



## IR Series

(IR-1, IR-2.5, IR-5, & IR-12)

## Installation & Operation Manual



2017

Diedrich Roasters LLC, 30620 HWY 200 Ponderay, ID 83852  
Telephone: (208) 255.7033 Toll Free: (877) 263-1276 Fax: (208) 265-4584  
Technical Support: 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 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.



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## 1. SAFEGUARDS

### Safety Information

Before attempting to operate your unit, read the instructions in this manual thoroughly. Throughout this manual, you will find notations enclosed in bordered boxes similar to the ones below.

#### CAUTION



#### CAUTION

CAUTION boxes contain information about actions or conditions that *may cause or result in a malfunction of your system.*

#### WARNING



#### WARNING

WARNING boxes contain information about actions or conditions that *may cause or result in damage to your system*, and which may cause your system to malfunction.

#### DANGER



#### DANGER

DANGER boxes contain information about actions or conditions that *may cause or result in injury to personnel*, and which may cause damage to your system and/or cause your system to malfunction.

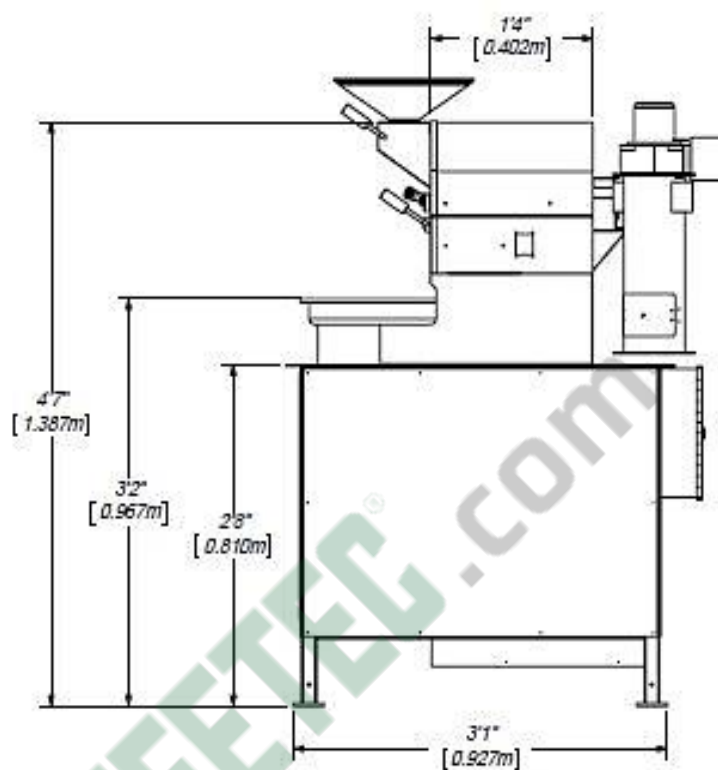
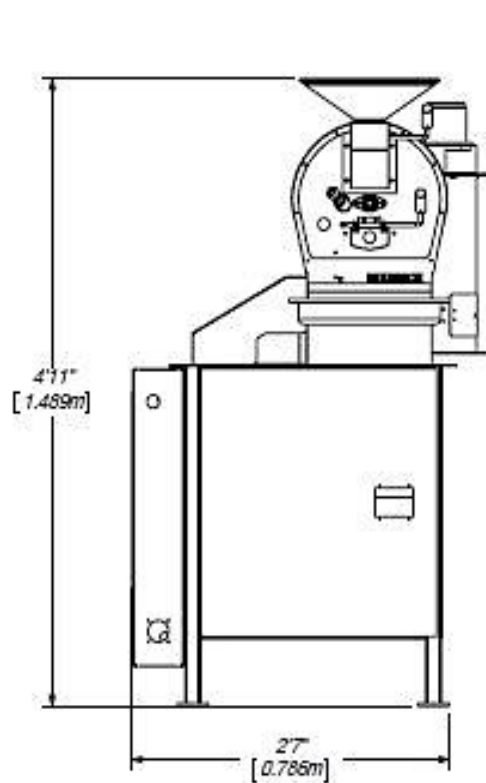


## 2. SPECIFICATIONS

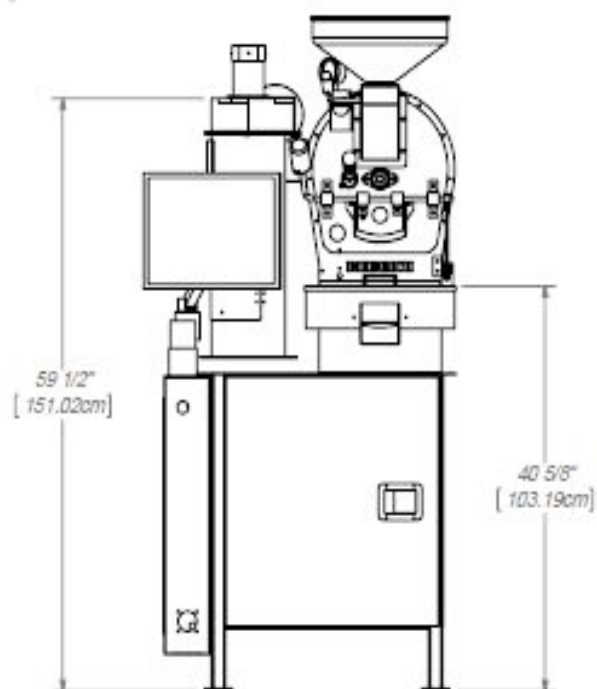
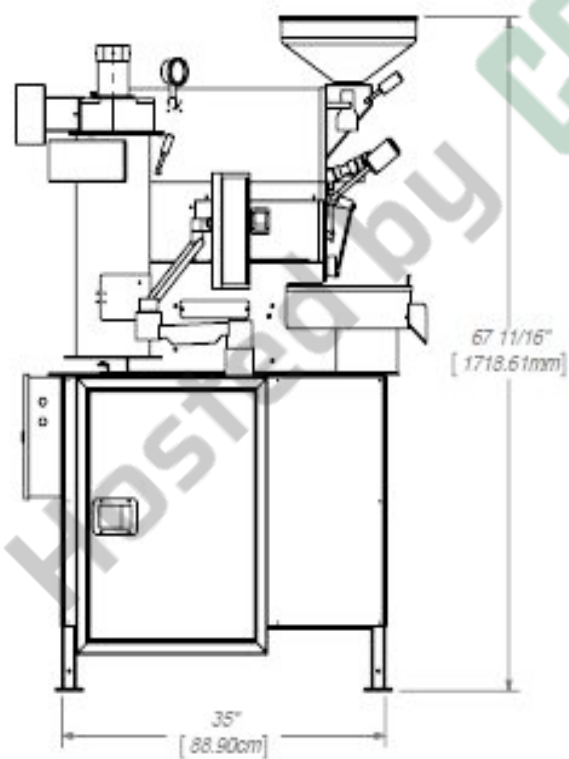
Description	Unit of Measure	IR-1	IR-2.5	IR-5	IR-12
Roast Capacity Range (minimum batch by temperature)	lbs	5.29oz / 2.2	1-5.5	1 - 10	1 - 26.4
	kg	150g / 1	.454 / 2.5	.453 - 5	.454 - 12
* Hourly Roast Output (based on 20 min cycle)	lbs	6.6	16.5	33	79.4
	kg	3	7.5	15	36
Roaster Weight Empty	lbs	125	250	880	960
	kg	56.8	113.6	400	437
Floor Bearing Weight with maximum load of beans	lbs	135	265	895	990
	kg	61.4	120.5	407	450
Space Required at base of roaster (includes exhaust air outlet)	inches	40 x 30	29 x 50	62 x 86	66 x 92
	centimeters	101.6 x 76.2	73.7 x 127	158 x 219	168 x 234
Input Gas Pressure Natural Gas	"WC	10-12	10-12	10-12	8 - 9
	MBAR	25 - 30	25 - 30	25 - 30	20 – 22.4
Input Gas Pressure Liquid Propane Gas	"WC	12 - 14	12 - 14	12 - 14	12 - 14
	MBAR	30 - 34.8	30 - 34.8	30 - 34.8	30 - 34.8
Gas Consumption (maximum rate)	BTU/Hour	8000	24000	50000	90000
	Kilowatts	2.34	6.15	14.65	26.38
Gas Consumption per roast (estimated rate)	BTU/Roast	1685	4195	9795	18675
	Kilowatts	0.5	1.23	2.9	5.5
Gas Supply Inlet Diameter (NPT)	inches	½ NPT	½ NPT	½ NPT	½ NPT
Electrical Supply	Volts AC – 60 Hz	110	110	110	110
	Volts AC – 50 Hz	220	220	220	220
Full Load Amperage	110 V AC	2.0	7.2	13	16
	230 V AC	1.5	3.1	7	10
Exhaust Duct Air Flow (50hz-60hz) (Range depends on air control position)	SCFM	32-65	113-130	236-290	285-365
	m3/h	54-110	192-221	401-493	484-620
Exhaust Duct Diameters	inches	4	6	8	8
	centimeters	10.16	15.24	20.32	20.32

### Basic Specifications





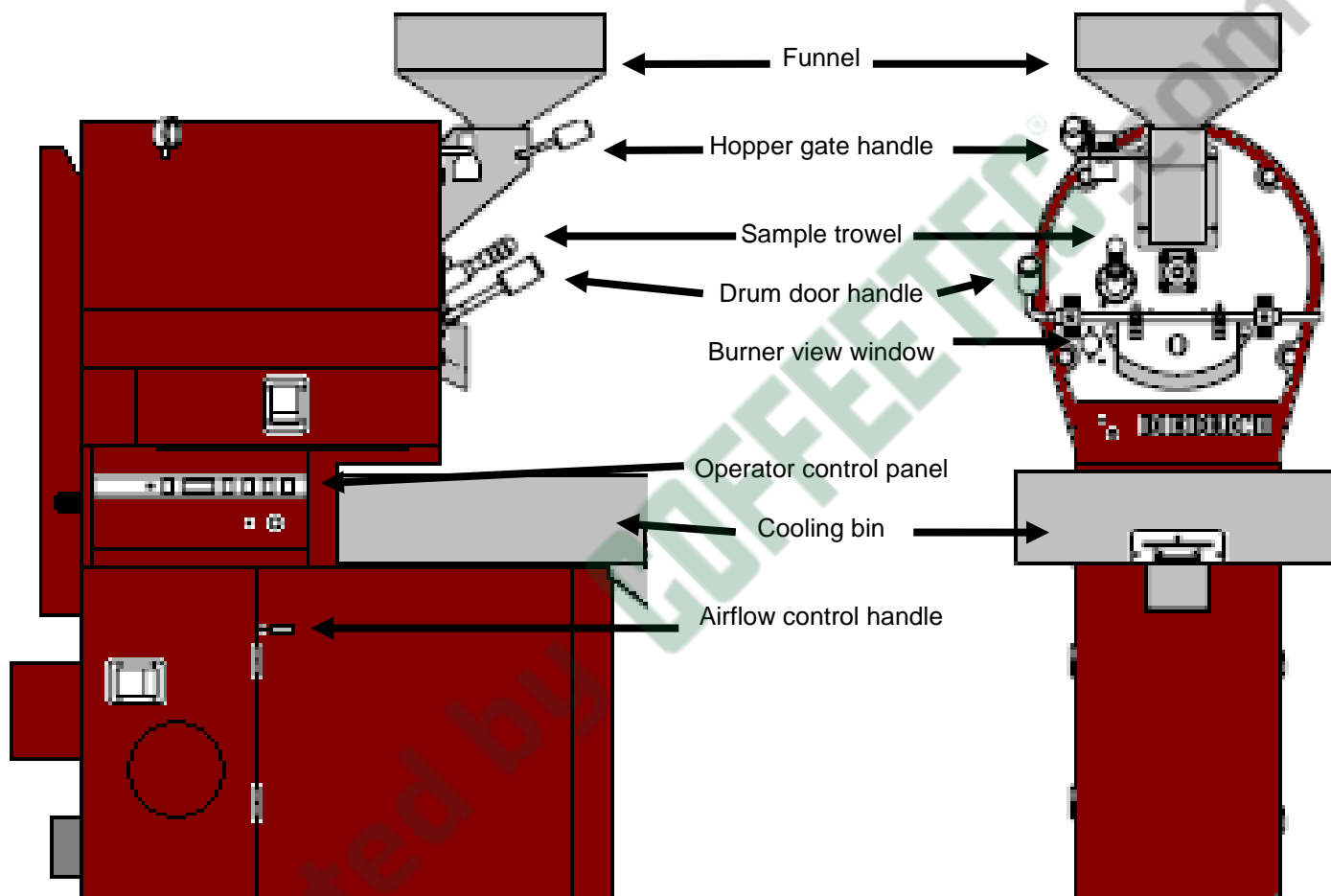
IR-1



IR-2.5

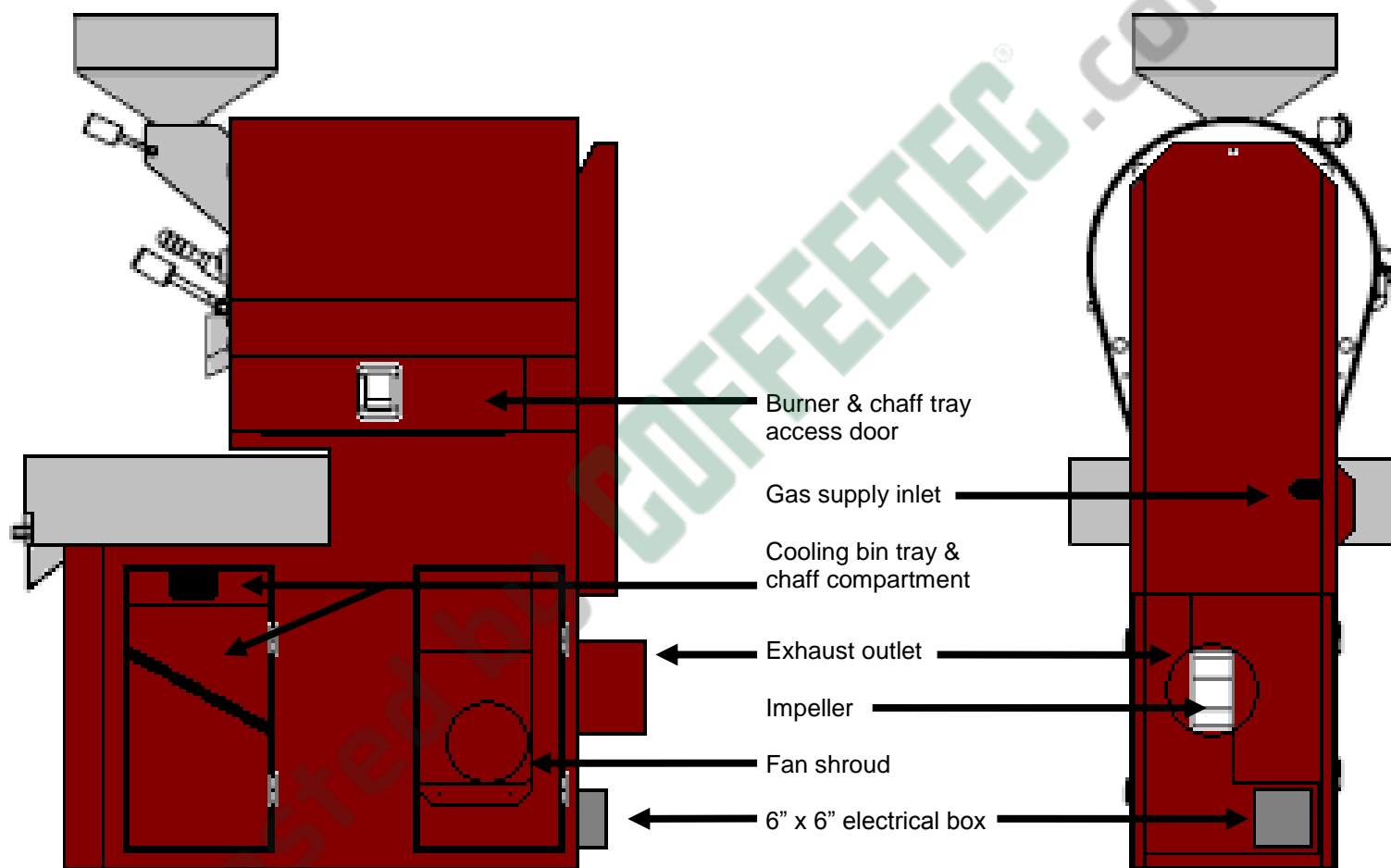


### *IR-5 & IR-12 Roaster Components*

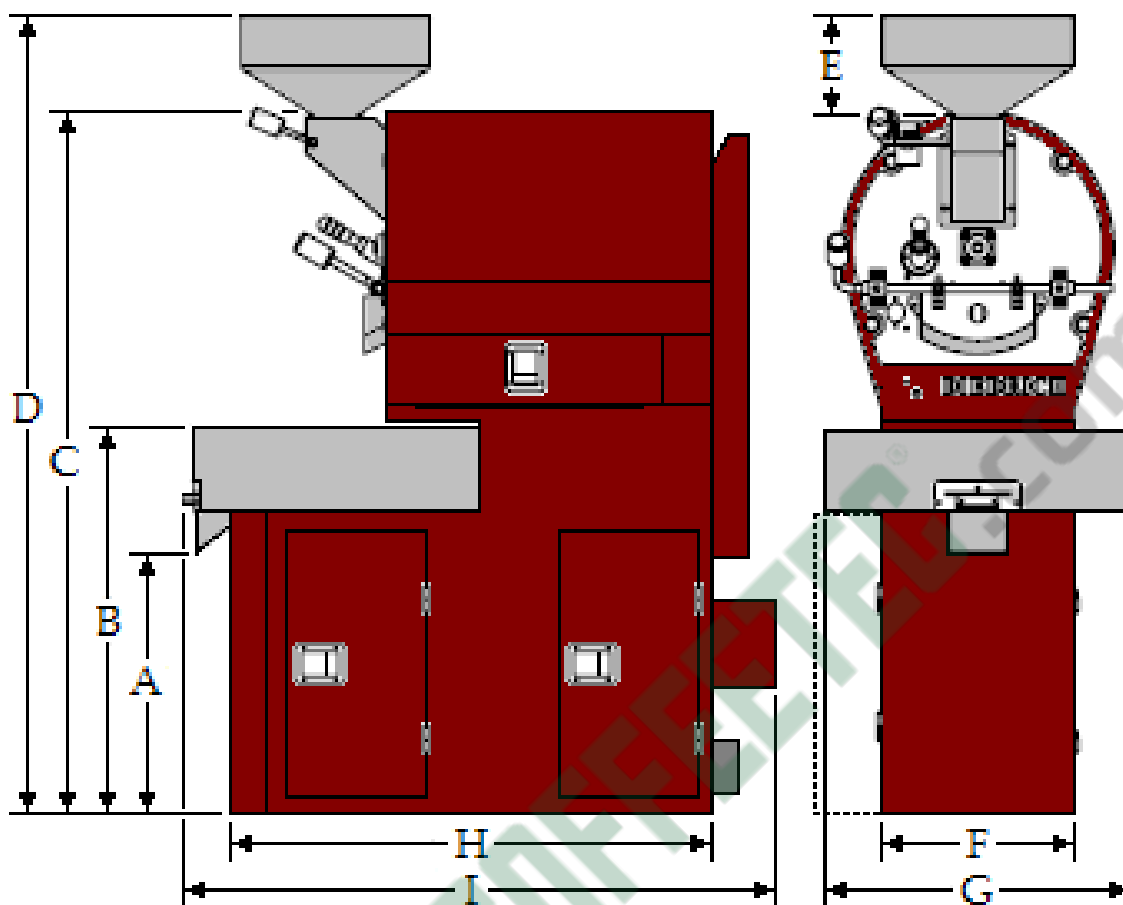




## IR-5 & IR-12 Roaster Components

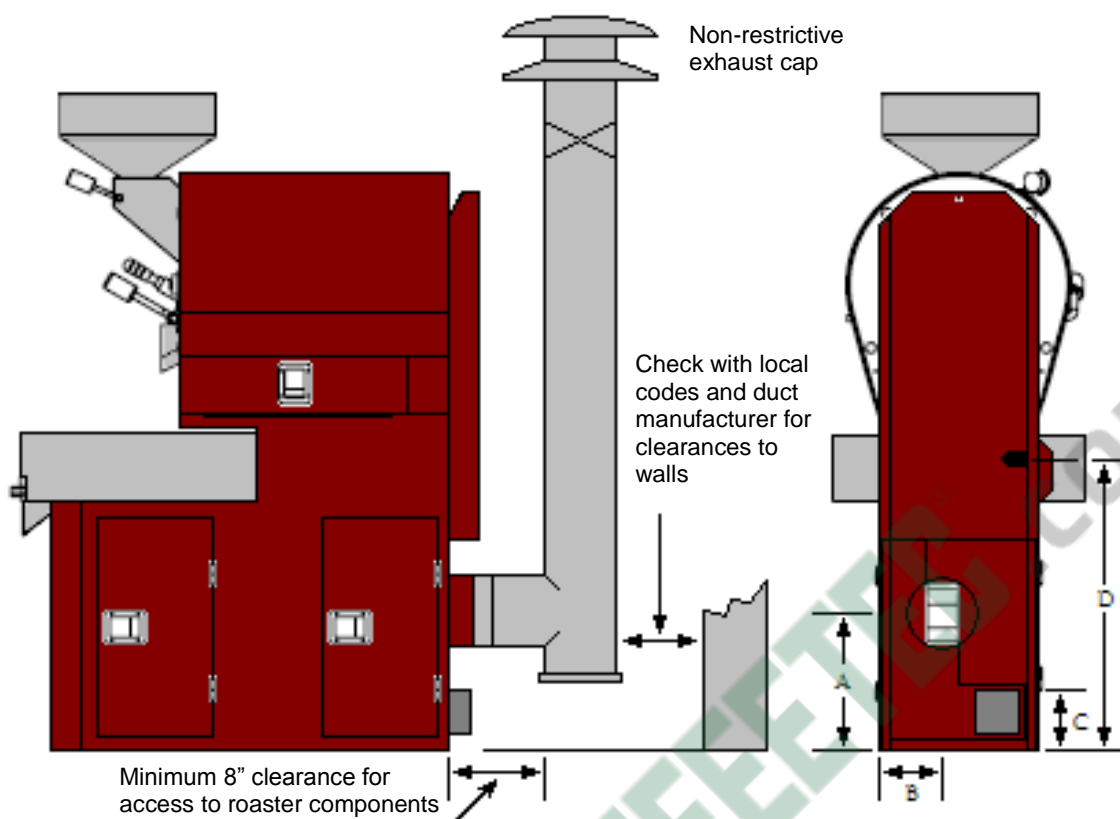






Roaster Dimensions Inches / Centimeters				
	IR-1	IR-2.5	IR-5	IR-12
A: Chute Height	NA	8-3/4"/22.22cm	24.5" / 62.2cm	24.5" / 62.2cm
B: Bin Height	32" / 81.28cm	41" / 104.14cm	35.25" / 89.5cm	36.25" / 92.1cm
C: Roaster Height	55" / 139.7cm	59.5"/151.02cm	64" / 162.5cm	66.5" / 168.9cm
D: Roaster Overall Height with Funnel	59" / 149.86cm	66"/151.02cm	70.5" / 179.1cm	77" / 195.6cm
E: Funnel Height	8" / 20.32cm	8" / 20.32cm	6.5" / 16.5cm	10.5" / 26.7cm
F: Compartment Width	13-1/4"/33.65cm	13-1/4"/33.65cm	18" / 45.7 cm	18" / 45.7cm
G: Cooling Bin Diameter	14-1/2"/36.83cm	16" / 40.64cm	25" / 63.5cm	29" / 73.66cm
G: Overall Width	28"/71.12cm	28"/71.12cm	26.5" / 67.3cm	29" / 73.66cm
H: Compartment Length	37"/93.98cm	37"/93.98cm	42" / 106.7cm	45" / 114.3cm
I: Overall Length	43"/109.22cm	43"/109.22cm	50" / 127cm	55" / 139.7cm





Roaster Models - Dimensions in Inches / Centimeters				
	IR-1	IR-2.5	IR-5	IR-12
A: Exhaust Air Outlet Height	47" / 1193.8	55.5" / 1409.7	16" / 44.5mm	16" / 44.5mm
B: Exhaust Air Outlet (Centerline from back left side)	4" / 101.60	6" / 152.40	7.5" / 19.1mm	7.5" / 19.1mm
C: Electrical Junction Box Height	9" / 228.60	9" / 228.60	9" / 22.8mm	9" / 22.8mm
D: Gas Inlet	1.55" / 3.94	1.70" / 4.32	30.5" / 77.5mm	30.5" / 77.5mm

#### Installation Hook-up Dimensions for Exhaust Duct and Electrical Junction Box



### 3. INSTALLATION INSTRUCTIONS

#### ATTENTION

Professional installation is required. Your Diedrich Roaster is designed for ease of installation and simplicity of operation. Read these instructions completely before starting installation. Your local building authority should be contacted to obtain local codes and installation requirements before installing your roaster.

#### 3.1 RECEIVING AND UNPACKING SHIPMENT

Upon receipt of your roaster immediately check for crate damage. Do not refuse shipment if damage is evident. Make notes of damage on the appropriate shipping forms and take photos. Uncrate and look for damage to the roaster; i.e., dents, scratches or chipped paint, and if found, immediately file a claim with the appropriate freight carrier.

Locate the roaster where operation and coffee roasting can be observed in natural light or under consistent light conditions. Natural light is essential for best results when observing the true color changes coffees undergo during roasting. The use of a full-spectrum fluorescent light to simulate the full color of sunlight is recommended for consistency in roasting.

After uncrating your roaster, if it becomes evident that movement may be hindered while moving it to its installation location, detach and remove the cooling bin.

If the roaster is automated, mount the computer monitor onto the arm using the supplied Allen key.

#### 3.2 LEVELING

 **WARNING**

**This roaster MUST be installed on a flat/level, and noncombustible floor.**

The floor must meet weight-bearing requirements of local codes. Refer to the specifications chart for floor bearing weights.

#### 3.3 PROXIMITY TO WALLS

#### DANGER

Clearance from the roaster to adjacent walls, counters or other appliances must be at least 18-inches (46 cm) or greater to ensure adequate cooling of the roaster and adjacent walls.

Failure to abide by required clearances will void your Diedrich warranty. No cabinets or storage areas are to be installed over the roaster or near the ducting.

Make sure all controls, access doors, and inspection panels are accessible and can be opened without restriction.



## 4. GAS INSTALLATION

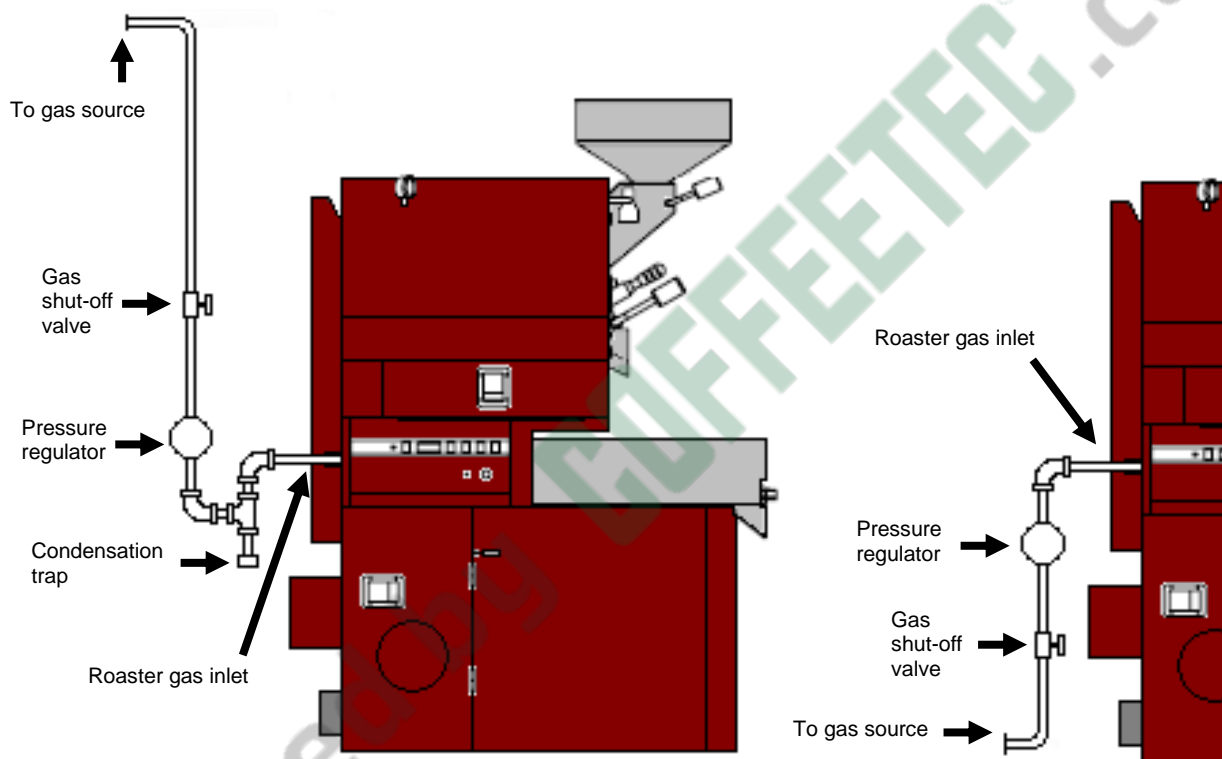
### ATTENTION

Use a licensed gas company for the gas line installation.

Gas installation **MUST** conform to local codes, regulations, and/or laws.

The gas supply line **MUST** be sized to accommodate the total length of the run and to accommodate any required elbows. The line **MUST** be no less than the roaster's inlet size.

A water trap to collect condensation and loose particles should be installed in the gas supply line upstream from the roaster.



Possible installation of Gas Lines

### 4.1 SAFETY SHUT-OFF VALVE

A safety shut-off valve **MUST** be installed in the gas supply line close to the roaster and pressure regulator and in a location where it can be reached quickly in case of an emergency. The shut-off **MUST** be marked to identify it as the gas shut-off.



## 4.2 PRESSURE REGULATOR



### WARNING

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

The roaster's factory installed valve is preset for the BTU requirements of the roaster burners. The valve in the roaster is not intended to reduce incoming pressure. **A pressure regulator MUST be installed before the roaster to reduce the incoming pressure.** Your gas technician will be able to provide the correct regulator for the specific installation.



### WARNING

The valve may experience damage if the incoming line pressure to the roaster exceeds 20-inches WC (50 mbars). An external pressure regulator is required to limit incoming gas pressure.

Locate the regulator on the incoming gas supply line between the safety shut-off valve and the roaster's gas inlet. Diedrich recommends 8 to 14 inches WC (20 – 34.8 mbars) for natural gas and 12 to 14 inches WC (30 – 34.8 mbars) for liquid propane at the roaster's gas inlet. These pressures are ideal for optimal performance.

**NOTE:** The manometer on top of the roaster measures the burner manifold pressure and not the incoming pressure. When the burners are set at maximum gain the manometer should read approximately 7-inches WC (16 mbars) for natural gas and 11-inches WC (27.4 mbars) for liquid propane.

## 4.3 PIPE SIZING



### WARNING

Sizing of the gas supply line is critical to the roasters performance. Ensure the gas supply line is sized in accordance with the maximum BTU demands of the roaster and any other appliances connected to the gas line.

**IMPORTANT:** When the gas installation is complete have your gas technician check the gas pressure at the point where the gas line connects to the roaster. The roaster and/or afterburner and any other appliances connected to the gas line should be running at the full flame setting for this test (See Orifice Sizes and Testing Specifications table below).



### WARNING

The roaster must be isolated from the gas supply line by closing the safety shut-off valve during any pressure testing of the gas supply line.



Roaster	Gas	Orifice	Max Manifold Pressure		Inlet Pressure		Gas Consumption		High Fire Allowable Range	
			"WC	mbar	"WC	mbar	BTU/Hr	KW	Plus 5%	Minus 5%
IR-12	LP	1.9mm	11	27	12 - 14	30 - 35	90,000	26	85,500.00	94,500.00
	N	35	6	15	8 - 9	20 - 22.5	90,000	26	85,500.00	94,500.00
IR-5	LP	1.45mm	11	27	12 - 14	30 - 35	50,000	15	47,500.00	52,500.00
	N	47	7	17	10 - 12	25 - 30	50,000	15	47,500.00	52,500.00
IR-2.5	LP	59	11	27	12 - 14	30 - 35	24,000	7	22,800.00	25,200.00
	N	55	7	17	10 - 12	25 - 30	24,000	7	22,800.00	25,200.00
IR-1	LP	64	11	27	12 - 14	30 - 35	10,000	3	9,500.00	10,500.00
	N	55	7	17	10 - 12	25 - 30	10,000	3	9,500.00	10,500.00

#### 4.4 GAS INSTALLATION

Before placing the roaster in operation, always check connections for gas leaks with a soapy water solution or other acceptable method.



**DANGER**

**DO NOT USE AN OPEN FLAME TO CHECK FOR LEAKS!**

Do not remove any labels, warnings or rating plates from the roaster or from its components as this may void manufacturer's and Diedrich Roaster's warranties.

#### 5. ELECTRICAL INSTALLATION

##### ATTENTION

Use a licensed electrician for the electrical installation.

Electrical installation must conform to local regulations. Some roasters must be hard-wired (pipe conduit with grounding wire) from the electrical source to the roaster.

Do not remove any labels, warnings or rating plates from the roaster or from its components as this may void manufacturer's and Diedrich Roaster's warranties.

Some automated roasters have the ability to control optional equipment (i.e., loader and/or destoner). **Each of these options will require an additional dedicated circuit separate from the roaster circuit.**



**DANGER**

**This roaster must be electrically grounded in accordance with local codes. A severe shock hazard exists if the electrical source is not grounded or if the polarity is reversed.**



All electrical components supplied in the roaster are grounded electrically to the roaster frame.

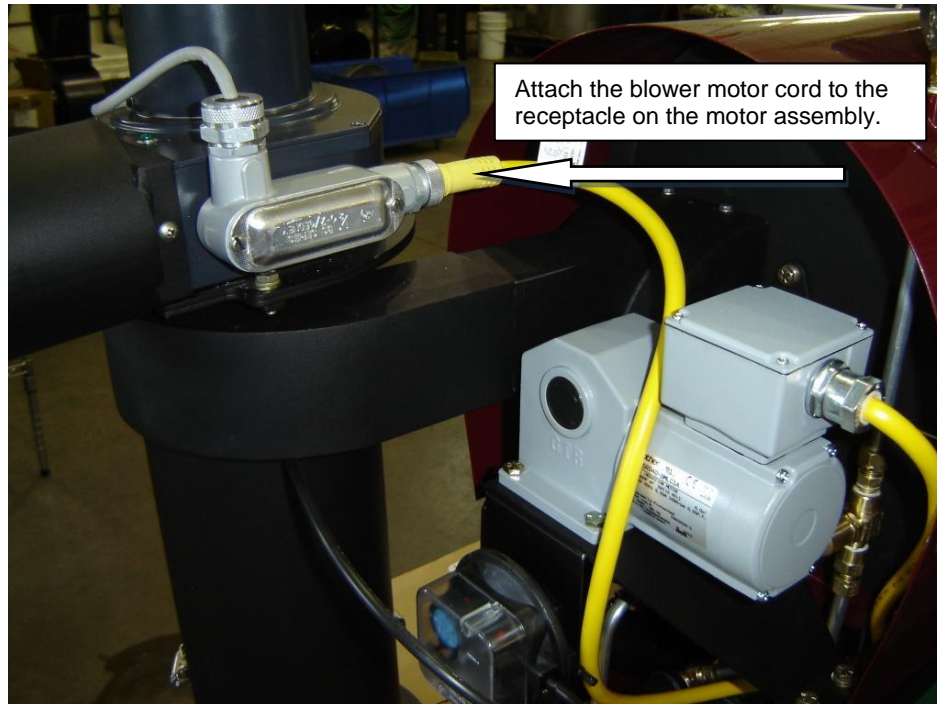


## **DANGER**

**A safety shut-off must be installed in the electrical supply line near the roaster's junction box where it is easily accessible by the operator.**

### **6. CYCLONE TO ROASTER CONNECTIONS**

*(Applies to IR-1 & IR-2.5 ONLY)* Connect the blower motor cord as shown in the photo below.



#### **6.1 ROASTER EXHAUST DUCTING**

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 roaster and the product 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 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 a minimum, stainless steel, double wall, positive pressure grease ducting (UL certified for USA and Canada, or CE for European Union).

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





## DANGER

**DO NOT USE CLASS B OR SPIRAL-WRAP DUCTING UNDER ANY CIRCUMSTANCES.**

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

Check local codes 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 licensed Heating, Ventilation, Air Conditioning (HVAC) professional can assist you with the best ducting layout for your site. Pertinent information relating to the diameter of the exhaust ducting on the roaster and the maximum exhaust air flow in SCFM is located in the *Basic Specifications* table at the beginning of this manual.

When venting your roaster, a direct vertical run is typically the most efficient and cost effective. The design of the 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 spacing permits, 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 contractor/engineer will determine the best design for your specific installation.

The roaster **MUST NOT** support the weight of the exhaust system. Ducting must be connected to the roaster based on the ducting manufacturer's recommendation.



## DANGER

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

A properly designed and installed chimney and rain cap is essential to the overall design. Water leaking in may cause an electrical short or damage the equipment. Your contractor will be able to coordinate with local jurisdictions for the correct cap. The cap should not have a screen since it will clog with residue of chaff over time.

Consult the services of a ducting manufacturer to determine the best venting option for your setup. Your HVAC installer may also have a recommendation or preferred manufacturer. Positive pressure grease vents are not an off-the-shelf product so plan ahead to compensate for long lead times.

### 6.2 INSTALLATION INSPECTION

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## ATTENTION

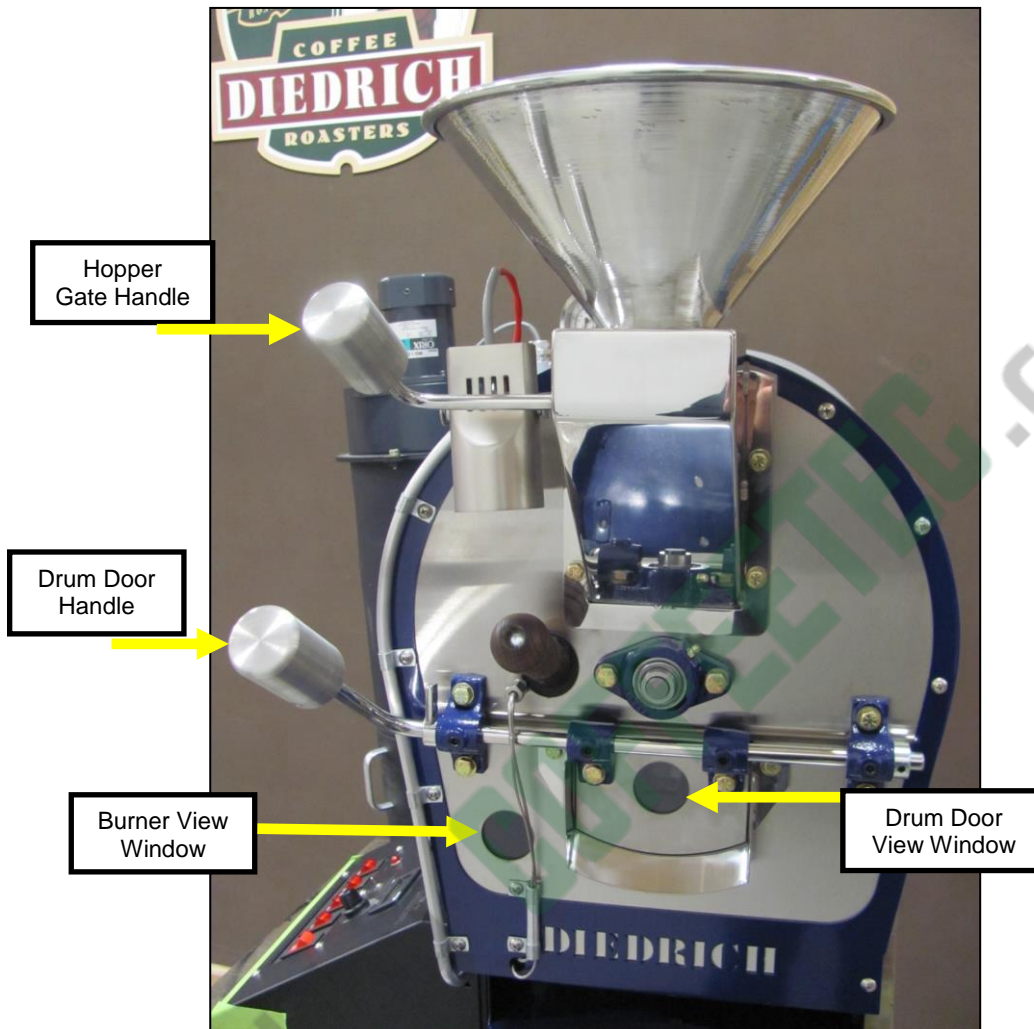
The completed roaster installation **MUST BE INSPECTED** for compliance to codes and by your local fire department **PRIOR TO OPERATING THE ROASTER**. Failure to have these inspections performed will void the warranty and will relieve Diedrich of any liability associated with the installation and use of our products.

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## 7. OPERATIONS

### 7.1 ROASTER PARTS



### 7.2 AIR FLOW POSITIONS

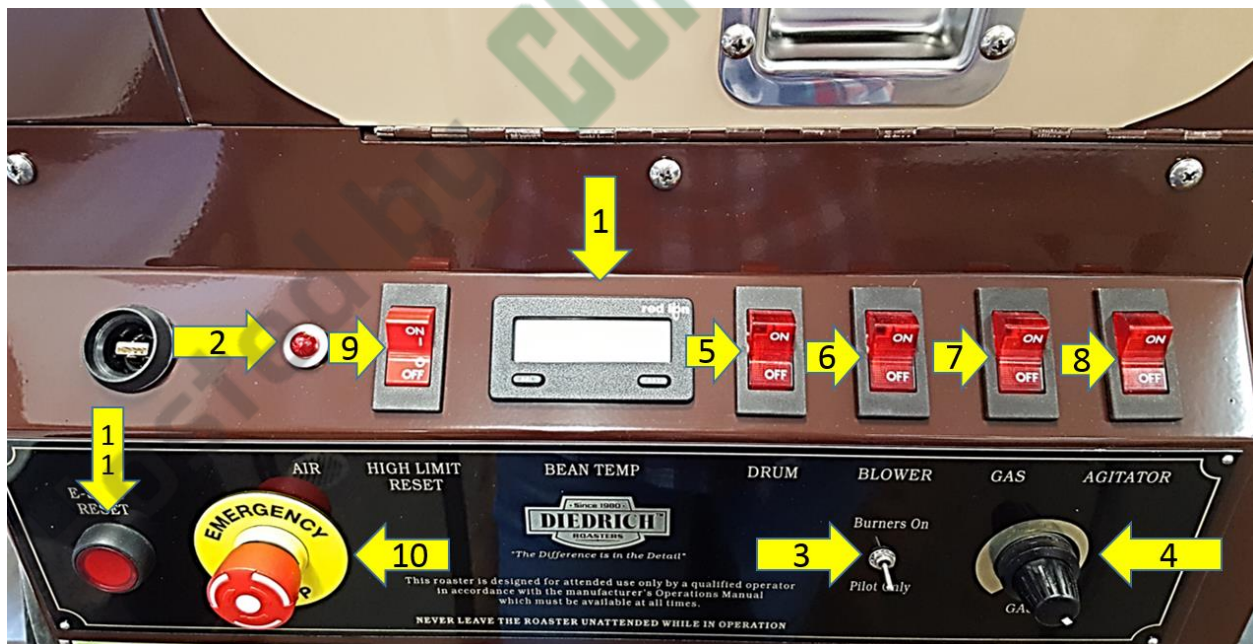




### 7.3 OPERATOR CONTROL PANEL.



IR-1 & IR-2.5 (Manual)



IR-5 & IR-12 (Manual)

### 7.4 COMPONENT DESCRIPTION

1. **BEAN TEMP display:** This is the temperature of the beans in the drum.
2. **AIR light:** This light may be on or off depending on the model of roaster. Standard model roasters have a red light. If it is illuminated there is an air flow restriction and the roaster will not ignite the burners.



Universal model roasters have a blue air light. This light will be illuminated during normal operation. If it is NOT illuminated there may be a draft in the exhaust ducting and the roaster will not ignite the burners.

3. **Pilot Only/Burners On toggle switch:** This switch toggles the main burners on and off. If lower than the minimum GAS knob setting is required, the operator can turn the main burners off.
4. **GAS knob:** This knob controls the flame level. The intensity can be viewed through the window below the sample trowel and gas pressure on the manometer on the top of the roaster.
5. **DRUM switch:** This switch starts the drum spinning.
6. **BLOWER switch:** This switch starts the blower fan.
7. **GAS switch:** This switch turns on the gas.
8. **AGITATOR switch:** This switch turns on the agitator in the cooling bin.
9. **RESET switch:** This switch will reset the high limit safety module if the temperature climbs above 485°F (252°C).
10. **Emergency Stop:** This button is to be pushed in case of an emergency.
11. **E-Stop Reset:** Push this button to reset the roaster after pushing the "Emergency Stop" (10) button.

---

### ATTENTION

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

---

## 8. INITIAL START-UP



### DANGER

**A possibility of fire exists if the coffee is not removed from the drum before 500°F (260°C). The coffee may ignite even if the flame was turned off at 485°F (252°C).**

### 8.1 LIGHTING THE PILOT BURNER

The pilot burner is a small flame which is in between the main burners. It looks like three small candle flames and can be seen through the view window below the sample trowel.

Follow these steps to ignite the pilot burner: *(Numbers ( ) correspond to the picture in section 7.3, Operator Control Panel above.*

---

### ATTENTION

Make sure the "Emergency Stop" button is not engaged before performing the steps below.

---

- 1) Ensure the "Pilot Only/Burners On" (3) switch is in the "Pilot Only" position.
- 2) Verify that the air flow handle in the Cooling Bin position.
- 3) Confirm that the "GAS" knob (4) is turned all the way to the right (clockwise).

**NOTE:** Standard model roasters and Universal model roasters have different start-up procedures. A Standard roaster has a red air light on the control panel a serial number that starts with "S". A Universal roaster has a blue air light on the control panel and a serial number that starts with "U".



4) Lighting the burners:

- a) **For Standard roasters:** (Standard roasters have a serial number which starts with "S".)

Turn on the switches in the following order:

- Drum (5)
- Blower (6)
- Gas (7)

**NOTE:** The igniter will spark until the pilot burner ignites or for a maximum 90 seconds. If the pilot does not ignite turn the GAS switch (7) "OFF", wait a minimum of 5 minutes, and then attempt to relight the appliance.

- b) **For Universal roasters:** Universal roasters have a serial number which starts with "U".

Turn on the switches in the following order:

- Drum (5)
- Gas (7)
- **Wait** for the **BLUE** air light to come on **then** turn on the Blower (6) switch.

**NOTE:** After the roaster will goes through a 30 second purge cycle the igniter will start to spark. Should the pilot fail to light, shut off the blower and gas switches, wait a minimum of 5-minutes, and then attempt to reight the appliance. **NOTE The blower MUST stop turning before attempting to light the roaster again.**

- 5) All roasters: Once the pilot is lit, switch to the "Burners On" (3) position and use the gas control knob to adjust the flame intensity

**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 two infrared burners to ignite for the first time. Watch through the view window for burner ignition.

- 6) Move the Gas (7) knob to the desired flame setting and monitor the Bean Temperature Display (1).

- 7) Allow the roaster warm to 400°F - 450°F, (204°C - 232°C).

**NOTE:** If no grinding sounds occur up to 415°F, the initial warm-up is complete and roasting can begin. If there is a grinding sound, turn "OFF" the drum motor (5) and contact the Diedrich Roasters Technical Support for instructions.

- 8) Check the exhaust system for leaks.

**NOTE:** If leaks are present, the ventilation contractor must be contacted to correct the situation.

## 9. ROASTING

The instructions below 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 Roasters roasting seminars.

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.



The bean development and color can be observed by using the sample trowel. 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.

## 9.1 SEASONING THE DRUM

The drum of the roaster must be seasoned before roasted coffee is fit for consumption. Use an inexpensive coffee for the seasoning process. Robusta coffee does not emit enough oil for the seasoning process.

The new drum requires at least 5 to 10 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. 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 itself.

- 1) Set the air control handle to the "Through Cooling Bin" position (See Section 7.2, Air Flow Positions).
- 2) Preheat the roaster to 460°F (237°C).  
**NOTE:** A cold roaster should warm for approximately 30 minutes before seasoning.
- 3) Load the green coffee beans into the funnel, through the hopper gate and into the drum.
- 4) Set the flame control to roughly 50%.  
**NOTE:** 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.
- 5) The airflow control handle should be moved to the "50/50" (mid) position when the coffee reaches the yellow stage 270°F (132°C).  
**NOTE:** The moisture in the coffee, which 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. The roast will progress from the yellow to the cinnamon color as the coffee begins to expel a fair volume of carbon dioxide (CO<sub>2</sub>) gas.
- 6) After the cinnamon color stage of the roast is reached, the coffee will start its first cracking. **Move** the airflow control handle to the "Through Roasting Drum" (vertical) position for the remainder of the roast.  
**NOTE:** 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.
- 7) Allow the roast to progress through the second crack.
- 8) Turn off the main burners once traces of oil begin to show on the beans.  
  
**NOTE:** At this point you are attempting to slow the rise per minute and coast to an oily bean temperature but not reach the high temperature limit. This allows you to keep the roast in the drum while the beans are oily and coat the drum surface. The bean temperature can cool but adjust the burner to keep them above 350°F (176°C).
- 9) Once the oil has soaked back into the beans discharge the coffee into the cooling bin **AND** move the airflow control handle to the "Through Cooling Bin" position.



- 10) Repeat this complete dark roasting cycle (50-60 minutes) 5-8 times, then start to develop lighter (15-18 minutes) roasts. This procedure will properly season the roasting drum.

## 9.2 ROASTING FOR CONSUMPTION

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### ATTENTION

If any of the following happens:

- Excessive smoke in the room;
- Smoke coming from the sample trowel port;
- Longer cool down times;
- Excessive chaff in the burner compartment.

Check for the following:

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

- 1) Preheat the empty drum until the Bean temp display (1) reads 415° (213°C) or until you reach your desired charge temperature.

**NOTE:** A cold roaster should warm for approximately 30 minutes before roasting

- 2) Load the green beans into the hopper funnel after the roaster's empty drum has been preheated.

**NOTE:** The charge temperature is the temperature which the beans are loaded into the drum. Depending on type of coffee, batch size, and roasting technique charge temperatures will typically be between 350°F (177°C) and 440°F (227°C). 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 setting are determined by but not limited to the desired bottom-out temperature and rate of climb from bottom-out.



### DANGER

**Do not allow green beans to sit in the hopper for prolonged periods of time. This area of the roaster becomes very hot and beans sitting in the funnel will result in pre-roasting, uneven roasting, scorching or possibly fire.**

- 3) Prior to starting the roasting process, **move** the airflow control handle to the "Through Cooling Bin" (vertical) position.

**NOTE:** This splits the airflow mostly through the cooling bin and partially through the drum. This also allows sufficient airflow through the drum to gently assist in the heating process without excessively drying out the coffee. The Diedrich Coffee Roaster utilizes the moisture that is present in the green coffee to assist in the conduction of heat to the core of the bean. Our philosophy is to allow the beans to absorb heat at their own natural potential since various types of coffee have different weight densities and absorb heat differently.

- 4) Move the hopper gate handle up to release the green beans from the hopper into the drum.
- 5) Move the handle down to close the hopper gate.

**NOTE:** If the hopper is not closed after loading, heat will be lost and roasting time will be longer.

- 6) Adjust the flame control to an appropriate heat setting for the batch size.



**NOTE:** A larger batch has greater heat absorbing capacity and a higher flame setting can be used without accelerating the roast too quickly.

The display temperature will fall drastically after charging the drum with beans. The temperature at which the coffee stops decreasing and starts rising is known as the bottom-out temperature. Charge temperature and initial fuel setting are determined by the desired bottom-out temperature and rate of climb from bottom-out.

The beans turning yellow is an easy stage of roast to identify. 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).

The coffee requires more heat if you are at six minutes but far from the yellow color. The coffee requires less heat if you are at four minutes and the coffee is already turning yellow. The yellow color of varietal coffees is an off-shade of orange for decaf coffees.

- 7) Move the air control handle to the "Through Roasting Drum" position.

**NOTE:** This increased flow of air through the drum exhausts the chaff shedding from the beans out of the drum. Some coffees will require more air to remove the chaff than the 50/50 position requires.

- 8) Leave the air control lever in the "Through Roasting Drum" position until the coffee has reached a cinnamon brown color.

**NOTE:** This changes the airflow to move most of the air through the drum and the lower percentage of air through the cooling bin. This increased flow of air through the drum exhausts the chaff, which is shedding from the beans, out of the drum.

- 9) Return the air control lever to the 50/50 position once the beans have reached a cinnamon brown color.

**NOTE:** The cinnamon brown color is another checkpoint that is easily identifiable. You should reach this color at 340°F (171°C) in 9 to 11 minutes. Some fine-tuning of the heat setting may be necessary at this point.

Between 11 and 13 minutes the beans will 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 where the beans fully open up. 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 control handle is not moved to the "Through Roasting Drum" position.

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## ATTENTION

The bean development accelerates very rapidly and these last few minutes are very critical. The operator should pay close attention to the coffee and frequently sampling is important. While learning to roast, it is advisable to lower the heat to slow down this stage of the roast.

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- 10) Prepare to discharge the roasted coffee into the cooling bin.
- 11) Move the air flow control handle to the "Through Cooling Bin" position.
- 12) Move the drum door level to eject the roasted beans into the cooling bin.



### **Roasters equipped with an Agitator**

- 1) Turn on the "Agitator" (8).
- 2) Switch the flame to "Pilot Only" (3).
- 3) Discharge the coffee into the cooling bin when it has reached the desired color and bean development.
- 4) After the coffee has been in the cooling bin for approximately a minute, turn off the "Agitator" (8) and spread out the coffee.
- 5) Remove the coffee from the cooler discharge gate.
- 6) With the "Agitator" (8) turned "OFF", the cool air can find a path through the coffee allowing the coffee to cool faster.
- 7) When the beans have cooled to room temperature, position a container under the cooling bin chute.
- 8) Turn "ON" the "Agitator" (8), and discharge the beans from the cooling bin.

### **9.3 SHUT DOWN**

- 1) Set the "Gas" (4) knob to the "OFF" position.
- 2) Make sure the "Pilot Only/Burners On" (3) toggle switch is in the "Pilot Only" position.
- 3) **After** the temperature reading has dropped to 250°F (121°C) or lower, **set** the "Blower" (6) and "Drum" (5) switches to "OFF".
- 4) Inspect for smoldering chaff. If found, extinguish with water (a spray bottle is recommended for this purpose).
- 5) Remove the chaff from the lower compartments of the roaster.
- 6) Open the side doors to remove chaff and for general cleaning.
- 7) Using a vacuum clean the **cooled** chaff out of the roaster.

**NOTE:** For faster cooling of the roaster, leave all the doors closed, place the airflow control handle in the "Through Roasting Drum" position. This action moves the air through the roasting drum, cooling down the complete system evenly and efficiently.

## **10. ROASTING LOG**

Diedrich recommends that you maintain roasting and cleaning logs (See example in the Roast Log at the end of this manual). These logs will aid in tracking the amount of coffee roasted, roasted bean weight loss, and cleaning intervals.

**Type of Coffee:** Naturals (unwashed coffees, i.e. Indonesians) have more chaff than washed coffees (i.e. Central and South American coffees) and decafs have virtually no chaff. *EXAMPLE: The chaff box and burner tray require much more attention if a fair quantity of Sumatra is roasted, but almost no cleaning if you are roasting decaf.*

**Weight Loss:** The green weight IN minus the roasted weight OUT divided by the green weight equals the percentage of weight loss. *EXAMPLE: 15 lbs. IN minus 12.75 lbs. OUT = 2.25 lbs. = 15% weight loss.*



Weight loss is a good indicator of the degree of roast. Variables such as humidity, coffee storage, and ambient air temperature will also affect the weight loss. It may go up or down 1% from day to day or month to month, but you should see 15% +/- 1%. If, after a few months, you start to see the weight loss moving to 16-17%, the roast is gradually getting darker. On the other hand, if the weight loss starts to drop down to 13-14%, the roast is gradually getting lighter.

**Roast Time:** Differences in roasting time may explain why the weight loss is different from the last time a particular coffee was roasted (the longer the roast, the higher the weight loss) even if the color is the same. Longer roasting and cooling times are also indicators that the airflow passages may be plugging up.

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

**Comments:** This is a good place for notations about techniques required for particular coffees. It may also be wise to note the weather as climatic conditions will affect the way some coffees roast. It is useful to note any changes in the way the roaster performs. This will be helpful in diagnosing future problems with the roaster.



**The servicing of the roaster is extremely important. The roasting log is a tool to use to monitor when the machine should be serviced. Pay close attention to the date to ensure the appropriate servicing.**

## 11. CLEANING

The cleaning schedule we recommend (*See Cleaning and Maintenance Schedule at the end of this manual.*) should be used as a guideline. Your specific roasting style, coffee, and climate will affect the time between cleaning.

Poor airflow can result in a build-up of flammable gases in the roaster as well as the exhaust ducting. Residue also insulates the ducting from within, resulting in higher internal duct temperatures.

Restriction of airflow anywhere in the system (including exhaust ducting) will create a build-up of residue/creosote in all airflow passages. This build-up directly affects the performance and efficiency of the roaster. To prevent excessive residue build-up, the airflow system requires periodic cleaning. Establish a cleaning schedule that is proportional to the amount of coffee roasted, taking into consideration the type of coffee and the degree of roast, as well as your specific climatic conditions.

The seasonal climate of the region will greatly affect the amount of cleaning required. A moist, humid climate requires more frequent cleaning of the roaster than a hot, dry climate. A moist, cold climate or coffees with excessive moisture create severe condensation. The moisture will adhere to the roaster's internal components and exhaust duct causing build-up to accumulate faster.

The types of coffees and degree of roast will also influence the amount of cleaning required. Some geographic regions are known for their dark roasted coffees. With darker roasts, more oils come to the surface of the bean, which in turn contributes to more oil in the exhaust smoke. The oily smoke adheres to all surfaces it comes in contact with. If more coffee is roasted dark rather than light, more frequent cleaning is required.

Natural or unwashed coffees (i.e., Indonesians) have much more chaff on the bean than washed (i.e., Central and South American) coffees. If more unwashed coffees are roasted than washed coffees, the chaff box, burner tray and cooling bin will require more frequent cleanings.

Decaffeinated coffee has almost no chaff on the exterior of the bean so if a fair quantity of decaf is roasted light, the chaff box will require very little cleaning. Decafs are usually roasted dark and oily, so duct cleaning will require more attention.



Painted surfaces which have oxidized can be cleaned with a light abrasive paste (Maguire's Mirror Glaze is recommended and available at most auto parts stores). Use caution when using abrasive products since they will actually remove paint. The view windows, chute, and agitator assembly (in cooling bin) are easier to clean while they are still warm from roasting heat. For polishing brass or stainless parts, use only a polishing compound made for these types of metals.



### **DANGER**

**ALWAYS DISCONNECT YOUR ROASTER AT THE ELECTRICAL SOURCE (at the circuit breaker or safety shut-off switch) PRIOR TO CLEANING AND PRIOR TO SERVICING ANY MOTOR OR MOVING COMPONENT.**



### **DANGER**

**Keep your roaster and ducting clean from inside the roaster to its termination outside of the building. Failure to do so may result in fire. Accumulated chaff and oil residues are extremely flammable.**

#### 11.1 EVERY 4 HOURS

After every **4 Hours** of continuous roasting, remove the chaff and broken beans from the drum chaff tray located directly under the drum.

#### 11.2 DAILY

Perform a general cleaning, inside and out, checking for residue build-up. To maintain cleanliness standards and general appearance, regularly clean the outside surfaces of the roaster.

#### 11.3 EVERY 40 HOURS



### **WARNING**

**To reduce the potential for fire, clean and remove the coffee chaff from the lower compartment or cyclone at the end of the day's roasting.**

After **40 Hours** of roasting, perform a thorough cleaning of all compartments. Perform a service check of all components in the roaster including the blower impeller. After 150 hours of roasting, clean the collector duct. The first three 40-hour cleaning cycles should include checking the tension of the drum drive chain (IR-2.5 ONLY)

**Refer to the Diedrich Roasters Maintenance, Cleaning & Troubleshooting Guide for specific information on maintaining and cleaning your Diedrich IR Series roaster.**



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 weight loss.

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



<b>Diedrich Roaster Cleaning &amp; Maintenance Schedule</b>			
<b>Daily</b>	<b>Date</b>	<b>✓when complete</b>	<b>Initials</b>
Vacuum all chaff from the cyclone chaff collection compartment.			
Vacuum any chaff and/or bean debris from the infrared burner compartment.			
Inspect perforated cooling bin screen for clogging. Clean as necessary with a screen roller, wire brush or by utilizing a sharp point to clean out the perforated holes.			
Vacuum all debris under the perforated cooling bin screen.			
<b>Weekly or every 40 hours of roasting</b>	<b>Date</b>	<b>✓when complete</b>	<b>Initials</b>
Lubricate front and back roasting drum bearings.			
Check the vacuum tube for evidence of residue blockage. Clean all residues from the tube or port.			
Wipe down all exterior surfaces of the roasting system.			
Inspect the blower fan and clean accordingly.			
Check residue build-up in the air box and piping. If accumulation is greater than 1/8th inch (3mm), then scrape/clean all effected interior surfaces and clean the impeller with a liquid cleaner and brush.			
Check the residue build-up in the cyclone chaff collection compartment. If accumulation is greater than 1/8th inch (3mm), then scrape/clean all affected interior surfaces.			
Check the residue build-up at the roaster's exhaust outlet & intermediate ducting. If the accumulation is greater than 1/8th inch (3mm), then clean thoroughly.			
Check the clean out port on the exhaust ducting. If the residue accumulations is greater than 1/8th inch (3mm), then ensure a professional chimney sweep cleans all the exhaust ducting.			
<b>Semi Annually (Every 6 months)</b>	<b>Date</b>	<b>✓when complete</b>	<b>Initials</b>
Lubricate air flow control mechanism.			
Lubricate drum drive chain. (IR-2.5 & IR-5 only)			
Check drum drive chain for proper tension. (IR-2.5 & IR-5 only)			
Do a cursory check of all bolts and screws and ensure they are tight.			
<b>Annually</b>	<b>Date</b>	<b>✓when complete</b>	<b>Initials</b>
Have a professional chimney sweep clean the exhaust ducting at least once a year regardless of the buildup.			