OXIDATION
TECHNOLOGIES, LLC.

CDU-10k Ozone Destruct System

Installation and Operation Manual

Table of Contents

Cautions, Warnings and Hazards Concerning Exposure To The Catalyst

NOTE: The catalyst is sealed inside of the CDU-10K unit. The catalyst will not be exposed to you if the container remains sealed and free of damage.

CATALYST EXPOSURE RISKS - ACCUTE EFFECTS

NOTE: This section **ONLY** applies if the CDU-10K container has been broken or opened up.

1. Eye Contact
    - May cause eye irritation.
2. Skin Contact
    - May cause skin irritation or dehydrating of skin.
3. Inhalation
    - May cause nose, throat and lung irritation.
4. Ingestion
    - Irritating to mouth, throat, and stomach.

Carulite-200 is used as ozone destruct catalyst
Carulite-200 SDS: https://www.oxidationtech.com/downloads/ozone_destruct/Carulite-200_MSDS-24.pdf

EMERGENCY AND FIRST AID PROCEDURES FOR HAVING BEEN EXPOSED TO THE CATALYST

(If the CDU-10K container has been broken or has been opened up, the following list applies.)

Eyes:
- Immediately flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Seek medical attention if irritation persists.

2. Skin
    - Flush contaminated areas with large amounts of water. Remove contaminated clothing. Wash clothing before reuse.
3. Inhalation
    - Remove person to fresh air. If breathing is difficult, administer oxygen. Seek medical attention.
4. Ingestion
    - Never give anything by mouth to an unconscious or convulsing person. If conscious, give large quantities of water. Do not induce vomiting. Seek medical attention. The material itself inside the CDU-10K Series Destruct Units is noncombustible but may accelerate the burning of combustible material.

1. Identification

Product identifier CARULITE® 200 CATALYST

Other means of identification

SDS number -

Recommended use Air purification media for the destruction of ozone and odors.

Recommended restrictions Use in accordance with supplier's recommendations.

Manufacturer/Importer/Supplier/Distributor information

Company name CARUS LLC

Address 315 Fifth Street,
Peru, IL 61354, USA

Telephone +1 815 223-1500 - All other non-emergency inquiries about the product should be directed to the company

E-mail salesmkt@carusllc.com

Website www.carusllc.com

Contact person Shelley Corban

Emergency Telephone For Hazardous Materials [or Dangerous Goods] Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC at

CHEMTREC®, USA: 001 (800) 424-9300

CHEMTREC®, Mexico (Toll-Free - must be dialed from within country): 01-800-681-9531

CHEMTREC®, Other countries: 001 (703) 527-3887

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards	Acute toxicity, oral	Category 4
	Acute toxicity, inhalation	Category 4
	Specific target organ toxicity, repeated exposure (inhalation)	Category 2 (brain)
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Warning

Hazard statement Harmful if swallowed. Harmful if inhaled. May cause damage to organs (Brain) through prolonged or repeated exposure by inhalation. Toxic to aquatic life.

Precautionary statement

Prevention	Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid release to the environment.
Response	If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell.
Storage	Store away from incompatible materials.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) This product is a metal mixture and based on 28-day Transformation/Dissolution testing, does not meet the definition of environmentally hazardous.

Supplemental information None.

Mixtures

Chemical name	CAS number	%
Manganese dioxide	1313-13-9	40 - 70
Copper oxide	1317-38-0	15 - 40

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The manufacturer has claimed the exact percentage as trade secret under the OSHA Hazard Communication Standard.

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.

Skin contact Remove contaminated clothing. Wash off with soap and water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops or persists.

Ingestion Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical advice/attention if you feel unwell. Never give anything by mouth to a victim who is unconscious or is having convulsions.

Most important symptoms/effects, acute and delayed Dusts may irritate the respiratory tract, skin and eyes. Prolonged exposure may cause chronic effects.

Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

Fire-fighting measures	
Suitable extinguishing media	Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media	None.
Specific hazards arising from the chemical	During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Carbon oxides (COx). Metal oxides.
Special protective equipment and precautions for firefighters	Firefighters should wear full protective clothing including self contained breathing apparatus. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.
Fire fighting equipment/instructions	Use water spray to cool unopened containers. Cool containers exposed to flames with water until well after the fire is out. Move container from fire area if it can be done without risk. In case of fire and/or explosion do not breathe fumes.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	Not itself combustible but assists fire in burning materials.

3. Composition/information on ingredients

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Local authorities should be advised if significant spillages cannot be contained. Do not breathe dust.
Methods and materials for containment and cleaning up	Stop the flow of material, if this is without risk. Dike far ahead of spill for later disposal. Following product recovery, flush area with water. For waste disposal, see Section 13 of the SDS.
Environmental precautions	Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Minimize dust generation and accumulation. Provide adequate ventilation. Handle and open container with care. Do not breathe dust/fume/gas/mist/vapors/spray. Do not taste or swallow. Do not eat, drink or smoke when using the product. Avoid prolonged exposure. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Wash contaminated clothing before reuse. Avoid release to the environment. Observe good industrial hygiene practices. Avoid contact with eye, skin and clothing.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in original tightly closed container. Store in a cool, dry place out of direct sunlight. Keep out of reach of children. Use care in handling/storage. Store away from incompatible materials (See Section 10).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Manganese dioxide (CAS 1313-13-9)	Ceiling	5 mg/m3

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Copper oxide (CAS 1317-38-0)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Manganese dioxide (CAS 1313-13-9)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Copper oxide (CAS 1317-38-0)	TWA	0.1 mg/m3	Fume.
Manganese dioxide (CAS 1313-13-9)	STEL	3 mg/m3	Fume. TWA 1 mg/m3 Fume.

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If material is ground, cut, or used in

any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. Ventilate as needed to control airborne dust. Observe occupational exposure limits and minimize the risk of inhalation of dust. Eye wash facilities and emergency shower must be available when handling this product. Provide adequate ventilation.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear dust-resistant safety goggles where there is danger of eye contact.
Skin protection	
Hand protection	Wear protective gloves. Suitable gloves can be recommended by the glove supplier.
Skin protection	
Other	Wear suitable protective clothing. Use of an impervious apron is recommended.
Respiratory protection	When engineering controls are not sufficient to lower exposure levels below the applicable exposure limit, use a NIOSH approved respirator for dusts. In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter. Seek advice from local supervisor.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Keep away from food and drink.

9. Physical and chemical properties

Appearance

Physical state	Solid.
Form	Granular.
Color	Brown or black.
Odor	Odorless.
Odor threshold	Not applicable.
pH	Not applicable (insoluble in water).
Melting point/freezing point	Property has not been measured.
Initial boiling point and boiling range	Property has not been measured.
Flash point	Not applicable (solid).
Evaporation rate	Not applicable (solid).
Flammability (solid, gas)	Non flammable.

Upper/lower flammability or explosive limits

Explosive limit - lower (%)	Not applicable (solid).
Explosive limit - upper (%)	Not applicable (solid).
Vapor pressure	Property has not been measured.
Vapor density	Not applicable (solid).
Relative density	Property has not been measured.

Solubility(ies)

Solubility (water)	Insoluble in water.

Partition coefficient	Not applicable, product is a mixture. **(n-octanol/water)**
Auto-ignition temperature	Not applicable (solid).
Decomposition temperature	1299.2 °F (704 °C)
Viscosity	Not applicable (solid).

Other information

Bulk density	800 - 900 kg/m3
Kinematic viscosity	Not applicable (solid).

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable under normal temperature conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Avoid incompatible materials and intense heat.
Incompatible materials	Oxidizing material. Combustible material. Organic material. Reducing agents. Halogenated compounds. Strong acids. Aluminum.
Hazardous decomposition products	Copper fumes. Carbon oxides. Metal oxides.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Harmful if inhaled. Dust may irritate respiratory system or lungs.
Skin contact	Dust/mist may irritate skin.
Eye contact	Dust in the eyes may cause irritation.
Ingestion	Harmful if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	Dust may irritate the respiratory tract, skin and eyes. Prolonged exposure may cause chronic effects.

Information on toxicological effects

Acute toxicity Harmful if inhaled or swallowed.

Components	**Species**	**Test Results**
Copper oxide (CAS 1317-38-0)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg, 24 Hours (OECD Test Guideline 402)
Oral		
LD50	Rat	> 2500 mg/kg (OECD Test Guideline 423)

Skin corrosion/irritation Dust may cause skin irritation.

Corrosivity

Manganese dioxide (CAS 1313-13-9)	OECD 404, EU Method B.4 Result: Not irritating. Species: Rabbit
Copper oxide (CAS 1317-38-0)	OECD Test Guideline 404 Result: Not irritating. Species: Rabbit

Serious eye damage/eye irritation Dust may cause eye irritation.

Eye

Manganese dioxide (CAS 1313-13-9)	OECD 405, EU Method B.5 Result: Not irritating. Species: Rabbit
Copper oxide (CAS 1317-38-0)	OECD Test Guideline 405 Result: Not irritating. Species: Rabbit

Respiratory or skin sensitization Not classified.

Respiratory sensitization Not classified.

Skin sensitization Not classified.

Skin sensitization

Copper oxide (CAS 1317-38-0)	OECD Test Guideline 406 Result: Not sensitizing. Species: Guinea pig

Germ cell mutagenicity Not classified.

Carcinogenicity Not classified.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Reproductive toxicity	Not classified.
Specific target organ toxicity single exposure	Not classified.
Specific target organ toxicity repeated exposure	May cause damage to the following organs through prolonged or repeated exposure: Brain.
Aspiration hazard	Not classified.
Chronic effects	Prolonged exposure, usually over many years, to manganese oxide fume/dust can lead to chronic manganese poisoning, chiefly affecting the central nervous system.
Further information	Chronic exposure to breathing low levels of manganese dust or fume over a long period of time can result in "manganism," a disease of the central nervous system similar to Parkinson's Disease, gait impairment, muscle spasms and behavioral changes. Frequent inhalation of dust over a long period of time increases the risk of developing asthma, chronic lung diseases, and skin irritation. Prolonged exposure, usually over many years, to manganese oxide fume/dust can lead to chronic manganese poisoning, chiefly affecting the central nervous system.

12. Ecological information Ecotoxicity Toxic to aquatic life. The product components are not classified as environmentally hazardous.

However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. A 28-day Transformation/Dissolution protocol test was conducted with this product at a 1 mg/L loading in a standard aqueous medium at pH 6. The 7 and 28 days release factors for copper were 1.82% and 4.35%, respectively. For manganese, no concentrations were measured above the validated and accredited reporting limits after 7 and 28 days of extraction (limit of 5 µg/L).

The implementation of the GHS classification system, taking into account the results of the T/Dp test, results in an Aquatic Acute 2 classification for the product; this classification is driven by the presence of copper (as CuO). Under CLP (EU-implementation of GHS) there is no environmental classification for the product.

Components		Species	Test Results
Manganese dioxide (CAS 1313-13-9) **Other**			
Other	EC50	Activated sewage sludge	> 1000 mg/l, 3 hr
	NOEC	Activated sewage sludge	1000 mg/l

Persistence and degradability No data available. **Bioaccumulative potential** No data available.

Mobility in soil Not available.

Mobility in general The product is insoluble in water. **Other adverse effects** None known.

13. Disposal considerations

Disposal instructions Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose in accordance with all applicable regulations. Do not allow this material to drain into sewers/water supplies.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods. **IATA**

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code This product is not intended to be transported in bulk.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Copper oxide (CAS 1317-38-0) Listed. Manganese dioxide (CAS 1313-13-9) Listed.

SARA 304 Emergency release notification Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Toxic Substances Control Act (TSCA) All components of the mixture on the TSCA 8(b) inventory are designated "active".

Superfund Amendments and Reauthorization Act of 1986 (SARA) SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Classified hazard categories Acute toxicity (any route of exposure) Specific target organ toxicity (single or repeated exposure) **SARA 313 (TRI reporting)**

Chemical name	CAS number	% by wt.
Copper oxide	1317-38-0	15 - 40

Manganese dioxide	1313-13-9	40 - 70

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Manganese dioxide (CAS 1313-13-9)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act Contains component(s) regulated under the Safe Drinking Water Act. **(SDWA)**

US state regulations

US. Massachusetts RTK - Substance List Not regulated.

US. New Jersey Worker and Community Right-to-Know Act

Copper oxide (CAS 1317-38-0) Manganese dioxide (CAS 1313-13-9)

US. Pennsylvania Worker and Community Right-to-Know Law

Copper oxide (CAS 1317-38-0)
Manganese dioxide (CAS 1313-13-9) **US. Rhode Island RTK**

Not regulated.

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Industrial Chemicals (AICIS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	24-July-2014
Revision date	18-February-2022
Version #	04
HMIS® ratings	Health: 2* Flammability: 0 Physical hazard: 0
NFPA ratings	
References	HSDB® - Hazardous Substances Data Bank Registry of Toxic Effects of Chemical Substances (RTECS)
Disclaimer	The information contained herein is accurate to the best of our knowledge. However, data, safety standards and government regulations are subject to change and, therefore, holders and users should satisfy themselves that they are aware of all current data and regulations relevant to their particular use of product. CARUS LLC DISCLAIMS ALL LIABILITY FOR RELIANCE ON THE COMPLETENESS OR ACCURACY OR THE INFORMATION INCLUDED HEREIN. CARUS LLC MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTIABILITY OR FITNESS FOR PARTICULAR USE OR PURPOSE OF THE PRODUCT DESCRIBED HEREIN. All conditions relating to storage, handling, and use of the product are beyond the control of Carus LLC, and shall be the sole responsibility of the holder or user of the product. (Carus and design) is a registered service mark of Carus LLC. CARULITE® is a registered trademark of Carus LLC.

Contact

Oxidation Technologies, LLC
PO Box 29
214 US Highway 18 Inwood,
IA 51240

Phone: 515-635-5854
Sales Inquires: sales@oxidationtech.com

Website: www.oxidationtech.com

CARUS
AIR



CARULITE® 200 GRANULAR CATALYST

FACT SHEET

CARULITE® 200 catalyst is used to effectively destroy ozone emitted from various off-gas emissions, converting toxic ozone to oxygen.

PARTICLE SIZES AVAILABLE

4 x 8 mesh granular (4.8 mm x 2.4 mm)

8 x 14 mesh granular (2.4 mm x 1.4 mm)

CHEMICAL/PHYSICAL DATA

Formula	Manganese dioxide/copper oxide catalyst
Appearance	Black/dark brown granular
Bulk Density	0.75-0.89 g/cc
Surface Area	≥ 200 m^2/g
Weight Loss	< 1%

SUGGESTED OPERATING CONDITIONS

- Vertically-oriented vessel with top-down air flow
- ≤ 5,000 hr^{-1} Gas Hourly Space Velocity
- ≥ 2.2 ft/sec (0.66 m/sec) Linear Velocity
- In humid applications pre-heat the air prior to the catalyst bed ~15° F (9° C) above ambient temperature to prevent condensation of moisture on the surface of the catalyst.

CATALYST POISONS

Minimize or avoid contact with: sulfur compounds, halogenated compounds, hydrocarbons, heavy metals, NOx, and silica.

APPLICATIONS

Potable water off-gas
Wastewater off-gas
Corona treater emissions
Office equipment emissions
Chemical processing emissions

SHIPPING CONTAINERS

Dependent upon the mesh size required, the CARULITE 200 catalyst is shipped in 20 kg net weight pails or in 136 kg net weight drums.

HANDLING, STORAGE, AND INCOMPATIBILITY

Although CARULITE 200 catalyst is not a hazardous substance, it should be handled with care. Protective equipment in handling should include safety glasses or goggles and rubber or plastic gloves. In cases where high dust exposure may exist, the use of NIOSH-MSHA dust respirator or an air-supplied respirator is advised.

The product should be stored in a cool, dry area in a closed container. Segregate from easily-oxidizable materials, peroxides, chlorates, and acids. Protect container against physical damage. Spillage should be collected and disposed of properly.

DISPOSAL

Unused CARULITE 200 catalyst is not considered a hazardous waste under U.S. 40 CFR 261. Dispose of used CARULITE 200 catalyst in a landfill approved to accept chemical waste, after verifying that it is not contaminated with hazardous substances through usage.

SHIPPING

CARULITE 200 catalyst is not regulated by the U.S. DOT. CARULITE 200 catalyst is shipped domestically as Class 85 and internationally as HTS Code 3815.90.3000.

Proper Shipping Name: Manganese Dioxide Compound

CARUS VALUE ADDED

LABORATORY SUPPORT

Carus Corporation has technical assistance available to its potential and current customers to answer questions, evaluate applications alternatives or perform laboratory testing. Our laboratory capabilities include: catalyst analysis, performance testing, process evaluations, and analytical services.

TECHNICAL SERVICES

As an integral part of our technical support, Carus provides in-house and on-site assistance. We offer full application services, including technical expertise, design recommendations, and follow-up support.

CARUS CORPORATION

For over 100 years, our dedication to research and development, technical support, and customer service has enabled Carus to become the world leader in permanganate, manganese, and catalyst oxidation technologies. Call Carus for assistance with specific applications.

CARUS CORPORATION — ONE COMPANY. ENDLESS SOLUTIONS

CORPORATE HEADQUARTERS | 315 Fifth Street, Peru IL 61354 | Tel + 1.815.223.1500 / 1-800-435-6856 | Fax + 1.815.224.6697 | Web: www.caruscorporation.com | E-Mail: salesmkt@caruscorporation.com

CARUS EUROPE | Parque Empresarial de ASIPO | C/Secundino Roces 3, Planta 1, Oficina 13-14 | 33428 Cayes, Llanera Spain | Tel +34.985.78.55.13 / Fax +34.985.78.55.10

Blower Specifications

REPUBLIC MANUFACTURING

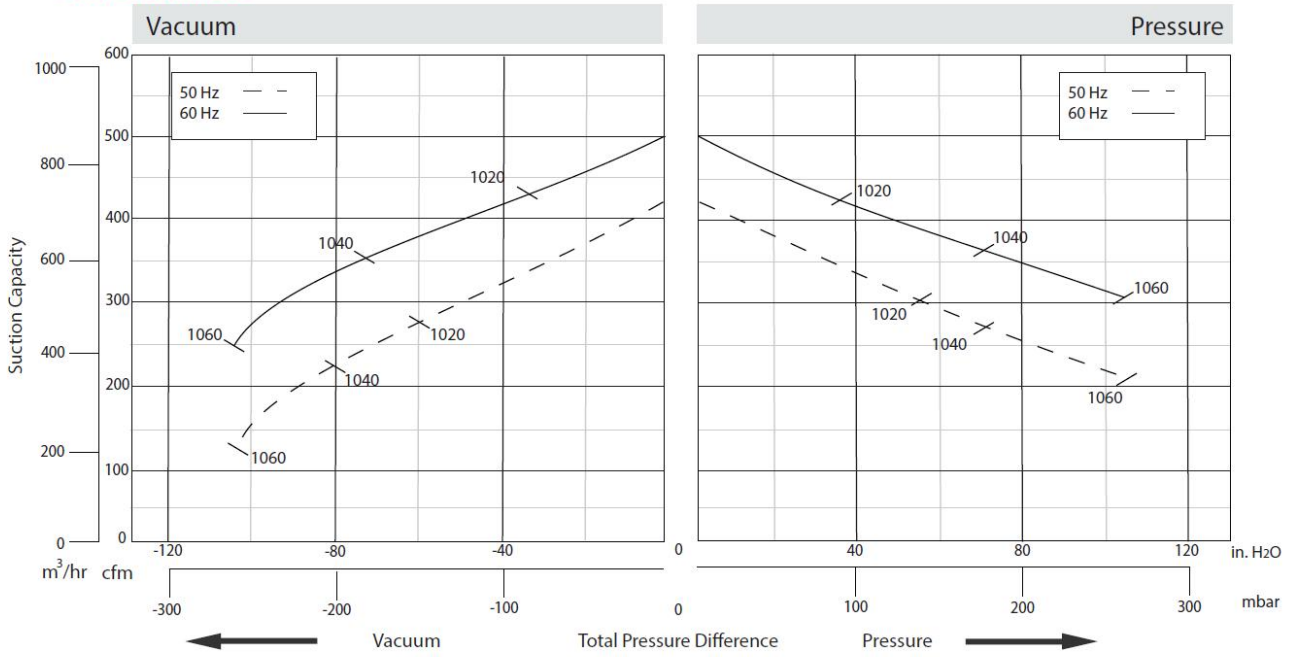
HRC 1020/1040/1060

REGENERATIVE BLOWERS

Republic offers a complete line of regenerative blowers for high vacuum or compressed air applications in both horizontal and vertical mounted positions. TEFC motors are rated for 50/60 Hz operation and are IE3, cUL, UL, and CE certified. The impeller is directly connected to the motor shaft, providing powerful air force without undue friction. The bearings are outside the compression chamber, ensuring maximum operational reliability under high differential pressure. Constructed in robust die-cast aluminum, this low-maintenance, oil-free design provides continuous, dependable service to our customers.

IE3
CC339B
CE
c UL us
E493872

PERFORMANCE



Model	Phase	Frequency (Hz)	Air flow (CFM/m³/hr)	Rated Vacuum (in. H_2O/mbar)	Rated Pressure (in. H_2O/mbar)	Motor (HP/kW)	Voltage (V)	Current (A)	Sound Level (dB)	Weight (lb/kg)
HRC 1020	3	50	412/700	60/150	56/140	5.8/4.3	190 △△/380 △	19.0 △△/9.5 △	70	126/57
		60	494/840	36/90	36/90	6.2/4.6	230 △△/460 △	19.0 △△/9.5 △	74	
HRC 1040	3	50	412/700	80/200	72/180	7.4/5.5	190 △△/380 △	25.8 △△/12.9 △	70	146/66
		60	494/840	72/180	72/180	8.4/6.3	230 △△/460 △	25.8 △△/12.9 △	74	
HRC 1060	3	50	412/700	108/270	104/260	10.0/7.5	190 △△/380 △	33.4 △△/16.7 △	70	153/69
		60	494/840	108/270	104/260	11.5/8.6	230 △△/460 △	30.0 △△/17.3 △	74	

The performance curves are based on air at a temperature of 59 °F and an atmospheric pressure of 29.91 inch Hg with a tolerance of +/-10%. The total pressure differences are valid for inlet and ambient temperatures up to 77 °F. Suction capacity relates to inlet conditions. Pressure capacity relates to atmospheric conditions. For other conditions please contact Republic. Three phase motor tolerances are +/-10% for fixed voltage motors and +/-5% for voltage range motors. Single phase machines are designed with a +/-5% tolerance. The frequency tolerance is +/-2% maximum.

Introduction and Application of the CDU-10K Ozone Destruct System

The CDU-10k Ozone Destruct System is a turnkey ozone destruct system implementing the CDU-10k ozone destruct unit with a heating system and blower to actively move air through the ozone destruct unit.

This system is rated and designed for 10,000 LPM (350 CFM) of airflow through the unit. Ozone levels in air above 10% by weight can flow through the destruct unit to ensure ozone is eliminated and air is safe for exhaust.

This system is designed to work well with dry air streams, wet air streams and saturated air streams. This same system will work with each, while additional installation consideration may be needed for saturated air streams.

Dry Air is defined as air directly from an ozone generation process that has been dried to a -40 deg F dew-point and has no potential of condensation in any conditions.

Wet Air is defined as humid air capable of condensation.

Saturated Air is defined as off-gas from an ozone water system, ozone gas was dissolved in water, the resulting off-gas is passing through the destruct system.

Theory of Operation

Catalytic Method refers to a process in which a catalyst is used to accelerate a chemical reaction without being consumed, by providing an alternative reaction pathway with lower activation energy.

The CDU-10K series Ozone Destruct Units utilize a catalytic method to remove excess ozone. The catalyst is a transition metal consisting of manganese dioxide and copper oxide material. It is not consumed by the ozone and acts as a true catalyst. The CDU-10K series are designed to achieve a 99.96% reduction to ozone levels at peak rated flow (10,000 LPM). This system includes a blower to flow air through the unit at 350 CFM of gas flow-rate.

These Ozone Destruct Devices are designed to have the ozone gas pass through the catalyst contained inside the destruct unit. This catalyst breaks down the ozone gas which can then be readmitted to the atmosphere.

Keep in mind that very high ozone levels at the inlet of the CDU-10K destruct system will result in some ozone at the exit. For example, ozone levels of 10,000 ppm at the inlet will cause a resulting ozone level of 4 ppm at peak flow conditions.

The catalytic ozone decomposition reactions are exothermic and will emit heat during the ozone destruction process. As a result, the stainless-steel shell of the destruct unit may become warm when operating at high ozone destruction capacity. Expect temperature up to 350 deg F at peak ozone levels of 10% or greater at peak flow-rate of 10,000 LPM. Operating at the max flow rate and max ozone flow will emit heat.

Installation

While handling the unit, you might experience some small fragments of the catalyst media coming out of the unit. This small amount of "dusting" is okay and expected. Remove the product caps which are sealing both ends of the unit.

The CDU-10k Ozone Destruct System is shipped as a turnkey package and requires minimal installation or set-up to be ready for operation.

Heat: The CDU-10K destruct unit will create heat during the ozone destruction process. Greater amounts of flow and ozone in that flow will create more heat. Ensure proper piping is used at the exhaust of the CDU-10K device (steel piping is best). Also ensure mounting brackets are used to dissipate heat from materials that cannot tolerate temperatures above 350-deg F.

Mounting

The CDU-10K Destruct System has 6 mounting feet with ½" Diameter holes that can be bolted to the floor or structure to maintain stability.

Piping

The CDU-10K Destruct System uses 4" NPT inlet and outlet fittings. Connect gas piping to these connections keeping in mind future serviceability. Union fittings within a reasonable distances of final connections are suggested.

Outlet piping must be a Metal piping rated for high temperatures for at least 10-feet of piping due to potential heat. After 10-feet CPVC or other piping may be used

Electrical

The CDU-10K Destruct System requires either 230 VAC, or 480 VAC 3-phase power for operation. In addition to this control wiring connections are available to provide external control and feed-back from the system.

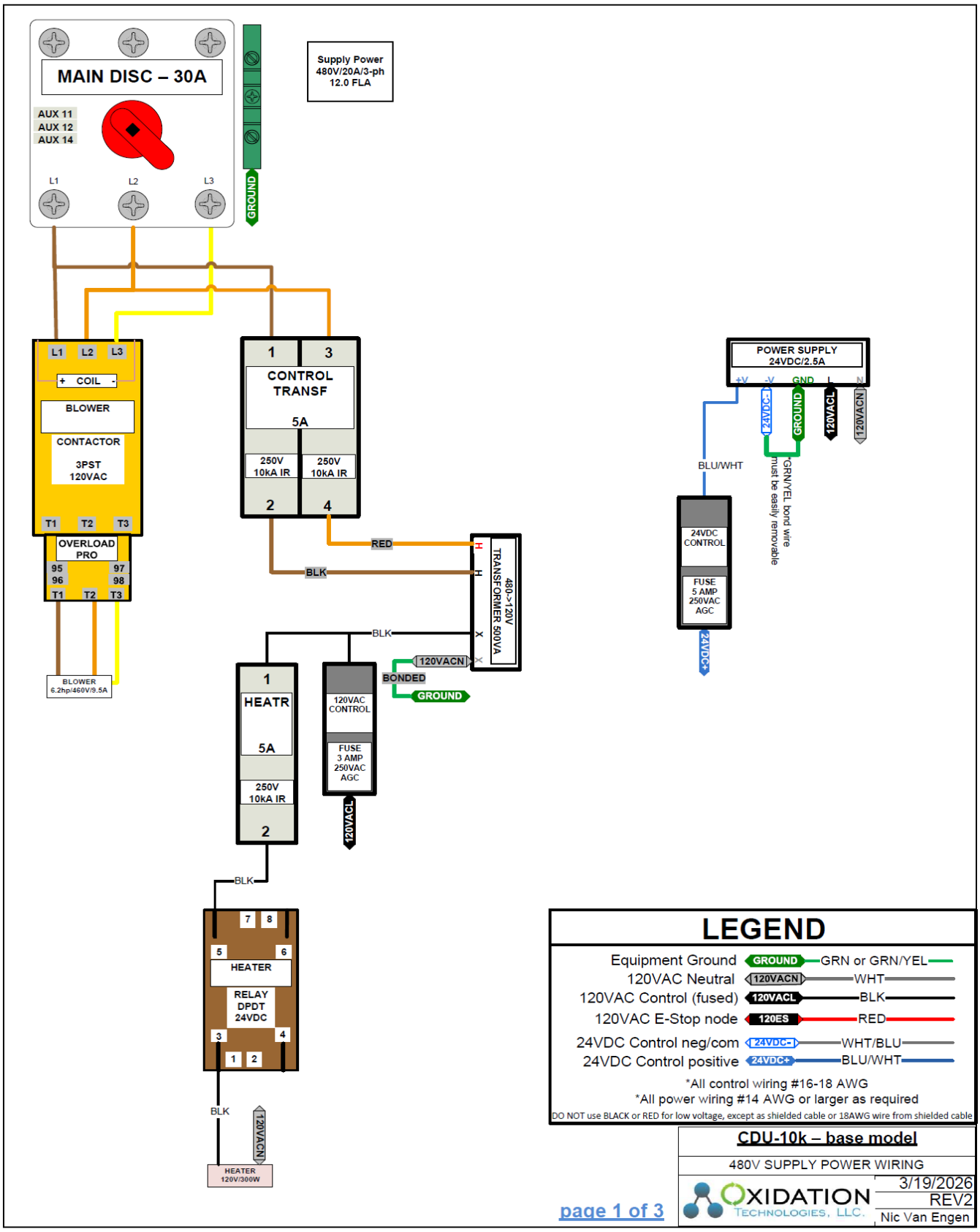
Required electrical power connections

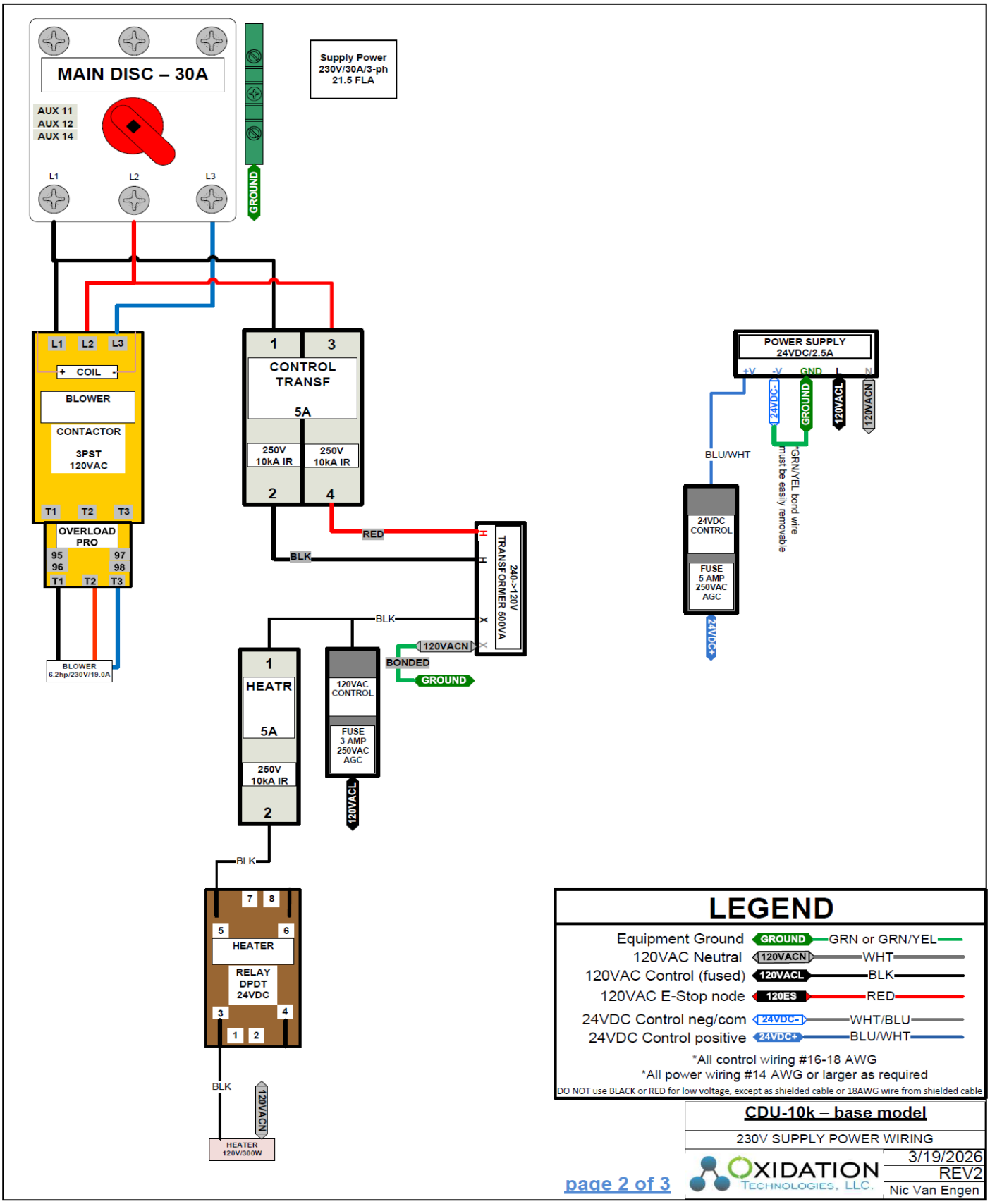
- 230 VAC, 3-Phase power – 30 amp breaker, 21.5 FLA
- 480 VAC, 3-phase power – 20 amp breaker, 12 FLA

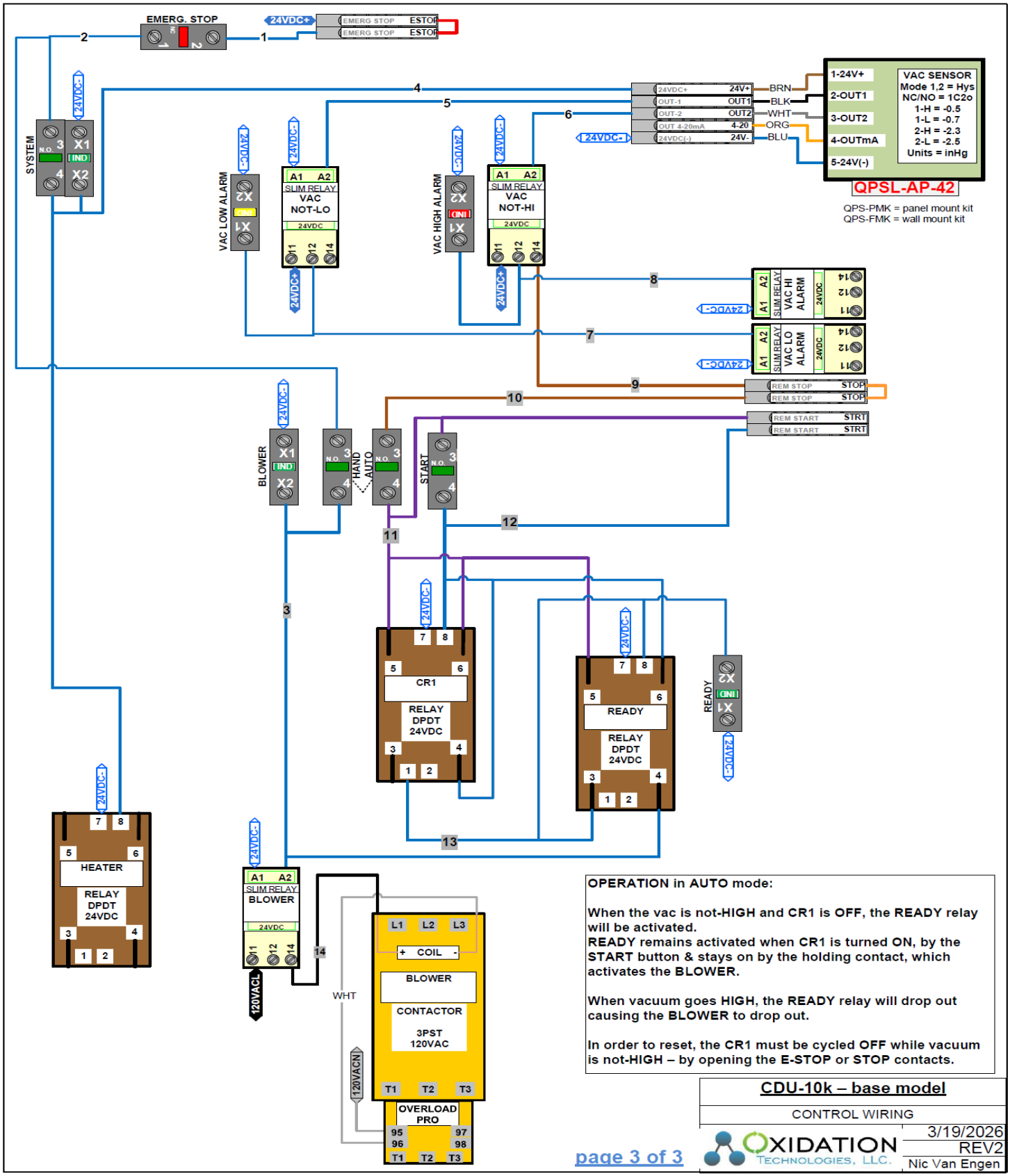
Optional Remote Connections

- Emergency Stop
- Vacuum Sensor HIGH Alarm
- Vacuum Sensor LOW Alarm
- Vacuum Sensor 4-20 mA output
- Remote Start

Wiring Diagrams







OPERATION in AUTO mode:

When the vac is not-HIGH and CR1 is OFF, the READY relay will be activated.
READY remains activated when CR1 is turned ON, by the START button & stays on by the holding contact, which activates the BLOWER.

When vacuum goes HIGH, the READY relay will drop out causing the BLOWER to drop out.

In order to reset, the CR1 must be cycled OFF while vacuum is not-HIGH – by opening the E-STOP or STOP contacts.

CDU-10k – base model

CONTROL WIRING

page 3 of 3

OXIDATION TECHNOLOGIES, LLC.

3/19/2026
REV2
Nic Van Engen

Heater Band

A heater band is installed onto the CDU-10k Ozone Destruct System to ensure moisture in the gas stream cannot condensate on the catalyst media. This is pre-installed, wired and insulated on all systems.

The heater ensures proper operation in wet gas stream applications.

The heater band is be powered by 120 VAC from within the control panel.

The heater band will create some heat and make the unit warm to the touch. Overall heat should not be higher than 150 deg F.

Power Requirements for the Heater Band
300 watts

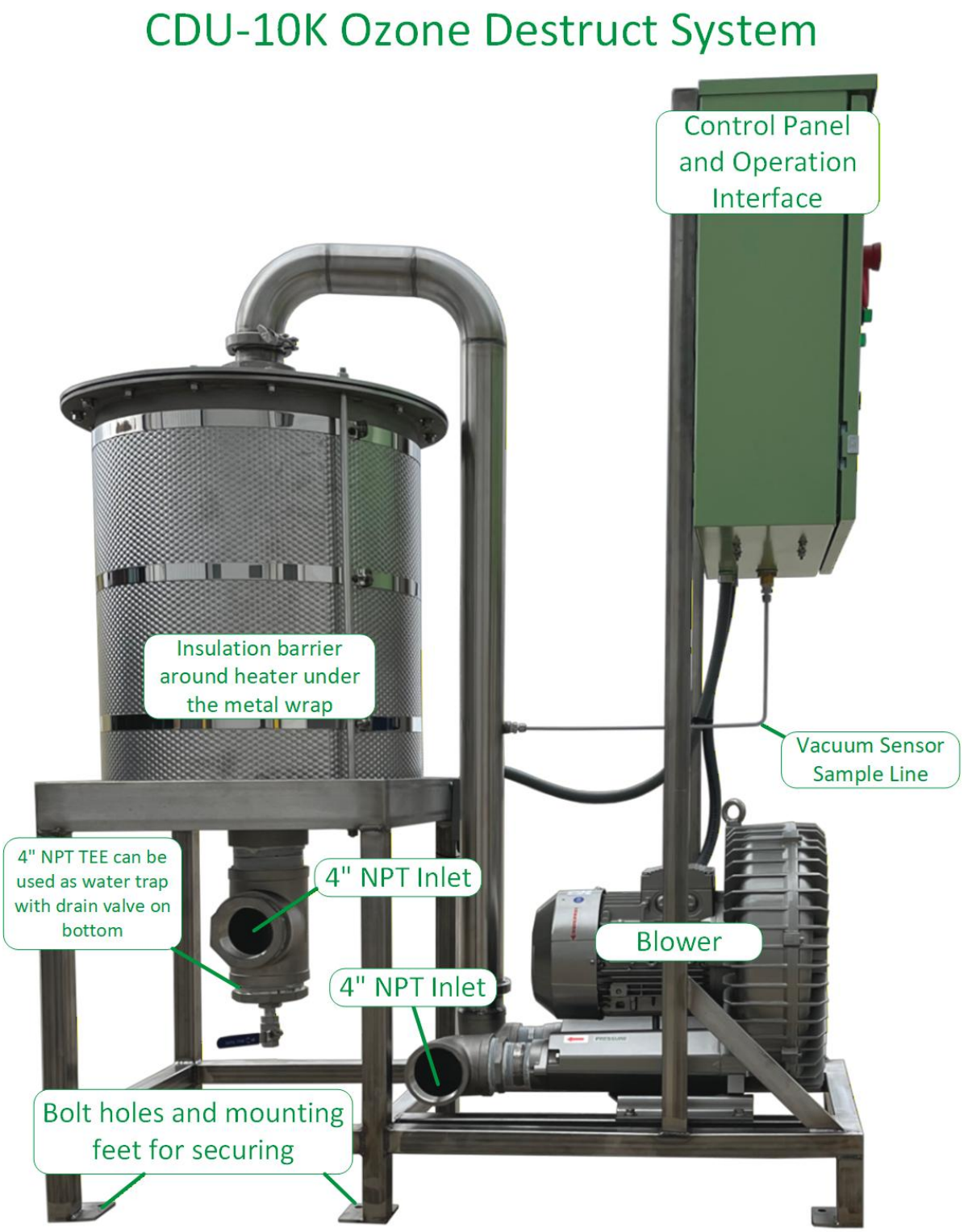
Water Trap

If the destruct device is intended for use in a saturated gas stream or from an ozone water system off-gas, then a water trap should be used to drain this captured water from the device.

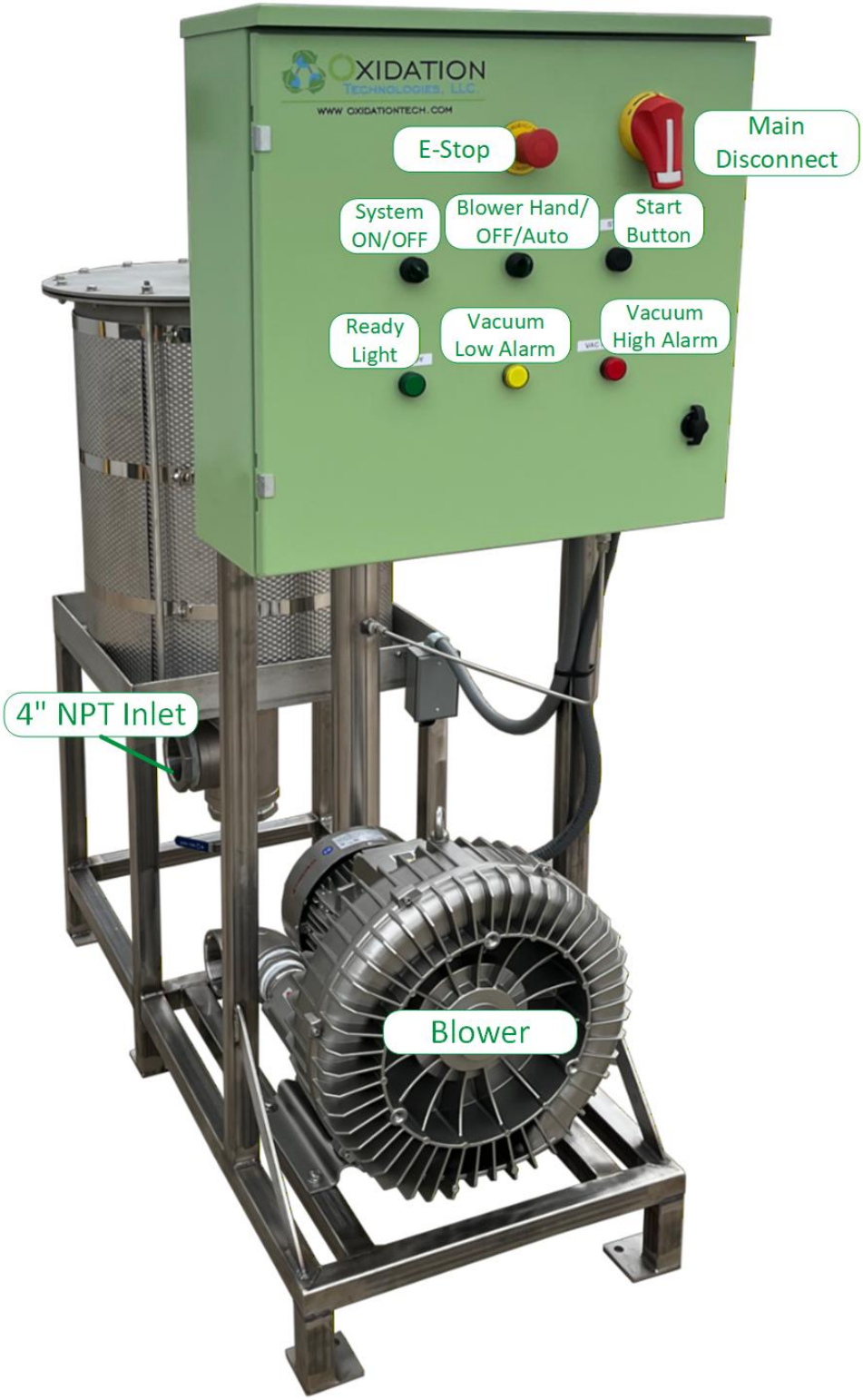
The CDU-10k may be equipped with a stainless-steel TEE fitting at the inlet (bottom) of the destruct unit. This can be used with either a manual or automatic valve, serving as both a water drain and water trap.

In the event greater amounts of water will drop from the air stream than this system can accommodate, plan to install a larger more robust water trap up-stream of the CDU-10k Ozone Destruct System.

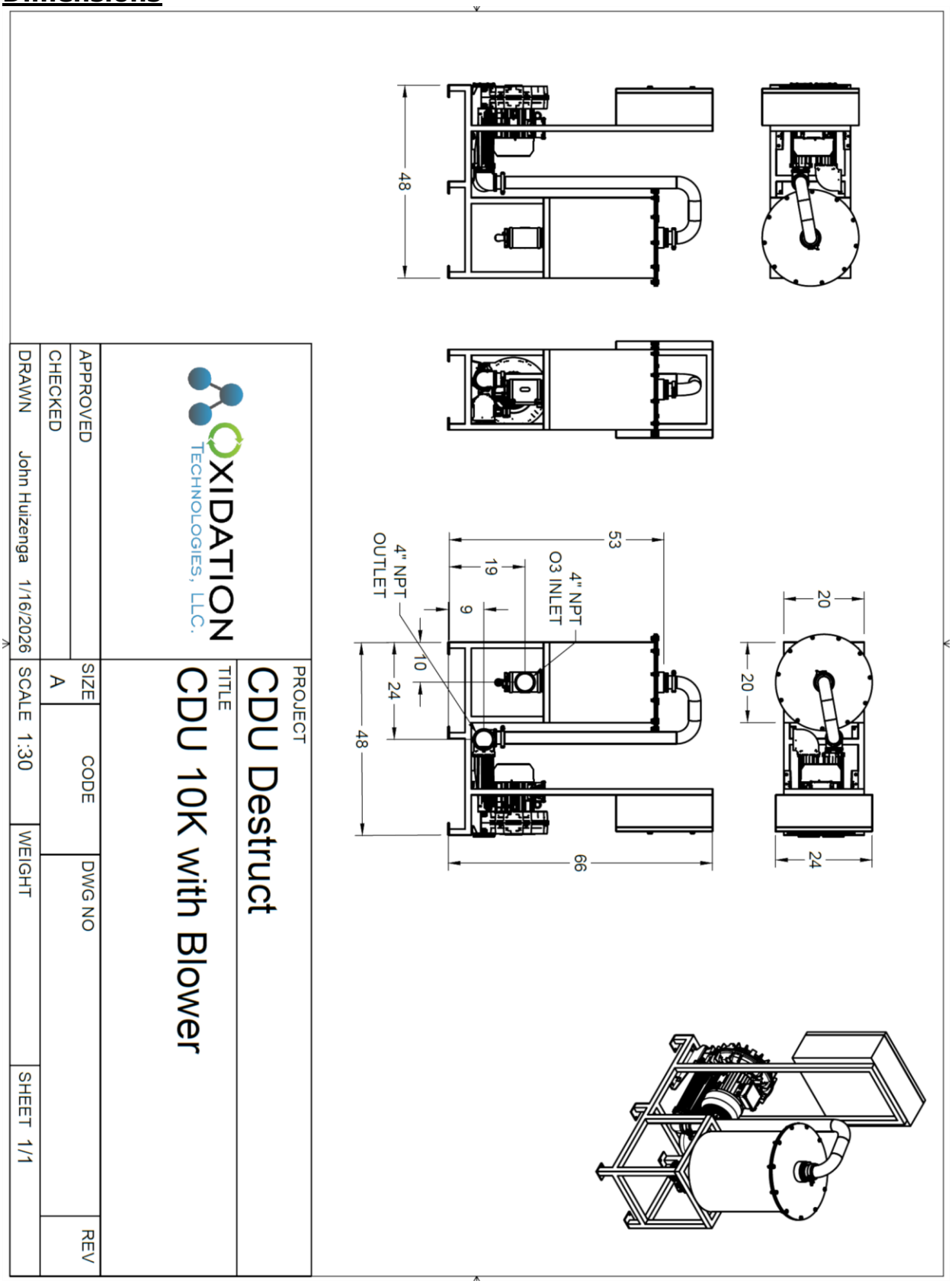
Outlined Image



CDU-10K Ozone Destruct System



Dimensions


48
53
19
9
4" NPT
O3 INLET
4" NPT
OUTLET
10
24
48
66
20
20
24
PROJECT
CDU Destruct
TITLE
CDU 10K with Blower
OXIDATION
TECHNOLOGIES, LLC.
APPROVED
CHECKED
DRAWN John Huizenga 1/16/2026
SIZE
A
CODE
DWG NO
REV
SCALE 1:30
WEIGHT
SHEET 1/1

Blower Specifications

REPUBLIC MANUFACTURING

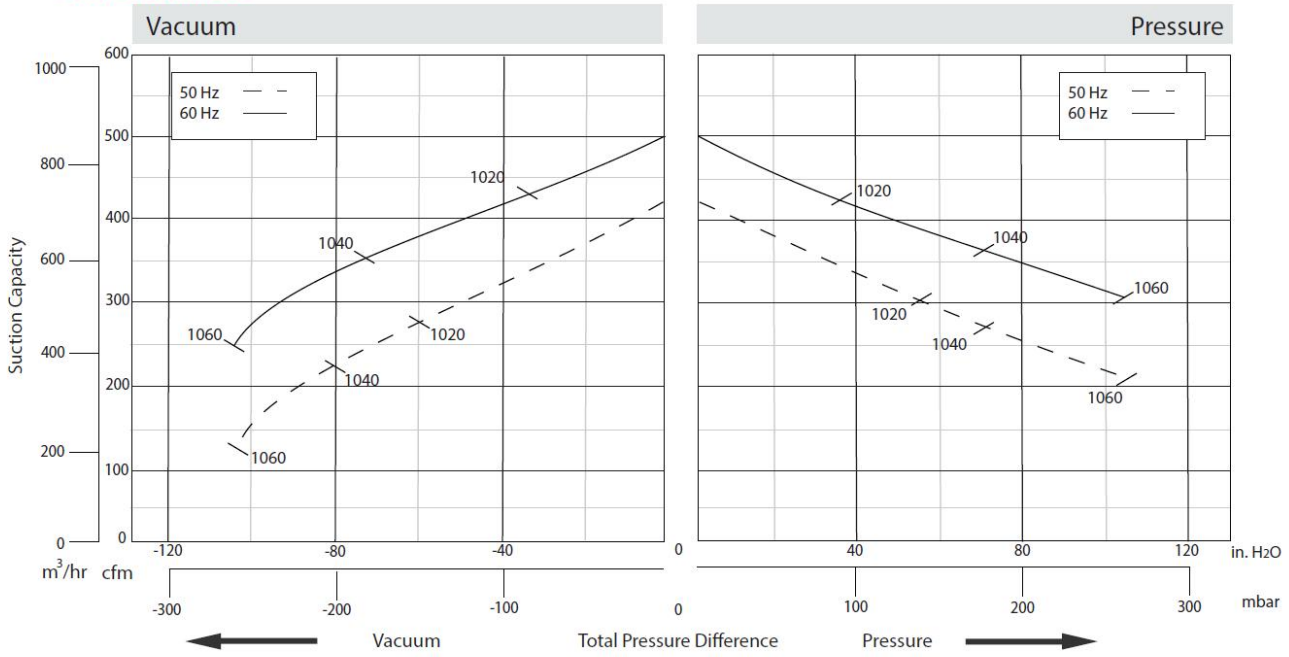
HRC 1020/1040/1060

REGENERATIVE BLOWERS

Republic offers a complete line of regenerative blowers for high vacuum or compressed air applications in both horizontal and vertical mounted positions. TEFC motors are rated for 50/60 Hz operation and are IE3, cUL, UL, and CE certified. The impeller is directly connected to the motor shaft, providing powerful air force without undue friction. The bearings are outside the compression chamber, ensuring maximum operational reliability under high differential pressure. Constructed in robust die-cast aluminum, this low-maintenance, oil-free design provides continuous, dependable service to our customers.

IE3
CC339B
CE
c UL us
E493872

PERFORMANCE



Model	Phase	Frequency (Hz)	Air flow (CFM/m³/hr)	Rated Vacuum (in. H_2O/mbar)	Rated Pressure (in. H_2O/mbar)	Motor (HP/kW)	Voltage (V)	Current (A)	Sound Level (dB)	Weight (lb/kg)
HRC 1020	3	50	412/700	60/150	56/140	5.8/4.3	190 △△/380 △	19.0 △△/9.5 △	70	126/57
		60	494/840	36/90	36/90	6.2/4.6	230 △△/460 △	19.0 △△/9.5 △	74	
HRC 1040	3	50	412/700	80/200	72/180	7.4/5.5	190 △△/380 △	25.8 △△/12.9 △	70	146/66
		60	494/840	72/180	72/180	8.4/6.3	230 △△/460 △	25.8 △△/12.9 △	74	
HRC 1060	3	50	412/700	108/270	104/260	10.0/7.5	190 △△/380 △	33.4 △△/16.7 △	70	153/69
		60	494/840	108/270	104/260	11.5/8.6	230 △△/460 △	30.0 △△/17.3 △	74	

The performance curves are based on air at a temperature of 59 °F and an atmospheric pressure of 29.91 inch Hg with a tolerance of +/-10%. The total pressure differences are valid for inlet and ambient temperatures up to 77 °F. Suction capacity relates to inlet conditions. Pressure capacity relates to atmospheric conditions. For other conditions please contact Republic. Three phase motor tolerances are +/-10% for fixed voltage motors and +/-5% for voltage range motors. Single phase machines are designed with a +/-5% tolerance. The frequency tolerance is +/-2% maximum.

Operation in Auto Mode

OPERATION in AUTO mode:

When the VAC is not-HIGH and CR1 is OFF, the READY relay will be activated.
READY remains activated when CR1 is turned ON, by the START button & stays on by the holding contact, which activates the BLOWER.

When vacuum goes HIGH, the READY relay will drop out causing the BLOWER to drop out.

In order to reset, the CR1 must be cycled OFF while vacuum is not-HIGH – by opening the E-STOP or STOP contacts.

Start-Up

Make sure the CDU-10K unit is securely plumbed before operating any Ozone Generator.

Maintenance

The destruct media may become fouled or contaminated over time, and will need replacement periodically depending upon usage and catalyst conditions. Replacement destruct media can be obtained from Oxidation Technologies.

In the event that the catalyst inside the sealed CDU-10K series becomes wet, such as if any process water accidentally flows into the unit, the CDU-10K series unit must be replaced. Water damages the catalyst and the unit WILL NOT destroy ozone once wet.

To replace the destruct media:
Remove the cover from the top of the unit and completely empty the unit by sucking the media out with a vacuum, or by tipping the unit upside down.

Clean the inside if necessary. Any build-up due to moisture should be removed. If detergents or solvents are used, rinse the unit thoroughly with water and dry it completely before refilling.

Dump the new media into the unit. With a soft mallet or similar object, tap the side of the unit while filling it so that the media "settles" towards the bottom.
Ensure that the gasket for the top cover is in good condition. Clean the mating surfaces and re-install the cover. Do not use sealants, if the gasket cannot be re-used. Replace the gasket immediately before supplying power to the CDU-10K.

Service Parts

Service parts listed below can be obtained directly from Oxidation Technologies. Please contact Oxidation Technologies directly for further information on other parts.

Part Number	Part Description
CDU-10k Heater Element	Replacement heater element strip
Carulite-200	Destruct Media – 250 lbs required
CDU-10k Gasket	Replacement Viton Gasket
CDU-10k Blower	Replacement Blower – HRC-1020
CDU-10k Vacuum Sensor	Replacement vacuum sensor

How to Contact Oxidation Technologies

By mail: Oxidation Technologies, Inc.
214 W Highway 18
Inwood, IA 51240

By Telephone: (515) 635-5854

Web site: www.oxidationtech.com

Email: Tech Information: info@oxidationtech.com
Sales Inquiries: sales@oxidationtech.com

REPUBLIC MANUFACTURING

HRC/4RC-SERIES REGENERATIVE BLOWER Installation & Operating Instructions

OM011 Rev.F

Republic Regenerative Blowers
HRC100-HRC1502 • 4RC210-4RC630

Installation Instructions & Operating Manual

Republic Manufacturing®
5131 Cash Road
Dallas, TX 75247 (214)
631-8070
www.republic-mfg.com
info@republic-mfg.com

Warning

Service procedures beyond the scope of this manual should only be performed by trained service personnel at Republic Manufacturing.

Important

Read the following safety instructions carefully. Disconnect blower from electrical source using an approved lockout/tagout procedure before attempting service

1. Side channel
2. Air inlet
3. Impeller
4. Impeller chamber
5. Exhaust outlet

Working Principle

Air or gas is pulled into a side channel (1) through the air inlet (2) and is accelerated by an impeller (3) rotating inside the impeller chamber (4). The resulting pressurized air or gas is discharged through the exhaust outlet (5). This type of operation is also known as a ring blower design.

Table of Contents

Safety Instructions

To insure safe operation, we have provided many important safety guidelines in this manual for the Republic Regenerative Blower. Please read this manual carefully and pay particular attention to instructions with the following signs:

DANGER: Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

1. Always use qualified electrical and mechanical personnel for installation and maintenance of Republic Blowers and motors.

2. Disconnect the electrical power at the motor starter, fuse box or circuit breaker before working on the system. Take special precautions to make sure the power cannot be turned on while you are working on the blower. **Use an approved lock-out/tagout system.**

3. Make sure the motor is electrically grounded, the mounting bolts are properly secured, and all guards are in place before start-up.

4. Wear safety glasses and earplugs when working on the blower or components within a Republic Blower system.

5. **Check the final installation for proper amp loads**.

6. Keep all tools, loose clothing and hands away from rotating or moving parts while the unit is running.

7. Inspect the blower at regular intervals for damaged or worn parts. **Replace damaged parts immediately! Do not connect or turn on a damaged blower!**

8. Inspect the inlet air filter at regular intervals and replace when necessary. A dirty air filter can cause improper blower performance.

9. Use only genuine Republic Manufacturing brand replacement parts.

10. Refer to Troubleshooting section of manual.

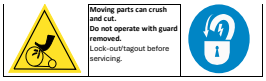
11. Make sure to install the inlet air filter or piping to blower inlet before starting the blower/motor.

12. Water, other liquids, aggressive or inflammable gases and vapors may not be handled. Handling of inflammable or aggressive gases and vapors is only possible with special versions.

13. Improper use of the unit can result in serious or even fatal injuries. Only operate the blower for the purposes indicated under “Intended Use”, with the fluids indicated under “Intended Use” and with the values indicated under “Technical Data”.

14. High temperatures of up to approximately 320°F (160°C) can occur on the surface of the blower. Allow to cool down after shut-down.

Lockout/Tagout Procedures



1. Notify all affected employees that a lockout or tagout is about to occur on a specific piece of equipment or machinery. The authorized employee to use the lockout/tagout system shall know the type and magnitude of energy that the machine or equipment utilizes and the hazards that exist with the energy source before preparing to shutdown.

2. If the machine or equipment is operating, please use normal stopping or rundown procedures for that machine.

3. Operate the switch, valve, or other energy isolating devices so that the equipment is isolated from its energy source. Isolating the equipment from its energy source may involve turning off such items as the operating control, a line valve, or an electrical circuit breaker.

4. Apply the lockout/tagout isolating device with assigned individual locks or tags.

5. Release any potentially-hazardous stored or residual energy. In order to do so, this may mean to return springs to a normal position, or bleeding down. Since the machine must be in a zero energy state, if there is any chance the stored energy may reaccumulate, verification of isolation must be continued until the servicing or maintenance is complete.

6. The machine or equipment is now locked out or tagged out.

Blower Description & Model Identification

Republic Manufacturing Regenerative Blowers are industrial grade regenerative blowers capable of producing high pressure air at low operating costs. Many models are available within each series:

- HRC-Series: Standard regenerative blowers with integral motor operating at 50 or 60 Hz, with 3 or 1 phase motor.
  0.5-38.9 HP (0.4-29.0 kW) Motor Sizes

- 4RC-Series: High pressure regenerative blowers with integral motor operating at 50 or 60 Hz, with 3 or 1 phase motor.
  0.7-11.5 HP (0.5-8.6 kW)

Republic Blowers have a nameplate containing the serial and model number located on the blower head near the exhaust port. When placing a service call, please provide the Republic serial number. Call us at (800) 847-0380 or e-mail info@republic-mfg.com.

- Models come with 1.25 in. (31.8 mm), 2.0 in. (50.8 mm), 2.5 in. (63.5 mm), or 4 in. (101.6 mm) inlet and ports; and can accommodate piping/hose in 1.25 in. (31.8mm), 20 in. (50.8 mm), 2.5 in. (63.5 mm), or 4 in. (101.6 mm) connections. ▲
  All models can be mounted in a variety of positions. (Please refer to Installation section of manual.)

Equipment Arrival & Inspection

Inspect the blower system at time of receipt to ensure that all components and accessories, as noted on the packing slip, were received and in good condition. Verify that the serial number on the packing slip matches the serial number shown on the blower head nameplate. Inspect the blower and motor assembly to ensure that the motor horsepower and voltage are correct.

If any equipment was damaged in transit, you will need to make a claim against the freight carrier immediately. If you have any shortages, discrepancies, or damage, please call your Republic Manufacturing Distributor or Republic Manufacturing at (800) 847-0380. No training required.

Storage Conditions

1. Must store blower in a place that meets the following conditions: clean, dry, and dust-free.

o

2. The temperature during storage must be between 32 (0C) and 104 F (40 C).°

Long Term Storage

The new blower may initially be stored following delivery.

1. Under advantageous storage conditions (as specified above): 1 year.
2. Under disadvantageous storage conditions (e.g. high humidity, salty air, sandy or dusty air): Inquire with Republic Manufacturing regarding service at (800) 847-0380. **Commissioning After Longer Standstill:**

Before recommissioning after a longer standstill, measure the insulation resistance of the drive motor. With values ≤ 1kΩ per volt of nominal voltage, the winding is too dry.

Suitability & Environmental Conditions

The units are suitable for the use in the industrial field.

Use only clean, dry air. Do not use explosive gases or atmosphere that contains such gases.

The ambient and suction temperatures must be between 32 F (0 C)° and 104 F (40 C).° For temperatures outside this range please contact your supplier.

In all applications where an unplanned shut down of the blower could possibly cause harm to persons or installations, a corresponding safety backup system must be installed.

Protect all surrounding items from exhausted air. This exhausted air can be very hot.

Protect unit from contaminants and moisture. Air particles, water vapor, oil-based contaminants or other liquids must be removed.

Blower must be installed with the proper-sized inlet and inline filter, gauge and relief valve to protect the blower from contaminants and over-heating, overpressure.

When using the blower at a high altitude or high temperatures, please consult with Republic Manufacturing prior to use.

Space Required for Installation

1. Allow at least 3 inches (76.2 mm) of clearance for removal and venting at the fan guard.

2. Allow at least 2 inches (50.8 mm) of clearance around the face of the blower cover.

3. Please refer to the blower dimensional drawings on individual specification sheets to determine the appropriate machine footprint.

Intended Use

This operating manual

- is intended for regenerative blowers models HRC100-HRC1502 and 4RC210-4RC630.
- contains instructions regarding transport and handling, installation, commissioning, operation, shut-down, storage, services, and disposal.
- must be completely read and understood by all operating and servicing personnel before beginning to work with or on the blowers.
- must be strictly observed.
- must be available at the site of operation.

The HRC100-1502 & 4RC210-630

- are blower-motor units for generating vacuum or pressure.
- are used to extract, pump and compress the following gases:

- Air.
- Non-flammable, non-aggressive, non-toxic and non-explosive gases or gas-air mixtures.
- With differing gases/gas-air mixtures, inquire with Republic Manufacturing.
- are equipped with one of the following kind of drive motors: • 3-phase AC drive motor with a standard, or
- Single-phase AC drive motor.

These operating instructions apply only to blower units with a standard design:

- are intended for industrial applications.
- are designed for continuous operation. With increased switch-on frequency (6x per hour with equal pauses and operating times) or with increased gas inflow and ambient temperature, the excess temperature limit of the coil and the bearing can be exceeded. Consult Republic Manufacturing under such conditions.

The limits listed in "Technical Data" must always be complied with when operating Republic Regenerative Blowers.

Foreseeable Misuse

It is prohibited

- to use the HRC100-HRC1502 or 4RC210-4RC630 in applications other than industrial applications unless the necessary protection is provided on the system, e.g. guards suitable for children's fingers;
- to use the device in areas in which explosive gases can occur if the blower is not expressly intended for this purpose;
- to extract, to deliver and to compress explosive, flammable, corrosive or toxic fluids, unless the blower is specifically designed for this purpose;
- to operate the blower with values other than those specified in "Technical Data".

Any unauthorized modifications of the blower are prohibited for safety reasons. The operator is only permitted to perform the maintenance and service work described in these operating instructions. Maintenance and servicing work which goes beyond this may only be carried out by companies which have been authorized by Republic Manufacturing.

Technical Data

Blower	Weight		Noise Level (dBa)	Blower	Weight		Noise Level (dBa)
	lb	kg			lb	kg	
HRC100	22	10	53	HRC102	33	15	68
HRC101	24	11	56	HRC202	33	15	61
HRC200	30	15	64	HRC202/1	35	16	61
HRC201	30	15	64	HRC302	40	18	60
HRC220	40	18	64	HRC302/1	38	17	60
HRC221	37	17	65	HRC402S	55	25	69
HRC250	40	18	65	HRC402	60	27	6
HRC300	51	23	70	HRC402/1	68	31	72
HRC340	53	24	70	HRC502	78	35	74
HRC350	57	26	71	HRC602	88	40	74
HRC301	53	24	70	HRC702	90	41	74
HRC400	57	26	70	HRC752	108	49	76
HRC401	57	26	70	HRC802	123	56	76
HRC500	68	31	72	HRC902	154	70	76
HRC501	66	30	74	HRC1002	163	74	76
HRC600	79	36	72	HRC1102	230	104	78
HRC700	88	40	72	HRC1202	265	120	78
HRC720	82	37	73	HRC1302	412	187	78

HRC730	95	43	73	HRC1402	434	197	78
HRC750	112	51	74	HRC1452	450	204	78
HRC800	137	62	82	HRC1502	465	211	78
HRC900	143	65	82				
HRC1000	265	121	82				
HRC1020	126	57	74				
HRC1040	146	66	74				
HRC1060	153	69	74				
HRC1100	205	93	79				
HRC1200	256	116	79				
HRC1300	278	126	79				
HRC1320	216	98	80				
HRC1340	267	121	80				
HRC1360	289	131	80				

Blower	Weight		Noise Level (dBa)	Blower	Weight		Noise Level (dBa)
	lb	kg			lb	kg	
4RC210-A75	40	20	62	4RC220-A75	67	34	62
4RC210-H16	36	18	62	4RC220-H26	53	27	62
4RC310-A71	40	20	62	4RC220-H56	67	34	62
4RC310-H16	36	18	62	4RC320-A75	79	36	63
4RC310-H26	36	18	62	4RC320-H46	71	32	63
4RC410-A41	57	26	62	4RC320-H56	75	34	63
4RC410-H16	57	26	62	4RC420-H26	82	37	66
4RC510-H16	64	29	68	4RC420-H56	95	43	66
4RC510-H26	70	32	68	4RC520-H26	100	45	70
4RC610-H16	80	36	71	4RC520-H77	126	57	71
4RC610-H26	86	39	71	4RC620-H36	106	48	71
4RC630-H67	188	86	76	4RC620-H57	144	65	72

Tightening Torques for Screw Connections

The following values apply if no other information is available.
With non-electrical connections, property classes of 8.8 and 8 or higher as per ISO 898-1 are assumed.

	Tightening torques for non-electrical connections	
Thread	**[Nm]**	**[ft lbs]**
M4	2.7 - 3.3	1.99 - 4.44
M5	3.6 - 4.4	2.65 - 3.25
M6	7.2 - 8.8	5.31 - 6.5
M8	21.6 - 26.4	15.9 - 19.5
M10	37.8 - 46.2	27.9 - 34.1
M12	63.0 - 77.0	46.5 - 56.8

The following information for electrical connection applies to all terminal board connections with the exception of terminal strips.

	Tightening torques for electrical connections	
Thread	**[Nm]**	**[ft lbs]**
M4	0.8 - 1.2	0.59 - 0.89
M5	1.8 - 2.5	1.33 - 1.84

Especially for metal and plastic threaded cable glands and pipe unions, the following values apply:

	Tightening torques for metal threaded glands/unions	
Thread	**[Nm]**	**[ft lbs]**
M12x1.5	4 - 6	2.95 - 4.43
M 16x1.5	5 - 7.5	3.69 - 5.53
M25x1.5	6 - 9	4.43 - 6.64
M32x1.5	8 - 12	5.9 - 8.85
M40x1.5		
	Tightening torques for plastic threaded glands/unions	
Thread	**[Nm]**	**[ft lbs]**
M12x1.5	2 - 3.5	1.48 - 2.58
M16x1.5	3 - 4	2.21 - 2.95
M25x1.5	4 - 5	2.95 - 3.69
M32x1.5	5 - 7	3.69 - 5.16

M40x1.5		

Installation

Blower may be lifted manually or utilizing lifting equipment based on the instructions below:

WARNING: Danger from lifting heavy loads. Manual handling of the unit is only permitted within the following limits:

- max. 66 lbs (30 kg) for men
- max. 22 lbs (10 kg) for women
- mas. 11 lbs (5 kg) for pregnant women

For the weight of the blower, see Mechanical Data section of this manual. All blowers heavier than the maximums stated above must be lifted using lifting equipment.

1. The blower is ready to connect upon delivery.
2. Install the blower on a level, stable operating surface and use the optional isolation pads to reduce noise and vibration. Attach the included loose muffler if necessary.
3. Have a qualified electrician configure the motor to your incoming voltage as noted in the "Motor Wiring" section of the manual. Refer to the nameplate on the motor for the correct power supply requirements.
4. To ensure sufficient cooling of the blower, it is absolutely necessary that the required minimum distances to the fan guard and the face of the blower cover be maintained. See "Mechanical Data" for minimum distances. Ventilation screens and openings must remain clear. Discharge air of other units may not be directly sucked in again.
5. The blower is suitable for installation within the following ambient conditions: dusty or damp environment, in buildings, in the open (though only if protected from intense sunlight exposure. The blower may be installed within the following conditions: on level surfaces, and at a maximum elevation of 1000 ft. above sea level. (For higher altitudes, contact Republic Manufacturing at 800-847-0380.)
6. Blower may be installed in any vertical/horizontal axis position with one exception: vertically with the blower face pointing upward.
7. From the motor side of the blower, verify the blower is rotating in the direction indicated by the arrow on the motor. (The motor side is marked with an arrow on most models.) Proper rotation can also be checked by the air flow at the inlet and outlet ports. On blowers powered by a 3 phase motor, change the connection of any two (2) wires to reverse blower rotation if needed.

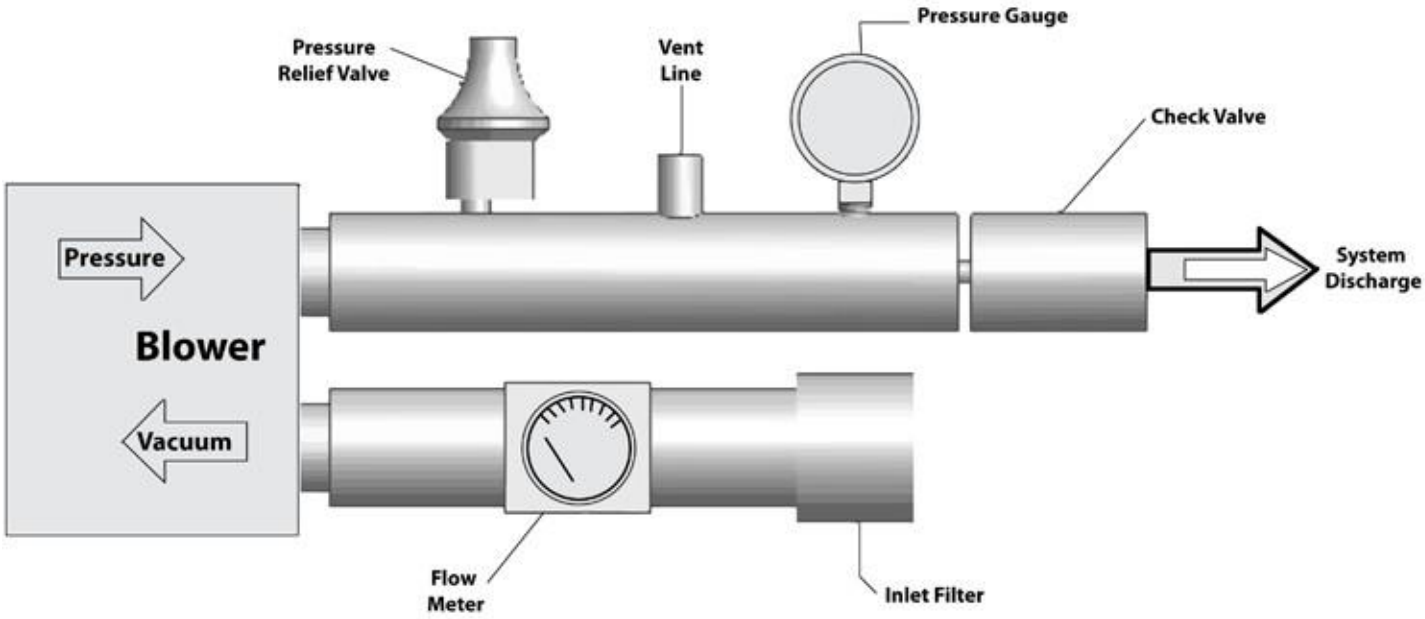
Plumbing & Accessories

1. Remove any foreign material (e.g. burrs, chips, welding drops, pipe cuttings, excess sealant, etc.) from plumbing.
2. Verify the motor is securely mounted and proper blower rotation before connecting to plumbing. The inlet and outlet port are not designed to support the plumbing without proper supporting elements.
3. Remove safety rubber plugs from the inlet and outlet ports.
4. Connect the plumbing with properly sized fittings.
5. Use a relief valve to discharge excess air beyond the preset level on pressure applications. Use a vacuum relief valve to draw in excess air when preset vacuum level is achieved.
6. Install an intake filter to prevent foreign material from entering the blower. In applications where there is high humidity or liquids being used in the process, install a moisture separator with a drain valve.
7. Install two (2) gauges - one before and one after the filter - to monitor differential air flow through the filter element. As filters become clogged, performance efficiency will be reduced. Filters should be checked periodically and replaced when necessary. The recommended check valves provide minimal pressure drop, positive sealing, and are resistant to the high discharge temperatures of the blowers.
8. Recommended piping should be, at minimum, the same size as the inlet and outlet ports on pressure systems.

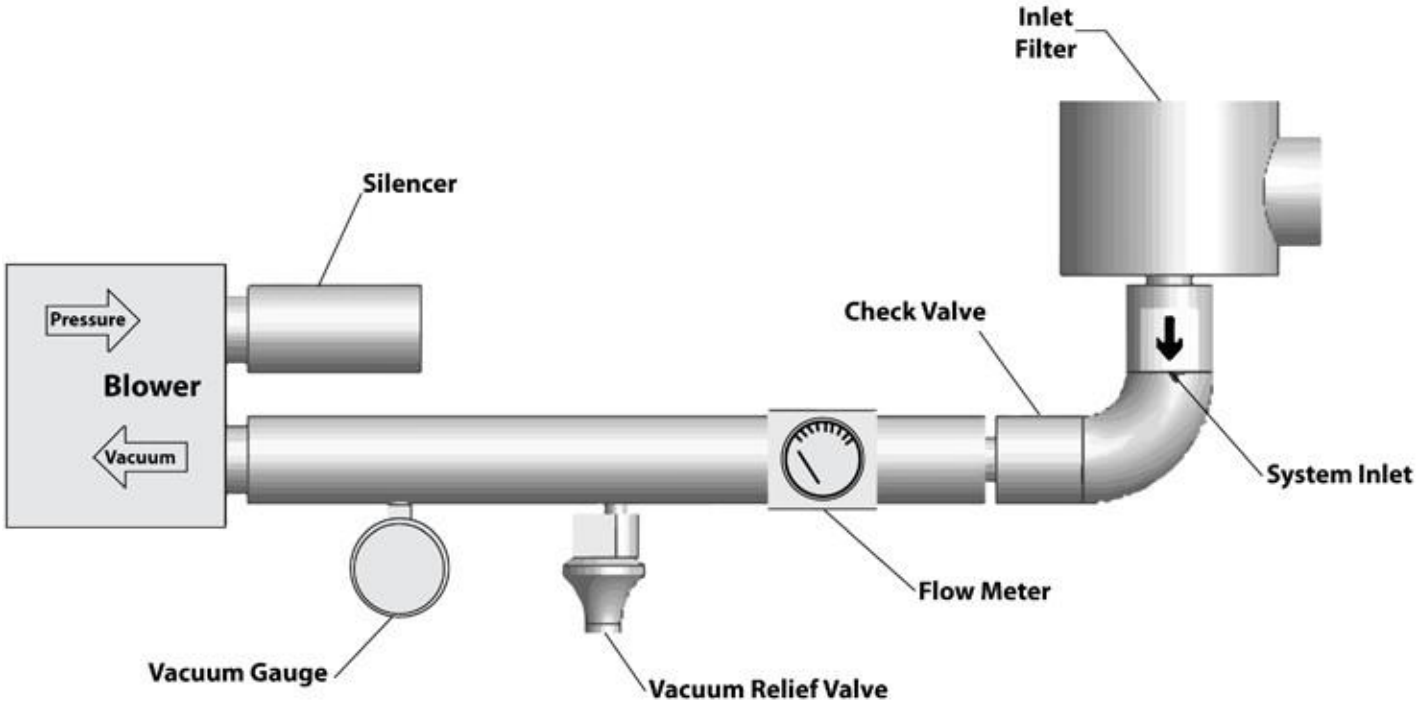
WARNING: Exhaust air temperature increases significantly above 65" WC (162 mbar). Discharged air is typically too hot for most plastic piping, therefore metal piping is recommended. This piping must be guarded and marked "DANGER-HOT-DO NOT TOUCH".

9. Metal piping is recommended for the first 5 ft. (1.5 m) to 8 ft. (2.4 m) from the blower on pressure systems. Elbows increase friction, so elbows should be minimized to decrease friction loss.
10. Pressure or relief valves should be installed in a "T" that is at least one (1) pipe size larger than the port diameter.

Typical Pressure Layout



Typical Vacuum Layout



Electrical Connection

DANGER: Malpractice can result in severe injuries and material damage. The electrical connection may be performed by trained and authorized electricians only. Before beginning work on the unit or system, the following measures must be carried out:

- De-energize.
- Perform proper lockout/tagout procedures such that electricity cannot be turned on again.
- Confirm unit is de-energized.
- Ground and short-circuit.
- Cover or block-off adjacent energized parts

WARNING: Incorrect connection of the motor can lead to serious damage to the unit.

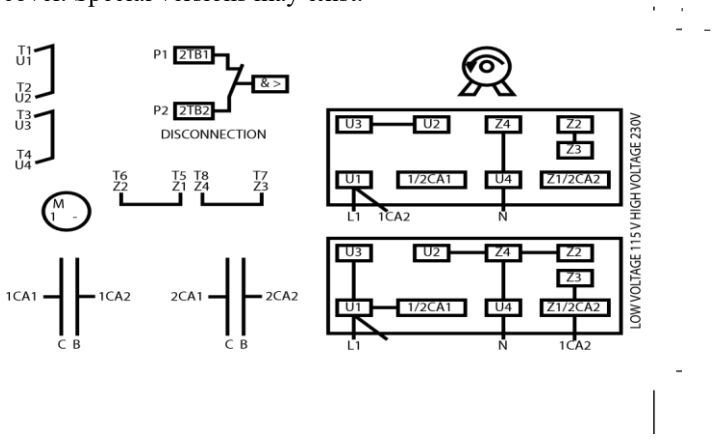
- ELECTRICAL POWER SUPPLY: Observe the rating plate. It is imperative that the operating conditions correspond to the data given on the rating plate. Deviations permissible without reduction in performance include:
- +/- 5% voltage deviation
- +/- 2% frequency deviation
- CONNECTION TO TERMINAL BOX: Open the required cable entry openings on the terminal box. Here the following two cases are differentiated:
- The cable entry opening is prefabricated and provided with a sealing plug.
- Screw out sealing plug.

OR

- The cable entry opening is closed off with a casting skin (only on blower with drive-motor axis heights of 100” [2.5 m] to 160” [4.0 m] in standard design).
- Break out casting skin using a suitable tool. For example, use a metal pin with a corresponding diameter or a chisel and hammer.
- Mount cable glands on the terminal box. Proceed as follows:
- Select one cable gland in each case which is suitable for the cable diameter.
- Insert this cable gland in the opening of the terminal box. Use a reducer if necessary.
- Screw on the cable gland so that no moisture, dirt, etc. can penetrate into the terminal box.
- Carry out the connection and arrangement of the jumpers in accordance with the wiring diagram in the terminal box or “Wiring Diagram” section of this manual.
- The electrical connection must be carried out as follows:
- The electrical connection must be permanently safe.
- **DANGER:** The terminal box must be free from foreign bodies, dirt, and humidity. Terminal box cover and cable entries must be tightly closed so as to make them dust-proof and waterproof. Check for tightness at regular intervals.
- **DANGER:** There may be no protruding wire ends.
- **DANGER:** Clearance between bare live parts and between bare live parts and ground : $\geq$ 0.22 in. (5.5 mm) at a nominal voltage of $U_N \leq$ 690 V.
- For the tightening torques for terminal board connections (except terminal strips), see “Tightening Torques for Screw Connections”.
- For motor overload protection, use motor circuit breakers and adjust to the specified nominal current as listed on the rating plate.
- **DANGER:** There is danger of an electrical shock when a defective blower is touched. Mount motor circuit breaker. Have electrical equipment checked regularly by an electrician.

Wiring Diagram - Single Phase

Most Republic single phase regenerative blowers use the wiring diagram shown below. Always follow the wiring diagram on the inside of the blower’s terminal box cover. Special versions may exist.

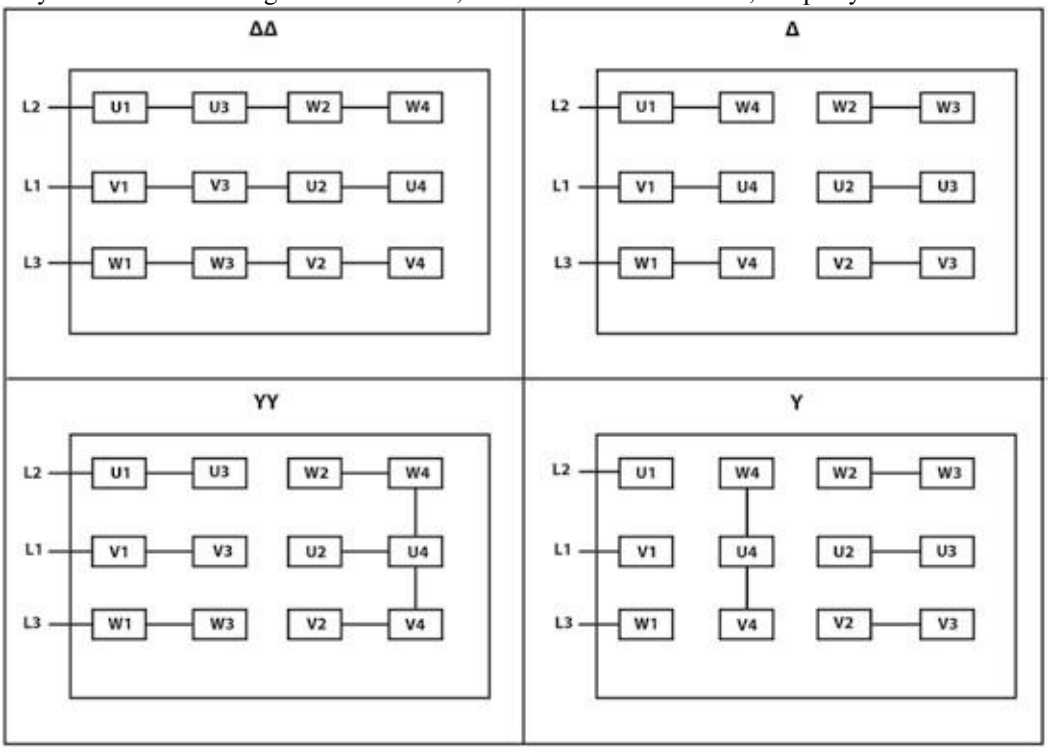


Wiring Diagram - Three Phase

Most Republic three phase regenerative blowers use the wiring diagram show below. Always follow the wiring diagram on the inside

of the blower's terminal box cover. Special versions may exist.

The blower data tag located at the top of the motor will match one of these four diagrams below. Each combination of hertz and voltage has a symbol next to it indicating which diagram should be followed for that configuration. Match the symbol next to hertz and voltage to the symbols above the diagram. Once wired, check rotation. If reversed, swap any two leads.



Thermal Leads

Republic regenerative blowers have two small black wires coming from the motor that are not connected to the terminal blocks. These wires are for use with motor over temperature protection features sometimes used in control panels. If a control panel without this feature is used, simply cap off the wires and do not use them.

Commissioning

WARNING: Improper use of the unit can result in serious or even fatal injuries. Do not proceed without reading Safety Instructions.
WARNING: Danger from rotating parts cutting/cutting off of extremities, grasping/winding up of hair and clothing.
WARNING: Danger due to vacuum and pressure, sudden escape of vapor (skin and eye injuries), sudden drawing in of hair and clothing, or burns.
Only start-up and operate under the following conditions:

- The blower must be completely assembled. Pay particular attention to the following components:
- the blower cover,
- the muffler on inlet and discharge connections, and
- the fan guard.
- The pipes/hoses must be connected to inlet and discharge connections.
- Inlet and discharge connections and the connected pipes/hoses may not be closed, clogged or soiled.
- Check the mounting elements, connections of the pipe/hose, lines, fittings and containers for strength, leaks and firm seating at regular intervals.

Preparation

DANGER: Blower can overheat causing damage to the drive motor winding if intake or discharge connections are closed/soiled. Before start-up, make sure the inlet and discharge connections are not closed, clogged or soiled.
CAUTION: Before starting up after a longer standstill: Measure the insulation resistance of the motor. With values $\leq$ 1 kΩ per volt of nominal voltage, the winding is too dry.

1. Check the direction of the rotation. The intended rotating direction of the shaft is marked with arrows on the housing.
2. The gas delivery direction is marked with arrows on the inlet and discharge connections.
3. Make sure the pipes/hoses on the inlet and discharge connections are properly connected.
4. Switch the blower on briefly and then off again.
5. Compare the actual rotating direction of the external fan with the intended shaft rotating direction indicated with the arrows shortly before the blower comes to a standstill.
6. If necessary, revers the direction of the rotation of the motor.
7. Observe the operating speed specified on the rating plate. This may not be exceeded, as otherwise the noise radiation, vibration behavior, grease consumption duration and bearing change interval worsen. To prevent damage as a result of higher speeds, it may be necessary to inquire with Republic Manufacturing as to the maximum speed.

Start-Up

1. Open shut-off device in intake/discharge pipe.
2. Switch on power supply for drive motor.
3. Operate blower for an hour, and then check:
    - Ambient temperature - increased room temperatures may require stronger ventilation especially for larger blowers. Room temperature should not exceed 104 (40°C).
    - Pressure and vacuum valves - adjust relief valve pressure or vacuum setting if needed.
    - Motor current - check that current supply matches recommended current rating on blower nameplate.
    - Electrical overload cutout - check that current matches rating on blower nameplate

If motor fails to start or slows down significantly under load, shut off and disconnect from power supply. Check that the voltage is correct for the motor and that the motor is turning in the proper direction.

Shut-Down

1. Switch off power supply for drive motor.
2. Close shut-off device in intake/discharge pipe, if applicable.

Operation

WARNING: Improper use of the unit can result in serious or even fatal injuries. Do not proceed without reading Safety Instructions.

WARNING: Danger due to vacuum and pressure, sudden escape of vapors (skin and eye injuries), sudden drawing in of hair and clothing.
WARNING: Danger of overheating due to hot surface of blower. High temperatures of up to approximately 320°F (160°C) can occur on the surface of the blower. Do not touch during operation. Allow to cool after shut-down.
CAUTION: Danger of overheating due to hot surface of blower. Temperature sensitive parts, such as lines or electronic components, may not come into contact with the surface of the blower.
CAUTION: Danger of rusting due to collection of condensed water in drive motor area. On drive motors with closed condensed water openings, remove closures occasionally to allow any water which has collected to drain off.
CAUTION: Danger of bearing damage. Heavy mechanical impacts must be avoided during operating and while at standstill.

Shut-Down & Longer Standstills

Preparing for shut-down or longer standstill

WARNING: Improper use of the unit can result in serious or even fatal injuries. Do not proceed without reading "Safety Instructions".
CAUTION: Danger of rusting due to collection of condensed water in drive motor area. On drive motors with closed condensed water openings, remove closures occasionally to allow any water which has collected to drain off.
CAUTION: Danger of bearing damage. Heavy mechanical impacts must be avoided during operating and while at standstill.
Prior to shut-down or longer standstill, proceed as follows:

1. Switch off the blower.
2. Close shut-off device in inlet and pressure line if installed.
3. Disconnect blower from power supply.
4. Release pressure. Open pipes/hoses slowly and carefully so that the vacuum or gauge pressure in the blower can be released.
5. Remove pipes/hoses.
6. Provide mufflers on inlet and discharge side with sealing plugs.

Servicing

WARNING: Improper use of the unit can result in serious or even fatal injuries. Do not proceed without reading "Safety Instructions".

Emptying/Rinsing/Cleaning

Before any maintenance/servicing work, empty, rinse and clean the outside of the unit.

1. Empty unit with air and rinse until all residues have been removed.
2. Clean the outside of the unit with compressed air.
    - Wear gloves and protective safety glasses.
    - Secure the surrounding area.
    - Clean the entire surface of the unit and exterior fan with compressed air.

Preventative Maintenance

After the first 100 hours of operation, the following need to be checked:

- filter elements;
- noise absorbing foam in mufflers; and
- motor and blower cleanliness.

Replace filter elements as needed. Mufflers should be checked on a monthly basis.

Allowable Number of Starts and Minimum Time Between Starts for NEMA Design A & Design B Motors

HP	2 Pole			4 Pole			6 Pole		
	A	B	C	A	B	C	A	B	C
1	15	1.2	75	30	5.8	38	34	15	33
1.5	12.9	1.8	76	25.7	8.6	38	29.1	23	34
2	11.5	2.4	77	23	11	39	26.1	30	35
3	9.9	3.5	80	19.8	17	40	22.4	44	36
5	8.1	5.7	83	16.3	27	42	18.4	71	37
7.5	7	8.3	88	13.9	39	44	15.8	104	39
10	6.2	11	92	12.5	51	46	14.2	137	41
15	5.4	16	100	10.7	75	50	12.1	200	44
10	4.8	21	110	9.6	99	55	10.9	262	48
25	4.4	26	115	8.8	122	58	10	324	51
30	4.1	31	120	8.2	144	60	9.3	384	53
40	3.7	40	130	7.4	189	65	8.4	503	57

Where:

A= Maximum number of starts per hour

B= Maximum product of starts per hour times load WK^2 (Note this is also maximum allowable intertia per NEMA)

C= Minimum rest or off time in seconds between starts

Allowable starts per hour is the lesser of A or B divided by the load WK^2 or

$$\text{Starts per hour} < A < \frac{B}{\text{Load } Wk^2}$$

Note- The above table is based on the following conditions:

a. Applied voltage and frequency are in accordance in MG1, 12.44

b. During the acceleration period, the connected load torque is equal to or less than a torque which varies as the square of the speed and is equal to 100% of rated torque at rated speed. (e.g. a variable torque load) c. External load WK^2 is equal to or less than the values listed in MG1, 12.54

For conditions which exceed the above parameters, Republic Manufacturing should be consulted

Troubleshooting

Problem	Reason	Remedy

Increased sound	Noise absorbing foam is damaged	Replace foam.
	Impeller rubbing inside	Send unit to Republic Authorized Repair Facility.
Excessive vibration	Damaged impeller	Replace impeller.
	Motor and/or impeller are dirty	Clean motor and impeller periodically.
Ambient and exhaust temperature increases	Motor and/or blower are dirty	Clean motor and blower periodically.
	Filters are dirty	Replace filters.
Decreased inlet air pressure	Inlet air filter is clogged	Clean inlet filter or replace cartridge.
Unit is very hot	Wrong wiring	Check wiring.
	Low voltage	Supply proper voltage.
	Inlet air filter is clogged	Clean inlet filter.
	Motor and/or blower are dirty	Replace cartridge.
	Operating pressure or vacuum is too high	Clean motor and blower periodically.
		Install a relief valve and pressure or vacuum gauge.
Unusual sound	Impeller is damaged or dirty	Clean or replace impeller.
	Bearing failure	Send unit to Republic Authorized Repair Facility.
	Flow speed is too high	Clean pipes. Use pipe with larger crosssection if necessary.
	Muffler is dirty	Clean or replace muffler inserts.
Motor overload	Low voltage	Check power source.
		Check wire size and wire connections.
Unit does not start	Incorrect electrical connection or power source	Check wiring diagram, circuit fusing and circuit capacity.
	Impeller is damaged	Clean or replace impeller.
		Install proper filtration.
	Leak in system	Seal leak in system.

Blower does not generate any or generates insufficient pressure difference	Wrong direction of rotation	Reverse direction of rotation by interchanging two connecting leads.
	Incorrect frequency	Correct frequency.
	Shaft seal defective	Replace shaft seal.
	Different density of pumped gas	Take conversion of pressure values into account. Inquire with Republic Manufacturing.
	Impeller is damaged	Clean or replace impeller.
Blower leaking	Seals on muffler are defective	Check muffler seals and replace if necessary.
	Seals in motor area are defective	Check motor seals and replace if necessary.

In the Event of a Breakdown

1. Use a lockout/tagout procedure to ensure the blower may be worked on safely.
2. Refer to the "Troubleshooting" section of the manual to determine the cause of the breakdown and the appropriate action to take.
3. If further assistance is needed, please call Republic Manufacturing at 800-847-0380.

When to Ship the Blower Back to Republic

If you cannot fix or troubleshoot your blower system using this manual then a skilled Republic Manufacturing professional is required. Please ship your blower back to Republic Manufacturing.

Disabling, Dismantling, and Scrapping of Blower

1. Disable the blower using the lockout/tagout procedure outlined in the manual.
2. Scrap entire unit using a suitable disposal company.
3. Most components are aluminum, stainless steel, or zinc-plated mild steel and may be recycled or disposed of as such.

Warranty Terms and Conditions

Republic Manufacturing warrants all finished Republic Manufacturing products to be free from functional defects in material and workmanship for a period of twelve (12) months from the date of installation, or no longer than eighteen (18) months from shipment. Wear parts such as filter elements, hoses and piping are not covered by the 12 to 18 month warranty.

DISASSEMBLY OF BLOWER MAY VOID WARRANTY.

To obtain service within the warranty period, first contact your authorized Republic Manufacturing dealer or Republic Manufacturing Service Department. Republic's responsibility under this warranty shall be to provide an analysis of the blower, which will determine course of action. Any product found to be defective within the warranty period will merit either: a. A no charge repair of existing blower. Any freight charges will be the purchaser's responsibility.
b. A replacement blower*. Any freight charges will be the purchaser's responsibility.
*This option would be a chargeable replacement until the original blower is received by Republic Manufacturing, and warranty is

approved.

Republic Manufacturing shall not be liable for incidental nor consequential damages resulting from the use of this product. There are no expressed nor implied warranties, which extend beyond the warranty of merchantability or fitness for a particular purpose to the equipment and/or its parts and components.

5131 Cash Road, Dallas, TX 75247 | 800.847.0380 | republic-mfg.com

REPUBLIC MANUFACTURING

Air Knife Systems

Centrifugal Blowers

Regenerative Blowers

Vacuum Pumps

OXIDATION TECHNOLOGIES, LLC.