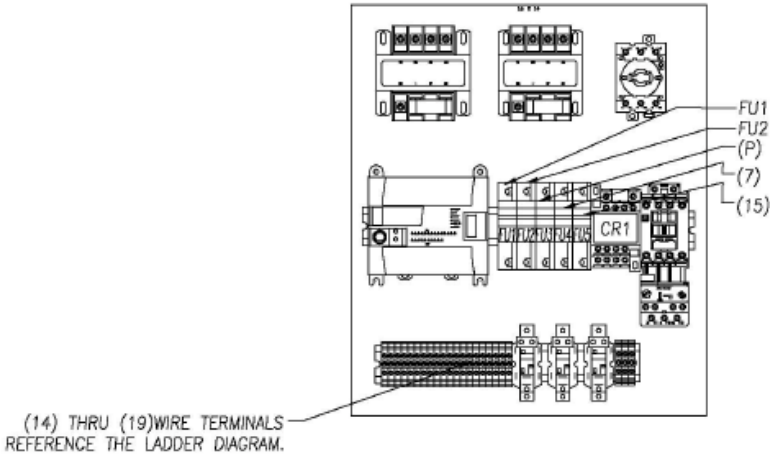
- 9) FU1 – Main 2 Amp fuse for PLC power
- 10) FU2 – Main 2 Amp fuse for the control panel power.
- 11) (P) – Installing the fuse enables the filter pump to run during backwash. Primarily used for system water backwash.
- 12) (7) – Installing fuse changes frequency of backwash from every 24 hours to every 7 days. (Closed loop systems only)
- 13) (15) – Installing fuse resets the duration of backwash from 5 minutes to 15 minutes (Just for initial startup).
- 14) Terminal 1 & 16 (Single Tank) – Input (dry contact) to disable the filter pump.  
Terminal 1 & 19 (Dual Tank)  
Terminal 1 & 20 (Three Tank)  
Terminal 1 & 22 (Four Tank)
- 15) Terminal 1 & 17 – “Backwash interlock input” is an input (dry contact) from the second filter system “filter lockout output” terminals 20 & 21 to prevent both units backwashing at the same time.

- 16) Terminal 20 & 21 – “Filter Lockout Output” is an output (dry contact) to first filter system “Backwash Interlock Input” terminals 1 & 17 to prevent system from backwashing at the same time.
- 17) Terminal 2 & 24 – Wet Contact – 120V output when filter is in backwash. Deactivated when filter is in service.
- 18) Terminal 1 & 18 – “Storage Tank Abort Input” - Dry contact input from backwash storage tank. When activated aborts the backwash and returns the filter to service.
- 19) Terminals 22 & 23 – Dry Contact – Dry contact output when unit is in backwash.
- 20) Memory Module – Provides a read only status of the PLC

TERMINALS DESCRIBED IN ITEMS NUMBERED 14 THRU 19 WILL BE DIFFERENT.  
 TERMINAL NUMBERS ON MULTIPLE TANK SYSTEMS REFERENCE THE LADDER DIAGRAM.



REV	DATE	DESCRIPTION	INIT
A	06NOV06	ORIGINAL ISSUE	CEY
B	01NOV06	PARTS REVISION	BES
C	08MAR07	DRAWING REVISION	BES
D	23MAY07	DRAWING REVISION	BES
E	15JUN07	DRAWING REVISION	BES
F	15JUN07	DRAWING REVISION	BES



<b>AmeriWater®</b> 		1303 Stanley Avenue Dayton, OH 45404 (937)461-8833 FAX (937)461-1988 <a href="http://www.amerewater.com">www.amerewater.com</a>
DRAWN BY: BRIAN SMITH		
DATE: 15JUN07	SHEET 2 OF 2	CONTROL_HEF,PLC,3PH SINGLE TANK
S/O# NA	SCALE: FULL	0153-0068F

## 4 Maintenance

### 4.1 Maintenance Schedule

**AmeriWater** High Efficiency Filter Systems are designed for low maintenance. The following maintenance procedures are **minimum** frequency and will help to ensure continued trouble free operation. **Refer to component cut sheets for maintenance instructions specific to your equipment.**

**Note: Keep daily record of pressures, backwash count, performed maintenance and unusual occurrences on log sheet provided. The system log provides valuable information should factory service assistance be required. Contact AmeriWater 800.855.5535 if log sheets are needed.**

**Weekly:**

Check automatic pump oilers (if applicable)  
Check pump strainer and clean as necessary

**Monthly:**

Grease pump motors (if applicable)

**Quarterly:**

Check all control functions

**Annual:**

Check pressure differential switch for proper operation  
Inspect pump and pump motor for bearing wear  
Inspect pump for seal wear  
Inspect media. Clean, add, or replace as necessary.

**Note: Expected wear life for pump seal is approximately 2 years. This may vary due to site specific operating conditions.**

### 4.2 Control Functions

- a) Actuate manual backwash by depressing and holding manual backwash button until backwash light illuminates.
- b) Watch system through backwash cycle for smooth valve actuation and water flow.
- c) Differential pressure should be 6-12 psig when system returns to filter mode.  
**See start up data sheet for pressure.**



### **a.3 Media (level & condition)**

- a) Backwash filter (De-energize control panel before last vessel is finished backwashing).
- b) Isolate filter system from all water sources.
- c) Open bottom filter drain (Ensure that pressure drops to zero).
- d) Remove vessel cap and gasket.
- e) Drain water to top of media then close drain.
- f) Inspect sand. Sand should be loose and clean. Some discoloration is normal in systems with iron oxide or organic particles. Remove any loose debris or small amount of accumulated cake.
- g) Push a broomstick or other rod into sand. Rod should penetrate media with relative ease until gravel is contacted.
- h) Top of sand should be approximately 7.5" - 8.5" below bottom of inlet manifold.
- i) Add or replace sand as necessary.
- j) Refill vessel(s) with water.
- k) Replace vessel cap gasket and secure cap.
- l) Open all water supply valves and energize power supply.
- m) Return system to service with manual backwash.

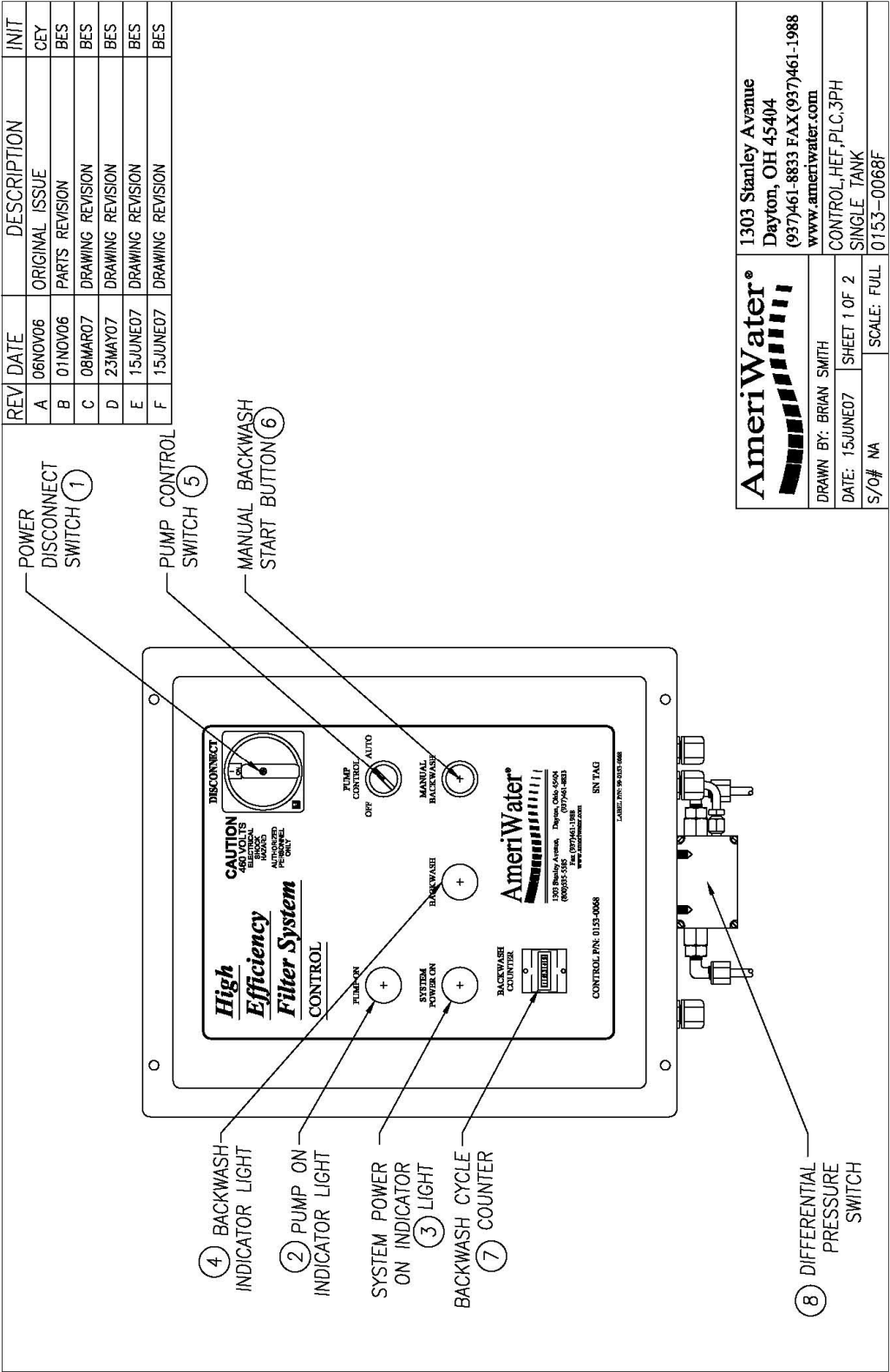
## **4.4 Pump Service**

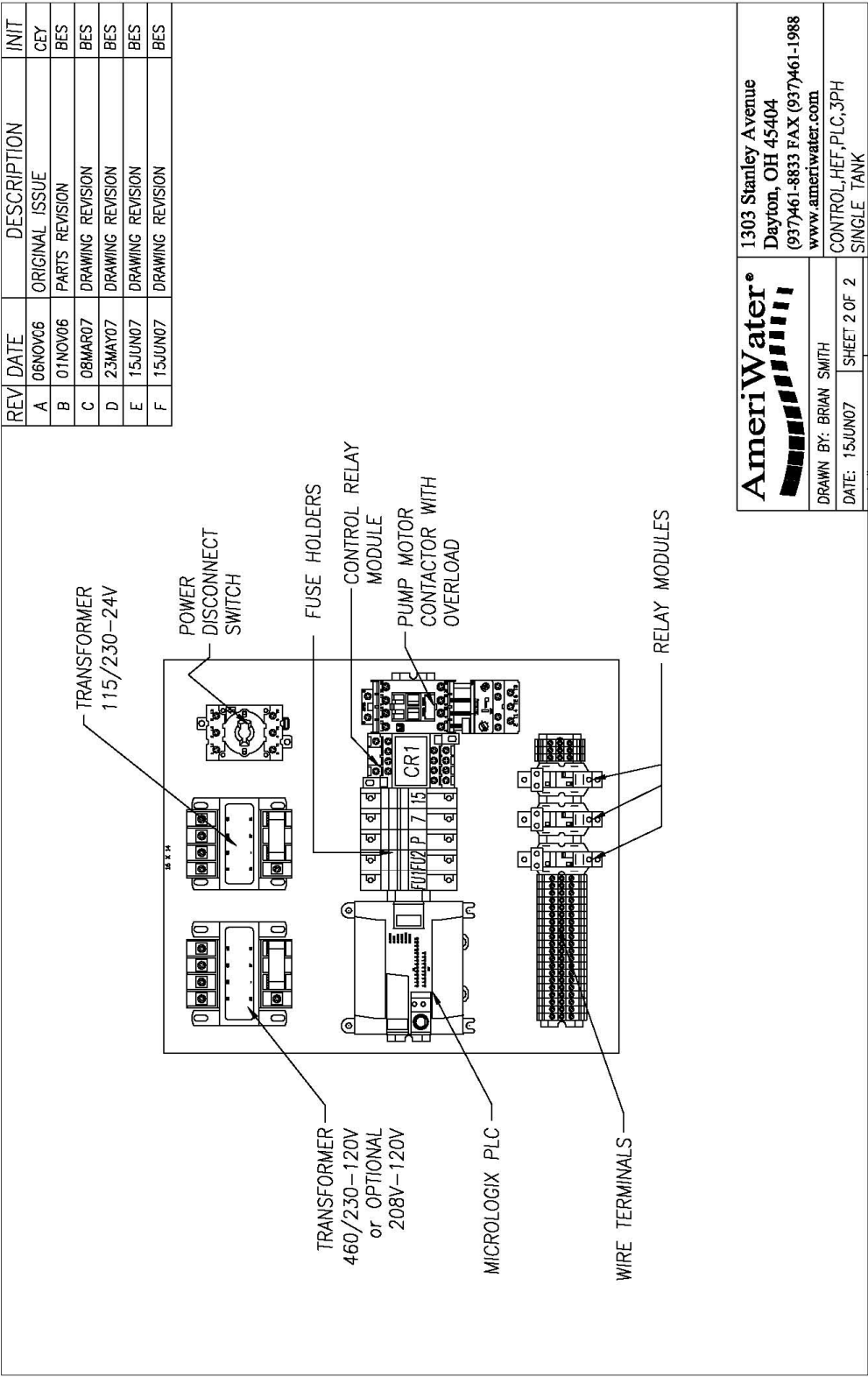
**Follow instructions contained in pump manufacturers cut sheets.**

Symptom	Possible Cause	Remedy
Water Running to Waste During Filter Cycle	Valve Failure	Rebuild valves
	Valve Failed Open	Check valve position indicators
	Normal Pump Discharge	5 Gallons/Hour water lubricated pump
		(Packed pump seals only)
	System in Backwash	Normal operation
Filter Pump Not Operating	Filter in Backwash Mode	Normal operation
	Pump Starter Tripped	Reset starter
	Pump Fuse Blown	Replace fuse
	Service Disconnect or Pump Switch Off	Switch to on position
	Micro Switch Failure	Consult factory representative
Pump Seal Leaks	Normal Wear	Replace pump seal
	Abrasive Material Entering Seal	Check pump strainer
	Excessive Pressure on Pump Discharge	Open all valves
	Excessive Pressure to Pump Suction	Check pressure to pump against rating
	Water Lubricated Seal	Normal 5 gallons per hour
Symptom Does Not Backwash	Control Power Failure	Energize control panel
	Blown Control Panel Fuse	Replace fuse
	Differential Switch Failure	Consult factory representative
Improper Control Sequencing	Low Voltage to Panel	Check power supply
		Consult factory representative
Fuses Blowing	High Voltage to Panel	Check power supply
	Short Circuit	Check wiring
	Wrong size fuse	Check fuse rating
Premature Media Failure	Bacteria Loading	Consult factory representative
	Overloading of Contaminant	Consult factory representative
	Air Entering System Causing	Check for air in system and backwash
	Media Disruption	Lines
	System Not Backwashing Properly	Check backwash control function and water pressure
System Piping Unusually Warm	Filter Discharge to Dead Head	Open all valves
		Check automatic valve functions
		Check for proper system installation
	Media Plugged	See media failure
If recommended remedy fails, contact AmeriWater 800.585.5535 for further information.		



CP = Control Panel Enclosure with Labeled Components





REV	DATE	ECR	DESCRIPTION	INIT
D	13MAY09	2008-064	ORIGINAL ISSUE	BS
G	31OCT16	2016-029	MODIFY TITLE BLOCK	CSB
G	08MAR17	2015-040	MODIFY THE AMERWATER HEF SINGLE TANK WIRING TO MATCH THE SCHEMATIC FROM OUR VENDOR	BS

CAUTION: TO REDUCE THE RISK OF FIRE, REPLACE ONLY WITH SAME TYPE AND RATING OF FUSES

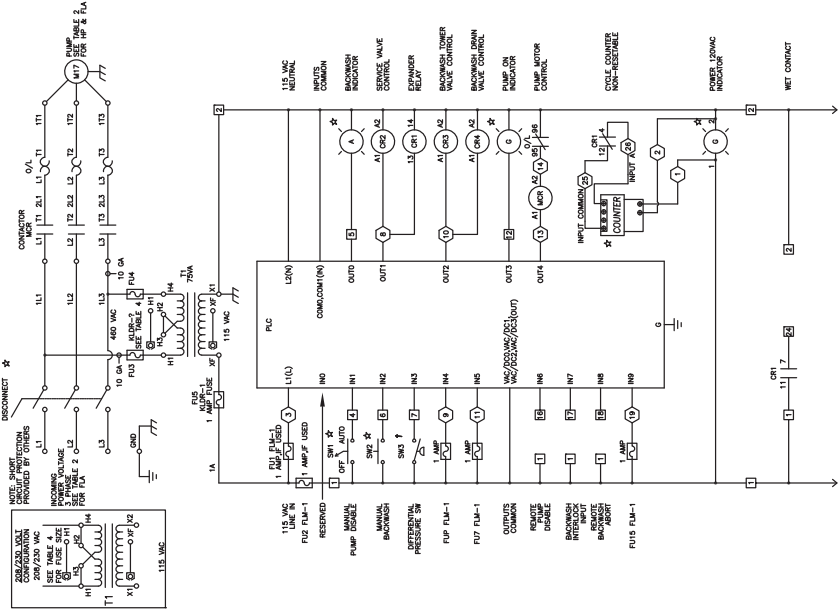


TABLE 1

ELECTRICAL LEGEND	
460 VAC	- VOLTAGE
1756-IB-D	- 1756-IB-D
1756-OB-D	- 1756-OB-D
1756-OW-D	- 1756-OW-D
1756-PA-D	- 1756-PA-D
1756-PC-D	- 1756-PC-D
1756-PD-D	- 1756-PD-D
1756-PF-D	- 1756-PF-D
1756-PT-D	- 1756-PT-D
1756-RA-D	- 1756-RA-D
1756-RE-D	- 1756-RE-D
1756-SC-D	- 1756-SC-D
1756-SL-D	- 1756-SL-D
1756-TA-D	- 1756-TA-D
1756-TB-D	- 1756-TB-D
1756-TC-D	- 1756-TC-D
1756-TD-D	- 1756-TD-D
1756-TE-D	- 1756-TE-D
1756-TF-D	- 1756-TF-D
1756-TG-D	- 1756-TG-D
1756-TH-D	- 1756-TH-D
1756-TI-D	- 1756-TI-D
1756-TJ-D	- 1756-TJ-D
1756-TK-D	- 1756-TK-D
1756-TL-D	- 1756-TL-D
1756-TM-D	- 1756-TM-D
1756-TN-D	- 1756-TN-D
1756-TO-D	- 1756-TO-D
1756-TP-D	- 1756-TP-D
1756-TR-D	- 1756-TR-D
1756-TS-D	- 1756-TS-D
1756-TT-D	- 1756-TT-D
1756-TU-D	- 1756-TU-D
1756-TV-D	- 1756-TV-D
1756-TW-D	- 1756-TW-D
1756-TX-D	- 1756-TX-D
1756-TY-D	- 1756-TY-D
1756-TZ-D	- 1756-TZ-D

TABLE 2

TANK SIZE	HP	208 VAC FLA	230 VAC FLA	460 VAC FLA
16 INCH	1	4.6A	5.0A	4.2A
20 INCH	2	5.4A	7.0A	5.1A
30 INCH	3	10.6A	11.0A	9.6A
36 INCH	3	10.6A	11.0A	9.6A

TABLE 3

T1 TRANSFORMER PRIMARY FUSING	
PRIMARY VOLTAGE	FU3 & FU4 FUSE SIZE
208	KLDR-1 6/10
230	KLDR-1 6/10
460	KLDR-8/10

FIELD TERMINAL DATA  
USE ONLY COPPER WIRE RATED 75 DEGREE C, FOR 26-10GA WIRE  
TORQUE TERMINAL SCREWS TO: 5.3 - 7.1 in-lbs

THIRD ANGLE PROJECTION

DATE: 13MAY09 SHEET 3 OF 4

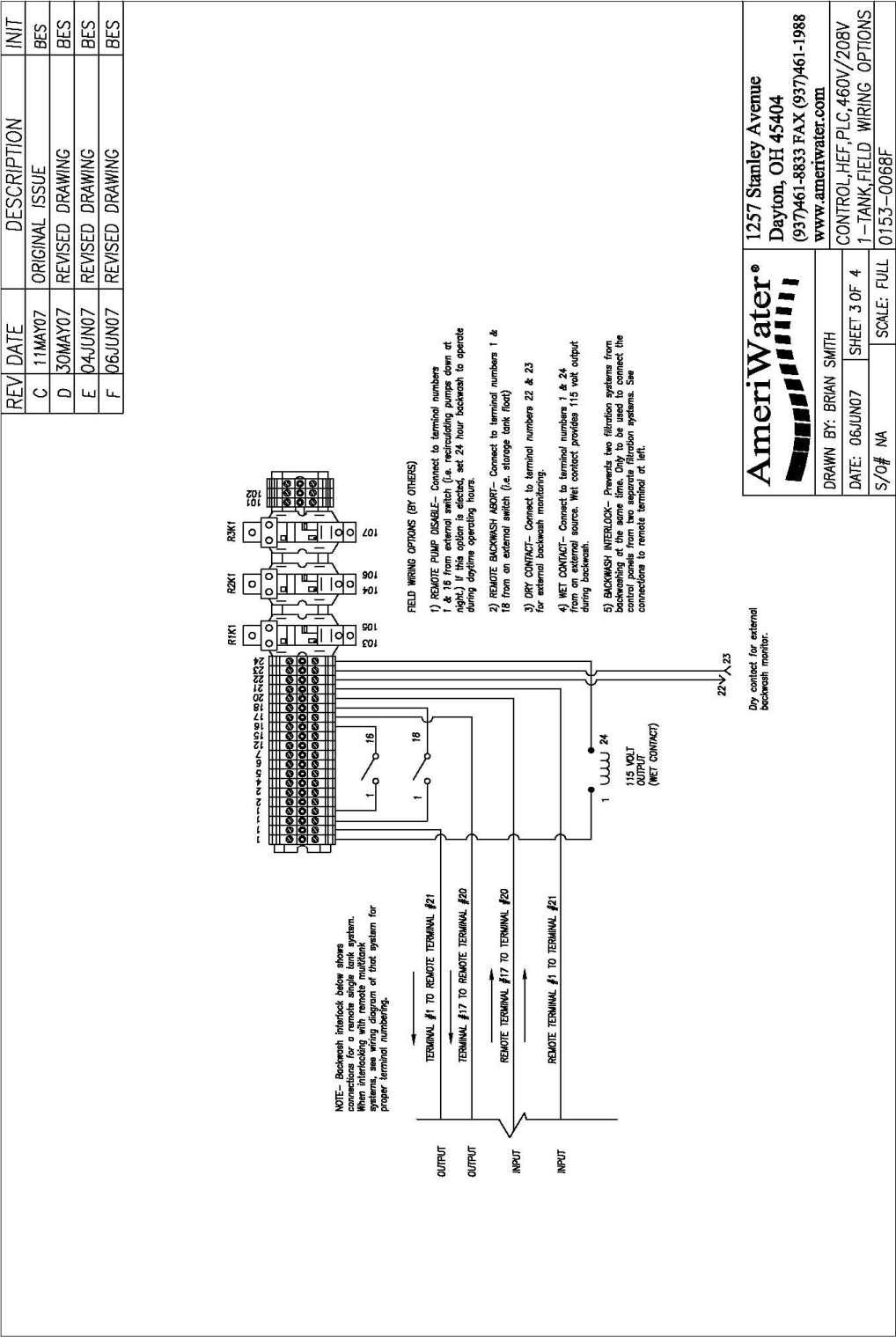
SCALE: NA DWN BY: BS CKD BY: BA 0153-0075G

TOLERANCES UNLESS OTHERWISE NOTED  
.XXX +/- .007  
.XX +/- .015  
.X +/- .03

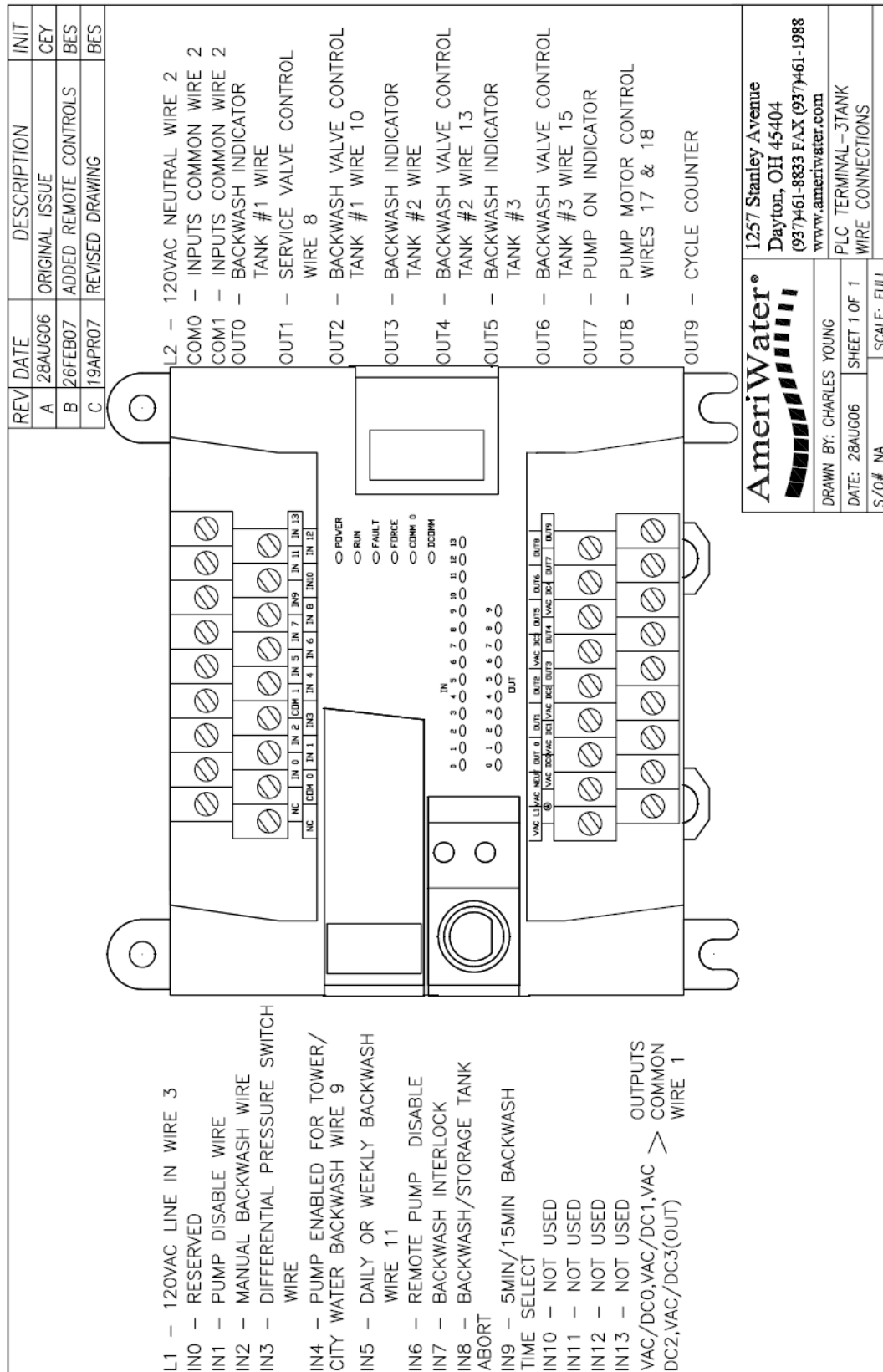
CONTROL universal AMP, HEF, PLC,  
460-230-208V-3PH, SINGLE TANK

THIS DESIGN IS THE PROPERTY OF AMERWATER AND IS ONLY ALLOWED TO BE USED BY EXPRESS PERMISSION AND LICENSE FROM AMERWATER.

TBIO = Input/output strips on Terminal block labeled to indicate connection points



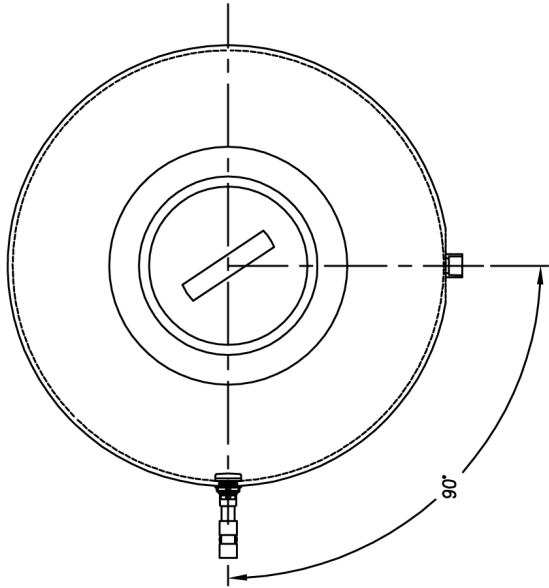
CPIO = Input/output strips on PLC labeled to indicate connection points







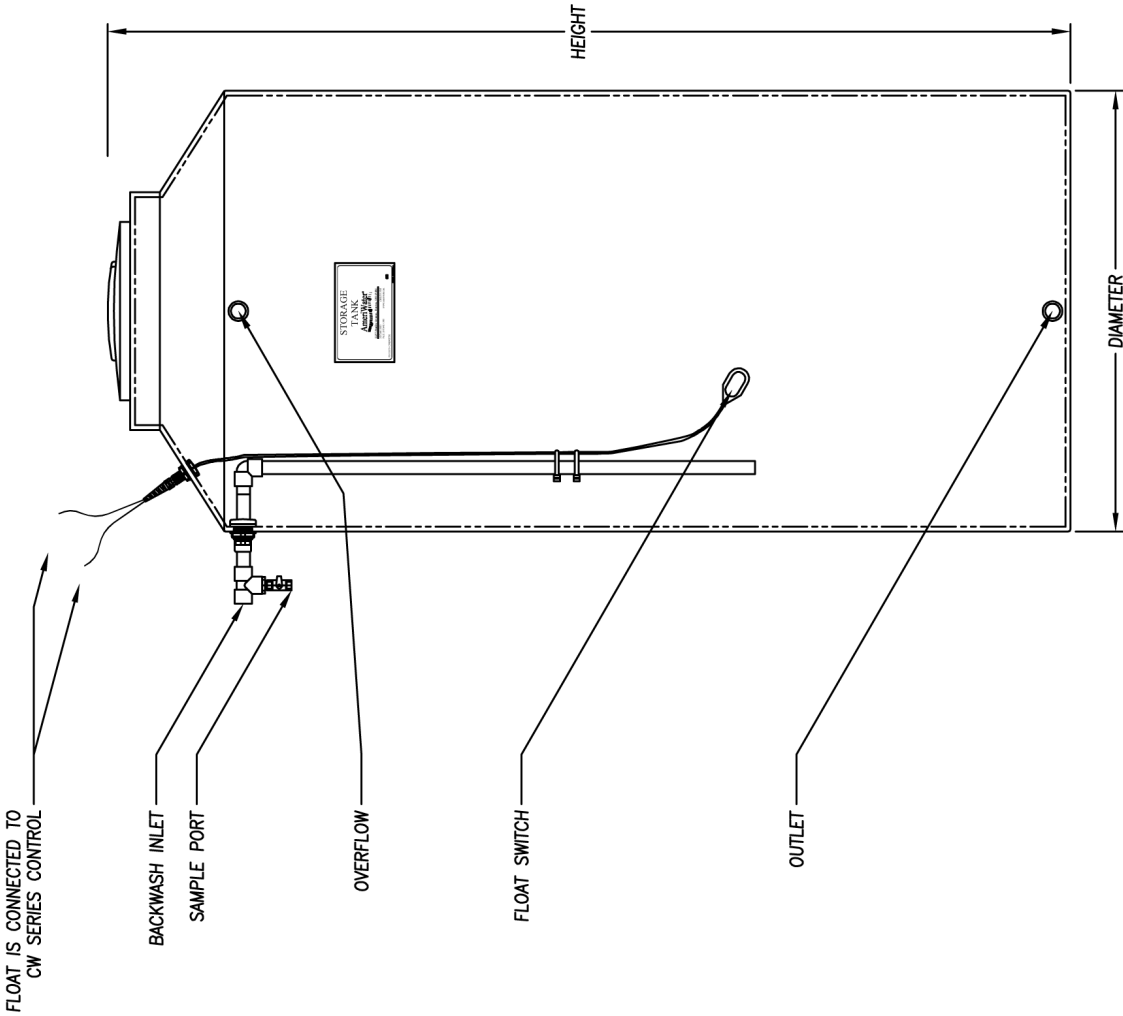
REV	DATE	DESCRIPTION	INIT
A	04DEC07	ORIGINAL ISSUE	CEY



MODEL	CAPACITY IN GALLONS	INLET	OUTLET	OVERFLOW	DIAMETER	HEIGHT
CWBWST130	130	1"	1" FPT	1" FPT	23"	76"
CWBWST200	200	1"	1" FPT	1" FPT	30"	72"
CWBWST300	300	2"	2" FPT	2" FPT	35"	81"
CWBWST550	550	2"	2" FPT	2" FPT	45"	97"
CWBWST750	750	2"	2" FPT	2" FPT	46"	119"
CWBWST1000	1000	2"	2" FPT	2" FPT	64"	81"

NOTE:

TANKS CONSTRUCTED FROM LINEAR POLYETHYLENE.



1257 Stanley Avenue  
Dayton, OH 45404  
(937)461-8833 FAX (937)461-1988  
www.amerewater.com

DRAWN BY: CHARLES YOUNG

DATE: 04DEC07 SHEET 1 OF 1

S/O# N/A

SCALE: FULL

TANK STORAGE, BACKWASH  
1"-2" OUTLET FLAT BOTTOM

0079-CWBWST

ML = Media Label

# MEDIA LAYER 1

(LOAD FIRST)

GRAVEL  $\frac{1}{2}$  X  $\frac{1}{4}$

Caution: Product contains silica.  
See MSDS for proper handling and safety precautions.

\_\_\_\_\_ OF \_\_\_\_\_

- The Media Layer number on the Media Label corresponds to the order in which it is to be loaded (for example, Media Layer 1 is loaded first, Media Layer 2 second, etc.).
- The Media Label identifies the total quantity (for example: 1 OF 2) to ensure that each media layer is loaded at the correct quantity.

## 6 System Component Cut Sheets

# INSTRUCTION MANUAL

IM060R04



## Model MCC

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS



 **GOULDS**  
WATER TECHNOLOGY  
a xylem brand

## TABLE OF CONTENTS

SUBJECT	PAGE
Safety Instructions .....	3
Important.....	3
Installation .....	3
Suction Piping .....	3
Discharge Piping.....	4
Rotation .....	4
Operation.....	4
Maintenance.....	4
Disassembly .....	4
Reassembly .....	5
Troubleshooting .....	5
Components List .....	6
Mechanical Seal Application Chart.....	6
Limited Warranty .....	7
Declaration of Conformity .....	21

### Owner's Information

Pump Model Number: \_\_\_\_\_

Pump Serial Number: \_\_\_\_\_

Dealer: \_\_\_\_\_

Dealer Phone No.: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Date of Installation: \_\_\_\_\_

Current Readings at Startup:

1 Ø	3 Ø	L1-2	L2-3	L3-1
Amps: _____	Amps: _____	_____	_____	_____
Volts: _____	Volts: _____	_____	_____	_____

## SAFETY INSTRUCTIONS

**TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN MANUAL AND ON PUMP.**

**THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT AND MUST BE KEPT WITH THE PUMP.**



This is a **SAFETY ALERT SYMBOL**. When you see this symbol on the pump or in the manual, look for one of the following signal words and be alert to the potential for personal injury or property damage.



**DANGER** Warns of hazards that **WILL** cause serious personal injury, death or major property damage.



**WARNING** Warns of hazards that **CAN** cause serious personal injury, death or major property damage.

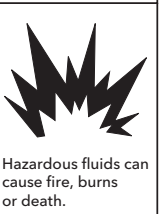


**CAUTION** Warns of hazards that **CAN** cause personal injury or property damage.

**NOTICE: INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.**

**THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.**

**MAINTAIN ALL SAFETY DECALS.**



Hazardous fluids can cause fire, burns or death.

**UNIT NOT DESIGNED FOR USE WITH HAZARDOUS LIQUIDS OR FLAMMABLE GASES. THESE FLUIDS MAY BE PRESENT IN CONTAINMENT AREAS.**

## DESCRIPTION and SPECIFICATIONS:

The Model MCC is a close coupled, end suction, centrifugal pump for general liquid transfer service, booster applications, etc. Liquid-end construction is cast iron and AISI Type 316 stainless steel. Impellers are fully enclosed, non-trimmable to intermediate diameters.

All units have NEMA 48Y or 56Y motors with square flange mounting and threaded shaft extension.

### 1. IMPORTANT

- 1.1. Inspect unit for damage. Report any damage to carrier/dealer immediately.
- 1.2. Electrical supply must be a separate branch circuit with fuses or circuit breakers, wire sizes, etc., in compliance with National and Local electrical codes. Install an all-leg disconnect switch near pump.



**CAUTION** Always disconnect electrical power when handling pump or controls.

- 1.3. Motors must be wired for proper voltage. Motor wiring diagram is on motor nameplate. Wire size must

limit maximum voltage drop to 10% of nameplate voltage at motor terminals, or motor life and pump performance will be lowered.

- 1.4. Always use horsepower-rated switches, contactor and starters.
- 1.5. Motor Protection
  - 1.5.1. Single-phase: Thermal protection for single-phase units is sometimes built in (check nameplate). If no built-in protection is provided, use a contactor with a proper overload. Fusing is permissible.
  - 1.5.2. Three-phase: Provide three-leg protection with properly sized magnetic starter and thermal overloads.
- 1.6. Maximum Operating Limits:
  - Liquid Temperature: 212°F (100°C) with standard seal
  - 250°F (120°C) with high temperature seal.
  - Working Pressure: 75 PSI with standard seal
  - 125 PSI with optional seals.
  - Starts per Hour: 20, evenly distributed.
- 1.7. Regular inspection and maintenance will increase service life. Base schedule on operating time. Refer to Section 8.

## 2. INSTALLATION

- 2.1. Locate pump as near liquid source as possible (below level of liquid for automatic operation).
- 2.2. Protect from freezing or flooding.
- 2.3. Allow adequate space for servicing and ventilation.
- 2.4. All piping must be supported independently of the pump, and must “line-up” naturally.



**CAUTION** Never draw piping into place by forcing the pump suction and discharge connections.

- 2.5. Avoid unnecessary fittings. Select sizes to keep friction losses to a minimum.
- 2.6. Units may be installed horizontally, inclined or vertically.



**CAUTION** Do not install with motor below pump. Any leakage or condensation will affect the motor.

- 2.7. Foundation must be flat and substantial to eliminate strain when tightening bolts. Use rubber mounts to minimize noise and vibration.
- 2.8. Tighten motor hold-down bolts before connecting piping to pump.

## 3. SUCTION PIPING

- 3.1. Low static suction lift and short, direct, suction piping is desired. Consult pump performance curve for *Net Positive Suction Head Required*.

- 3.2. Suction pipe must be at least as large as the suction connection of the pump. Smaller size will degrade performance.
- 3.3. If larger pipe is required, an eccentric pipe reducer (with straight side up) must be installed at the pump.
- 3.4. Installation with pump below source of supply:
  - 3.4.1. Install full flow isolation valve in piping for inspection and maintenance.

**CAUTION** Do not use suction isolation valve to throttle pump.

- 3.5. Installation with pump above source of supply:
  - 3.5.1. Avoid air pockets. No part of piping should be higher than pump suction connection. Slope piping upward from liquid source.
  - 3.5.2. All joints must be airtight.
  - 3.5.3. Foot valve to be used only if necessary for priming, or to hold prime on intermittent service.
  - 3.5.4. Suction strainer open area must be at least triple the pipe area.
- 3.6. Size of inlet from liquid source, and minimum submergence over inlet, must be sufficient to prevent air entering pump through vortexing. See Figures 1 through 4.
- 3.7. Use 3 to 4 wraps of Teflon tape to seal threaded connections.

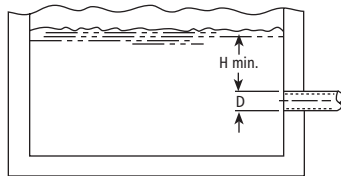


Figure 1

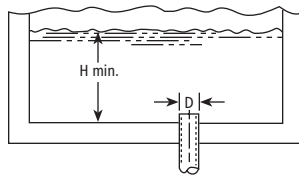


Figure 2

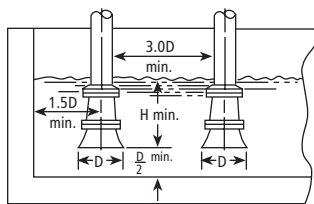


Figure 3

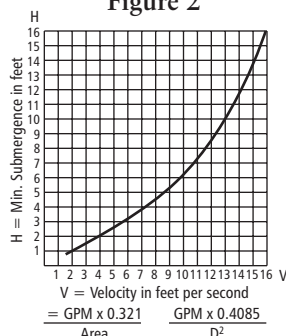


Figure 4

#### 4. DISCHARGE PIPING

- 4.1. Arrangement must include a check valve located between a gate valve and the pump. The gate valve is for regulation of capacity, or for inspection of the pump or check valve.
- 4.2. If an increaser is required, place between check valve and pump.
- 4.3. Use 3 to 4 wraps of Teflon tape to seal threaded connections.

#### 5. ROTATION

- 5.1. Correct rotation is right-hand (clockwise when viewed from the motor end). Switch power on and off quickly. Observe shaft rotation. To change rotation:
  - 5.1.1. Single-phase motor: Non-reversible
  - 5.1.2. Three-phase motor: Interchange any two power supply leads.

#### 6. OPERATION

**CAUTION** Pumped liquid provides lubrication. If pump is run dry, rotating parts will seize and mechanical seal will be damaged. Do not operate at or near zero flow. Energy imparted to the liquid is converted into heat. Liquid may flash to vapor. Rotating parts require liquid to prevent scoring or seizing.

- 6.1. Before starting, pump must be primed (free of air and suction pipe full of liquid) and discharge valve partially open.
- 6.2. Make complete check after unit is run under operating conditions and temperature has stabilized. Check for expansion of piping.

#### 7. MAINTENANCE

- 7.1. Ball bearings are located in and are part of the motor. They are permanently lubricated. No greasing required.

#### 8. DISASSEMBLY

Complete disassembly of the unit will be described. Proceed only as far as required to perform the maintenance work required.

- 8.1. Turn off power.
- 8.2. Drain system and flush if necessary.
- 8.3. Remove motor hold-down bolts.
- 8.4. Disassembly of Liquid End
  - 8.4.1. Remove casing bolts (370).
  - 8.4.2. Remove back pull-out assembly from casing (100).
  - 8.4.3. Remove impeller locknut (304).

**CAUTION** Do not insert screwdriver between impeller vanes to prevent rotation of close-coupled units. Remove cap at opposite end of motor. A screwdriver slot or a pair of flats will be exposed. Using them will prevent impeller damage.

- 8.4.4. Remove impeller (101) by turning counter-clockwise when looking at the front of the pump. Protect hand with rag or glove.

**CAUTION** Failure to remove the impeller in a counter-clockwise direction may damage threading on the impeller, shaft or both.

- 8.4.5. With two pry bars 180 degrees apart and inserted between the seal housing (184) and the motor adapter (108), carefully separate



the two parts. The mechanical seal rotary unit (383) should come off the shaft with the seal housing.

- 8.4.6. Push out the mechanical seal stationary seat from the motor side of the seal housing.

## 9. REASSEMBLY

- 9.1. All parts should be cleaned before assembly.
- 9.2. Refer to parts list to identify required replacement items. Specify pump index or catalog number when ordering parts.
- 9.3. Reassembly is the reverse of disassembly.
- 9.4. Observe the following when reassembling the liquid-end:
  - 9.4.1. All mechanical seal components must be in good condition or leakage may result. Replacement of complete seal assembly, whenever seal has been removed, is good standard practice. It is permissible to use a light lubricant, such as glycerin, to facilitate assembly. Do not contaminate the mechanical seal faces with lubricant.
  - 9.4.2. Inspect casing O-ring (513) and replace if damaged. This O-ring may be lubricated with petroleum jelly to ease assembly.
- 9.5. Check reassembled unit for binding. Correct as required.
- 9.6. Tighten casing bolts in a star pattern to prevent O-ring binding.

## 10. TROUBLESHOOTING CHART

### MOTOR NOT RUNNING

(See causes 1 through 6)

### LITTLE OR NO LIQUID DELIVERED

(See causes 7 through 17)

### POWER CONSUMPTION TOO HIGH

(See causes 4, 17, 18, 19, 22)

### EXCESSIVE NOISE AND VIBRATION

(See causes 4, 6, 9, 13, 15, 16, 18, 20, 21, 22)

#### PROBABLE CAUSE:

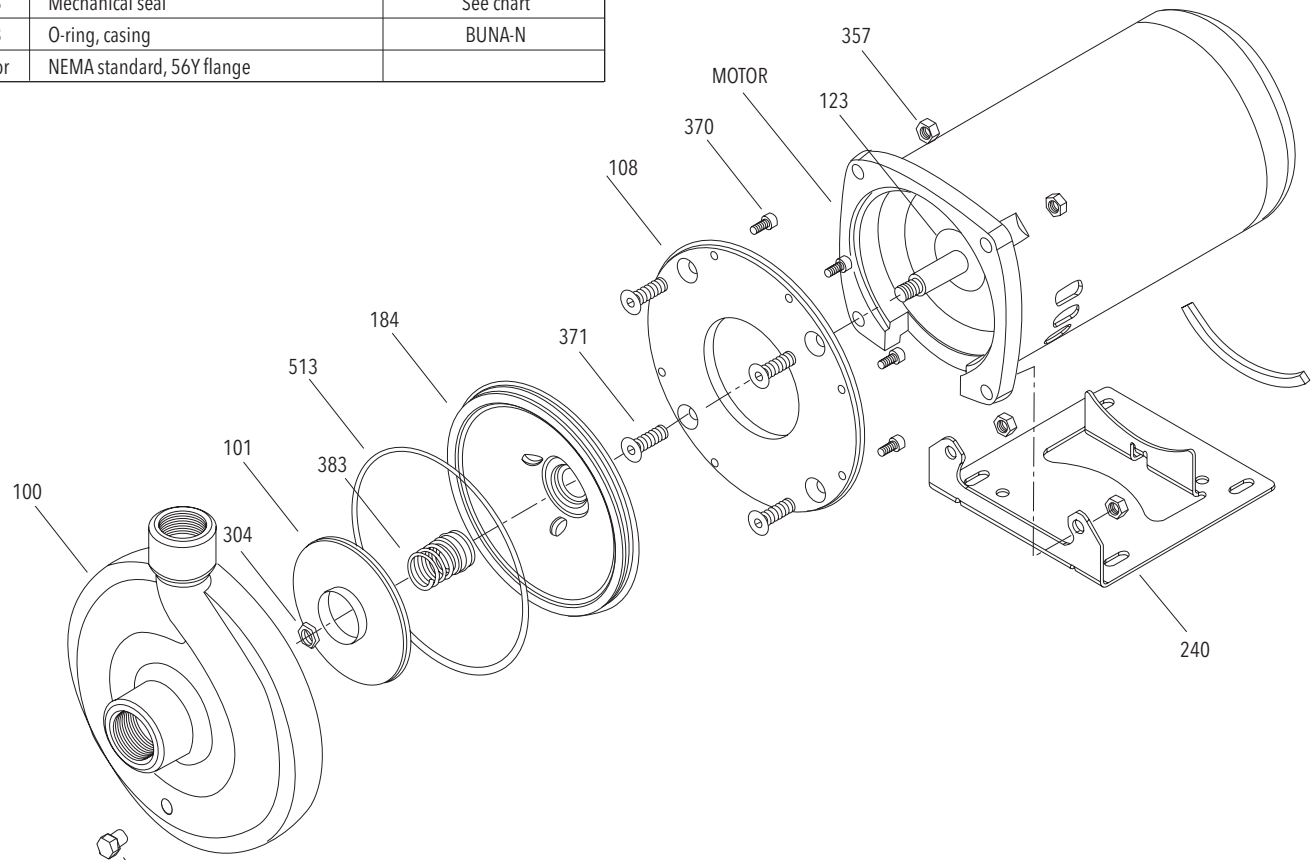
1. Tripped thermal protector
2. Open circuit breaker
3. Blown fuse
4. Rotating parts binding
5. Motor wired improperly
6. Defective motor
7. Not primed
8. Discharge plugged or valve closed
9. Incorrect rotation
10. Foot valve too small, suction not submerged, inlet screen plugged.
11. Low voltage
12. Phase loss (3-phase only)
13. Air or gasses in liquid
14. System head too high
15. NPSHA too low:  
Suction lift too high or suction losses excessive.  
Check with vacuum gauge.
16. Impeller worn or plugged
17. Incorrect impeller diameter
18. Head too low, causing excessive flow rate
19. Viscosity or specific gravity too high
20. Worn bearings
21. Pump or piping loose
22. Pump and motor misaligned

## COMPONENTS LIST

Item No.	Description	Materials
100	Casing	Cast iron
101	Impeller	AISI 316L SS
108	Motor adapter	Steel
123	Deflector	BUNA-N
184	Seal housing	AISI 316L SS
240	Motor support	Steel
	Rubber channel	Rubber
304	Impeller locknut	AISI 316 SS
357	Nut, motor	AISI 300 SS
370	Socket head screws, casing	AISI 410 SS
371	Bolts, motor	Plated steel
383	Mechanical seal	See chart
513	O-ring, casing	BUNA-N
Motor	NEMA standard, 56Y flange	

## MECHANICAL SEAL APPLICATION CHART

Rotary	Stationary	Elastomer	Metal Parts	Part No.	Casing O-ring
Carbon	Ceramic	BUNA	18-8SS	10K10	BUNA
	Sil. Carb.	EPR	316SS	10K18	EPR
		Viton		10K55	Viton
EPR		10K81		EPR	
Viton		10K62		Viton	



## COMMERCIAL WARRANTY

For goods sold to commercial buyers, Seller warrants the goods sold to Buyer hereunder (with the exception of membranes, seals, gaskets, elastomer materials, coatings and other "wear parts" or consumables all of which are not warranted except as otherwise provided in the quotation or sales form) will be (i) be built in accordance with the specifications referred to in the quotation or sales form, if such specifications are expressly made a part of this Agreement, and (ii) free from defects in material and workmanship for a period of one (1) year from the date of installation or twelve (12) months from the date of shipment (which date of shipment shall not be greater than eighteen (18) months after receipt of notice that the goods are ready to ship), whichever shall occur first, unless a longer period is specified in the product documentation (the "Warranty").

Except as otherwise required by law, Seller shall, at its option and at no cost to Buyer, either repair or replace any product which fails to conform with the Warranty provided Buyer gives written notice to Seller of any defects in material or workmanship within ten (10) days of the date when any defects or non-conformance are first manifest. Under either repair or replacement option, Seller shall not be obligated to remove or pay for the removal of the defective product or install or pay for the installation of the replaced or repaired product and Buyer shall be responsible for all other costs, including, but not limited to, service costs, shipping fees and expenses. Seller shall have sole discretion as to the method or means of repair or replacement. Buyer's failure to comply with Seller's repair or replacement directions shall terminate Seller's obligations under this Warranty and render the Warranty void. Any parts repaired or replaced under the Warranty are warranted only for the balance of the warranty period on the parts that were repaired or replaced. Seller shall have no warranty obligations to Buyer with respect to any product or parts of a product that have been: (a) repaired by third parties other than Seller or without Seller's written approval; (b) subject to misuse, misapplication, neglect, alteration, accident, or physical damage; (c) used in a manner contrary to Seller's instructions for installation, operation and maintenance; (d) damaged from ordinary wear and tear, corrosion, or chemical attack; (e) damaged due to abnormal conditions, vibration, failure to properly prime, or operation without flow; (f) damaged due to a defective power supply or improper electrical protection; or (g) damaged resulting from the use of accessory equipment not sold or approved by Seller. In any case of products not manufactured by Seller, there is no warranty from Seller; however, Seller will extend to Buyer any warranty received from Seller's supplier of such products.

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