



FROM CLEAN AIR CONSULTANTS, INC.

HYDROTRON
MODEL NG-DHYD
WET COLLECTOR DOWNDRAFT
WORKSTATION

OWNER'S MANUAL

CUSTOMER:

INTRODUCTION

Congratulations!! You have chosen equipment made in America.

This manual is important and should be read in its entirety before you uncrate or attempt any installation of this product.

Manual Accuracy

We have made every effort to be exact with the instructions, specifications, and drawings. However, sometimes errors do occur and we apologize for them.

Owing to our policy of continuous improvement, as well as the custom design of our units, your equipment may not exactly match the manual. If you find this to be the case, and you need additional help, please do not hesitate to call for technical support.

Before calling, find both the serial and model numbers on the nameplate (see below). This will allow us to provide the answers to your questions.

Serial number and model number



Contact Info

If you have any service questions, parts requests, or general questions about the equipment, please call or write us at the location listed below.

Clean Air Consultants, Inc.
2525 National Drive
Garland, TX 75041
Toll free: 800-289-0189
Phone: 972-278-2664
Fax: 972-278-1810
E-mail: info@filter-1.com

If you have any comments regarding this manual, please write us at the address above.

Visit our website at www.filter-1.com

KEEP THIS LITERATURE IN A SAFE PLACE FOR FUTURE REFERENCE.

GENERAL INFORMATION ABOUT YOUR UNIT

CAC Job# _____

Model: NG-DHYD- Serial Number: 17-100-

Distributor: CLEAN AIR CONSULTANTS

NOTES: _____

Date Purchased: _____ Date Installed: _____

Record Start-Up Data Here: _____

Motor Voltage: (Measured): _____ Motor Current (Measured) _____

Motor Voltage (From Nameplate): _____

To order spare parts contact your local distributor or:

Clean Air Consultants / Filter-1
2525 National Drive
Garland, TX 75041
Toll Free: 800-289-0189
FAX: 972-278-1810
E-mail: info@filter-1.com

Unit model number, serial number, and part description required.

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AMERICAN MADE AIR QUALITY SOLUTIONS



Maximizing the Work Environment

Safety

Drawing particulate directly into the water, the Hydrotron DHYD Wet Collector Station provides safe collection of aluminum, titanium, and other potentially hazardous dust, as well as heavy sparking applications, meeting or exceeding OSHA and NFPA regulations for dust removal inside the building.

Energy Savings

Recirculation of clean, tempered air saves on heating and cooling costs.

Customization

The Hydrotron DHYD is built to dimensions needed for size of operation and available plant space. Options include special features such as a crane slot, pneumatic turntable, up/down tables, adjustable regain air, automatic vent fan, casters, and auxiliary switches.

Added Environmental Control

The optional clear plastic workstation enclosure provides for containment, integral fluorescent lighting, and regain air. The optional Filter 1 "Push-Pull" Regain Air System takes a portion of the filtered air and discharges it down toward the table top to "push" as the blower simultaneously "pulls" the dirty air into the table grating.

Wet Collector Downdraft Workstations

Hydrotron DHYD

Current Technology

Water Filter System: The Hydrotron Wet Dust Collector Systems purify air by a combination of centrifugal force and the violent mixing of water and contaminated air. As the air stream passes the fixed baffles, particulate is separated by a heavy, turbulent curtain of water created by high velocity air. The centrifugal force caused by the rapid changes in airflow direction forces the dust particles to penetrate the water droplets and become entrapped. Contaminated water is then removed from the airstream by special mist filters. Dust, as sludge, settles to the bottom and the water is reused.

Automatic Fill System: Water make-up is controlled by a pressure sensor system that is unaffected by debris in the water. The system is operated by a solid state programmable logic controller (PLC) and includes an electrical solenoid valve, isolation valve, and a manual fill/high-water sensor for reliable water control.



Hydrotron DHYD Series

Wet Collector Single and Dual Workstations



Selected User List

American Airlines	U.S. Air Force
Boeing Corporation	Dupont Corporation
Northrop Grumman	Lockheed Martin
General Electric	GKN Aerospace
Raytheon	Bendix Corporation
Pratt Whitney	Lithonia Lighting
Team Rahal Racing	Delta Airlines

Hydrotron DHYD Single Station

MODEL	CFM	DIMENSIONS*	HP
DHYD1-30-5-4	3,000	1 Table 30"x48"	5
DHYD1-30-5-3	3,000	1 Table 30"x36"	5
DHYD1-30-5-4-3	3,000	1 Table 36"x48"	5
DHYD1-30-5-5	3,000	1 Table 30"x60"	5
DHYD1-30-5-6	3,000	1 Table 30"x72"	5
DHYD1-50-10-4	5,000	1 Table 30"x48"	10
DHYD1-50-10-4-3	5,000	1 Table 36"x48"	10
DHYD1-50-10-5-3	5,000	1 Table 36"x60"	10
DHYD1-50-10-6-3	5,000	1 Table 36"x72"	10

Hydrotron DHYD Double Station

MODEL	CFM	DIMENSIONS*	HP
DHYD2-30-5-4	3,000	2 Tables 30"x48"	5
DHYD2-50-10-5-3	5,000	2 Tables 36"x60"	10
DHYD2-50-10-5	5,000	2 Tables 30"x60"	10
DHYD2-50-10-4	5,000	2 Tables 30"x48"	10
DHYD2-50-10-4-3	5,000	2 Tables 36"x48"	10
DHYD2-50-10-5-3	5,000	2 Tables 36"x60"	10
DHYD2-50-10-6	5,000	2 Tables 30"x72"	10

*Larger / Custom Sizes Available: Consult Factory.



2525 National Dr.
Garland, TX 75041
972-278-2664

www.Filter-1.com

Features

- TEFC Motors, Single and Three Phase
- Direct Drive/Non-overloading Fan
- Interior Baffle Section
- Mist Eliminator Filters
- Solid State PLC, Electronic Water Level Control by Fan Pressure
- Construction: Galvanized Steel With Coal Tar Epoxy Coatings to Interior Wet Surfaces
- Magnahelic Gauge
- Industrial Blue Enamel

Options

- Regain Air System
- Stainless Steel Construction
- Overflow/Low Water Alarm
- Overflow/Low Water Cut-off
- Explosion Proof Motors
- Crane Slot
- Pneumatic Turntable
- Automatic Vent Fan
- Casters
- Auxiliary Switches
- Up/Down Table

Typical Applications

- Aircraft manufacture/maintenance
- Manufacture of electrical enclosures
- Milling/refining
- Chemical, rubber, or plastics products
- Ceramics
- Foundries
- Sanding
- Grinding
- Polishing

Filter 1 has a policy of continuous design improvement and reserves the right to update designs and specifications without notice.

IMPORTANT INFORMATION

To The Installer

Before installing this unit, please read this manual thoroughly to become familiar with specific items which must be adhered to, including but not limited to, unit voltage, amperage, water pressure, and water level and ventilation considerations.

Transportation Damage

All units are securely packed in shipping containers designed to meet International Safe Transit Association specifications. The unit must be checked upon arrival for external damage. If damage is found, a request for inspection by carrier's agent must be made in writing immediately.

The unit must be carefully inspected on arrival for damage and bolts or screws which may have come loose in transit. In the event of damage the consignee should:

1. Make a notation on delivery receipt of any visible damage to shipment or container.
2. Notify carrier promptly and request an inspection.
3. With concealed damage, carrier must be notified as soon as possible – preferably within five days.
4. File the claim with the following support documents within a nine month statute of limitations.
 - a. Original or certified copy of the Bill of Lading, or indemnity bond
 - b. Original paid freight bill or indemnity in lieu thereof.
 - c. Original or certified copy of the invoice, showing trade and other discounts or reductions.

The carrier is responsible for making prompt inspection of damage and for a thorough investigation of each claim. The distributor or manufacturer will not accept claims from dealers for transportation damage.

SAFETY PRECAUTIONS

! RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION

ATTENTION INSTALLING PROFESSIONAL

- | As a professional installer, you have the obligation to know the product better than the customer. This includes all safety precautions and related items.
- | Prior to actual installation, thoroughly familiarize yourself with this Instruction Manual. Pay special attention to safety warnings. Often during installation or repair, it is possible to place yourself in a position which is more hazardous than when the unit is in operation.
- | Remember, it is your responsibility to install the product safely and to know it well enough to be able to instruct a customer in its safe use.
- | Safety is a matter of common sense...a matter of thinking before acting. Most dealers have a list of specific good safety practices...follow them.
- | The precautions listed in this Installation Manual are intended as supplemental to existing practices. However, if there is a direct conflict between existing practices and the content of this manual, the precautions listed here take precedence.



WARNINGS

If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

Installation and service must be performed by a qualified installer or service agency.

To prevent possible property damage, personal injury or death due to electrical shock, the unit must be located to protect the electrical components from water.

This product contains or produces a chemical or chemicals which may cause serious illness or death and which are known to the state of California to cause cancer, birth defects or other reproductive harm.

SAFETY WARNINGS

Follow all electrical and safety codes, as well as the National Electrical Code (NEC), National Fire Prevention Agency (NFPA), and the Occupational Safety and Health Act (OSHA).

It is necessary for all electrical work to be performed by a qualified electrician according to the most stringent applicable codes. Be sure starter, conduit, and wiring for blower motor is of the proper size. Disconnect, lock out and tag out prior to beginning any electrical service.

The unit has been prewired to the voltage specification on the purchase order. Please verify before engaging power.

WARNING: Permanent damage to the motor will be sustained if connected to voltages other than the normal operating voltage for which the unit has been pre-wired.

NFPA standards require specific duct design and dust collector configuration when collecting potentially reactive metal dusts such as aluminum, magnesium, titanium, and other materials. A guideline for determining the precautions to be taken can be found in NFPA 497. Other NFPA standards may be specific to your application. Consult current NFPA standards for applicable safeguards which may be required for the installation, operation, and service of this product.

Current NFPA standards are available from:

NFPA
1 Batterymarch Park
Quincy, MA, 02269
800-344-3555.

Note: NFPA™ is a registered trademark of National Fire Prevention Agency

Additional references are the Uniform Building Code and Uniform Mechanical Code.

A WORD OF CAUTION

Owning and operating FILTER-1 machines involves certain known hazards. With knowledge and training these hazards can be minimized. Our engineers are available to guide you if necessary.

 <p>EXPLOSION HAZARD Venting may be required in some applications. Outside location of some equipment may be required. Consult competent advisers in this regard.</p>	 <p>CAUTION GRINDING OR WELDING THAT RESULTS IN SPARKS REQUIRE FIRE SUPPRESSION SYSTEM</p>	<p>FIRE HAZARD No sparks should be allowed to enter the machine without a properly installed fire suppression system. Personnel should never allow smoking material to enter these machines.</p> <p>The volatile organic compounds that are collected with this machine are very dangerous if they become too concentrated.</p>
 <p>DANGER HIGH VOLTAGE</p> <p>FILTER-1 units operate on voltages of 110 to 460 AC volts. All service personnel should be aware of this fact and should have adequate training before any repairs are attempted on the equipment. All repairs are to conform to NEC electrical standards.</p>	 <p>ROTATING MACHINERY The fan inside this unit is rotating at 1740-3600 rpm. The electrical source should be locked out and the unit allowed to come to a full stop before any entry is made to the fan compartment.</p>	<p>COLLECTED MATERIAL: It is possible that the dust being collected in this unit is considered hazardous or toxic, therefore proper personnel safety and waste disposal practices should be followed. Contact your plant safety coordinator for direction.</p> <p>Always disconnect the unit from the power source before working on or near the motor or wiring assemblies. Lock out and tag out disconnects to prevent the unexpected application of power. Failure to do so could result in death or serious injury.</p>
<hr/>		

Using your hand to test the running temperature of a motor can be a very painful experience

Normal body temperature:	98.6F
Threshold of pain caused by heat:	120.0F
Average temperature of hot water tap:	140.0F
Average temperature of hot coffee:	180.0F
Normal operating temperature of a fully loaded electrical motor, open type 70 degrees ambient temperature:	174.0F

You cannot wash your hands in 140.0 degree water!!

You cannot stir a fresh cup of coffee with your finger!!

You cannot place your hand on a motor that is operating properly without burning your hand!!

WARNINGS AND HAZARDS

READ CAREFULLY!

HEAVY LOAD: Use proper equipment and safety to move.

HIGH VOLTAGE: FILTER-1 units operate using voltages from 110-575 A.C. VOLTS. Only trained service personnel should ever attempt to install or repair a FILTER-1 unit. All work done must conform to NEC and local electrical standards.

PRESSURIZED AIR: Only trained service personnel should ever attempt to install a FILTER-1 unit. All work must be done to conform to UBC plumbing standards.

MOVING PARTS: FILTER-1 units have centrifugal blowers rotating from 1740-3600 RPMS. Always allow it to come to a full stop, and use lock out tag out to prevent accidental starting.

WATER CHEMISTRY: Water chemistry is an important part of maintaining the operation of an efficient unit and will assist in providing a longer lasting piece of equipment. Concentration of solids, normally tested as conductivity, should be kept at a low enough level to keep material from building up on the internal surfaces of the unit.

PH levels in the HYDROTRON units should be maintained at a level between 6.5 and 8. We recommend that if these conditions are not being maintained, you contact a local water treatment company in your area for assistance.

ODOR: Draining and cleaning should be done regularly as discussed in the maintenance section. If odor becomes a problem, the treatment should be according to what is producing the odor. Things that get in water are fungus and bacteria, which are treatable with compounds. These compounds must not take the ph outside of the 6.5 to 8 ph range. It is better to use bromine rather than chlorine. Do not add chlorine, bleach, antifreeze, or other products that are very corrosive and/or harmful as they may evaporate when the air is pulled through the system.



WARNING

This unit may create a Flammable Gas as a byproduct of collecting metallic dust. This may become explosive if allowed to concentrate. Follow NFPA guidelines in the collection of metallic dust via water entrapment.

PRODUCT APPLICATION

This unit is primarily designed for industrial applications. It is not designed for outdoor applications.

The **Hydrotron HWF** is designed for control of contaminants that are generated in the grinding and sanding of such materials as aluminum, titanium and magnesium. It is designed to be attached to a ducted system or can be built as a booth with as many modules as needed to obtain the desired amount of air flow.

The **HPB “Hydrotron Booth”** has 18 gauge steel wall and ceiling panels that are galvanized and insulated with sound absorbing material. The Booth is open on the front and has lights mounted on the ceiling. The controls for the lights and the motor starters can be mounted on the Booth or remotely.

The **HPB** may have the optional advantage of using the Regain Plenum which increases airflow inside the booth up to 400 fpm in the breathable zone. The cleaned exhaust air is returned to the front of the booth through adjustable louvers. The **Hydrotron** series also includes a model that has a table surface on which to place your work. Your grinding dust is directed into the water bath.

The **DHYD Hydrotron** table can have a work surface constructed of either a metal grate or fiberglass. This unit comes in a single or double workstation which includes a model that encloses the sides and top of the table making use of the regain air. This design allows for metals to be ground on the tabletop with the sparks going directly into the water with no ducting involved.

All of our **Hydrotrons** require a continuous supply of clean water and electricity of optimal voltage and phase. Water loss due to evaporation is replenished through the use of an adjustable electronic water level control. All **Hydrotrons** capture particles through the mixing of water and air and periodically have to be shut down, and maintained by replacing dirty water with clean, disposing of collected sludge according to NFPA guidelines, and washing the insides, including the mist separators, unless they are equipped with a conveyor.

LOCATION REQUIREMENTS AND CONSIDERATIONS

General

Thought should be given to the service of this unit. The unit services from the rear but in the event of component failure, the blower and motor assembly will have to be serviced from the rear and top.

Clearances and Accessibility

Unobstructed front clearance of 24" for servicing is recommended. Unobstructed clearance above motor of 12" for servicing is recommended. Unobstructed rear clearance of 36" for servicing is recommended. Installer should consider that future service will require access to the rear of the unit for motor removal. Planning for moving unit to accomplish this service is acceptable, but the least convenient plan. NEC code generally requires 36" of clearance in front of all electrical boxes.

Structural and Floor

This unit will hold several hundred gallons of water, and the unit itself is several hundred pounds. Gross weight may easily exceed 10,000 pounds. The installer should consult with either a Facility Engineer or a local professional aware of codes and engineering design to be sure that the floor and structure can safely withstand the installation of this unit.

Ventilation Requirements

This unit may be used to collect metallic dust which may interact with the water collection media. This may cause the creation of Hydrogen gas. Installer and user should be aware of and follow NFPA guidelines for such collection methods. Risk assessment is the responsibility of the end user in the application and use of this product.

DETERMINATION OF ELECTRICAL SERVICE REQUIREMENTS

Determination of electrical service requirements for Clean Air Consultant/Filter-1 equipment requires strict adherence to National Electrical Code. While many electricians are familiar with the classic application of the National Electrical Codes, the unique nature of this equipment requires an in-depth application of said codes. While this section will not attempt to repeat the applicable codes, it will discuss the larger considerations to hopefully prevent under sizing the electrical service for Clean Air Consultant/Filter-1 equipment. This equipment must be provided electrical service by locally recognized qualified professionals familiar with the application of the NEC codes and additional local codes.

Filter-1 equipment is primarily a large horsepower motor that is directly attached to a matching blower implement. The rotating speed of this combination ranges from 1750 to 3600 RPMs. Additionally, the control box of this equipment may control additional motors for augers, pumps or conveyors that are used to move collected dust to an appropriate location or move water through filtration or agitation. Due to the inrush of amperage during the startup of this equipment, it behaves very much like compressor driven air conditioning equipment.

In accordance with the NEC, NFPA 70, CSA C22.1 and the Canadian Electrical Code (CEC), each of our units is marked with MCA and MOP ratings. MCA is the Minimum Circuit Ampacity. MOP is the Maximum Overload Protection. The NEC has established simple methodology to ensure safe operation of this type of equipment with proper protection for the equipment and its service wiring. Since the consideration has already been taken to establish these numbers, the installer need only consider these two numbers when providing the electrical service to the equipment as long as no additional equipment is added to the equipment assembly that was not accounted for in the original design.

The MCA is used to determine the minimum wire size needed to guarantee that the wiring will not overheat under all operating conditions for the life of the product. This takes into account multiple electrical loads and effect of aging of the electrical components.

The MOP is the maximum allowable overload protection that will properly disconnect power to the equipment under any anticipated fault condition.

Because not all electricians are familiar with the unique characteristics of large rotating machinery, it is not unusual to have a larger than familiar circuit breaker on wire that is too small for said wiring gauge. For example, it is not uncommon to have a 40 amp circuit breaker on 12 gauge wire. Normally this would call for a 30 amp maximum circuit breaker. Being familiar with the codes for rotating equipment will put at ease those concerns.

SAFETY

Electrostatic Discharge

NOTE: Discharge body's static electricity before touching the unit. An electrostatic discharge can adversely affect electrical components.

Use the following precautions during installation and servicing to protect the electrical components from damage. By putting the unit, the control and the person at the same electrostatic potential, these steps will help avoid exposing the controls to electrostatic discharge. This procedure is applicable to both installed and non-installed (ungrounded) units.

1. Disconnect all power to the unit. Do not touch the controls or any wire connected to the control prior to discharging the body's electrostatic charge to ground.
2. Firmly touch a clean, unpainted metal surface of the unit near the control. Any tools held in a person's hand during grounding will be discarded.
3. Service electrical components or connecting wiring following the discharge process in step 2. Use caution not to recharge your body with static electricity, (i.e. do not move or shuffle your feet, do not touch ungrounded objects, etc.) If you come in contact with an ungrounded object, repeat step 2 before touching control or wires.
4. Discharge your body to ground before removing a new control from its container. Follow steps 1 through 3 if installing the control on a unit. Return any old or new controls to their containers before touching any ungrounded object.

DHYD SPECIFICATIONS

See Submittal drawing for the exact specifications for your equipment

DHYD1 SINGLE STATION				DHYD2 DOUBLE STATION			
MODEL	SIZE	HP	CFM	MODEL	SIZE	HP	CFM
DHYD-1-10-1.5R	25" x 34"	1.5	1,000	DHYD-2-30-5-4R	30" X 48"	5	3,000
DHYD-1-30-5-3R	30" x 36"	3	3,000	DHYD-2-50-10-4R	30" X 48"	10	5,000
DHYD-1-30-5-4R	30" x 48"	5	3,000	DHYD-2-50-10-4-3R	36" X 48"	10	5,000
DHYD-1-30-5-4-3R	36" x 48"	3	3,000	DHYD-2-50-10-5R	30" X 60"	10	5,000
DHYD-1-30-5-4-4R	48" x 48"	5	3,000	DHYD-2-50-10-5-3R	36" X 60"	10	5,000
DHYD-1-30-5-5R	30" x 60"	5	3,000	DHYD-2-50-10-5.5-4R	48" X 66"	10	5,000
DHYD-1-30-5-6R	30" x 72"	6	3,000	DHYD-2-50-10-6R	30" X 72"	10	5,000
DHYD-1-30-5-6-4R	48" x 72"	5	3,000	DHYD-2-50-10-6-3R	36" X 72"	10	5,000
DHYD-1-50-10-4R	30" x 48"	10	5,000	DHYD-2-50-10-8R	30" X 96"	10	5,000
DHYD-1-50-10-4-3R	36" x 48"	10	5,000	DHYD-2-70-15-8-3R	36" X 96"	15	7,000
DHYD-1-50-10-4-4R	48" x 48"	10	5,000				
DHYD-1-50-10-5-3R	36" x 60"	10	5,000				
DHYD-1-50-10-6-3R	36" x 72"	10	5,000				
DHYD-1-50-10-8-3R	36" x 96"	10	5,000				
DHYD-1-50-10-8-4R	48" x 96"	10	5,000				
DHYD-1-95-15-10-4R	48" x 120"	10	9,500				

**Larger, custom sizing available: Consult factory*

AVAILABLE OPTIONS:

- Regain air system
- Stainless steel construction
- Overflow and low water cut-off switches
- Explosion proof motors
- HEPA safety after filters
- Custom paint colors

STANDARD:

- TEFC motors, single and three phase
- Direct drive, non-overloading fan
- Interior baffle section
- Mist eliminator filters
- Electric water level control by fan pressure
- Galvanized steel construction with a two part coal tar epoxy coating on all interior wet surfaces
- Magnehelic gauge
- Industrial Gulf Blue acrylic enamel

***Filter-1 has a policy of continuous design improvement and reserves the right to update designs and specifications without notice.*

AVAILABLE OPTIONS

Overhead Lights

This unit can be equipped with overhead lights to assist the technician in observing the component of interest in the work area. These are usually operated from the control box or automatically illuminate when the unit is turned on.

Air Balance and Sound Attenuation (If included)

This unit can be equipped with "Regain Air". This overhead air plenum helps to ensure high table velocities and air direction to ensure the entrapment of maximum dust from rotating equipment that may throw off high velocity dust. This regain air is adjustable in volume and direction.

Indicator Lights (If included)

This unit can be equipped with indicator lights. They will be labeled to indicate the following:

- ◆ High Water
 - The unit has a high water condition. This is serious because air volumes will be low and dust collection efficiency will be low. This is usually caused by the automatic fill system being out of adjustment or debris holding the fill valve open
- ◆ Low Water
 - The unit has a low water condition. This is serious because air volumes will be high but mixing with the water and dust entrapment will be low. This is usually caused by the automatic fill feature being out of adjustment or water supply pressure too low or water supply being manually turned off.
- ◆ Water Filter
 - If you have this option, it indicates that the water filter is fully loaded with solids. This is serious, because a fully loaded filter will allow solids to build up in the water reducing efficiency of the dust collection, as well as potentially damaging the pump, since it will be running at maximum pressure with minimum flow rates.

Low Level Cut-Off (If included)

Low water level causes too high airflow through the filter and low efficiency. This can be caused by:

- Interruption of water supply

- Make-up water valve stuck in closed position
- Levels set too low

The pressure switch (PS 2) turns off the blower automatically if the level—and pressure—drops below the preset value. PS2 is factory set.

If the water drops too low, the low water light will come on and the blower will turn off. The low water cause must be found and readied before the unit is restarted. It will be necessary to push the reset button before the blower can be started again.

High Level Alarm / Cutoff (If included)

Water level which is too high increases the filter pressure and reduces airflow through the filter. Higher water levels causes water overflow, waste and safety hazard.

If the water is too high, the high water light will come on and the blower will turn off. It will be necessary to push the reset button before the blower can be started again.

If the make-up water solenoid valve fails in open position while the blower is running, the high level float switch initiates high level alarm / indication.

Excess water must be removed from the unit after a high water shut down. After water correction reset high water button must be pushed before unit will restart. It will cut off again if water is still too high. .The unit controls are designed so the unit will run 40 seconds after initial start up before either the high or low water cutoff can operate.

Vent Fan (If included)

A vent fan can be incorporated into this equipment to remove potentially hazardous vapors from the wet area when the main blower is off.

Mechanically Actuated Lift Table (If included)

This equipment can be supplied with an up/down table that is electro-mechanical in operation. The table moves 8" up and down using the up/down switch.

HEPA Safety Afterfilters (If included)

This unit can be equipped with HEPA safety after filters in the blower compartment. A second Magnehelic gauge gives status of the HEPA filters.

UTILITY CONNECTIONS

Electrical

This unit may require power supplies as great as 575 VAC 3-phase. Before proceeding with electrical connections, ensure that the supply voltage, frequency and phase correspond to that specified on the unit rating plate. Power supply to the unit must be NEC Class 1 and must comply with all applicable codes. The unit must be grounded in accordance with local codes or, in their absence, the latest edition of the National Electric Code, ANSI NFPA 70 and/or The Canadian Electric Code CSA C22.1.

Use a separate fused branch electrical circuit containing properly sized wire, and fuse or circuit breaker. The fuse or circuit breaker must be sized in accordance with the maximum over-current protection specified on the unit rating plate. An electrical disconnect must be provided at the unit location.

Note: This unit is phase sensitive. Installer should make sure of proper rotation of the motor when making electrical connections; correct rotation is clockwise when viewed from the motor end.

Water Supply

This unit will require normal shop water supply pressure of 40 psig or more. Install piping in accordance with any applicable codes or jurisdiction authorities. Connect piping to the 0.5 inch NPT water control solenoid valve shown in the picture below.



Ensure the supply piping is free of any foreign objects before final connection is made. This is critical to ensure proper seating of the solenoid valve.

We also recommend the overflow coupling be plumbed into a conveniently located drain system, along with the tank drain. Consideration should be given to the type of dust collected and requirements of proper disposal of said dust once collected into the water media.

Drain and Disposal of Hazardous Waste

The collection of dust is required because the dust is hazardous to person or property. Disposal of such waste must follow local and national codes and regulations.

PROGRAMMABLE LOGIC CONTROLLERS

This unit is equipped with a Programmable Logic Controller (PLC), an integrated device that can sense numerous inputs and actuate numerous outputs controlled by a custom software program written by Clean Air Consultants. This is an improvement to the quality and performance of our control scheme. It replaces a number of components like timers, 24 hour timers, pulse boards and relays while delivering sophisticated logical control and operational feedback of your unit. While your interaction with the PLC will be minimal, you or your installer will be required to set the clock, and perhaps set up cleaning times. During operation, the PLC will display on its screen the operating condition of the unit and may trigger alarms for various operational conditions and even shut the unit down. These alarms will normally display on the screen so that the responding technician will know where to start in the remediation of the problem.

In interacting with the PLC, there are a few tricks built into the software to assist you in the day to day operations of the unit. See below.

1.	Press and Hold 'STOP' For 3+ Seconds (Wet or Dry Units)	Resets Program and Alarm States. Perform this step if the controller has hung up, locked out due to an Alarm trigger or to cancel an Auto-Off-Line Clean cycle. Call the factory if PLC program hangs up.
2.	Press and release 'STOP' 2 – 3 times (Dry Units) Press Again to Release	Locks out all cleaning cycles triggered by 24 hour timer or auto-off line clean until 'STOP' button pressed again. Do this to use unit if clean cycle comes at an inconvenient time.

A PLC is a compact electronic device which can easily replace relays in some machine control applications saving both space and dollars. Relays have multiple I/O configurations and need to be used with a variety of other devices to provide equipment and system control. Performing the same task as an electrical relay, programmable logic controllers turn electrical flow on or off. However, because of the use of ladder logic and sensors, a PLC is capable of using logic in response to an almost limitless amount of real-time values to determine the sequence of electrical flow to be actuated with or without the presence of a human operator.

Logic Controllers can be pre-programmed to perform certain tasks (time, count, detect, display, communicate or process) at specific and selected times and intervals. Logic Controllers are expandable and more than one can be used for applications that need more control capability or for access to networks.



The advantages of using a Logic Controller include flexibility in use, full automation of machine cycles, alarms in case of faults (as in the case of wet collectors with low/high water alarms), and counting the number of operations for the purposes of preventive maintenance.

Function

Designed to withstand extended temperatures, electrical noise, vibration and impact—PLC units function in volatile environments for extended periods of time and deliver reliable values for analysis and action. In essence, the function of a PLC is to coordinate, respond and control complex electromechanical processes.

Programmable logic controllers are flexible and can be quickly adapted to control other types of systems other than the one they were originally intended for.

The "sanity check" and other built in trouble shooting aspects of a PLC reduce downtime by quickly allowing an operator to assess and repair problems.

Controller Interaction

Your interaction with this controller will be minimal. If interaction with the controller is required, like setting the clock during the initial set-up or in some rare instances, unit timings may be adjusted, usually at the direction of the factory, the controller menu can be brought up

by pressing the ESC (escape key) and the OK buttons at the same time. You may scroll through the menu by using the “-/+” to highlight the desired menu and pressing OK.



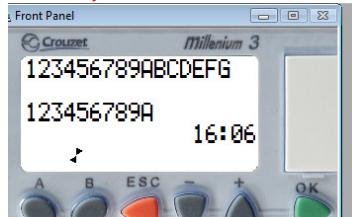
You may start or stop the program running or change parameters if that option is available, or change the clock setting to your particular time zone under the MISCELLANEOUS menu.

PLC INSTRUCTIONS

1. Make sure the power is on and the program is running. The screen should be lit and it should display.



IF IT LOOKS LIKE THIS, THE PROGRAM IS NOT RUNNING!



2. If the controller is running but hung up, which I have not seen, press and hold the off button for 3 seconds until you see the screen reset.
3. If still hung up, try cycling the power off for 30 seconds then back on.
4. Press the ESC and OK buttons at the same time. This will get you into the set-up menu.
 - a. You can start or stop the program here.
 - b. Under Miscellaneous, verify the clock is correct
 - c. Under parameters, you can set the start and stop times for 4 cleaning cycles during the day. You may also set the days of the week. This is 096 under parameters.
 - i. N00 – START TIME
 - ii. N01 – STOP TIME
 - iii. N02 – START TIME
 - iv. N03 – STOP TIME
 - v. N04 – START TIME
 - vi. N05 – STOP TIME
 - vii. N06 – START TIME
 - viii. N07 – STOP TIME

You will notice that from the factory, all the times are between midnight and 1:00 AM. As part of your set-up, you should determine if you want your unit to go into clean at break, lunch, dinner or midnight.

SETTING THE CONTROLS

After all the connections have been made (the ½" water line, the electrical power, the overflow of the tank and the drain), the **Hydrotron** is now ready to put into operation.

****FAN ROTATION ON THE HYDROTRON UNITS IS ALWAYS IN A
CLOCK-WISE FASHION WHEN VIEWED FROM THE MOTOR END****

With the power on at the unit, but with the blower off, the manual fill switch on the control box should be turned on. This will add water to the unit until it gets to the proper level and then it will automatically stop.



Each unit is unique; factory settings are recorded on the inside of the control box. After the unit has been operational for several hours, the **unit pressure** should be rechecked. If it is in the 5" to 6" range, then it is operating properly and the water level should be checked to make sure that water is coming in sporadically to keep the water level at the same position as it has been during operation.

NOTE:

1. If the water level is too low, water will be thrown out through the blower.
2. If water level is too high, the Magnehelic gauge will show a high reading and will result in reduction of airflow.
3. A continuous supply of water must be available to replace water evaporation.
4. When the Magnehelic gauge reads too high and the water is at the correct level:
 - a. Clean sediment out of the cabinet with the scoop provided.
 - b. Clean mist collector impinger.
5. In the event that water is noted escaping through the blower, adjust the gate—which, if installed, will be located at the top of the unit—by closing in small increments.
6. The Magnehelic gauge will have a normal operating total pressure of 6.5 inches of water.
7. In environments with processes that cause machining coolant, oil, and/or oily smoke to be airborne, Hydrotron units may wash these elements from the air, causing the water to be discharged from the unit. Solve this by changing your water more frequently or by adding a defoaming agent (surfactant) to the water. A defoaming can be obtained from a spa supply, and should be non-toxic and non-corrosive.
8. If safety afterfilters are installed, then the safety afterfilter gauge should read 1"-3"; they should be considered dirty at 3.

AUTOMATIC FILL FEATURE FIELD SET-UP

All Filter-1 Hydrotron Wet Dust Collectors Including DHYD, HPB, MII HPB, & HWF SERIES

The Hydrotron unit is designed with a dual scheme water level control. It has both a static component and a dynamic component.

The static component is active when the blower is off. Water level in the tank is controlled by a float switch that may or may not be visible, but is usually located under the table grate on DHYD's, inside the unit on HWF's and HPB modules and is in the stand pipe on the primary drain on the MII HPB modules. When the unit is off, water is added to the tank until the float switch is elevated and interrupts the signal to the solenoid valve.

The dynamic component kicks in when the blower is turned. Since the water is lifted and entrained in the airstream during the filtration process, it is not available to elevate the float switch. The dynamic component measures the internal pressure drop across the unit with a pressure switch. As air flow is affected by the evaporation of water, the dynamic pressure of the unit changes and a signal is sent to the solenoid valve to open and replenish the water supply. Initial factory settings are recorded on the inside panel of the control box cover.

As can be imagined, any changes to the over-all airflow of the unit will impact the dynamic fill component and could cause the unit to add too much water or allow evaporation to run unchecked until the unit is dry and filtration is compromised. This situation should be avoided at all costs.

Since ductwork design is accomplished in the field, it is necessary to do the auto-fill adjustment in the following procedure after all of the air flow adjustments have been finalized. This would include changing the exhaust slide gate to adjust regain or if a significant portion of the table is covered by tool boxes, part movement sheathing/protection, or workers jackets or aprons.

Hydrotrons with the automatic refill feature are factory set for water level automatic refill. However it is necessary to re-check and field tune these adjustments to the unit in its final application. During commissioning follow the procedure below.

Following are the instructions:

1. Make sure all facilities and power are properly hooked up and turned on. This will include water, ductwork and unit voltage.
2. Fill unit by turning the Manual Fill Switch to ON at the control box cover. Unit will fill until level switch is satisfied. Turn manual fill switch to OFF.

Figure 1 Sketch of Control Box Cover

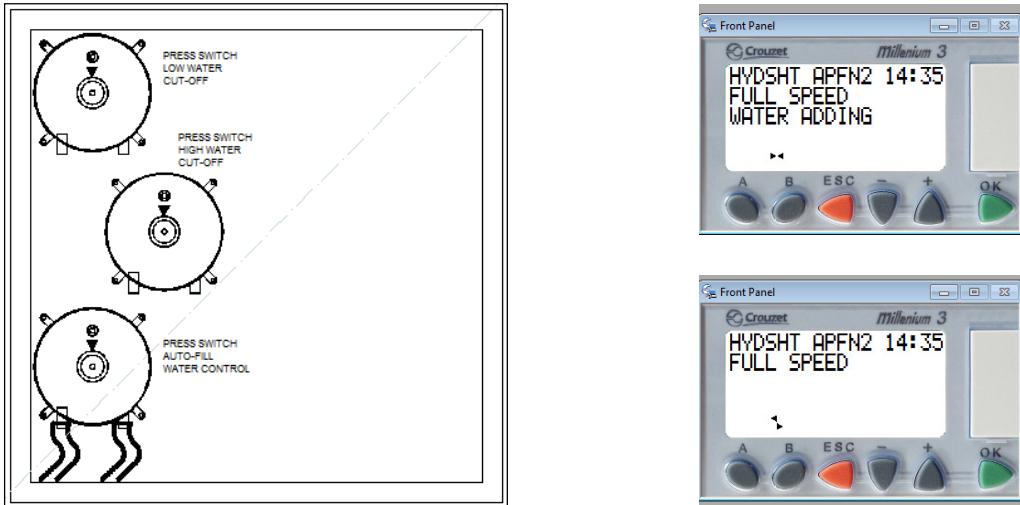


3. Turn off water to unit by using manual shut-off valve at unit.
4. If ductwork is routed and positioned as desired, turn on unit by pressing the 'I' button.

NOTE: THE CONTROL ENCLOSURE FOR YOUR HYDROTRON UNIT MAY CONTAIN TWO OR MORE PRESSURE SWITCHES. THE SWITCH IN THE LOWER LEFT HAND CORNER OF THE BOX IS THE SWITCH OPERATING THE WATER SOLENOID CONTROL VALVE.

Open the control box and examine the inside of the control box. A simplified sketch is shown in Figure 2 with only the components of interest for this procedure.

Figure 2 Sketch of Simplified Control Box



5. Use the PLC screen as feedback. If the screen indicates water adding, the water valve is engaged. If there is no indication, the water valve is not engaged. There is no flow at this time because the water was shut off in Step 3.
6. Be aware that the water solenoid valve has a 3 second delay off timer controlled by the PLC. This prevents chattering of the solenoid valve during pressure fluctuations.
7. Remove the plastic cover from the Water Level Control Pressure Switch
8. Make note of the pressure reading of the magnehelic gauge on the side of the unit.
9. Make note of the screen and the water valve status.



- a. If no "water adding" is present go to Procedure 11.
 - b. If "water adding" go to next procedure
- WARNING: PRESSURE SWITCH
ELECTRICAL CONNECTIONS ARE HIGH
VOLTAGE. ELECTRICAL SHOCK HAZARD!**

10. If you are at this procedure, “water adding” is present on the PLC screen. The goal of this part of the procedure is to get the adjustment so that the system is just satisfied and not adding water.
- a. The adjustment knob on the pressure switch is indexed and marked for inches of water.
 - b. The number near the red arrow is probably greater than the reading at the magnehelic.
 - c. Decrease the setting by 1 tic mark, approximately 1/4".
 - d. Wait 3 seconds for the chatter timer to expire and the PLC to register that the valve is NOT adding water.
 - e. If screen does not change and water still adding, return to step “c”. If meter (This step may have to be repeated numerous times)
 - f. If PLC screen changes and does not show water adding, unit is set up for auto refill and may be used as needed.
 - g. Turn water back on at manual shut-off valve.
 - h. Close control box and secure.
 - i. Turn off unit until ready for use.

PROCEDURE COMPLETE AUTO REFILL

SET-UP COMPLETE

STOP HERE

11. If you are at this procedure, the PLC screen is not showing “water adding” and the water valve is not engaged. The goal of this part of the procedure is to get the unit so that it is adding water so the previous procedure can be followed to completion.
- a. The adjustment knob on the pressure switch is indexed and marked for inches of water.
 - b. The number near the red arrow is probably less than the reading at the magnehelic.
 - c. Increase the setting by 1 tic mark, approximately 1/4".
 - d. Wait 3 seconds for the chatter timer to expire and the PLC to register that the valve is “adding water”.

- e. If screen does not change and water NOT adding, return to step "c". (This step may have to be repeated numerous times)
 - f. If PLC screen changes and does show water adding, proceed to next step.
 - g. Return to Procedure 10
-

The end user should become familiar with all the requirements of NFPA 484 and NFPA 68 in evaluating individual applications to ensure compliance. Filter-1 has no responsibility with meeting the requirements of these two NFPA guidelines.

****See Addendum for more info on NFPA 484.**

START-UP PROCEDURE AND ADJUSTMENT

Before starting unit, make sure water level in tank is correct and, if you have the pump/filter option, make sure pump is plugged into a dedicated socket at the unit side. Then perform the following priming procedure.

If all power is properly installed to the unit and proper water supply has been verified and normal water level established, the unit may be turned on.

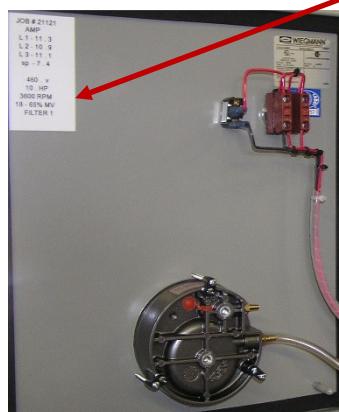
The static pressure reading of nominally 6 inches of water column should be maintained. Air flow should be obvious at the table surface and from the regain plenum if your unit has this option.

Motor Rotation Verification

Normal rotation is clockwise when viewed from the motor end. Observe and listen. Unusual noise and low air flow are signs that the phase may be reversed on 3-phase units. Do not run the unit in this condition as it will damage the motor. Change speed by switching two of the power leg positions. If unfamiliar with this procedure a certified electrician should be called.

Automatic Fill Adjustment

All Hydrotron units are factory set for automatic water fill to appropriate settings. Proper pressure readings may range from 3 to 9 inches water column for the family of Hydrotron Units. Refer to the inside of the control box cover for the factory settings for your particular unit.



OPERATIONAL CHECKS

With unit operating, check the static pressures (SP) and amperage of the operating unit. These figures were recorded at the factory and documented on the inside of the electrical control box door.

At this point, voltages should have already been verified by the installer as matching the nameplate voltages. Checking at this point with the unit running will verify sufficient gauge and source capacity supplying this unit. If the voltage is more than 10% lower than nameplate, the unit should be shut off and a qualified electrician consulted to resolve the low voltage situation.

In environments with processes that cause machining coolant, oil and/or oily smoke to be airborne, Hydrotron units may wash these elements from the air causing the water to foam, and in turn cause foamy water to be discharged from the unit through the blower. Solve this by changing your water more frequently or by adding a de-foaming agent (surfactant) to the water (available from your local spa supply). This should be non-toxic and non-corrosive to your unit. The supplier of the cutting fluid may also have a de-foaming agent specifically for the cutting agent being used.

Unit is ready for use.

The end user should become familiar with all the requirements of NFPA 484 and NFPA 68 in evaluating individual applications, in order to ensure compliance. Filter-1 has no responsibility with meeting all the requirements of these two NFPA guidelines.

****See Addendum for a brief discussion on NFPA 484.**

MAINTENANCE

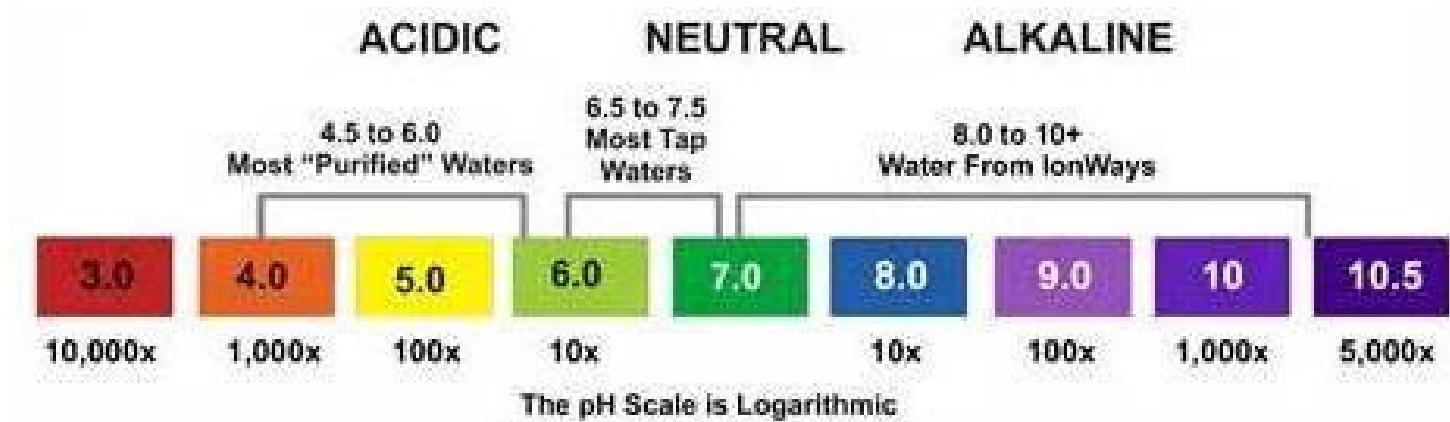
As with any piece of industrial equipment, use caution and normal safety procedures during maintenance.

Make sure the water supply and electricity are turned off, locked out and tagged out, prior to performing any maintenance or service.

Preventative maintenance on the Hydrotron should be periodically completed. Care should be taken not to generate any sparks or open flames during the cleaning procedure listed below.

1. Water in the tank should be maintained in the 6.5-8 PH range, and the PH of the water should be tested every 2 weeks. The water will need to be drained and refilled if it is outside the 6.5-8 range. Check this often until you determine if a problem exists. Do not allow this to drop below 6.5 and become acidic as this could damage the unit. Similarly, letting the PH get above 8 and becoming alkaline can cause damage, as well as inconvenient side effects like foam, which may bypass mist eliminators and wind up on the floor, roof, wall or any personnel or equipment near this equipment.

PH SCALE



2. Contact a local water treatment service company for assistance with water quality if required.

3. Periodic inspection of the Mist Eliminators (impingers) should also be completed looking for any buildup of solids. If solids build up on the impingers, it will negatively affect the dust collection performance of the unit. Filter-1 recommends doing this at least once per month; however, the timeframe of this action will be determined by the end user based upon the loading and use of the product. Many users do this weekly, monthly, or on their own preventative maintenance schedules. The end user will determine, over time, the appropriate frequency of this action. Access to the impingers is granted by removing the access panels that reside at the rear of the unit. (The door is usually held in place by several black plastic hand knobs on the panel.) Soaking in a soapy solution followed by a pressure wash will generally remove any solid buildup on the impingers. Be certain all soap is removed from the impingers before re-installation. Foam is an undesirable consequence and can impact the performance of the unit.
4. Due to the nature of the air/water flow through the wet downdraft table collected dust settles as sludge in the main dust collector compartment. However, trace amounts can settle under the fiberglass grated area. To clean this area, remove the fiberglass grate, as well as any baffle below it, until you can see the bottom of the tank. Remove sludge as needed, being careful not to scrape the coal tar epoxy off the metal surfaces. We recommend non-sparking tools. Use a National Fire Protection Association (NFPA) approved vacuum cleaner if needed. Cleaning of the tank is required periodically to remove any sludge deposited during dust collection. Sludge should be removed from the tank either when the water is drained or as required. This can be completed by scraping the bottom of the tank and disposing of the sludge properly. (Consult the NFPA code concerning proper disposal of sludge.) Access is gained through the rear of the unit. The window door must be removed; then the impinger assemblies should slide rearward and be removed. Note that sludge build-up can cause the operating pressure to rise with consequent loss of airflow.
5. Water in the tank should be totally drained and changed periodically. We recommend this be done at a minimum of every 30 days. The solids content of the water will continue to increase if this is not done. This will cause operating efficiencies to be effected negatively.
6. Once a month or as needed, clean the fitting where the tube from the differential pressure switch connects to the body of the dust collector.

PREVENTIVE MAINTENANCE CHECKLIST

<p style="text-align: center;">Are these instructions complete and accurate? [Y] Yes, they are current and valid. [N] No, they are not current and valid. Reference the edits I have made.</p>				
STEP NO.	✓	WORK DESCRIPTION	FREQUENCY	
		Make sure water supply and electricity are turned off, locked out and tagged out.		
1		TEST PH: IF OUTSIDE THE 6.5-8 RANGE, DRAIN AND REFILL THE WATER.	TEST EVERY TWO WEEKS	
2		INSPECT THE MIST ELIMINATORS (IMPINGERS) FOR BUILDUP OF SOLIDS. REMOVE SOLID BUILDUP BY SOAKING IN A SOAPY SOLUTION POWER WASH IN REVERSE FLOW DIRECTION TO REMOVE ALL TRACES OF SOAP	MONTHLY	
3		CHECK SLUDGE LEVEL.	EVERY TWO WEEKS	
4		CLEAN SLUDGE FROM THE TANK WHEN 1" OF SLUDGE HAS ACCUMULATED.	AS NEEDED	
5		INSPECT AND CLEAN THE FITTING ON SIDE OF UNIT NEAR CONTROL BOX ABOVE THE IMPINGERS	MONTHLY	
6		CLEAN THE FLOAT SWITCH	WEEKLY	
7		DRAIN WATER FROM THE TANK. AFTER DRAINING, USE SUPPLIED RAKE TO PULL THE SLUDGE TO THE FRONT OF THE UNIT AND REMOVE USING A WET-DRY VAC. DISPOSE OF SLUDGE PROPERLY (CONSULT NFPA CODE).	WEEKLY	
8		INSPECT BLOWER HOUSING FOR EVIDENCE OF PRODUCT OR WATER PASS THROUGH.	MONTHLY	
9				
10				
		P.M. CHECKLIST – ELECTRICAL SAFETY:		
11		CHECK FOR EXPOSED WIRES AND CONDUCTORS; DAMAGED, FRAYED INSULATION – VERIFY ALL IN GOOD CONDITION WITHOUT DAMAGE.	MONTHLY	
12		VERIFY ALL PANELS, BOXES, DISCONNECTS AND SWITCHES ARE CLEARLY LABELED – INDICATING ELECTRICAL SOURCE FEED FROM & TO	MONTHLY	
13		VERIFY THAT CONDUIT, JUNCTION BOXES, DISCONNECT PANELS, COVERS, ETC. ARE IN GOOD CONDITION AND INTEGRITY MAINTAINED.	MONTHLY	
14		GROUNDING PLUGS ARE IN PLACE FOR 3 PRONG PLUGS.	MONTHLY	
15		EXTENSION CORDS ARE NOT USED IN LIEU OF HARD WIRE CONNECTIONS.	MONTHLY	
16		NO MATERIAL IS STORED IN OR IN FRONT OF ELECTRICAL SWITCHES, DISCONNECTS OR ENCLOSURES AND ALL CLEARANCE ZONES ARE KEPT FREE OF ANY ITEMS, STORAGE, OR BLOCKAGE.	MONTHLY	

MAINTENANCE LOG

CLEANING A HYDROTRON DHYD

All Hydrotrons capture particles through the mixing of air and water and periodically have to be shut down and cleaned out, and waste disposed of properly. Complete draining of the tank reservoir should be done 3 or 4 times a year.



Remove the access panel to gain access to the wet section of the dust collector by loosening the black plastic hand knobs; several hold the panel in place.



Slide the impingers out. Soak in a soapy solution and follow with a pressure wash to remove any solid buildup on the impingers.

Be certain all soap is removed from the impingers before re-installation. Foam is an undesirable consequence and can impact the performance of the unit.



Remove center piece to allow access to the impeller.



Loosen the screws holding the impeller in place.



Pull the impeller out. Clean sludge from collector.



Trace amounts of dust can settle under the fiberglass grating area. To clean, remove the fiberglass grating, as well as the metal sound baffles to access the sump.



Cleaning of the tank is required periodically to remove any sludge deposited during dust collection. Sludge should be removed from the tank either when the water is drained or as required. This can be completed by scraping the bottom of the tank and disposing of the sludge properly. Remove sludge as needed, being careful not to scrape the coal tar epoxy off the metal surfaces. We recommend non-sparking tools. Use National Fire Protection Association (NFPA) approved vacuum cleaner if needed.

SERVICEABLE IMPINGER MAINTENANCE

Impingers are the devices that separate mist and liquid droplets from the airflow that carries them. Basically they are inertial separators. The mass of the droplet is greater than the air and by traveling a rapid and tortured pathway; the droplets will impinge and affix themselves to the surface of the plastic chevrons and drain back into the scrubbing bath.

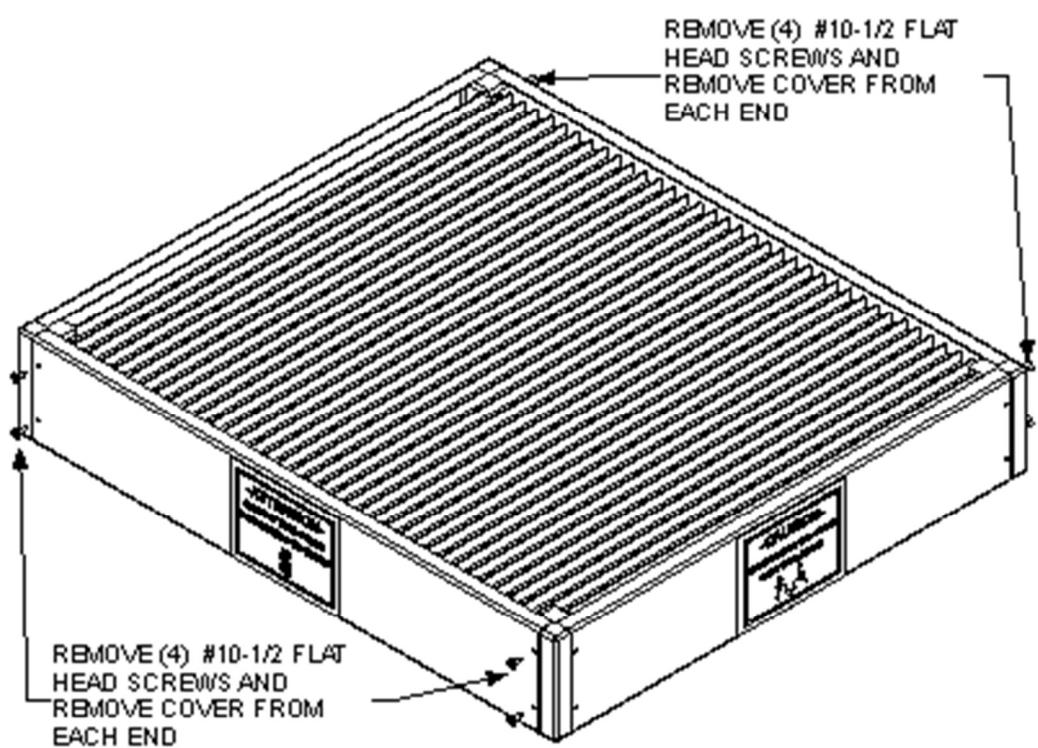
If/when these paths become smoothed out by sludge and debris, the separation effect is drastically reduced and static pressures increase beyond normal operating parameters. This will lead to numerous undesirable events. One of which is dirty sludge water being sprayed out of the unit and covering everything as far as the water will carry in the air flow.

When considering a cleaning solution to remove the obscuring material the following logic should be applied.

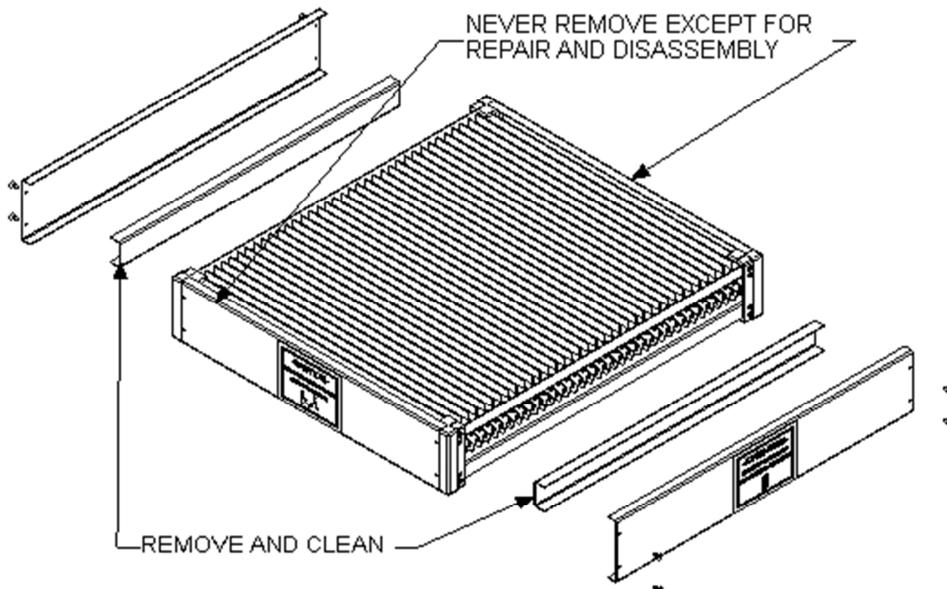
1. These impingers are fabricated out of stainless steel and engineered polymer plastic.
2. The materials should be resilient to reasonable cleaning chemicals used to clean, however they must be rinsed thoroughly to prevent said chemicals from entering the Hydrotron.
3. Do not put any chemical into a Hydrotron that you do not want airborne. This could expose workers and facilities to harmful fumes. Consult your local water professional for guidance.
4. If your sludge is metallic in nature, you should use something acidic to dissolve the obscuring metallic sludge. Vinegar is basically a human friendly chemical that will work in this application.
5. If your sludge is organic, (food, animal fat, etc.), then something caustic will dissolve the obscuring sludge.
6. If heavily impacted with sludge, a lengthy soak in the desired dissolving agent will loosen and expedite the cleaning process.
7. If your chemical choice is not thoroughly rinsed from the impinger and it is prone to foaming, then you could cause foam to form in the Hydrotron and it will pass through the impinger and you will have soapy type bubbles ejecting from your unit and covering your surrounding equipment.

To Clean the Serviceable Impinger: Follow These Steps:

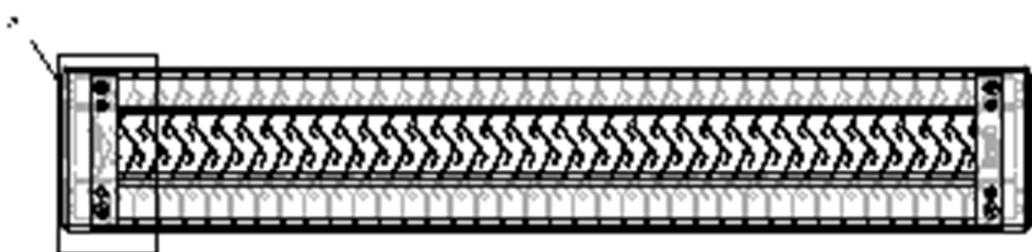
1. Orient impinger and remove proper covers. Failure to remove the proper panel will result in the impinger becoming totally disassembled requiring painstaking work and patience to re-assemble.



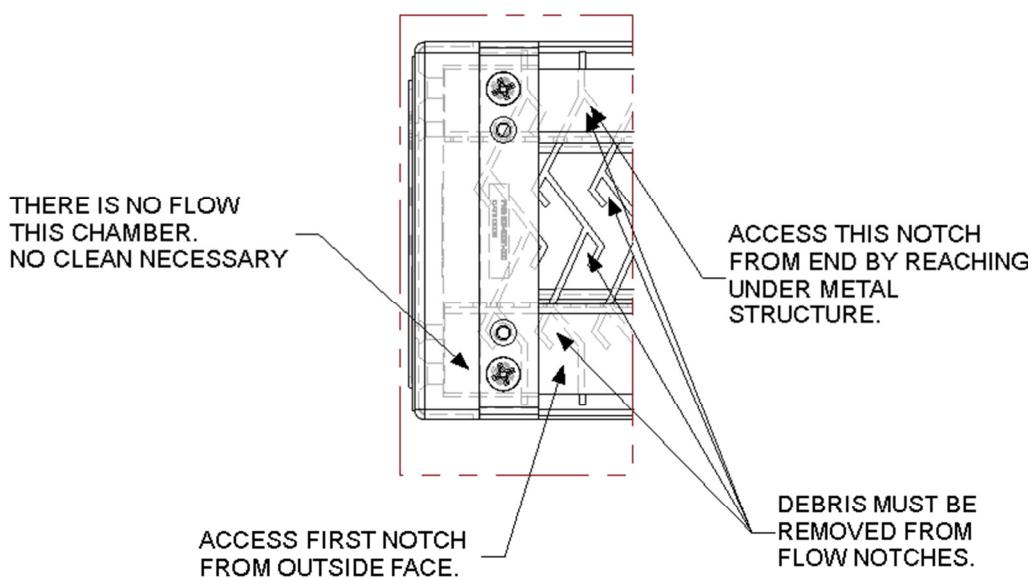
2. Remove outer and inner panel. Inner panel may need cleaning.



3a. Examining the end of the impinger assembly, it is clear you can have access all of the way through the impinger. Using a soft bristled brush, plastic bristles, (hard core approximately 1/8"), each of the notches can be scrubbed clean. You may also use a power washer. CAUTION: Temperatures greater than 160° F (71 C), will cause irreparable damage to the plastic chevrons of the impinger.



3b. Notice the highlighted areas that need attention.



4. Rinse thoroughly.
5. Re-assemble.
6. Return to Unit noting air flow direction.

Service Complete

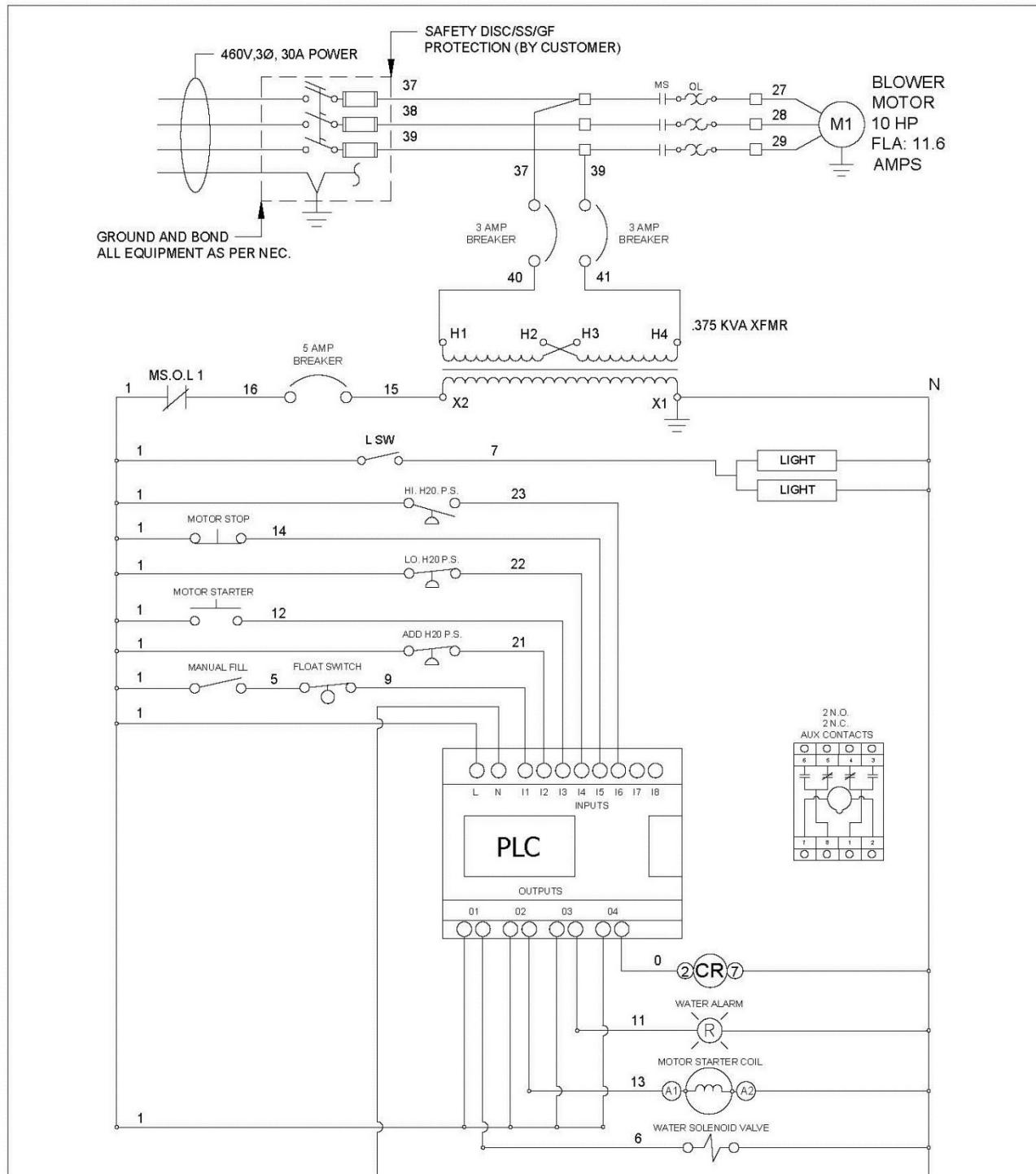
TROUBLESHOOTING

Symptom	Cause	Fix
Low Water Light	Water Low	<ul style="list-style-type: none"> • Manual Water Valve Closed • Automatic fill out of adjustment • Air flow restricted by table top blockage • Water pressure too low
High Water Light	Water High	<ul style="list-style-type: none"> • Debris in solenoid valve preventing 100% shut off • Automatic fill out of adjustment
Blower Ejecting Water at Unit Top	Low Water	<ul style="list-style-type: none"> • See Low Water Above
	Foam	<ul style="list-style-type: none"> • Contact local water treatment professional for de-foam • Contact Factory for Optional de-foam accessory • Cleanse parts of cutting fluid before processing on table
	Dirty Impingers ¹	<ul style="list-style-type: none"> • Soak and wash impingers with non-foaming soap like automatic dishwashing power • Wash with power washer
	Poorly Installed Impingers	<ul style="list-style-type: none"> • Re-seat impingers into proper location • Re-gasket impingers with 1/8" PVC Foam tape or similar
Low Air Flow	High Water Level	<ul style="list-style-type: none"> • See High Water Above
	Dirty Impingers	<ul style="list-style-type: none"> • See Above
	Electrical Phase Incorrect	<ul style="list-style-type: none"> • Swap two of three electrical leads to reverse motor rotation direction.

¹Dirty impingers may be from lint carryover from buffing operations to mineral buildup on the impinger blades. Many areas have extremely hard water, and due to evaporation, excess mineral buildup can occur. Monthly inspection of the unit is necessary and cleaning of impinger and fan impeller may be required.

Contact a local water treatment service company for assistance with water quality if required.

TYPICAL ELECTRICAL SCHEMATIC



FILTER -1

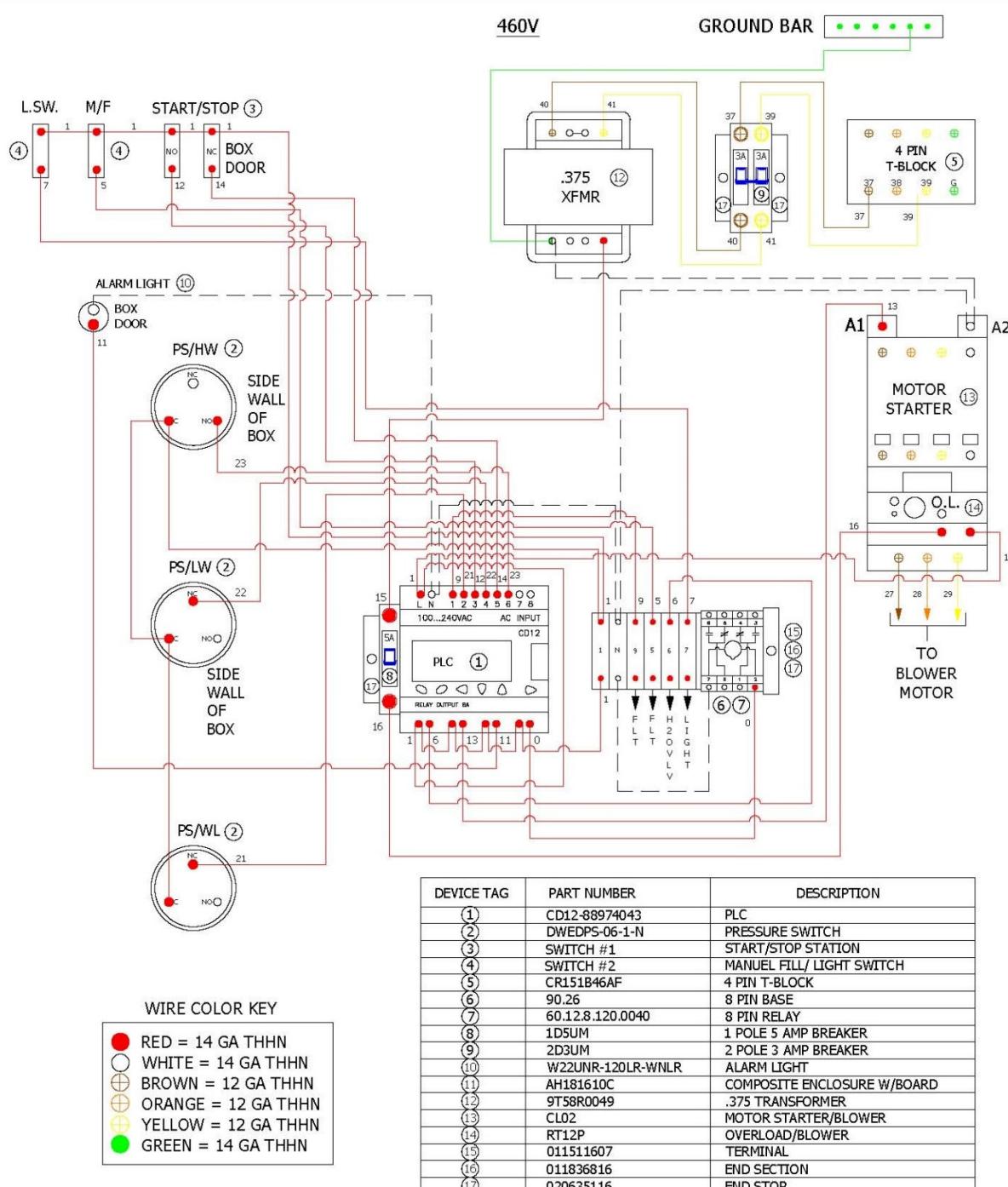
2525 NATIONAL DR. PH: (972) 278-2664
GARLAND, TEXAS 75041 FAX: (972) 278-1810

www.filter-1.com

TITLE		HYDROTRON	
DHYD 460V, PRESSURE LEVEL CONTROL, HIGH AND LOW WATER SHUT DOWN WITH PLC			
ED#	24432	SHEET	1 OF 1
MCA:	18 AMPS	MOP:	30 AMPS

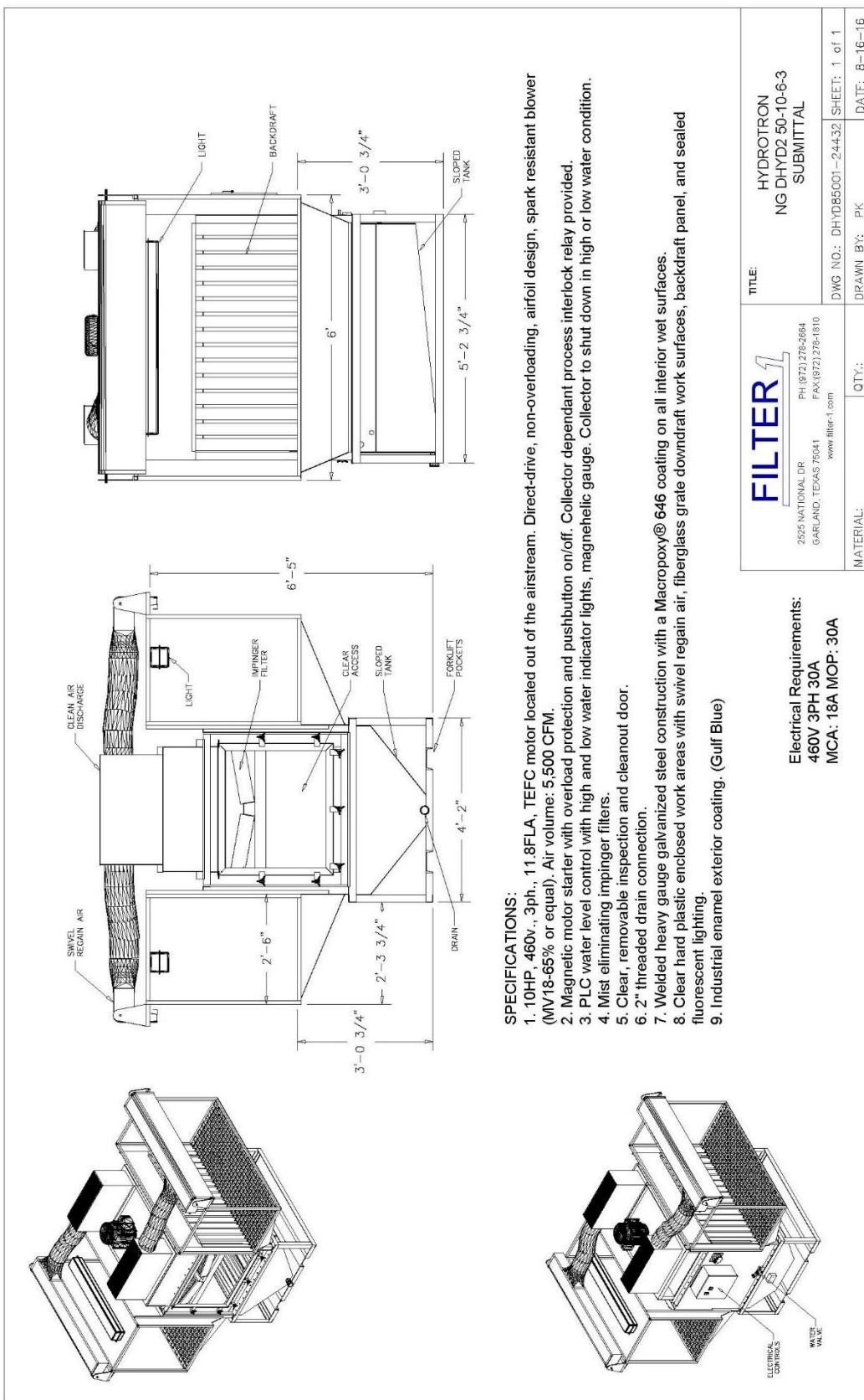
DATE 08-02-2016

TYPICAL P2P ELECTRICAL SCHEMATIC



FILTER -1		TITLE HYDROTRON DHYD2 50-10-6-3-MO ELECTRICAL POINT TO POINT	
2525 NATIONAL DR. GARLAND, TEXAS 75041		PH: (972) 278-2664 FAX: (972) 278-1810	ED# 24432 SHEET 1 OF 1
www.filter-1.com		MCA: 18 AMPS MOP: 30 AMPS	DATE 08-02-2016

TYPICAL SUBMITTAL DRAWING



SPECIFICATIONS:

1. 10HP, 460v., 3ph., 11.8FLA, TEFC motor located out of the airstream. Direct-drive, non-overloading, airfoil design, spark resistant blower (M18-65% or equal). Air volume: 5,500 CFM.
2. Magnetic motor starter with overload protection and pushbutton on/off. Collector dependant process interlock relay provided.
3. PLC water level control with high and low water indicator lights, magnetic gauge. Collector to shut down in high or low water condition.
4. Mist eliminating impinger filters.
5. Clear, removable inspection and cleanout door.
6. 2" threaded drain connection.
7. Welded heavy gauge galvanized steel construction with a Macropoxy® 646 coating on all interior wet surfaces.
8. Clear hard plastic enclosed work areas with swivel regain air, fiberglass grate downdraft work surfaces, backdraft panel, and sealed fluorescent lighting.
9. Industrial enamel exterior coating. (Gulf Blue)

FILTER		TITLE	HYDROTRON NG DHYD2 50-10-6-3 SUBMITTAL	
Electrical Requirements: 460V 3PH 30A MCA: 18A MOP: 30A	2925 NATIONAL DR GARLAND, TEXAS 75041 www.filter-1.com	PH (972) 275-3684 FAX (972) 275-1610	DWG NO.: DHYD85001-24432	SHEET: 1 of 1

MATERIAL:	QTY:	DRAWN BY:	PK	DATE: 8-16-16
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TYPICAL PARTS LIST

ITEM #:	QTY.:	PART #:	DESCRIPTION:
1	1	GEO1036E13E215T-W22	10HP 460V 3PH, 3600RPM TEFC MOTOR
2	1	MV18-65 ALUM.	BLOWER WHEEL
3	1	MV18C-ALUM	INLET CONE
4	1	ASB210G73	WATER VALVE
5	1	GR2KC13	LIQ. LEVEL FLOAT CONTROL
6	2	GEAFLIGHTFIXTURE18	4' LIGHT FIXTURE
7	8	RTUCL-B1	PLASTIC KNOB
8	4	FLIMP21X22	IMPINGER FILTER
9	1	DW2015	0-15 MAGNEHELIC GAUGE
10	1	GEAAH181610C	ENCLOSURE/SEE ELEC. POINT TO POINT

FILTER 1

2525 NATIONAL DR.
GARLAND, TEXAS 75041
www.filter-1.com

PH:(972) 278-2664
FAX:(972) 278-1810

TITLE:
**HYDROTRON
NG DHYD2 50-10-6-3
PARTS LIST**

DWG NO.: DHYD285002-244.32 SHEET: 1 OF 1
DRAWN BY: RW DATE: 08-16-2016

MSDS

Paint



Protective & Marine Coatings

DURA-PLATE® 235 MULTI-PURPOSE EPOXY

PART A B67-235 SERIES COLORS
PART B B67V235 HARDENER

Revised: September 23, 2013

PRODUCT INFORMATION

4.67

PRODUCT DESCRIPTION

Dura-Plate 235 Multi-Purpose Epoxy is a modified epoxy phenolamine, formulated specifically for immersion and atmospheric service in marine and industrial environments. Dura-Plate 235 provides exceptional performance in corrosive environment, and can be applied at temperatures as low as 0°F (-18°C).

- Self-priming
- Low temperature application, 0°F (-18°C)
- Surface tolerant - damp surfaces
- Provides salt water and fresh water immersion resistance
- Approved as a primer per MIL-PRF-23236, Type V, Class 7, Grade C
- Outstanding application properties

PRODUCT CHARACTERISTICS

Finish:	Semi-Gloss
Color:	Wide range of colors available
Volume Solids:	68% ± 2%, mixed
Weight Solids:	79% ± 2%, mixed
VOC (EPA Method 24):	Unreduced: <280 g/L; 2.33 lb/gal Reduced 10%: <327 g/L; 2.72 lb/gal
Mix Ratio:	4:1 by volume

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	6.0 (150)	12.0 (300)
Dry mils (microns)	4.0* (100)	8.0* (200)
~Coverage sq ft/gal (m²/L)	136 (3.3)	272 (6.6)
Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft	1088 (26.6)	

*See Performance Tips section

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 6.0 mils wet (150 microns):

	@ 0°F/-18°C	@ 40°F/4.5°C	@ 77°F/25°C	@ 120°F/49°C 50% RH
To touch:	18 hours	3.5 hours	2 hours	20 minutes
To handle:	36 hours	12 hours	3.5 hours	40 minutes
To recoat:				
minimum:	36 hours	12 hours	3.5 hours	40 minutes
maximum:	6 months	6 months	6 months	6 months
Cure to service:	30 days	14 days	7 days	3 days

If maximum recoat time is exceeded, abrade surface before recoating.
Drying time is temperature, humidity, and film thickness dependent.

Pot Life: 16 hours 8 hours 4 hours 1 hour
Sweat-in-time: 1 hour 30 minutes 15 minutes 5 minutes

Shelf Life:	Part A: 36 months, unopened Part B: 24 months, unopened Store indoors at 40°F (4.5°C) to 100°F (38°C).
Flash Point:	116°F (47°C) PMCC, mixed

Reducer/Clean Up:
Reducer R7K104

RECOMMENDED USES

- For use over prepared steel and masonry surfaces.
- Salt water and fresh water immersion resistance
 - Ballast tanks, offshore and marine structures
 - Bilges and wet void areas
 - Above- and below- water hull areas
 - Decks and superstructures
 - Water and waste water tanks
 - Acceptable for use with cathodic protection systems.
 - Dura-Plate 235 Black meets or exceeds the performance criteria of C-200; SSPC Paint 16; and Mil-P-23236B(SH) Type I or IV Class 2
 - Suitable for use in USDA inspected facilities
 - Conforms to MPI # 101

PERFORMANCE CHARACTERISTICS

Substrate*: Steel

Surface Preparation*: SSPC-SP10/NACE 2

System Tested*:

2 cts. Dura-Plate 235 @ 5.0 mils (125 microns) dft/ct
*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060 CS17 wheel, 1000 cycles, 1 kg load	65 mg loss
Adhesion	ASTM D4541	850 psi
Direct Impact Resistance	ASTM D2794	10 in lb
Dry Heat Resistance	ASTM D2485	250°F (121°C)
Moisture Condensation Resistance	ASTM D4585, 100°F (38°C), 2000 hours	Rating 10 per ASTM D610 for rusting; Rating 10 per ASTM D714 for blistering
Pencil Hardness	ASTM D3363	H

IMMERSION

(Ambient temperature)

- Salt Water..... Recommended
- Fresh Water..... Recommended
- Ballast Tank Mix Recommended

Epoxy coatings may darken or yellow following application and curing.



Protective & Marine Coatings

DURA-PLATE® 235 MULTI-PURPOSE EPOXY

PART A B67-235 SERIES COLORS
PART B B67V235 HARDENER

PRODUCT INFORMATION

4.67

RECOMMENDED SYSTEMS

	Dry Film Thickness / ct. <u>Mils</u> (Microns)
Steel, immersion or atmospheric service: 2 cts. Dura-Plate 235	4.0-8.0 (100-200)
Steel, immersion service: 1 ct. Dura-Plate 235 1-2 cts. TarGuard Coal Tar Epoxy	4.0-8.0 (100-200) 8.0-16.0 (200-400)
Steel, immersion service: 2 cts. Dura-Plate 235 2 cts. SeaGuard Anti-Foulant (refer to respective data pages for coverage)	4.0-8.0 (100-200)
Steel, atmospheric service: 1 ct. Dura-Plate 235 1-2 cts. Macropoxy 646	4.0-8.0 (100-200) 5.0-10.0 (125-250)
Steel, atmospheric service: 1 ct. Zinc-Clad II Plus 1-2 cts. Dura-Plate 235	3.0-5.0 (75-125) 4.0-8.0 (100-200)
Steel, atmospheric service: 1 ct. Zinc-Clad IV 1-2 cts. Dura-Plate 235	3.0-5.0 (75-125) 4.0-8.0 (100-200)
Steel, atmospheric service: 1 ct. Corothane I GalvaPac Zinc Primer 1-2 cts. Dura-Plate 235	3.0-4.0 (75-100) 4.0-8.0 (100-200)
Steel, atmospheric service: 1 ct. Dura-Plate 235 1-2 cts. Acrolon 218 HS or Hi-Solids Polyurethane	4.0-8.0 (100-200) 3.0-6.0 (75-150) 3.0-5.0 (75-125)
Concrete/Masonry, immersion service: 1 ct. Kem Cati-Coat HS Epoxy Filler/Sealer 10.0-20.0 (250-500) as required to fill voids and provide a continuous substrate	
2 cts. Dura-Plate 235	4.0-8.0 (100-200)
Galvanized, atmospheric service: 1 ct. Dura-Plate 235	4.0-8.0 (100-200)
Steel-Seam FT910 - as required for filling pits, and transitioning sharp edges, weld seams, etc...	

The systems listed above are representative of the product's use, other systems may be appropriate.

DISCLAIMER

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SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

Iron & Steel:

Atmospheric: SSPC-SP2 or SSPC-SP12/NACE 5, WJ-4
Immersion: SSPC-SP10, 2 mil (50 micron) profile or
SSPC-SP-12/NACE 5, WJ-2

Concrete & Masonry:

Atmospheric: SSPC-SP13/NACE 6, or ICRI No. 310.2,
CSP 1-3
Immersion: SSPC-SP13/NACE 6-4.3.1 or 4.3.2, or ICRI
No. 310.2, CSP1-3

Galvanized, atmospheric: SSPC-SP1

Surface Preparation Standards					
	Condition of Surface	ISO 8501-1	Swedish Std.	SSPC	NACE
White Metal		ISO 7079:A1	SIS055900	SP 5	1
Near White Metal	Sa 3	Sa 3	Sa 2.5	SP 10	2
Commercial Blast	Sa 2.5	Sa 2.5	Sa 2.5	SP 6	3
Brush-Off Blast	Sa 2	Sa 2	Sa 1	SP 7	4
	Sa 1	Sa 1	Sa 1	SP 2	-
Hand Tool Cleaning	Rusted	O St 2	O St 2	SP 2	-
	Pitted & Rusted	D St 2	D St 2	SP 2	-
	Rusted	C St 3	C St 3	SP 3	-
Power Tool Cleaning	Pitted & Rusted	D St 3	D St 3	SP 3	-

TINTING

Tint Part A with Maxitones only. Mill White tints at 150%. Ultradeep Base tints at 100%. Five minutes minimum mixing on a mechanical shaker is required for complete mixing of color.

APPLICATION CONDITIONS

Temperature: 0°F (-18°C) minimum, 120°F (49°C) maximum
(air and surface)

At least 5°F (2.8°C) above dew point

Material should be at least 40°F (4.5°C) for optimal performance.

Relative humidity: 85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:

Part A: 1 gallon (3.78L) and
4 gallons (15.1L) in a 5 gallon (18.9L)
container

Part B: 1 quart (0.94L) and 1 gallon (3.78L)

Weight: 11.3 ± 0.2 lb/gal ; 1.35 Kg/L, mixed
may vary with color

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice.
Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.



Protective & Marine Coatings

DURA-PLATE® 235 MULTI-PURPOSE EPOXY

PART A B67-235 SERIES COLORS
PART B B67V235 HARDENER

Revised: September 23, 2013

APPLICATION BULLETIN

4.67

SURFACE PREPARATIONS

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel, Immersion Service:

Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Near White Metal Blast Cleaning per SSPC-SP10/NACE 2 or SSPC-SP12/NACE 5. For SSPC-SP10/NACE 2, blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils / 50 microns). For SSPC-SP12/NACE No. 5, all surfaces to be coated shall be cleaned in accordance with WJ-2. Pre-existing profile should be approximately 2 mils (50 microns). Light rust bloom is allowed. Remove all weld spatter and round all sharp edges by grinding. Prime any bare steel the same day as it is cleaned.

Iron & Steel, Atmospheric Service:

Minimum surface preparation is Hand Tool Clean per SSPC-SP2 or SSPC-SP12/NACE 5. For surfaces prepared by SSPC-SP2, first remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. For better performance, use Commercial Blast Cleaning per SSPC-SP6/NACE 3, blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils). For surfaces prepared by SSPC-SP12/NACE No. 5, all surfaces shall be cleaned in accordance with WJ-4. Pre-existing profile should be approximately 2 mils (50 microns). Prime any bare steel the same day as it is cleaned.

Galvanized Steel

Allow to weather a minimum of six months prior to coating. Solvent Clean per SSPC-SP1 (recommended solvent is VM&P Naphtha). When weathering is not possible, or the surface has been treated with chromates or silicates, first Solvent Clean per SSPC-SP1 and apply a test patch. Allow paint to dry at least one week before testing adhesion. If adhesion is poor, brush blasting per SSPC-SP7 is necessary to remove these treatments. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2, prime the area the same day as cleaned.

Concrete and Masonry

For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI No. 310.2, CSP 1-3. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 75°F (24°C). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement and hardeners. Fill bug holes, air pockets and other voids with Steel-Seam FT910.

Concrete, Immersion Service:

For surface preparation, refer to SSPC-SP13/NACE 6, Section 4.3.1 or 1.3.2 or ICRI No. 310.2, CSP 1-3.

Follow the standard methods listed below when applicable:

ASTM D4258 Standard Practice for Cleaning Concrete.
ASTM D4259 Standard Practice for Abrading Concrete.
ASTM D4260 Standard Practice for Etching Concrete.
ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete.
SSPC-SP 13/Nace 6 Surface Preparation of Concrete.
ICRI No. 310.2 Concrete Surface Preparation.

APPLICATION CONDITIONS

Temperature: 0°F (-18°C) minimum, 120°F (49°C) maximum (air and surface)
At least 5°F (2.8°C) above dew point

Material should be at least 40°F (4.5°C) for optimal performance.

Relative humidity: 85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

Reducer/Clean Up Reducer R7K104

Airless Spray

Unit.....	30:1 Pump
Pressure.....	2400 - 2800 psi
Hose.....	1/4" - 3/8" ID
Tip015" - .019"
Filter.....	60 mesh
Reduction.....	As needed, up to 10% by volume

Conventional Spray

Gun.....	DeVilbiss MBC-510
Fluid Tip	E
Air Nozzle.....	704
Atomization Pressure.....	60-65 psi
Fluid Pressure.....	5-15 psi
Reduction.....	As needed, up to 10% by volume

Brush

Brush.....	Natural Bristle
Reduction.....	Not recommended

Roller

Cover	3/8" woven with solvent resistant core
Reduction.....	Not recommended

If specific application equipment is not listed above, equivalent equipment may be substituted.

Surface Preparation Standards

	Condition of Surface	ISO 8501-1	Swedish Std.	SSPC	NACE
White Metal		Sa 3	Sa 3	SP 5	1
Near White Metal		Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast		Sa 2	Sa 2	SP 6	3
Brush-Off Blast		Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted	C St 2	C St 2	SP 2	-
	Pitted & Rusted	D St 2	D St 2	SP 2	-
	Rusted	C St 3	C St 3	SP 3	-
	Pitted & Rusted	D St 3	D St 3	SP 3	-



Protective & Marine Coatings

DURA-PLATE® 235 MULTI-PURPOSE EPOXY

PART A

B67-235

SERIES COLORS

PART B

B67V235

HARDENER

APPLICATION BULLETIN

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APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mix contents of each component thoroughly using low speed power agitation. Make certain no pigment remains on the bottom of the can. Then combine 4 parts by volume of Part A with 1 part by volume of Part B. Thoroughly agitate the mixture with power agitation. Allow the material to sweat-in as indicated prior to application. Re-stir before using.

If reducer solvent is used, add only after both components have been thoroughly mixed, after sweat-in.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	6.0 (150)	12.0 (300)
Dry mils (microns)	4.0* (100)	8.0* (200)
~Coverage sq ft/gal (m²/L)	136 (3.3)	272 (6.6)
Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft	1088 (26.6)	

*See Performance Tips section

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 6.0 mils wet (150 microns):

	@ 0°F/18°C	@ 40°F/4.5°C	@ 77°F/25°C	@ 120°F/49°C 50% RH
To touch:	18 hours	3.5 hours	2 hours	20 minutes
To handle:	36 hours	12 hours	3.5 hours	40 minutes
To recoat:	minimum: 36 hours	12 hours	3.5 hours	40 minutes
	maximum: 6 months	6 months	6 months	6 months
Cure to service:	30 days	14 days	7 days	3 days

If maximum recoat time is exceeded, abrade surface before recoating.
Drying time is temperature, humidity, and film thickness dependent.

Pot Life: 16 hours 8 hours 4 hours 1 hour
Sweat-in-time: 1 hour 30 minutes 15 minutes 5 minutes

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Reducer R7K104. Clean tools immediately after use with Reducer R7K104. Follow manufacturer's safety recommendations when using any solvent.

DISCLAIMER

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PERFORMANCE TIPS

Stripe coat crevices, welds, and sharp angles to prevent early failure in these areas.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle.

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

Excessive reduction of material can affect film build, appearance, and adhesion.

Insufficient ventilation, incomplete mixing, miscatalyzed, and external heaters may cause premature yellowing.

Excessive film build, poor ventilation, and cool temperatures may cause solvent entrapment and premature coating failure.

For Immersion Service: (if required) Holiday test in accordance with ASTM D5162 for steel, or ASTM D4787 for concrete.

Do not mix previously catalyzed material with new.

Do not apply the material beyond recommended pot life.

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Reducer R7K104.

Please contact your Sherwin-Williams Representative for recommendations for immersion service of tinted material.

When coating over aluminum and galvanizing, recommended dft is 2-4 mils (50-100 microns).

Refer to Product Information sheet for additional performance characteristics and properties.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

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WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

ADDENDUM

A Practical Discussion of NFPA 484 and the Use of Wet Dust Collectors

1. Does this code apply to me?
2. Who enforces the code?
3. What does this code say in plain language?
4. What are the basic dangers?
5. What is the most common practice in handling combustible dust?
6. How do I test my dust?

1. Does the code apply to me?

If you process or finish metals that can create explosive dusts, (Aluminum, Magnesium, Niobium, Tantalum, Titanium, or Zirconium), one way or another NFPA 484 Standard for Combustible Metals applies to you. If you are in a US city, then this code is part of both the fire code and the building code. If your city has adopted the International Building code, it also refers back to the NFPA code. OSHA and your own fire and liability insurance carrier may also have an interest in your compliance to this code.

2. Who enforces the code?

The most common enforcement comes through the Fire Marshal. This is simply because on the local level, the Fire Marshal is charged with the job of understanding the code and how to apply it. However, the authority having jurisdiction (AHJ) can be anyone who is a public safety officer or inspector. Fire, health, or labor workers are all able to enforce the code if you are in their city or jurisdiction. The AHJ may also interpret the code when that is necessary. OSHA is getting more involved with the issue of compliance to the code as concerns for worker safety increase.

3. What does this code say in plain language?

NFPA 484 is the standard for all combustible metals. Most of the code applies to a small part of the industry that actually manufactures metal powders. However, 484 Chapter 6 addresses Aluminum, and Section 6.3 is dedicated to processing and finishing operations.

Here are some of the "Dos and Don'ts" relating to dust collection systems and collector design.

- Do connect all dust producing equipment to hoods that capture and transport the dust.
- Do **not** mix the buffing-polishing with the grinding.
- Do keep your duct velocity at 4500 feet per minute.
- Do **not** allow the minimum explosive concentration (MEC) of the dust to occur. (This is a problem with vacuum cleaners.)
- Do use metal, not plastic, duct and keep the duct system simple and smooth, with seams downstream and as straight as you can.
- Do **not** install any dead spots or ports for future use.
- Do bond and electrically ground all the machines, the duct, and the dust collector itself.
- Do **not** mix any other metals with Aluminum in a dry collector or in any ducting.

Minimum Design Features of Wet Dust Collectors:

- The blower must be on the clean side of the filter.
- The collector cannot have any un-vented pockets (hydrogen)
- The efficiency must be high and should be tested at final location by a certified air quality inspector to ensure capability to recirculate the air in the building.
- The wet unit should be as close to the dust generation as possible.
- No after-filters are allowed (for aluminum, magnesium, or titanium).
- Mix the sludge with dry clay (kitty litter) to make sure it is safe, i.e., to prevent it from overheating and giving off hydrogen.

Dry Dust Collectors -- Special Instructions:

- The collector must be located outside the building.
- The collector must have explosive venting, barriers and warning signs regarding using the collector for Aluminum only and a warning about the contents being explosive dust.
- Portable collectors must be limited to one pound of dust.
- Do not mix any other metals with aluminum in a dry collector or in any ducting.
- The filter media must be grounded.

- The blower must be on the clean side of the filter.
- No electrostatic collectors are permitted.
- Water condensation must be prevented.
- There must be no accumulation of dust anywhere in the collector except for inside the dust receptacle.

(For added comments on safety considerations for Dry Dust Collectors, see the Annex A.6.3.2.5.2 below.)

4. What are the basic dangers?

The dangers involve the risk of fires and explosions. Here are a few real world examples:

- A dry downdraft table used for Aluminum finishing is set on fire when an employee sharpens a knife on lunch break.
- A young man is burned badly when he uses a bench grinder normally used for steel to grind away aluminum rivets.
- While sanding aluminum parts, a worker is badly injured when a small collector, with a steel blower wheel on the dirty side of the filter, explodes.

Other examples of potential dangers include:

- Aluminum and steel together burn very, very hot and are used in the military to melt away steel parts in the field. Mixing the two metals can be very dangerous.
- Steel parts or steel grating in the workplace where aluminum or magnesium grinding occurs provide a high risk of sparks.
- Common shop vacuum cleaners can be very dangerous due to the likelihood of creating an explosive fuel/air mixture in the vacuum hose and in the canister. The risk of explosion is high if a static charge spark occurs.

5. What is the most common practice in handling combustible dust?

Wet unit sales indicate a move in the industry to the wet dust collector for finishing applications for almost all aluminum, magnesium or titanium alloys. Recent improvements in the design of the wet unit provide even better reliability and a lower cost of operation. Wet dust collectors offer the kind of peace of mind that busy plant, safety and maintenance managers desire.

6. How do I test my dust?

Testing is not necessary in most cases. The dust deflagration index, or the K_{ST} value, is known to be in the highest category for these metals. Metal dusts that are produced in grinding and finishing operations tend to vary widely in particle size and in chemistry (the alloy and degree of oxidation) that affect volatility. Most operations are below the size that is considered flammable (420 microns) and the size that wet collectors are able to filter at high efficiency (greater than 5 microns). Most mechanical (not thermal) dust-generating operations produce particles above 10 microns. If a wet collector is used, it is the best available technology for safety with all of the dust variables.

Excerpt: Additional discussion on the use of Dry Dust Collectors for combustible dusts:

A.6.3.2.5.2 A high-efficiency cyclone-type collector presents fewer hazards than a bag- or media-type collector and, except for extremely fine powders, will usually operate with fairly high collection efficiency. Where cyclones are used, the exhaust fan discharges to atmosphere away from other operations. It should be recognized that there will be some instances in which a centrifugal-type collector can be followed by a fabric- or bag-type, or media-type collector or by a scrubber-type collector where particulate emissions are kept at a low level. The hazards of each collector should be recognized and protected against. In each instance, the fan will be the last element downstream in the system. Because of the extreme hazard involved with a bag- or media-type collector, consideration should be given to a multiple-series cyclone with a liquid final stage.

Industry experience has clearly demonstrated that an eventual explosion can be expected where a bag- or media-type collector is used to collect aluminum fines. Seldom, if ever, can the source of ignition be positively identified. In those unusual instances when it becomes necessary to collect very small fines for a specific commercial product, it is customary for the producer to employ a bag- or media-type collector. With the knowledge that strong explosive potential is present, the producer will locate the bag- or media-type collector a safe distance from buildings and personnel.

If a bag- or media-type collector is used, the shaking system or dust removal system can be such as to minimize sparking due to frictional contact or impact. Pneumatic- or pulse-type

cleaning is more desirable because no mechanical moving parts are involved in the dusty atmosphere. If the bags are provided with grounding wires, they can be positively grounded through a low-resistance path to ground. Where bags are used, it is customary that the baghouse be protected by an alarm to indicate excessive pressure drop across the bags. An excess air temperature alarm is also frequently employed. A bag- or media-type collector is customarily located at least 15 m (50 ft) from any other building or operation. It is not customary to permit personnel to be within 15 m (50 ft) of the collector during operation or when shaking bags. Explosion vents are usually built into the system, as described in NFPA 68, Guide for Venting of Deflagrations. Care is customarily exercised in locating the vents because of the possibility of blast damage to personnel or adjacent structures. We recommend backflow dampers in the duct work.

*Note: This is an informal industry discussion of NFPA 484 for the purpose of providing a practical understanding of its requirements and the helpfulness of wet dust collectors in meeting safety concerns. To confirm code requirements and enforcement for your facility, please refer questions to your local Fire Marshal and/or contact OSHA or the NFPA. A copy of NFPA 484 may be purchased through the NFPA or viewed as a read-only online version by submitting your profile information at: nfp.org

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PLC ADDENDUM

Programmable Logic Controller

History: In the fall of 2012, Clean Air Consultants implemented the use of programmable logic controllers on most of its units. This was done to improve performance and simplify the control wiring as units become more complex and code requirements mandate specific behavior.

At the time of the implementation, the user interface with the PLC was minimal since the PLC was primarily used to replace the 24 hour time clock and the pulse board on the dry units. On the wet collectors, it was implemented to control the water level and other sequencing necessities. From the user's point of view, the unit still had a start and stop button and would occasionally get into a clean cycle.

This architecture of having the PLC be subject to the analog architecture created some nuanced characteristics that led to requests from the end user to improve. With the power of the PLC not fully utilized and the analogue architecture holding onto the past, Clean Air Consultants rolled out a new control scheme that fully utilized the power of the PLC. As of April, 2013, the PLC is now the highest priority controlling element and at the top of the control scheme and barring a specific request for a unit to be built "AS PREVIOUS" or old school, all new shipments should be delivered with the PLC control scheme.

Synopsis: The purpose of this Addendum is to give quick and clear direction when setting up or interfacing with the PLC.

Early Program Operational Actions: 10/2012 – 3/2013

Clean cycle over-rules Start Button.

Reset the Program: Press and Hold the Stop Button for 3 seconds.

Lock Out the Clean Cycle: Press and Release the Stop Button 2-3 times. Allows unit operation during a timed clean.

Un-Lock Out the Clean Cycle: Press and Release the Stop Button once more.

History of the PLC part II: 4/2013 – 3/2014

Start Button over-rules Clean cycle.

Reset the Program: Press and Hold the Stop Button for 3 seconds. May see "RESET RESET RESET" on the screen.

Reset the Program on Wet Spark Trap: The Wet Spark Trap does not have a Start/Stop button but an On/Off toggle switch. Cycle the On/Off switch from current position to alternate position 3 times in 3 seconds. May see "RESET RESET RESET" on the screen.

Manual Clean Switch: If the unit is ordered with a manual clean switch, it will be a timed manual clean switch in case the switch is accidentally left on. It is field adjustable. Default is 5 minutes.

Getting into the Program

Instructions:

Make sure the power is on and the program is running. The screen should be lit and it should display the program description on the first line.

IF THE FIRST LINE HAS A WORD
LIKE 'ALRM' IN IT, DO NOT PANIC,
THAT IS THE PROGRAM
DESCRIPTION AND NOT A
CONDITION OF THE UNIT!

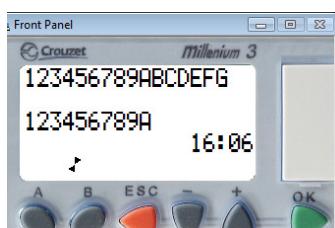


For example, this is a program for a Hydrotron with High and Low level water alarm. The second screed shot is of a Dry unit with a Variable Frequency drive.

If you had
an actual Alarm State, the screen would like similar to the examples below.



IF IT LOOKS LIKE THIS, THE PROGRAM IS NOT RUNNING!



Press the **ESC** and **OK** buttons at the same time. This will get you into the set-up menu.

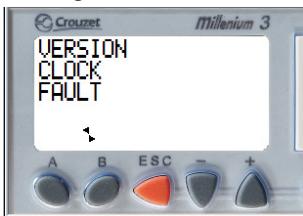
You can start or stop the program running here.



Setting the Clock:

Under Miscellaneous, verify the clock is correct. While the clock may have been set at the factory, it will not keep time during the shipping and power outages nor will it know what time zone it is in which it wakes.

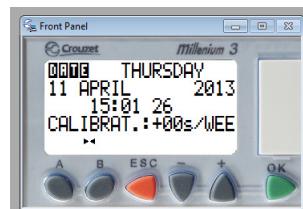
1. Use "UP+" / "DOWN-" to scroll to highlight Miscellaneous
2. Press OK
3. Use "UP+" / "DOWN-" to scroll to highlight CLOCK
4. Press OK
5. Use "UP+" / "DOWN-" to scroll to highlight DATE/HOUR SETUP
6. Press OK
7. Use "UP+" / "DOWN-" to scroll to highlight DAY of Month
8. Press OK
9. Use "UP+" / "DOWN-" to scroll set correct number
10. Press OK
11. Use "UP+" / "DOWN-" to scroll to highlight Month
12. Press OK
13. Use "UP+" / "DOWN-" to scroll set correct Month
14. Press OK
15. Use "UP+" / "DOWN-" to scroll to highlight Year
16. Press OK
17. Use "UP+" / "DOWN-" to scroll set correct Year
18. Press OK
19. Use "UP+" / "DOWN-" to scroll to highlight Hour (24 Hour Format)
20. Press OK
21. Use "UP+" / "DOWN-" to scroll set correct Hour (24 Hour Format)
22. Press OK
23. Use "UP+" / "DOWN-" to scroll to highlight Minute
24. Press OK
25. Use "UP+" / "DOWN-" to scroll set correct Minute
26. Press OK
27. Press Escape to be back to Home Screen. Make sure you leave the program running.
- 28.



CLOCK



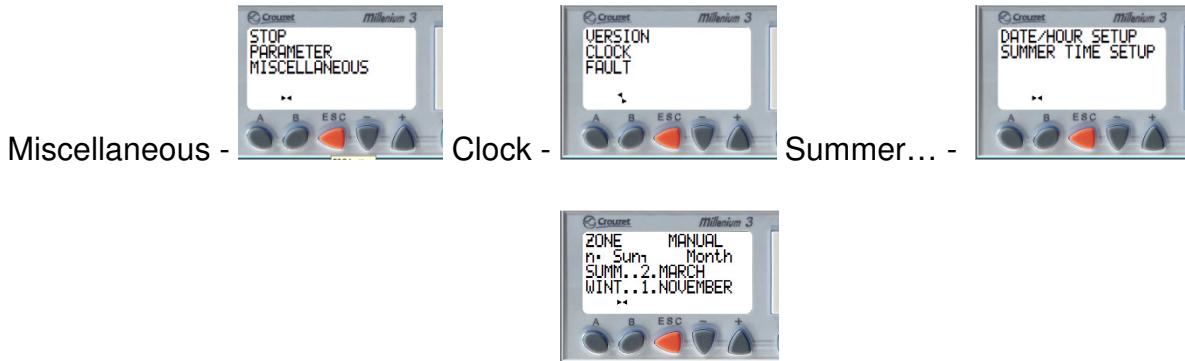
DATE/HOUR



SET FIELDS

Daylight Savings Time:

If you wish to turn on the Daylight Savings Time, it is accessible in the following menus. Follow the protocol demonstrated above of highlight and OK.



In this screen, you will have the choice in “ZONE”. The selection is USA, EUROPE, MANUAL or DISABLE. Choose ‘MANUAL’

Daylight Savings is always on Sunday. Currently in the USA, Daylight Savings Time begins on the second Sunday in March and ends on the first Sunday in November. Set the fields appropriately.

Escape out to the root menu and make sure the program is running and your effort is complete.

Changing a Program Time Sequence:

If you wish to change or set the 24 hour clock cleaning times or the length of the auto off-line time you may do so by selecting the Parameters choice in the root menu.

Follow the protocol demonstrated above of highlight and OK.



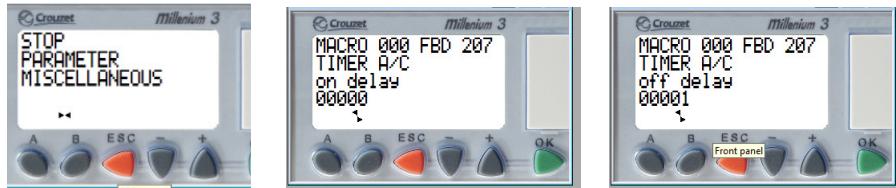
FBD096 IS THE 24 HOUR CLOCK CLEANING TIMES

Under parameters, you can set the start and stop times for 4 cleaning cycles during the day. You may also set the days of the week. This is 096 under parameters.

- ix. N00 – START TIME
- x. N01 – STOP TIME
- xi. N02 – START TIME
- xii. N03 – STOP TIME
- xiii. N04 – START TIME
- xiv. N05 – STOP TIME
- xv. N06 – START TIME
- xvi. N07 – STOP TIME

You will notice that from the factory, all the times are between midnight and 1:00 AM. As part of your set-up, you should determine if you want your unit to go into clean at break, lunch, dinner or midnight.

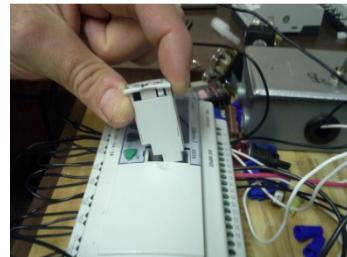
FBD207 IS THE AUTO OFF-LINE CLEANING TIME. (DELAY OFF TIME IN SECONDS)



- i. Highlight FBD 096
- ii. Press OK
- iii. Scroll to FBD 207
- iv. Press OK
- v. Highlight "on delay"
- vi. Press OK
- vii. Scroll to "off delay"
- viii. Press OK
- ix. Highlight Seconds Field
- x. Press OK
- xi. Press and Hold the up button until you get to the desired off cycle clean time. (There is usually a 90 second wind down of the blower and then each valve takes about 22 seconds.) Example: A 9 Valve unit takes 288 seconds to make 1 pass. 5 minutes is 300 seconds.
- xii. Press OK

Uploading a Program Sent From the Factory via Chip:

If you have received a chip from the factory and need to upload that program from the chip to the PLC, you may do so by selecting the Memory choice in the root menu.
Insert memory chip.



Follow the protocol demonstrated above to highlight Memory Card and press OK.



Highlight Restore and hit OK.



It will take about a minute. The screen will go dark as it times out.

When done it will say hit OK. Escape out to the root menu. Make sure you hit RUN to start the program. The screen should return to a normal operation format as described early in this appendix.

CURRENT PRODUCTION: 3/2014 to Present

DRY DUST COLLECTORS

As of March of 2014, all dry units should be shipped with a program designated by the letters UNGD in the title. This is the most developed and polished program to date. Some of the features are:

- When the 24 hour clock cleaning times are set, the unit will go into these cleaning periods regardless of the operational status of the unit, running or idle.
- If the unit is running and it goes into a 24 hour timed clean, it can be over-ridden by hitting the start button. This will initiate a 10 minute over-ride of the cleaning cycle.
- If it is desired to over-ride all cleaning cycles and initiated cleaning functions, press 'A' on the PLC and all cleans will be locked out indefinitely. Press 'A' again to release the lockout of all cleans.

CAUTION: NOT CLEANING YOUR CARTRIDGES REGULARLY OR AS REQUIRED CAN RESULT IN SHORTENED CARTRIDGE LIFE AND REDUCED DUST COLLECTION PERFORMANCE OF YOUR APPLIANCE.

WET DUST COLLECTORS

As of March of 2014, all wet units should be shipped with a program designated by the letters APFN2 in the title. This is the most developed and polished program to date. Some of the features are:

- If the unit is a SHUT DOWN NFPA unit, and there is a need to trouble-shoot the unit, Pressing 'A' once will put the unit into TEST MODE FOR 10 minutes and the unit will not shut down due to high or low pressure switches sensing water conditions. Pressing 'A' a second time will release the TEST MODE.

CAUTION: DO NOT USE THE UNIT TO COLLECT DUST IN TEST MODE. THIS WILL NOT MEET NFPA CRITERIA AND YOU WILL PUT YOUR EMPLOYEES AND FACILITIES AT RISK!

- If the unit is equipped with a CONVEYOR, the unit will have a manual switch on the control box door. The two options for this switch are Off and Auto.
 - a. If the switch is Off, then no power is delivered to the motor starter coil for the conveyor.
 - b. If the switch is set for Auto, then the conveyor will operate according to the timings set internally to the PLC. These are field adjustable.
 - c. For Conveyor troubleshooting purposes, turn the conveyor switch to auto and then the conveyor can be operated continuously by pressing the 'B' button once on the PLC. Press 'B' again to return the conveyor to Auto mode.
 - d. If it is desirable to disable the conveyor at the software level, the parameter B172 to '0' and the conveyor will not respond to automatic timers.

CAUTION: NOT CLEANING YOUR UNIT REGULARLY OR AS REQUIRED CAN RESULT IN POOR PERFORMANCE, SHORTENED UNIT LIFE AND / OR A VOIDED WARRANTY.

Typical Descriptors of Field Adjustable Components of the PLC

Item	Parameter	Description
1	MACRO 000 FBD207	Off-Line Clean Timer. Increase or decrease the number of DELAY OFF seconds the unit will clean after being turned off.
2	MACRO 000 FBD112	Off-line Clean Toggle - set VALUE to '1' to activate off line timed clean. Set VALUE to '0' to deactivate.
3	MACRO 000 FBD113	On-line Clean Toggle - set VALUE to '1' to activate off line timed clean. Set VALUE to '0' to deactivate. Unit will clean continuously as long as it is running and up to full speed.
4	MACRO 000 FBD119	Manual Clean Timer. - If the unit is equipped with a manual clean button, this timer keeps the unit cleaning for a set duration. Manual clean can only be activated when the unit is idle.
5	MACRO 000 FBD140	Timed over-ride of 24 hour timer initiated clean. Whether the unit is running or idle, if the 24 hour clock comes upon an event that calls for cleaning, this cleaning cycle can be interrupted by pressing the start button on the dust collector. This parameter controls the amount of time that the unit will run during this over-ride. Delay Off.
5	MACRO 000 FBD096	24 HOUR CLOCK - has 8 events which number N0-N7. Each of these can be set as an ON event or an OFF event. They can be set anytime 24 hours a day and 7 days a week. CAUTION: Try to start and stop all events in the same 24 hour day. Starting an event pre-midnight on a Friday night and not ending that event pre-midnight Friday night may cause the cleaning cycle to run over the weekend if the events are only set for Mon - Fri. The next off event seen by the 24 hour clock will not occur until after midnight Monday morning.
6	MACRO 004 FBD008, FBD023, FBD031, FBD052, FBD059, FBD066, FBD073, FBD080, FBD087, FBD094, FBD101, FBD121, FBD128, FBD135, FBD142	These (14) timers, under MACRO 004, control the time between the cleaning pulses. Factory set to 20 seconds, they can be changed in the parameters section to increase or decrease the time to respond to the quality and supply of compressed air at each unique factory. If your unit has 7 cleaning valves, only the first (7) timers will affect any changes to the operation of your unit. Unused timers are inactive.

See specific adjustments for each style of unit below. If the unit is not listed, there is not field adjustment available.

Dry Unit Motor Start

Block	Function	Block Num	Parameters	Save on pov	Authoriz	Comment
 TIME PROG	Daily, weekly and yearly prog	B96	Double click to see the parameters	--	Yes	24 HR CLOCK
 TIMER A+C	Timer A-C	B207	On time : 0H 0M 0S Off time : 0H 5M 0S	No	Yes	OFF LINE CLEAN TIMER
 NUM	Numerical constant	B112	Value of the constant : 0	--	Yes	OFF LINE CLN '1' TO ACTIVATE
 NUM	Numerical constant	B113	Value of the constant : 0	--	Yes	ON LINE CLN '1' TO ACTIVATE
 TIMER A+C	Timer A-C	B119	On time : 0H 0M 0S Off time : 0H 7M 0S	No	Yes	MANUAL CLN TIMER
 TIMER A+C	Timer A-C	B140	On time : 0H 0M 0S Off time : 0H 10M 0S	No	Yes	OVER-RIDE CLEAN WITH STRT TIMER
 TIMER A+C	Timer A-C	M04B00	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 1
 TIMER A+C	Timer A-C	M04B08	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 2
 TIMER A+C	Timer A-C	M04B23	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 16
 TIMER A+C	Timer A-C	M04B31	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 3
 TIMER A+C	Timer A-C	M04B52	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 4
 TIMER A+C	Timer A-C	M04B59	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 5
 TIMER A+C	Timer A-C	M04B66	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 6
 TIMER A+C	Timer A-C	M04B73	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 7
 TIMER A+C	Timer A-C	M04B80	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 8
 TIMER A+C	Timer A-C	M04B87	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 9
 TIMER A+C	Timer A-C	M04B94	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 10
 TIMER A+C	Timer A-C	M04B101	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 11
 TIMER A+C	Timer A-C	M04B121	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 12
 TIMER A+C	Timer A-C	M04B128	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 13
 TIMER A+C	Timer A-C	M04B135	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 14
 TIMER A+C	Timer A-C	M04B142	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 15

Dry Unit Variable Frequency Drive

Block	Function	Block Num	Parameters	Save on power	Authoriz	Comment
 TIME PROG	Daily, weekly and yearly prog	B96	Double click to see the parameters	---	Yes	24 HOUR CLK
 TIMER A-C	Timer A-C	B207	On time : 0H 0M 0S Off time : 0H 0M 1S	No	Yes	OFF LINE CLEAN TIMER
 NUM	Numerical constant	B112	Value of the constant : 0	---	Yes	OFF LINE CLN '1' TO ACTIVATE
 NUM	Numerical constant	B113	Value of the constant : 0	---	Yes	ON LINE CLN '1' TO ACTIVATE
 TIMER A-C	Timer A-C	B119	On time : 0H 0M 0S Off time : 0H 7M 0S	No	Yes	MANUAL CLEAN TIMER
 TIMER A-C	Timer A-C	B140	On time : 0H 0M 0S Off time : 0H 10M 0S	No	Yes	OVER-RIDE CLEAN WITH START TIMER
 TIMER A-C	Timer A-C	M04B00	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 1
 TIMER A-C	Timer A-C	M04B08	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 2
 TIMER A-C	Timer A-C	M04B23	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 16
 TIMER A-C	Timer A-C	M04B31	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 3
 TIMER A-C	Timer A-C	M04B52	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 4
 TIMER A-C	Timer A-C	M04B59	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 5
 TIMER A-C	Timer A-C	M04B66	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 6
 TIMER A-C	Timer A-C	M04B73	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 7
 TIMER A-C	Timer A-C	M04B80	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 8
 TIMER A-C	Timer A-C	M04B87	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 9
 TIMER A-C	Timer A-C	M04B94	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 10
 TIMER A-C	Timer A-C	M04B101	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 11
 TIMER A-C	Timer A-C	M04B121	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 12
 TIMER A-C	Timer A-C	M04B128	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 13
 TIMER A-C	Timer A-C	M04B135	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 14
 TIMER A-C	Timer A-C	M04B142	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	VLV 15

Blow Off Booth (BOB)

Block	Function	Block Num	Parameters	Save on power fail	Authoriz	Comment
 TIME PROG	Daily, weekly and yearly prog	B96	Double click to see the parameters	---	Yes	24 HOUR CLOCK
 TIMER A-C	Timer A-C	B207	On time : 0H 0M 0S Off time : 0H 2M 0S	No	Yes	OFF LINE CLEAN TIMER
 TIMER A-C	Timer A-C	B82	On time : 0H 5M 0S Off time : 0H 0M 0S	No	Yes	MIN RUN TIME OPERATION
 TIMER A-C	Timer A-C	B105	On time : 0H 0M 0S Off time : 0H 5M 0S	No	Yes	MANUAL CLEAN TIMER
 NUM	Numerical constant	B156	Value of the constant : 0	---	Yes	OFF LINE CLEAN '1' TO ACTIVATE
 NUM	Numerical constant	B158	Value of the constant : 0	---	Yes	DOOR SWITCH RESETS TIMER '1' TO ACTIVATE
 TIMER A-C	Timer A-C	M01B23	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	TIME BETWEEN CLEAN EVENT
 TIMER A-C	Timer A-C	M01B53	On time : 0H 0M 20S Off time : 0H 0M 0S	No	Yes	TIME BETWEEN CLEAN EVENT

WET COLLECTORS

Hydrotron Shut Down NFPA Program with Conveyor

Block	Function	Block Num	Parameters	Save on power failure	Authoriz	Comment
 NUM	Numerical constant	B172	Value of the constant : 0	---	Yes	CONVEYOR SET '1' TO TURN ON FEATURE
 TIMER A-C	Timer A-C	M21B08	On time : 0H 0M 0S Off time : 0H 30M 0S	No	Yes	CONVEYOR OFF CLEAN
 TIMER A-C	Cyclic timing	M21B09	On time : 0H 8M 0S Off time : 0H 8M 0S Function L1 - Continuous flashing	No	Yes	CONVEYOR CYCLE CLEAN

RESPONSIBILITY STATEMENT

Filter-1 dust collection products are manufactured, sold and delivered to our end users for a wide variety of dust producing applications by Clean Air Consultants and our distributors. It is the position of Filter-1 that our units do not cause fires or explosions; rather operational conditions caused by the manufacturing process being ventilated does. Herein we wish to list our responsibilities and those of our equipment owners as well.

At Filter-1, we feel it is our responsibility to provide our end users with up to date designs of dust collection equipment specifically designed for the dust producing process requiring ventilation. Filter-1 dust collection products can be provided with many safety options regarding operating conditions caused by upsets in the ventilation and dust collection process. During the proposal process, we must work together with the owner/end user, to enable the collection systems to be provided with the proper safety equipment. We provide a wide array of options specifically designed to be included in the manufacture of dust collection systems where hazards exist or might be caused by the process, operational errors or lack of maintenance.

At Filter-1, we feel it is the responsibility of our customers and end users to provide us with proper system application information to provide the best equipment for the application. We further ask that as system operators you realize that there are many situations that can arise that we, as equipment manufacturers, cannot control and therefore it is your responsibility. Some of these are duct design, equipment location and specific quantitative representation of general dust loading of our equipment. We also feel it is your responsibility as the owner or end user, to be aware of codes, regulations and standards applicable to your system and that you as owners see these are followed. Therefore, Filter-1 assumes no liability for the fitness of any of its products—with respect to fire and explosions—for a particular installation or application.

This statement of responsibility is to be included with all quotations and proposals generated by **CLEAN AIR CONSULTANTS** and or its authorized distributors. By accepting any of our quotations you thereby accept our responsibility statement.

WARRANTY CONDITIONS

In order for the warranty to apply to this piece of equipment, the operator must follow one of the two procedures outlined below:

1. Drain all of the water and clean out the sludge once a month, or;
2. Measure the ph of the water every 2 weeks and apply appropriate controls (i.e.: bromine) to keep water ph between 6.5 and 8. Consult a local water treatment expert. Do not add chlorine, bleach, antifreeze, or other products that are very corrosive and / or harmful as they may evaporate when the air is pulled through the system.
3. Water needs to be drained and sludge cleaned out a maximum of every 90 days.

It must be recognized that **FILTER-1** cannot control how much or what is deposited in the Hydrotron; therefore the operator must take responsibility for cleaning, servicing and draining the unit. Litmus paper will be furnished with each Hydrotron for measuring ph. Any warranty claim must include a documented signed-off record of the PH measurements made. For your convenience, a Maintenance Log is included in this manual.

ODOR: Draining and cleaning should be done regularly as discussed in the maintenance section. Fungus and bacteria can get in water and create a foul smell. If odor becomes a problem, the treatment should be according to what is producing the odor; which are treatable with compounds. These compounds must not take the ph outside of the 6.5 to 8 ph range. It is better to use bromine rather than chlorine. Do not add chlorine, bleach, antifreeze, or other products that are very corrosive and/or harmful as they may evaporate when the air is pulled through the system.

LIMITED WARRANTY

Filter-1 warrants to the original purchaser that the major structural components of the goods will be free from defects in materials and workmanship for 10 years from the date of shipment, if properly installed, maintained and operated under normal conditions. (See "Warranty Conditions" on previous page.) Filter-1 warrants all components and accessories including air locks, fans, conveyers, motors, etc., for 12 months from date of shipment. Filter-1 does not warrant against damages due to corrosion, abrasion, normal wear and tear, product modification, or product misapplication.

After Filter-1 has been given adequate opportunity to remedy any defects in material or workmanship, Filter-1 retains the sole option to accept return of the goods, with freight paid by the purchaser, and to refund the purchase price for the goods after the goods are returned undamaged and in usable condition. Such a refund will be the full extent of Filter-1's liability. Filter-1 should not be liable for any other costs, expenses or damages whether direct, indirect, special, incidental, consequential or otherwise.

The terms of this warranty may be modified only by a special warranty document signed by Frank Watson. Failure to use factory replacement parts including filters may void this warranty.

