

HURRICANE

600

OPERATIONS/MAINTENANCE MANUAL



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OPERATION / MAINTENANCE MANUAL

HURRICANE 500 & 600

INTRODUCTION

The *Hurricane* is designed for rugged, reliable operation featuring powerful vacuuming capability with a very minimum daily maintenance. The *Hurricane* will pneumatically convey material from distances in excess of 1000 feet. Any material that is flowable, whether liquid, slurry or solid, or able to move through a 4", 5" or 6" diameter hose, can be handled with this equipment.

DANGER

THE HURRICANE SHALL NOT BE USED TO VACUUM/CONVEY FLAMMABLE OR COMBUSTIBLE HYDROCARBON LIQUIDS.

THE HURRICANE SHOULD NEVER BE USED OR MOVED WITHOUT REFERENCE TO THE SAFETY PROCEDURES NOTED BELOW.

This equipment is self-contained and powered by an electronically controlled diesel engine. It will provide excellent service if properly maintained. There are no unique or complicated parts that require sophisticated maintenance procedures under normal operation. The diesel engine is equipped with automatic shutdowns for low oil pressure and high temperature.

The engine enclosure of the *Hurricane* has locking latches and a locking cap on the fuel tank.

The tandem axle trailer is equipped with electric brakes. The *Hurricane* can easily be towed and maneuvered with a one ton, or larger, truck having dual rear wheels.

Because of its ease of set-up and maneuverability, the *Hurricane* is a very flexible and effective piece of industrial vacuum cleaning equipment. You will only be limited by your imagination.

HURRICANE 500/600



Figure 1



Baghouse Timer Board

Figure 2

Vacuum Relief Valve/
Vibrator Solenoids



Baghouse
Solenoid

Baghouse
Diaphragm

Figure 3

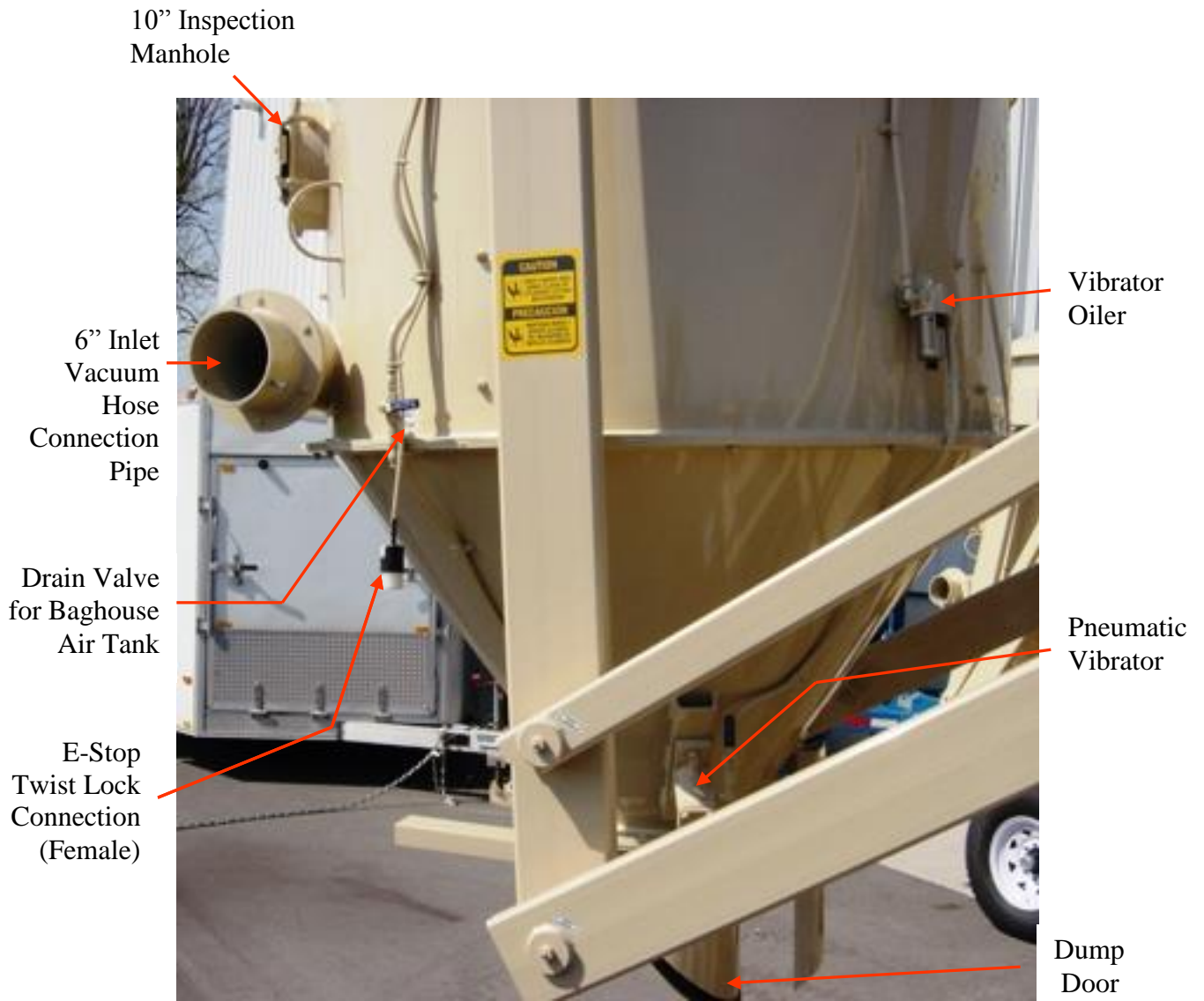


Figure 4



SAFETY PROTOCOL

Failure to follow the safety rules in this manual can result in personal injury, death or property damage. Please observe the same common sense precautions used with any machine, where carelessness, inattention or poor maintenance could be hazardous to people or property. Carefully read the safety precautions below and within this manual.

Towing Safety Instructions

- Due to the *Hurricane's* height caution is required for overhead clearance.
- The *Hurricane's* height does not permit shipping or transporting via semi-truck trailer. The *Hurricane* must be towed using an appropriate motor vehicle. Caution must be used when towing the *Hurricane* due to its weight.
- The *Hurricane* is not engineered to be lifted or lowered by a crane or similar lifting devices.
- Be sure all lights on the trailer are functioning properly before travel.
- Always tow the *Hurricane* with the safety chains and the emergency brake chain attached to the towing vehicle.
- Before towing the *Hurricane*, inspect the tires and the hitch mechanism to be sure they are road-worthy.
- Always tow the *Hurricane* with the hopper in the lowered and locked position.
- Always tow the unit with the hopper completely empty and the discharge door secured closed.

Set-up Safety Instructions

- Be sure to block the wheels before detaching the unit from the towing vehicle.
- Always position the unit on solid, stable ground. Locate planks underneath the jack stands to distribute the weight of the unit evenly.
- Always position the unit so that it is set no more than 5° off level in any direction.
- Never raise the hopper under electrical power wires.
- Always pin the hydraulic safety strut blocks when the hopper is in the raised position.
- Never stand under the raised hopper unless the hydraulic safety strut blocks are pinned and secured in place.
- Lower and pin all four jack stands so that each bears weight before raising the hopper.



SAFETY PROTOCOL

Follow Safety Sticker Instructions

- Carefully read all safety stickers on unit. Keep safety stickers in good, readable condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety stickers. Replacement safety stickers are available through the manufacturer.

Handle Fuel Safely

- Handle fuel with care: it is highly flammable. Do not refuel the machine while smoking or near open flame or spark.
- Always stop engine before refueling machine. Fill fuel tank outdoors.
- Prevent fires by keeping machine clean of accumulated trash, grease and debris.

Prepare For Emergencies

- Be prepared if a fire starts.
- Keep a first aid kit and fire extinguisher handy.
- Keep emergency numbers for doctors, ambulance service, hospital and fire department near your telephone.

Wear Protective Clothing

- Wear close-fitting clothing and safety equipment appropriate to the job.
- Operating equipment safely requires the full attention of the operator. Do not wear radio or music headphones while operating machine.

Protect Against Noise

- Prolonged exposure to loud noise can cause impairment or loss of hearing.
- Wear OSHA approved personal protective equipment to protect against objectionable or uncomfortable noise.

Handle Chemical Products Safely

- Direct exposure to hazardous chemical can cause serious injury. Potentially hazardous chemicals used with this unit include such items as lubricants, coolants, paints and adhesives.
- Refer to Material Safety Data Sheet (MSDS) for specific details on chemical products: physical and health hazards, safety procedures and emergency response information.
- Review each MSDS before you begin using unit.



SAFETY PROTOCOL

Stay Clear of Rotating Components

- Keep rotating shields in place at all times.
- Always operate the machine with access doors closed and locked.
- Shut unit down and be sure all moving parts have stopped rotating before make adjustments or performing service on machine.
- Keep hands, feet and clothing from power driven parts.

Practice Safe Maintenance

- Understand service procedure before performing work. See specific components service manual, located in *Hurricane's* owner manual for instructions and additional safety requirements.
- Vacuum creates VERY HIGH SUCTION—EXTREME CAUTION IS REQUIRED when handling suction inlet locations.
- When vacuuming certain materials static electricity can be generated. PROPER STEPS SHOULD BE TAKEN TO PROPERLY BOND AND GROUND HOSES, UNIT, ETC.
- Never lubricate, service, or adjust machine while it is operating.
- Maintain all parts in good operating condition. Replace worn or broken parts immediately.
- Disconnect battery ground cable (-) before making adjustment on electrical systems.
- Do not look into the discharge door or the hopper inlet pipe when unit is operating.
- Always wear safety glasses or goggles when performing maintenance on unit.
- Whenever vacuuming sticky materials, such as thick slurry, check the hopper often to verify all the material is discharging and not building up on the inside. Utilize vibrator often to minimize material build-up.

Engine Exhaust

- Engine exhaust fumes can cause sickness or death. DO NOT operate engine in an enclosed area without proper ventilation or exhaust pipe extension to the atmosphere.

Avoid High-Pressure Fluids

- Escaping fluid under pressure can penetrate the skin causing serious injury.
- Avoid the hazard by relieving pressure before disconnecting hydraulic hoses or other lines. Tighten all connections before applying pressure.
- Refer to MSDS for emergency information.



SAFETY PROTOCOL

Blower Discharge Dust

- DO NOT operate the unit if dust is visible at the blower discharge.
- Shut unit down and contact Industrial Vacuum Equipment Corp. before continuing.

Engine Cooling System

- Explosive release of fluids from pressurized cooling systems can cause serious injury and burns.
- Shut down engine. Allow sufficient time for coolant to decrease in temperature. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to relieve pressure before removing completely.

Dispose of Waste Properly

- Follow OSHA, State and Federal guidelines pertaining to the disposal of waste associated with vacuum process.

E-Stop Button Instructions

- Each day, before beginning vacuum operations, test the E-Stop button to make sure it is working properly.
- Whenever the vacuum is in operation, the E-Stop button **MUST** be within reach of the vacuum hose operator, or must be attended by another operator.
- Whenever adding/removing hose and/or pipe, the E-Stop button should be used to stop vacuum suction until all connections are completed.



Button “IN” - Vacuum OFF



Button “OUT” - Vacuum ON

Figure 5

INSTRUMENTATION

The instrument panel on the *Hurricane* engine housing contains the following items:

1. LED Display – Will show engine instrumentation by using the Fwd/Back arrow keys.
Example: Tachometer, Hours, Oil Pressure, Coolant Temperature
2. Air Pressure Gauge – Air pressure should read between 90 and 115 PSI.
3. Ignition Switch – Keyed switch
4. Rabbit/Turtle Switch (Disabled)
5. Dump System Timer Board – The dump timer is equipped with an ON TIME or VACUUM TIMER adjustable from 1 to 10 minutes. The OFF TIME or DUMP TIME is adjustable from 10 to 100 seconds.
6. Vacuum System ON/OFF Switch – When the switch is in the ON position, the dump timer will start working and ramp engine to full RPM's.
Note: The Emergency Stop Button must be pulled out.
Note: The dump timer always starts its cycle in the dump mode, or OFF time.

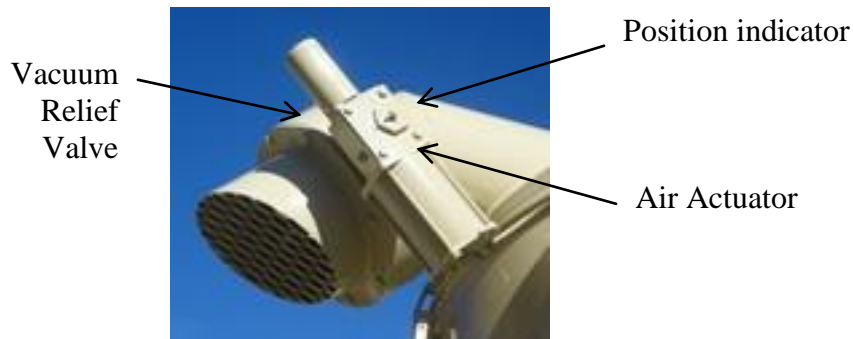


Figure 6

7. Baghouse ON/OFF Switch – When the switch is in the ON position, the baghouse timer will start, pulsing the filters in a factory-set sequence.
8. Vibrator ON/OFF Switch – See Note in “Vacuum Unit Operation” section.
9. Auger Forward/Reverse Switch (optional) – Controls Auger; only operates in dump mode.

Hurricane 500 & 600 Tier 3 Instrumentation

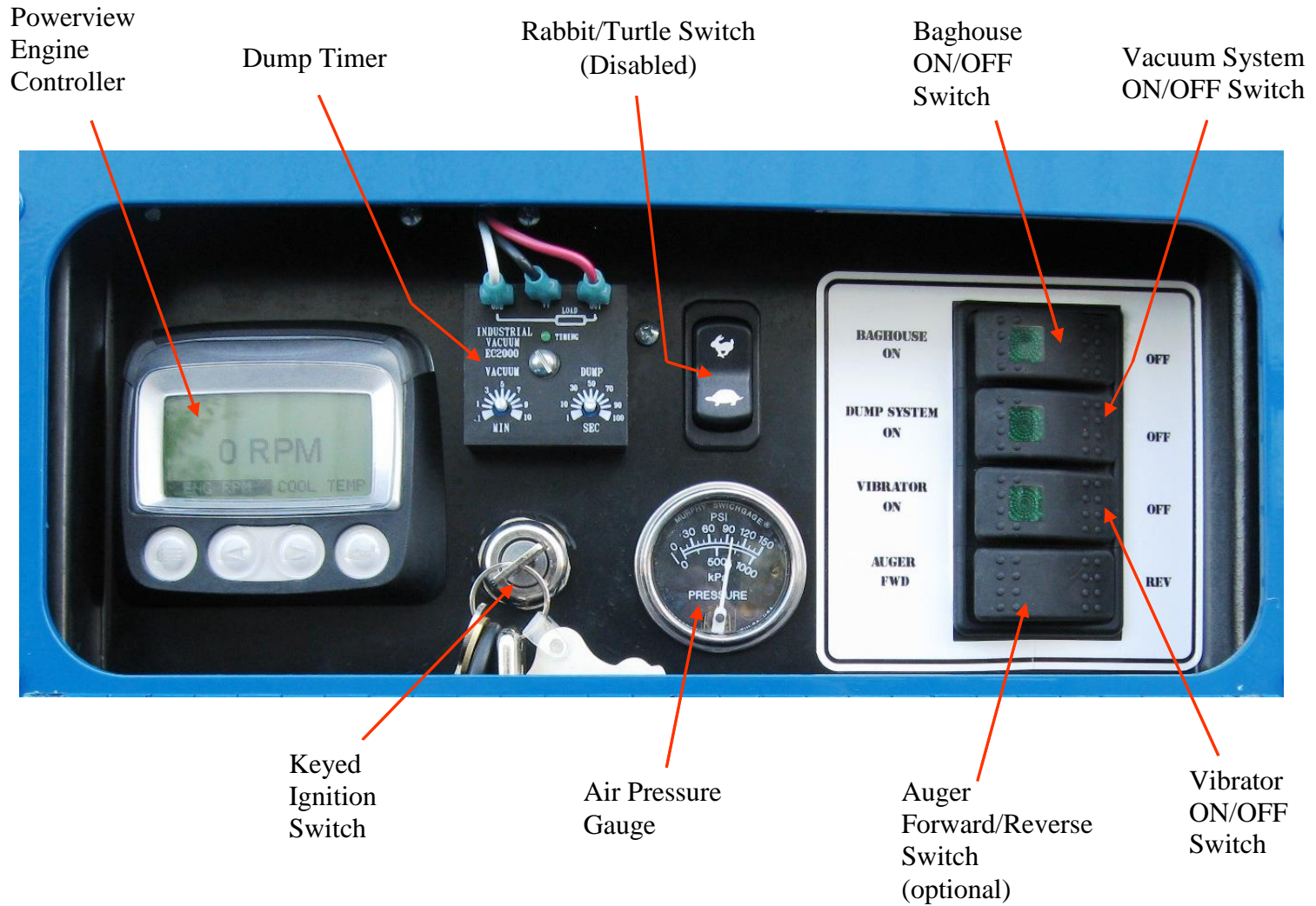


Figure 7

Hurricane 500 & 600 Tier 3 Engine

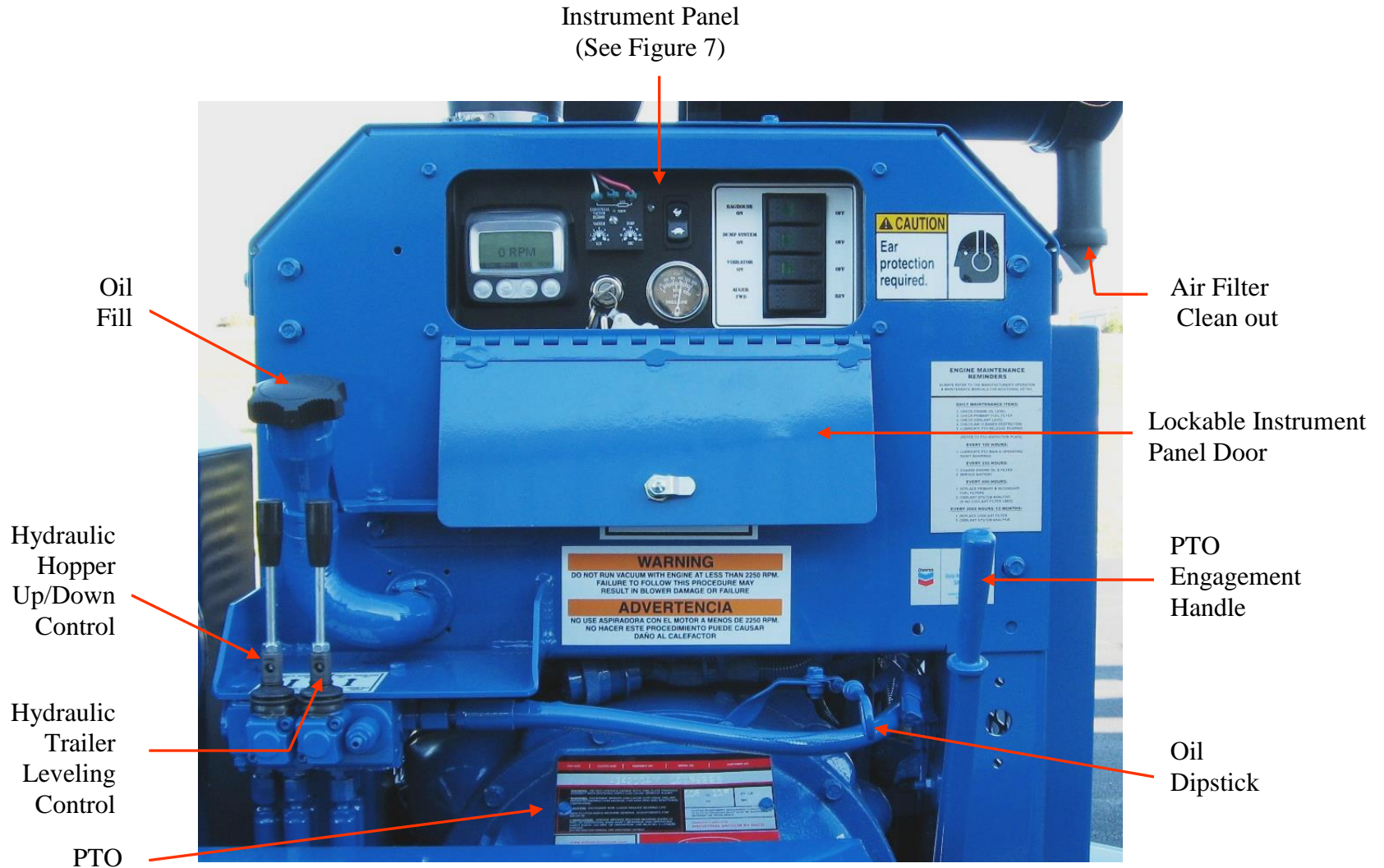


Figure 8



DAILY MAINTENANCE

**ALL MAINTENANCE PROCEDURES SHOULD BE ACCOMPLISHED
WITH ENGINE OFF!**

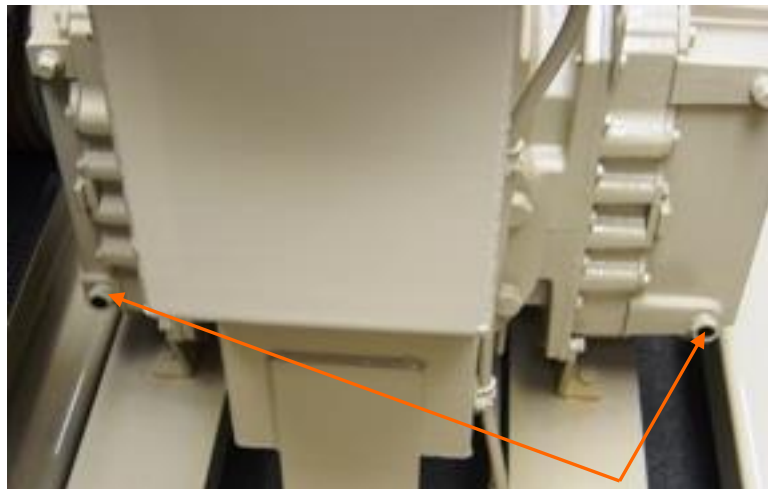
ENGINE

1. Check oil level.
2. Check radiator coolant level.
3. Check or change outer air cleaner cartridge.
4. Check battery connections.
5. Check radiator fins for dirt and obstructions on the fan side.

BLOWER

1. Check oil level at both ends of blower.

Figure 9



**Roots
Blower**

Blower Oil level sight glasses –
maintain at **half** full level

2. Check belt tension.



DAILY MAINTENANCE

VIBRATOR

1. Check Vibrator Oiler level.

AIR COMPRESSOR

1. Auxiliary drive air compressor – NO daily maintenance needed.

HYDRAULIC SYSTEM

1. Check oil level (at least 1/2 to 2/3 full).
2. Check for hydraulic leaks on the various hoses and connections.

GENERAL

1. Check fuel level.
2. Make general inspection for leaks and loose bolts.
3. Drain water from all air tanks.
4. Check the inside of the collection hopper to be sure no material is collecting on the walls of the cone.
5. When the unit is running and the air pressure is up to 90 PSI, listen for the bag pulsing sequence.



EXTENDED MAINTENANCE

FIRST 100 HOURS

1. Change engine oil and engine oil filter. Refer to John Deere Manual.

EVERY 200 HOURS

1. Change engine oil and engine oil filter. Refer to John Deere Manual.
2. Check upper deflector plate inside collection hopper for excessive wear.

EVERY 300 HOURS

1. Change blower safety filter.
2. Change filter bags if needed. See maintenance procedures.
3. Rebuild air dryer. Refer to Air Dryer Bulletin.

EVERY 500 HOURS

1. Change engine fuel filter. Refer to John Deere Manual.
2. Change blower oil in both ends. Refer to Blower Manual. **NOTE: Apply pipe joint compound sealant to blower oil threaded plug before re-installation.**
3. Check condition of removable wear plate for excessive wear.

EVERY 1,000 HOURS

1. Remove vent tube on engine and clean it with diesel fuel. Refer to John Deere Manual.
2. Change hydraulic oil. See spec sheet.
3. Check dump door gasket for excessive wear.
4. Replace desiccant in air dryer.

EVERY 5,000 MILES

1. Repack wheel bearings on trailer. Refer to Dexter Manual.
2. Check pressure on trailer tires, 80 PSI.



MAINTENANCE PROCEDURES

Filter Bag Change

1. Disconnect air line that runs from vacuum relief valve to the solenoid.
2. Open all dome hold down clamps. (See Figure 10)

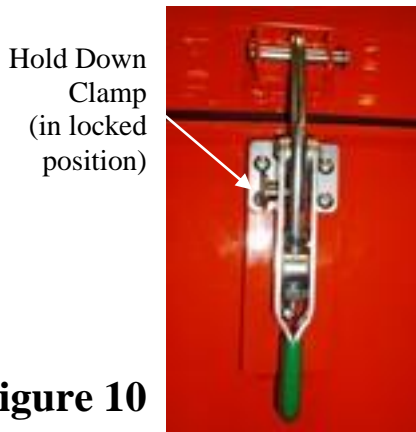


Figure 10



Figure 11

3. Carefully open hinged dome. Remove hinge safety clevis pin prior to opening dome. Re-install clevis pin after dome is in the open position. (See Figure 11)
4. Disconnect dinn cable from diaphragm solenoid. (See Figure 12)
5. Disconnect air/draw hose from air cannon. (See Figure 12)
6. Remove clip from both hold down pins. (See Figure 12)
7. Remove blast pipe safety clevis pin from bracket. (See Figure 12)
8. Lift hinged blast pipe assembly into vertical position and secure safety pin.
9. Lift cages out of filter bags and set aside.

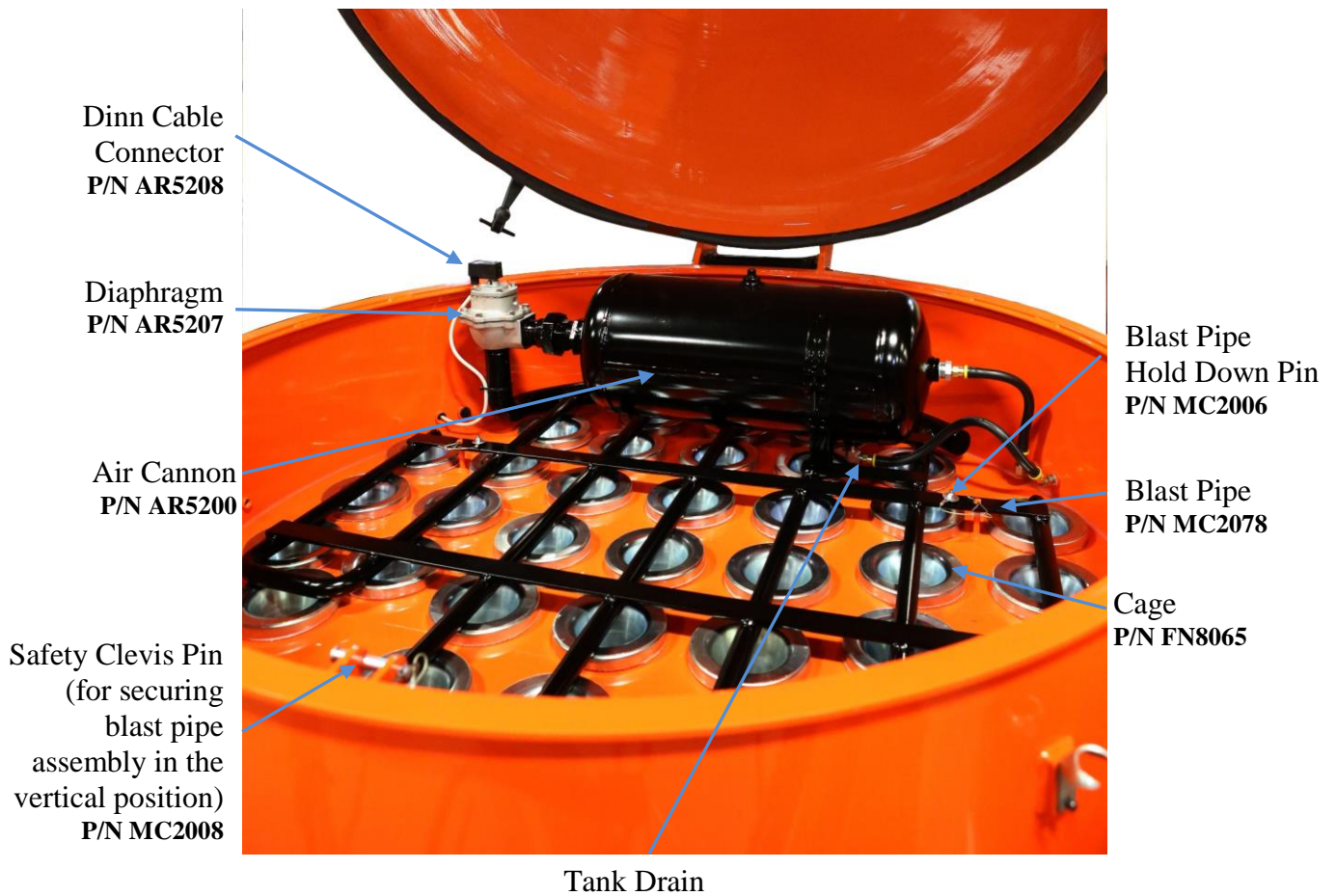


Figure 12

10. Using a large screwdriver, press in on the top part of the filter and pop it out of place. Let the filter fall down and through the cone.
11. Remove all filters. Clean all of the dust off filter area.
12. Install filters using the same method, only in reverse.
13. Completed



MAINTENANCE PROCEDURES

ENGINE

Maintenance instructions on the engine are included with this manual. The engine should be maintained per the engine manufacturer's requirements.

BLOWER

Maintenance instructions on the blower are included with this manual. This blower is a precision piece of equipment, and service should not be attempted by other than qualified personnel. The blower needs little maintenance other than checking oil levels and changing oil as required. If the blower begins to "knock", **SHUT DOWN THE UNIT IMMEDIATELY AND CONSULT FACTORY.**

PTO

Operating and maintenance instructions are included with this manual. Follow the manufacturer's instructions as to grease intervals and adjustment procedures. The clutch needs adjustment when there is little or no effort required to snap it over center. Sometimes this means adjusting the clutch every few days for the first 100 hours of operation. If the clutch slips excessively, it will overheat and cause damage.

AIR DRYER

A bulletin on this component is included in this manual.

BAGHOUSE TIMER AND DUMP CYCLE TIMER

These components cannot be serviced in the field. All that can be checked are voltage to unit, fuse and output. If the fuse is good and power is present at the input leads and the unit fails to operate, replace circuit board.

VACUUM RELIEF VALVE

This valve is factory set and should not be tampered with. Serious damage may result if unqualified Personnel improperly adjust valve.

ENGINE AIR CLEANER

The air cleaner on the diesel engine is a dual element filter. There is a smaller secondary element inside the primary element. The secondary element needs only to be changed if the primary element is damaged, or is installed improperly. Operating the engine without proper filtration will **VOID THE ENGINE WARRANTY**. Operating the engine without proper air filtering for as little as one hour can seriously shorten engine life.

FUEL AND LUBRICANT SPECIFICATIONS

FUEL SPECIFICATIONS

1. Use grade No. 2-D Diesel fuel above 32° F.
2. Use grade No. 1-D Diesel fuel below 32° F.
3. Use grade No. 1-D Diesel fuel for all temperatures at elevations above 5,000 feet.

ENGINE LUBRICATING OIL

Use SAE 15W-40, multi-viscosity oil.

Example: Chevron-Delo 400 Multigrade

BLOWER LUBRICATING OIL

The required lubricant for this machine is Amsoil Synthetic R&O, AW Gear & Bearing ISO-220 (RCM).

HYDRAULIC LUBRICATING OIL

Use hydraulic oil AW ISO 32.

VIBRATOR LUBRICATING OIL

General purpose 10 weight oil.

VACUUM UNIT SET-UP

1. Perform daily maintenance procedures.
2. When the trailer is in position, set the wheel chocks to prevent movement when disconnected from the truck.
3. Start the diesel engine and idle to build up air pressure and warm up.
4. Attach vacuum suction hose to inlet pipe on collection hopper.
5. Using the adjustable jack on the front of the trailer, raise tongue of *Hurricane* off pintle hook to disconnect the truck. Lower front of trailer, then lower and pin rear jack stands in such a way that trailer will sit level. Make sure the jack stand pads are sitting on a concrete surface; use heavy planks as required to maintain a stable foundation. Use the hydraulic leveling cylinder to raise or lower trailer in lieu of manual crank jack stand.
6. Raise front of trailer so that the rear jack stands are carrying weight, then lower and pin the front jack stands.
7. When the unit is properly set, it should be level with pressure on all four jack stands.
8. **WARNING:** Do not proceed or raise collection hopper unless area around and above unit is inspected and found to be free of electrical power wires or other obstructions.
9. Using “Cylinder Up/Down” control lever, located near engine, raise collection hopper to necessary height to clear the collection box, dump truck, container, etc.
10. When the proper height is reached, reposition safety blocks to the closest hole on the hydraulic safety struts just above the hydraulic cylinder top, and pin in place. Gradually lower the hopper until it is resting on the safety strut safety blocks.
11. **WARNING:** Do not stand under the collection hopper or get between the collection hopper and the trailer when the cylinder is in the raised position without the hydraulic safety strut blocks pinned in place.
12. **WARNING:** Do not leave the collection hopper in the raised position without the hydraulic safety strut blocks pinned in place.

VACUUM UNIT OPERATION

1. Start engine and leave Vacuum System switch in OFF position. (It will idle at approximately 800 RPM.)
2. Check Air Pressure Gauge (on instrument panel) to be sure there is at least 80 PSI of air pressure.
3. Engage PTO or clutch on right side of vacuum. Be sure it is fully engaged.
4. Select the proper vacuum or ON TIME and OFF TIME or dump time. The dump time and vacuum time must be set on the instrument panel according to the type of material being picked up.
5. Turn Vacuum System ON/OFF switch to the ON position.
6. Turn Baghouse ON/OFF switch to the ON position.
7. Pull out E-Stop button.
8. Start vacuuming.

NOTE: When vacuuming material that is not discharging out of the dump door and the cone, operate vibrator frequently. Locate manual ball valve on vibrator (which is attached to the side of the collection cone). Open manual ball valve. This will supply air to the vibrator in dump mode and allow the Vibrator Switch (located on the instrument panel of the engine) to be indexed ON/OFF as needed.

VACUUM UNIT SHUT DOWN

1. Allow all material to clear suction hose.
2. Index Vacuum System switch to the OFF position.
3. Disengage clutch.
4. Allow all material to clear the collection hopper and cone.
5. Index vibrator switch to the OFF position.
6. Allow diesel engine to idle for 5 minutes after it has been under load before shutting off.
7. Let the baghouse filter pulsing system continue to operate while the engine is cooling down. This will prolong the life of the filters.

VACUUM UNIT TRANSPORTATION

1. Raise collection hopper and unpin hydraulic safety strut blocks. Re-locate to the “travel” position.
2. Lower collection hopper and guide the 6” hose down between the engine shroud and the cross bracing on the towers.
CAUTION: Do not place arms or hands in or near the hopper extension support arms.
3. As the collection hopper approaches the bottom position, be sure the bottom of the hopper swings in towards the trailer and the retention hook on the dump door engages the bar on the trailer frame.
4. Secure dump door in the closed position.
5. Ensure the trailer’s adjustable jack is fully raised, and jack stands are pinned in uppermost position before traveling on the road.
Raise the hydraulic leveling leg so that the cylinder is raised to its uppermost position.
6. Verify that safety chains are attached to towing vehicle before travel.
7. Verify that all marker lights, brake and turn signals are functioning properly before travel.
8. Latch and lock all engine doors and remove the key.

MAJOR COMPONENT SPECIFICATIONS

	<u>MODEL 500</u>	<u>MODEL 600</u>
ENGINE	John Deere Model 6068L, 156 HP	John Deere Model 6068L, 156 HP
BLOWER	Roots Model 616 DVJ	Roots Model 624 RAM
AIR COMPRESSOR	Bendix	Bendix
BLOWER DRIVE	5 V-belt drive w/adjustable engine mounts	5 V-belt drive with adjustable engine mounts
HYDRAULIC PUMP	Eaton	Eaton
CLUTCH	NACD 11.5"	NACD 11.5"
BATTERY	12 Volt	12 Volt

RECOMMENDED SPARE PARTS FOR HURRICANE 500 & 600

<u>PART NUMBER</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>
FN8014	37	Filter Bags
FN8065	37	Cages
FN8006H	1	Blower Safety Filter
MC6800	1 (gallon)	Blower Oil
EC2001	1	Filter Pulsing Timer
AR5207	1	Filter Pulsing Diaphragm/Solenoid
AR5208	1	Dinn Cable
EC6001	1	12 – 24 VDC Converter
EC2000	1	12V Dump Timer
AR4201-1	1	12V Butterfly Solenoid
MC7020	1	Removable Wear Plate
ED0008T3-1	1	Fuel Filter (Primary)
ED0008T3-2	1	Fuel Filter (Secondary)
ED0007-2	1	Oil Filter
ED0016-2	1	Air Filter (Outer/Primary)
ED0016-1	1	Air Filter (Inner/Secondary)
MC7001	2	Butterfly Spring
MC7007	1	Dump Door Gasket
AR5003	1	Air Dryer
AR5000	1	Desiccant Kit
AR5001	1	Valve Kit

OPTIONAL EQUIPMENT

Industrial Vacuum Equipment Corp. offers a variety of accessories and optional equipment to complement your *Hurricane*, including:

- | | |
|------------------------|--|
| Floor Nozzles | Attach to the end of the vacuum hose to pick up material spread across bare floors or decks. |
| Removable Bulk Nozzles | Lightweight nozzle for attachment to the end of the vacuum hose. Provides a rigid handle and suction tube to vacuum material from bare floors and enhances the operator's ability to vacuum hard to reach areas. |
| Replacement Parts | Industrial Vacuum Equipment Corp. stocks complete replacement parts for your <i>Hurricane</i> , including hose and filters. It is recommended that only Industrial Vacuum Equipment Corp. supplied replacement parts be used for your <i>Hurricane</i> . |

INDUSTRIAL VACUUM EQUIPMENT CORP. ALSO MANUFACTURES A WIDE LINE OF VACUUM AND COLLECTION DEVICES AND HOPPERS FOR HAZARDOUS AND NON-HAZARDOUS APPLICATIONS. CONSULT YOUR FACTORY REPRESENTATIVE FOR INFORMATION ON OUR ENTIRE PRODUCT LINE.

LIMITED WARRANTY

Seller warrants each new product to be free from defects in material and workmanship under normal use and maintenance as herein described. This warranty does not apply to commercial items manufactured by others (Roots Vacuum Pumps, John Deere Engines, etc.), which are covered by existing warranties of the respective manufacturers thereof. Seller's sole obligation under this warranty shall be limited to repairing, replacing or allowing credit for, at Seller's option, any part which under normal and proper use and maintenance proves defective in material or workmanship within twelve (12) months after delivery to Buyer. In the event of defects developing within that period, the Seller will furnish, F.O.B. its plant, without charge, parts required to replace material found defective. Beyond this, the Seller assumes no responsibility.

This warranty is in lieu of all other warranties (except of title), expressed or implied, and there is not an implied warranty of merchantability or fitness for a particular purpose. In no event shall Seller be liable for consequential or special damages.

Used products are sold on an "as is" basis and there is no implied warranty of merchantability or of fitness for a particular purpose, unless otherwise expressly stated on the face of this form.

COMPONENT WARRANTY INFORMATION

Warranty information for unit components may be found in the relevant section of this binder.