



## **CR Series Roasters**

*(CR-35, CR-70, CR-140, & CR-280)*

# **Installation, Operation & Maintenance Manual**

**2020**

Revision D

**DIEDRICH ROASTERS, LLC**

P.O. Box 430

Ponderay, Idaho 83852

Toll Free: (844) 343-3742    Fax: (208) 417-1552    Support: (888) 519-0069  
Technical Support: [support@diedrichroasters.com](mailto:support@diedrichroasters.com)

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Please read all sections of this manual and retain for future reference.

 **DANGER**

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

- The completed roaster installation **MUST BE INSPECTED** for compliance to building codes in your specific location, and by your local fire inspector **PRIOR TO** operating the roaster. Failure to have these inspections performed may void the warranty and will relieve Diedrich Roasters of any liability associated with the installation and use of your machine.

 **DANGER**

Keep the area around the roaster free and clear from combustibles and maintain a minimum of 18-inches (46 cm) clearance around the roaster at all times.

 **DANGER**

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

 **DANGER**

Avoid contact with hot surfaces.

- A fire extinguisher should be located close to the roasting system. Consult with your local fire department for recommendations on suitable fire extinguishers.

 **WARNING**

Always be aware of the risk of a fire. Fires are caused by failure to maintain a clean roaster and its exhaust duct system.

- Proper installation, cleaning, and safe operation of the coffee roaster are the owner's and operator's responsibility.
- This roaster is intended for professional use only and is to be operated by qualified personnel only. **Never permit an unqualified person to operate the roaster.**

 **DANGER**

Instructions to be followed in the event the operator smells gas or otherwise detects a gas leak must be posted in a prominent location. This information can be obtained from the local gas company or gas supplier.

# CR Series Roasters Installation, Operation and Maintenance Manual

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# INSTALLATION

## 1.0 SYSTEM SPECIFICATIONS

	CR-35	CR-70	CR-140	CR-280
BATCH CAPACITY min/max	3.5 / 35kg	10 / 70kg	20 / 140kg	35 / 280kg
VOLTAGE CLASS	200-240 1PH 200-240 3PH 380-480 3PH	200-240 1PH 200-240 3PH 380-480 3PH	200-240 3PH 380-480 3PH	200-240 3PH 380-480 3PH
BREAKER SIZE	90 / 50 / 30 Amp	90 / 60 / 30 Amp	110 / 70 Amp	150 / 90 Amp
FULL LOAD AMPS	70.8 / 40.8 / 24.9 Amp	65.6 / 38.8 / 22.6 Amp	78 / 44.8 Amp	112 / 61.3 Amp
MAX BTU/hr (kW)	300,000 (87.9)	500,000 (146.5)	1,200,000 (351.7)	1,800,000 (469)
ESTIMATED BTU/ROAST btu (kW)	53,000 / (15.5)	113,330 / (33.21)	226,660 / (66.42)	360,000 / (105.5)
ESTIMATED FULL BATCH ROAST TIME TO 440 °F mins	15	15	15	15
ROAST AIR MAX scfm (scmh)	550 (935)	750 (1274)	1778 (3021)	2000 (3398)
COOLING AIR MAX scfm (scmh)	1000 (1700)	2000 (3398)	2500 (4248)	5000 (8495)
GAS TYPES	NAT/LPG	NAT/LPG	NAT/LPG	NAT/LPG
Inlet or Manifold GAS PRESSURE	7 NG - 11 LPG / (17.42 - 27.37) wc / (mbart)	7 NG - 11 LPG / (17.42 - 27.37) wc / (mbart)	1-2 / (68.9- 137.9) psi / (bar)	1-2 / (68.9-137.9) psi / (bar)
GAS CONNECTION	3/4" FNPT	3/4" FNPT	1" FNPT	1" FNPT
AIR PRESSURE PSI(mb)	70(4826)	70(4826)	70(4826)	70(4826)
AIR CONNECTION	1/4" FNPT	1/4" FNPT	1/4" FNPT	1/4" FNPT
WATER PRESSURE PSI(mb)	40-70(2757- 4826)	40-70(2757- 4826)	40-70(2757- 4826)	40-70(2757- 4826)
WATER FLOW gpm (lpm)	3 / (11.4)	4 / (15.14)	8 / (30.28)	10 / (37.86)
WATER CONNECTION	1/4" FNPT	1/4" FNPT	1/4" FNPT	3/8" FNPT

	CR-35	CR-70	CR-140	CR-280
STANDARD COOLING BIN BLOWER OUTLET DIAMETER in(mm)	10(254)	14(356)	16(406)	18(457)
ROAST AIR CYCLONE OUTLET DIAMETER in(mm)	8(203)	8(203)	14(356)	14(356)
COOLING BIN CYCLONE OUTLET DIAMETER in(mm)	8(203)	8(203)	18(457)	24(610)

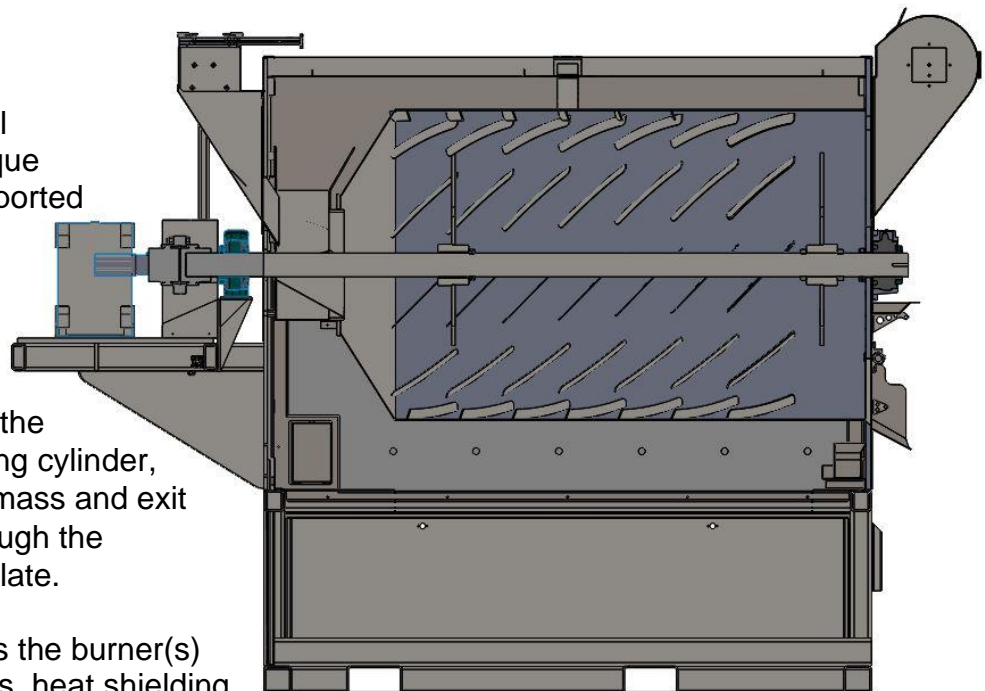
Capacities Table

## 2.0 COMPONENT DESCRIPTIONS

*NOTE: In this manual, references of left and right-hand side are determined by facing the front of roaster.*

### Side view cut away example of roaster body

**Roaster:** The upper portion of the roaster consists of a carbon steel roasting drum with a unique paddle arrangement supported by bearings mounted at each end and driven by a heavy-duty gearbox motor. The back of the roasting drum has an open center. This allows the hot air to enter the roasting cylinder, pass through the coffee mass and exit the roasting cylinder through the opening in the top front plate.



The lower section houses the burner(s) and gas train components, heat shielding from burners, air/grease lines, and the roaster control panel (electrical junction box).



**Ensure the chaff is cool before emptying the chaff into any other containers. Hot embers residing in the chaff could continue to heat and possibly ignite a fire.**

**Chaff Collection Cyclone:** The chaff collection cyclone(s) separate the coffee husk from the exhaust air before it is expelled into the exhaust system. The cyclones are positioned at the rear of the roaster and a detachable collection barrel is positioned under the cyclones to collect chaff. The chaff collection barrel requires emptying periodically depending on the type of bean.



**Always turn on the cooling bin agitator and blower prior to discharging the roasted coffee into the cooling bin. Failure to do so could cause the coffee to continue to heat and possibly start a fire.**

**Cooling Bin:** The cooling bin is the round piece of equipment located at the front of the roaster. The cooling bin's function is to contain the roasted coffee and cool it when it's discharged from the roasting drum.

The cooling bin consists of two levels. The upper level is called the cooling tray. The cooling tray contains the agitator that levels the coffee as it exits the roasting drum. The agitator stirs the coffee in the cooling bin and moves it to the outer area for discharging. The lower area contains the agitator driveline that powers the agitator. The driveline consists of a drive shaft that is connected to an electric motor. A special access door located on the side of the cooling bin exists for accessing the agitator driveline.

**Blower Housing:** A blower motor and impeller are contained in the standard cooling bin blower housing or attached to the cooling bin cyclone. The blower motor and impeller create the vacuum necessary for moving the air that cools the coffee. The blower housing is connected to the cooling bin by a removable (for cleaning) air duct that runs to the blower housing.

The coffee is quickly cooled by moving large amounts of room temperature air down through the roasted coffee and by the mixing action of the agitator. The coffee must be kept moving for the first several minutes while it is hot to stop the coffee from continuing to roast in the cooling tray. The air along with any smoke from the hot coffee is then exhausted out the cooling bin ducting. After the coffee is cooled, it can be discharged into storage containers through the discharge gate on the cooling tray or into an optional destoner.

### **Optional Equipment**

**Loader:** The loader's function is to move the green coffee to the funnel located on top of the roaster. The standard Diedrich loader consists of a motor and impeller assembly, a green bean floor station, and a steel tube. The motor and impeller creates the vacuum required to lift the beans from the green bean floor station through the tube to the green bean funnel located on top of the roaster. After the roaster has been properly brought to operating temperature, the green coffee can be released into the roasting drum.

**Destoner:** The function of the destoner is to separate and collect foreign objects that may be in the roasted coffee (i.e., small stones). This process is done after the coffee has been roasted since it is not as heavy as the green bean coffee. The roasted coffee is vacuumed into an elevated silo. Using gravity, the heavier objects fall into a collection area at the bottom of the roasted coffee receiver. A slide gate is used to discharge the coffee from the silo.

**Oxidizer:** The oxidizer is a burner system that significantly reduces the amount of smoke from the roaster exhaust. The oxidizer is built of carbon steel with a stainless steel liner and vent connection. The lower section houses the actual burner assembly.

The oxidizer is activated automatically when the coffee reaches 250°F (121°C). Shortly after this temperature the coffee starts to emit fumes. When the oxidizer is activated, it quickly climbs to a temperature where the smoke and odors are burned. It stays at an elevated temperature until the coffee has cooled in the cooling tray and then the oxidizer burner returns to the lower temperature for the next batch.

### **3.0 SITE PREPERATION**

The customer is responsible to make arrangements for unloading and positioning their roasting system.

When practical, install the vent ducting before receiving the roaster. Refer to your copy of the pre-approved layout drawing for the exact location of the exhaust ducting. Final ducting connections to the roasting system will occur when the system is in place and lagged to the floor. Mark out the center lines of all components starting with the center line of the exhaust penetration through the roof. Measure out and mark the center lines, intakes and exhaust locations of all components to be installed.

The system will remove fresh air from the building. Normally an additional fresh air inlet is required to allow for burner “make up air”. The size and type is dictated by local codes and often must be installed prior to roasting. A licensed HVAC contractor should be utilized for the make-up air requirements.

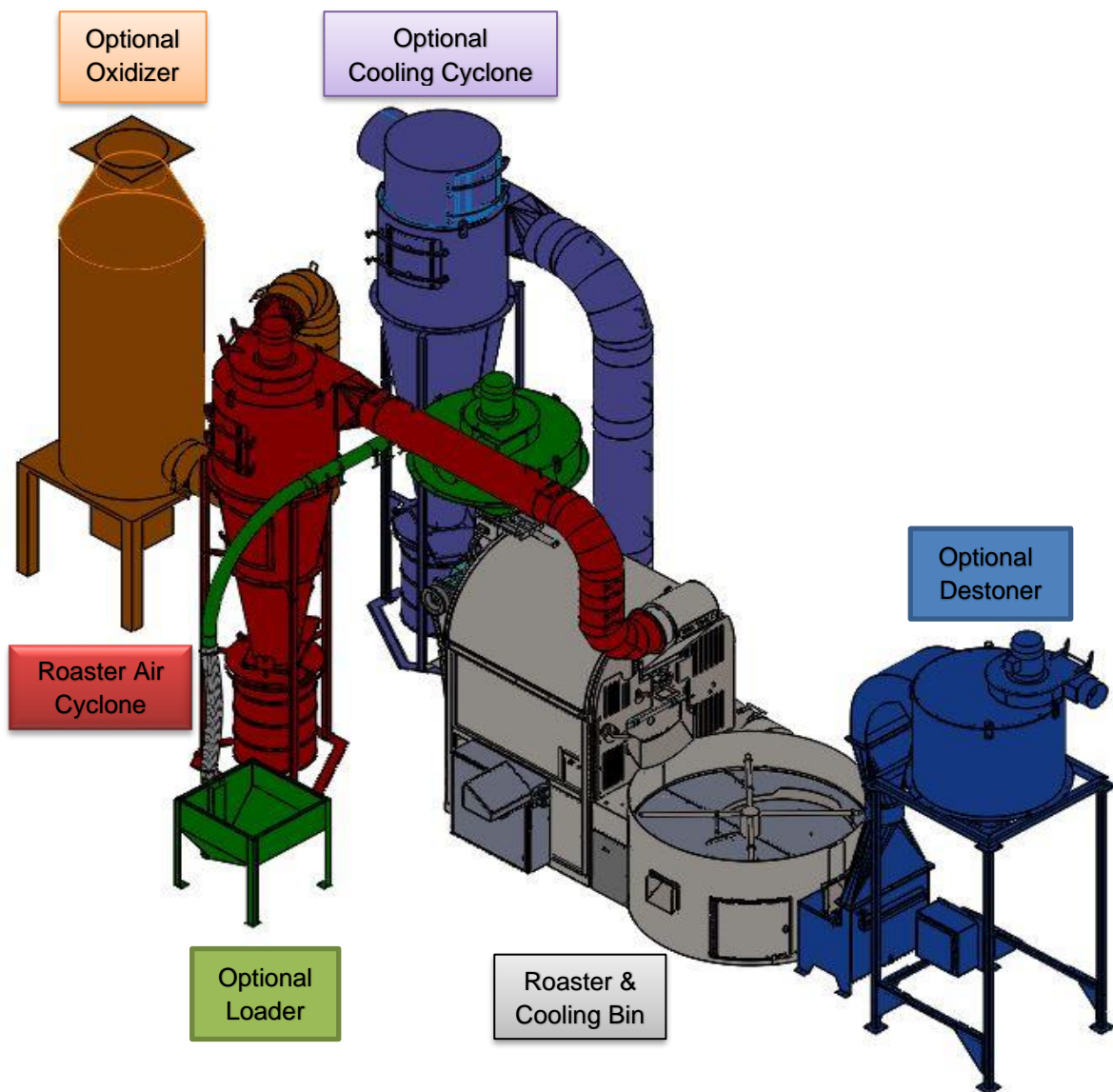
The environmental operating temperature ranges for the roaster should be as follows.

- Temperature range: 41°F to 104° F (+5 °C to +40 °C)
- Electrical equipment shall be capable of operating correctly when the relative humidity is up to 50% at a maximum temperature of 104°F (+40 °C)
- Electrical equipment shall be capable of operating correctly at altitudes up to 3,280 feet (1000 meters) above mean sea level.
- Electrical equipment designed to withstand the effects of transportation and storage within a temperature range of -13°F to 131° F (-25°C to +55 °)

### **4.0 RECEIVING AND UNPACKING EQUIPMENT**

When the roaster and its systems are received, immediately check the tilt sensor for crate damage. Do not refuse shipment if damage is evident. Make notes of the damage on the appropriate shipping forms and take several photos of the damage. Uncrate the components and inspect for further damage, dents, or scratches. Immediately file a claim with the freight carrier if damage is evident. A forklift can lift the roaster from the pallet at the fork tubes located on either the lower right side of the roaster or the front of the roaster, depending on the size (see illustration, next page).





## 5.0 ROASTER INSTALLATION

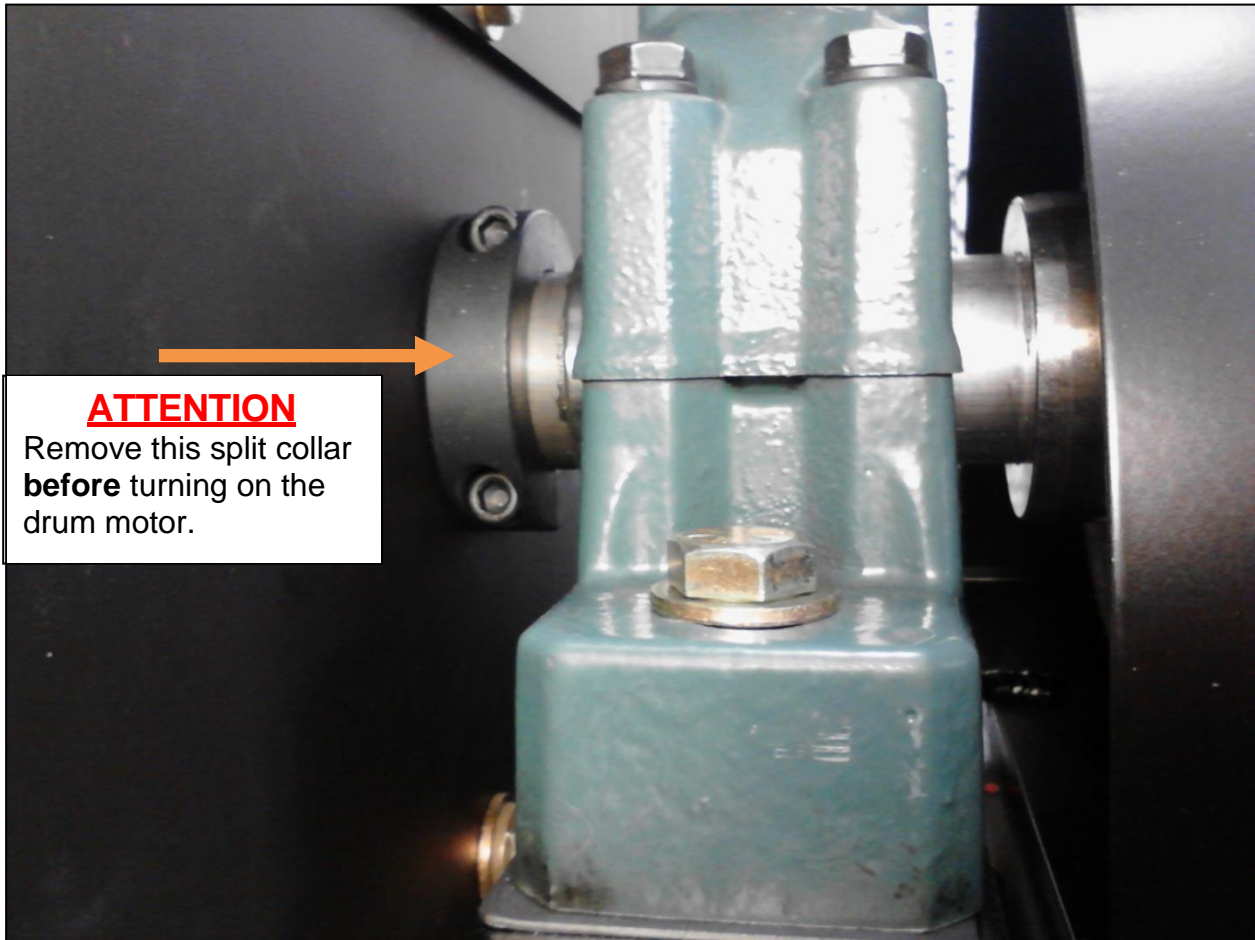
It is the purchaser's responsibility to ensure the appropriate codes and regulations, specific to their area, are followed to make sure that proper site engineering and installation requirements are met.

Clearances to combustible/non-combustible walls or counters must be considered. The roaster and oxidizer should be located at least 36 inches (92 cm) from any surrounding walls. For ease of access to the roaster and oxidizer, 48 inches (122 cm) is preferred. A sufficient area around the roaster for safe movement of all personnel is required. The venting and ducting area between the roaster and afterburner should have limited accessibility as this area contains extremely hot pipes. Make sure all controls, access doors, and inspection panels are accessible and can open without restriction.

Assemble the roaster by working backwards from the exhaust point to the cooling bin. Assembling the system in this manner reduces the number of possible misalignments.

## 6.0 ROASTER PARTS

### 6.1 DRUM RETAINING COLLAR



*Drum Retaining Collar*

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#### **ATTENTION**

A split collar is installed on the drum shaft to help prevent the drum from shifting during shipment. The collar **MUST** be removed before turning on the drum motor. The collar is located at the rear of the roaster between the back plate and the bearing. There may also be a collar mounted on the front bearing that needs to be removed.

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### 6.2 CYCLONES AND BLOWERS

**CR-70:** Hang and bolt the roast air cyclone onto the frame at the back of the roaster. Install the roast air pipe between the roast air hopper on the front of the roaster and the cyclone inlet with the provided strap clamps. Place the cooling bin cyclone or cooling bin blower in position so the outlet lines up with the exhaust stack or oxidizer inlet.

**CR-35, CR-140, and CR-280:** Position the roast air cyclone so the outlet lines up with the exhaust stack or oxidizer inlet. Place the cooling bin cyclone or cooling bin blower in position so the outlet lines up with the exhaust stack or oxidizer inlet. (See layout drawing.)



**Do NOT connect any of the utilities until the roasting system is in its final position.**

### **6.3 ROASTING SECTION**

The roasting section must be installed on a flat, non-combustible surface. If shims are required, they must be non-combustible. The flooring must meet the weight bearing requirements of local codes for commercial buildings.

The coffee roaster is designed to be raised by the fork tubes on the bottom of the roaster. Set the roaster into position for proper alignment with the ducting connecting the cyclone.

Mount the green coffee loading funnel with the loader motor/blower installed onto the hopper at the top rear of the roaster. Install the four (4) bolts with lock washers and tighten to the slide gate/funnel support box. The funnel is heavy and is most easily lifted with a forklift with padding on the forks. If the roaster is equipped with a green bean loader, the exhaust of the loader should be ducted outside of the building.

Now the roaster can be set into position. The ducting should be held in place between components to ensure the proper fit before the roaster is secured in its final place. All venting sections are connected using strap clamps. This allows the easy removal of sections for frequent cleaning. Sections can be clamped together at one end when assembling components of the roasting system to aid in the assembly process.

### **6.4 COOLING BIN INSTALLATION**

The CR Series Roasters have a cooling bin which is placed in front of the roaster. The cooling bin is designed to be raised from the lower front with a fork lift.

Slowly move the cooling bin toward the roaster, being careful to guide the cooler in and not pinch or damage the air/grease lines and power cords with roaster frame. The front left of the cooling bin has an access panel that will assist in connecting the lines / cords. The CR-140 and CR-280 CR-210, and CR-280 cooling bin ducting runs alongside the roaster, and the stainless bean discharge chute on the front of the machine needs to be removed prior to cooling bin installation. After placement, there are fork tube covers provided with your shipment to cover the fork tube access points.

The cyclone frame or cooling blower can now be bolted to the floor in its proper position.

## **6.5 DESTONER SYSTEM** *(Optional)*

The destoner is built in several sections to accommodate a range of installation options; the base unit, the trunk and the silo with vacuum blower. If it is shipped disassembled, all flanges and tube connections must be sealed with a silicone caulking to prevent vacuum leaks. If this is not done, the system may be unable to create the vacuum needed to lift the coffee.

If the destoner silo is mounted to the building structure, the complete installation must be engineered to account for the weight of the coffee, the silo and components. Another consideration is the rigidity of the mounting structure, as the starting torque of the blower motor can cause shifting if the installation structure is inadequate.

The exhaust of the destoner should be ducted outside the building and should allow access to inspect and or clean as needed.

## **7.0 GAS INSTALLATION**

The gas installation must conform to applicable codes established by local government and regulatory officials. A licensed/certified gas technician should be used for the gas installation.

All pipe used for the installation must be at least Schedule 40 pipe. Sealant on pipe joints must be resistant to liquid propane and natural gas. A water trap to collect condensation and loose particles should be installed in the last vertical run upstream of the roaster. The gas piping for both the coffee roaster and the oxidizer should be rigid gas pipe with the appropriate strain reliefs or earthquake shut-off as required to meet local codes. All gas lines should be pressure tested and bled prior to connecting to the roaster.

### **7.1 PIPE SIZING**

Sizing of the gas supply line is critical for optimal performance. The supply line must have enough gas volume to obtain the maximum BTU rating specified in the Capacities Chart per descriptions on page 1 and still maintain the minimum pressure requirements. Ensure your gas technician or the gas company sizes the gas supply line in accordance with the maximum BTU demands of the roaster and any other appliances connected to the gas line. The pipe size and pressure supplied will directly affect the performance of the roaster. Insufficient gas pressure or volume will result in poor performance of the roaster and the oxidizer may not reach sufficient temperatures.

### **7.2 SAFETY SHUT OFF VALVE**

A safety shut-off valve must be installed in the gas supply line before the connection to the roaster and in a location where it can be reached quickly in an emergency situation. The shut-off must be located close to the machine and must be marked to identify it as the gas shut-off.

### 7.3 INCOMING REGULATOR

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#### *ATTENTION*

If the installation has both a roaster and oxidizer, a separate incoming pressure regulator **must** be used for each piece of equipment.

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An incoming regulator must be installed to adjust the incoming pressure to the roasters required pressure as indicated in the Capacities table on page 1.

All connections **must** be tested prior to use of your equipment.

### 7.4 REGULATOR VENTING

The secondary gas pressure regulator supplied with the roaster must be vented to the building's exterior in accordance with local codes.

### 8.0 ELECTRICAL INSTALLATION

#### **CAUTION**

To avoid a severe shock, all components **must** be grounded.

The electrical installation must conform to applicable codes established by local government and regulatory officials. A licensed/certified electrician should be used for the electrical installation.

Please refer to the electrical conduit schedule provided separately for supply feed specifications and wiring information. **Use separate Low and high voltage conduits to reduce cross-interference**; low= communication wiring; high= power wiring.

The roaster and its related equipment must be wired together onsite. The installation must be hard-wired (piped conduit) with grounding wires to the electrical source.

The main electrical panel must be installed such that the disconnect device is situated between 0.6 meters (~2ft.) and 1.9 meters (~6.3ft.) above the floor level.

All components in the roaster are electrically grounded to the roaster frame. All wiring in the machine is labeled and color coded. The wires are also marked for their location on the terminal strips and motor terminations refer to the "Electrical Conduit Schedule" that is supplied in the electrical schematic documents . The loader and roast air blower motors are already wired in; they just need to be reconnected at each motor's electrical junction box during installation.

### 8.1 MANUAL ROASTERS

The optional destoner must have its own electrical circuit run to it.

## 8.2 AUTOMATED ROASTERS

All CR-Series roasters have a free standing electrical panel Main Control Panel (MCP) which is mounted separately from the roaster. The incoming power is fed to the freestanding electrical panel MCP. The optional destoner receives its power from the freestanding control panel circuit. With the electrical control panel set into position, the conduit can be installed between the roaster and the electrical control panel.

## 8.3 MOTOR ROTATION

Once the roaster has been wired and checked for safety, you **must** check the direction of motor rotation to ensure it is correct.

## 9.0 WATER INSTALLATION

The water quench inlet pipe is located on the right rear of the roaster. See the separate supplied "Installation Guide" for details on capacities and connection size.

A **low-flow, 10 micron water filter** on the incoming water line is recommended to prevent the internal water nozzle from becoming clogged.

Installing an additional water hose is recommended, for cleaning and emergency situations.

## 9.1 SAFETY SHUT OFF VALVE

A safety shut-off valve **must** be installed in the water supply line before the connection to the roaster and in a location where it can be reached quickly in an emergency situation. The shut-off **must** be located close to the machine and should be marked to identify it as the water shut-off.

## 10.0 AIR COMPRESSOR INSTALLATION

Roasters equipped with a pneumatic slide gate system require an onsite air compressor. The air inlet, pressure regulator and water trap are located at the rear of the roaster. The system requires the pressures outlined in the Capacities Table located in the separate "Installation Guide."

Installing an additional air hose with a blower nozzle is recommended for cleaning and maintenance purposes.

## 10.1 SAFETY SHUT OFF VALVE

A safety shut-off valve **must** be installed in the air supply line before the connection to the roaster and in a location where it can be reached quickly in an emergency situation. The shut-off **must** be located close to the machine and **must** be marked to identify it as the air supply shut-off.

## 11.0 DUCTING

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### ATTENTION

Under no circumstances should Class B or Spiral-wrap ducting be used when exhausting hot air.

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### WARNING!

The exhaust duct system is not to be supported by the Oxidizer or roaster.

The temperature of the ducting between the roaster, the cyclone and the afterburner typically runs between 470°F to 500°F (243°C to 260°C). This area should be isolated so that it is not readily accessible unless or until servicing of the vent system is required. Touching the hot vent pipe may cause severe burns. Connections, flanges and clamps should be installed so they can be removed easily for frequent cleaning. The vent system requires cleaning at regular intervals so easy access must be considered.

One of the most important aspects of the roaster installation is the use of an approved ducting system. Its design will greatly affect the performance of the coffee roaster and the coffee quality. Two considerations when designing a ducting system are the static pressure and the distance the ducting is to combustible/non-combustible materials.

All makes of Diedrich coffee roasters and oxidizers have a blower mounted inside which forces exhaust air into the ducting. The oils and residues in the exhaust air are flammable. In the event of a ducting/flue fire, the internal duct temperatures can exceed 1000°F (538°C), which could cause nearby combustible materials to ignite. For this reason, Diedrich recommends at least stainless-steel double wall positive pressure grease ducting.

Ducting must be suitable for 1000°F (538°C) continuous and 1400°F (760°C) intermittent operating temperatures.

CR roasting systems have two separate ducting exhausts. There is one exhaust duct for the roast air coming from the drum and one exhaust duct for the cooling bin air. The exhaust ducts are *typically* joined into an oxidizer and one duct exits the oxidizer.



**It is highly recommended to also vent exhaust for optional loader and destoner.** High temperature vent pipe is not required. This will eliminate coffee debris blowing into your roasting facility.

CR systems that **do not** use an oxidizer have two hot exhaust ducts leave the roaster and exit the building (one for Roast Air and one for Cooler exhaust).

Exhaust pipe diameter must be at least the same diameter as the exhaust outlet on the equipment (refer to equipment layout drawings).

The exhaust system must be designed to operate with a static flue pressure **between positive 0.25"WC and negative 0.15"WC (positive .63 MBAR and negative .37 MBAR)** at the exhaust of the roaster while in operation.

Check local codes and regulations to determine the requirements specific to your location.

Designing an exhaust system requires a trained professional to calculate the efficiency of the system and proper size of duct. The ducting must be of sufficient diameter to accommodate the SCFM (standard cubic feet per minute) or SCMh (standard cubic meters per hour) of airflow. A certified/licensed HVAC technician or one of the vent ducting companies listed below can assist you with the best ducting layout for your site. Before calling them for assistance you will need to be prepared to provide the technical information from the Capabilities Table on page 1.

When venting your roaster, a direct vertical run is typically the most efficient and cost-effective. The design of your building may dictate the use of 45° or 90° elbows which will put a restriction on the airflow and may cause unwanted backpressure on the roaster. If space allows, use two 45° elbows rather than a 90° elbow to reduce restriction. A booster fan may be needed to assist air movement if the system is too restrictive. A qualified ducting specialist will determine the best design for your specific installation. The roaster must not support the weight of the exhaust system. Ducting should be connected to the roaster based on the ducting manufacturer's recommendation.

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### **ATTENTION**

Fires are caused by failure to maintain a clean roaster and its exhaust ducting system. Regular cleaning of the roaster and exhaust ducting will help prevent the buildup of residues and conditions that could cause fire.

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A properly designed and installed chimney cap/rain cap is critical to the overall design. The manufacturers listed on the next page offer components to prevent water penetration into the system. Water leaking into an oxidizer may cause an electrical short or damage the burner assemblies on the equipment. Some air quality jurisdictions dictate the use of certain types of chimney caps/rain caps also. The cap must not have a screen since it will clog with residue of chaff over time.

In order to provide our customers with a choice of venting options we have included a list of several ducting manufacturers as a starting point. This is just a list of companies who are familiar with Diedrich roasters, other manufacturers may be used. Your HVAC specialist may have a recommendation or preferred manufacturer. Some ducting manufacturers have on-site engineers



to assist you in designing your unique exhaust ducting. Please be advised, positive pressure grease vent is not an off-the-shelf product, plan ahead to compensate for long lead times.

*Recommended Ducting Manufacturers*

Selkirk Metalbestos, Inc.  
[www.selkirkusa.com](http://www.selkirkusa.com)

Van-Packer  
[www.vpstack.com](http://www.vpstack.com)

Security Chimney International a division of LENNOX Hearth Products  
[www.lennoxhearthproducts.com](http://www.lennoxhearthproducts.com)

Jeremias  
[www.jeremiasinc.com](http://www.jeremiasinc.com)

# OPERATION AND MAINTENANCE

## 12.0 SAFEGUARDS

The proper installation, cleaning, and safe operation of the coffee roasting system are the owner and operator's responsibility.

- 1) Prior to cleaning or servicing ensure the circuit breaker in the electrical control box is switched to the off position. Test for power prior to cleaning or servicing.
- 2) Ensure the coffee roaster is cool to the touch prior to cleaning or servicing.
- 3) Wear protective gloves and eyewear when scrapping residue off internal walls and components.
- 4) Use extreme caution when utilizing scrappers or other devices to clean internal walls and components, a slip of a tool may cause bodily harm.

Read this manual carefully for important operation, maintenance and safety information. All persons operating the Diedrich coffee roaster must be properly trained in the safe and proper use of the roasting system. **The safe use of this equipment also requires an understanding of the basic chemistries that occur during the roasting process so that subtle warnings can be identified before problems arise.** Never permit an unqualified individual to operate this roaster. A qualified operator must have a clear understanding of proper and intended use of the equipment, roasting methods, cleaning requirements, fire suppression procedures and must be aware of all safety precautions.

Operators must understand how to start and stop the motors using the control system. In particular, the operator should be aware of the **emergency stop button**. This button disconnects the control power and shuts off the motors and gas.

### WARNING!

Always make sure the chaff is cool before emptying the chaff into any other containers such as a waste container. Hot embers residing in the chaff could ignite a fire.

### WARNING!

**Never** leave the roaster unattended while it is turned on. Empty the chaff at the end of every roasting session before leaving the roaster.

### WARNING!

**Never**, under any circumstances, put a hand or any body part into the roasting drum, or any other roaster access port, until the roaster has cooled down and power has been disconnected at the electrical source.

Keeping the roasting system clean internally and externally cannot be over-emphasized. The handling of coffee and the coffee bags creates dust and residues which are a fire hazard. Oil, residues, and certain gases released during roasting are combustible. This residue collects on the internal walls of the airflow passages and presents a significant fire hazard.

### **CAUTION**

**Always be aware of the risk of a fire. Fires are caused by failure to maintain a clean roaster and the exhaust duct system. A dirty roaster will also affect the efficiency of the roasting system. More importantly the balance of the heat media will be compromised, changing the cup quality of the coffee.**

**Fire extinguishers** should be located within easy reach of the roasting system. These should preferably be CO<sub>2</sub> extinguishers with sufficient capacity for a severe roasting system fire. Consult with your local fire professional for recommendations on suitable fire extinguishers

Be careful when touching the roaster components, as some of these areas are very hot. The motors, ducting, and chaff cyclone are extremely hot. This area should have restricted access and not be entered until the system is cool and power has been disconnected.

### **CAUTION**

**Roasted coffee emits a significant amount of CO (carbon monoxide) gas. Inhalation of this gas can prove fatal. When entering any roasted coffee silo or container, the silo or container must be well ventilated and an observer must be present during this time.**

Water Quench should be used to stop the aggressive exothermic reaction within a few degrees of the final roast temperature, especially during darker roasts. Although water quench can be used to cool the beans, it is not intended to be used for fire suppression or containment. Consult with your local fire fighting professional for steps to take in case of fire.

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### **ATTENTION**

Improper installation and operation may result in a fire or explosion causing property damage, personal injury or death. Adherence to these instructions is imperative.

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**DO NOT** store or use gasoline or other flammable liquids in the vicinity of this roaster or any other appliances.

**IF YOU SMELL GAS:**

- Evacuate the building to a safe distance.
- Do not try to light any appliance.
- Do not touch any electrical switch.
- Do not use any phone in your building.
- Immediately call your gas supplier from a nearby phone.
- Follow the gas supplier's instructions.
- If you cannot reach your gas supplier dial 9-1-1 or call the Fire Department.

If this roaster is not installed, operated and maintained in accordance with this manual, you could be exposed to substances in fuel or from fuel combustion which can cause serious illness or death.

### 13.0 OPERATOR CONTROL CONSOLE – MANUAL ROASTER (panel will vary)



*Manual Roaster Operator Control Console*

**Emergency stop:** The emergency stop button turns off all control power when pushed in. All of the motors will stop and the gas will shut off. When pulled out to the “ON” position the roaster can once again start the motors.

**High limit Reset/Silence:** The high limit alarm will sound if the roaster is above the 485°F (251°C). A high temperature limit module in the roaster will shut off the pilot burner and main burner. Push the “RESET/SILENCE” button to silence and reset the module. The roaster temperature must be under 485°F (251°C) for the high limit module to allow the burners to reignite.

**Bean Temp:** The display shows the temperature inside the roasting drum.

**Roast Air:** To start the roast air motor push “START”. The light will illuminate after the motor has started. To stop the roast air motor press “STOP”. The roast air speed is adjusted with the dial. When turned to left (0) the blower will be at minimum speed. When turned all the way to right (9+) the blower will be at maximum speed. The blower motor is always on at a minimum speed to move exhaust out of roaster. For example, if dial is set to 5 you are about 50% of the controllable air speed, it should be at approximately 70% when set at 7.

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## ATTENTION

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Always keep the drum rotating until roaster is cooled down to below 250°F (121°C).

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**Drum:** To start the drum motor push “START”. The light will illuminate after the motor has started. To stop the drum motor press “STOP”. CR-35 Variable speed is controlled by a knob on the console.

**Agitator:** To start the agitator motor push “START”. The light will illuminate after the motor has started. To stop the agitator motor press “STOP”.

**Cooler:** The cooler motor is used to draw air through the cooling bin and cool the beans after a roast cycle. To start the cooler motor push “START”. The light will illuminate after the motor has started. To stop the cooler motor press “STOP”. Low/high switch for low airflow and high airflow adjustment.

**Gas:** The drum and roast air blower must be on for the gas to start. To start the gas push “START”. The light will illuminate after Ignition sequence has started. To turn off the gas push “STOP”. To indicate that pilot is lit, the light in the “PILOT-BURNER” selector switch will illuminate.

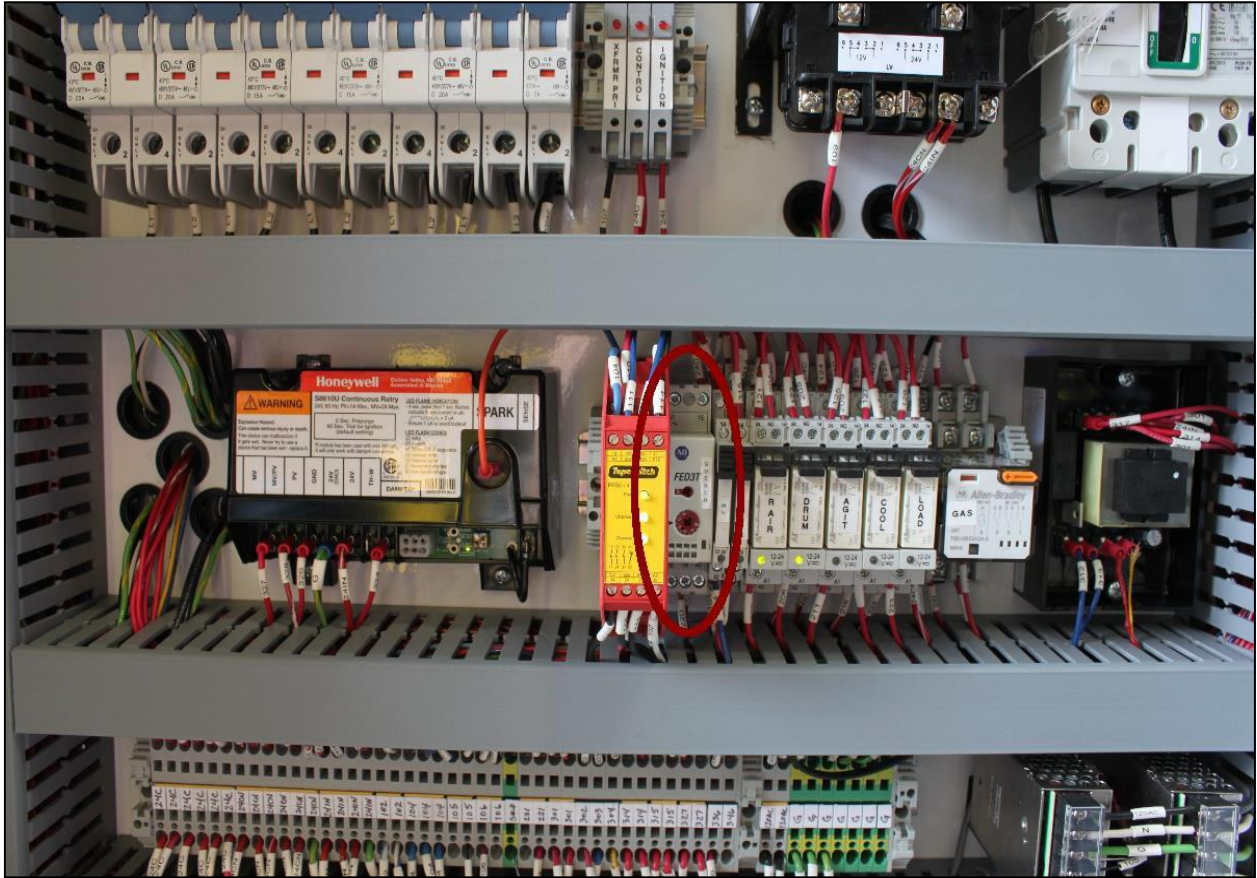
(AGA) Same as above, except you first start only the drum, then the start for gas, wait for the blue indication light, then start the roast air. If anything fails to light, check the side of the HMI enclosure for red indication light and reset. If the pilot or either of the 2 burners fails to light and needs to be reset, it must be done before attempting to relight. When relighting, turn everything off and start this sequence over.

**Pilot Burner:** This selector switch is used to turn main burners on or off. The operator can select between “pilot only” or “burner(s)on”.

The flame intensity is adjusted with the potentiometer dial. When turned to left (0) the burner gas will be at minimum. When turned all the way to right (9+) the burner gas will be at maximum. Switch the “PILOT-BURNER” selector to “Pilot” if a setting lower than 0 is needed.



**Quench:** Activate the water quench by pushing “START”. The light will illuminate while quenching. The quench time is controlled by a timer located in the roaster electrical cabinet. It is factory set to a quantity listed in the Technical Table of the Installation Guide. You can also stop the water quench before the timer by pushing “STOP”. See picture below. The relay **FED3T** has a round, red dial where you can set the length of quench time you desire.



*Roaster Control Panel*

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### **ATTENTION**

Occasionally during shipment and/or installation a slight shifting of the roasting drum may occur and disturb alignment. Check for misalignment.

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## **14.0 INITIAL START-UP**

Check the drum seating as follows:

1. Place the roast air dial to the 0 position and the "PILOT - BURNERS" selector switch to the "PILOT" position.

2. Turn on the “DRUM”, “Roast Air” and “GAS” buttons.
3. After the ignition system goes through purge cycle, the pilot should light.
4. Once the pilot is lit, switch to the "BURNERS -1" or “BURNERS -2” position and use the gas control knob to adjust the gas.

The pilot will go through three trials for ignition. Should the pilot fail to light, press “STOP” on the gas switch, and restart using the instructions above.

**Note:** *The first time the pilot ignites, extra time may be necessary to allow air to bleed out of the gas line. Following the ignition of the pilot, two to three minutes may be required to allow the burner(s) to ignite for the first time. Watch through the view window for burner ignition.*

Move the gas dial to a high flame setting and watch the digital temperature unit on the control panel. Let the roaster warm to 415° F, (213° C). If no grinding sounds occur the initial warm-up is complete and roasting can commence. If a grinding noise is heard, turn off the gas and adjust the airflow to the maximum setting. If the grinding becomes severe press the emergency stop button. Contact Diedrich Technical Support for instructions.

## 15.0 SEASONING THE ROASTING DRUM

The drum of the roaster must be seasoned before roasted coffee is fit for consumption. Use an inexpensive coffee for the seasoning process. Do not use a Robusta coffee as it does not emit as much oil for seasoning the drum.

The new drum may require from 8 to 12 seasoning roasts to become properly oiled. Each seasoning roast requires about 50% of roaster capacity of coffee, enough to fully cover the drum's lower surfaces. During seasoning, the roaster should be operated for 30 – 60 minutes with the oily beans tumbling in the drum at a temperature of 425°F – 460°F or until the beans become dry. After completion of each seasoning roast, discard the roasted coffee after it cools. It may take additional roasts to achieve the best flavor from your new roaster. Seasoning the roasting drum will give you the opportunity to become familiar with the roaster's controls and the roasting process.

1. Set the roast air dial to the minimum position.
2. Preheat the roaster to 420°F (215°C).
3. Push and hold the hopper gate button to release the green beans from the hopper into the drum (release the button when finished).

The coffee will change in color from green to a pale yellow. During this progression look through the drum door view window, you will start to see chaff, the bean's outer skin, separating from the coffee bean. Unwashed coffee has considerably more chaff than washed coffees and decaf coffees have almost no chaff. The bean development and color can be observed by using the sample trier. You can develop a consistent roast profile by referring to a set of roasted bean samples or color tiles. Sampling of beans should be consistently viewed under **a full-spectrum natural fluorescent lamp** to maintain a consistent sample comparison.



When the coffee reaches the yellow stage 280°F (138°C); the Roast Air Control Dial should be moved to the "5" (mid) position. As the coffee reaches the yellow stage, the moisture in the coffee that was a good conductor of heat early on in the roast, is now turning to steam. At this stage in the roast, the air flowing through the roasting drum becomes a more uniform heat medium.

When the coffee reaches first crack it is important to move the "Roast Air" control dial to the "9" position for the remainder of the roast. Let the roast progress in the full roasting stage until the coffee develops through the second crack and oil begins to appear at the tips of the beans.

When you begin to notice the first traces of oil, turn the gas control "OFF". Let the coffee roast in its own liberated heat until the beans are fully oiled and almost black. You can leave coffee turning in the drum for 30 – 60 minutes or until the beans are dry to help fully coat (season) the drum. Once the beans become less oily, turn on the "AGITATOR" and "COOLER" blower then discharge the coffee into the cooling bin.

### **WARNING!**

Pay close attention to the temperature at this point. **DO NOT LET THE TEMPERATURE RISE OVER 480°F (249°C).**

As the coffee reaches a temperature of 340°F (171°C) the chemical changes in the coffee start an exothermic reaction (the chemistry creates its own heat). This exothermic reaction continues through the remainder of the roast. The High Temperature system turns the gas off at 485°F (251°C), but the temperature continues to rise due to the exothermic heat. If the coffee is not removed from the drum before 500°F (260°C) the coffee may ignite. This is why you quench the drum to lower the heat.

#### **High Temperature Limit:**

*At 475°F (246°C) - the main burner shuts off, but the pilot does NOT shut off (No alarm sounds). At 485°F (252°C) the alarm will sound and the High Temperature limit shuts down the roaster's entire gas system. You will have to reset the roaster once it has cooled down below the high limit temperature. To restart the burners, follow the normal start up procedure.*

Repeat the complete dark roasting cycle 5-8 times. This procedure will properly season the roasting drum.

## **16.0 ROASTING FOR CONSUMPTION**

The following instructions explain the operation of the roaster. They are not an attempt to teach all the subtleties and proper techniques of roasting the many varieties of coffee beans. Further information on roasting is available during the Diedrich Roasting Seminars.

Follow the procedures outlined in the Start-Up section. Set the "ROAST AIR" dial to the minimum position. This allows sufficient airflow through the drum to gently assist in the heating process without drying out the coffee excessively.

If roasting a full capacity batch, preheat the empty drum until the digital unit reads 440° (226°C) or until you reach your desired charge temperature. Depending on type of coffee, batch size, and roasting technique charge temperatures will typically be between 420°F (215°C) and 440°F (227°C).

Average roasting times are from 14 -15 minutes for a light roast and 15-18 minutes for a darker roast, depending on the source or type of beans. Reducing the burner flame is one of several ways to lengthen roast times. The temperature of the roasting system (comprised of the coffee beans, roasting drum, and end plates) reacts slower than the flame adjustments. Do not expect an immediate temperature change when the heat level is changed. After a short time, the beans and roasting system will show signs of dissipating heat.

Load the green beans into the funnel after the roaster's empty drum has been preheated. The charge temperature is the temperature which the beans are loaded into the drum. The display temperature will fall drastically after charging. The temperature at which the coffee stops decreasing and starts rising is known as the bottom out temperature. Charge temperature and initial fuel settings are determined by, but not limited to, the desired bottom out temperature and rate of climb from bottom out.

Activate the hopper gate button to release the green beans from the hopper into the drum. Push the handle in to close the hopper gate.

Adjust the flame control to an appropriate heat setting for the size of the batch of coffee to be roasted. A large batch has a lot of heat absorbing capacity and a higher flame setting can be used without accelerating the roast. A full batch may use close to full fuel as an initial fuel setting. A half batch may use about half fuel.

A stage of roast that is easy to identify is when the beans turn yellow. It makes a good time/color reference point at about six or seven minutes. The yellow color of varietal coffees is an off-shade of orange for decaf coffees. The yellow color indicates about 270°F (132°C).

When the beans have reached the yellow color, move the "ROAST AIR" control dial to the middle (4-6) range until the beans reach a dark tan color at about 345°F (174°C).

The cinnamon brown color is another checkpoint that is easily identifiable and should be reached at approximately 9 – 11 minutes into the roast. If you hit the yellow stage at the right time, you should be fairly close, but some fine-tuning of the heat may be necessary at this point.

Between 11 and 13 minutes the beans should reach the 1st crack and you will observe a gradual color change of the beans to brown. This is the most significant stage of bean development. At this stage the beans fully open up and the roasted coffee may be ready to release into the cooling bin for a lighter roast. The chemical changes in the coffee start to produce a large volume of carbon dioxide (CO<sub>2</sub>) gas. This gas will pressurize the roasting drum if the airflow is not increased. Normally, a pressurized roasting vessel is the most efficient heat transfer medium, but for coffee, a pressurized roasting drum will hinder bean development.

As more airflow through the drum is needed, move the “ROAST AIR” control dial to the maximum (9) setting.

This is the most significant stage of bean development. At this stage the beans fully open up and, for a lighter roast, the roasted coffee may be ready to release into the cooling bin. The operator should pay close attention to the coffee. Frequent sampling is most important. ***These last few minutes are very critical as the bean development accelerates very rapidly.*** While learning to roast, it may be advisable to lower the heat to slow down this stage of the roast.

The darker the roast, the more smoke is produced. This requires a greater airflow to keep clean air moving through the drum. Approximately 13 minutes into the roast, you will observe a gradual change or darkening of the bean color. Use the sample trier to obtain sample beans to observe bean development.

When the coffee reaches this final stage of roast, prepare to discharge the roasted coffee into the cooling bin. Turn the “AGITATOR” to “ON”, then turn the “COOLER” to “ON” and turn the gas selector switch to “PILOT”. Press the “QUENCH” button to start the removal of heat from the coffee; then discharge the coffee into the cooling bin.

After the coffee has been in the cooling bin for 1-3 minutes, the operator may turn off the agitator and spread out the coffee. Remove the coffee from the top cooler discharge gate. With the “AGITATOR” turned “OFF”, the air can find a path through the coffee. The air is hindered if the coffee is in motion. This will allow the coffee to cool faster. While the drum discharge gate is open, wipe clean the viewing window. It is much easier to clean residue from the window while it is hot rather than letting the residue bake on and harden during the cooling.

***Note:*** After completing the first roast, the drum metal temperature will be close to the same temperature as indicated on the digital temperature unit. This allows the next roast to be started almost immediately.

When the beans have cooled to room temperature, position a container under the cooling bin chute, turn on the “AGITATOR”, and discharge the beans out of the cooling bin. Return the “AGITATOR” switch to “OFF”.

If any of the following happens:

1. Excessive smoke in the room.
2. Smoke coming from the sample trier port.
3. Longer cool down times.
4. Excessive chaff in the burner compartment.

Check for the following:

1. Excessive build-up of residue throughout the airflow system within the roaster.
2. Excessive build-up of residue in the exhaust ducting.

If these abnormalities occur, inspect the roaster and ducting for probable cause and take immediate action to rectify the situation.

## 17.0 SHUT DOWN

1. Set the gas switch to “PILOT” position.
2. Press the “**STOP**” gas button.
3. Set the “ROAST AIR” control dial to the maximum (9+) position to cool the roasting drum.
4. After the temperature reading has dropped to 250°F (121°C) or lower, press the “BLOWER” and “DRUM” “**STOP**” buttons.
5. Make sure the “FLAME CONTROL” is turned to the “OFF” position.
6. *For CR-25 manual roasters, turn off the switch on the electrical panel.*
7. Remove the chaff barrel from the roaster.
8. Open the side doors to remove chaff and for general cleaning.
9. Inspect for smoldering chaff. If found, extinguish with water (a small spray bottle is best for this purpose).

### WARNING!

Never leave the roaster without cleaning out the chaff collector.

## 18.0 ROASTING LOGS

Diedrich recommends maintaining a [roasting log](#) (*see example on next page*). You will find the log very valuable for many different aspects of the roasting process. This log will assist in keeping track of the amount of beans roasted during the course of the day; how long since the last cleaning or maintenance; and, the weight loss from the green to the roasted beans.

**Type of Coffee** - Naturals (unwashed coffees, Indonesians) have much more chaff than washed coffees (i.e. Central and South American coffees). Decaffeinated coffees have virtually no chaff on the outside of the bean. Thus, the chaff collection barrel and burner tray require much more attention if a fair quantity of unwashed coffees are roasted, but almost no cleaning if you are roasting decaffeinated coffees.

**Weight Loss** - the green weight IN minus the roasted weight OUT divided by the green weight equals the percentage of weight loss. Example:

26 lbs **IN** minus 21.3 lbs. **OUT** = 4.68 lbs. = 18% weight loss

Weight loss is a good indicator of the degree of roast. Variables such as humidity, ambient air temperature, and how the coffee was stored will affect the weight loss. It may go up or down 1% from day to day or month to month, but you should always see about 16-18%.

**Roasting Times** – Roasting time may explain why weight loss can be different from roast to roast even if the color is the same. (the longer the roast, the higher the weight loss) Longer roasting and cooling times are also indicators that the airflow passages may be restricted.

**Total Time** - Total time on the roaster is very important as it directly relates to the servicing/cleaning needs of the roaster.

**Comments** - It may be helpful to note the weather of the day, barometric pressure, relative humidity and other conditions will affect the performance of the burner, the conductivity of the air, and thus the performance of the roaster. This information may also be useful in accessing the service needs of the roaster or diagnosing a problem.

Diedrich Roast Log						
Date	Type of Coffee	Weight In	Weight Out	% Wgt Loss	Roast Time	Comments
Total roasting time						

Note: The green weight IN minus the roasted weight OUT divided by green weight IN equals the percentage of

Example: 15 lbs IN - 12.75 lbs OUT = 2.25 lbs / 15 = 15% weight loss

## 19.0 CLEANING

### **CLEANING AND MAINTENANCE OF THE ROASTER IS EXTREMELY IMPORTANT FOR CUP QUALITY, ROASTER PERFORMANCE AND SAFETY.**

Keeping the roasting system clean internally and externally cannot be over-emphasized. The oil and dust mixture that accumulates is a fire hazard. A dirty system also makes servicing more difficult.

The roasting process manipulates the chemistry of the coffee considerably more than any other process it undergoes. The chemical changes are a result of raising the bean temperature with a combination of convective, conductive and radiant heat at a specific rate. If the roasting medium is to stay consistent and predictable, the airflow system must be kept clean so that the balance of heat media stays consistent.

The exhaust ducting inside the roaster to its termination outside the building is one system. It is of utmost importance to keep it clean.

Accumulated chaff and oil residues are extremely flammable. Poor airflow can result in a build-up of flammable gases in the roaster and exhaust ducting. A restriction of airflow anywhere in the system will create a “snowball” effect of residue/creosote build-up in all airflow passages within the system. This build-up directly affects the performance and efficiency of the roaster.

Take time daily for general cleaning. Check for residue build-up. After every two (2) hours of roasting, check the collection barrel under the chaff cyclone to get a feel for how often it must be emptied. A maintenance chart is supplied on pages 36-37 of this manual and the lengths of time listed in the chart are general starting points. **These times will vary based upon the degree of roast, type of coffee, and environmental conditions (such as humidity). A cleaning timeline must be established which reflects these unique conditions.** When the roast system is new and clean it is easy to gauge how quickly the residue accumulates in the different areas. Inspect all of the airflow components in the system every 20 hours during the initial 100 hours of operation. This will allow you to observe the rate of residue accumulation as it relates to your style of roasting and help establish a cleaning schedule.

### 19.1 CHAFF COLLECTION CYCLONES

The chaff cyclone barrel should be emptied when the barrel is approximately 1/2 full. Close the cyclone slide gate or butterfly valve when emptying the chaff barrel. Exhaust will escape into the room if the slide gate or closing device at the bottom of the cyclone is not closed.

The residue inside the cyclone should never be more than 1/8 inch (3.0 mm.) thick. Before cleaning the chaff collection cyclone internally, **adequate ventilation must be provided** as exhaust residue contains a high level of CO (carbon monoxide) gas. Remove or open the upper and/or lower access panels/doors. Scrape the inside clean with a wide putty knife. Replace the access panels and ensure they are properly sealed before roasting.

**STIR THROUGH THE CHAFF TO INSPECT FOR ANY SMOLDERING EMBERS BEFORE DISPOSING OF CHAFF.**

If any smoldering chaff is found, spray with water to extinguish.

**NEVER LEAVE THE ROASTER DURING OR AFTER ROASTING UNTIL THE CYCLONE BARREL IS EMPTIED.**

## 19.2 IMPELLER REMOVAL

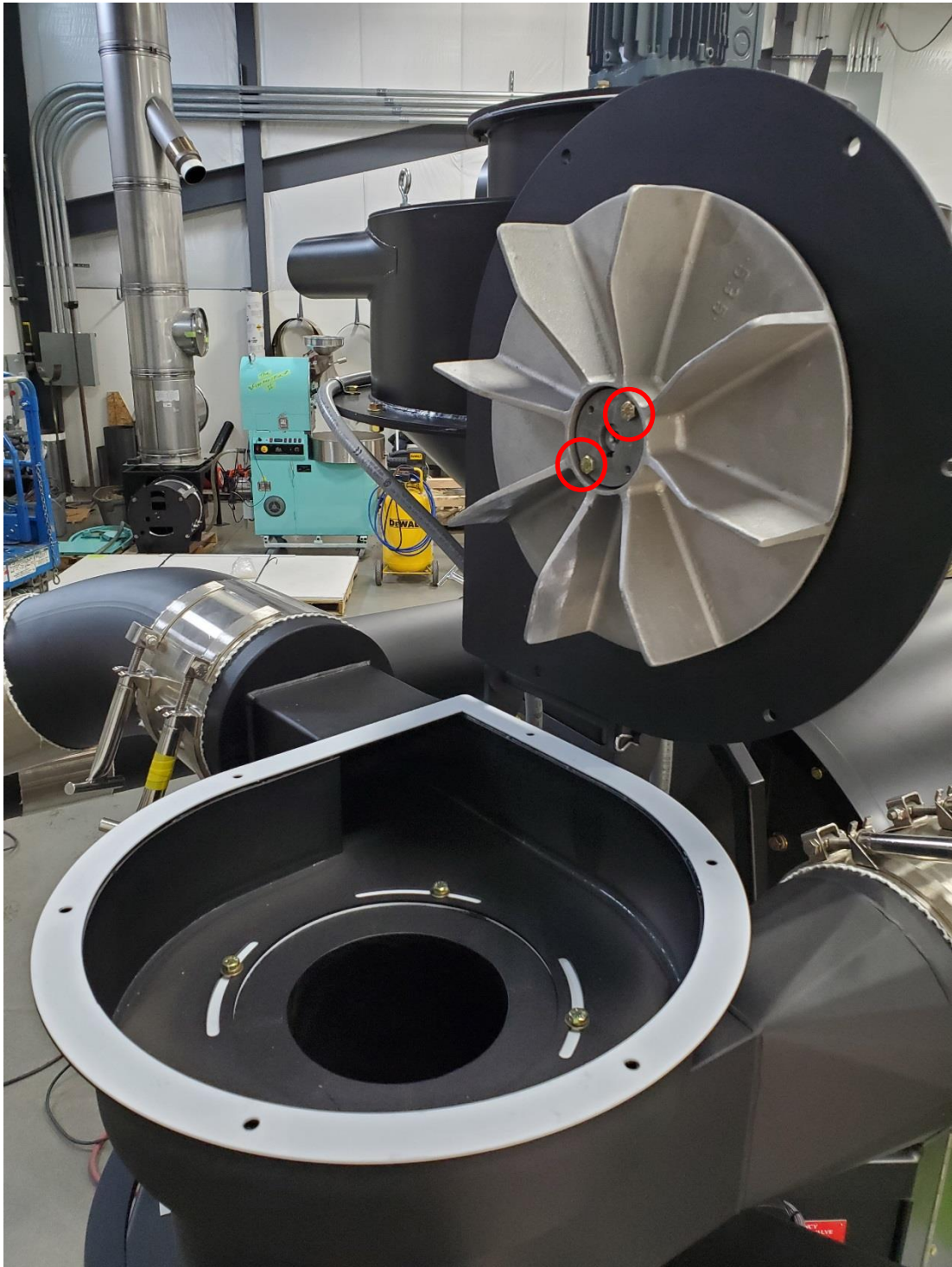
Below are instructions for the removal of impellers with the taper lock system. *(See pictures on next page.)*

1. Unscrew the bolts which secure the mounting plate to the cyclone. Swing the impeller housing open. Use caution as the impeller housing is heavy.
2. Unscrew the 2 bolts in the impeller hub then screw them into the threaded holes in the hub.
3. Being careful not to twist the bolts off, tighten these 2 bolts evenly first one then the other, a little at a time. This will put pressure on the impeller to push it off of the hub.
4. Using a large chisel or pry bar force the hub and impeller apart along with continuing to tighten bolts.
5. Once you have the impeller off, scrape debris off of the inside of the door and scrape the impeller clean. At this point, also clean the roast air housing and roast air hopper.
6. Making sure to line up the keyway in the hub to key in the shaft, put the impeller on the motor shaft and then install the hub on shaft
7. Screw the bolts back into the impeller and tighten evenly.
8. Now take a large punch and hammer and hit the hub on opposite sides forcing it further into impeller, after hitting the hub with the punch tighten bolts again. Repeat this step until the bolts do not tighten any more. (normally 5 or 6 times)
9. Torque specs - 1/4" bolts (7/16" wrench) 9 ft. lbs. or 108 in. lbs.; 5/16" bolts (1/2" wrench) 15 ft. lbs or 180 in. lbs

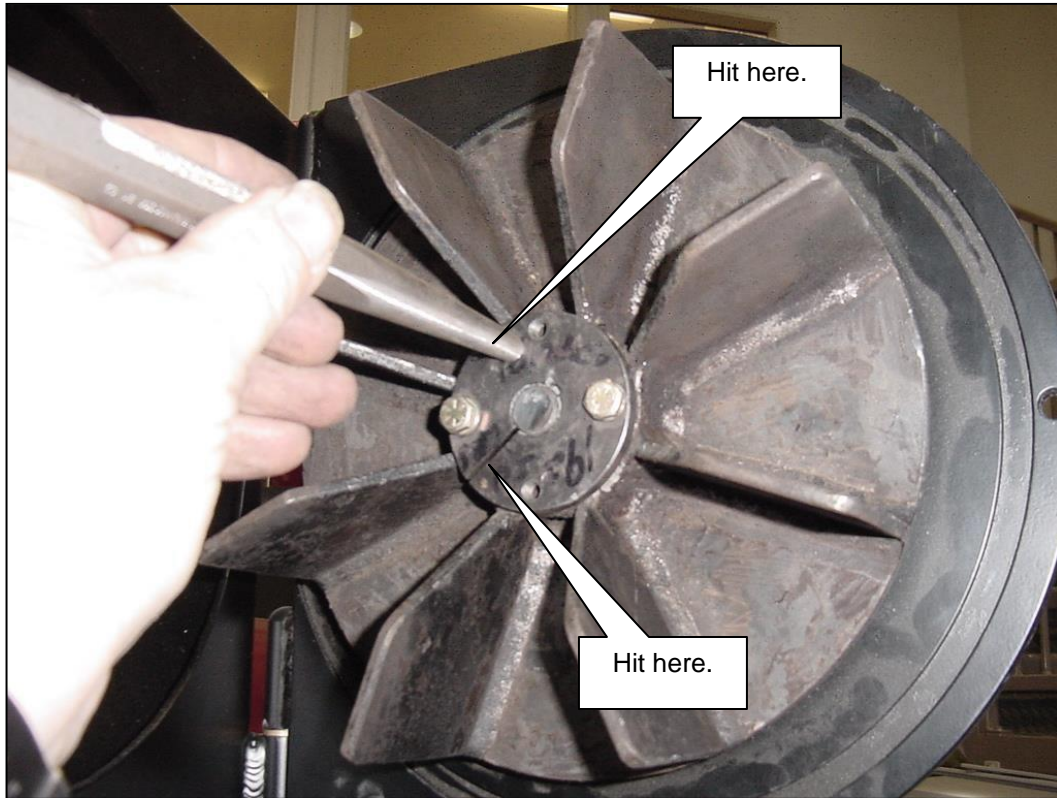


*Roast Air Impeller Housing*









Clean the fan blade thoroughly as an uneven cleaning will create an imbalance and vibration when the blower is turning.

To install the fan blade, reverse the disassembly procedure. Ensure that the fan blade is centered in the housing and turns freely by hand prior to turning on the blower motor.

### 19.3 AIR DUCTS

**The residue build-up within the venting acts as insulation in the pipe, reducing the heat dissipation ability of the metal. This increases the potential of a flue fire as the internal vent temperatures tend to become increasingly hot as the residue accumulates.**

Air ducts must be thoroughly cleaned if more than 1/8 inch (3.0 mm.) of residue accumulates in any part of the vent system.

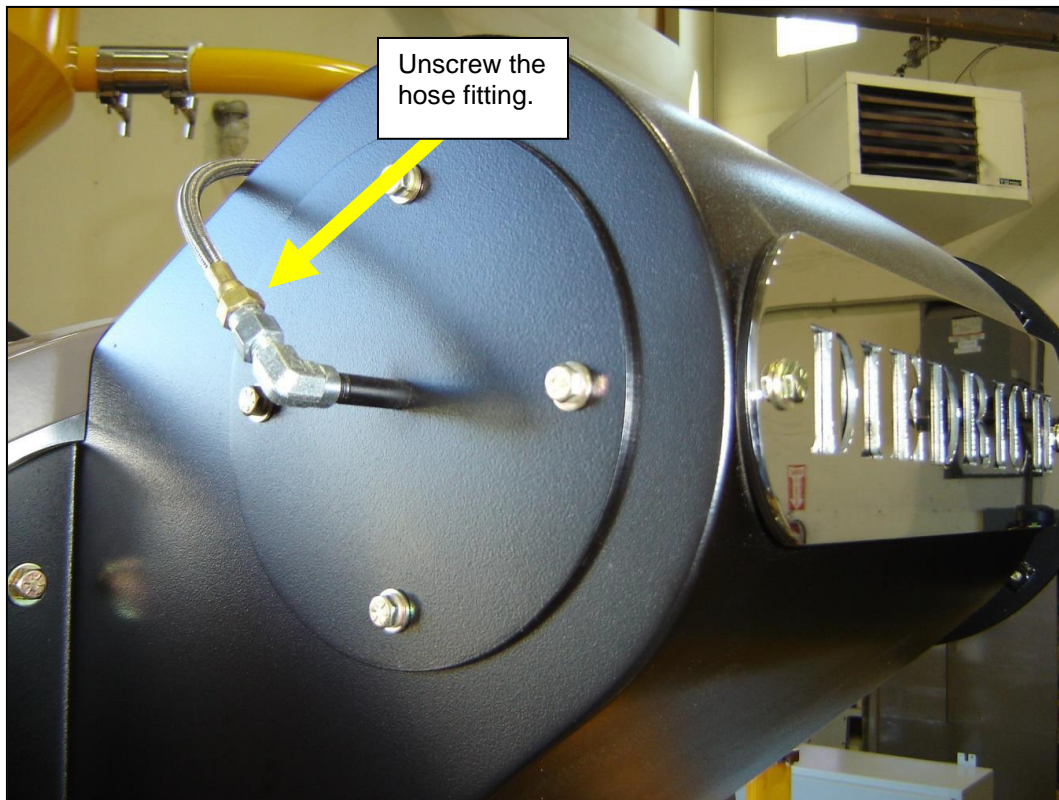
The air ducts include the piping from the roast air hopper at the front of the roaster to the chaff collection system and the ducting from the cooling bin to the cooling bin blower assembly. Air ducting from this roasting system to the outside of the building is as important as the ducting within the roasting system and must also be cleaned at regular intervals. **Any loss of efficiency within the complete system, whether it is in the roaster or the venting to the outside of the building, creates a fire hazard.**

The ducting system on the Diedrich roaster is installed with strap clamps. The vent pipe is heavy so a hoist system or several persons will be required for its removal.

Vent pipe installations will vary from system to system depending upon the customer's installation requirements. As the extent of the system is not known, no specific directions for the cleaning of the venting can be provided.

#### 19.4 VACUUM SENSOR TUBE

The vacuum sensor tube is located on the roast air hopper on the front of the roaster. To clean the tube, unscrew and remove the flexible hose from the fitting. Unscrew the elbow fitting connected to the tubing. Slide a pipe cleaner or thin wire through the tubing to clear any debris that may be blocking the opening on the inside of the hopper.



*Vacuum Sensor Tube*

#### 19.5 BURNER TRAY

For every 8 hours of continuous roasting, remove the chaff and broken beans from the front burner tray. The area is located directly under the roasting drum at the front plate and is accessed by opening the door on the side of the roaster.

#### 19.6 COOLING BIN

The area below the cooling bin screen must be cleaned of any accumulated residue for cooling efficiency and to prevent a fire hazard. The area is accessible from the access door on the side of the cooling bin. To clean the cooling bin screen, use compressed air to blow debris through the screen into the compartment below. Use an awl to poke debris from the holes of the screen. Diedrich Roasters offers a hand roller that is helpful in this process. Use a wire brush on the underside of the screen to dislodge remaining debris. Wipe down the agitator assembly sweepers.

To remove the cooling bin screen:

1. Lift agitator assembly from gearbox drive shaft.
2. Remove screws from the screen around the bean discharge plate(s).
3. Remove the screws holding the screen to cross-bar support assembly.
4. Remove screws holding the screen retainer strap and lift out strap.
5. Lift out screen.
6. Reassemble in reverse order.

## ROUTINE MAINTENANCE

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### ATTENTION

Cleaning and maintenance of the roaster is extremely important for cup quality, roaster performance and overall safety.

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### CAUTION

**Always disconnect the power to the roaster at the electrical source before servicing motors or moving components.**

Suggested hand tools (one each) to be available for cleaning and maintenance:

- SAE Allen wrench set,
- Combination wrench set,
- Grease gun (cartridge type)
- Putty knife (flexible),
- Wire Brush,
- Vacuum cleaner (reversible air flow),
- #2 & #3 Phillips screwdriver,
- Slotted screwdriver

Lubricants required:

- USDA rated High Temperature Food Grade Grease (*Available from Diedrich Technical Support*),
- Mobil 630 STD gear oil (or equivalent),
- ISO grade 460 Dodge 334863 gearbox oil (or equivalent).

**WARNING!**

Keep fingers, hair and loose clothing clear of moving parts.

## **20.0 MOTORS**

The electric motors are sealed and no service is required.

## **21.0 DRUM SHAFT BEARINGS**

The bearings should be lubricated every 8 operating hours, NOT roasting time. Operating time is the time the roaster is turned “ON” until it is turned “OFF”.

**Use only High Temperature Food Grade Grease.** Hardware store or automotive types of grease can be toxic and are not to be used in the proximity of food products.

The roaster should be at operating temperature with the drum rotating. Lubrication is best done upon finishing the day’s roasting while the roaster is still warm. With the drum rotating, use a grease gun to inject 1-2 shots of grease in the Zerk fittings on side skirt of the cooling bin. Wipe off excess grease from Zerk fittings and bearings.

## **22.0 AGITATOR SHAFT BEARING**

The CR-35, CR-70, CR-140, and CR-280 have an additional bearing supporting the vertical agitator drive shaft. The bearing should be greased according to the maintenance chart at the end of this manual. Use a grease gun to inject 2-3 shots of grease in the agitator grease fitting on the side skirt of the cooling bin.

## **24.0 GEARBOX LUBRICATION**

### **24.1 DRUM MOTOR GEARBOX LUBRICATION**

Change the roasting drum gearbox oil with SHC-634 gear oil according to the Drum Gearbox Oil Capacities chart below. Remove lower gearbox drain plug and use a gear oil suction pump to remove the oil from the gearbox.

Upon regular changing of oil in gearbox, all oil should be checked for foreign objects indicating abnormal wear. Refill with ISO grade 460 Dodge 334863 gearbox oil (or equivalent). See Table for capacities of gearboxes.

Drum Gearbox Oil Capacities	
Roaster Model	Capacity oz(liter)
CR-35	5 (.15)
CR-70	28(0.828)
CR-140	74(2.2)
CR-280	280(8.5)

*Drum Gearbox Oil Capacities*

## 24.2 AGITATOR GEARBOX LUBRICATION

Change the agitator gearbox according to the Agitator Gearbox Oil Capacities chart below. The gearbox is located below the cooling bin and accessible through the cooling bin access door. Remove access plug on top of the gearbox and remove the oil from the gearbox with a gear oil suction pump. **Upon regular changing of oil in the gearbox, all oil should be checked for foreign objects indicating abnormal wear.** Re-fill with Mobil SHC-630 gear oil (or equivalent) and replace plug.

Agitator Gearbox Oil Capacities	
Roaster Model	Capacity oz(liter)
CR-35	8.1 (.24)
CR-70	16.9(0.5)
CR-140	23.7(0.7)
CR-280	44(1.3)

*Agitator Gearbox Oil Capacities*

## 25.0 ROASTER MAINTENANCE CHART

The following two-page chart is intended as a starting point. The amount of time it takes for chaff and residue to build up in the roaster is dependent on many variables. The amount of coffee, type of coffee, how it is processed, degree of roast, humidity, and roasting style will all affect the amount of time needed between specific cleanings. By observing these variables, you will be able to establish a cleaning program that works well for your roastery.

<b>DIEDRICH MAINTENANCE Chart</b>		<b>Date</b>	<b>Signature</b>
4 hours	Roast air cyclone: Empty chaff collection barrel		
4 hours	Cooling bin cyclone Empty chaff collection barrel		
Daily	Cooling Bin: Vacuum compartment under the screen		
Daily	Cooling Bin: Clean cooling screen		
Daily	Drum: Remove chaff from tray below drum		
Daily	Drum: Grease drum bearings		
2 weeks	Cooling bin cyclone: Scrape inside walls of cyclone and associated ducting		
2 weeks	Roast air cyclone: Inspect Cyclone: Scrape inside walls of cyclone and associated ducting		
Monthly	Agitator & Cooling Bin: Inspect bearing grease lines		
Monthly	Agitator & Cooling Bin: Inspect paddles, adjust if needed		
Monthly	Agitator & Cooling Bin: Grease shaft bearing (CR-35, CR-70 only)		
Monthly	Air system: Clear condensation filter at regulator		
Monthly	Drum: Inspect front & rear bearings		
Monthly	Drum: Inspect bearing grease lines		
Monthly	Drum: Inspect coupler		
Monthly	Drum: Inspect drum gap adjust if needed		
Monthly	Quench: Check quench bypass		
Monthly	Oxidizer: Clean air filter		
Monthly	Roast air cyclone: Inspect impeller		
Monthly	Clean combustion blower filter(s)		

	<b>DIEDRICH MAINTENANCE Chart</b>	<b>Date</b>	<b>Signature</b>
Biannually	Roast air cyclone: Inspect motor		
Biannually	Agitator: Inspect shaft bearing		
Biannually	Agitator & Cooling Bin: Inspect motor		
Biannually	Agitator & Cooling Bin: Inspect gearbox for signs of leaks		
Biannually	Air system: Inspect air lines		
Biannually	Air system: Inspect air solenoids		
Biannually	Air system: Inspect air cylinders		
Biannually	Destoner: Inspect motor		
Biannually	Destoner: Inspect impeller for loose paddles or hubs		
Biannually	Drum: Inspect gearbox oil level		
Biannually	Drum: Inspect motor		
Biannually	Drum: Inspect drum door seat for residue build up		
Biannually	Electrical Main Cabinet: Check PLC battery Indicator (automated only)		
Biannually	Electrical Main Cabinet: Clean cabinet air filters		
Biannually	Loader: Inspect motor		
Biannually	Loader: Inspect impeller for loose paddles or hubs		
Biannually	Oxidizer: Inspect motor		
Biannually	Quench: Check quench solenoid operation		
Biannually	Quench: Inspect water line for leaks		
Biannually	Roast air cyclone: Inspect motor		
Biannually	Roast air cyclone: Inspect shaft bearings		
Biannually	Roast air cyclone: Inspect impeller for loose paddles or hubs		
Biannually	Roaster Electrical Cabinet: Inspect air lines to pressure transducer		
Biannually	Roaster Electrical Cabinet: Inspect spark & flame rod wires to the pilot assembly		
Annually	Agitator & Cooling Bin: Inspect gearbox oil level		
Annually	Agitator & Cooling Bin: Inspect coupling		
Annually	Drum: Grease coupler(if equipped)		