

# AG2 Series V.5/05 - 4" Tube Heater Installation, Operation, Maintenance and Parts Manual\*

**▲ WARNING: This heater must be installed and serviced by trained gas installation and service personnel only! 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. Protect yourself and others by observing all safety information. Retain instructions for future reference.**

\*For complete installation instructions, see the General Manual that accompanied this piece. Additional literature on this and other products are available at [www.detroitradiant.com](http://www.detroitradiant.com).

## AG2 Series

Project: \_\_\_\_\_ Date: \_\_\_\_\_  
 Customer Name: \_\_\_\_\_  
 Location: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Contractor: \_\_\_\_\_  
 Engineer: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Serial #: \_\_\_\_\_ Phone#: \_\_\_\_\_  
 Local Representative: \_\_\_\_\_  
 Date of Installation: \_\_\_\_\_  
 Notes: \_\_\_\_\_

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## Model V.5/05

Qty.	Model #	Gas Type (circle one)	BTU/H High Fire	BTU/H Low Fire	Applications					Straight Length	U-Tube Length	Weight - Pcs.	Suggested Mounting Height	Uncoated Combustion Chamber	Radiant Emitter Tube	Alum. Add On	Baffle Pieces
					Swine	Arena	Dairy	Poultry	Polebarns & Shops								
	AG2-20-65	N or LP	65,000	50,000	No	Yes	No	Yes	Yes	21'-7"	13'-0"	120# - 2	6' - 9'	Aluminized	4" Hot Rolled	Qty. 1	5
	AG2-20-75	N or LP	75,000	50,000	No	Yes	Yes	Yes	Yes	21'-7"	13'-0"	120# - 2	7' - 10'	Aluminized	4" Hot Rolled	Qty. 1	5
	AG2-30-65	N or LP	65,000	50,000	No	Yes	No	Yes	Yes	31'-3"	**17'-8"	160# - 2	6' - 9'	Aluminized	4" Hot Rolled	Qty. 2	5
	AG2-30-75	N or LP	75,000	50,000	No	Yes	Yes	Yes	Yes	31'-3"	**17'-8"	160# - 2	7' - 10'	Aluminized	4" Hot Rolled	Qty. 2	5
	AG2-30-100	N or LP	100,000	65,000	No	Yes	Yes	Yes	Yes	31'-3"	**17'-8"	160# - 2	8' - 14'	Aluminized	4" Hot Rolled	Qty. 2	6
	AG2-40-65	N or LP	65,000	50,000	No	Yes	No	Yes	Yes	40'-11"	22'-8"	190# - 2	6' - 9'	Aluminized	4" Hot Rolled	Qty. 3	5
	AG2-40-75	N or LP	75,000	50,000	No	Yes	Yes	Yes	Yes	40'-11"	22'-8"	190# - 2	7' - 10'	Aluminized	4" Hot Rolled	Qty. 3	5
	AG2-40-100	N or LP	100,000	65,000	No	Yes	Yes	Yes	Yes	40'-11"	22'-8"	190# - 2	7' - 11'	Aluminized	4" Hot Rolled	Qty. 3	5
	AG2-40-125	N or LP	125,000	95,000	No	Yes	Yes	Yes	Yes	40'-11"	22'-8"	190# - 2	9' - 14'	Aluminized	4" Hot Rolled	Qty. 3	5
	AG2-40-150	N or LP	150,000	100,000	No	Yes	Yes	No	Yes	40'-11"	22'-8"	190# - 2	10' - 14'	Titanium	4" Hot Rolled	Qty. 3	5
	AG2-50-100	N or LP	100,000	65,000	No	Yes	No	Yes	Yes	50'-7"	**27'-4"	235# - 2	8' - 11'	Aluminized	4" Hot Rolled	Qty. 4	5
	AG2-50-125	N or LP	125,000	95,000	No	Yes	Yes	Yes	Yes	50'-7"	**27'-4"	235# - 2	9' - 14'	Aluminized	4" Hot Rolled	Qty. 4	5
	AG2-50-150	N or LP	150,000	100,000	No	Yes	Yes	No	Yes	50'-7"	**27'-4"	235# - 2	10' - 14'	Titanium	4" Hot Rolled	Qty. 4	5
	AG2-60-150	N or LP	150,000	100,000	No	Yes	Yes	No	Yes	60'-3"	32'-4"	270# - 3	10' - 14'	Titanium	4" Hot Rolled	Qty. 5	5

\*\* Model requires 5EA-SUB accessory package.

- AGAO-SS - Upgrade burner box from coated steel to 304 Series Stainless.
- ALUM-AO - Upgrade hot rolled steel radiant tubes to black coated 16ga. aluminized steel for maximum efficiency and longevity. Highly recommended in any contaminated or moisture laden environment (ex. poultry applications). See chart above for quantity needed.

Warranty registration options:

1. Register online at [www.reverberray.com/warranty](http://www.reverberray.com/warranty)
2. Complete the information above and fax to Detroit Radiant Products Co.
3. Complete the information above and mail to Detroit Radiant Products Co.



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 21400 Hoover Rd., Warren, MI 48089  
 T. (586) 756-0950 F. (586) 756-2626  
 Form# LIOAG2-2M-9/05 (ID)  
 Replaces Form# LIOAG2-1M-03/01



# AG2 Series

**▲ WARNING!**

**NOT FOR RESIDENTIAL USE!**

Do not use in the home, sleeping quarters, attached garages, etc.

**▲ WARNING!**

This heater must be installed and serviced by trained gas installation and service personnel only. Read and understand these instructions thoroughly before attempting to install, operate or service this heater. Failure to comply could result in personal injury, asphyxiation, death, fire, and/or property damage. Retain these instructions for future reference.

**▲ WARNING!**

This is not an explosion-proof heater. Where there is the possibility of exposure to flammable vapors, consult the local fire marshal, the fire insurance carrier and other authorities for approval of the proposed installation.

**▲ WARNING!**

Failure to comply with the stated clearances to combustibles could result in personal injury, death and/or property damage.

**▲ WARNING!**

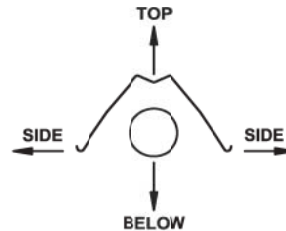
In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain the required clearances from the heater to the combustibles. Signs must either be posted adjacent to the heater thermostats or in the absence of such thermostats, in a conspicuous location.

**▲ WARNING!**

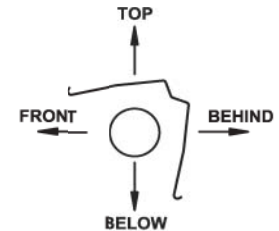
This heater should be installed so that the minimum clearances to vehicles, as marked on the heater, will be maintained. If vehicle lifts are present, ensure that these clearances will be maintained from the highest raised vehicle.

**CLEARANCES TO COMBUSTIBLES (IN.)**

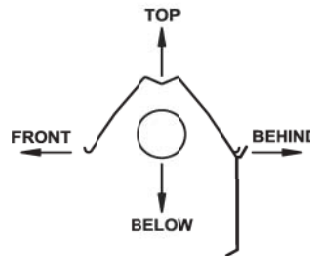
MODEL NO.	MOUNTING ANGLE	SIDE		TOP	BELOW
		FRONT	BELOW		
AG2 (20,30,40) - 65 [N,P]	0°	9	9	6	60
	45°	39	8	10	60
	0°	29	8	6	60
	0°	9	9	6	60
	0°	7	7	6	30
AG2 (20,30,40) - 75 [N,P]	0°	9	9	6	60
	45°	39	8	10	60
	0°	29	8	6	60
	0°	9	9	6	60
	0°	7	7	6	30
AG2 (30,40,50) - 100 [N,P]	0°	14	14	6	66
	45°	39	8	10	66
	0°	29	8	6	66
	0°	16	16	6	66
	0°	7	7	6	30
AG2 (40,50,60)-125 [N,P]	0°	20	20	6	76
	45°	58	8	10	76
	0°	42	8	6	76
	0°	20	20	6	76
	0°	7	7	6	30
AG2 (40,50,60) - 150 [N,P]	0°	24	24	6	81
	45°	58	8	10	81
	0°	42	8	6	81
	0°	23	23	6	81
	0°	11	11	6	44



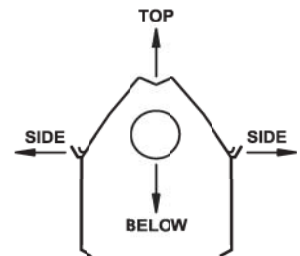
0° MOUNTING ANGLE



45° MOUNTING ANGLE



0° W/1 SIDE SHIELD



0° W/2 SIDE SHIELDS

# AG2 Series Mechanical Instructions

This supplement is designed to address the specifics of the AG2 Series - see page 12 for product features.

## Product Summary

AG2 Series heaters are available from 20 to 60 foot, 65,000 to 150,000 BTU's, natural or LP gas. AG2 Series are positive pressure, two stage heaters and feature uncoated hot rolled steel for it's radiant pipes.

## Operational Features

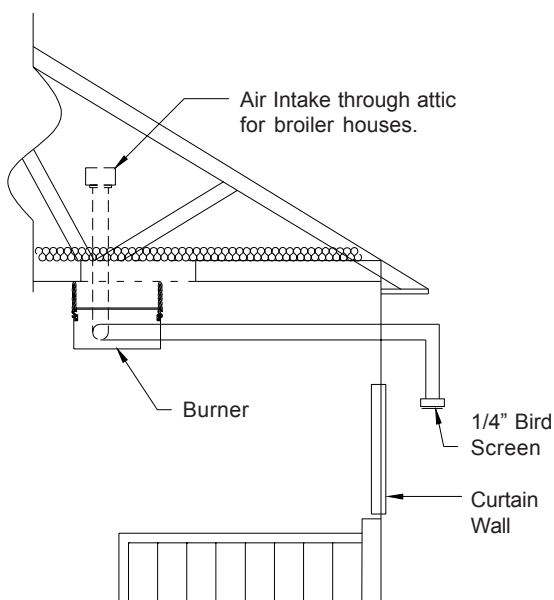
Outside air for combustion is required in all agricultural applications. Place air inlet in a non-contaminated area, away from any steam or moisture sources.

## Tube Installation Sequence

The AG2 Series has a 4" uncoated combustion chamber (identified by an orange sticker) and 4" uncoated hot rolled steel (HRT) heat exchangers, following the combustion chamber and every tube there after. 150,000 BTU/H models incorporate an aluminized tube to be placed directly following the combustion chamber. Tube packages with the ALUM-AO upgrade will have 4" black coated aluminized heat exchangers replacing the uncoated hot rolled steel. See the Tube Installation Sequence chart below for an illustration.

	Aluminized (65-75 MBTU/H)	Uncoated Hot-rolled				
B	Combustion Chamber	*				
B	Combustion Chamber		Uncoated Hot-rolled	*		
B	Combustion Chamber	Uncoated Hot-Rolled or Aluminized (65-125 MBTU/H) (150 MBTU/H)	Uncoated Hot-rolled	Uncoated Hot-rolled	*	
B	Combustion Chamber	Uncoated Hot-Rolled or Aluminized (100-125 MBTU/H) (150 MBTU/H)	Uncoated Hot-rolled	Uncoated Hot-rolled	Uncoated Hot-rolled	*
B	Combustion Chamber	Uncoated Aluminized (150 MBTU/H)	Uncoated Hot-rolled	Uncoated Hot-rolled	Uncoated Hot-rolled	Uncoated Hot-rolled *

B = Burner location      \* = Baffle location



## Combustion Air

The combustion air intake collar is also a factory-preset air orifice. Non-contaminated air for combustion must be ducted to the heater in all agricultural applications.

Do not take combustion air from positively or negatively pressurized attic spaces, except in broiler houses.

Locate intake away from any steam source. Use caution when placing intake above curtain walls, as they leak .

See adjacent figure. Use light gauge, 4 inch PVC air intake material from curtain sidewall to heater. Do not exceed 25 feet. With elbow, drop below curtain top, one foot in length. Cap with 1/4 inch birdscreen.



# AG2 Series

## Electrical Requirements

- 120 Volt - 60 Hz GRD, 3-wire.
- 24V thermostat connection.
- Starting current 4.8 amps
- Running current 1.1 amps

## Gas Requirements

- Manifold Pressure
  - Nat. 3.5" - LP. 10.0"
- Minimum Inlet Pressure
  - Nat. 5.0" - LP. 11.0"
- Maximum Inlet
  - Nat. 14.0" - LP. 14.0"

Allowances must be made for the system to expand. Consult installation manual for further gas supply instructions.

## Ventilation Requirements

- In agricultural applications, these heaters are generally unvented.
- Consult the generic supplement for venting instructions.
- For unvented operation, there must be a positive air displacement of at least 4.0 CFM per 1000 BTU/H for natural gas or 4.5 CFM per 1000 BTU/H for LP gas. WVE-4 termination cap must also be used.

## Theory of Operation

### Standby:

The Micro 60U24 control continually checks for internal faults, safety circuit integrity, and relay contact positioning.

### Starting Circuit:

Upon a call for heat, the control will verify that the differential pressure switch is in the proper position. The fan relay energizes the fan, an operational static pressure is achieved and the normally open differential pressure switch will close, initiating the ignition sequence. The glow-bar is powered and after 45 seconds the main gas valve opens. If flame is not established the heater will attempt to re-ignite for a total of three trials for ignition and then proceed to lockout.

### First Stage Running Circuit:

After ignition the flame-rod monitors the main burner flame. If flame is lost, the control acts to close the gas valve within one second and a new trial sequence, identical to the start up sequence, is initiated. If proof is not established within 8.5 seconds, the unit will retry 2 additional ignition sequences and then proceed to hard lock-out. The control can be reset by interrupting the power source or at the thermostat.

### Second Stage Running Circuit:

Stage two on the gas valve is powered directly from the second stage of the controller or thermostat. In order for the second stage to flow the higher output, the first stage has to be energized as well. The controller or thermostat will determine which stage is required to maintain the desired comfort level.

### Shut Down:

When the controller or thermostat is satisfied the fan will enter into a 2 minute post-purge cycle.

### Soft Lockout:

In the event of an external interruption (wind, gas, etc.) the heater will go into a "soft-lockout" feature. In this mode the heater will attempt a normal start-up after approximately 30 seconds. In the event of continued problems, the heater will go into a hard lock-out mode.

### Lockout Codes:

In event of a component failure, a red LED diagnostic light located on the burner box end panel will flash a code identifying the fault. Lockout codes are summarized in the table below. Some fault codes have a time delay before the LED will flash. Refer to the FAULT CODE DELAY on the chart to see the approximate time delay.

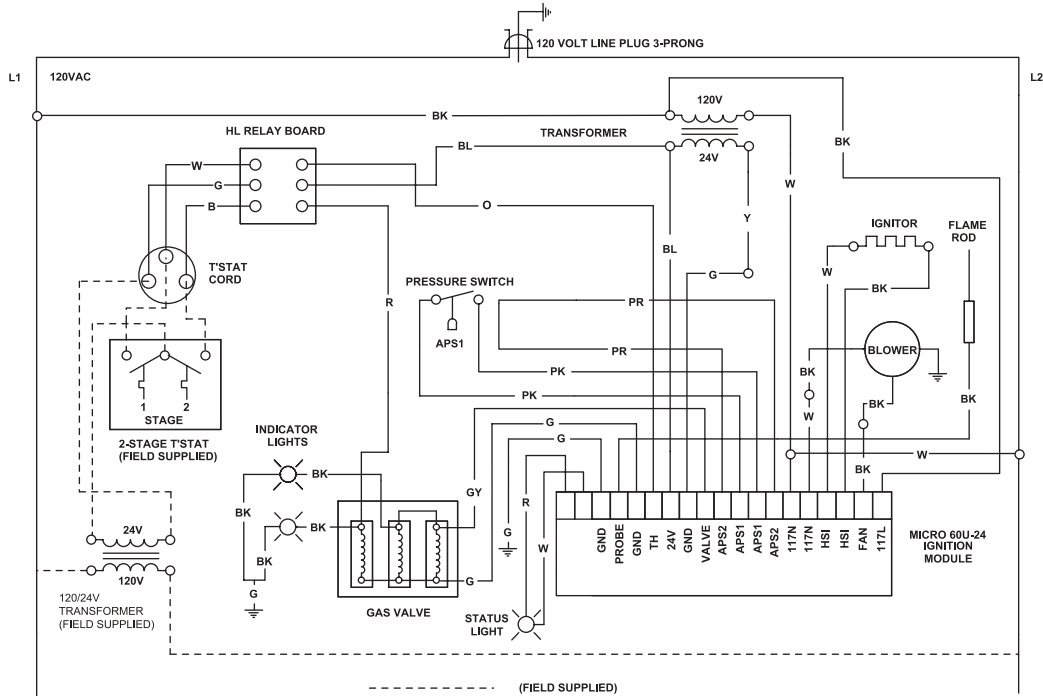
LED CODE	FAULT STATUS	FAULT CODE DELAY
Initial flash on power up, then steady off	Normal operation	Immediate
Steady on	Module failure / Internal fault	Immediate
1 flash	Ignition failure	30-32 minutes
2 or 3 flashes	APS - Note: fan / intake / exhaust	10-12 minutes
4 flashes	Solenoid valve fault / Leaky valve / Flame amplifier fault	Immediate
No flash on 117V start up	Transformer fault	Immediate

**NOTE:** Hard lockout LED CODE will appear upon completion of the soft lockout sequence of operation.

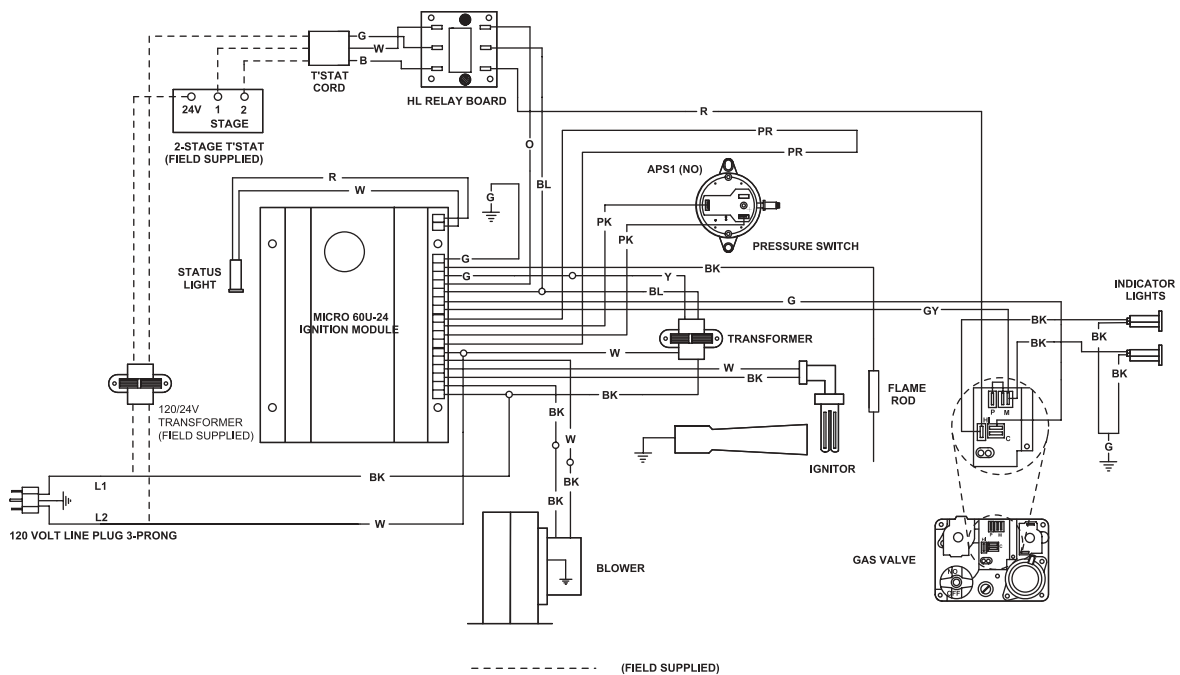
# AG2 Series Wiring Diagrams

## MICRO 60U-24 Single Pressure Switch WITH HLRB RELAY BOARD

MICRO 60U-24 LADDER DIAGRAM - WITH RELAY BOARD

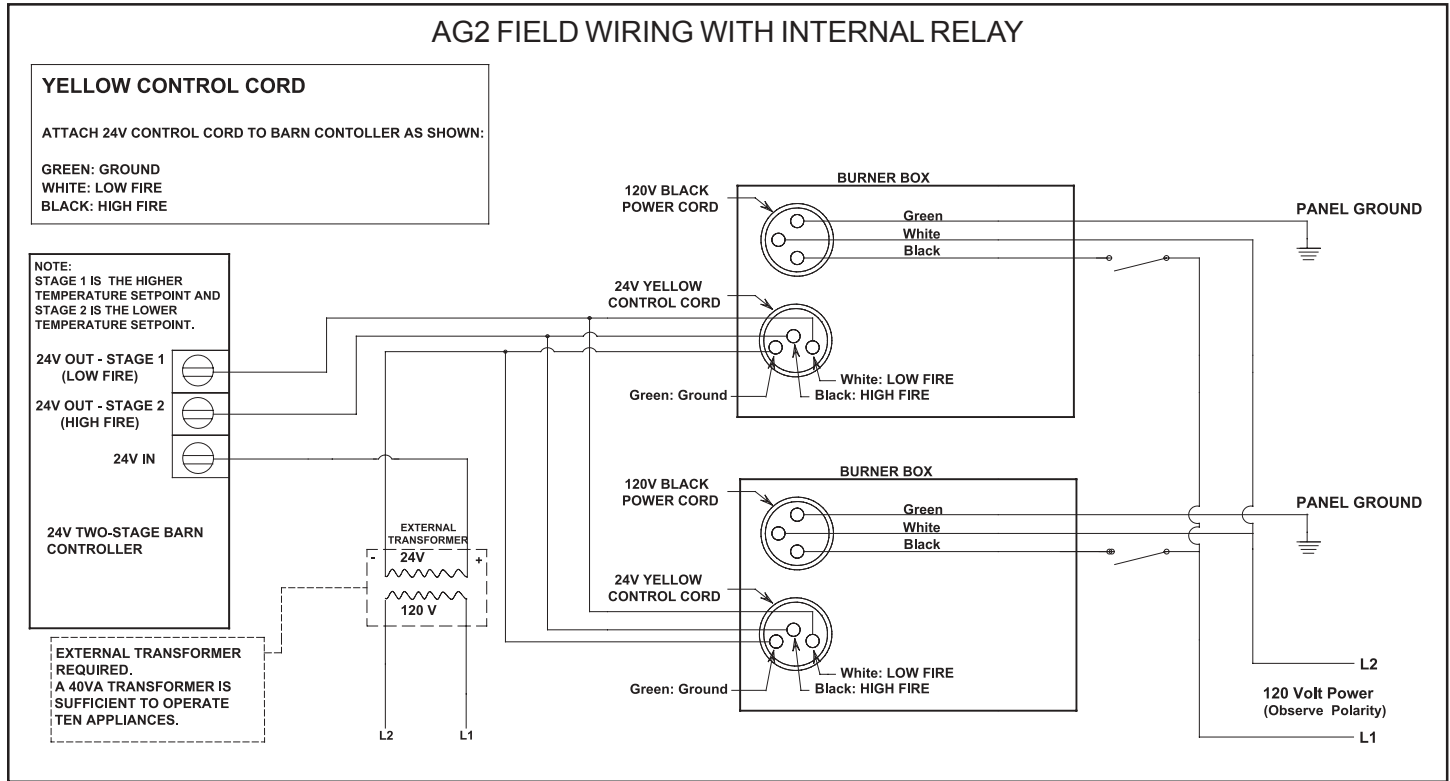


MICRO 60U-24 BLOCK DIAGRAM - WITH RELAY BOARD

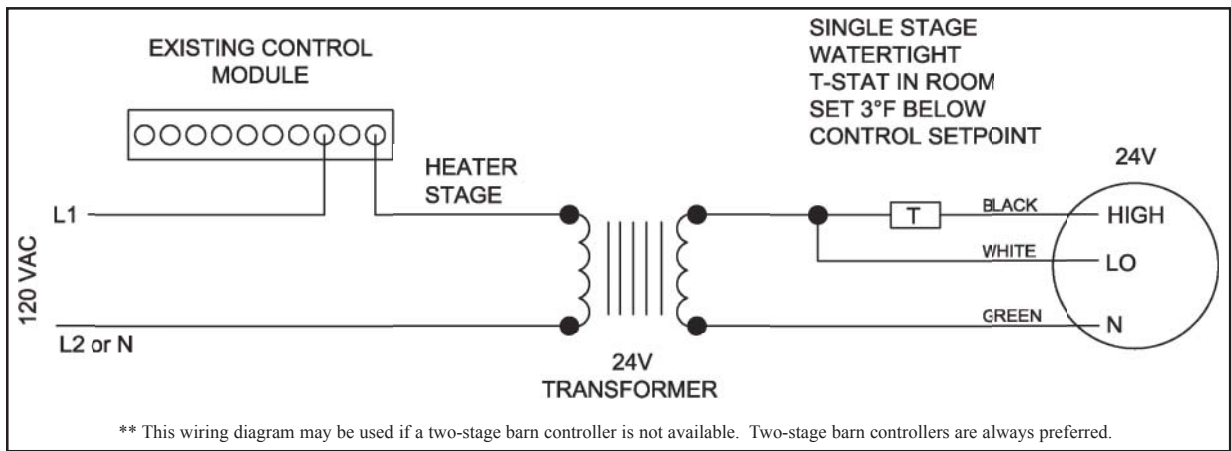


# AG2 Series

## Field Wiring Diagrams



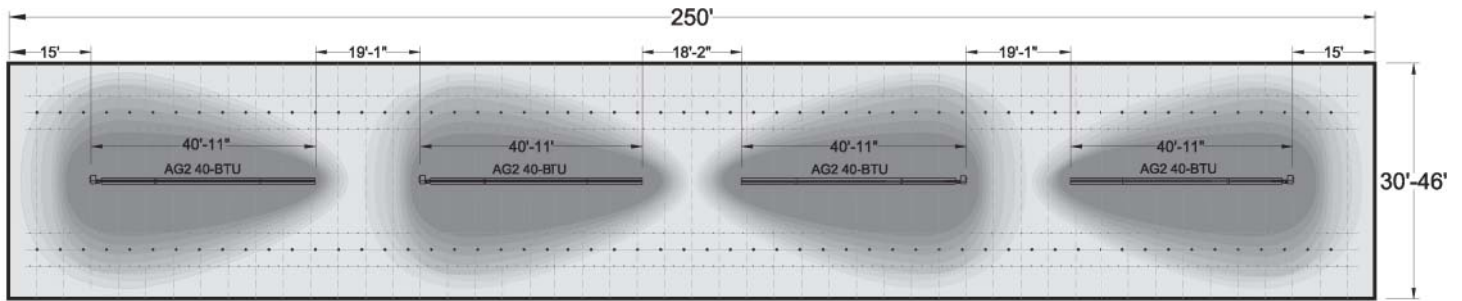
TYPICAL WIRING DIAGRAM TO BARN CONTROLLER



TWO-STAGE CONTROL WIRING WITH SINGLE STAGE BARN CONTROLLER

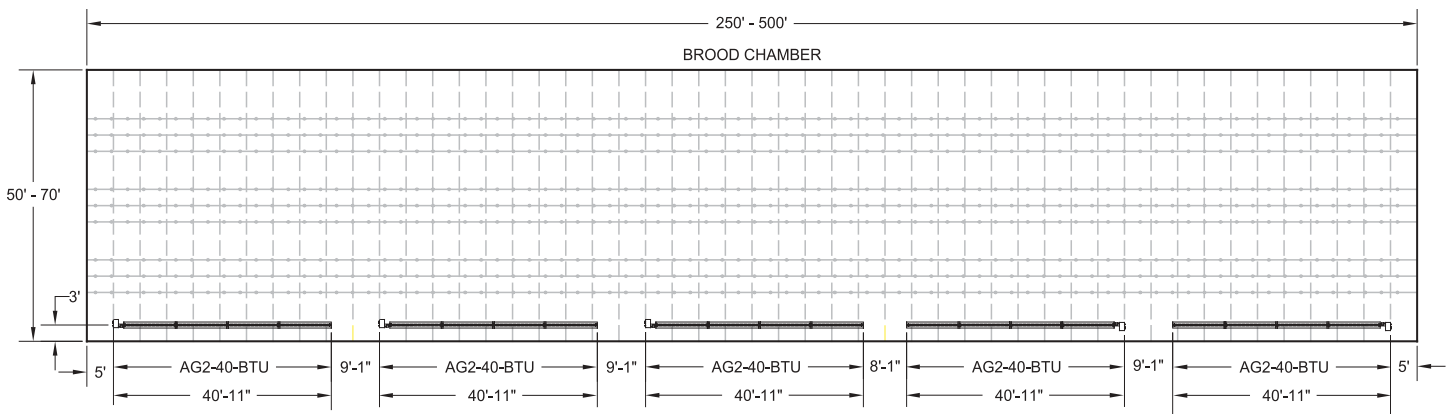
**ELECTRICIAN:** 24V must be field supplied to each unit's yellow cord. Supply 120V to black cord. Observe polarity. Confirm proper two stage electrical wiring by cycling heaters between stages. Proper operation of high fire, low fire and off should be confirmed on all two stage AG2 Heaters. AG2 model heaters require a 24-volt two-stage thermostat / controller to operate.

# AG2 Series Sample Brooder Installation Diagrams



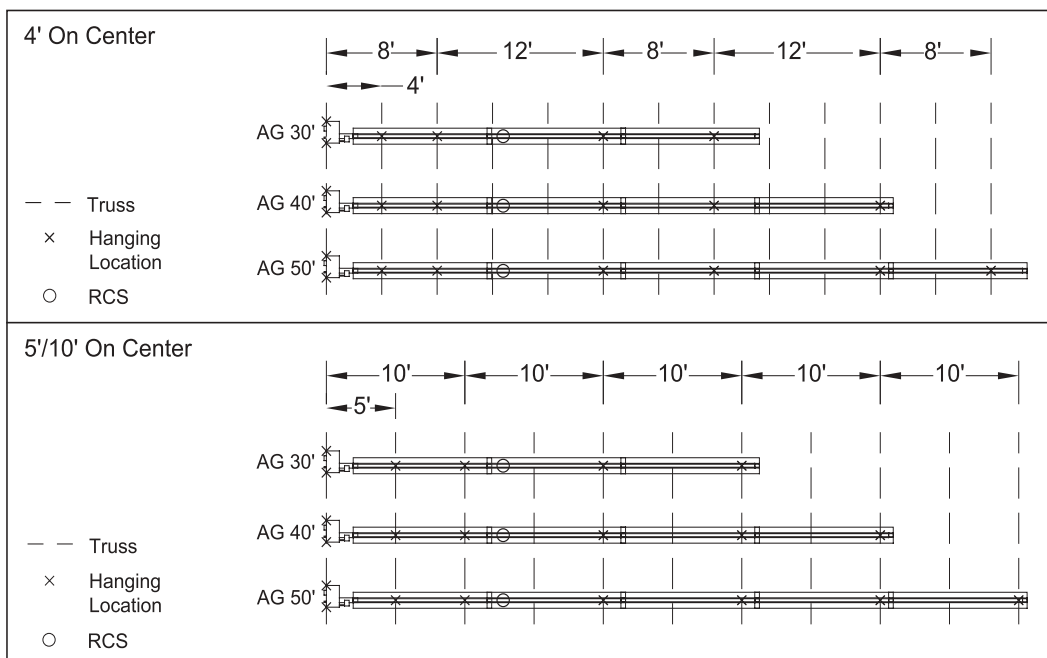
## CENTER HOUSE INSTALLATION

**NOTE:** Utilize CH hangers on houses 60 feet or more with center house mounting



## SIDE WALL INSTALLATION

**NOTE:** Mount Reflector at a 45° angle toward center.



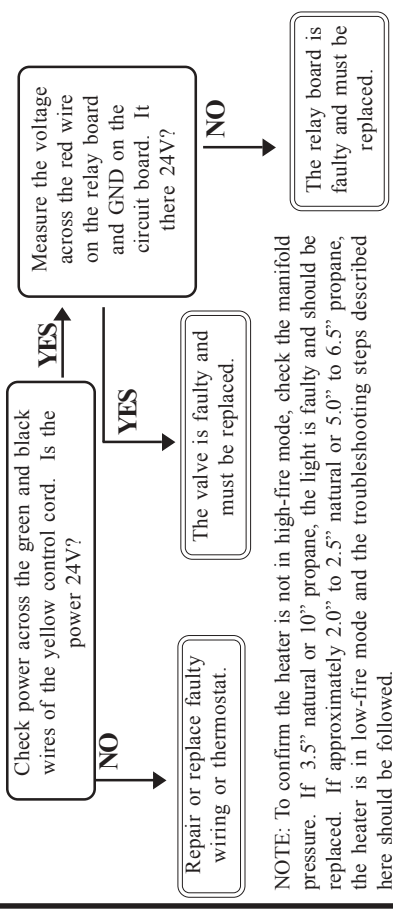
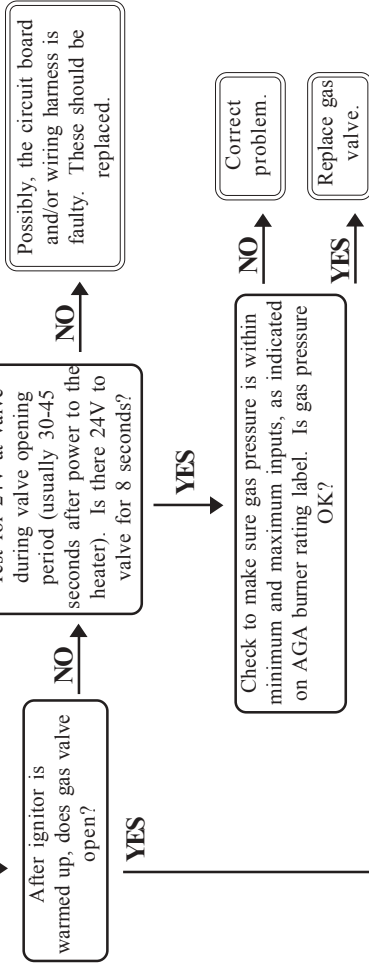
## 30', 40' and 50' TRUSS INSTALLATION







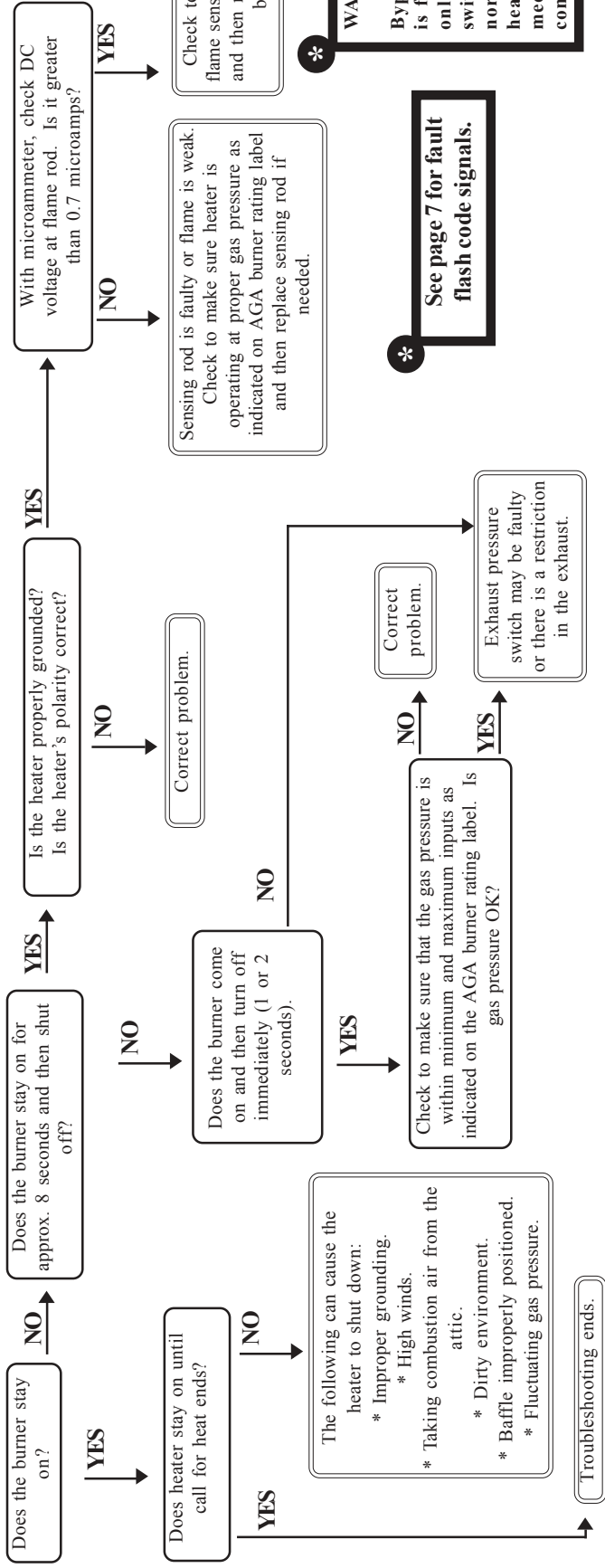
## If heater does not go into high-fire mode, check the following:



NOTE: To confirm the heater is not in high-fire mode, check the manifold pressure. If 3.5" natural or 10" propane, the light is faulty and should be replaced. If approximately 2.0" to 2.5" natural or 5.0" to 6.5" propane, the heater is in low-fire mode and the troubleshooting steps described here should be followed.

Correct problem.  
Make sure gas lines were purged of air.

Check to make sure gas pressure is within minimum and maximum inputs, as indicated on AGA burner rating label. Is gas pressure OK?  
NO --> Correct problem.  
YES --> Make sure gas lines were purged of air.

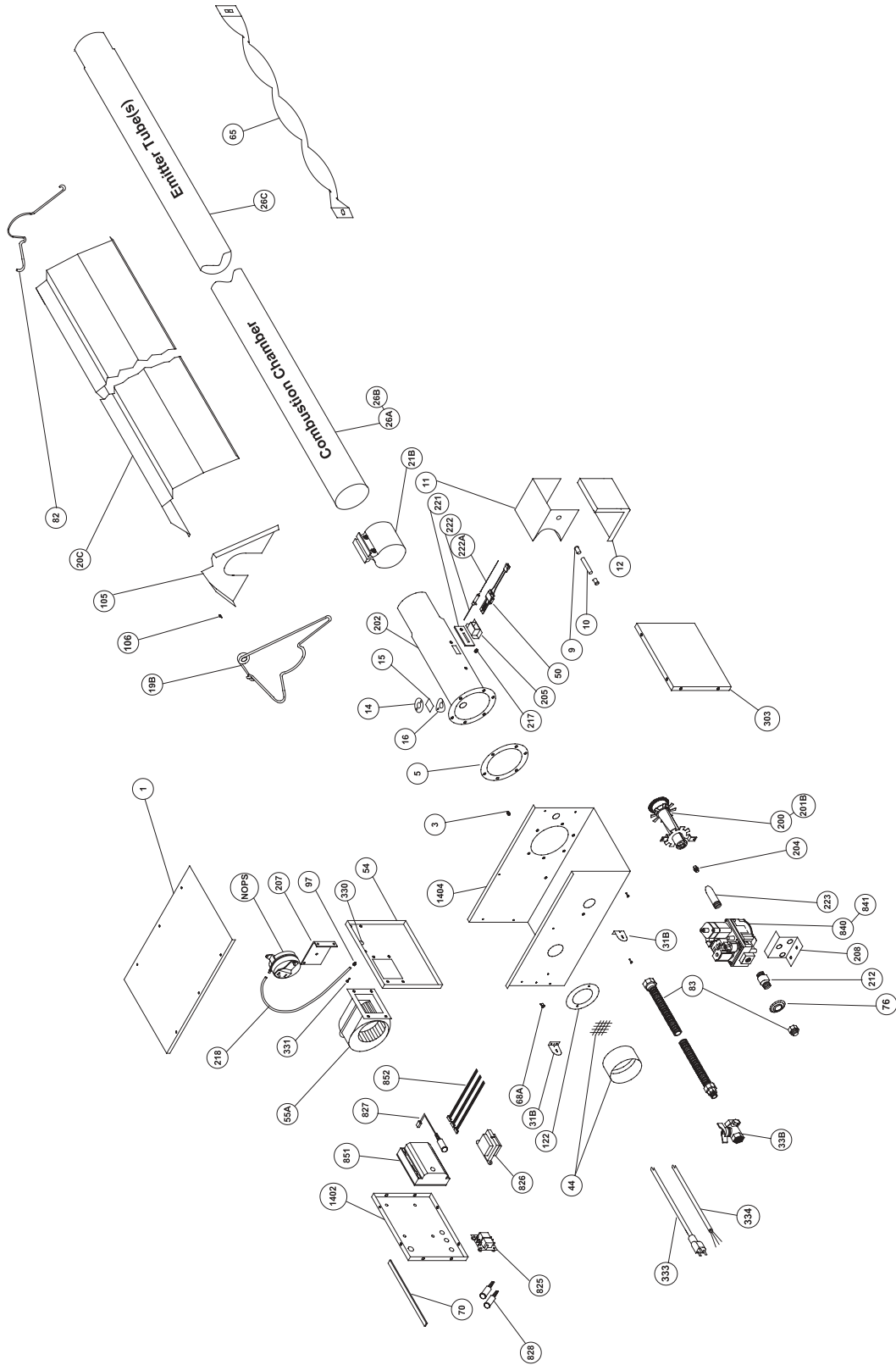


**WARNING:**  
Bypassing any switch is for testing purposes only. Do not leave switch bypassed during normal operation or heater's built-in safety mechanisms will be compromised.

**See page 7 for fault flash code signals.**

# AG2 Series

## Parts Breakdown



# AG2 Series Basic Parts List

## AG2 SERIES PARTS LISTING

PART #	DESCRIPTION	PART #	DESCRIPTION
TP-1	CONTROL BOX COVER	TP-200	BURNER (50 TO 100 MBTU/H)
TP-5	FLANGE GASKET	TP-201B	BURNER (125 MBTU/H TO 150 MBTU/H)
TP-9	CONDUIT COUPLING	TP-202	16" BURNER TUBE W/ FLANGE
TP-10	CONDUIT 4" X 1/2"	TP-204	GAS ORIFICE - CONSULT FACTORY
TP-11	GLO-BAR IGNITOR BOX	TP-205	GLO-BAR HOLDER
TP-12	GLO-BAR IGNITOR BOX COVER	TP-207	V.5/05 PRESSURE SWITCH MOUNTING BRACKET
TP-14	SIGHT GLASS GASKET	TP-208	"Z" MOUNTING BRACKET
TP-15	SIGHT GLASS	TP-211	MARK 17X-24 CIRCUIT BOARD
TP-16	SIGHT GLASS WASHER	TP-211A	MARK 17U-24 CIRCUIT BOARD (REMOTE SENSE)
TP-17	SIGHT GLASS KIT	TP-212	1/2" X 3" PIPE NIPPLE
TP-19B	WIRE HANGER	TP-214	GLO-BAR WIRING HARNESS
TP-20C	120" REFLECTOR	TP-217	PRESSURE BARB FITTING
TP-21B	TUBE CLAMP	TP-218	EXHAUST PRESSURE TUBE (VINYL)
TP-26A	10 FT. RADIANT TUBE STRAIGHT	TP-221	GLO-BAR HOLDER GASKET
TP-26B	10 FT. RADIANT TUBE STRAIGHT (AL-TI)	TP-222	FLAME ROD
TP-26C	10 FT. UNCOATED HOT ROLLED STEEL RADIANT TUBE	TP-222A	FLAME ROD WIRE
TP-31B	CONTROL BOX HANGING BRACKET	TP-223	GAS MANIFOLD
TP-33B	1/2" GAS COCK	TP-303	END PANEL - RIGHT
TP-44	AIR ORIFICE W/SCREEN (CONSULT FACTORY)	TP-825	HLRB RELAY BOARD
TP-50	GLO-BAR IGNITOR	TP-826	40VA TRANSFORMER (OLD TP219)
TP-54	BURNER BOX DIVIDER	TP-827	RED LED DISPLAY DIAGNOSTIC LIGHT
TP-55A	FAN BLOWER	TP-828	YELLOW OPERATIONAL IND. LIGHT (OLD TP216)
TP-65	33" INTERLOCKING HEAT DIFFUSER (BAFFLE)	TP-840	36E96-224 TWO STAGE GAS VALVE-NAT (OLD TP210)
TP-68A	STRAIN RELIEF BUSHING	TP-841	36E96-226 TWO STAGE GAS VALVE-LP (OLD TP210P)
TP-70	CONTROL BOX COVER GASKET (PER FOOT**)	TP-933	6' BLACK 120V THREE PRONG PLUG
TP-76	RUBBER GROMMET	TP-934	6' YELLOW 24V CONTROL WIRE
TP-82	REFLECTOR CENTER SUPPORT	TP-1402	END PANEL - LEFT
TP-83	STAINLESS STEEL FLEX CONNECTOR	TP-1404	CONTROL BOX
TP-97	1/4" X 1/4" BRASS INT./EXT. ATMOS.BARB FITTING	TP-NOPS	NORMALLY OPEN DIFFERENTIAL SWITCH
TP-105	REFLECTOR END CAP	(TP-264B)	N.O. Differential Pressure Switch (65 TO 75MBTU/H)
TP-106	REFLECTOR CLIP	(TP-264E)	N.O. Differential Pressure Switch (100 TO 125MBTU/H)
TP-122	GASKET FOR AIR ORIFICE & AIR COLLAR	(TP-264D)	N.O. Differential Pressure Switch (150MBTU/H)


\*\* 6' TOTAL NEEDED TO COVER OUTER EDGES OF A BURNER BOX.




# Kit Contents & Product Features

Kit contents for the AG2 Series are shown below. Reference the proper column for your particular models length.


FILLED BY:		AG2 SERIES KIT CONTENTS				
TP#	DESCRIPTION	20 FOOT	30 FOOT	40 FOOT	50 FOOT	60 FOOT
TP-19B	4" Hangers	3	4	5	6	7
TP-21B	4" Tube Clamps	2	3	4	5	6
TP-33B	1/2" Gas Cock	1	1	1	1	1
TP-82	4" Refl. Cntr. Sprt.	1	1	1	1	1
TP-83	24" SS Flex Line	1	1	1	1	1
TP-105	Refl. End caps	2	2	2	2	2
TP-106	Refl. End cap Clips	8	8	8	8	8
IOM	Install / Op Manual	1	1	1	1	1




4" Hanger  
TP-19B




4" Butt Clamp  
TP-21B




1/2" Gas Cock  
TP-33B




4" Reflector Center  
Support - TP-82




24" SS Flex  
Connect TP-83



Reflector End Caps  
TP-105



Generic IOM  
(LIOGT)  
**AND**  
AG2 Series Insert  
(LIOAG2)



Bag of Reflector  
End Cap Clips.  
TP-106

## PRODUCT FEATURES

### APPROVALS

- IAS, CSA.
- Indoor / outdoor approval.
- Commercial / agricultural approval.

### BURNER SIGHT GLASS

- For burner inspection.

### COMBUSTION AIR INLET & VENT

- 4" Male duct.

### WATERPROOFED CONTROL BOX

- Outside air collar (4") attached.
- Totally enclosed components.

### GAS CONNECTION

- 1/2" gas cock included.
- 7/8" flare-2' S.S. flex included.

## CONTROLS

- 100% safety shut off.
- Differential pressure switch.
- Stainless steel flame swirl burner.
- Silicon carbide hot surface igniter.
- Flame rod sensing.
- Pre and post purge controls.
- Microprocessor circuit board provides soft lockout and self-diagnostic features.

## EMITTER & COMBUSTION TUBES

- Black coated aluminized steel combustion chamber (first 10' section) 65-125 MBTU/H models only.
- Black coated titanium treated combustion chamber (first 10' section) 150 MBTU/H models only.
- Uncoated aluminized combustion chamber (second 10' section) 150 MBTU/H models only.
- 16ga. 4" O.D. uncoated hot-rolled steel radiant tubes.
- Slip fit connection.

## OPERATIONAL LIGHTS

- Light #1 - Indicates high fire.
- Light #2 - Indicates low fire.
- Light #3 (red) - Indicates diagnostic fault code (see status chart on page 4).

## WARRANTY

- 1 year - Burner box components.
- 3 years - Combustion and radiant tubes.
- 5 years - Burner.

## OTHER

- One reflector center support per heater.
- Turbulator baffle included.
- Stainless steel upgrades available.
- Made in U.S.A
- Visit [www.detroitradiant.com](http://www.detroitradiant.com)