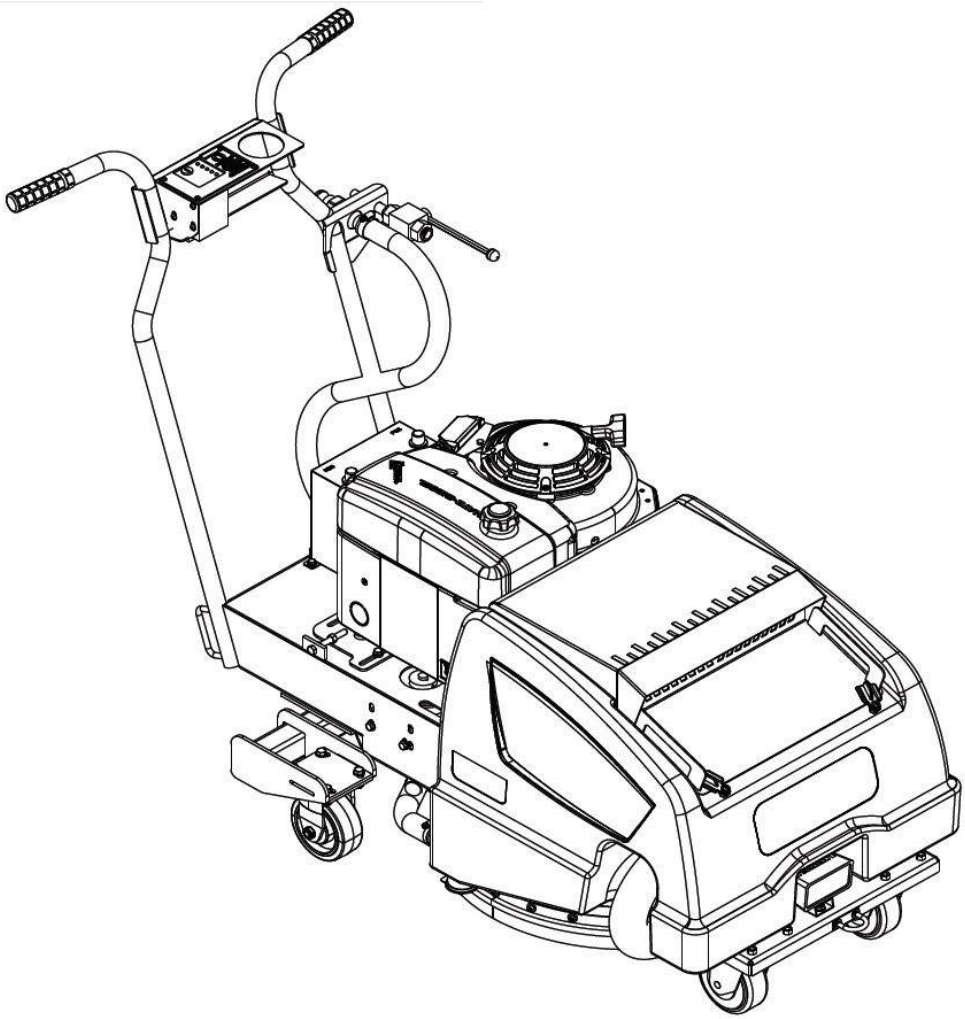
Bortek® INDUSTRIES, INC.

FIRST IN POWER CLEANING EQUIPMENT®



Cyclone CY210 Diesel

SERVICE MANUAL

20018550002 2.13.2018

Table of Contents

I. INTRODUCTION

SERVICE MANUAL PURPOSE

This manual is a technical resource that Cyclone Technology provides for servicing a CY210. If while servicing, you experience technical difficulties a call to Cyclone Technology technical support may be needed to alert the factory to potential issues and/or provide the customer with an acceptable level of service. Contact Cyclone Technology Technical Support at 1-800-335-9695 or info@cycloneclean.

GENERAL MACHINE DESCRIPTION

The CY210 is an industrial hard surface cleaning machine, it uses 8 turbine blades and dual spray tips for deep cleaning and instant recovery. The CY210 can be used in conjunction with a TR5000, TR5500, CY5500, CY5000, CY5500SK or any pressure washing system with pressures up to 5000psi. In addition, the CY210 can be used with heated water up 160˚F.

WARNING!

The CY210 uses a combination of high pressure water and heat, to achieve a deep, long lasting clean. To avoid premature wear of critical components, such as the pressure pump and water recycling system, the CY210 should never be used in combination with any acids, alkalines, or abrasive fluids. The use of acids, alkalines, or abrasive fluids within the CY210 may result in permanent damage to critical components and could void the manufacturer's warranty. Before introducing any chemicals to the CY210 contact your local Cyclone Technology authorized dealer for further information.

PARTS AND SERVICE

Repairs should be performed by an Authorized Cyclone Technology Service Center that employs factory-trained service personnel and maintains an inventory of Cyclone Technology original replacement parts and accessories.

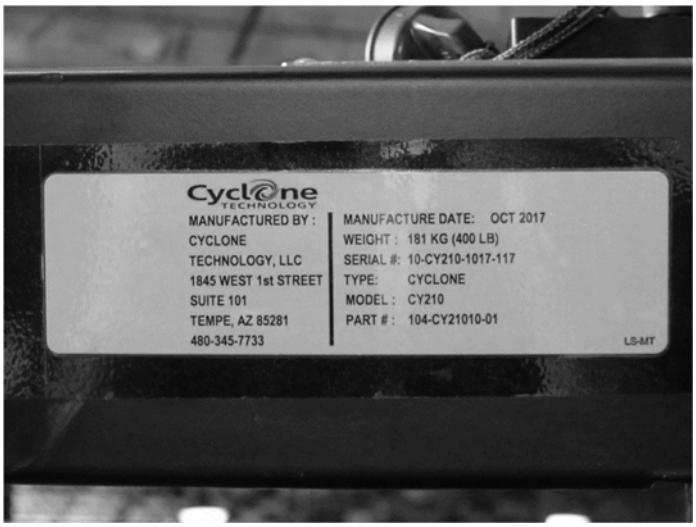
II. UNIT IDENTIFICATION

The Model Number and Serial Number of the machine are shown on the nameplate, see pictures below.

Copy the model number as well as the serial number in the provided space to reference when ordering parts through Cyclone Technology Technical Support.

CY210 SERIAL NUMBER _____

This information is required when ordering repair parts for the machine or contacting Cyclone Technology Technical Support.



III. GENERAL INFORMATION

RECEIVING THE MACHINE

Upon receiving the machine inspect the machine and all components for damages caused by transit. If damage has occurred, please contact Cyclone Technology customer service department.

GENERAL SAFETY INSTRUCTIONS

Specific Cautions and Warnings are included to warn you of potential danger of machine damage or bodily harm.

READ ALL INSTRUCTIONS BEFORE SERVICING

It is important that all instructions are read and understood to ensure not only the longevity of your CY210 but also to ensure your own safety when servicing your machine.

CAUTION AND WARNING SYMBOLS

Cyclone Technology uses the symbols below to signal potentially dangerous conditions. Always read this information carefully and take the necessary steps to protect personnel and property.

DANGER!

THIS SYMBOL IS USED TO WARN OF IMMEDIATE HAZARDS THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.

- This machine emits exhaust gases (carbon monoxide) that can cause serious injury or death; always provide adequate ventilation when using machine.

WARNING!

THIS SYMBOL IS USED TO CALL ATTENTION TO A SITUATION THAT COULD CAUSE SEVERE PERSONAL INJURY.

- This machine shall be used only by properly trained and authorized persons.
- High speed operation is designed only for use on level surfaces.
- Turn the key switch off (O) and disconnect the batteries before servicing electrical components.
- Never work under a machine without safety blocks or stands to support the machine.
- Do not dispense flammable cleaning agents, operate the machine on or near these agents, or operate in areas where flammable liquids exist.
- Ear plugs or other hearing protection devices are mandatory to avoid hearing damage or loss.

CAUTION!

THIS SYMBOL IS USED TO CALL ATTENTION TO A SITUTION THAT COULD CAUSE MINOR PERSONAL INJURY OR DAMAGE TO THE MACHINE OR OTHER PROPERTY.

- This machine is only approved for hard surface use.
- When operating this machine, ensure that third parties are not endangered.
- Before performing any service function, carefully read all instructions pertaining to that function.
- Do not leave the machine unattended without first turning the key switch off (O), removing the key and chocking the wheels.
- Turn the key switch off (O) and remove the key before opening the electrical control box.
- Take precautions to prevent hair, jewelry, or loose clothing from becoming caught in moving parts.
- Before use, all hoses and drain plugs must be secure.

NOTES:

- Pay attention to all decals and labels on this machine.
- If you have any questions, contact your supervisor or your local Cyclone Technology Dealer.
- Should your machine malfunction, do not attempt to correct the problem without proper authorization. Only a trained company mechanic or an authorized Cyclone Technology dealer service person shall make repairs to this equipment.
- Reference the separately provided engine manufacturer's maintenance and operator manuals for more detailed engine specification and service data.

IV. SAFETY RECOMENDATIONS

STANDARD PRACTICES AND PROCEDURES

This information was prepared to aid in the identification of potentially unsafe conditions when using high-pressure washing equipment. These practices describe how to use high-pressure water jets for cleaning hard surfaces. These practices do NOT replace the training necessary to operate and maintain high-pressure water jet systems. It should be noted that other potential hazards might exist which have not been mentioned in this manual.

BEFORE OPERATING EQUIPMENT

Before operation of this equipment, it is important that you read the Operator's/ Owner's Manual for each of the component parts installed in your machine. It is especially important to read and understand the safety information included in the manuals. Failure to do so could result in damage to the equipment, serious injury or death to the operator and may void all warranties associated with this equipment.

WARNING!

This equipment has:
MOVING PARTS at HIGH RATES OF SPEED
VERY HOT WATER
HIGH PRESSURE WATER
DIESEL FUEL
PINCH POINTS

In all cases, Cyclone Technology products are sold with the understanding that the purchaser agrees to THOROUGHLY TRAIN ALL OPERATING AND MAINTENANCE PERSONNEL IN THE CORRECT AND SAFE OPERATION AND MAINTENANCE OF THE CYCLONE SYSTEM.

Do NOT attempt to change Original Equipment Manufacturer (OEM) parts or equipment. Use of non-OEM parts could result in damage to the equipment, serious injury or death to the operator and may void all warranties associated with this equipment.

EQUIPMENT & CLOTHING

1. Ear plugs, or other hearing protection devices are mandatory. The engines, pumps, and Cyclone Cleaning Head all produce noise levels high enough to cause hearing damage or loss.
2. Leather gloves should always be worn during operation. The water heater components of the Cyclone system use 160°F water. High-pressure and return hoses and couplings can get hot enough to burn you.
3. Safety glasses should be worn when operating the Cyclone System.
4. Long pants are recommended when operating the Cyclone System.

STANDARD PRACTICES AND PROCEDURES

1. Never leave CY210 engine running unattended.
2. A strong vacuum is formed from the rotation of the Cyclone cleaning head. Therefore, all surface plates such as manhole covers, utility access covers and large debris must be secured, removed or avoided during the cleaning process.
3. All surfaces should be swept of loose debris prior to operating the CY210, hard surface cleaner, the CY210 is not designed to pick up particulates.

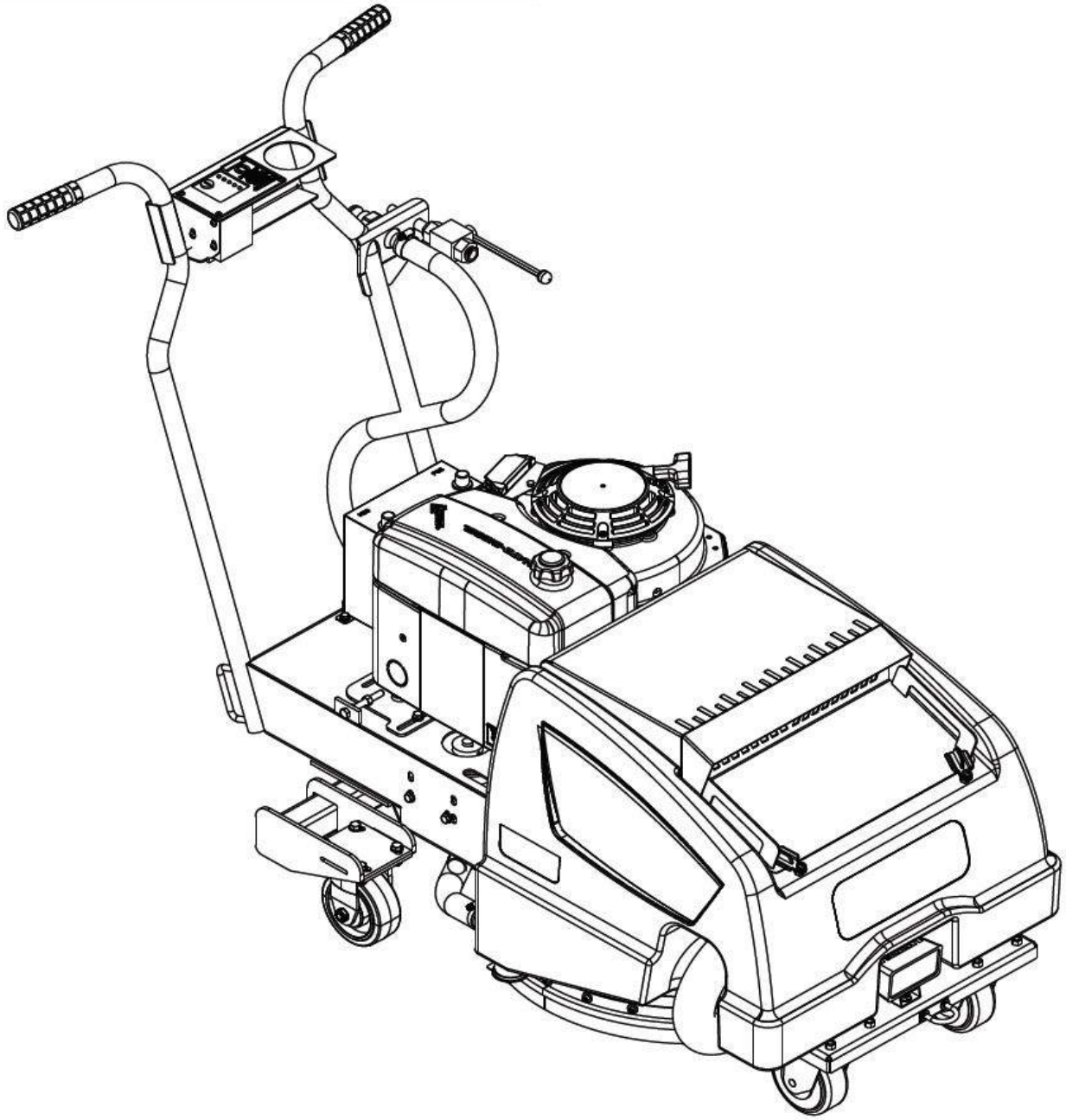
 WARNING!

These items could cause extensive and costly damage to the blades and spray bars and serious injury or death to the operator.

1. Always turn off the engine before fueling.
2. Never point the hand-held spray gun at yourself or another person. Water coming out of the gun is at a high enough pressure to cause injury or death.
3. This equipment should not be used without consulting all applicable standards, guidelines, or recommendations of the United States Occupational Safety and Health Administration (OSHA), the American Society of Testing Materials (ATSM), the National Standards Institute (ANSI), and the instructions, recommendations and standards of Cyclone Technology. Cyclone Technology does not guarantee that the practices and recommendations contained in this manual will prevent harm or injury, even when such equipment is properly used in conformity with the recommended practices. In the event of bodily injury, nothing in this manual should substitute for proper medical care.

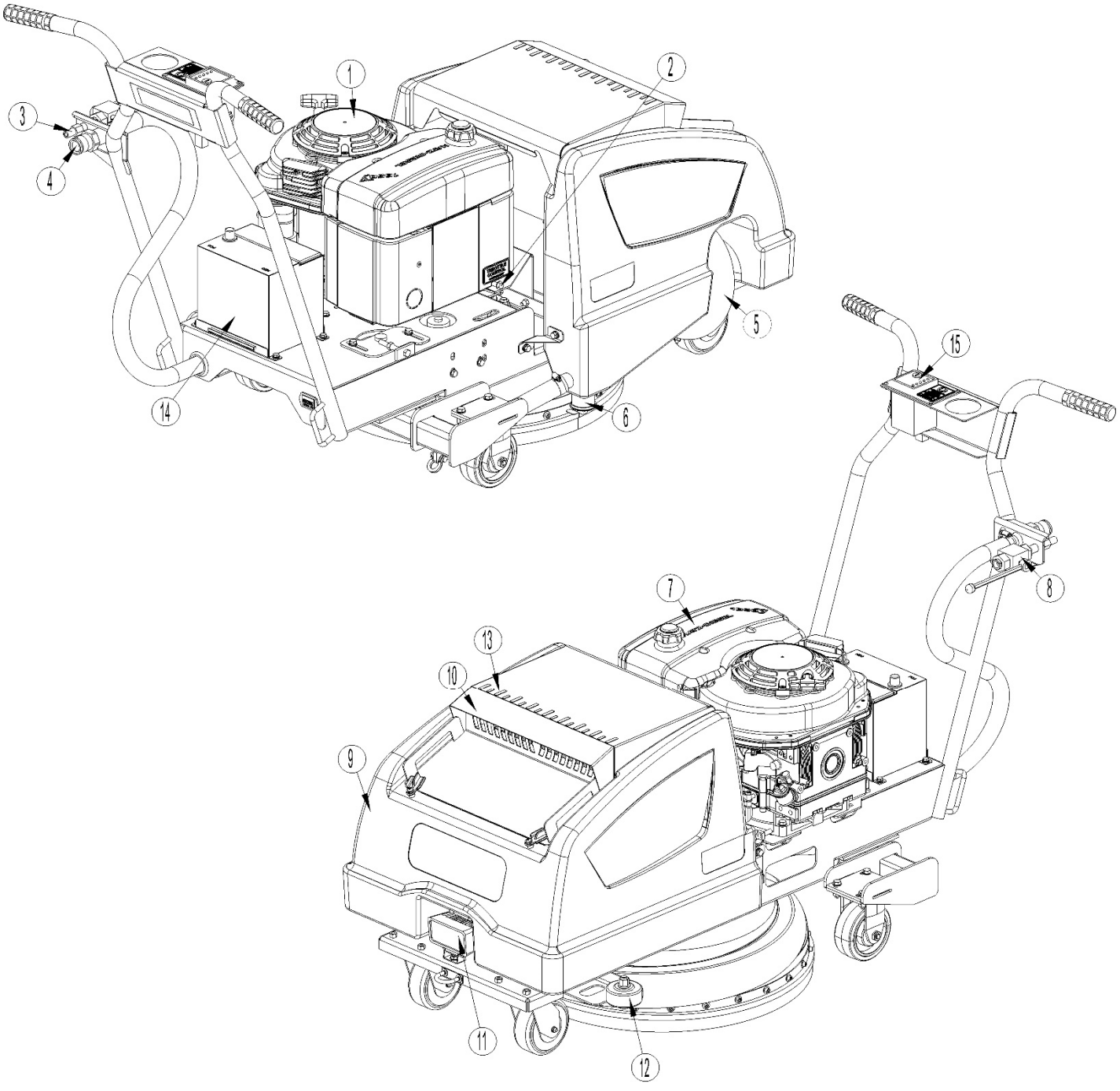
V. KNOW YOUR MACHINE

As you read through this manual, you will occasionally run across a bold number or letter in parenthesis, i.e. (2). These numbers refer to an item shown on these pages unless otherwise noted. Refer to these pages whenever necessary to pinpoint the location of an item mentioned in the text. NOTE: Refer to the service section of this manual for detailed explanations of each item illustrated on these pages.



i. CY210 WALK BEHIND CLEANING UNIT

1. Hatz 1B50V Diesel Engine
2. Throttle Control
3. High Pressure Input
4. Water Recovery Return Line
5. Recovery Port Tube
6. Recovery Tank Drain Plug
7. Fuel Tank
8. High Pressure Ball Valve
9. Recovery Tank
10. Large Debris Basket
11. Headlight
12. Cyclone Protective Roller
13. Path Aligning Decal
14. Battery
15. Engine Controls



VI. HATZ DIESEL ENGINE

i. Oil Recommendations

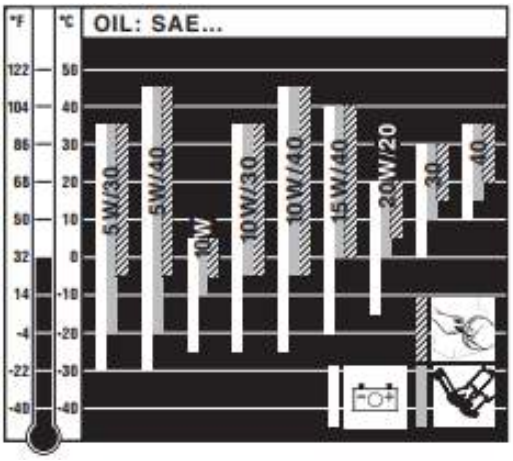
Using the proper type and weight of oil in the crankcase is extremely important. So is checking the oil daily and changing oil regularly. Failure to use the correct oil, or using dirty oil, causes premature engine wear and failure.

ii. Oil Type

Use high quality detergent oil of ACEA service class B2, E2, or higher or API (American Petroleum Institute) service class CD, CE, CF-4, CG-4, or higher.

Approximate engine oil capacity is 1.5 liters.

Select the viscosity based on the air temperature at the time of operation as shown in the following table.



iii. Fuel

For best results use only clean, fresh, diesel oils which satisfy the following specifications:

EN 590 or
BS 2869 A1/A2 or
ASTM D 975 -1D/2D

At temperatures below 0 °C, winter-grade fuel should be used or paraffin added to the fuel well in advance.

Lowest ambient temperature when starting, in °C	Paraffin content for:	
	Summer fuel	Winter fuel
0 up to −10	20 %	–
−10 up to −15	30 %	–
−15 up to −20	50 %	20 %
−20 up to −30	–	50 %

iv. Maintenance Schedule

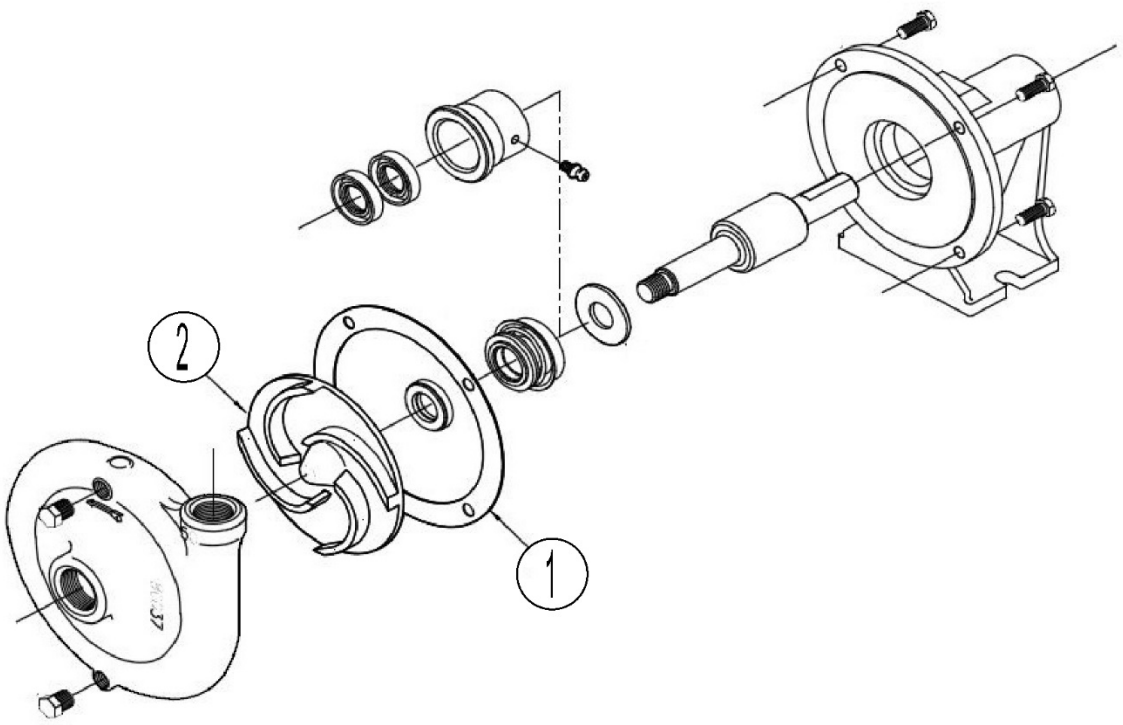
FREQUENCY	MAINTENANCE REQUIRED
Every 8-15 Hours	• Check oil level • Check combustion and cooling air intake zone • Check air cleaner maintenance indicator
Every 250 Hours	• Change engine oil • Check and adjust valve clearances • Clean cooling air area • Check screw connections • Clean mesh insert for exhaust
Every 500 Hours	• Change fuel filter element • Dry-type air cleaner maintenance
Every 1000 Hours	• Clean the oil filter
Once a year	• Siphon water out of fuel tank

v. Troubleshooting

Symptom	Possible Cause	Recommend Action
Engine does not start, or not immediately, but can be turned over easily as usual.	Speed control lever in stop or idle position. Engine shutdown pin in STOP position. No fuel in the injection pump. Insufficient compression: - Incorrect valve clearance. - Cylinders and/or piston rings worn. Injector not functioning.	Move lever to START position. Move to operating position by pulling the pin gently. Add fuel. Systematically check the entire fuel supply system: If still no fault found, - check engine feed line - check fuel filter Check valve clearances, adjust if necessary
Engine fires but does not run.	Speed control lever not moved far enough towards “START”. Equipment not disengaged. Fuel filter blocked	Move lever to “START” position. Disengage engine from equipment if possible. Renew fuel filter.
Starter motor does not operate, or engine does not turn over.	Fault in the electrical system: - Battery and/or other cables incorrectly connected up. - Cable connections loose and/or oxidized. - Battery faulty and/or flat. - Starter motor faulty. - Faulty relays, monitoring element.	Check electrical system and its component.
Engine cuts out of its own accord during operation	Fuel supply interrupted - Tank has run empty. - Fuel filter blocked. - Aeration outlet restricted at fuel tank seal. - Air in the fuel system.	Add fuel. Change fuel filter. Ensure adequate tank venting. Check fuel system for penetration of air. Check air vent valve.
Engine output and speed both drop.	Fuel supply interrupted: - Tank has run empty. - Fuel filter blocked. - Aeration outlet restricted at fuel tank seal. - Air in the fuel system. - Speed control lever does not	Add fuel. Change fuel filter. Provide adequate tank breathing. Check fuel system for penetration of air. Check air vent valve. Lock the lever into position.
Engine output and speed fall, black smoke from exhaust.	Air cleaner contaminated. Valve clearances incorrect. Injector not functioning.	Clean or renew the air cleaner. Adjust valve clearances.
Engine becomes very hot. Indicator lamp for cylinder temperature (optional extra) comes on.	Too much lubricating oil in engine. Inadequate cooling: - Contamination of entire cooling air zone. - Air duct panels not properly sealed.	Drain off lubricating oil as far as upper mark on dipstick. Clean cooling air zone. Check cooling air deflector plates and shafts for completeness and airtight seal.
Condensate outlet from exhaust box.	Operation over a longer period without load.	Run engine with a load of 70% until the exhaust box gets dry again.

VII. RETURN PUMP (Price Pump)

The CY210's standard return pump has the job of pumping out wastewater and debris out of the CY210's collection tank. This centrifugal pump is an integral component of a CY210 and keeping it operating correctly is vital to the machines' s cleaning effectiveness.



Item	Ref. No.	Qty.	Description
1	228-3100010-01	1	Gasket
2	266-0100001-01	1	Impeller

Repair Kits

A	116-4500034-01	Kit, Rebuild Price/Charge Pump
B	116-4500035-01	Kit, Rebuild w/ Impeller

i. Operation Common Issues and Maintenance

Operation

The CY210's standard return pump (Price pump) is powered by a belt driven off the main engine pulley. This belt is tensioned by the idler pulley assembly installed adjacent to the return pump. As water and debris are picked up by the Cyclone head and deposited in the CY210 recovery tank, it is gravity fed down into the return pump's inlet fitting. Once fed into the pump, the wastewater and debris are pumped out to the reclaim line fitting on the handlebar assembly.

Common Issues

The return pump operates at a continuous speed of approximately 4500 rpm. At speed, it is capable of pumping waste water and debris 200-300 ft away from the CY210. The most common factors that can hinder this performance include:

- loose drive belt
- clogged wastewater inlet fitting
- worn impeller vanes
- plugged breather line/breather line fitting
- plugged return line
- seized internal shaft bearings

If the CY210's return pump is not able to pump water out through the reclaim line and the possibility of plugged lines is ruled out, follow the subsequent information on the subject of disassembly and repair.

Routine Maintenance

Routine maintenance on the Price pump is limited to greasing the port on the center of the pump body. This port leads to the internal shaft seals that need greased approximately every 800-1000 hours. Only use 1-2 pumps out of a standard grease gun. Do not over grease this port as the shaft seals can be damaged, thereby letting water into the bearing cavity!

CAUTION!

Over greasing the shaft seal port can lead to premature return pump failure!

ii. Disassembly

1. Disconnect power source to motor.
2. Loosen coupling or remove belt to disconnect pump.
3. Remove pump to repair area.
4. Remove volute bolts and volute from pump.
5. Remove impeller. Unscrew CCW.
6. Remove bearing shaft from bracket. Remove bearing by pressing on threaded end of shaft in an arbor or hydraulic press.
7. Remove seal head from the bracket.

iii. Reassembly

1. Thoroughly clean seal cavity and bearing bore of the bracket.
2. Type 6A Seal Installation: Place bracket on firm surface with seat cavity (pump end) up. Using a tool (1 -19/64"ID x 1-5/8" OD x 1/2" deep), press seal into seal cavity with carbon face of seal (volute end up) up. Press until flange is seated in seal cavity of bracket. Press only on outer flange of seal. Avoid touching carbon surface.
3. Install the bearing shaft into bracket. Apply small amount of Loctite 609 (or equivalent) to grooves inside bearing bore. Install bearing by pressing on outer diameter of bearing in arbor or hydraulic press. Caution: Take care to not damage carbon face of seal during shaft installation.
4. Install seat: Apply small amount of light oil on the bearing shaft and I.D. of seat elastomer. Gently place seat on end of shaft with ceramic face down toward seal. After threading impeller onto shaft, seat will be properly located.
5. Place small amount of serviceable Loctite 222 (or equivalent) onto shaft threads.
6. Thread impeller onto shaft ensuring seat is aligned flush with shoulder of shaft and impeller hub. Tighten securely.
7. Install volute flange gasket, volute and volute bolts. Tighten volute bolts evenly to 7-9 Ft. Lbs.
8. Rotate pump shaft by hand to ensure impeller does not rub against volute.
9. Return pump to installation, reconnect electric connections.
10. Start pump momentarily to observe shaft rotation. If rotation corresponds to the rotation arrow, pump may be put into service. If rotation is incorrect, switch any two leads on 3 -phase motors. Check wiring diagram of motor for single phase rotation.
11. Remove top pipe plug (if applicable) from the front of volute and prime pump thoroughly, making sure all air is purged.
12. Start pump, allowing adequate time to purge all air from system. Observe any gauges, flow meters, etc. to verify pump performs properly.

iv. Idler Pulley Replacement

1. Remove the castellated nut holding on the idler pulley
2. Remove the idler pulley
3. Replace idler pulley and castellated nut

v. Belt Tensions

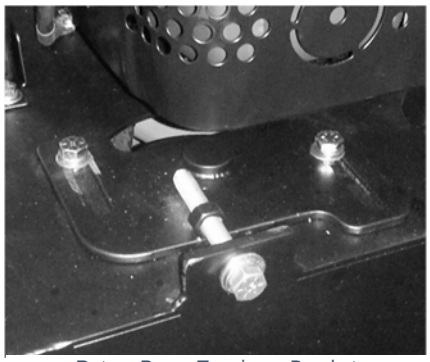
Belt tension and condition should be checked every 40 hours. Belt tensions should be checked using a frequency meter. Note that whenever tensioning both belts, set the tension on the spindle belt before setting the tension on the return pump belt.

Tensioning:

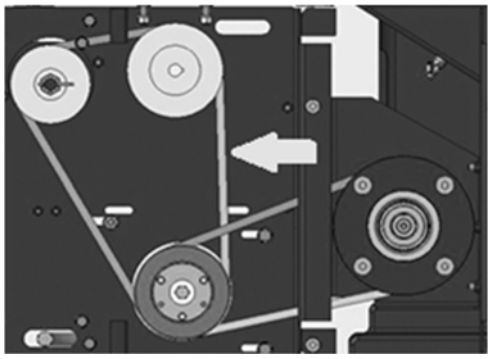
Spindle Belts: Loosen the engine mounting bolts. Using the engine tensioner bolts, increase or decrease the tension on the spindle belts to the figures listed in the table below. Tighten the engine mounting bolts and check the tension on the belts again to ensure that the initial tension setting has not been affected by tightening the engine bolts. Finish by setting the jam nut on the engine tensioner bolts.

Return Circuit: Loosen the bolts holding the tensioner plate down. Adjust the tensioner bolt to increase and decrease the tension on the return pump circuit to match the value shown in the table below. Make sure to take readings off the belt span shown in the picture below. Tighten down the tensioner bolts and check the belt frequency again to make sure it has not been affected.

Engine Tensioner Bolts



Return Pump Tensioner Bracket

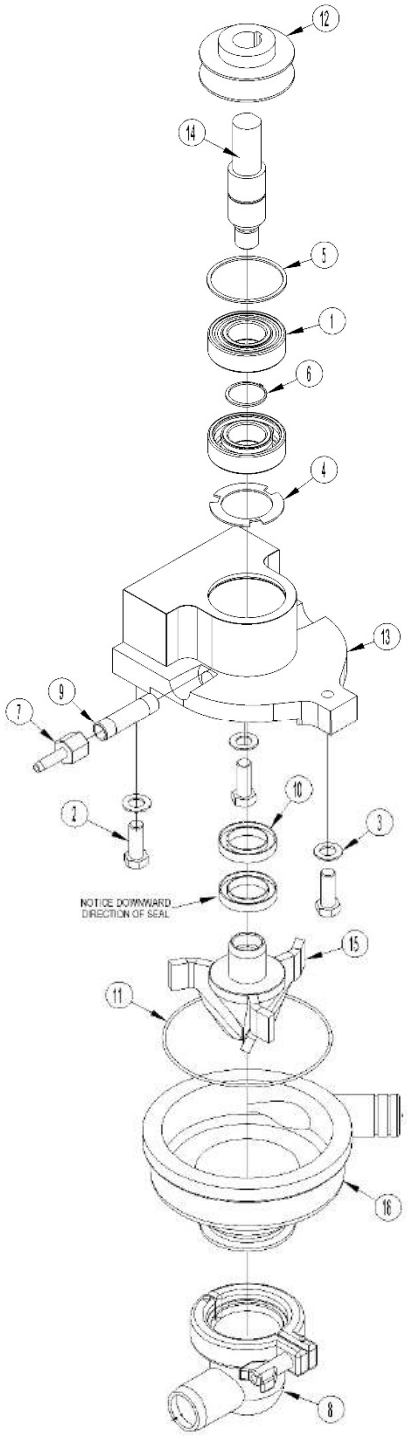


Return Pump Belt Span Measuring Location

	Frequency (Hz)	
	Broken In	New
Engine to Spindle	54	62
Spindle to Return Pump (Price)	48	55

VIII. MACERATOR PUMP

The CY210's macerator pump has the job of pumping out wastewater and debris out of the CY210's collection tank and is used as an upgrade to the CY210 in applications where the machine will be used in the presence of lots of surface solids. The macerator pump is an integral component of a CY210 and keeping it operating correctly is vital to the machines' s cleaning effectiveness.



Item	Ref. No.	Qty.	Description
1	202-0108013-01	2	Radial Ball Bearing
2	204-0101028-07	3	Bolt, 3/8-16 X 1.0", Cap, G8, Zinc
3	204-0603006-07	3	Washer, 3/8", Flat, Hardened, SAE, Zinc
4	204-0608002-01	1	Wave Washer
5	204-1600006-01	1	Spiral Ring Internal 2" Dia.
6	204-1600007-01	1	Snap Ring External
7	216-0101023-04	1	Fitting, St, 1/4 FPT, Barb
8	216-0229001-02	1	Fitting, 90, with Seal & Clamp
9	216-1000082-01	1	Fitting, Nipple, 1/4 X 2 SCH40
10	228-0100023-01	2	Oil Seal
11	228-0100029-01	1	O-Ring
12	236-0200025-01	1	Sheave 1 Groove 3/4" Bore
13	250-1000002-01	1	Bearing Housing Macerator Pump
14	264-0000007-01	1	Shaft Top Macerator Pump
15	264-0700007-01	1	Weldt, Center Impeller Shaft
16	501-0101086-05	1	Housing Secondary Machining

Rebuild Kits

A	116-0000027-01	Kit, Macerator Repair Kit, Minor (Items: 1, 4, 5, 6, 10, 11)
B	116-0000028-01	Kit, Macerator Repair Kit, Major (Items: 1, 4, 5, 6, 10, 11, 15)

i. Operation Common Issues and Maintenance

Operation

The macerator pump is powered by a belt driven off the main engine pulley. This belt is tensioned by the idler pulley assembly installed adjacent to the return pump. As water and debris are picked up by the Cyclone head and deposited in the CY210 recovery tank, it is gravity fed down into the return pump's inlet fitting. Once fed into the pump, the wastewater and debris are pumped out to the reclaim line fitting on the handlebar assembly.

Common Issues

The macerator pump operates at a continuous speed of approximately 7000 rpm. At speed, it is capable of pumping waste water and debris 200-300 ft away from the CY210. The most common factors that can hinder this performance include:

- loose drive belt
- clogged wastewater inlet fitting
- worn impeller blades
- plugged breather line/breather line fitting
- plugged return line
- seized internal shaft bearings

If the CY210's macerator is not able to pump water out through the reclaim line and the possibility of plugged lines is ruled out, follow the subsequent information on the subject of disassembly and repair.

Routine Maintenance

Routine maintenance on the macerator pump is limited to greasing the port on the center of the pump body. This port leads to the internal shaft seals that need greased approximately every 400-500 hours. Use only 1-2 pumps of grease for this. Do not over grease this port as the shaft seals can be damaged, thereby letting water into the bearing cavity!

CAUTION!

Always support the cyclone head prior to working beneath the deck.

ii. Disassembly

1. Disconnect power source to motor.
2. Loosen coupling or remove belt to disconnect pump.
3. Remove pump to repair area.
4. Remove volute bolts and volute from pump.
5. Remove impeller (unscrew CCW) and shaft seals.
6. Remove the pulley and spiral ring underneath it.
7. Remove bearing shaft and bearings be pressing entire assembly out of the bearing cavity with a hydraulic or arbor press.
8. Press bearings off shaft using a hydraulic press.

iii. Reassembly

1. Thoroughly clean seal cavity and bearing bore of the bracket.
2. Pressure new bearings onto shaft making sure snap ring is in place.
3. Coat inner bearing cavity with grease.
4. Re-install wave washer into bearing cavity and press in bearing + shaft assembly back into cavity. Re-install spiral ring.
5. Install shaft seals inside the shaft seal bore. Note that both seal cups face towards the bearing cavity; very important!
6. Place small amount of serviceable Loctite 222 (or equivalent) onto shaft threads.
7. Thread impeller onto shaft ensuring seat is aligned flush with shoulder of shaft and impeller hub. Tighten securely.
8. Use a thin coat of clear silicon around the volute seating area.
9. Install volute flange O-ring, volute and volute bolts.
10. Rotate pump shaft by hand to ensure impeller does not rub against volute.
11. Grease the lip seal with 1-2 pumps of grease from a standard grease gun.
12. Re-install macerator pump on CY210.

iv. Belt Tensions

Belt tension and condition should be checked every 40 hours. Belt tensions should be checked using a frequency meter. When measuring the belt tension for the belt driving the return pump, measure the tension of the span of belt between the spindle and the return pump as shown in the figure on page 17.

	Frequency (Hz)	
	Broken In	New
Engine to Spindle	54	62
Spindle to Return Pump (Macerator)	45	52

IX. BATTERY

i. Battery Safe Handling Guidelines

1. Always wear proper eye, face and hand protection when working with battery.
2. Never lean over the battery while boosting, testing, or charging.
3. Exercise caution when working with metallic tools or conductors to prevent short circuits and arcing.
4. Keep terminals protected to prevent accidental shorting.
5. Replace any battery that has signs of damage to the terminals, case, or cover.
6. Install the battery in a ventilated area for operation and during charging.

ii. Wet Cell Battery Maintenance

Battery maintenance is important, a serviceable battery needs to have the fluid checked. If the electrolyte level is low refill the battery cell with distilled water only. Do not overfill the battery cells especially in warmer weather because the natural expansion of the fluid can push electrolytes from your battery. Periodically inspect your battery terminal connections to ensure they are clean, snug, and protected from the elements. To prevent corrosion of cables on top post batteries use a small bead of silicone sealer at the base of the post and place a felt battery washer over it. It is recommended that you coat the felt washer in high temperature grease then place the cable on the post and tighten.

STATE OF CHARGE	SPECIFIC GRAVITY	VOLTAGE	
		12V	6V
100%	1.265	12.7	6.3
*75%	1.225	12.4	6.2
50%	1.19	12.2	6.1
25%	1.155	12	6
Discharged	1.12	11.9	6

iii. Battery Storage

When possible, store your battery in a cool, dry location. Check the battery voltage every 6 months and charge if it falls below 12.6 volts.

Disconnect the battery cables when the CY210 is not being used for extended periods.

X. CLEANING HEAD

i. Replacing the Cyclone Brush

1. Remove the old or damaged cyclone brush from the CY210.
2. The replacement brush will not require cutting to fit.
3. (25) 1/4”-20, 1/2” long Allen-head bolts and flat washers will be needed to fasten the brush to head casting.
4. Install the brush hardware using blue Loctite.

ii. Rotating Union

The high pressure rotating union directs pressurized water to the rotating portion of the cyclone assembly. This high-pressure swivel assembly contains two seals that allow pressurized water to move from a stationary point to a rotating point without pressure loss. These internal seals are kept cool and lubricated by water flowing through the high-pressure swivel assembly.

General maintenance for the rotating union includes:

- Every 40 operating hours the grease point on the rotating union should be lubricated.
- Regularly inspecting all seals for any water leaks
- If seals are worn, contact Cyclone Technology to purchase a repair kit (Ref. No. 116-0000038-01)

CAUTION!

Although it is possible to use the Cyclone for recovering standing water, it is necessary that some water is pumped through the union to keep the internal seals cool. Accelerated wear may occur if the rotating union is run dry for extended periods of time.

Disassembly:

Step 1: Remove rotating union from spindle and hose connection.

Step 2: Using retaining ring pliers remove 1 3/8" internal retaining ring from top of rotating union.

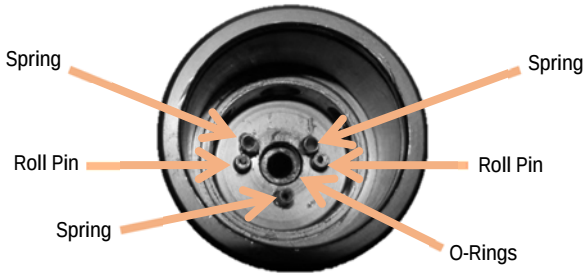
Step 3: Remove old rotor assembly.

Step 4: Remove old large O-ring, and rotor seat.

Step 5: Using needle nose pliers remove 3 springs and 2 roll pins from inside housing, see image below.

ONLY REPLACE ROLL PINS IF NECESSARY

Step 6: Remove square profile O-ring from center of housing, followed by the small black O-ring.



Assembly:

Step 1: Install small black O-ring into center of housing, followed by square profile black O-ring directly on top of the other O-ring.

Step 2: Replace springs and roll pins inside housing, in same orientation as pictured above. Use grease to secure springs during assembly.

Step 3: Install new rotor seat, insuring slots aligned with roll pins and central location.

Step 4: Replace large O-ring around perimeter of inner housing.

Step 5: Reinstall rotor assembly, ensure top of rotor is below seat of retaining ring.

Step 6: Reinstall retaining ring using retaining ring pliers.

Step 7: Replace copper washer on top of assembly, reinstall between hose connection and spindle assembly.

iii. Spray Tips

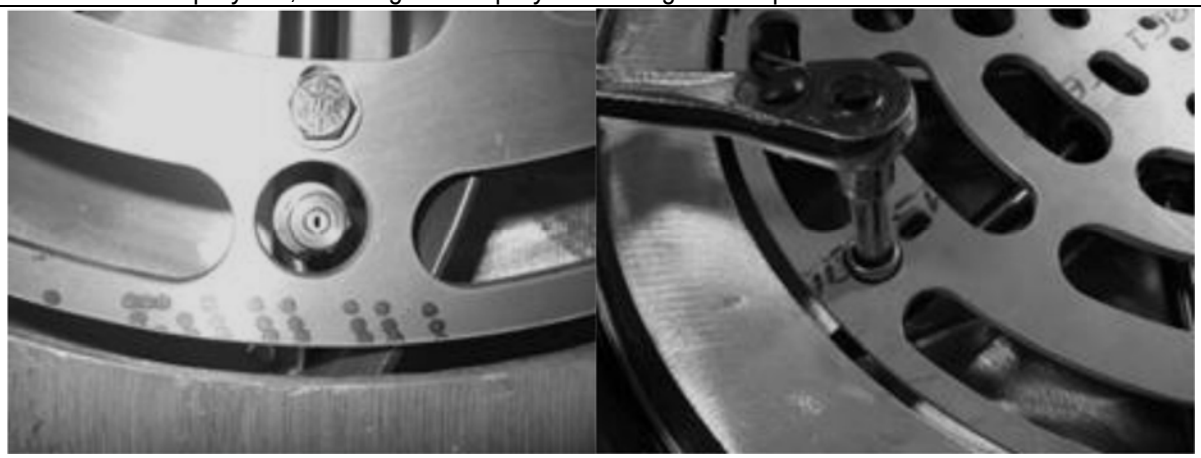
The CY210 uses two spray tips in the cleaning head. The spray tip size in the cleaning head determines the output pressure and spray pattern. If the nozzle orifice is too big it will expel too much water and reduce pressure. If the orifice is too small, the pressure may rise to the point the unloader valve starts to dump water through the bypass, reducing flow. This is also the case if a foreign object gets clogged in the tips. It is important to understand how the tips can affect the output pressure of the machine to determine the causes of pressure spikes and losses.

Changing Spray Tips:

1. Cyclone Technologies recommends a 40-degree spray tips for use in the CY210 walk behind
2. Spray tips should be changes every 8-16 hours depending on the severity of the cleaning being done. This can be determined if the machine is losing pressure due to the tips opening from excessive wear.
3. Use a 9/16-inch shallow well socket to remove the spray tips from the spray bars. This can be done without removing the protective disc.
4. Wrap the threads of the new pressure tips with a minimum of 5 wraps of Teflon tape and replace into the spray bar. Be sure to line up the slot in the pressure tip parallel with the spar bar, this is essential to the system operating properly.
5. When changing tips be sure to inspect the CY210 hardware and turbine blades for damage and needed maintenance.

WARNING!

Always support the cyclone head prior to working beneath the deck. When installing new spray tips, they must have a minimum of 5 wraps of Teflon tape to make sure the stainless-steel threads on the tip do not contact the threads of the stainless-steel spray bar. Contact between the two can cause the tip to seize inside the spray bar, resulting in the spray bar having to be replaced.



iv. Fan Assembly and Disk

The CY210 uses patented cyclone technology, utilizing 8 turbine blades (Fig.9a) to create a vortex of wind, water, and debris. The CY210 head spins at speeds up to 2400RPM, creating a strong vacuum to aid in the recovery of wastewater and debris. Due to the impact of debris created by the rotation of the CY210 fan assembly, hardware, structural components and blades will wear and eventually require replacement or repair. It is recommended the CY210 is inspected every 40 hours for such wear.

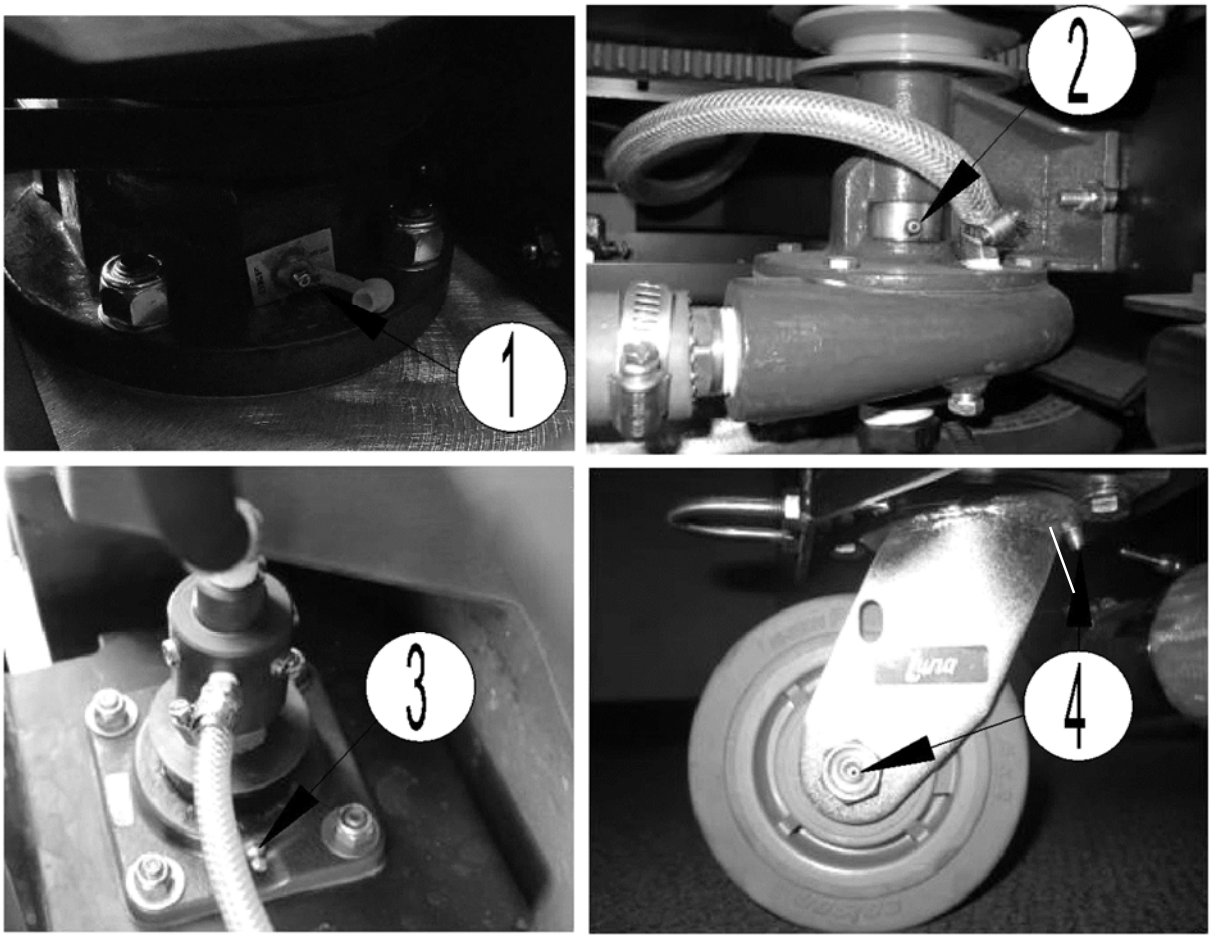
The CY210 blades must be replaced before the wear of the blade reaches the fastener at the tip of the blade; inspect every 40 hours. In addition, the hardware under the head should be inspected every 16 hours for wear and replaced before any component reaches the point that it is difficult to remove.

Replacing the CY210 Blades

1. To access the CY210 blades first remove the Cyclone Disk covering the Fan Assembly
2. Next remove the two 5/16-18 X 1in bolts at the base of the blade near the spindle and the one 5/16-18 X 1 in Allen head bolt at the tip of the blade
3. Remove blade
4. Replace blade and hardware. It is recommended to replace all blades at the same time for both balance and wear purposes.
5. Replace Cyclone Disk

v. Greasing

It is recommended that you are diligent in checking the grease points on the CY210 regularly. There are four components on the CY210 which require greasing, they are located on the bearing for the spindle (1), at the front of the cleaning head on the recovery pump (2), and in the center of the CY210 unit at the rotating assembly (3), which supplies pressurized water to the cleaning head. Also, the casters need to be greased (4).



When greasing these points always use multipurpose bearing grease, and it is recommended that you grease points 1,3 and 4 after every 40 hours of operation. For greasing information see the maintenance section for the return pump on page 15 (page 20 for the Macerator pump).

XI. Casters

The CY210 is equipped with four casters. These casters should be inspected every 200 hours for wear. The casters should roll smoothly and if the casters lose any more than an 1/8 of an inch in radius they should be replaced. Please note that individual wheels can be replaced, which can be less costly than replacing the entire caster.

XII. Maintenance Chart

CY210 CLEANING UNIT	AS NEEDED	16 HOURS	40 HOURS	200 HOURS	400 HOURS	800 HOURS
CYCLONE BELT TENSION AND CONDITION			X			
GREASE LUBRICATION POINTS (NOT INCLUDING RETURN PUMP)			X			
GREASE RETURN PUMP (PRICE)- 1 pump of grease						X
GREASE RETURN PUMP (MACERATOR) – 1 pump of grease					X	
CYCLONE BRUSH CONDITION			X			
CYCLONE PRESSURE TIPS	X					
CYCLONE HARDWARE		X				
CYCLONE DECK CASTERS				X		
INSPECT CYCLONE BLADES AND BARS			X			
SERVICE BATTERY CONNCETION				X		

XIII. WIRING DIAGRAM