

# EXPLOSION PROOF VACUUM DS2-EX

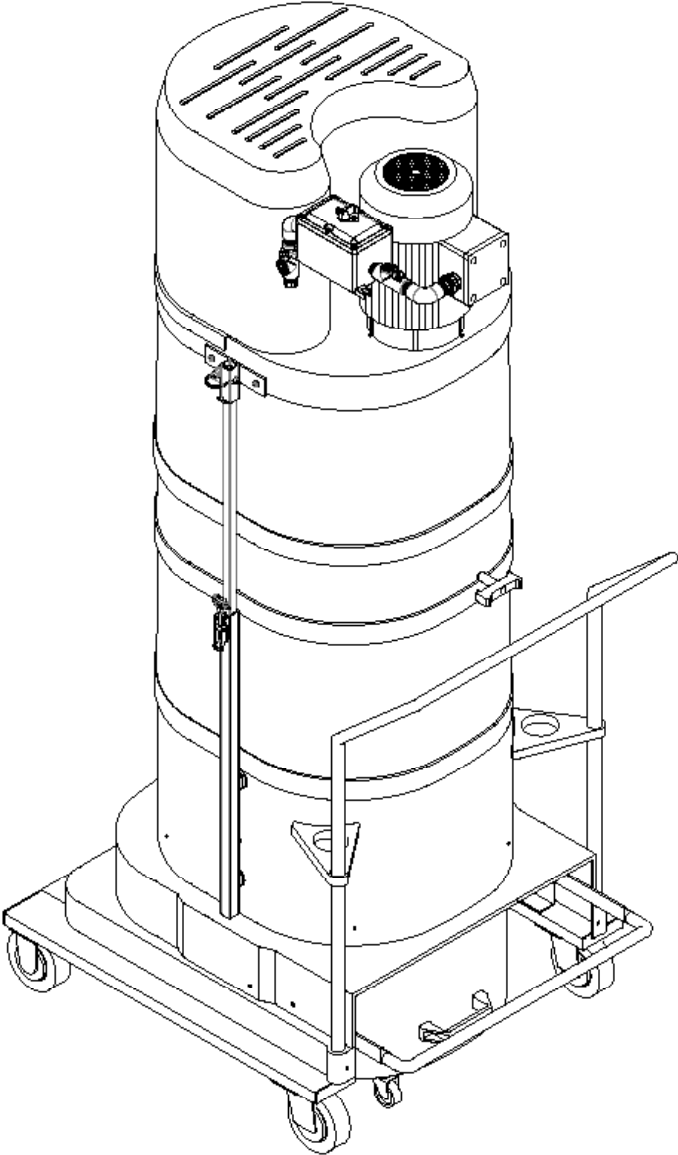
## Installation, Operation, Maintenance & Service

Model No.

Serial No.

Filter No.

Start-Up Date:



Revision: 1  
Date: 10/29/2019



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ISO 9001  
REGISTERED



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## WARRANTY

1. RUWAC warrants that new equipment which are complete units and are sold and/or manufactured by RUWAC, Inc. will be free from defects in material and workmanship for a period of 18 months from date of shipment or 12 months from date of start-up, whichever come first. RUWAC warrants that replacement parts sold hereunder will be free from defects in material or workmanship for a period of 120-days after the date of shipment. RUWAC machines that have been completely re-built at the factory will carry a 180-day warranty from date of shipment. All field repairs performed by authorized RUWAC service personnel are covered by a 120-day parts only warranty.

2. RUWAC, Inc. will not assume any responsibility under the terms of this limited warranty on equipment, which has not been paid in full. This warranty does not apply to any equipment that has been disassembled, repaired, or otherwise altered by any person without the written authorization of RUWAC'S service department, nor does it apply to any product that has been subjected to failure sure to corrosive or abrasive attack, misused, damaged, or improperly installed, nor does it apply to motors, controls, and components not manufactured by RUWAC, Inc. Motors, controls, and other Sub vendor's components therefor are warranted only to the extent of the manufacture's warranty. All warranty work on such products must be authorized by RUWAC, Inc. and must be performed in an authorized shop as designated by the manufacturer. RUWAC sole liability and buyer's sole and exclusive remedy hereunder is the replacement or repair at RUWAC'S option of products not complying with this warranty. Such repair or replacement shall be F.O.B. RUWAC'S factory, and RUWAC reserves the right to invoice all expenses incurred when repairs are made in the field at the request of the customer, except as specifically set forth herein, RUWAC makes no warranty express or implied, with respect to the products and/or service supplied hereunder, this warranty is in lieu of and excludes all other warranties, including without limitation, any warranty of merchantability, fitness for a particular purpose, or conformance to purchaser's specifications.

# SAFETY INSTRUCTIONS

## IMPORTANT SAFETY INSTRUCTIONS

### READ ALL INSTRUCTIONS BEFORE USING THIS VACUUM

The Ruwac DS2-Ex is designed for use in hazardous (classified) locations rated: Class I, Group D, Class II, Groups F&G, T3B, 165 C, ambient 40 C.

**WARNING** - To reduce the risk of fire, electric shock or injury:

1. Make sure that this vacuum is connected to the proper voltage, phase and frequency as stated on the equipment label.
2. Use only for the pickup of dry settled material. Do not use for the pickup of liquids.
3. Do not pick up ignition sources such as smoldering cigarettes, matches or hot ashes.
4. Insure that the ignition temperature of the material being vacuumed is below that of the operating temperature of the motor.
5. Pay special attention to the reactive properties of the material being vacuumed. Insure that the material is not reactive with other materials present in the machine or its materials of construction. Check your MSDS carefully for special hazards ie. Impact sensitivity.
6. Do not operate this vacuum with missing or damaged filters.
7. Inspect the vacuum for visible damage, especially to the power cord and cord cap. The vacuum must be removed from service and repaired prior to use.
8. Use only Ruwac replacement parts, accessories and hoses specifically designed for your machine.
9. Unplug the vacuum from the power source when not being used or when being serviced.
10. This vacuum is not supplied with a cord cap. The cord cap must be selected and installed by a qualified electrical technician. Insure that it is rated for the location, voltage, amperage and phase of the vacuum. Use only twist lock style cord caps.
11. The vacuum is supplied with a 30 foot power cord. It is absolutely critical that if an extension cord is added that it has the same rating ie. SOOW as the power cord provided and is properly sized to prevent voltage drop to the vacuum.
12. Connect to grounded dedicated circuits only.
13. Do not use the power cord to move this vacuum.
14. This vacuum is not designed for outside use or use in wet applications.

# START-UP

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1. Pull up on the dust pan lever to release the dust pan and slide out. Check that it is empty, slide back into place and step down on the lever locking the dust pan into place.

## WARNING:

The electrical service at the installation site must supply the voltage stamped on the machine serial tag. Most motors have multiple voltage capabilities that may appear on the motor serial tag but do not apply to the specific machine. Operating at an incorrect voltage may damage the machine. The machine should be connected to a dedicated fused service and properly grounded.

## WARNING:

A qualified electrician in accordance to the NATIONAL ELECTRIC CODE and all local codes should perform all wiring and or electrical adjustments during installation and servicing.

2. Install the proper cord cap on the power cable, following the manufacturers instructions. Insure that all terminal screws are properly tightened.
3. Start the machine by turning the selector to the ON position noting the motor direction. If the motor is turning in the wrong direction, shut the machine off by turning the selector to the OFF position. Have your electrician rewire the cord cap to correct the motor rotation.

## WARNING:

When using the vacuum in another location, always verify motor rotation before placing the vacuum into service.

# INSPECTION & MAINTENANCE

## WARNING:

Always wear a dust mask when performing filter inspections or service.

## Standard Filter Inspection

1. Shut off machine and disconnect from power source.
2. Move the vacuum to a non-hazardous, well ventilated area.
3. Pull up on the foot lever to release the dust pan and empty if needed.
4. Using a mirror and flash light inspect the filter from the area where the dust pan was removed.
5. Remove any material between the pleats by hand. Always wear proper safety equipment when handling hazardous materials.
6. Inspect the filter pleats for any damage.

## WARNING:

Care should be exercised when cleaning the filter. Make sure that you are familiar with the material present in the vacuum and any handling or exposure warnings for that material. Consult the MSDS for this information.

## Standard Filter Replacement

## WARNING:

The motor deck assemble is heavy, follow safe lifting procedures.

1. Turn the machine off and disconnect from power source.
2. Follow the preceding filter inspection procedure to determine if removal is necessary.
3. Remove all of the housing component by un-clamping toggle located on each side of vacuum housing .
4. Remove the silencer assembly.
5. Remove the motor deck and disconnect any ground wires.
6. Disconnect the clear differential pressure gauge tubes from the respective barbed fittings if so equipped.
7. Remove the HEPA filter housing spacer and HEPA adapter assembly if so equipped.
8. Remove filter housing spacer assembly.
9. Turn the filter housing assembly over on a flat work surface then carefully work the filter off the filter shaker insert.
10. Remove and save the black filter mesh pads for use in the new filter.

# INSPECTION & MAINTENANCE

## WARNING:

The removed filter must be disposed of in accordance with the MSDS instructions for the material present in the filter. Some materials require special disposal. Consult your Safety engineer for specific disposal instructions.

11. Install the new filter into the filter shaker insert by taking special not to damage the filter material while sliding the filter over the inserts.
12. Seat the filter housing spacer assembly on the base oriented as removed.
13. Reinstall the housing components making sure they are properly seated and that all ground wires and differential pressure tubes are securely reconnected.
14. Reinstall the motor deck, ground wire and silencer assembly.
15. Reconnect the power cable to a power source and turn the vacuum on.
16. Cover the inlet with a piece of wood or cardboard to compress the housing spacers and re-clamp with toggle clamps located on each of the vacuum housings.

## HEPA Filter Removal and Installation

1. Turn off the vacuum and disconnect from the power source.
2. Move the vacuum to a non-hazardous well ventilated location.
3. Remove the silencer assembly and the motor deck.
4. Remove the hold down brackets for the HEPA filter.
5. Remove the HEPA filter and dispose of as directed in the filter disposal warning listed for the standard filters.
6. Install the replacement HEPA filter with the gasket facing down, centering the filter on the mounting plate.
7. Instal the hold down brackets and tighten the mounting screws so that the filter is evenly seated.
8. Reinstall the motor deck and silencer assembly. Make sure that all grounding wires are reconnected.
9. Connect the power cord to the power source and turn the vacuum on.
10. Cover the inlet with a piece of wood or cardboard to compress the housing spacers and re-clamp with toggle clamps located on each of the vacuum housings.

# INSPECTION & MAINTENANCE

## Turbine, Motor and Belt Replacement

**NOTE:** The Turbine is not field serviceable and must be replaced as one unit if defective. Replacement of the motor belt or turbine will require the turbine seal to be replaced.

1. Switch the vacuum off and remove the power cord from the power source.
2. Remove the vacuum from the hazardous area to a service work area where the motor deck can be rested on a work bench.
3. Remove the silencer assembly and the motor deck, placing the motor deck on a level work surface.
4. Using a sharp edge, remove the silicone seal from the turbine.
5. Loosen or remove the mounting nuts for the turbine if the motor or belt need to be replaced.
6. By sliding the turbine toward the motor the belt or motor or turbine can be removed.
7. The mounting nuts of the turbine will need to be removed to replace the turbine.

## Belt Installation and Alignment

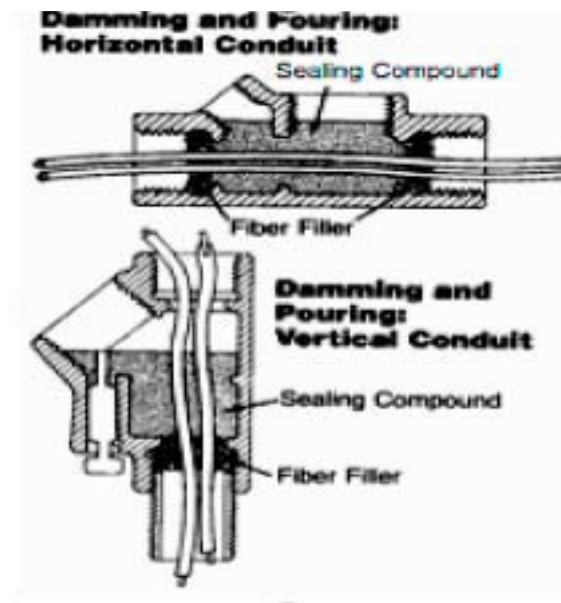
1. Complete the previous operations to prepare the motor deck for service of the motor, turbine or belt.
2. Replace the defective component.
3. Secure the motor with the bolts provided.
4. Reconnect the ground wire.
5. Match the height of the first the groove of the turbine sheave to the first groove of the motor sheave to insure belt alignment. The motor sheave and be adjusted by sliding the shaft bushing up.
6. Using a torque wrench, tighten the locking bolts to 15 pounds.
7. Install the belt and tension to provide 1/2" deflection in the center of the belt
8. Hand spin the motor sheave to insure proper alignment, verify by taking a second height measurement to the first groove.
9. Install the ground wire on the turbine and snug up the turbine nuts. Do not over tighten, turbine studs are hardened.
10. Apply a bead of silicone around the turbine and smooth bead.
11. Let silicone seal cure before assembly.
12. Connect the vacuum to the power source and switch on.
13. Cover the inlet with a piece of wood or cardboard to compress the housing spacers and re-clamp with toggle clamps located on each of the vacuum housings.

# INSPECTION & MAINTENANCE

## Power Cord and Seal Replacement

**WARNING:** The power cord should be replaced if upon inspection, the insulation shows any deterioration or visible damage that has penetrated the insulation and exposed the individual wires. It must be replaced with a 12 gauge SO series cable rated for the appropriate phase.

1. Switch the vacuum off and disconnect from the power supply.
2. Disconnect the cord wires from the motor starter and ground connection
3. Remove the strain relief and the cover of the cable sealing fitting.
4. Using a screw driver remove the potting material seal.
5. Reinstall the strain relief and measure the amount of wire needed and where the insulation comes to the beginning of the opening of the potting chamber.
6. Use the Appleton # ACK6F-A kit which includes the fiber material and cement.
7. Use the fiber material to form a dam so the cement will stay in the chamber until it hardens. Also, make sure that the wires are separated to allow the cement to fill in between them.
8. Mix and fill the cement into the opening to a level just below the opening of the access plug.
9. Connect the power cord wires to the starter and ground terminal.
10. Insure that the cement has cured and that the seal is present around all wires.
11. Install the access plug and securely tighten.
12. Re-install the control box cover and secure all bolts.
13. Tighten the strain relief nut so that the cable is secure.





# TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Insufficient Vacuum Pressure	- Dustpan improperly seated	- Remove dustpan, inspect seal, replace dustpan.
	- Filter clogged or improperly seated	- Follow filter inspection procedure, section IV.
	- Clogged hose	- Remove hose and re-inspect vacuum pressure, if vacuum pressure returns to normal, snake hose.
	- Unit is improperly sealed	- Block the inlet with a flat and rigid material to place the unit under vacuum pressure then inspect for air leaks.
Air Leaks	- Worn or poorly seated seals, fasteners improperly installed	- Block the inlet with a flat and rigid material to place the unit under vacuum pressure then remove fasteners and turn the unit off. Inspect all seals for completeness, then reseal secure components, again under vacuum pressure.
Material In Exhaust; On Top Side of Filter	- Poor filter seal or torn filter	- Follow filter inspection procedure in previous pages.
Unusual or High Pitched Noises	- Motor bearing, turbine bearing	- Follow belt/turbine/motor inspection procedure in previous pages. Check motor and turbine bearing for noise by hand.
	- Worn or poorly seated seals, Fasteners improperly installed	- Block the inlet with a flat and rigid material to place the unit under vacuum pressure then remove fasteners and turn the unit off. Inspect the seals for damage, then reseal and secure components again under vacuum pressure.
	- Belt worn, cracked, damaged, stretched, loose	- Follow belt/turbine/motor inspection procedure in previous pages.

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Notes:



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# TERMS & CONDITIONS

**ACCEPTANCE:** The terms and conditions of sale set forth herein apply to any order accepted or acknowledged by RUWAC, Inc. Buyer's acceptance of RUWAC'S proposal or delivery of all or any part of the goods covered hereunder constitutes acceptance of the terms and conditions of sale contained herein, and RUWAC hereby rejects any additions to or modification to these terms and conditions. Any representations, promises, warranties, or statements by RUWAC or its agents that differ in anyway from these terms and conditions shall be given no force or effect. No contract is final until accepted in writing by RUWAC at its corporate office in Holyoke, Massachusetts.

**PRICES:** Prices quoted orally expire the same day they are made unless accepted in writing on that day or confirmed by written communication by RUWAC. Written price quotations are guaranteed for thirty (30) days after the date issued, but may be terminated by written notice within that period. After thirty (30) days, any written price quotations are subject to adjustment to reflect prices in effect at the time of shipment, including any changes in packing, storage, or shipping charges. This order or proposal includes only the equipment specified herein, and does not include freight or installation of RUWAC equipment. All prices are F.O.B. RUWAC'S plant in Holyoke, Massachusetts and are exclusive of all taxes, levies, and duties that may be assessed in connection with the sale or delivery of goods, and Buyer shall be responsible for all such taxes, levies, and duties. In the event RUWAC pays any such tax, levy, or duty, Buyer shall promptly reimburse RUWAC therefore. Any packaging requirements other than RUWAC'S standard packaging and commercial container will be invoiced as an extra charge.

**PAYMENT:** Payment is due in full thirty (30) days after the date of invoice. All invoices paid after the due date will be assessed a late payment charge of one and half percent (1.5%) per month or any portion thereof, or the maximum amount allowed by applicable law, whichever is less. Buyer shall be responsible for all costs of collection, including reasonable legal fees. Sales on the foregoing terms are subject to the approval of RUWAC'S credit department and may be changed at any time at RUWAC'S sole discretion. If RUWAC has reasonable grounds with respect to Buyer's ability or willingness to make timely payments for the goods, RUWAC may at any time suspend performance, decline to ship, or require advance payment in cash or other adequate assurance satisfactory to RUWAC.

**SHIPMENTS AND DELIVERY:** RUWAC shall use its reasonable efforts to meet all shipment or delivery dates recited in RUWAC'S proposal or in Buyer's order but any such dates are estimated only and are not guaranteed. RUWAC shall have no liability to Buyer for damages or penalties, direct or indirect, for any delay in shipment or delivery, whether such delay is minor or substantial, nor shall Buyer have the right to declare a breach of contract because of any such delay. In any event, delivery schedules are based upon the effective date of the order and are subject to prompt receipt by RUWAC of all necessary down payments, information and instructions from Buyer, including any required approval of drawings. RUWAC shall have the right to make partial shipments, and invoiced covering the same shall be payment terms hereof. RUWAC will attempt to ship in accordance with Buyer's instructions, but RUWAC will make the final selection of a method of shipment and a carrier unless Buyer clearly and conspicuously specifies that shipment must be by a particular method of carrier. RUWAC is not responsible for damage or loss in transit, and all such claims must be by Buyer directly against the carrier.

**CHANGE ORDERS:** RUWAC shall not be obligated to make any changes in or additions to the scope of the work which are initiated by Buyer or result from circumstances beyond RUWAC'S control unless there is an equitable adjustment in price and or delivery.

**CANCELLATION, SUSPENSION OR DELAY:** In the event Buyer requests or causes a cancellation, suspension or delay in any RUWAC'S work under this proposal or order based thereon, Buyer shall indemnify and pay to RUWAC all appropriate charges, including but not limited to any costs, expenses, and commitments incurred by RUWAC up to the date of receipt of notice of such cancellation, suspension or delay, plus RUWAC'S overhead and reasonable profit. If shipment is delayed on account of Buyer, the purchase price shall be due and payable as if delivery had been made. Additionally, all charges related to storage, disposition and/or resumption of work, at RUWAC'S plant or elsewhere, shall be for Buyer's sole account and Buyer thereto shall assume all risks incidental.

**CLAIMS: NOTICE OF DEFECTS:** Buyer shall give written notice of rejection of any shipment or portion thereof within thirty (30) days after the date of shipment specifying the reasons therefore. Failure to give such notice shall be deemed a waiver of any right of rejection and any claim with respect thereto (except as to claims under the warranty) and shall be deemed an acceptance of such shipment. Buyer shall set aside and hold rejected goods without further processing until RUWAC has an opportunity to inspect and advise of the disposition, if any, to be made of such goods. In no event shall any rejected goods be returned reworked, or scrapped by Buyer without the express written authorization of RUWAC.

**INSPECTION OF EQUIPMENT:** RUWAC shall have the right to inspect, after prior notices, the equipment supplied by it when in operation. If Buyer requires, RUWAC shall execute an appropriate secrecy agreement.

**CONFIDENTIALITY:** All proposals, drawings, diagrams, specification, pricing, and other materials relating to the goods included are the property and confidential information of RUWAC. Buyer shall not disclose such material or information without the written approval of RUWAC.

**BACK CHARGE:** RUWAC will pay claims for expenses of Buyer relating to labor and/or material supplied by Buyer only if (a) RUWAC is advise in writing before such expenses are incurred (2) RUWAC gives Buyer its prior written consent to the supply of such labor and/or material by buyer.

**LIMITED WARRANTY:** RUWAC warrants that new equipment which are complete units and are sold and/or manufactured by RUWAC, Inc. will be free from defects in material and workmanship for a period of 18 months from date of shipment or 12 months from date of start-up, whichever comes first. RUWAC warrants that replacement parts sold hereunder will be free from defects in material and workmanship for a period of 120-days after the date of shipment. RUWAC machines that have been completely re-built at the factory will carry a 180-day warranty from date of shipment. All field repairs by authorized RUWAC service personnel are covered by a 120-day parts only warranty. RUWAC, Inc. will not assume any responsibility under the terms of this limited warranty on equipment, which have not been paid for in full. This warranty does not apply to any equipment that has been disassembled, repaired, or otherwise altered by any person without the written authorization of RUWAC'S service department, nor does it apply to any product that has been subject to failure due to corrosive or abrasive attack, misused, damaged, or improperly installed, nor does it apply to motors, controls, and components not manufactured by RUWAC, Inc. Motors, controls, and other Sub vendor's components therefore are warranted only to the extent of the manufacturer's warranty. All warranty work on such products must be authorized by RUWAC, Inc. and must be performed in an authorized shop as designated by the manufacturer. RUWAC sole liability and buyer's sole and exclusive remedy hereunder is the replacement or repair at RUWAC'S option of products not complying with this warranty. Such repair or replacement shall be F.O.B. RUWAC'S factory, and RUWAC reserves the right to invoice all expenses incurred when repairs are made in the field at the request of the customer, except as specifically set forth herein, RUWAC makes no warranty express or implied, with respect to the products and/or service supplied hereunder, this warranty is in lieu of and excludes all other warranties, including without limitation, any warranty of merchantability, fitness for a particular purpose, or conformance to purchaser's specifications.

**LIMITATION OF LIABILITY:** RUWAC'S responsibility with respect to the goods and RUWAC'S obligations related thereto should in no event exceed the purchase price of the goods. RUWAC shall not be liable to Buyer for any special incidental, indirect, or punitive damages for any reason whatsoever, including, but without limitation damages in the form of (a) loss of profits, revenues, or anticipated savings resulting from the failure of the equipment to meet specifications or warranties (b) damages suffered by Buyer as a result of loss of production facilities or equipment (c) cost of replacement equipment (d) damages suffered by customers of the Buyer (e) any fines or penalties assessed for failure to comply with any law or government regulations.

**REPAIR OF GOODS EXPOSED TO HAZARDOUS, TOXIC, OR INFECTIOUS MATERIAL:** Buyer shall ensure that any goods submitted by Buyer or any of its customers to RUWAC for repairs or other service have been decontaminated and cleaned (including sterilization, if appropriate) of any hazardous, toxic or infectious materials, including without limitation any materials listed by the Environmental Protection Agency, OSHA, or any applicable state law as deserving or requiring special treatment. Upon RUWAC'S request, Buyer or its customer shall certify in writing that such goods contain no such hazardous, toxic, or infectious materials, and that such decontamination has taken place in accordance with accepted parties and in accordance with all applicable laws and regulations. If special safety equipment is required to protect RUWAC'S service personnel from any such hazardous, toxic, or infectious materials during field service work or otherwise. Buyer shall ensure that such safety equipment is provided and that the personnel are properly instructed. The provision of this paragraph shall apply to all work to be performed by RUWAC'S service personnel at any time, whether or not covered by warranty. Buyer shall defend and indemnify RUWAC for any and all losses, liabilities, expenses, and damages (including attorneys' fees) arising out of any failure of buyer or its customer to comply fully with the terms of this paragraph.

**BUYER SUPPLIED DATA:** Buyer acknowledges that RUWAC has relied upon all specifications and other data supplied by Buyer to RUWAC in the selection and design of the equipment and the preparation of this proposal. In the event the site operating conditions differ from those represented by Buyer and relied upon by RUWAC, any warranties or performance guarantees contained herein affected by such conditions shall be null and void, unless otherwise mutually agreed upon in writing.

**REMEDIES OF SELLER:** In addition to any other remedies of RUWAC provided hereby or by law, in the event Buyer becomes bankrupt, insolvent, assigns assets for the benefit of creditors or its financial condition has substantially deteriorated, RUWAC may, at its sole option, declare a breach of contract, stop all work hereunder or demand payments in advance as security for its performance hereunder.

**FACTIONS: GOVERNING LAW:** Any dispute, controversy, or claim against RUWAC with respect to the goods or any of RUWAC'S obligations related thereto must be commenced within one year from the date of shipment. All contract between Buyer and RUWAC shall be governed by and construed in accordance with the laws of the state of Massachusetts except that body of laws controlling conflict of laws.

**BONDS:** In addition to the price specified herein, Buyer shall pay the cost of any bonds, which Buyer requires RUWAC to obtain.

**ENTIRE AGREEMENT:** These terms and conditions, together with the provisions of the proposal constitute the entire agreement between the parties pertaining to the goods, and they supersede any prior or contemporaneous agreements, representations, or understandings between the parties. No waiver or modification of these terms and conditions is binding unless such waiver or modification is set out in writing signed by an authorized manager or officer of RUWAC. RUWAC'S failure to strictly enforce any right on one occasion does not constitute a waiver of that or any on any other occasion.

# GROUNDING INSTRUCTIONS

## ABOUT RUWAC'S FRV UNITS AND GROUND:

- ALL DS2 UNITS ARE CONSTRUCTED OF FIBERGLASS COMPOSITE HOUSING TO ENSURE THEY ARE FULLY GROUNDED AND STATIC DISSIPATING DURING OPERATION
- PERIODIC TESTING MUST BE PERFORMED TO ENSURE CONTINUITY IN GROUND TO AVOID STATIC BUILD UP AND EXPLOSION PREVENTION
- A STANDARD OHM READER WON'T BE ABLE TO DETECT ACCURATE GROUNDING, THEREFORE A MEGOHMMETER MUST BE USED INSTEAD

## ELECTRIC MODELS

The following is a list of parts that should periodically be checked for continuity. Please note that while all clamps are grounded, they should still be tested in relation to each other and other parts.

- Inlet to line ground should measure in at less than 1 megohm (<1 MΩ)
- Vacuum hose end to end should measure in at less than 1 megohm (<1 MΩ)
- Clamp to clamp should measure in at less than 1 megohm (<1 MΩ)
- Clamp to inlet should measure in at less than 1 megohm (<1 MΩ)
- Clamp to line ground should measure in at less than 1 megohm (<1 MΩ)

## AIR-POWERED MODELS

All air-powered models do not have any moving parts, therefore they are intrinsically safe upon originally assembly.

- Inlet to retractable grounding reel should measure in at less than 1 megohm (<1 MΩ)
- Clamp to clamp should measure in at less than 1 megohm (<1 MΩ)
- Clamp to inlet should measure in at less than 1 megohm (<1 MΩ)
- Clamp to retractable grounding reel measure in at less than 1 megohm (<1 MΩ)

**Only Ruwac explosion proof accessories should be used alongside your DS2-EX unit. Using any other accessories will compromise the grounding of your machine, potentially rendering it defenseless against safe collecting combustible dust and creating a dangerous environment.**