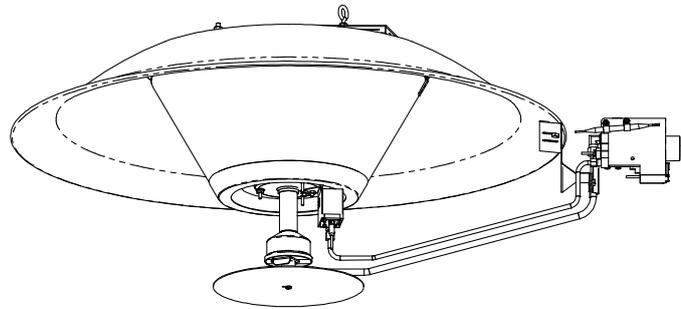


RADIANT GAS BROODER

MODELS: MEGASUN 12 (-2, -4, -9) with PILOT IGNITION

INSTALLATION AND OPERATION INSTRUCTIONS



OWNER/INSTALLER: For your safety this manual must be carefully read before installing, operating or servicing this brooder. This brooder is intended for use with either Natural Gas or Propane Gas and must be installed in accordance with the relevant provisions of any National and Local Gas Safety (Installation and Use) Regulations. Due account should also be taken of any obligations arising from any National and Local Health and Safety at Work Regulations, National and Local Building Regulations and National and Local Electrical Wiring Regulations. The appliance must be installed, and where necessary, converted for use on other gases, by a qualified installer only.

WARNING: Improper installation, adjustment, alteration, service or maintenance can cause injury, property damage or death. Refer to this manual. For assistance or additional information, consult a qualified installer, service agency or the gas supplier.

INSPECT all combustion air openings into the building and, if necessary, clear as they become blocked by litter, dust, feathers or other matter.

INSPECT and clean filters on a regular basis to allow proper brooder operation.

FOR YOUR SAFETY: EXHAUST FANS MUST be operating on an appropriate cycle when brooders are operating to avoid a high concentration of carbon monoxide. When used without fresh air, this brooder may give off carbon monoxide, an odourless and poisonous gas. **CARBON MONOXIDE POISONING MAY LEAD TO DEATH.** Early signs of carbon monoxide poisoning resemble the flu with headaches, dizziness and nausea. If you experience these signs, **GET FRESH AIR IMMEDIATELY!** Have the brooders serviced as soon as possible and check the ventilation in the house.

These brooders are designed for agricultural applications and may operate with the use of either Natural Gas or Liquid Propane (LP) Gas. Check the brooder's data plate to determine the correct gas type before proceeding with installation.

FOR YOUR SAFETY

IF YOU SMELL GAS:

- ! **DO NOT** try to light any appliance.
- ! **DO NOT** touch any electrical switch; do not use any telephone in your building.
- ! **IMMEDIATELY** call your gas supplier from a neighbour's telephone. Follow the gas supplier's instructions. If you cannot reach your gas supplier, call the fire department.

DO NOT store or use petroleum or other flammable vapours and liquids in the vicinity of this or any other appliance.

**SAVE THIS MANUAL
FOR FUTURE REFERENCE.**

TABLE OF CONTENTS

<u>Section</u>	<u>Description</u>	<u>Page</u>
1)	GENERAL INFORMATION	1
2)	BROODER SPECIFICATIONS.....	1
3)	BROODER CONTROL OPTIONS.....	2
4)	BROODER ASSEMBLY	2
5)	MINIMUM CLEARANCES TO COMBUSTIBLES.....	5
6)	BROODER INSTALLATION	6
7)	GAS CONNECTIONS.....	7
8)	ELECTRICAL CONNECTIONS	11
9)	LIGHTING AND SHUTDOWN INSTRUCTIONS.....	13
10)	VENTILATION	13
11)	MAINTENANCE, SERVICING and CONVERSION INSTRUCTIONS	15
12)	TROUBLESHOOTING.....	18
13)	REPLACEMENT PARTS GUIDE	19

1. GENERAL INFORMATION

This brooder is a self-contained infrared radiant brooder for agricultural locations where flammable gases or vapours are not generally present.

Installation of the brooders must be in accordance with the relevant provisions of any National and Local Gas Safety (Installation and Use) Regulations taking into account any National and Local Health and Safety at Work Regulations, National and Local Building Regulations and National and Local Electrical Wiring Regulations.

Inspect all openings and filters regularly and clean as necessary. This is necessary because litter, dust feathers and other matter can become airborne and clog openings and filters and adversely affect brooder operation and performance.

Every brooder should be located with respect to building construction and other equipment so as to permit access to the brooders. Each installer shall use skilful and reliable installation practices when locating the brooders and must give consideration to service accessibility.

For optimum temperature control for brooders requiring remote temperature controls, do not locate thermostats in shaded or draughty locations, outside the area to be heated. The sensor should also be shielded from direct radiation to prevent short cycling of the brooder.

This brooder is for INDOOR INSTALLATION ONLY and is used in an UNVENTED mode. The term *Unvented* actually means *Indirect Vented*. While the products of combustion are expelled into the building, national standards require ventilation in the building to dilute these products of combustion. This ventilation must be provided by gravity or mechanical means. Ventilation requirements are addressed further in these instructions.

2. BROODER SPECIFICATIONS

MODEL	MEGASUN 12				
Types	N2 / L2 (WVLMK24), N4 / G4 / L4 (WVLMK230), N9 / L9 (WVLTH)				
Appliance Type	A1				
Appliance Cat.(II)	II2H3P, II2H3B/P, II2E3P, II2E3B/P, II2Er3P, II2Er3B/P, II2L3P, II2L3B/P, II2ELL3P, II2ELL3B/P, II2E(R)B3P				
Appliance Cat.(I)	I2H, I2E	I2Er, I2E(R)B	I2LL, I2L	I3P	I3B/P
Heat Input (Hs)	11,7kW	11,7kW	11,7kW	12,3kW	12,3kW
Gas Rate	1.1m ³ /h	1.1m ³ /h	1.3m ³ /h	0.88kg/h	0.90kg/h
Gas	G20	G20/G25	G25	G31	G30/G31
Gas supply pressure	20mbar	20/25mbar	20 or 25mbar	30/37/50mbar	30/50mbar
Setting Pressure	10 mbar	7,7/9,0mbar	8.5mbar	25 mbar	25 mbar

Injector Main	2,87mm (33)	3.26mm (30)	3.45mm (29)	1.90mm (190)	1.78mm (50)
Injector Pilot	0.51mm (76)	0.51mm (76)	0.51mm (76)	0.36mm (79)	0.36mm (79)
Elec. Supply	No. 2: 24 VAC ~ 50/60Hz 1Ph 0.5A No. 4: 230 VAC ~ 50/60Hz 1Ph 0.1A				
Fuse Extern.	No.2: 3A No. 4: 0.5A				
Dimensions	Ø = 0.89m H = 0.46m				
Weight	12.0kg				
Gas Connection	Model 2 and 4: Rc- ½" Model 9: Rc – 3/8"				

3. BROODER CONTROL OPTIONS

Control No. 2 (WVLMK24): For single or multi-zone installations using central or multiple thermostats. This 24-volt, AC, zone-type control also can operate on DC voltage as a back up. The gas valve includes a built-in regulator. A 24-volt power supply is required. Brooder can be operated by a 24-volt thermostat, computer or an environmental controller. 100% gas safety shut-off valve.

Control No. 4 (WVLMK230): See No. 2 but than with 230V supply. No DC back up.

Control No. 9 (WVLTH): An individual, non-electric, fully automatic ON/OFF control with integral thermostat, which operates on millivolts generated by the pilot. No electrical supply is needed. Integral thermostat features a wide temperature range for easy adjustment. 100% gas safety shut-off valve.

4. BROODER ASSEMBLY

1. Make sure that all components are present before assembling the brooder:

Qty.	Description	Qty.	Description	Qty.	Description
(1)	Control Arm	(1)	Burner Base	(1)	Low Profile Hanging Bracket
(1)	Safety Pan	(1)	Emitter Assembly	(1)	Manifold Support Bracket & Clamp
(1)	Reflector	(1)	Fastener Kit		

The Fastener Kit contains all the nuts, bolts and washers required for brooder assembly. You will need two (2) crescent wrenches and a flat-bladed screwdriver for brooder assembly.

2. Place the Low Profile Hanging Bracket onto the Reflector as shown. Secure the bracket to the centre of the Reflector with a screw, nut and washer from the Fastener Kit. Assemble the eyebolt to the hanging bracket with nuts and washers. Align the hanging bracket with the two (2) holes located at the edge of the Reflector. See Figure 1.
3. Position the Emitter Assembly on a table with the mounting studs facing upwards.
4. Place the Reflector over the Emitter Assembly so that the mounting studs pass through the three (3) holes in the Reflector and the hole in the hanging bracket. Secure the Reflector and the hanging bracket to the mounting studs using nuts and flat washers as shown. See Figure 1.
5. Flip the Emitter/Reflector Assembly Over. Secure the Burner Base to the Burner Cap (which is attached to the Emitter Assembly) and secure it in place using three (3) flat washers, spring lock-washers and nuts from the Fastener Kit.
NOTE: Make sure that the two (2) holes located on the Burner Base are facing the two (2) holes in the edge of the Reflector. See Figure 2.
6. Attach the Manifold Support Bracket Assembly to the rim of the Reflector using two (2) screws, nuts and washers from the Fastener Kit. See Figure 3. **NOTE:** DO NOT COMPLETELY TIGHTEN THE FASTENERS AT THIS STAGE YET.

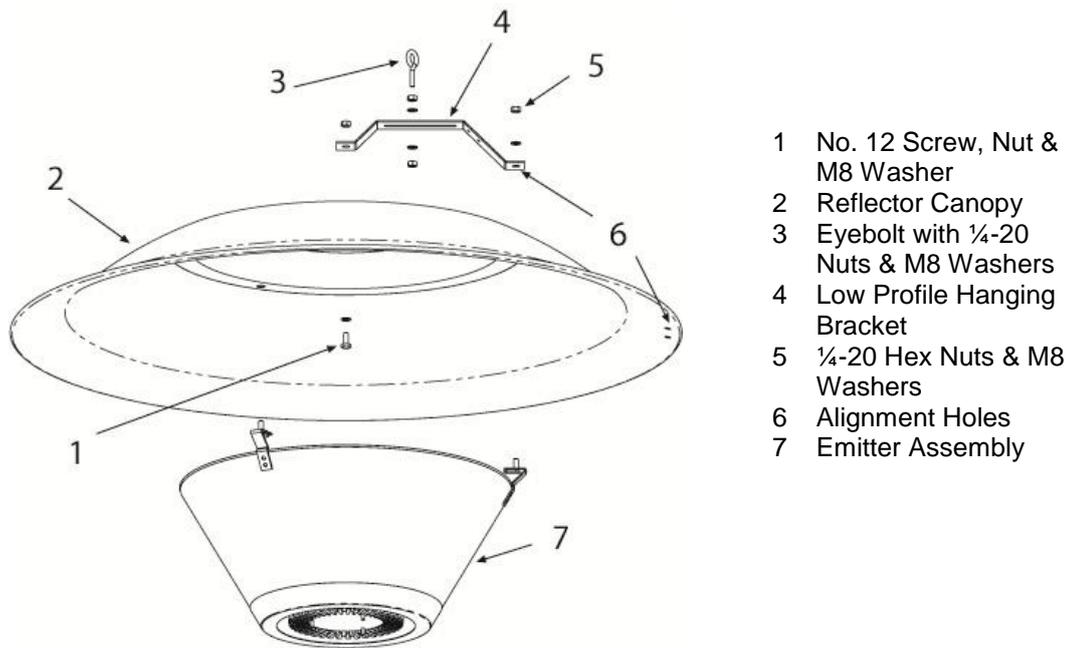


FIGURE 1

7. Attach the Control Arm Assembly to the Manifold Support Bracket Assembly as shown in Figure 3 using one (1) V-clamp and two (2) nuts from the Fastener Kit. **NOTE:** Adjust the Control Arm so that the V-clamp is butt against the tube fitting located at the bottom of the Gas valve. Tighten the nuts.
8. Adjust the Control Arm so that the Pilot Assembly and Injector Fitting aligns with their connection points on the main burner. Secure the Pilot Assembly as shown in Figure 3a to the burner using two (2) screws from the Fastener Kit.
9. Insert the Injector Fitting into the burner base as shown in Figure 3a. Rotate the swivel clamp until it locks into the groove of the Injector Fitting.
10. Tighten the screws and nuts holding the Manifold Support Bracket Assembly installed earlier above.
11. Attach the Safety Pan to the bottom Injector Fitting using one (1) screw and lockwasher from the Fastener Kit. See Figure 3b.
12. Flip the brooder over to its original position and place the Pilot Shield (perforated) onto the Pilot Assembly. The brooder is now ready for installation.

WARNING: ONCE THE BROODER IS ASSEMBLED AND BEFORE IT IS FIRST FIRED, YOU MUST CHECK FOR GAS LEAKS! USE A SOAP AND WATER SOLUTION AND APPLY AT INJECTOR FITTING, PILOT ASSEMBLY, AND FIELD CONNECTION AT THE GAS VALVE.

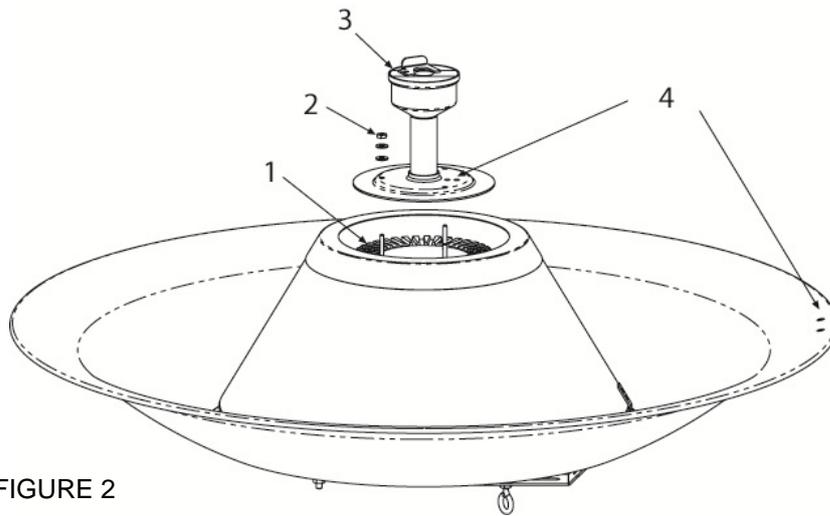
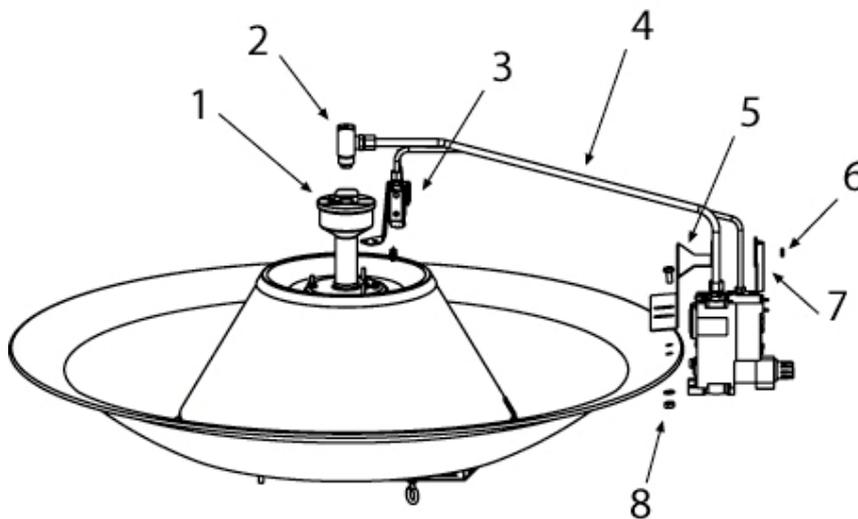


FIGURE 2

- 1 Burner Cap
- 2 M5 Hex Nuts & Washers
- 3 Burner Assembly
- 4 Alignment Holes



- 1 Main Burner
- 2 Orifice Fitting
- 3 Pilot Assembly
- 4 Gas Control Arm Assembly
- 5 Manifold Support Bracket Assembly
- 6 No. 8-32 Nuts
- 7 V-clamp
- 8 1/4-20 Screws, Nuts & M8 Washers

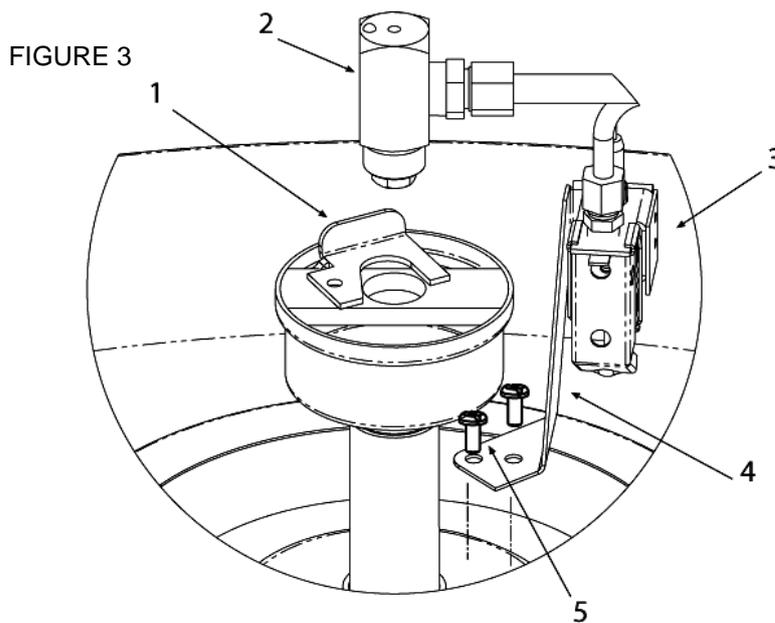
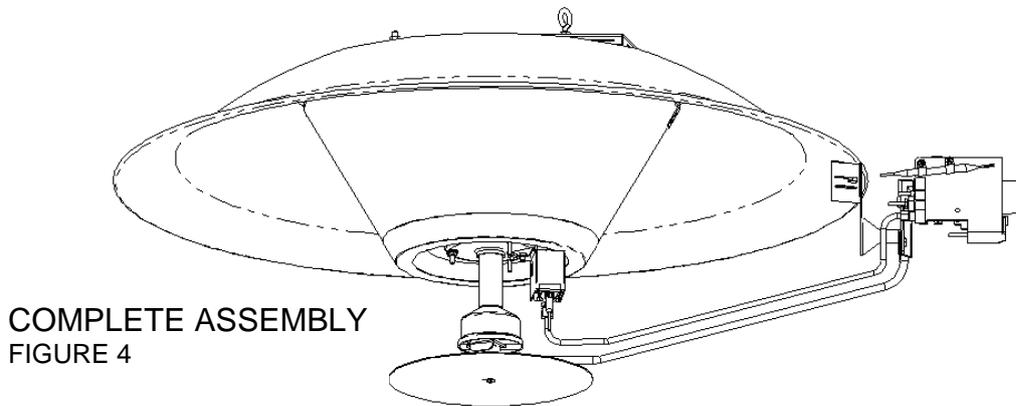
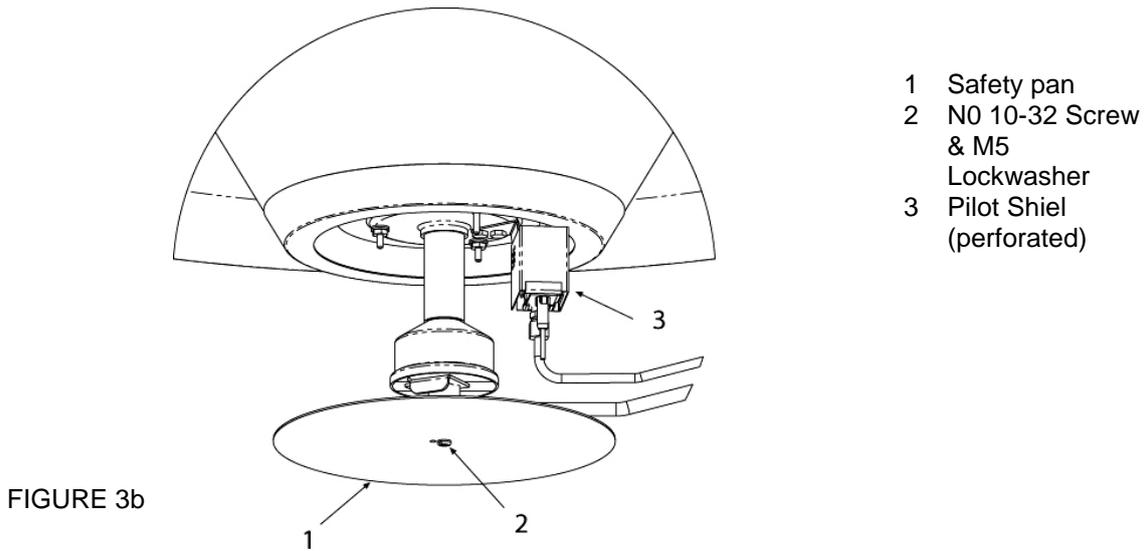


FIGURE 3

- 1 Swivel clamp (in open position)
- 2 Orifice fitting
- 3 Pilot Assembly
- 4 Pilot Holder Bracket
- 5 No 10-24 Screws

FIGURE 3a



5. MINIMUM CLEARANCES TO COMBUSTIBLES

Minimum clearances to combustible materials shall be measured from the outer surface of the reflector as shown in the following table:

MINIMUM CLEARANCES TO COMBUSTIBLES		
S = SIDES:	B = BELOW:	A = ABOVE:
1,0 m	1,8 m	0,5 m

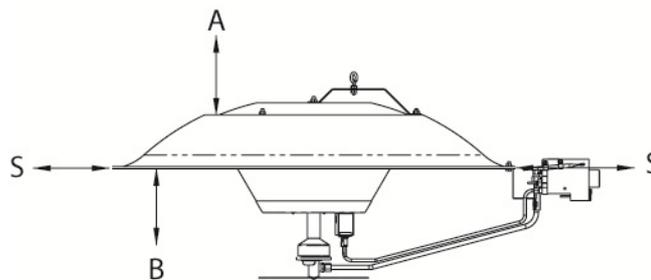
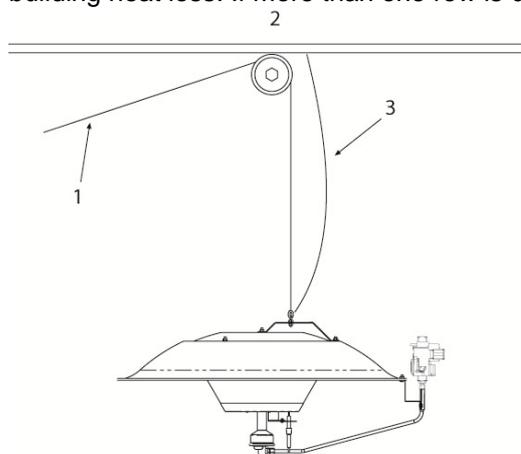


FIGURE 5

6. BROODER INSTALLATION

1. Locate brooders approximately 8m to 12m apart, in a row, as needed for bird comfort and building heat loss. If more than one row is desired, stagger rows for best heat distribution.



- 1 Suspension chain or cable attached to winch system
- 2 Ceiling Structure
- 3 Safety chain or cable attached to house ceiling structure (provide 5 – 15 cm of slack)

FIGURE 5a

2. Suspend the brooder at the desired height above the floor (litter) level, normally 1,8 m. For brooders connected to a winch (to allow for adjustment of brooder height), connect each brooder using a chain or cable suitable for the weight of each brooder. **DO NOT USE ROPE.** Size the winch and cable so that it is capable of handling the total weight of all brooders and gas piping involved. **NOTE:** Connect a safety chain to each brooder and anchor it to the house structure above each brooder to prevent it from falling onto the litter if the cable/chain breaks or the winch fails. **THE GAS HOSE SHOULD NEVER BE USED AS A SAFETY CHAIN!** Give the safety chain a slack of 5 to 15 cm.
3. Connect the gas line and electrical supply (if required) to each brooder as outlined in Sections 7 and 8.

NOTE: After connection of the gas line, make sure that the brooder is suspended with the control side approximately 1,5 cm below the other side of the brooder to prevent hot products of combustion from damaging the gas control valve.

WARNING	
	<u>FIRE HAZARD</u>
	A safety chain must be connected from the hanging bracket to a fixed part of the building structure directly above the brooder.
	The safety chain will prevent the brooder from falling to the floor in the event that the main suspension system fails
	Failure to follow these instructions may result in death, serious injury or property damage

7. GAS CONNECTIONS

1. Gas piping for the house must be sized to be capable of satisfying the entire demands of the house should all equipment be operating at the same time. Please use Table 1 as a guide for the sizing of piping for the house. An example using this table is shown.
2. Connect to the supply tank or manifold in accordance with the National Gas Safety Regulations. Authorities having jurisdiction should be consulted before the installation is made.
3. Pipe joint compounds must be resistant to the action of liquefied petroleum (LP) gases.

4. Gas connections to individual brooders can be made in several ways to fit individual operation practices. Brooders can be "hard-piped," or they can utilize flexible gas connectors, or they can utilize rubber hosing suitable for LP gas usage (to allow movement of the brooders for cleaning, etc.). Check with the authorities having jurisdiction and/or National Gas Safety Regulations prior to choosing an individual gas connection method.

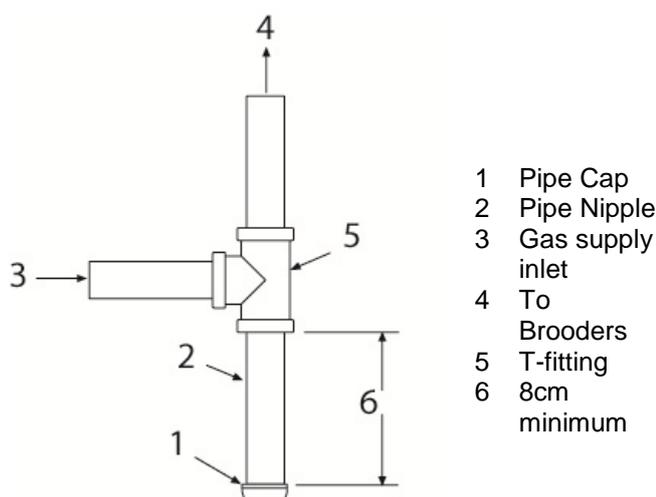


FIGURE 5b: Sediment trap (drip leg)

5. A field installed keyless manual shut-off valve must be installed in the gas piping to each brooder. This will allow service of individual brooders without having to shut down the entire gas supply system. When installing the gas line, it is recommended to connect a sediment trap of min 8 cm (see illustration 5b) in the gas line at a point before the gas line enters the house. This trap or "drip leg" acts to trap impurities and water that can condense out of the gas. It helps to keep impurities from entering the appliance and causing potential damage to gas valves, etc. Periodically remove the cap from the drip leg and drain any accumulation of dirt and/or water.
6. After all gas connections and adjustments are made, check all gas connections for leaks (not just the gas connections at the brooders) using a heavy soap suds solution. **WARNING: DO NOT USE AN OPEN FLAME OF ANY KIND TO TEST FOR LEAKS!**
7. It is recommended that a pressure gauge be installed at the end of the gas piping run to allow you to check the gas supply pressure in the system. This needs to be capable of accurately measuring in mbar.

7a. INSTRUCTIONS FOR TESTING FOR GAS LEAKS AND PROPER GAS PRESSURE

WARNING: DO NOT OMIT THESE TESTS!

TESTING THE INSTALLATION FOR GAS LEAKS:

1. Inspect all connections and appliance valves to be sure connections are wrench-tight and that all appliance valves are closed, including the pilot valves.
2. Connect a low-pressure test set to the low pressure piping system just upstream of the appliance regulators and control.

3. Fully open the LP gas container valve, or natural gas supply, slowly to pressurize the piping system. Once the system is pressurized and stabilized, close the container valve, or natural gas supply valve, tightly.
4. Observe the indicated pressure on the low-pressure test set gauge. This reading should be approximately equivalent to the set delivery pressure of the final stage regulator. Now, slowly open one burner valve or pilot valve on the appliance to vent off just enough gas to reduce the pressure on the test gauge by 2.5 mbar, then close the burner or pilot valve.

If the pressure remains unchanged on the gauge for at least 10 minutes, the system can be assumed leak-tight. If a drop in pressure does occur, it indicates a leak in the system.

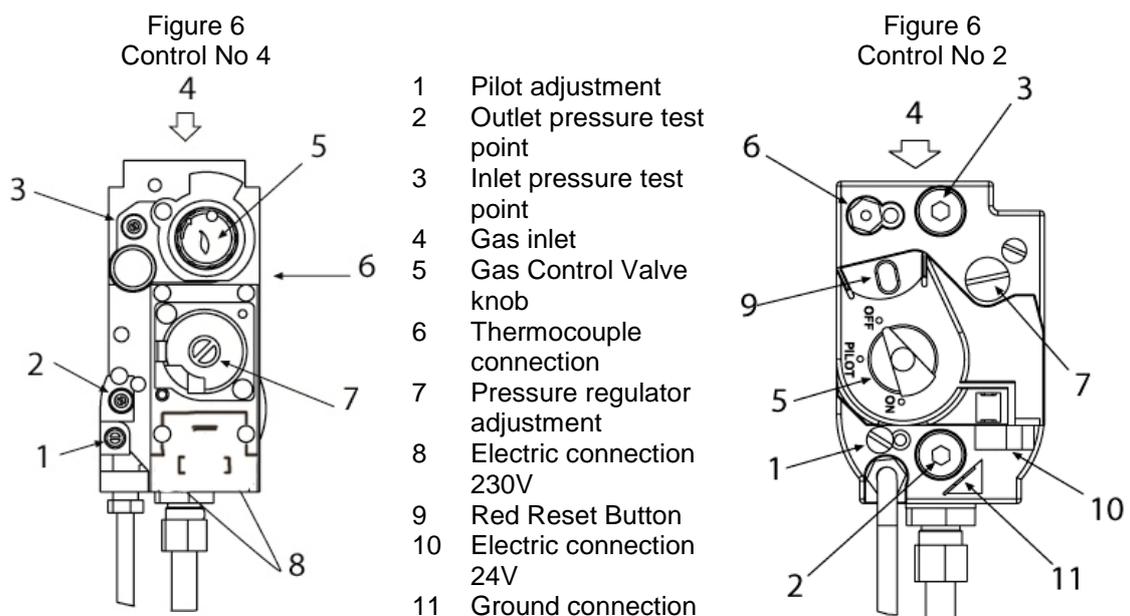
If the pressure drop occurs, check the joints, connectors, and other possible points of leakage with an approved, high quality leak detection solution. NEVER USE A MATCH OR OPEN FLAME TO CHECK FOR LEAKS. Once a leak has been located and repaired, repeat Steps 3 and 4 above. If there is an increase in pressure, it indicates that the LP gas container valve, or natural gas supply valve, is not shut off tightly. Shut off the valve tightly and repeat Step 4 above.

NOTE: Do not expose final stage piping to excessive heat or direct sunshine during the leak test. Pressure build-up in the line due to heat may compensate for pressure loss due to leaks. This will prevent the gauge reading from indicating system leaks.

WARNING: Gas Pressure Testing is to be performed only by qualified personnel.

CHECK GAS INLET (SUPPLY) PRESSURE:

1. Be sure the valve is in the “OFF” position before removing the pressure tap plug at the valve. Connect a low-pressure test set (water manometer or dry gauge) to the 1/8” NPT Inlet Pressure Tap connection or the 9 mm inlet gas pressure test point. (Refer to Figure 6 for each control valve type.) Turn the valve to the “ON” position. DO NOT EXCEED THE PRESSURES SHOWN IN THE GAS PRESSURE TABLE.
2. Turn the valve back to the “OFF” position before removing the test set and replacing the plug. Repeat the gas leak test at the plug.

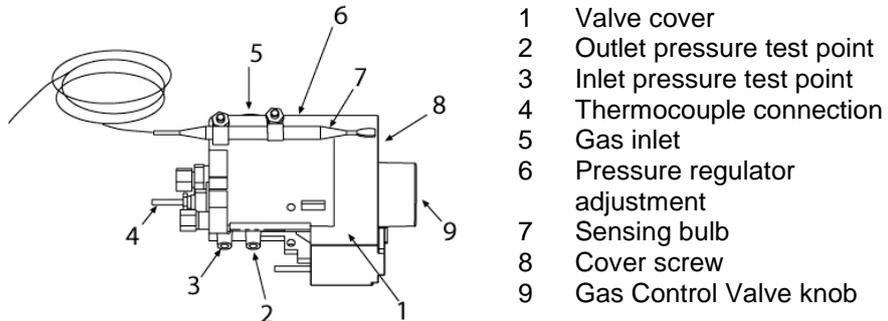


CHECK GAS OUTLET (MANIFOLD) PRESSURE:

1. Be sure that the valve is in the “OFF” position before removing the pressure tap plug at the valve. With the main burner operating, check the manifold pressure using a lower-

- pressure test set connected to the 1/8" NPT Outlet Pressure Tap or 9 mm outlet pressure test point. (Refer to Figure 6 or 6a for each control valve type.) The controls have combination valves with built-in appliance regulators. They should provide the correct manifold pressure at the varying supply pressures noted in the Gas Pressure Table below. **DO NOT EXCEED THE PRESSURES SHOWN IN THE GAS PRESSURE TABLE.**

FIGURE 6a: Control No. 9



- If manifold gas pressure adjustment is required, remove the manifold pressure adjustment cover screw. (See Figure 6 or 6a for valve drawings.)

Using a small screwdriver, turn the adjusting screw clockwise to increase or counter clockwise to decrease the gas pressure to the burner. Once adjusted replace the manifold pressure adjustment cover screw and seal using a paint mark.

- Turn the valve back to the "OFF" position before removing the manometer and replacing the plug. Repeat the gas leak test at the plug.

GAS PRESSURE TABLE			
BROODER MODEL	GAS TYPE	MANIFOLD Press.	SUPPLY PRESSURE
MEGASUN 12-N	Natural gas G20	10mbar	20-50mbar
MEGASUN 12-N	Natural gas G20/G25	7.7/9.0mbar	20-50mbar
MEGASUN 12-G	Natural gas G25	8,5mbar	25-50mbar
MEGASUN 12-B	LP gas G30	25mbar	30 or 50mbar
MEGASUN 12-L	LP gas G31	25mbar	30 or 37 or 50mbar

PRESSURE READING NOTES — CONTROL 9 ONLY:

- INLET PRESSURE can be checked by turning the captured screw (see Figure 6a) counter clockwise 2 or 3 turns and then placing the tubing from the gauge over the test point.
- OUTLET PRESSURE can be checked in the same manner as described above by using the captured screw.

WARNING: After taking pressure readings, be sure to turn captured screws clockwise firmly to reseal. Do not over torque

REGULATOR LOCK-UP AND LEAKAGE:

After the leak testing and delivery pressure tests have proven satisfactory, the regulator lock-up and leakage test may be performed. The lock-up pressure of the final stage regulator should be slightly higher than, but not more than, 120% of the set delivery pressure. For example, on a delivery pressure setting of 30mbar, the maximum allowable lock-up pressure is 36mbar.

To perform the lock-up and leakage test, follow these steps:

- With the LP tank valve fully open (or the main natural gas valve), shut off all appliance valves so there is no demand for gas. This includes shutting off all pilots.
- A slight rise in pressure will occur under these conditions. This rise should be no more than 120% of the delivery pressure. This is the lock up pressure.

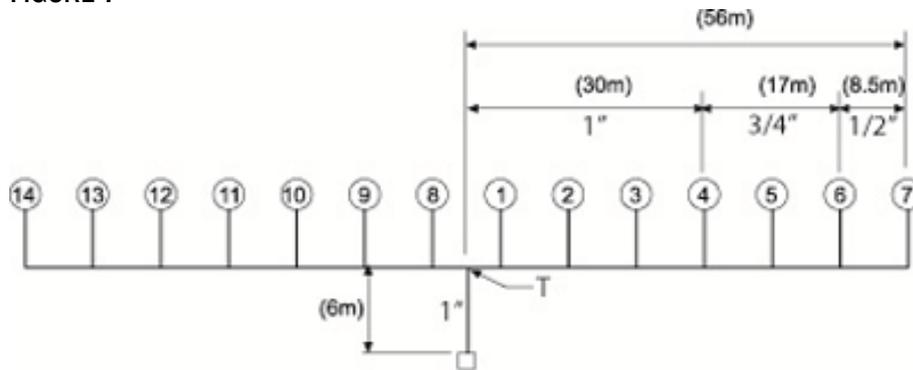
NOTE: A quick rise in pressure above the allowable lock-up point could indicate undersized piping, a worn seat disc or foreign material in the seating area. This condition must be corrected before putting the system in service.

- Continue the test for five minutes or more. If a creeping rise in pressure is noticed, the final stage regulator seat is not closing off properly. The regulator must be replaced or repaired, and the system retested, before putting the system in service.

7b. GAS PIPE SIZING EXAMPLE – G31 GAS

House Size: 12m x 122m
 Brooder Quantity: 14
 Individual Brooder Capacity: 12.3kW
 Second Stage Regulator Pressure: 37mbar
 Operating Pressure: 25mbar, G31 gas with all brooders operating

FIGURE 7



STEP 1. Gas should be run at high pressure from the LP tank to the second stage regulator at the house. Using the above house configuration example, calculate the gas pipe sizing. First, calculate the total distance from the second stage regulator to the furthest brooder. In Figure 7 above, that distance equals 62m (6m + 56m). Using Table 1, look up the row for 61.5m and select the smallest pipe size that has the capacity for the flow of the end brooder (12.3kW). The smallest pipe size is 1/2" with a capacity of up to 17kW over 61.5m.

STEP 2. Calculate the distance from the second furthest brooder to the secondary regulator. In the example, that distance equals 53.5m. Using Table 1, look up the row for 53.5m. As 53.5m is not listed, you will use the next distance up, in this case 61.5m. Then select the smallest pipe size that has the capacity for the flow of both the furthest (no 7) and second furthest (no 6) brooders, which combines to 23.4kW. The smallest pipe size is 3/4" with a capacity of up to 35.2kW over 61.5m. Repeat this process for each brooder until you reach the Tee. Table 2 shows the completed example.

STEP 3. At the Tee, calculate the total distance to the secondary regulator. In this example, that equals 6m. Using Table 1, look up the row for 6m and select the smallest pipe size that has the capacity for the flow of all the brooders connected to the pipe system (164kW). The smallest pipe size is 1" with a capacity of up to 231kW over 6m.

TABLE 1. -- Recommended LP Gas Pipe Sizing Between Single or Second Stage Regulator and Brooders

	Nominal Pipe Size, Inside Diameter.							
	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	3"	4"
3m	85.3	178	336	690	1030	1990	5610	11400
6m	58.6	123	231	474	710	1370	3850	7860
9m	47.2	98.5	185	381	570	1100	3090	6310
12.5m	40.2	84.1	159	326	488	940	2650	5400
15m	35.8	74.7	141	289	433	833	2350	4790

18.5m	32.2	67.7	127	261	392	755	2130	4340
24.5m	27.5	58	109	224	335	646	1820	3710
31m	24.6	51.3	96.7	198	297	573	1610	3290
38.5m	21.7	45.4	85.6	176	263	507	1430	2920
46m	19.6	41.3	77.7	159	239	460	1300	2640
61.5m	17	35.2	66.5	136	204	394	1110	2260
77m	14.9	31.4	58.9	121	181	349	983	2000
92m	13.5	28.4	53.3	110	164	316	890	1820
107.5m	12.6	26.1	48.9	101	151	291	819	1670
123m	11.7	24.3	45.7	93.8	140	271	762	1550

Maximum propane capacities listed are based on 1.25mbar pressure drop at 25mbar setting - Capacities in kW.

TABLE 2.

Brooder number	Distance from Regulator m	Flow Capacity Required kW	Distance Used from Table m	Smallest Pipe Size and Capacity From Table kW
7 and 14	62	11.7	61.5	½" -- 17
6 and 13	53.5	23.4	61.5	¾" -- 35.2
5 and 12	45	35.2	46	¾" -- 41.3
4 and 11	36	46.9	38.5	1" -- 85.6
3 and 10	27.5	58.6	31	1" -- 96.7
2 and 9	19	70.3	18.5 ^{Note 1}	1" -- 127
1 and 8	10.5	82.1	12.5	1" -- 159 ^{Note 2}

Note 1: The distance used is rounded down to 18.5.

Note 2: The actual smallest pipe size for the required capacity is ¾" from the table. However, the gas pipe size from brooders 3 and 4 to the regulator must be 1" diameter and therefore a smaller diameter pipe cannot be used. If ¾" pipe was used from the Tee to brooder 1, the pressure drop in the rest of the system would exceed the design pressure drop of 1.25mbar

The calculation above is just an example for a typical G31 gas supply. Please check with your gas supplier or Local and National Installation Regulation for the tables applicable for natural gas or LP gas in your specific situation.

8. ELECTRICAL CONNECTIONS – No.2 and 4 Control

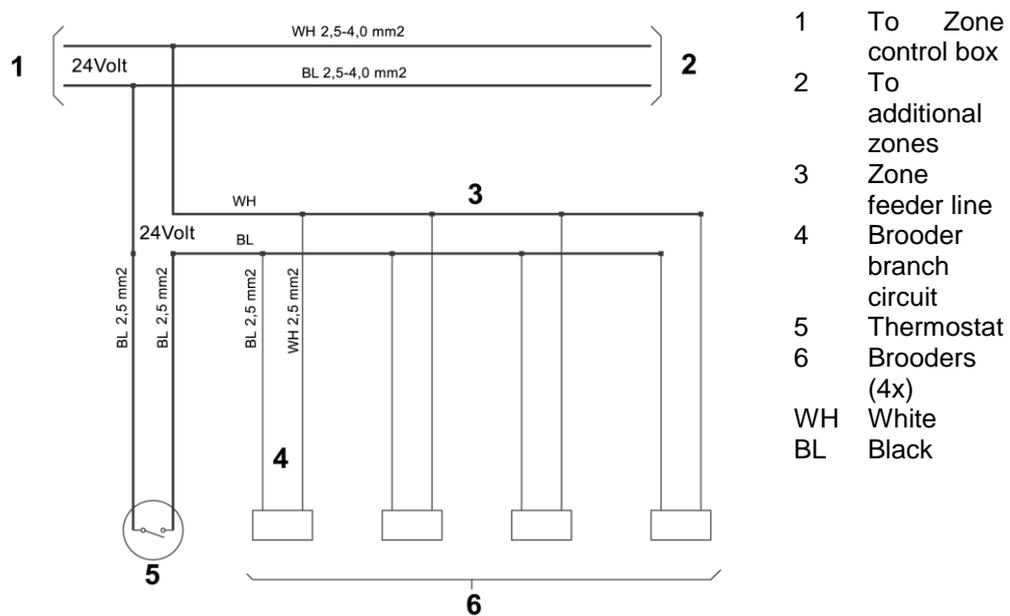
1. All electrical wiring to this brooder must be installed in accordance with the latest or current National Regulations and any Local Regulations, which apply.
2. The electrical system must be electrically grounded in accordance with the latest or current National Regulations and any Local Regulations, which apply.
3. The brooders with the no.9 control options do not require any electrical supply because they generate their own electricity and operate thermostatically off this power. The brooders with the no.2 control option require a 24VAC supply to each brooder. This is provided via a 24Volt Transformer. The 24Volt Transformer **MUST** be large enough to operate the number of brooders connected to it (see table below). This is calculated as follows:

$$\text{No. of Brooders} \times 16.8\text{VA} \times 1.25 \text{ Safety Factor} = \text{Transformer Size}$$

No. Brooders	Minimum Transformer VA	No. Brooders	Minimum Transformer VA
3	63	14	294
4	84	15	315
5	105	16	336
6	126	17	357
7	147	18	378
8	168	19	399
9	189	20	420
10	210	21	441
11	231	22	462
12	252	23	483
13	273	24	504

NOTE: If you plan to use a Zone Control Panel with DC back-up power supply capabilities, special attention must be given to individual brooder wiring because the DC electrical power is polarity sensitive. All brooders must be connected the same way (i.e., the same power leg must be connected to the same terminal on every brooder). While this will not affect brooder operation on 24VAC, brooders that are not hooked up in this manner will not work properly on DC power. Refer to Figure 8 for a typical wiring schematic. These no.2 control brooders must be supplied with a thermostat for temperature control (either with or without a Zone Control Panel).

- The wire to the no.2 type brooders **MUST** be a minimum 2,5mm². For the no. 4 type brooders normal 1,5 mm² can be used.
- Failure to connect the no.2 type brooders to the minimum power supply recommended or to use a cable less than the minimum size specified will result in the brooder not functioning properly.
- A Thermostat is also required for each brooder or group of brooders as shown in the schematic. The schematic (Figure 8) shows a group of four (4) brooders controlled by one (1) thermostat. Additional zone groups having more or less brooders can be added. These should be wired the same as shown in the schematic.



The schematic above shows the lay-out for 24V. For control no 4 use the same drawing above only replace the voltage by 230V and the wiring by 1,5mm²

9. LIGHTING AND SHUTDOWN INSTRUCTIONS

◆ No. 2 CONTROL (VR8200M VALVE) No. 4 CONTROL (V4600A VALVE)

1. Depress gas control knob and hold it down
2. Ignite pilot burner. Hold down the knob for 20 seconds after the pilot burner has been lit. Release knob. If it goes out, wait three (3) minutes before trying to relight the pilot.
3. If the pilot will not stay lit after several tries, release the gas control knob and call your service technician or gas supplier.
4. When the pilot flame remains lit, release the gas control knob.
5. Turn on electrical power supply to the brooder.
6. Adjust the wall-mounted thermostat to change the temperature setting. Adjust as desired for bird comfort.
7. NOTE: To interrupt the gas flow, the gas control knob must be turned clockwise to its stop. After release, the knob will automatically rotate to its ready position. A safety device prevents the knob from being fully depressed until the thermocouple has cooled down sufficiently to de-energize the power unit, after which the knob will be effective again. When the knob is depressed during latch position, pilot gas will flow to pilot burner

◆ No. 9 CONTROLS (0630045 VALVE)

1. Turn the gas cock dial on the control valve to the "PILOT" position. Depress the dial and apply lighted taper to the pilot burner.
2. Hold the dial in for one (1) minute after the pilot is lit. Release the dial. If pilot flame fails to establish, repeat the procedure.
3. If pilot flame fails to establish after a second attempt, refer to the fault-finding chart.
4. When the pilot flame is established, turn the gas cock dial to the "ON" position and set the thermostat to call for heat. The main burner will ignite.
5. Adjust the remote thermostat to change the temperature setting. Adjust as desired for bird comfort.

NOTE: TO TURN OFF THE MAIN BURNER only, turn the gas cock dial to the "PILOT" position. FOR COMPLETE SHUTDOWN of main burner and pilot, press in the gas cock dial and turn to the "OFF" position.

6. If the brooder is to be taken down for inspection or maintenance, turn the ON/OFF ball valve on the connecting kit hose to the "OFF" position and disconnect the hose from the control valve inlet.

APPROXIMATE TEMPERATURE VERSUS CONTROL KNOB POSITION

Thermostat Range	CONTROL KNOB POSITION						
	1	2	3	4	5	6	7
°C	21°	26°	30°	33°	39°	43°	47°

10. VENTILATION

FOR YOUR SAFETY: Exhaust fans must be operating on an appropriate cycle when heating the building to avoid high concentrations of carbon monoxide and water vapour.

The temptation, particularly during the winter months, is to close up the poultry house to conserve heat and save money. This must be resisted, particularly during the heating up period prior to the arrival of the stock, because the lack of ventilation can restrict the required amount of combustion air for the brooders causing them to burn improperly and produce levels of carbon monoxide which could be harmful to people and the stock.

WARNING: Carbon Monoxide is an odourless and poisonous gas. Extended exposure to carbon monoxide may lead to death. Early signs of carbon monoxide poisoning resemble the flu, including headaches, dizziness and/or nausea. If you experience these signs, GET FRESH AIR IMMEDIATELY. Have the brooders serviced as soon as possible and check the ventilation in the house.

The ventilation requirements and calculation methods for unflued appliances are set out in the European Standards **EN 13410:2001** and must be applied. Ventilation may be achieved by any of the three following different means:

a). Ventilation by thermal evacuation.

Ventilation by thermal evacuation is sufficient if **10m³/h of exhaust air per kW of operating heat input** are ventilated out of the installation room.

The air/products of combustion mixture must be evacuated above the radiant heaters, if possible near the ridge, by means of exhaust mixture openings (vents). Where the exhaust mixture openings can be closed, it shall only be possible to operate the radiant heaters when they are open.

The maximum horizontal distance between a radiant heater and vent opening shall be:

- 6 (six) times the vent height in the case of **wall** openings
- 3 (three) times the vent height in the case of **roof** openings.

b). Ventilation by mechanical evacuation.

Ventilation by mechanical ventilation is sufficient if **10m³/h of exhaust air per kW of operating heat input** are ventilated out of the installation room.

The air/products of combustion mixture must be evacuated above the radiant heaters using fans. It shall only be possible to operate the radiant heaters whilst the exhaust airflow is proven.

The maximum horizontal distance between a radiant heater and a fan shall be:

- 6 (six) times the fan mounting height in the case of **wall** openings
- 3 (three) times the fan mounting height in the case of **roof** openings.

Total minimum proven ventilation airflow in **m³/h** will be: Total installed kW input x 10

Note: Mechanical exhaust air openings must be positioned such that the burner stability of the nearest appliance is unaffected.

c). Ventilation by natural air change.

Gas fired radiant heaters may be operated without any special exhaust system if the exhaust gases are discharged to the outside atmosphere by a sufficient natural air change in the installation room.

Furthermore, no provision for thermal or mechanical ventilation is required in the following particular cases:

- i). Buildings with natural air change greater than 1.5 volumes per hour
- ii). Buildings with a density of operating heat input not greater than 5W/m³.

Air Supply.

Air supply openings are required to admit air and shall be located below the radiant heaters.

The total area of the unobstructed cross-sections of all the air supply openings shall not be smaller than the total area of the unobstructed cross-sections of all the exhaust openings.

Slits and gaps of **fixed** cross-sections can also be used as air supply openings.

Where the air supply openings can be closed, it shall only be possible to operate the radiant heaters when they are opened.

Ventilation requirements may vary depending on other equipment that may be located in the building requiring ventilation. All ventilation requirements should be addressed before sizing the necessary gravity or mechanical means to accomplish this ventilation.

While ventilation is necessary for proper brooder operation and proper growing conditions for the stock, excessive ventilation can result in high fuel consumption. Adjust the ventilation as necessary for optimum performance of the brooders and growing conditions for the stock.

11. SERVICING and MAINTENANCE

CAUTION: Turn the gas and electrical supply OFF and allow the brooder to cool down for 20 minutes before attempting any maintenance.

WARNING	CAUTION
<p style="text-align: center;">HOT SURFACE HAZARD</p> <p>The brooder will be HOT after operation and it should not be serviced for 20 minutes after shut down</p> <p style="text-align: center;">POISON & SOOT HAZARD</p> <p>The swivel clamp must be repositioned to the closed position after the orifice has been cleaned.</p> <p>The brooder must always be operated with the swivel clamp in the closed position</p>	<p>The orifice must be cleaned with a pin having a diameter slightly smaller than the actual orifice hole size (see name plate). DO NOT use a drill.</p> <p>The orifice must be cleaned without being removed from the fitting.</p>

MAINTENANCE: Maintenance is defined as work that a non-gas competent person may carry out on the appliance. This work must not involve the use of tools to maintain/access the gas and electric components on the appliance. The maintenance procedure must be carried out after each crop.

1. Release the main burner injector fitting and pan from the burner by turning the swivel clamp.
CAUTION: In order to prevent damage to the control arm tubing, first place a hand under the pan and allow the control to be lowered gently under its own weight.
2. The injector must be cleaned without being removed from the fitting. This is carried out by inserting a pin having a smaller diameter than the actual injector hole size (see the brooder dataplate or instruction manual). DO NOT USE A DRILL as this will increase the injector hole and result in overfiring.
3. Clean around the burner cap ports with a bristle brush. After cleaning the burner ports, compressed air can be blown into the burner ports to blow any debris out of the burner through the burner venturi.
4. Clean both the inside and outside surfaces of the perforated emitter assembly with a large wire brush; then use compressed air to remove any burnt dust or dirt particles from the emitter.
5. Reconnect the main burner injector fitting and pan to burner in reverse order.
6. Remove the windshield and housing tab. The pilot injector must be cleaned without being removed from the fitting. This is carried out by inserting a pin having a smaller diameter than the actual injector hole size (see the brooder instruction manual). DO NOT USE A DRILL as this will increase the injector hole and result in overfiring.

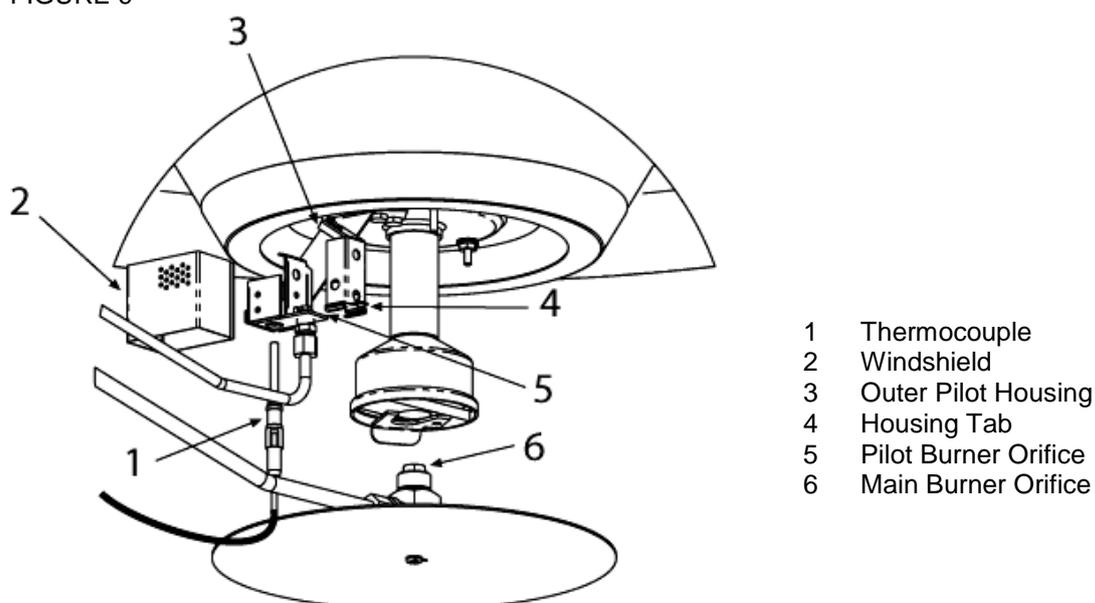
7. Replace the housing tab and windshield.

SERVICING: A qualified person must service the appliance. Servicing is defined as work that requires the use of tools or the person to access/remove components along the control arm assembly. The brooder must be serviced annually as a minimum, or more frequently as circumstances/conditions dictate.

1. Release the main burner injector fitting and pan from the burner by turning the swivel clamp.
CAUTION: In order to prevent damage to the control arm tubing, first place a hand under the pan and allow the control to be lowered gently under its own weight.
2. Unscrew the injector fitting from the control arm, unscrew the main burner injector from the injector fitting and clean the injector by soaking it in acetone. Dry the injector by blowing compressed air through it. **NOTE:** DO NOT attempt to clean the injector by passing a drill through the injector as this will increase the injector hole and result in overfiring of the emitter.
3. Apply pipe thread sealant (resistant to LP Gas) to the threads of the injector and replace it into the injector fitting. Reconnect the injector fitting and pan to burner in reverse order.
4. Remove the windshield and housing tab. Unscrew the pilot burner injector from the injector fitting and clean the injector by soaking it in acetone. Dry the injector by blowing compressed air through it. **NOTE:** DO NOT attempt to clean the injector by passing a drill through the injector as this will increase the injector hole and result in overfiring of the pilot.
5. Replace the housing tab and windshield.

NOTE: After reassembly of all components, check the gas connections at the burner and the gas valve for leaks. Use a heavy soapsuds solution. **DO NOT** use an open flame to check for gas leaks.

FIGURE 9



CONVERSION INSTRUCTIONS.

Check the data plate on the brooder to determine if conversion is allowed or not. If the gas category starts with the Roman number I (example: I3P, I2H, etc.) conversion is not allowed.

If the gas category starts with a Roman number II (example: II2L3P, etc.) conversion is allowed. Follow the instructions given below

A qualified person **MUST** carry out conversion from one gas category to another.

1. Release the main burner injector fitting and pan from the burner by turning the swivel clamp.
CAUTION: In order to prevent damage to the control arm tubing, first place a hand under the pan and allow the control arm to be lowered gently under its own weight.
2. Unscrew the injector fitting from the control arm, unscrew the main burner injector from the injector fitting.
3. Apply pipe thread sealant supplied (resistant to LP Gas) to the threads of the replacement injector and fit it into the injector fitting. Injector sizes are shown below for the different gas types. Please check that the correct injector size is to be fitted for the relevant gas type.

Main Burner.

Natural Gas G20	2.87mm (no. 33)
Natural Gas G20/G25	3.26mm (no. 30)
Natural Gas G25	3.45mm (no. 29)
LP Gas G31:	1.9mm (no. 190)
LP Gas G30:	1.78mm (no. 50)

4. Reconnect the injector fitting and pan to burner in reverse order.
5. Remove the windshield and housing tab, unscrew the pilot burner injector from the injector fitting.
6. Apply pipe thread sealant supplied (resistant to LP Gas) to the threads of the replacement injector and fit it into the injector fitting. Injector sizes are shown below for the different gas types. Please check that the correct injector size is to be fitted for the relevant gas type.

Pilot Burner.

Natural Gas G20 or G25:	0.51mm (no. 76)
LP Gas G31 or G30:	0.36mm (no. 79)

7. Replace the housing tab and windshield.
8. Adjust gas pressure and check for gas leaks by following the procedure 7a. "Instructions for testing for gas leaks and proper gas pressure" as specified in this manual.

12. TROUBLESHOOTING

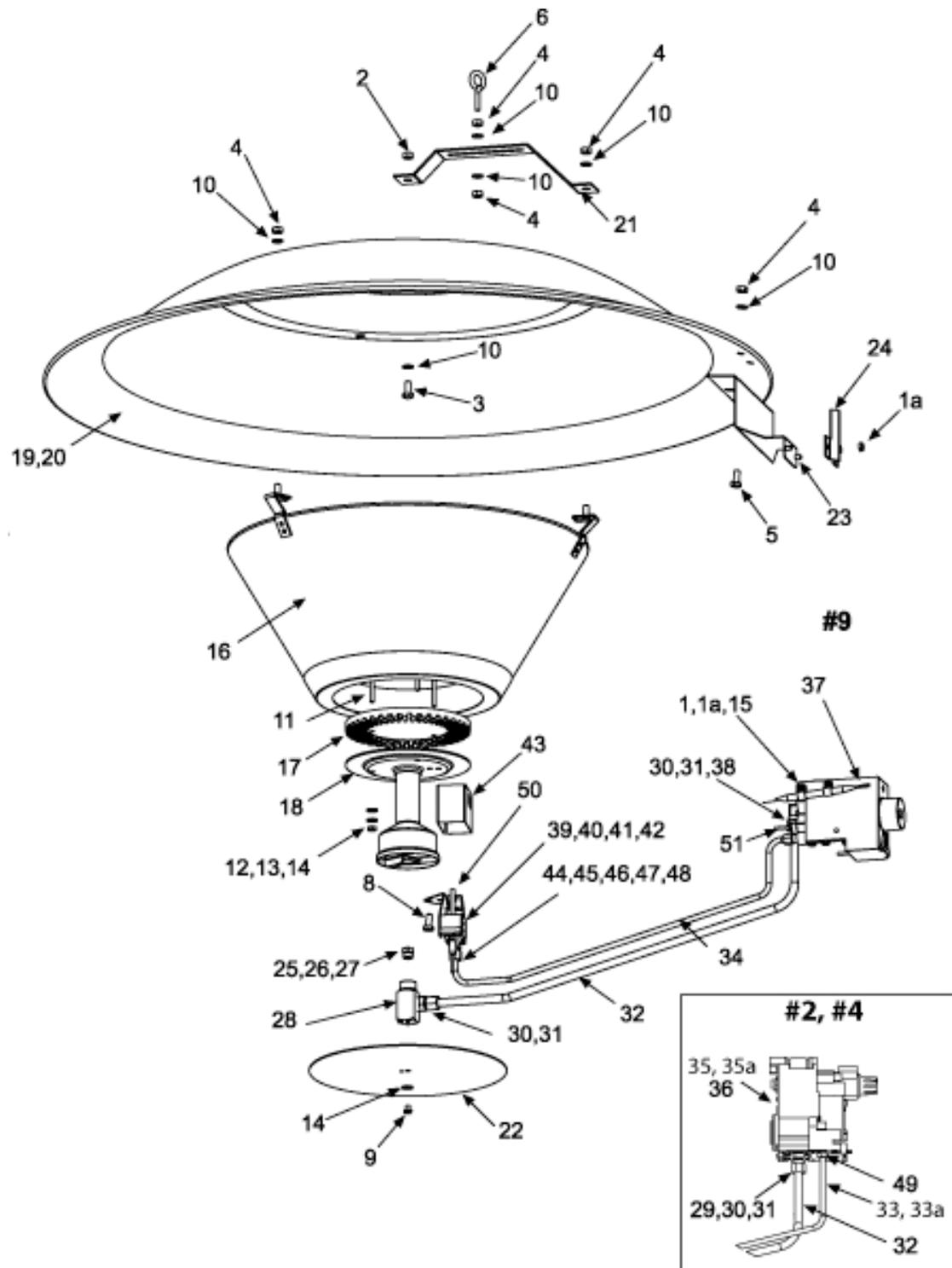
TROUBLE	POSSIBLE CAUSE	SOLUTIONS
<i>Pilot will not stay lit when lighting the pilot...</i>	<ul style="list-style-type: none"> ◆ There is air in the gas line. ◆ The pilot injector is clogged. ◆ The thermocouple is defective. ◆ The pilot safety valve is defective. 	<ul style="list-style-type: none"> ◆ Bleed the air out or continue to ignite the brooder until all the air is purged. (Maintenance). ◆ Clean the injector as necessary. (Maintenance & Service) ◆ Replace the thermocouple. (Service). ◆ Replace the gas valve. (Service).
<i>Brooder shuts off on pilot safety (i.e. pilot goes out)...</i>	<ul style="list-style-type: none"> ◆ The pilot injector is clogged. ◆ The supply pressure is insufficient. ◆ The thermocouple is defective. ◆ The pilot safety valve is defective. 	<ul style="list-style-type: none"> ◆ Clean the injector as necessary. (Maintenance & Service). ◆ Check the manifold gas pressure and adjust as necessary. (Service). ◆ Replace the thermocouple. (Service). ◆ Replace the gas valve. (Service).
<i>Brooder is not glowing red...</i>	<ul style="list-style-type: none"> ◆ The supply gas pressure is too low. ◆ The gas piping size is incorrect. ◆ The injector is clogged. ◆ The injector size is incorrect. 	<ul style="list-style-type: none"> ◆ Check the manifold gas pressure and adjust as necessary. (Service). ◆ If you are not sure of the performance, use the gas pipe sizing table in this manual. (Service). ◆ Clean the injector as necessary. (Maintenance & Service). ◆ See the instructions for correct injector size and replace if necessary. (Service).
<i>Brooder will not attain the desired temperature...</i>	<ul style="list-style-type: none"> ◆ There is insufficient heat in the building for heat loss (i.e., not enough brooders). ◆ The thermostat sensing bulb is incorrectly placed. ◆ The thermostat is out of calibration. 	<ul style="list-style-type: none"> ◆ Conduct a heat loss and add brooders or other source of heat as necessary. (Service). ◆ Reposition the sensing bulb as necessary for proper operation. NOTE: The sensing bulb should be shielded from direct radiation to prevent short cycling of the brooder. (Service). ◆ Recalibrate (if possible) or replace. (Service).
<i>Flames flaring up, outside of emitter surface...</i>	<ul style="list-style-type: none"> ◆ The gas pressure is too high. ◆ The injector size is incorrect. ◆ The type of gas supplied to the brooder is incorrect. ◆ There is insufficient combustion air. 	<ul style="list-style-type: none"> ◆ Check the manifold gas pressure and adjust if necessary. (Service). ◆ See instructions for correct injector size and replace if necessary. (Service). ◆ Check the dataplate to identify the correct type of gas the brooder is equipped to operate using. (Maintenance). ◆ Clean the inside of the burner with a wire brush and blow out with compressed air. (Maintenance).

13. REPLACEMENT PARTS GUIDE

Megasun Models

Item No.	Part No.	Description	12-2	12-4	12-9
1	02166070	no.8-32 x 1/2" Pan Head Screw	-	-	2
1a	02167040	no.8-32 Hex Locknut	2	2	4
2	02127230	no.12-24 Hex Nut	1	1	1
3	02320010	no.12-24 x 1/2" Hex Head Screw	1	1	1
4	02167010	1/4-20 Hex Locknut – Keps	7	7	7
5	02259010	1/4-20 x 5/8" Hex Head Screw	2	2	2
6	02309000	1/4-20 x 2" Eyebolt (includes one nut)	1	1	1
8	02168050	no.10-24 x 3/8" Pan Head Screw	2	2	2
9	02004010	no.10-32 x 1/4" Pan Head Screw	1	1	1
10	02305010	no.M8 Flat Washer	8	8	8
11	02281010	no.M5 x 35mm Hex Head Screw	3	3	3
12	02282010	no.M5 Hex Nut	3	3	7
13	02301010	no.M5 Flat Washer	3	3	7
14	02302010	no.M5 Spring Lockwasher	4	4	4
15	03577020	Cable Clamp 5/16"ID	-	-	2
16	43525000	Emitter Assembly	1	1	1
17	43309000	Burner Cap	1	1	1
18	43633030	Burner Base Assembly (with swivel clamp)	1	1	1
19	43303000	Reflector Reflector – Aluminum	1	1	1
20	43303010	Reflector Reflector – Galvanized	1	1	1
21	43826010	Low Profile Hanging Bracket	1	1	1
22	43304030	Burner Pan (center mounted)	1	1	1
23	43983020	Manifold Support Assembly (radiation shield)	1	1	1
24	43982020	V-Clamp (manifold support)	1	1	1
25	03259840	Main Burner Injector (1.9mm) – (LPG-G31)	1	1	1
26	03259500	Main Burner Injector (no.50) – (LPG-G30)	1	1	1
27	03259xxx	Main Burner Injector (no.33) – (Nat. Gas-G20)	1	1	1
27a	03259xxx	Main Burner Injector (no. 30) – (Nat. Gas-G20/G25)	1	1	1
27b	03259xxx	Main Burner Injector (no. 29) – (Nat. Gas-G25)	1	1	1
28	43305990	Main Burner Injector Fitting Sub-Assembly	1	1	1
29	30397000	1/2 MPT x 3/8 Tube Fitting	1	1	-
30	03600020	3/8" Compression Sleeve	1	1	1
31	03601020	3/8" Compression Nut	1	1	1
32	43307160	Main Burner Tubing, 3/8" (all models)	1	1	1
33	43307170	Pilot Burner Tubing, 1/4"	1	-	-
33a	43307220	Pilot Burner Tubing, 1/4"	-	1	-
34	43307190	Pilot Burner Tubing, 1/4"	-	-	1
35	30411050	Gas Valve - Honeywell no. VR8200M-2956 – G20,G25	1	-	-
35a	30411060	Gas Valve - Honeywell no. VR8200M-2964 – LPG	1	-	-
36	30679050	Gas Valve – Honeywell no. V4600A – G20,G25 & LPG	-	1	-
37	30531500	Gas Valve - SIT no.06330045 – G20,G25 & LPG	-	-	1
38	03213020	3/8 MPT x 3/8 Tube Fitting Elbow	-	-	1
39	43997050	Pilot Assembly Complete - LPG	1	1	1
40	43997060	Pilot Assembly Complete - Natural Gas	1	1	1
41	43997980	Pilot Housing Sub-Assembly	1	1	1
42	43996019	Pilot Housing – Outer	1	1	1
43	44002019	Pilot Windshield – Perforated	1	1	1
44	06589030	Pilot Injector Holder – 1/8 NPT x 1/4 Tube	1	1	1
45	03260790	Pilot Injector (no.79) - LP Gas	1	1	1
46	03260760	Pilot Injector (no.76) - Natural Gas	1	1	1
47	03600010	1/4" Compression Sleeve	1	1	1
48	03601010	1/4" Compression Nut	1	1	1
49	03527000	1/4" Break-Away Fitting (gas valve end)	1	1	-
50	30642010	Thermocouple, 36" Snap-In	1	1	-
51	30484020	Thermocouple, 1200mm Screw-In SIT no.0.200.260	-	-	1
52	02284020	M8 x 1 Hex Nut SIT no.0.992.014 (t'couple attach)	-	-	2
53	30531930	M8 x M9 Thermocouple Adapter SIT no.0.974.089	-	-	1
54	43534090	Kit, Complete Fastener (not shown)	1	1	1

ALL ILLUSTRATIONS ARE INTENDED TO GIVE THE GENERAL IMPRESSION OF UNITS ONLY. WE RESERVE THE RIGHT TO ALTER ANY SPECIFICATION WITHOUT NOTICE.





ALKE LIMITED WARRANTY

LIMITED WARRANTY

Alke (NL) warrants the original owner of any Megasun Poultry Heating Product that it will be free from defects in material or workmanship under normal use and service. The heater(s) shall be installed, used and maintained strictly in accordance with the manufacturer's instructions. The manufacturer's sole obligation under this warranty is limited to furnishing replacement parts, for 12 months from the date shipment by the manufacturer. Labour charges for the removal of defective parts or the installation of replacement parts is not included.

ADDITIONAL WARRANTY ON MODEL MEGASUN 12 BROODER EMITTER: Additionally, the manufacturer will at any time during a 12 month period from the date of shipment by the manufacturer, furnish at no cost to the original owner, replacement emitter assemblies which have become inoperative by reason of any defect in our workmanship, materials or construction. The manufacturer will not be responsible for labour charges incurred for removal or installation of emitters. Any transportation charges involved in the return or repair are excluded.

WARNING: Manufacturer's warranty shall not apply: (a) to circumstances where gas pressure to each heater is higher than that specified for each heater; (b) to circumstances where the type of gas is different than the type of gas noted on the name plate for each heater; (c) to water damage to gas controls; and (d) to any heater or component which has been repaired or replaced with other than factory parts, modified in any way, misused or damaged, or which has been used contrary to the manufacturer's written instructions.

LIMITATION OF WARRANTY: THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. WITHOUT LIMITING THE FOREGOING, THE MANUFACTURER EXPRESSLY EXCLUDES ANY AND ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND ANY IMPLIED WARRANTY OF MERCHANTABILITY FOR ITS PRODUCTS.

If any provision of this warranty is found to be void, unenforceable or unconscionable, then that portion is hereby severed and the remainder of this warranty is hereby saved and shall remain in force.

EXCLUSIVE REMEDY: The sole and exclusive remedy under this warranty is the replacement of the defective parts or brooders as hereinabove specified. THE MANUFACTURER DOES HEREBY EXPRESSLY EXCLUDE ANY AND ALL LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES UNDER THIS OR ANY OTHER WARRANTY. Without intending to limit the aforesaid exclusion, THE MANUFACTURER DOES HEREBY EXCLUDE ANY LIABILITY UNDER THIS OR ANY OTHER WARRANTY FOR INJURIES OR COMMERCIAL LOSSES TO PROPERTY THAT RESULT FROM THE OPERATION, PROPER OR IMPROPER, OF ITS PRODUCTS.

ADDITIONAL TERMS: Manufacturer assumes no liability for delay in performing its obligations under this warranty. Manufacturer assumes no liability for failure in performing its obligations there under if failure results directly or indirectly from any cause beyond its control, including but not limited to acts of God, acts of Government, floods, fires, shortages of materials, strikes and other labour difficulties or delays or failures of transportation facilities. This is a Non-Residential product. Installation and service shall be by a registered Contractor and in accordance with National and Local standards.

When presenting warranty claims, proof of date of purchase must be submitted.

No Representative is authorised to assume for the manufacturer, any liability except as set forth above.

FOR YOUR RECORDS:

Alke Brooder Model Number: _____ Date Installed: _____

Serial Numbers: _____

For replacement parts, please contact your local distributor or:

Alke BV (NL)
Industrielaan 11a, 3925 BD Scherpenzeel
POBox 52, 3925 ZH Scherpenzeel
The Netherlands
Tel: +31 (0) 33 2773824 / Fax: +31 (0) 33 2773080
email: info@alke.nl
www.alke.nl