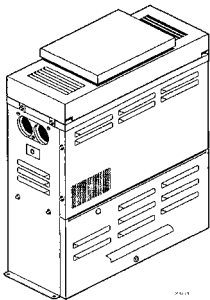




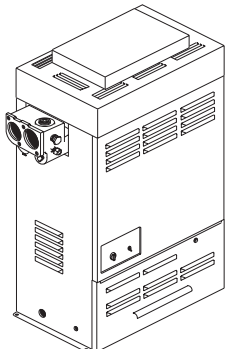
	<i>Natural Gas</i>	<i>L.P.G.</i>					
<i>MODEL:</i>	MB055PEH	MB055	MB105	MB155	MB185	MB265	MB405

WARNING: If the information in these instructions are not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

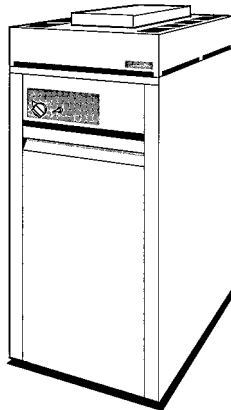
- Do not store or use gasoline or other flammable vapours and liquids in the vicinity of this or any other appliance.
- **WHAT TO DO IF YOU SMELL GAS - Gas Emergency Services 0800 111 999**
 - Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Immediately call your gas supplier from a neighbour's phone. Follow the gas supplier's instructions.
- Installation and service must be performed by a Gas Safe registered installer.



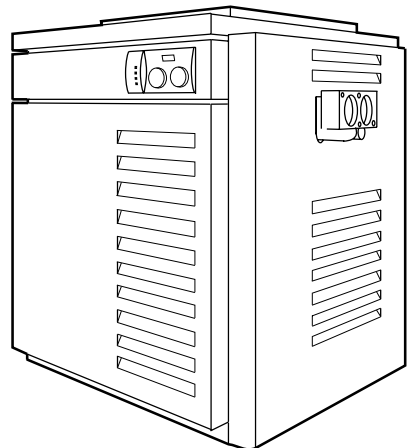
MB055



MB105



MB155



SB111.0

MB185 - MB265 - MB405



Operating, Installation and Servicing Instructions for



Pool & Spa Heaters

MB055PEH

MB055

MB105

MB155

MB185

MB265

MB405

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PART ONE - OWNER'S OPERATING INSTRUCTIONS

FOR YOUR SAFETY - READ BEFORE OPERATING

WARNING: IF YOU DO NOT FOLLOW THESE INSTRUCTIONS EXACTLY, A FIRE OR EXPLOSION MAY RESULT, CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

SECTION 1 / START-UP PROCEDURES

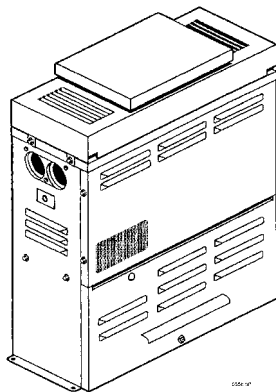
BEFORE START-UP

BURNERS

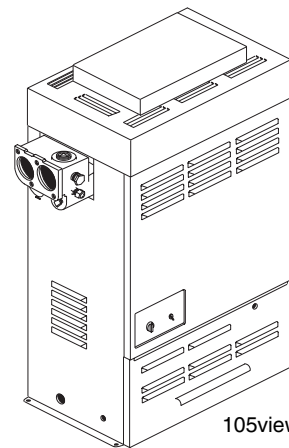
Clean air louvres of dust, lint and debris. Keep heater area clear and free from combustibles, flammable liquids and chemicals. Do not obstruct the flow of combustion and ventilating air.

WATER

Water must be flowing through the heater during operation. Ensure that system is filled with water and the pump is operating.

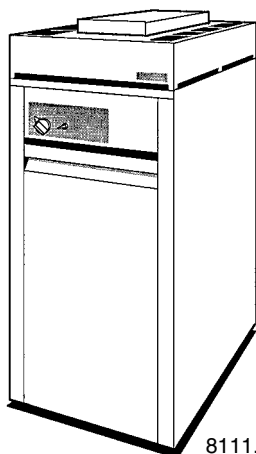


055



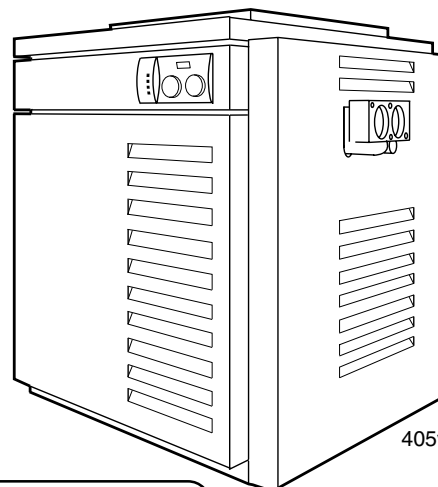
105view.tif

105



8111.tif

155



405view.tif

185 - 265 - 405

CAUTION: Propane gas is heavier than air and will settle on the ground. Since propane can accumulate in confined areas, extra care should be exercised when lighting propane heaters.

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: IF YOU DO NOT FOLLOW THESE INSTRUCTIONS EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

- A. This appliance is equipped with an ignition device which automatically lights the pilot. Do **not** try to light the pilot by hand.
- B. **BEFORE OPERATING** Smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
 - * **WHAT TO DO IF YOU SMELL GAS**
 - * Do not try to light any appliance.
Do not touch any electric switch;
Do not use any phone in your building.
 - * Immediately call your gas supplier from a neighbour's phone. Follow the gas supplier's instructions.
 - * If you cannot reach your gas supplier, call the fire service.
- C. Use only your hand to push in or move the gas control lever. Never use tools. If the lever will not push in or move by hand, don't try to repair it, call a qualified service engineer. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service engineer to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above on this label.
2. Set the thermostat to the lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the pilot. Do **not** try to light the pilot by hand.
5. Remove heater door panel.
6. Turn " OFF " gas supply to appliance.
7. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas **STOP!** Follow " B " in the safety information above on this label. If you don't smell gas, go to the next step.
8. Turn " ON " gas supply to appliance.
9. Replace heater door panel.
10. Turn on all electric power to the appliance.
11. Set the thermostat to the desired setting.
12. If the appliance will not operate, follow the instructions " To Turn Off Gas To Appliance " and call your service engineer or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to the lowest setting.
2. Turn off all the electric power to the appliance if service is to be performed.
3. Remove heater door panel.
4. Turn off gas supply to appliance.
5. Replace heater door panel.

CARE OF YOUR HEATER

This heater casing is Polyester powder on top of zinc coated steel to assist in resisting corrosion. It is recommended that periodically the casing is cleaned and sprayed with WD40 or similar liquid especially when installed outdoors. Exposed threads on manifolds will benefit from a light coating of grease. Outdoor tops are finished with a special black high temperature coating and as this is part of the flueing system, subject to high temperatures and the elements, can discolour and corrode over a period of time.

AFTER START-UP

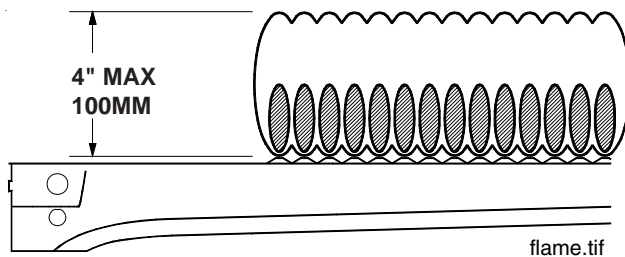
Feel the inlet and outlet pipes. Outlet pipe should be only slightly warmer than the inlet. It should not be hot.

WARNING: *Should overheating occur or the gas supply fail to shut off, turn off the manual gas control to the appliance.*

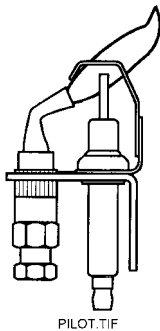
VISUAL INSPECTION

With the heater on, remove the door and make a visual check of the pilot and burner.

The flame should be blue with a well-defined pattern.



MAIN BURNER FLAME



PILOT BURNER FLAME

A yellow or "floating" flame indicates restricted air openings or incorrect injector size. Should this occur, shut the heater off and contact your installer or gas supplier.

WATER PRESSURE SWITCH

A water pressure switch is provided in the heater to shut off the burners in the event that water supply to the heater is interrupted. It is very important to verify that the switch electrically opens and shuts off the gas valve when water flow to the heater is interrupted. Otherwise, rapid and severe damage is likely to occur to the heater. (The water pressure switch should be checked and adjusted for proper operation by a qualified service person at the time of installation checked thereafter.)

WARNING: *Operation of the heater without water circulation will cause rapid and severe damage to the heater.*

SECTION 2/CAUTION

Elevated water temperature can be hazardous, and the U. S. Consumer Product Safety Commission recommends the following guidelines:

1. Spa or hot tub water temperatures should never exceed 40°C (104°F). A temperature of 38°C (100°F) is considered safe for a healthy adult. Special caution is suggested for young children.
2. Drinking of alcoholic beverages before or during spa or hot tub use can cause drowsiness which could lead to unconsciousness and subsequently result in drowning.
3. *Pregnant Women Beware!* Soaking in water over 39°C (102°F) can cause fetal damage during the first three months of pregnancy resulting in the birth of a brain-damaged or deformed child. Pregnant women should stick to the 38°C (100°F) maximum rule.
4. Before entering the spa or hot tub, users should check the water temperature with an accurate thermometer; spa or hot tub thermostats may err in regulating water temperatures by as much as 2°C (4°F).
5. Persons with a medical history of heart disease, circulatory problems, diabetes, or blood pressure problems should obtain a physician's advice before using pools or hot tubs.
6. Persons taking medications which induce drowsiness, such as tranquilizers, antihistamines, or anticoagulant, should not use spas or hot tubs.

SECTION 3/MAINTENANCE AND CARE PROCEDURES

To be followed one month after start-up and then semi-annually. A full service by a competent person (i.e. CORGI registered) should be conducted at least once a year.

1. Inspect top of heater and draffhood for soot, (a sticky black substance around finned tubes and "V" baffles), and open flue gas passage ways. If soot is present, contact installer or service agent.
2. Inspect and operate all controls, gas valve and pressure relief valve.

3. Make visual check of the burner and pilot flame. Flame pattern on the main burner and pilot is indicated in the previous illustration. Yellow flame means restriction of the air openings. Lifting or blowing flame indicates high gas pressure. Low flame means low gas pressure. Should this occur, shut the heater off and contact your gas supplier or qualified service agency.
4. On indoor heaters, clean room intake openings to assure adequate flow of combustion and ventilation air.

CAUTION: Combustion air must not be contaminated by corrosive chemical fumes which can damage the heater and void the warranty.

5. Keep area around heater clear and free from combustible materials, gasoline and other flammable and corrosive vapours and liquids.

POOL & SPA WATER CHEMISTRY

IMPORTANT! These Heaters are not suitable for use on Salt Chlorinated pools. If this is intended please contact the Manufacturer.

Chemical imbalance can cause severe damage to your heater and associated equipment. Maintain your water pH between 7.4 and 7.8 and total alkalinity between 100 and 150 p.p.m. If the mineral content and dissolved solids in the water become too high, scale forms inside the heat exchanger tubes, reducing heater efficiency and also damaging the heater. If the pH drops below 7.2, the heater will be severely damaged. This will result in corrosion of the heat exchanger. **Heat exchanger damage resulting from chemical imbalance is not covered by the warranty.**

AUTOMATIC CHLORINATORS AND CHEMICAL FEEDERS

All chemicals must be introduced and completely diluted into the pool or spa water before being circulated through the heater. Do not place chlorine tablets or bromine sticks in the skimmer. High chemical concentrations will result when the pump is not running (i.e. overnight).

Chlorinators must feed downstream of the heater and have an anti-siphoning device to prevent chemical back-up into the heater when the pump is shut off.

NOTE: High chemical concentrates from feeders and chlorinators that are out of adjustment will cause very rapid corrosion to the heat exchanger in the heaters. Such damage is not covered under the warranty.

COLD WEATHER OPERATION

MODERATE CLIMATE: Heater operation can continue during short term cold spells. When temperatures are below freezing, flow (continuous pump operation) must be maintained.

CAUTION: Do not use the heater to maintain water temperatures just above freezing or for freeze protection. When heater is used during freezing weather, care must be taken to avoid freeze ups. Continuous pump operation is a must. Additional protection may be required. The heater is not warranted against freeze ups.

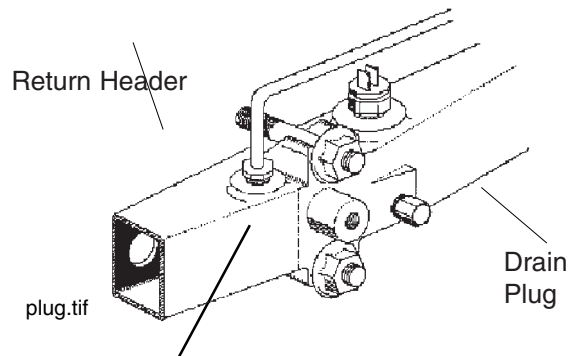
COLD CLIMATE: Prolonged operation with water temperatures below 10°C (50°F) is not recommended. When starting the heater with pool temperatures below 10°C (50°F) operate the heater continuously until higher temperatures are reached. Operating the heater for prolonged periods with pool water below 10°C (50°F) can seriously damage the heater, and is not covered by the warranty.

For cold climate areas, please follow the winterizing procedures listed.

WINTERIZING THE POOL & SPA HEATER

When heaters installed outdoors in freezing climate areas are to be shut down for the winter, observe the following step-by-step procedure:

1. Turn off gas valve, manual gas valve, and electrical supply to the heater.
2. Open drain cock located on the inlet/outlet header, (under water pipes). Remove drain plug from return header. Remove the heat exchanger inspection panels on the side opposite water piping to gain access to the plug on the return header.



185, 265 & 405 Models

3. Disconnect compression fittings from the pressure switch and return header that connects to the 1/4" copper tube and allow the tube to drain.

PART TWO - INSTALLATION/SERVICE INSTRUCTION

SECTION 1 / RECEIVING EQUIPMENT

WARNING: This appliance must be installed and serviced by a Gas Safe registered installer.

On receipt of your equipment it is suggested that you visually check for external damage to the carton. If the carton is damaged, a note should be made on the delivery note when signing for equipment. Remove the heater from the carton and if it is damaged, report the damage to the carrier immediately. Save the carton.

These items are shipped loose inside the carton with the 055 & 105 heater:

1. CPVC Adaptors (2)
2. Plastic Flange (1)

These items are shipped loose inside the carton with the 155, 185, 265 & 405 heater:

1. In/Out Flanges (2)
2. 1-1/2" Flange Gaskets (2)
3. 2" Flange Gaskets (2)
4. Flange Bolts (4)
5. 2" CPVC Adaptors (2)

Be sure that you receive the number of packages indicated on the delivery note.

When ordering parts, you must specify model and serial number of heater. When ordering under warranty conditions, you must also specify date of installation.

It is recommended that this manual be reviewed thoroughly before installing your pool/spa heater. If there are any questions that this manual does not answer, please contact the supplier.

SECTION 2 / GENERAL SPECIFICATIONS

All heaters are inter-changeable and can be used either indoor or outdoors. The appropriate top designated for that type of use is required. If desired, the top can be changed at a later date to change from outdoor to indoor or vice versa.

GENERAL SPECIFICATIONS							
WATER CONTENT	Litre (gal)	Model 055	0.8 (0.18)	Model 105	1.1 (0.3)	Model 155	1.8 (0.4)
		Model 185	1.9 (0.4)	Model 265	1.9 (0.4)	Model 405	2.6 (0.5)
MAXIMUM WATER PRESSURE		8 bar (125 psi)					
MAXIMUM WATER FLOW TEMP		45.0 (110)					
ELECTRICAL SUPPLY		230V 50Hz FUSED AT 3A. POWER 100W					

PERFORMANCE SPECIFICATIONS

GAS CATEGORY, TYPE, AND
SUPPLY PRESSURE.

II_{2H3P} G20 @ 20 mbar (8 in. wg)
G31 @ 37 mbar (14.8 in. wg)

PERFORMANCE SPECIFICATIONS - NATURAL GAS

GAS TYPE AND SUPPLY PRESSURE

G20 @ 20 mbar (8 in. wg)

MODEL		055	105	155	185	265	405
BURNER PRESSURE	mbar (in. wg)	6.3 (2.5)	6.8 (2.7)	7.7 (3.1)	8.1 (3.2)	8.3 (3.3)	8.7 (3.5)
HEAT INPUT	GROSS kW (Btu/h)	12.9 (44,000)	26.67 (91,000)	38.98 (133,000)	49.53 (169,000)	71.5 (244,000)	108.4 (370,000)
	NET kW (Btu/h)	11.6 (39,600)	24.0 (81,900)	35.08 (119,700)	44.58 (152,100)	64.4 (219,600)	97.6 (333,000)
HEAT OUTPUT	kW (Btu/h)	10.06 (34,300)	20.8 (71,000)	30.4 (103,700)	38.63 (131,820)	55.8 (190,300)	84.58 (288,600)
GAS RATE	m ³ /h	1.22	2.5	3.7	4.6	6.6	10.28
INJECTOR DIA. & (MARKING)	mm gauge	1.78 (50)	1.78 (50)	1.85 (49)	1.78 (50)	1.78 (50)	1.78
NUMBER OF BURNERS & INJECTORS		4	8	10	13	19	29

PERFORMANCE SPECIFICATIONS - PROPANE GAS

GAS TYPE AND SUPPLY PRESSURE

G31 @ 37 mbar (14.8 in. wg)

MODEL		055	055	105	155	185	265	405
BURNER PRESSURE	mbar (in. wg)	23.8 (9.6)	19.0 (7.6)	21.5 (8.6)	28.5 (11.4)	29.4 (11.8)	29.3 (11.7)	30.0 (12.0)
HEAT INPUT	GROSS kW (Btu/h)	14.1 (48,000)	12.9 (44,000)	26.67 (91,000)	38.98 (133,000)	49.53 (169,000)	71.5 (244,000)	108.4 (370,000)
	NET kW (Btu/h)	13.0 (44,500)	11.9 (40,500)	24.54 (83,720)	35.86 (122,360)	45.57 (155,480)	65.8 (224,480)	99.8 (340,400)
HEAT OUTPUT	kW (Btu/h)	11.0 (37,400)	10.06 (34,300)	20.8 (71,000)	30.4 (103,700)	38.63 (131,820)	55.8 (190,300)	84.58 (288,600)
GAS RATE	m ³ /h	0.50	0.47	0.97	1.43	1.82	2.57	4.04
INJECTOR DIA. & (MARKING)	mm gauge	1.09 (57)	1.09 (57)	1.09 (57)	1.09 (59)	1.06 (59)	1.06 (59)	1.06
NUMBER OF BURNERS & INJECTORS		4		8	10	13	19	29

SECTION 3 / INSTALLATION INSTRUCTIONS

IMPORTANT NOTICE

These instructions are intended for the use of qualified personnel only, specifically trained and experienced in the installation of this type of heating equipment and related system components. Installation and service personnel must be CORGI registered. Persons not qualified must not attempt to fix this equipment nor attempt repairs according to these instructions.

WARNING:

Improper installation, adjustment, alteration, service or maintenance may damage the equipment, create a hazard resulting in asphyxiation, explosion or fire, and will void the warranty.

STATUTORY REQUIREMENTS

Gas Safety (Installation and Use) Regulations, 1994

It is the law that all gas appliances are installed by competent persons in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your own interest, and that of safety, to ensure that the law is complied with.

General Requirements

The appliance must be installed by a competent person ie. Gas Safe registered in accordance with the relevant requirements of the Gas Safety Regulations, current I.E.E. Regulations, Model Water Byelaws, Local Water Authority Byelaws and any relevant requirements of the local gas supplier, local authority and the relevant British Standard Codes of practice and Building Regulations. Manufacturers notes must not be taken in any way as overriding statutory obligations. Typical documents include:

Models 055, 105 & 155

- BS. 5440:1 Flues (for gas appliances of rated input not exceeding 60 KW).
- BS. 5440:2 Ventilation (for gas appliances of rated input not exceeding 60KW).
- BS. 5449 Forced circulation hot water systems.
- BS. 6798 Installation of gas fired hot water boilers of rated input not exceeding 60 KW.
- BS. 6891: Installation of low pressure pipework.
- Health & Safety Document No. 635.
- The Electricity at Work regulations, 1989.
- CP341; Water Supply.
- British Gas Publications:
 - IM2; Purging Procedures of Non-domestic Gas Installations
 - IM5, Soundness Testing Procedures for Industrial and Commercial Gas Installations.

Models 185, 265 & 405

- BS. 6891; Installation of low pressure pipework.
- BS. 6644; Installation of Gas Fired Hot Water Boilers 60kW to 2MW.
- CP 341; Water Supply.
- British Gas Publications:
 - IM2; Purging Procedures on Non-domestic Gas Installations.
 - IM5; Soundness Testing Procedures for Industrial and Commercial Gas Installations.
 - IM11; Flues for Commercial and Industrial Gas Fired Boilers and Air Heaters.
- Model Water Byelaws.

This appliance must be installed externally in open air (without a flue) or indoors (with a suitable flue system) in a room separated from living rooms and provided with appropriate ventilation direct to the outside.

The appliance must be used only in accordance with these instructions. Incorrect use is dangerous and invalidates all warranties and Certification.

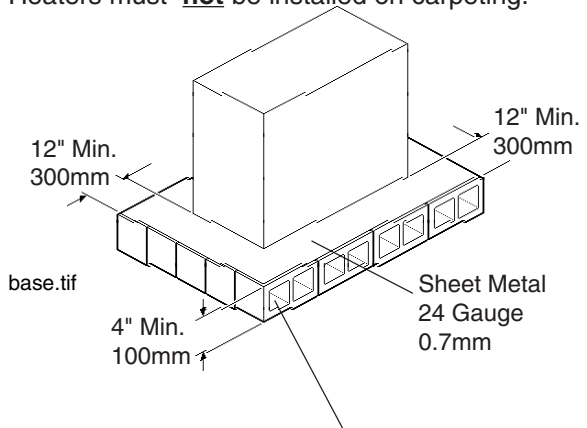
Conversion Instructions.

The heater is supplied in two versions, one for use with Natural Gas, G20 at 20 mbar inlet pressure, the other for Propane, G31 at 37 mbar. If it is necessary to convert the heater for use on the other gas the appropriate conversion kit must be purchased and fitted using the instructions provided.

NOTE: *The heater should not be located in an area where possible water leakage will result in damage to the area adjacent to the appliance or to the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the appliance. The pan must not restrict combustion air flow.*

BASE INSTALLATION

Heater must be mounted on a level base, such as cement slab, cement blocks or other non-combustible surface. An alternative method for providing a base for combustible floors is illustrated below. Heaters must **not** be installed on carpeting.



Hollow concrete cinder block, align holes and leave ends open. Alternative method for providing a non-combustible base.

CLEARANCES

ALL HEATERS

For clearances from combustible surfaces, see the chart below.

CLEARANCE FROM COMBUSTIBLE MATERIAL (mm)						
Plant Room Installation						
Model	Top	Back	Right	Left	Front	
055	900	50	150	150	Clear	
105	900	50	150	150	Clear	
155	1050	300	150	300	Clear	
185-405	750	150	300	150	Clear	
Outdoor Installation						
Model	Top	Back	Right	Left	Front	
055	Clear	50	150	150	Clear	
105	Clear	50	150	150	Clear	
155	Clear	300	150	150	Clear	
185-405	Clear	150	150	150	Clear	

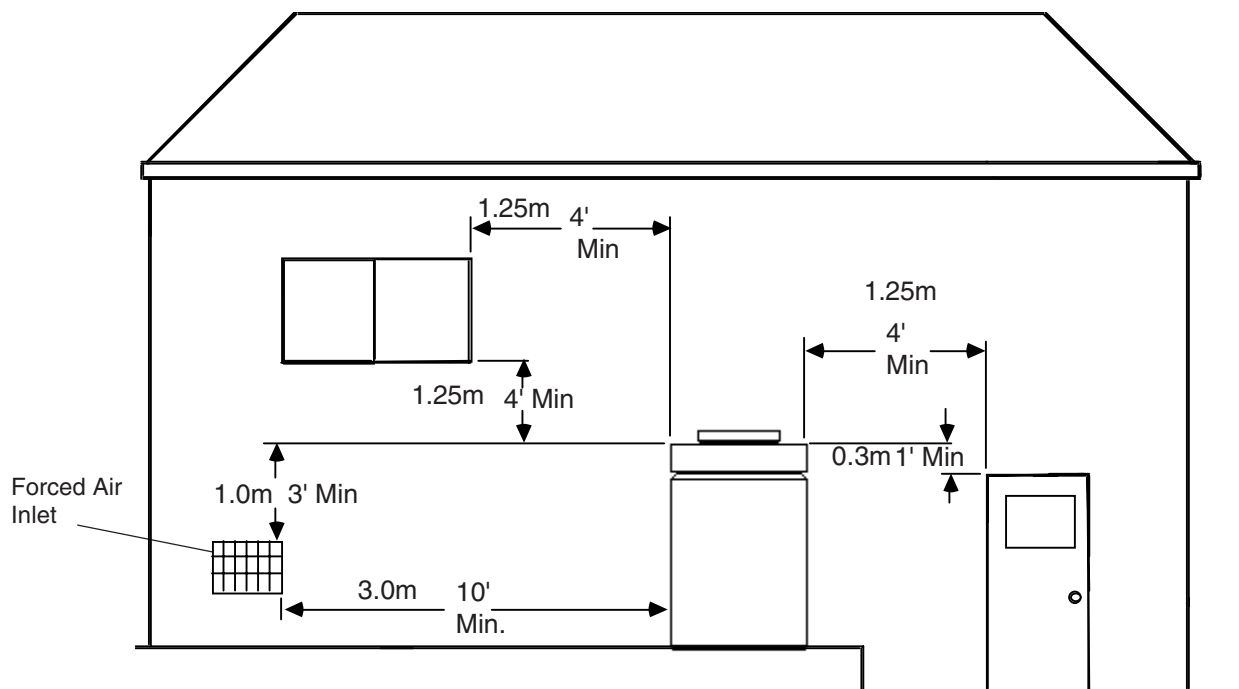
For servicing, provide at least 600mm (24") in front of the heater for burner tray removal, and at least 450mm (18") on water connection side of the heater to inspect and delime the heat exchanger.

Heaters must not be installed under an overhang of less than 1.0m (3 feet) from the top of the heater. Three (3) sides must be open in the area under the overhang. Roof water drainage must be diverted away from the heaters installed under overhangs with the use of gutters:

The point from where the flue products exit the heater must be a minimum of 1.25m (4 feet) below, four (4) feet horizontally from or 0.3m (1 foot) above any door, window or gravity inlet to a building. The top surface of the heater shall be at least 1.0m (3 feet) above any forced air inlet, or intake ducts located within 3.0m (10 feet) horizontally.

HIGH WIND CONDITIONS (OUTDOOR HEATERS ONLY)

In areas where high winds are frequent, it may be necessary to locate the heater a minimum of 1.0 m from high vertical walls, or install a wind break so the heater is not in direct wind current.

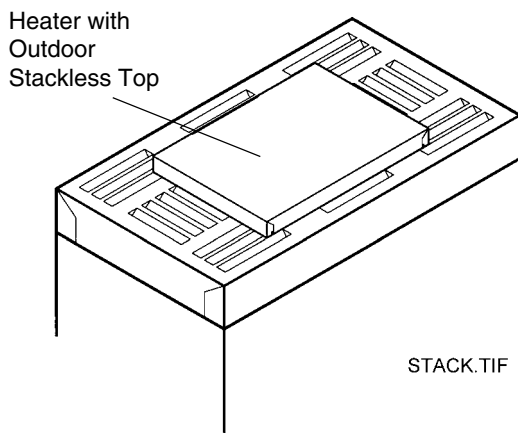


OUTDOOR HEATERS

These heaters are certified by British Gas plc for outdoor installation, when equipped with the approved tops designated for outdoor use.

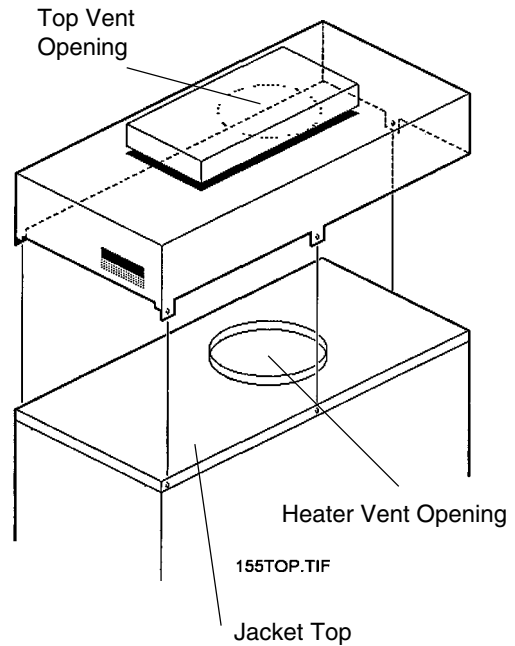
WARNING: The heater shall not be located in an area where water sprinklers, or other devices, may cause water to spray through the cabinet louvres and into the heater. This could cause heavy internal rusting or damage some electrical components, and this would void the warranty.

It is recommended that the casing is cleaned and sprayed with WD40 or similar liquid, and exposed threads on the manifolds are lightly coated in grease, after assembly.



105 & 155 Models

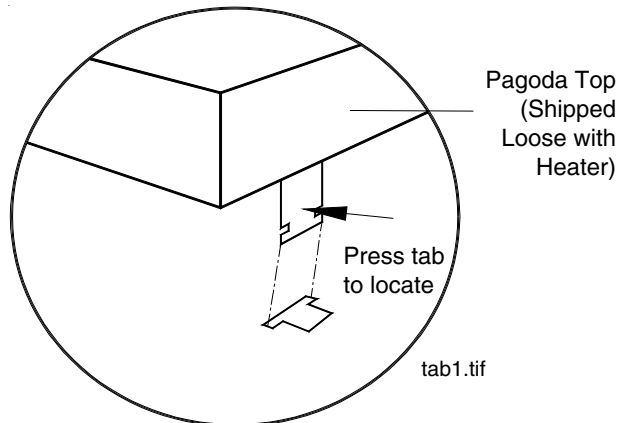
FLUE TERMINAL (Outdoor) Stackless Top Illustration



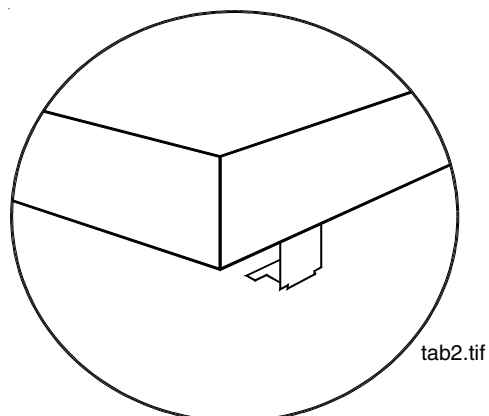
185, 265 & 405 Models

FLUE TERMINAL (Outdoor) Stackless Top Illustration

1. Insert tabs into keyhole (4 places).



2. Snap tabs into keyholes so as not to pull out.

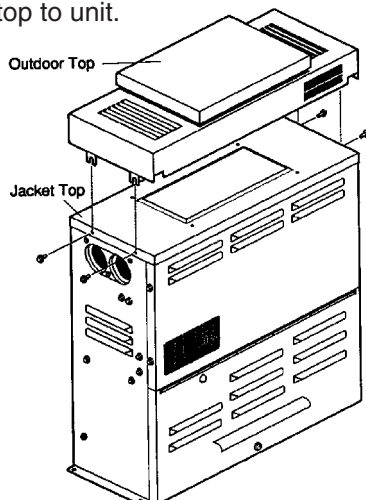


FLUE CONNECTIONS AND DIMENSIONS

055 Models

FLUE TERMINAL (Outdoor) Stackless Top Illustration

- 1: Remove the (8) screws which fasten jacket top to heater.
- 2: Line up top vent opening over heater vent opening
- 3: Lower outdoor top onto unit lining up slots in outdoor top with screw holes in jacket top.
- 4: Reinstall (8) screws to secure jacket top and outdoor top to unit.



055expl1.tif

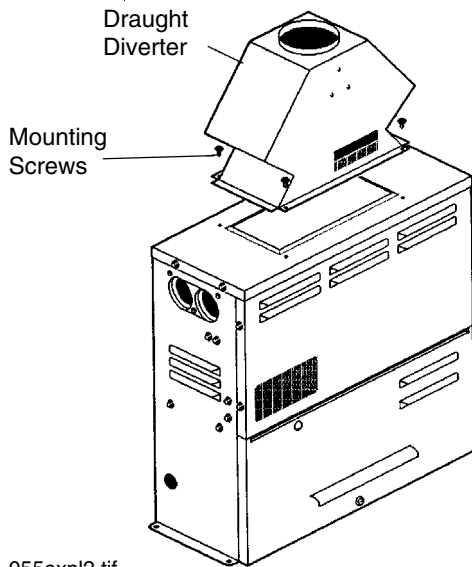
INDOOR HEATER

The design is also certified by British Gas plc for indoor installation when fitted with the appropriate draught diverter and a suitable flue system to outside. Note that the heater must be in a room separated from living rooms and provided with appropriate ventilation direct to the outside.

055 Models

FLUE TERMINAL (Indoor) Draught Diverter Illustration

Locate and assemble as shown. Secure with screws supplied in envelope inside carton.



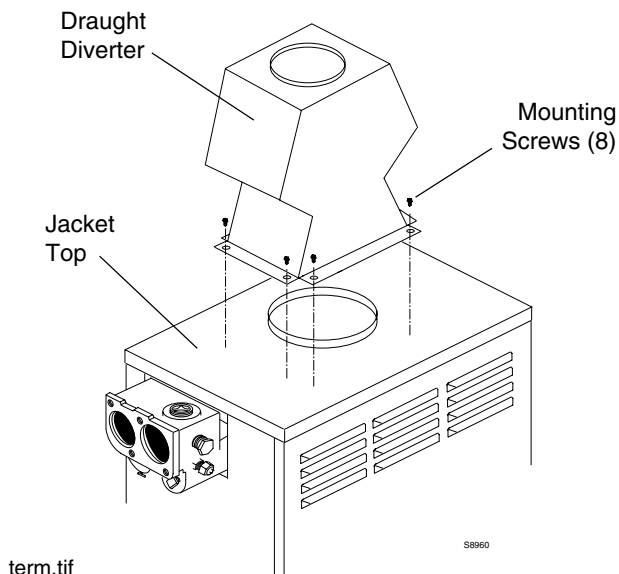
055expl2.tif

Fig. # 8143

105 & 155 Models

FLUE TERMINAL (Indoor) Draught Diverter Illustration

Locate and assemble as shown. Secure with screws supplied in envelope inside carton.



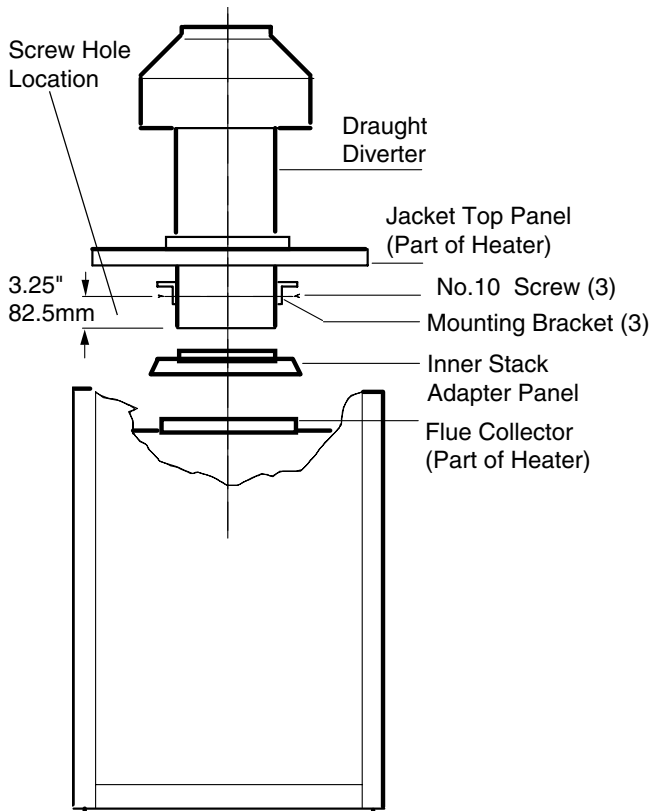
term.tif

S8960

185, 265 & 405 Models

FLUE TERMINAL (Indoor) Draught Diverter Illustration

1. Remove the louvred jacket top by removing four (4) No.10 flat head screws.
2. If originally installed, remove "Pagoda" top from the louvred jacket top.
3. Place the inner stack adapter panel over the flue collector inside the heater. Make sure the flanged side of the flue opening is up.
4. Turn the stack (diverter) upside down and set it down bottom side up.
5. Turn the jacket top panel (removed in step 1) down and place it through the stack.
6. Attach the three (3) mounting brackets to the stack using the screws provided and the holes that are pre-drilled in the stack. **Make sure the brackets are positioned with the flange near the top side of the stack (see illustration below).**
Caution must be taken not to over tighten and strip the screw threads.
7. Turn the assembled stack and jacket top, right side up. The jacket top will be trapped between the brackets and the top of the stack. Place the stack over the inner adapter panel flanged hole and lower the louvred jacket top panel back into its original position. Reinstall the four (4) No.10 flat head screws removed in step 1 above.

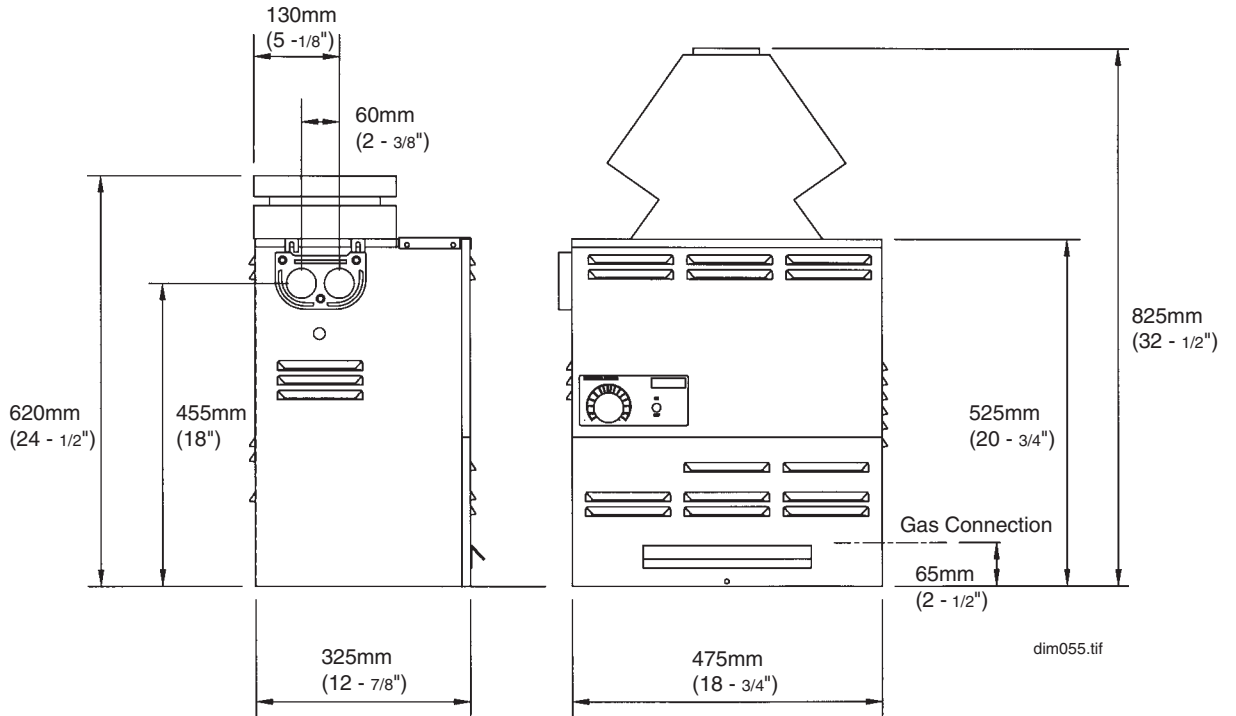


405term.tif

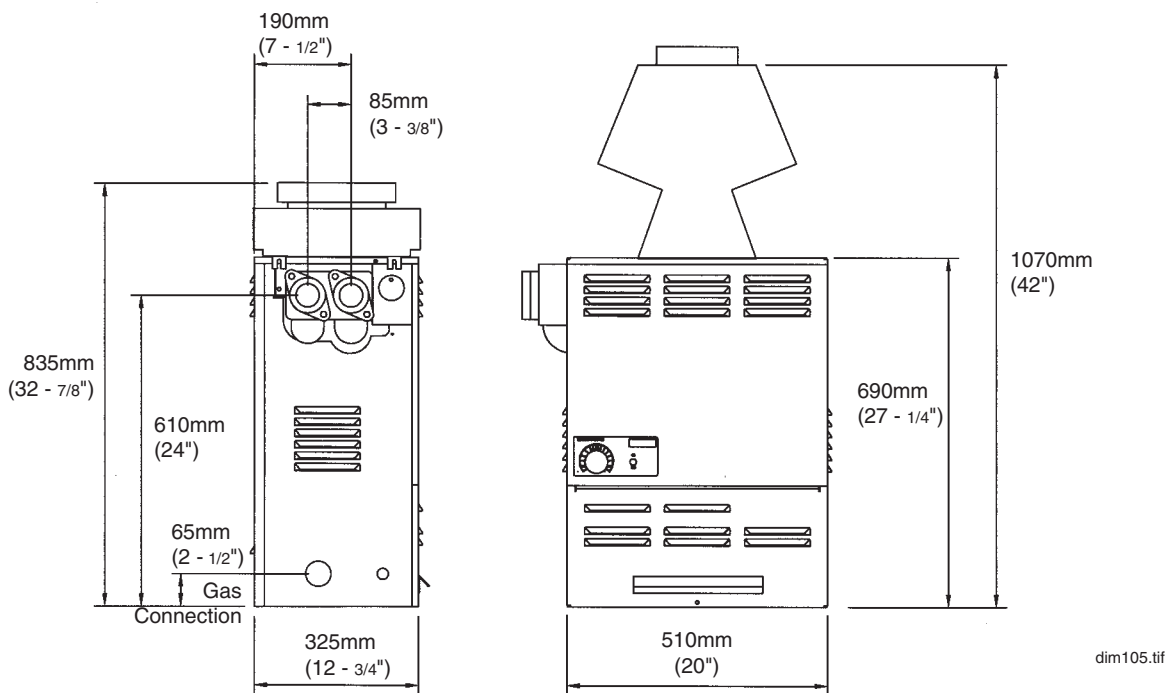
SPECIFICATIONS & DIMENSIONS 055 - 105 - 155

MODEL	FLUE DIA mm (in.)	WATER CONNECTIONS	SHIPPING WEIGHT	
			APPLIANCE	DIVERTER
055	100 (4)	1-1/2" NPT	31.8 (70)	2.3 (5)
105	127 (5)	1- 1/2" NPT	48 (105)	3.5 (8)
155	152 (6)	2" NPT	62 (135)	3.5 (8)

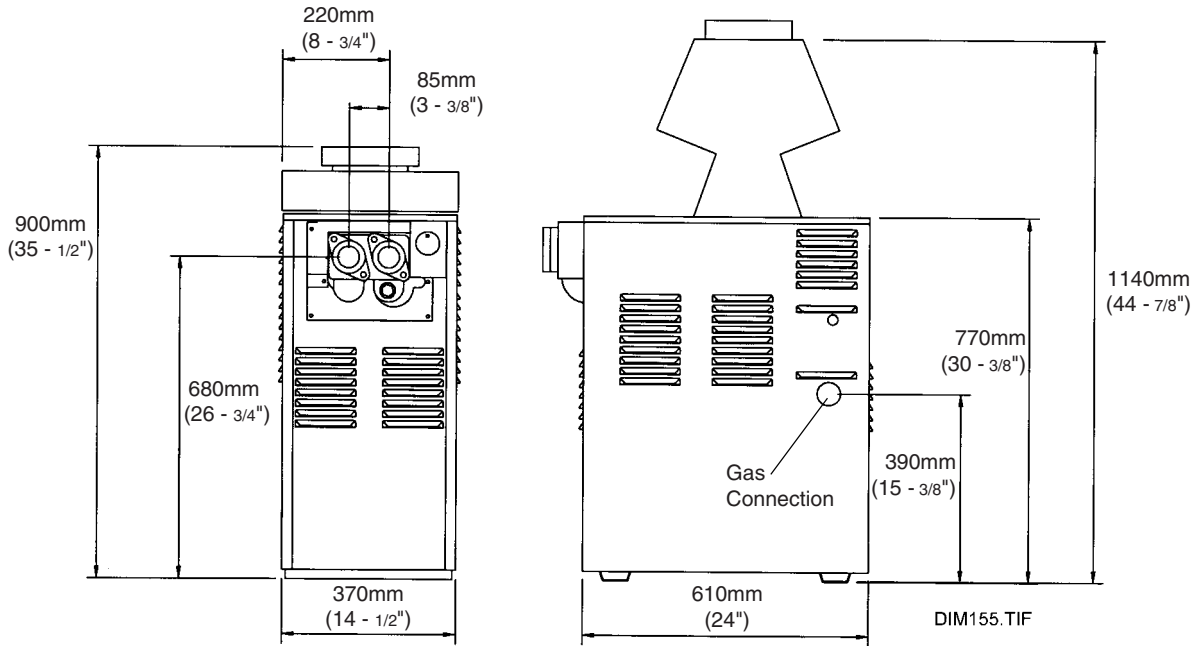
DIMENSIONS - 055 Model Only



DIMENSIONS - 105 Model Only

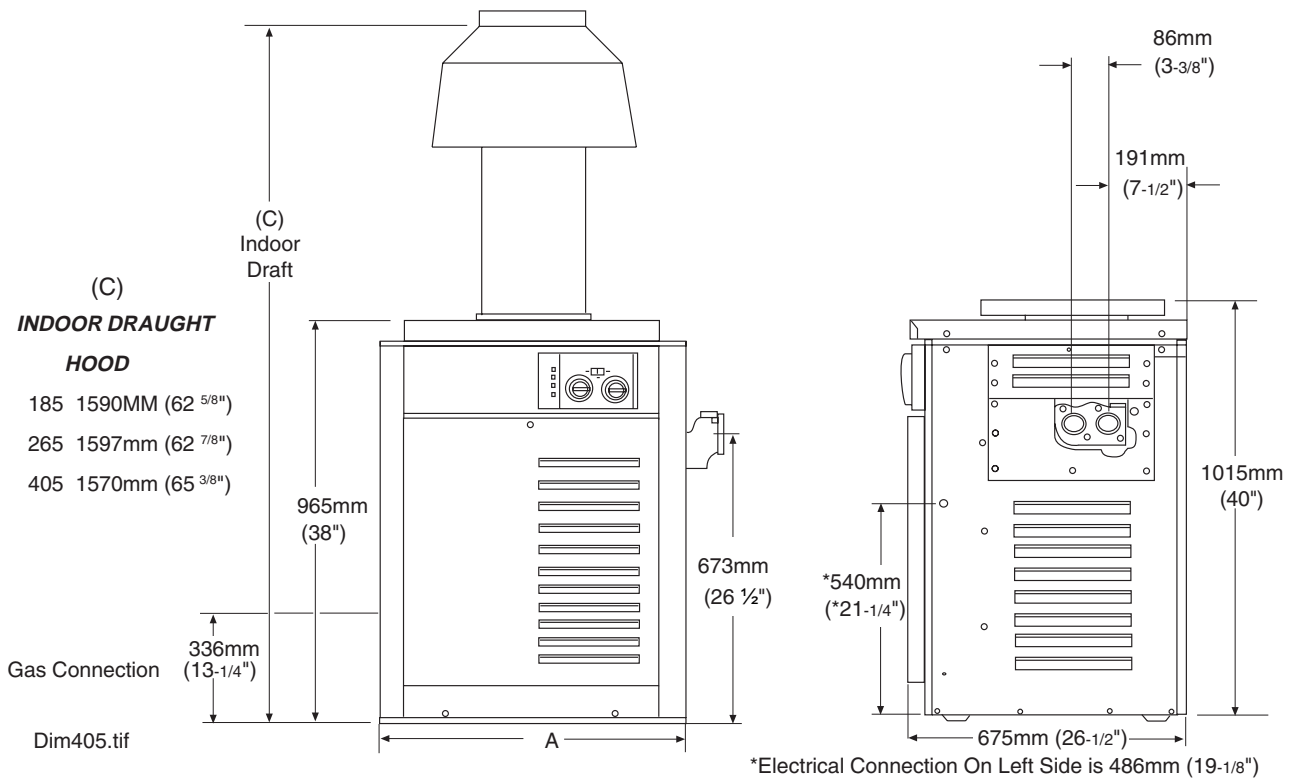


DIMENSIONS - 155 Model Only



SPECIFICATIONS & DIMENSIONS 185 - 265 - 405

MODEL	WIDTH (A) mm (in.)	FLUE DIA mm (in.)	WATER CONNECTIONS	SHIPPING WEIGHT	
				kg (lbs)	
				APPLIANCE	DIVERTER
185	464 (18 1/4)	150 (6)	2" NPT	86.8 (191)	5.5 (12)
265	568 (22 3/8)	175 (7)	2" NPT	97 (214)	7 (15)
405	743 (29 1/4)	230 (9)	2" NPT	115 (253)	9 (20)



VENTILATION REQUIREMENTS

The heater must have both ventilation and combustion air. Safe and efficient operation of the heater is vitally dependant upon a good supply of fresh air to the room in which the appliance is installed. Minimum requirements for net free air supply openings direct to outside air at both high and low level are detailed in the table at the bottom of this page.

Position grilles to avoid the risk of accidental blockage or flooding. Further guidance is given in BS6644.

CAUTION: Combustion air must not be contaminated by corrosive chemical fumes which can damage the heater and void the warranty.

NOTE: The design is also certified by British Gas plc for indoor installation when fitted with appropriate manufacturer's draught diverter and a suitable flue system to outside. The heater must be in a room separated from living rooms and provided with appropriate ventilation direct to outside. It must not be installed in a cupboard or compartment which is directly connected to a living space.

FLUE SYSTEM

WARNING:

Indoor boilers require a draught diverter that must be connected to a flue pipe and properly flued to the outside. Failure to follow this procedure can cause fire or fatal carbon monoxide poisoning.

To ensure safe and satisfactory operation of the heater, the flue system must be capable of the complete evacuation of flue products at all times. The effective height of the flue terminal above the draught diverter must ensure sufficient buoyancy to overcome the resistance of the bends and horizontal runs of the flue pipe. The number of bends and length of horizontal run must be kept to a minimum to reduce resistance.

The chimney must terminate in a downdraught free zone.

Compliance with the recommendations made in BS 6644; British Gas publication IM11 "Flues for Commercial and Industrial Gas fired boilers and air heaters" and the "Third Edition of the 1956 Clean Air Act memorandum" should be strictly observed where applicable.

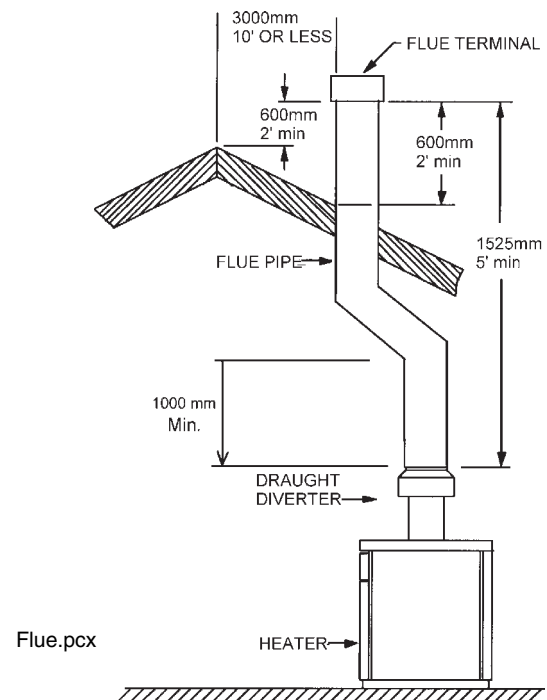
The flue/chimney design should avoid the formation of excessive quantities of condensate and for this reason it is recommended that all chimneys are suitably insulated and lined.

The draught diverter supplied with the heater must be used.

Drain points should be fitted at the bottom of all vertical flue sections. Drain pipes must be a minimum of 25mm (1 in) internal diameter and manufactured from acid condensate resistant material (eg stainless steel) and positioned so that pipe runs and discharge points are not subject to the effects of frost and that flue gases cannot leak into the room.

Any terminal fitted must be of a type acceptable to British Gas plc.

As part of commissioning, the flue must be satisfactory when tested for flue flow and spillage as detailed in BS5440 Part 1.



The chimney must terminate in a downdraught free zone.

Model	Input (kW)	Plant Room (cm ²) <small>ref. BS5440 for models under 60kW ref. BS6644 for models over 60kW</small>			
		Inside		Outside	
		High	Low	High	Low
055	13	117	234	59	117
105	27	243	486	122	243
155	39	351	702	176	351
185	50	450	900	225	450
265	72	-	-	297	600
405	108	-	-	378	756

GAS SUPPLY CONNECTIONS



Gas piping must have a manual shut-off valve located outside the heater jacket. All gas piping should be tested after installation in accordance with local codes.

CAUTION: The heater and its manual shut off valve must be disconnected from the gas supply during any pressure testing of that system at test pressures in excess of 150mbar (2.2psi). Dissipate test pressure in the gas supply line before reconnecting the heater and its manual shut off valve to gas supply line. **FAILURE TO FOLLOW THIS PROCEDURE MAY DAMAGE THE GAS VALVE. OVER PRESSURED GAS VALVES ARE NOT COVERED BY WARRANTY.** The heater and its gas connections shall be leak tested before placing the appliance in operation. Use soapy water for leak test. **DO NOT** use open flame.

NOTE: Do not use PTFE tape on the gas line pipe thread. A Flexible sealant is recommended.

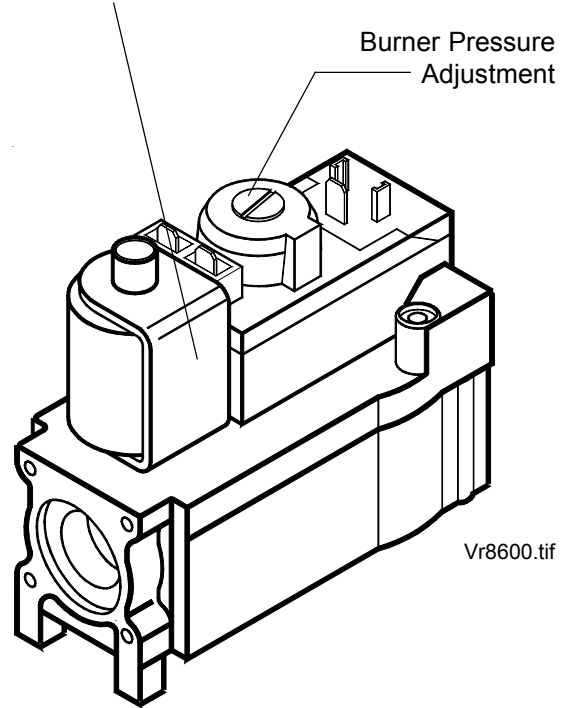
A minimum of 17 mbar (6.8") WG and a maximum of 25 mbar (10") W.G.upstream pressure under load, and no load conditions are provided for natural gas or a minimum of 25 mbar (10") W.G.and a maximum of 45 mbar (18") W.G for propane gas.

GAS PRESSURE REGULATOR

The gas pressure regulator is preset in the factory. If an adjustment is needed, remove cap and turn adjustment screw clockwise  to increase pressure or counterclockwise  to decrease pressure.

Turn to page 7 for burner pressure and other relevant performance specifications.

Honeywell Gas Valve



PIPE SIZING FOR GAS CONNECTIONS

MAXIMUM EQUIVALENT PIPE LENGTH METRES

N - NATURAL GAS @ 1.0 mbar PRESSURE DROP							
P - L.P.G. @ 2.5 mbar PRESSURE DROP							
	10mm		15mm		22mm		28mm
MODEL	N	P	N	P	N	P	N
055		6	12	15			
105			3	5	20		
155					10.5	>24	36
185					8	>24	29
265					4.5	18	14.5

PLUMBING FOR WATER CONNECTIONS
LEFT SIDE WATER CONNECTION CONVERSION
185, 265 & 405 Models Only

Dis-assembly:

1. Remove the jacket top, upper side panels, right and left side access panel (see figure 1).
2. Remove rain shield front and side panel assembly as follows: (see figure 2).
 - a) Remove front screws attaching rain shield to the vertical surface behind the control compartment.
 - b) Remove four (4) screws attaching the rain shield to the rear vertical support panel.
 - c) Remove front and side rain shield panels, leaving the back shield in place.
3. Remove the flue collector housing (see figure 3).
4. Disconnect wires to high limit and AGS (Automatic Gas Shut-off) limit switches in return and inlet/outlet header castings (see figure 4).
5. Remove pressure switch as follows: (see figure 4).
 - a) Disconnect wires to pressure switch.
 - b) Disconnect tube fitting from header casting.
 - c) Remove pressure switch with tubing through the front of the heater.
6. Remove thermostat temperature sensor (see figure 4).

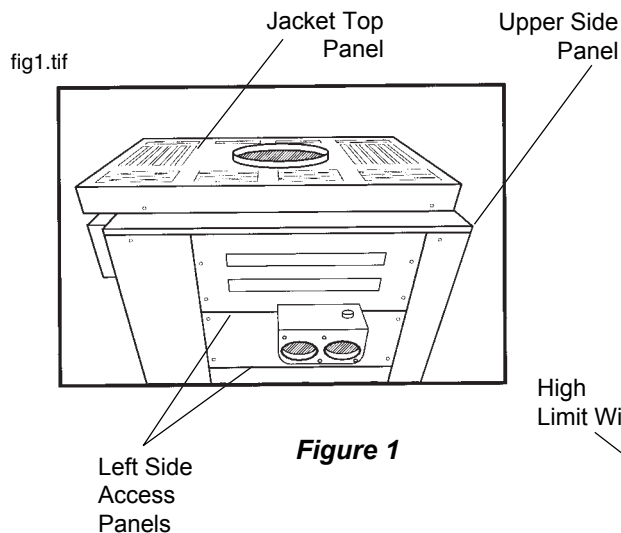


Figure 1

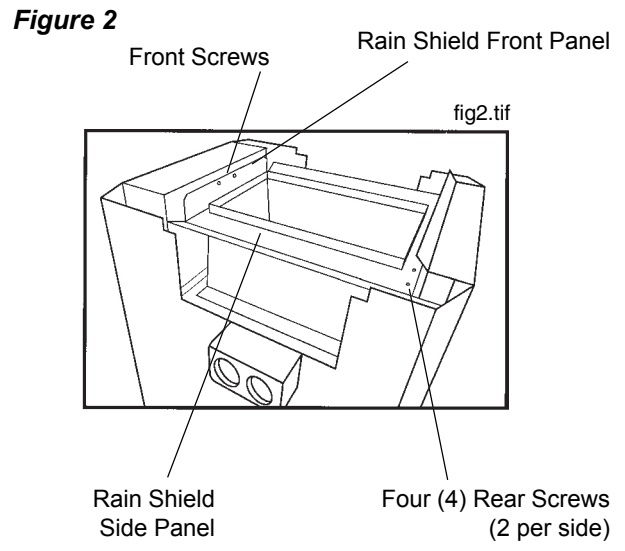


Figure 3

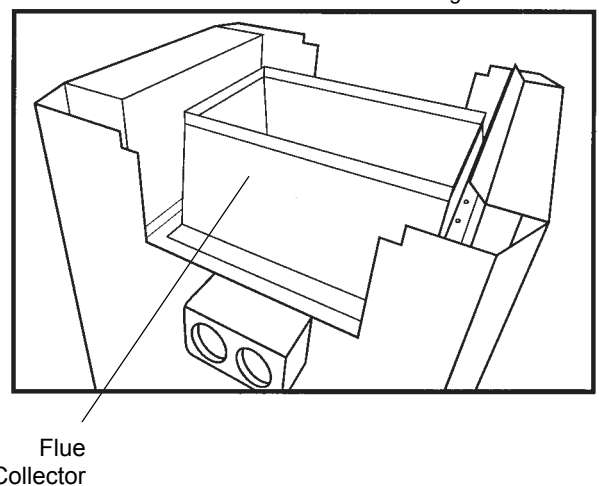
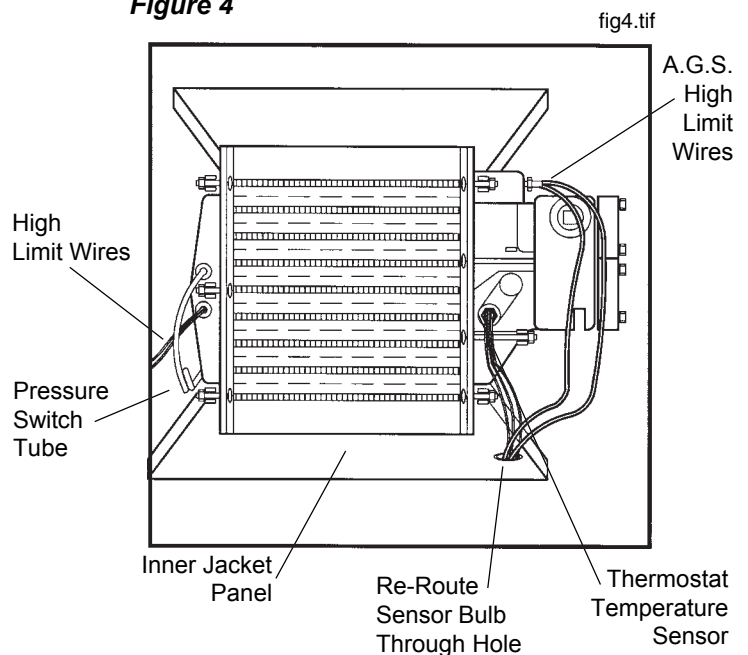


Figure 4



7. a) Disconnect the three (3) pin sensor plug from the poolstat circuit board (see figure 5).
- b) Push the connector plug and wires down through the control box holes (see figure 5) and then through the inner jacket panel hole into the heat exchange area (see figure 4).

Reverse Heat Exchanger:

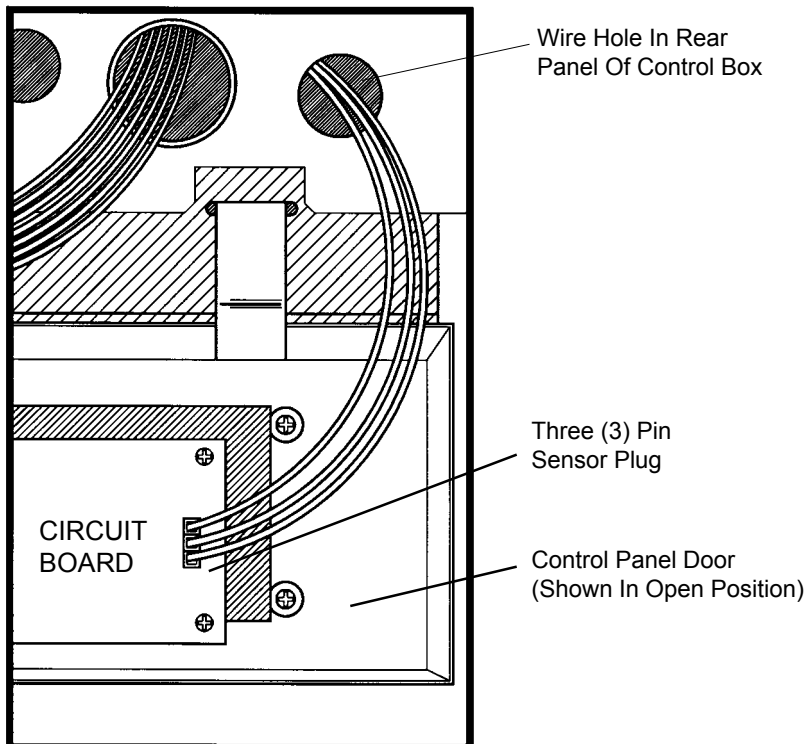
8. Lift the complete heat exchanger straight up and out of the unit. Use care not to damage the combustion chamber blocks.
9. Re-route the pressure switch tube back through the right side of the inner cabinet panel.
10. Rotate the heat exchanger (inlet/outlet casting will be on the left) and lower it back into place above the combustion chamber. Again, be careful not to damage the combustion chamber blocks.

Assembly:

11. Re-route the three (3) pin plug and sensor wires from the heat exchange area through the hole in on the right side of the inner cabinet panel then up into the control box. Plug the three (3) pin connector back into the poolstat circuit board (see figure 5).
12. Connect the pressure switch tube to the same hole it was removed from in the return header.
13. Re-route the pressure switch wires to the right side and connect them to the pressure switch.

14. **OPTIONAL**, re-route the AGS wires to the left side and overheat thermostat capillary to the right side. Connect the wires to the sensors in the header castings.
15. Replace the flue collector. Use caution not to damage any wiring and make sure no wiring comes in direct contact with the flue collector.
16. Replace the rain shield and screws (see figure 2).
17. Reverse and replace right and left access panels
18. Replace top side panels and jacket top panel.

board.tif



CONNECTIONS

All Models

LOCATION

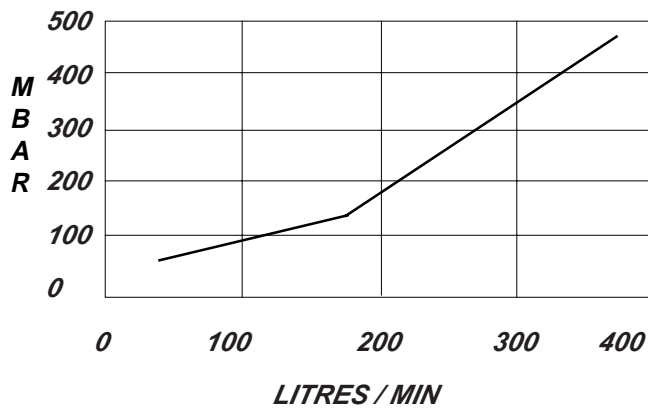
The heater requires water flow and pressure to operate properly. It must therefore be installed downstream of the discharge side of the filter pump. A typical installation is plumbed as follows:

1. The inlet side of the filter is plumbed to the discharge side of the filter pump.
2. The outlet side of the filter is then plumbed to the inlet of the heater.
3. The outlet of the heater is plumbed to the return line to the pool or spa. The pump, filter and heater are plumbed in series.

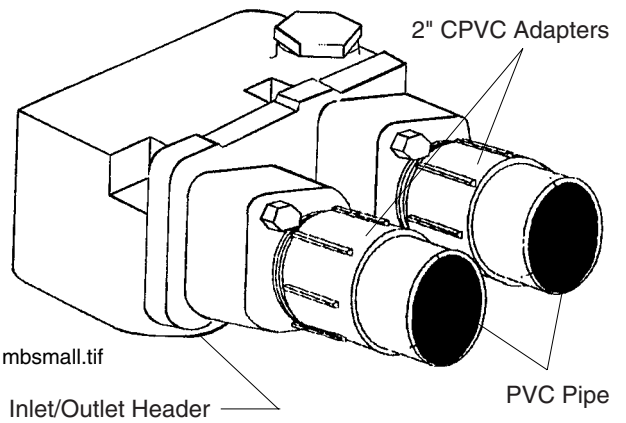
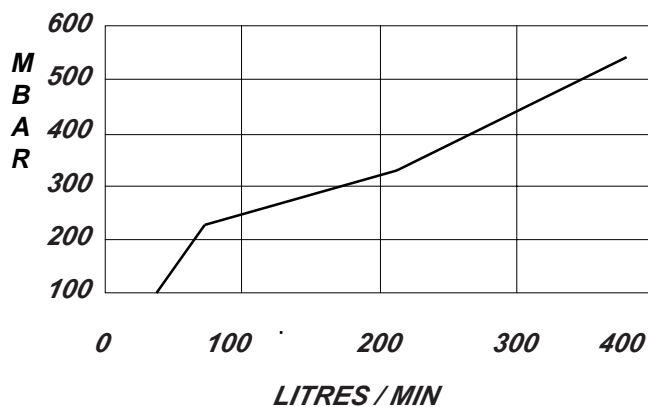
Plumbing from the heater back to the pool must not have any valves or restriction that could prevent flow when the pump is operating.

Use the pressure loss chart below to specify a suitable pump.

PRESSURE LOSS CHART 055 / 105 / 155 MODEL ONLY



PRESSURE LOSS CHART 185 / 265 / 405 MODELS ONLY



Heater must be located so that any water leaks will not damage the structure of adjacent area. High temperature 2" plastic pipe (CPVC) may be threaded directly into the header flanges. This is not the same as the Schedule 80 PVC pipe which is also coloured grey. PVC may be used immediately after the CPVC adapters.

NOTE: If operating pressure above 2 bar (30psi) are encountered then connection pipes must either be screwed into the flange or suitably anchored.

CAUTION: NEVER install PVC directly into header flanges.

FLOW RATES

MODEL	PIPE SIZE	MINIMUM/min. Litres (Gals)	MAXIMUM/min. Litres (Gals)
055	1-1/4"-1-1/2"	77 (17)	225 (50)
105	1-1/4"-1-1/2"	77 (17)	430 (95)
155	1-1/4"-1-1/2" -2"	77 (17)	430 (95)
185	1-1/4"-1-1/2" -2"	77 (17)	470 (104)
265	1-1/4"-1-1/2" -2"	95 (21)	470 (104)
405	1-1/4"-1-1/2" -2"	150 (33)	470 (104)

*When flow rates exceed maximum an external auxiliary bypass valve is required. See external bypass valve section for details.

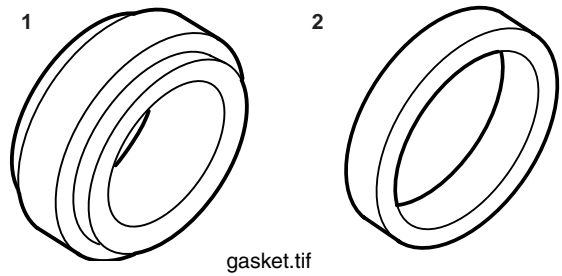
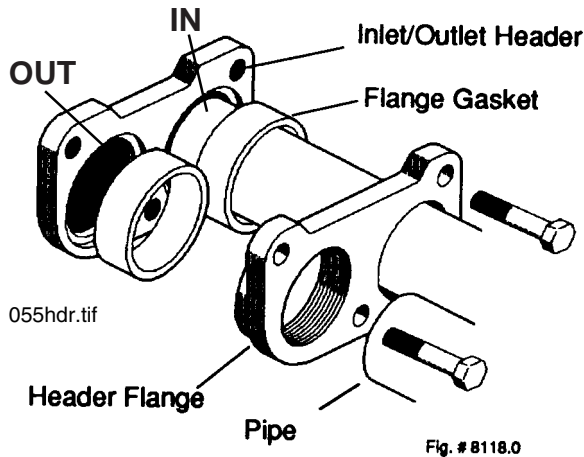
COMPANION FLANGE CONNECTIONS

DO NOT use petroleum base assembly fluids (such as Petroleum Jelly or lubricating oil). If assembly lube is required, use a silicone base such as Amoral etc.

055 Model Only

The inlet/outlet header flange accepts a 1 1/2" copper tube or 1 1/4" galvanized pipe as a slip connection directly into the manifold. The flange is also threaded for 1 1/2" pipe thread.

055 Models Only



UNITHERM GOVERNOR OPERATION
Does not apply to 105 Model

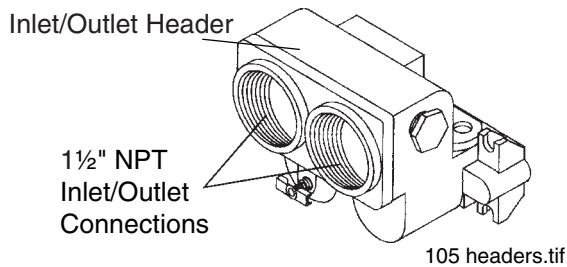
The patented Unitherm Governor is a thermostatic mixing valve specifically designed to maintain constant heater internal temperature between 40.6 to 46.1°C despite continually changing flow rates from the filter and changing pool temperatures. This narrow range is needed to prevent damaging condensation on the burners which will occur if the heater runs for any length of time below 37.8°C. It is also needed to inhibit scale formation in the tubes by maintaining temperatures well below accelerated scaling temperatures.

INTERNAL AUTOMATIC BY-PASS VALVE
Does not apply to 055 Model

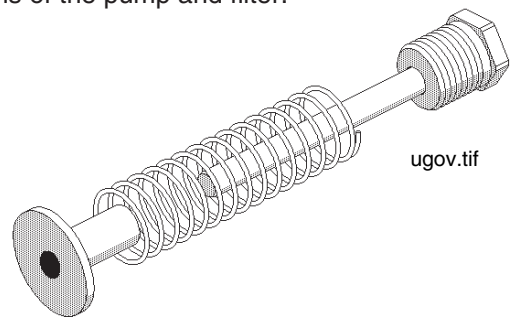
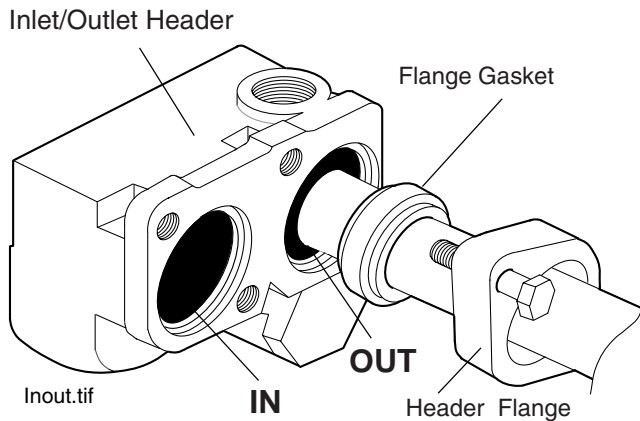
In addition to the Unitherm Governor, a built-in automatic by-pass valve is provided in the in/out header. While the Unitherm Governor responds to the changes in water temperature in the heater, the internal by-pass valve automatically responds to changes in water pressure in the piping system. Proper amount of water flow is maintained through the heater under varying pressures dictated by the conditions of the pump and filter.

105 Model Only

The 105 accepts direct connection to 1½" plastic pipe using the adapters provided.



155, 185, 265 & 405 Models Only



155, 185, 265 & 405 Models Only

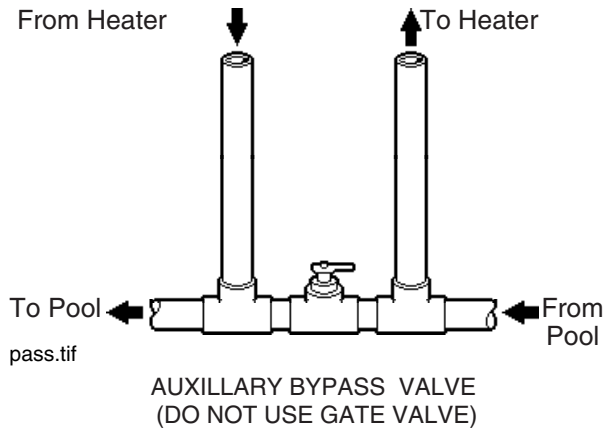
There are two sets of flange gaskets supplied with your heater. Use the appropriate gaskets for all your heater connections. Discard unused set.

GASKET DESIGN 1: Accepts 1-1/2" copper tube or 1-1/4" galvanized pipe as a slip connection.

GASKET DESIGN 2: Accepts 2" copper tube as a slip connection. The flange is threaded for 2" screw in pipe connections. Also used with the 2" CPVC adapters.

EXTERNAL AUXILIARY BYPASS VALVE
(Where Required)

An auxiliary bypass valve should be used when flow rates exceed those shown in the table in the 'Connections' section on p18. (usually a high performance pump size larger than two HP will exceed this flow rate). This valve is required to complement the function of the automatic bypass valve, particularly when starting the heater in winter or early spring when the spa or pool temperature is down below 10°C. It also serves to eliminate needless pressure drop through the heater and accompanying reduction in the flow rate to the spa jets, etc.

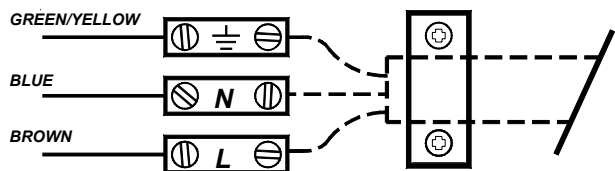


AUXILIARY BYPASS VALVE ADJUSTMENT
To set bypass: With clean filter, adjustment is made by feeling the inlet and outlet pipes at the heater. Outlet pipes should be slightly warmer than inlet and comfortable to the touch. If pipe is hot, close bypass; if cold, open bypass.

ELECTRICAL WIRING

NOTE: If it is necessary to replace any of the original wiring, it must be replaced with 105° C wire or its equivalent, except all black wire which must be replaced with 150° C wire or its equivalent.

INTERNAL WIRING



mainsin.tif

INSTALLER WIRING

NOTE: Heaters are factory wired for 230V power supply.

NOTE: 22mm Dia. holes not utilized on jacket and control box can be used for fireman switch or auxiliary control interface wiring.

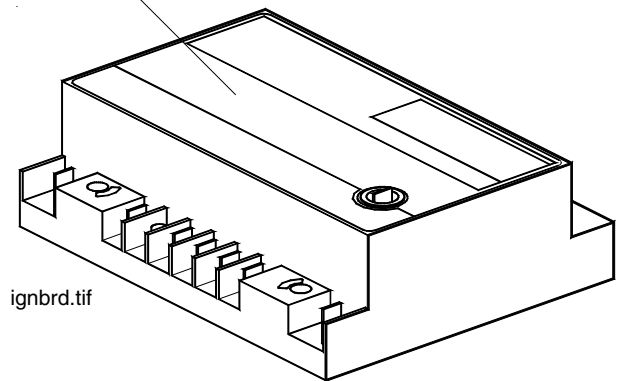
The *Electronic Intermittent Ignition Device* automatically lights the pilot and main burners upon a call for the heat. The heater is supplied with a transformer for 230V mains input.

NOTE:

Heater is equipped with an electronic ignition device with a 100% safety lockout feature. If the heater fails to start or lockout, reset the ignition device by interrupting the power to the heater for 60 seconds.

Caution: If service replacement of the electronic ignition device is required, replace only with the ignition component supplied as a required spare.

Robertshaw Intermittent Ignition Device.



ignbrd.tif

Wiring external to the appliance must be in accordance with the IEE Wiring Regulations and any local regulations which apply.

A 3 pin unswitched shuttered socket outlet, fused at 3A must be provided near to the heater, this should serve only the heater together with its controls and pumps.

Wiring should be 3 core PVC insulated (minimum,) not less than 24 x 0.2mm. All fuses must be ASTA approved to BS1362.

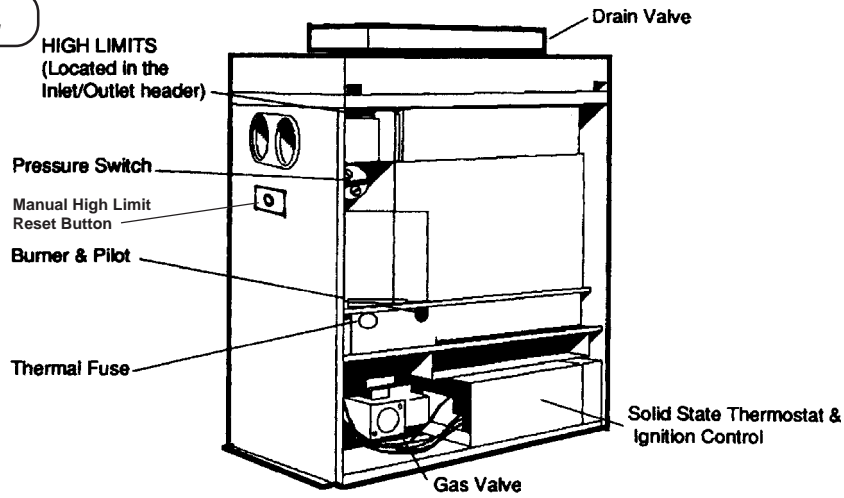
Connect the power supply as shown above. Ensure that the cable is clamped in the cable clamp. The wires must be such that the current carrying conductors become taut before the earth conductor in the event of the cable clamp not gripping the cable adequately.

NOTE: Input power to the heater (220V) should be supplied from the load (Pump) side of time clock or switch. Connecting heater to continuous power source will allow "Fail" indications (service and pressure switch) when pump is not operating.

SECTION 4 / SERVICING INSTRUCTIONS

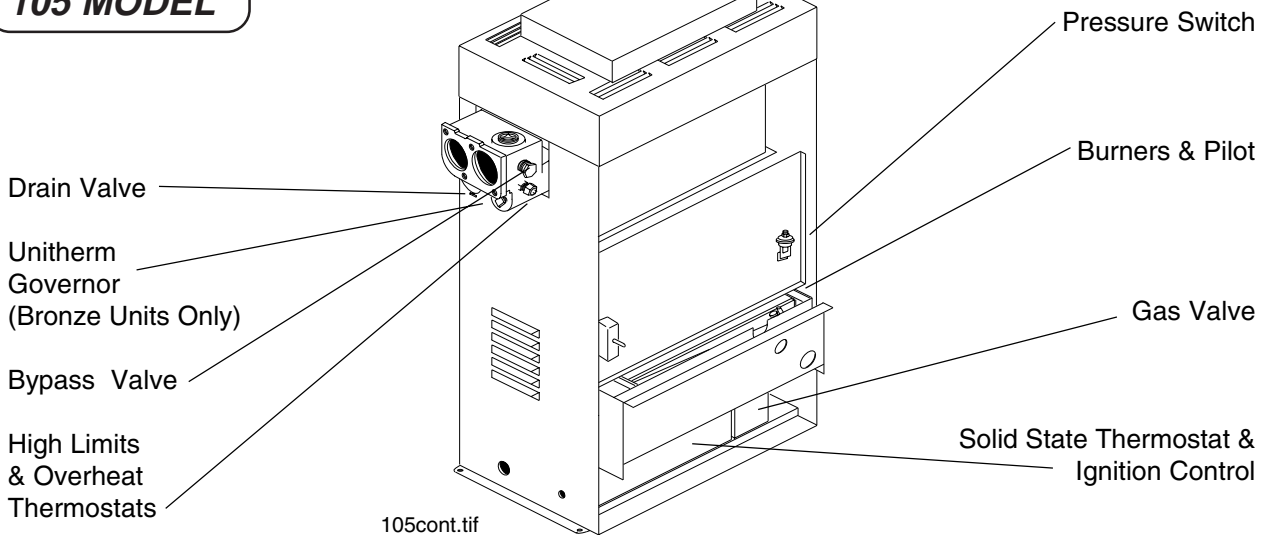
GENERAL LOCATION OF CONTROLS

055 MODEL



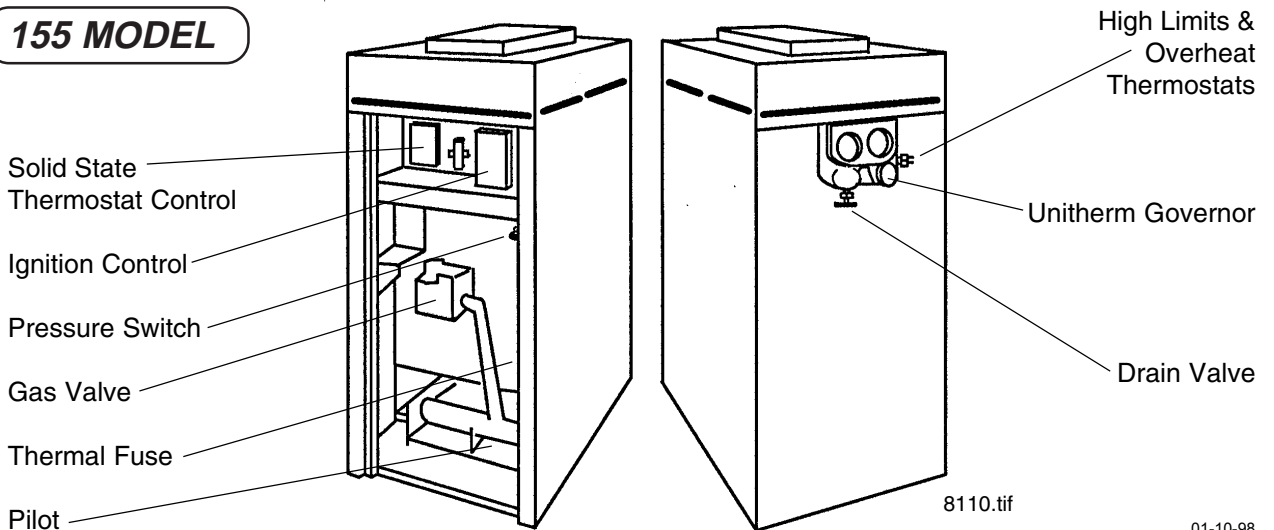
055cont.tif

105 MODEL



105cont.tif

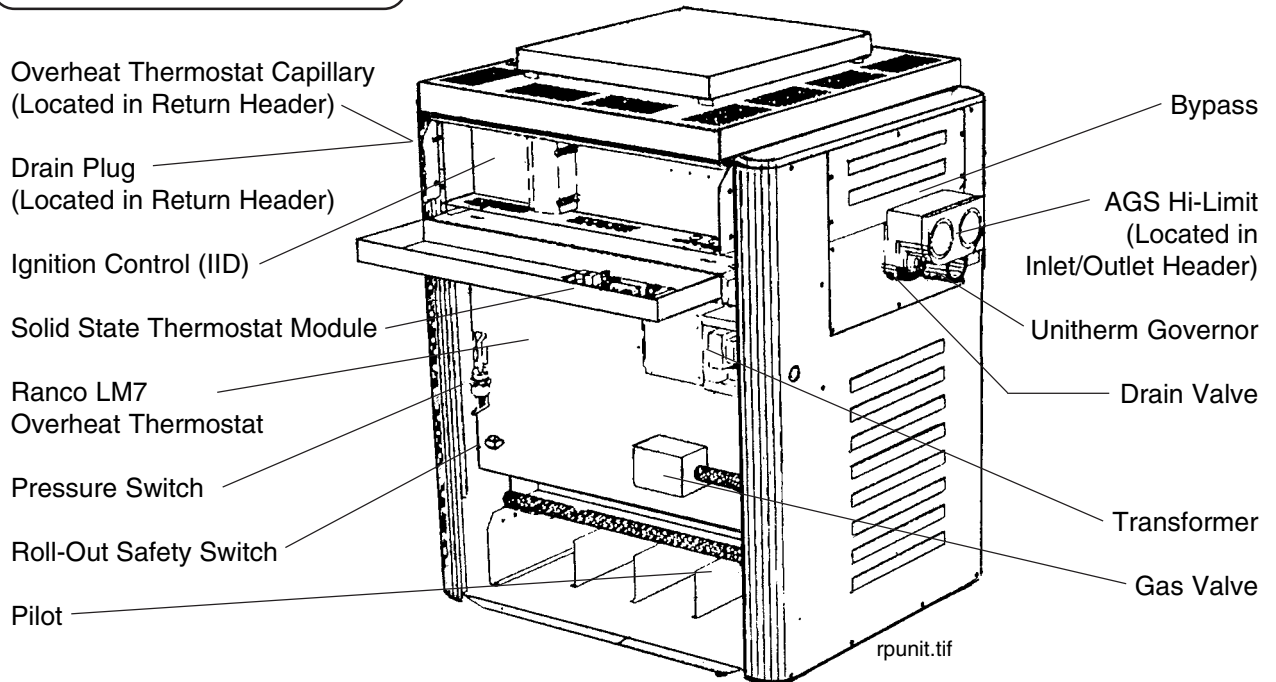
155 MODEL



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GENERAL LOCATION OF CONTROLS - continued.

185-265-405 MODEL

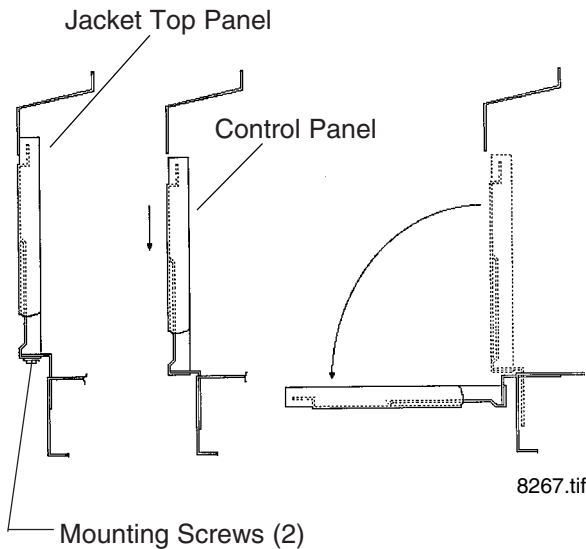


155 Model

CONTROL PANEL REMOVAL

1. Remove lower door.
2. Remove (2) screws from bottom flange of control panel.
3. Slide down control panel to clear jacket top panel.
4. Rotate control panel down until panel stops. Do not force.

NOTE: Caution must be taken not to damage controls or wiring.

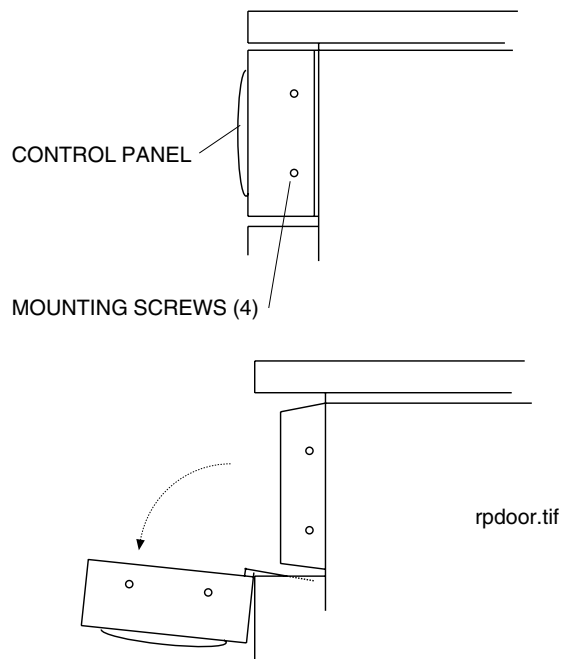


185,265 & 405 Models

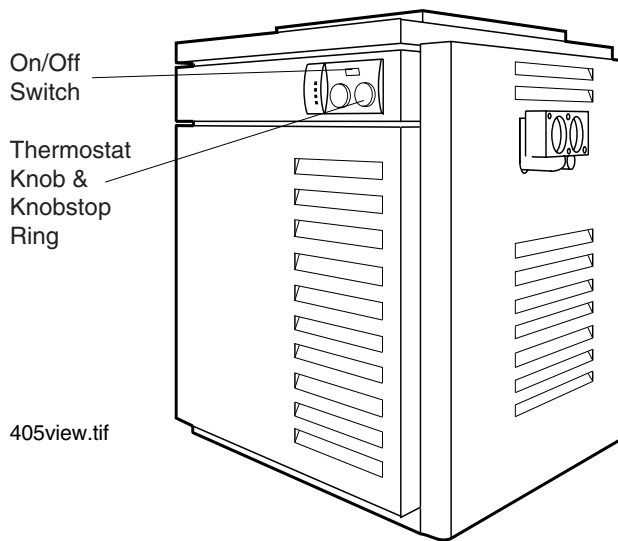
CONTROL PANEL REMOVAL

1. Remove (4) screws from sides of control panel.
2. Rotate control panel down until panel stops. Do not force.

NOTE: Caution must be taken not to damage controls or wiring.



185,265 & 405 Models



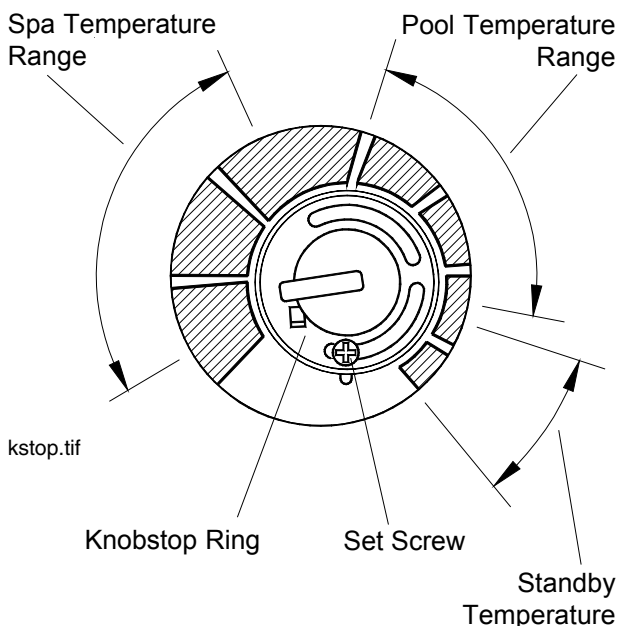
405view.tif

All Models

TEMPERATURE CONTROLS

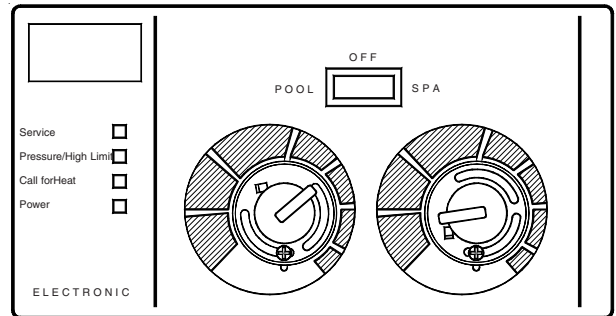
The pool or spa water temperature is controlled by the pool heater thermostat on the upper front panel of the heater. The control centre contains an On/Off switch and one thermostat (**055,105 & 155 models**) or two thermostats (**185,265 & 405 models**). Heaters fitted with two thermostats may be set up for one temperature setting when heating a spa and a second temperature setting for heating a swimming pool. The switch functions as a means for turning the heater on or off, and for switching between thermostats when fitted with two thermostats.

Thermostats are fitted with a means of limiting the upper temperature limit below the maximum level. The knob stop adjustment ring illustrated below is adjustable by loosening the set screw, rotating the knobstop ring to the desired location and retightening the set screw.



kstop.tif

185,265 & 405 Models



rpcont.tif

There are four operational indicator lamps located on the 185, 265 & 405 Spa/Pool control panel. They are as follows:

1. The "Power" (green) lamp is on when power is applied to the RP 2100 Spa/Pool heater.
Green ON – Power to Heater Normal
2. The "Call For Heat" (green) is on when thermostat is functionally calling for heat.
Green ON – Call for Heater Normal
3. The "Pressure/High Limit" (red) indicates "safety" failure.
Red ON – Pressure/High Limit Failure Service Required
4. The "Service" (red) indicates failure of control/limit circuit.
Red ON – Service Required

NOTE: If both the "Service" and "Pressure/High Limit" indicators are On, check first and make sure that the Filter/Strainer are clean before calling for service.

All Models

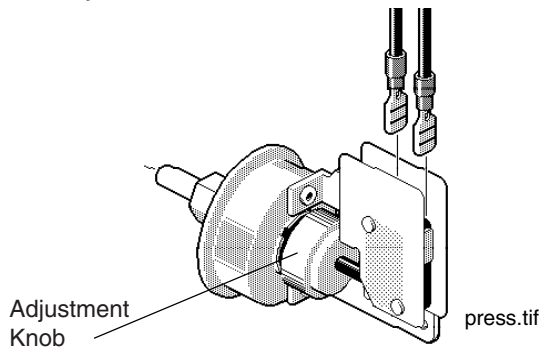
PRESSURE SWITCH

The pressure switch, or heater actuator, ensures that the heater operates only when the filter pump is in operation. It is factory set at 0.12 bar (1.75 PSI) for deck level installations. When the heater is located below the level of the spa or pool, it may be necessary to reset the pressure switch to compensate for the no-flow static head. If it is necessary to reset the pressure switch, we recommend the following procedure:

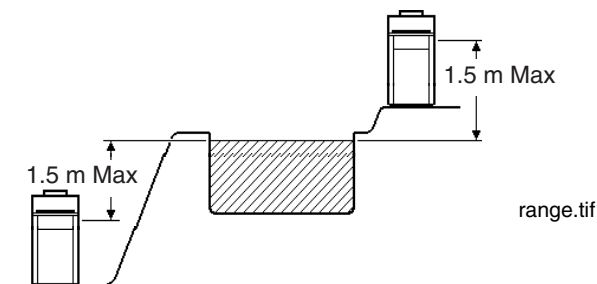
All Models

PRESSURE SWITCH ADJUSTMENT

1. With pump and heater on, turn adjustment knob (clockwise) until a click is heard from the gas valve.
2. Turn adjustment knob (**counter clockwise**) 1/4 turn.
3. Turn pump off and on several times. Heater should shut off immediately. If it does not, repeat steps above until proper adjustments is made.



PRESSURE SWITCH ADJUSTMENT RANGE



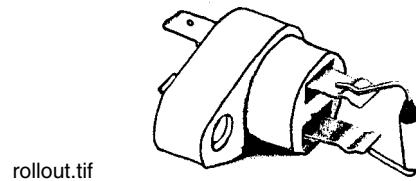
NOTE: If heater is installed outside of the limits shown, a flow switch must be used in place of the pressure switch when mounted and wired adjacent to the heater.

TWO SPEED PUMPS

In some cases, the flow on the low speed is insufficient to operate the heater. This is apparent when the pressure switch cannot be further adjusted or if the heater makes banging noises. In these cases, the pump must be run at high speed when heating the water.

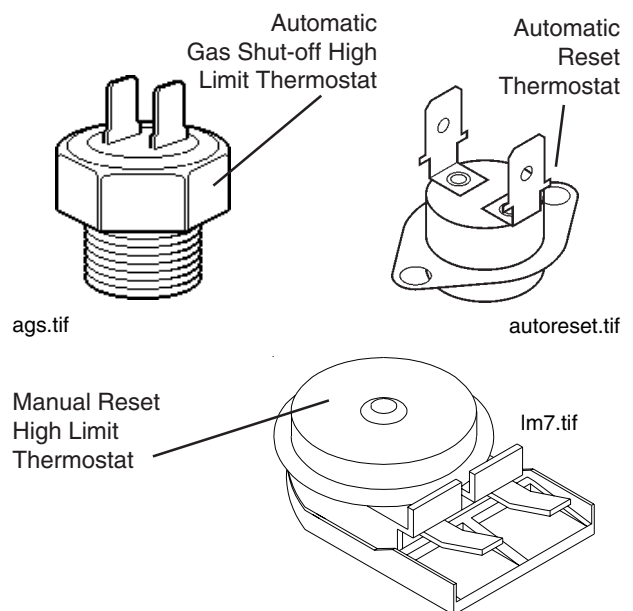
CAUTION: Do not operate the heater without the function of a properly adjusted pressure switch or flow switch.

FLAME ROLL-OUT SAFETY SWITCH



The heater is equipped with a thermal cutoff device to prevent flame roll-out in the event that the heat exchanger becomes blocked. This is a "Single-use" type fusible link or thermal fuse, that must be replaced when disabled by an over temperature condition, caused by excessive restriction in the heat exchanger flue passage.

HIGH LIMITS



The heater is equipped with one manual reset over-heat thermostat located in the return header, set to open at approx. 100°C. the other is the Automatic Gas Shut-off limit, set to open at 57°C and located in the Inlet/Outlet header.

NOTE: An erratic high limit is often characteristic of internal heat exchanger problem, i.e. scale buildup, defective bypass. Refer to troubleshooting sections.

055, 105 & 155 Models

HIGH LIMIT & MANUAL RESET HIGH LIMIT THERMOSTAT REMOVAL

Disconnect top portion of unit. (See heat exchanger removal procedure steps 1 thru 7 and step 10).

1. Remove Jacket Top, Flue Collector and Baffle.
2. Remove defective high limit and replace with new high limit.

- To remove the manual reset high limit, follow the procedure for the high limit thermostat but in addition, disconnect the electrical connections and release its mounting bracket from the side panel by removing the M4 nut at the front of the bracket. The thermostat can then be removed from its bracket. Ensure thermostat phial is correctly located in its pocket.
- Reverse above procedure to reinstall.

185, 265 & 405 Models

MANUAL RESET HIGH LIMIT REMOVAL

- Shut off main electrical power switch to heater.
- Remove inspection panels.
- Disconnect electrical connections from thermostat.
- Remove defective high limit and replace with a new high limit. Secure bulb in pocket with chip provided.
- Reverse above procedure to reinstall.

HIGH LIMIT REMOVAL (A.G.S.)

- Shut off main electrical power switch to heater.
- Remove inspection panels.
- Drain heater.
- Remove defective high limit and replace with a new high limit.
- Reverse above procedure to reinstall.

All Models

PILOT SAFETY IGNITION

The heater employs a pilot safety which closes the main gas valve within 8/10ths of a second whenever the pilot flame is interrupted. Pilot flame is automatically lit when the device is powered. Unit performs its own safety check and opens the main valve only after the pilot is proven to be lit.

BURNER DRAWER REMOVAL

- Shut off main electrical power switch to heater.
- Shut off gas upstream of heater.
- Remove front door.
- Disconnect gas line from gas valve.
- Remove (2) screws that mount burner tray to unit.
- Disconnect wires that terminate at gas valve.
- Slide out burner tray.
- Reverse above procedure to re-install.

NOTE:-IMPORTANT Reconnect Earth Connection

055, 105 & 155 Models

GAS VALVE REMOVAL

- Remove burner tray. (See burner drawer removal procedure).
- Disconnect pilot tubing from gas valve.
- Remove gas valve with manifold from burner tray.
- Remove manifold from gas valve.
- Reverse above procedure to re-install.

185, 265 & 405 Models

GAS VALVE REMOVAL

- Shut off gas supply to the heater. Remove gas piping to gas valve inlet.
- Disconnect wires, pilot tubing and bleed line, if required.
- Turn vertical gas pipe from manifold slightly and unscrew gas valve.
- Reverse above procedure to re-install.

All Models

MAIN BURNER AND INJECTOR REMOVAL

- Remove burner drawer. See burner drawer removal procedure.
- Remove screws and burner hold down bracket.

NOTE: *If the heat exchanger is sooted badly, the burner hold down bracket and spacer can become distorted from direct flame impingement and this usually necessitates replacement of these parts.*

- Lift burners from slotted spacers and slide from orifices. Clean with a wire brush.
- Orifices usually do not need to be replaced. To clean, run either copper wire or a drill shank through orifice. Do not enlarge hole. To remove orifice, use a socket wrench and remove from manifold. **DO NOT** overtighten when reinstalling.

055, 105 & 155 Models

PILOT REMOVAL AND CLEANING

- Remove burner drawer. (See burner drawer removal procedure).
- Disconnect pilot tubing, disconnect wires from gas valve.
- Disconnect pilot bracket from burner shield.
- Remove pilot from bracket.
- Remove pilot orifice, and clean with wire or small brush. **CAUTION! DO NOT** enlarge hole in pilot orifice.
- Reverse above procedure to re-install.

185, 265 & 405 Models

PILOT REMOVAL AND CLEANING

1. Disconnect pilot tubing, and wires from gas valve.
2. Remove pilot assembly from burner tray.
3. Remove pilot from bracket.
4. Remove pilot injector and clean with wire or small brush. **CAUTION!** Do not enlarge hole in pilot orifice.
5. Reverse above procedure to re-install.

HEAT EXCHANGER REMOVAL

1. Shut water, gas and electricity off, close valves and relieve pressure, remove relief valve. Remove side inspection panels.
2. Remove top holding screws.
3. Remove draft diverter, lift and remove top and flue collector. Remove inspection panels.
4. Loosen bolts and disconnect flange nuts on inlet-outlet header, loosen union(s) at gas pipe and slide boiler away from piping until studs clear the header.
5. Lift heat exchanger straight up using caution not to damage refractory.
6. Reverse above procedure to reinstall.

055, 105 & 155 Models

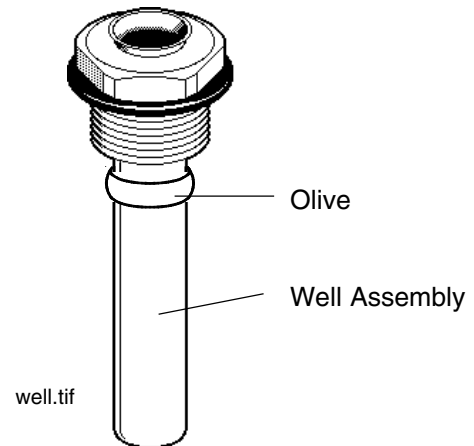
HEAT EXCHANGER REMOVAL

1. Shut water, gas, and electricity off, close valves and relieve pressure.
2. Drain heat exchanger.
3. Loosen and remove flange bolts.
4. Remove flange and inlet/outlet pipes from the header.
5. Remove outdoor stackless top or indoor stack top from unit.
6. Remove jacket top, flue collector, and baffles.
7. Remove upper front jacket panel, and disconnect wires at toggle switch.
8. Remove capillary bulb from inlet/outlet header.
9. Disconnect press switch tube from return header.
10. Disconnect hi-limit wire from thermostat, and pressure switch. Remove overheat thermostat capillary & phial.
11. Lift heat exchanger straight up from combustion chamber, using caution not to damage refractory.
12. Reverse above procedure to re-install.

All Models

CONTROL IMMERSION WELL REPLACEMENT

1. Shut water off to heater and drain heat exchanger.
2. Remove jacket top panel.
3. Remove old control well with bushing and sleeve, with 7/8" wrench or socket.
4. Slip "o" ring gasket over control well and install in header.

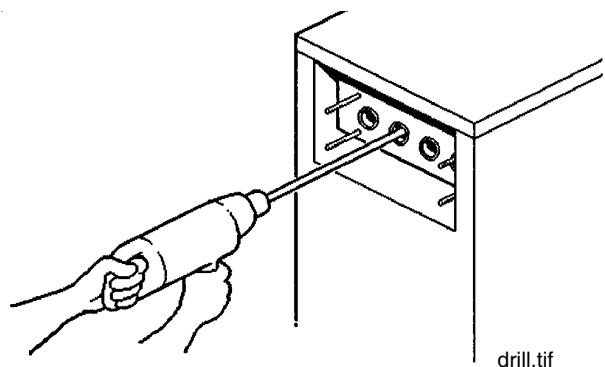


TUBE CLEANING PROCEDURE (Typical)

Establish a regular inspection schedule, frequency depending on local water condition and severity of service. Do not let the tubes clog up solidly. Clean out deposits over 1.5 mm in thickness.

The heater must be cleaned from the rear as shown. It is preferable, however, to remove the heat exchanger and the in/out header for better visibility through the tubes and to be sure the ground-up lime dust does not get into the system, Note that you do not remove the top panel or the heat exchanger, generally.

After reaming, mount the wire brush in place of the auger and clean out debris remaining in the tubes. Another method is to remove the heat exchanger, ream tubes and immerse heat exchanger in non-inhibited de-scale solvent.



All Models

DESOOTING PROCEDURE

CAUTION: SOOT IS COMBUSTIBLE. EXERCISE EXTREME CARE. NEVER USE A WIRE BRUSH.

Soot can clog areas between fins and cause eventual tube failure. Any sign of soot at the base of the burners or around the outer jacket indicates a need for cleaning.

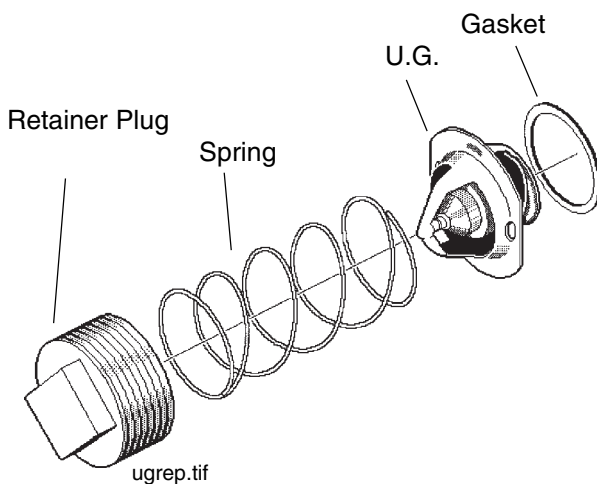
1. Disconnect top portion of unit. (See heat exchanger removal procedure steps 1 through 6).
2. Remove burner tray (See burner drawer removal procedure.)
3. Take a garden hose and wash heat exchanger, making sure soot is removed completely from between fins. Avoid excessive water against refractory.

NOTE: DO NOT WIRE BRUSH.

155, 185, 265 & 405 Models

UNITHERM GOVERNOR (U.G.) REPLACEMENT

1. Shut water, gas and electricity off, close valves and relieve pressure.
2. Drain heat exchanger.
3. Remove retainer plug located under outlet pipe connection.
4. Remove spring and replace old U.G. with a new U.G.
5. Reverse above procedure to reinstall.

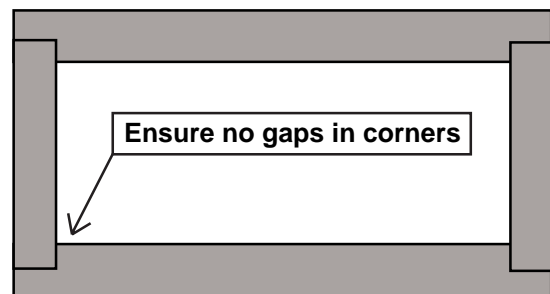


To test the operation of the Unitherm Governor, place in hot water (over 43°C) and watch for movement against spring. If there is no movement, replace unit.

055, 105 & 155 Models

COMBUSTION CHAMBER REMOVAL

1. Remove heat exchanger (See heat exchanger removal procedure).
2. Lift up and remove front and rear refractory shield.
3. Remove refractory panels.
4. Reverse above procedure to re-install.

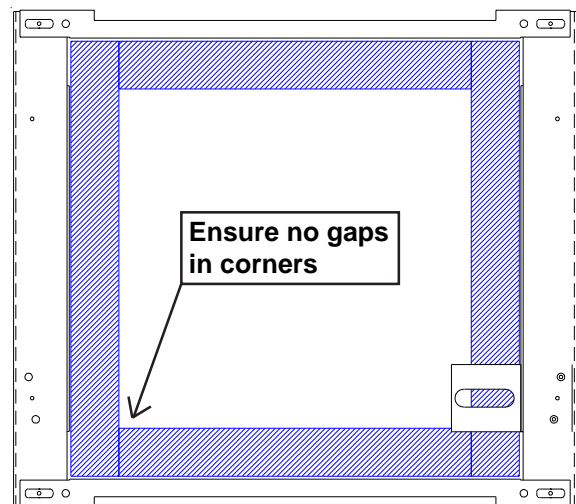


Refractory Panels Top View

185, 265 & 405 Models

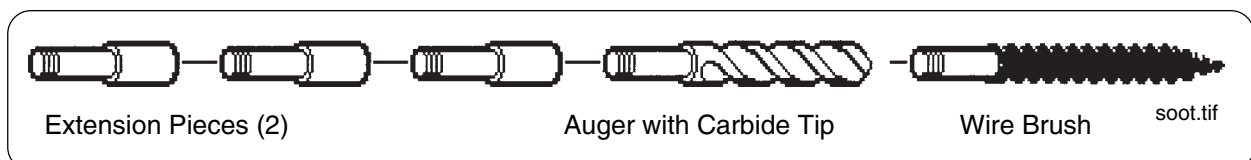
COMBUSTION CHAMBER REMOVAL

To remove combustion chamber, you must first have removed the heat exchanger. Unbolt metal combustion chamber retainer from top and remove combustion chamber panels individually.



ref265.dwg

Refractory Panels Top View



SECTION 5 / TROUBLE SHOOTING GUIDE

IMPORTANT NOTICE: These instructions are primarily intended for the use of qualified personnel specifically trained and experienced in the installation of this type of heating equipment and related system components. Installation and service personnel must be Gas Safe Registered. Persons not qualified shall not attempt to install this equipment nor attempt repairs according to these instructions.

All Models

MECHANICAL (FOR QUALIFIED SERVICE PERSONNEL ONLY)

<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>
Harmonics, or whining noise.	U.G. inoperative.....	Check movement by putting into hot water (43°C or higher). If no movement, replace.
	*Debris or restriction in system...	Locate the restriction and remove. Flush system and clean.
	*Debris in gas line.....	Remove debris or blow out gas line.
	Low flow.....	Scale forming in heat exchanger - clean heat exchanger and check pool pH and total alkalinity.
Heater going on and off continuously.	Dirty filter.....	Backwash filter.
	Low water level in pool.....	Raise water level.
	External bypass setting out of adjustment.....	Adjust bypass
	*Pressure switch out of adjustment.....	Adjust pressure switch
Liming or scale forming on heat exchanger. PPM PPM	Pool water.....	Recommended pH should be between 7.4 and 7.8 total alkalinity 100-150 maximum. Hardness 150-400 maximum.
Sooting	High flow rates.....	Reduce by adding manual bypass valve and adjust by putting thermometer in header (1/4" NPT) drain opening. Set bypass so thermometer reads between 40°C and 43°C.
	U.G. Inoperative.....	Check movement by putting in hot water (43°C or higher). If no movement, replace.
	*Air starvation.....	Refer to installation instructions.
	*Improper venting.....	Follow recommended installation instructions.
	*Insects or debris clogging burner intake ports.....	Clean burners.

(* Usually occurs on initial start-up.)

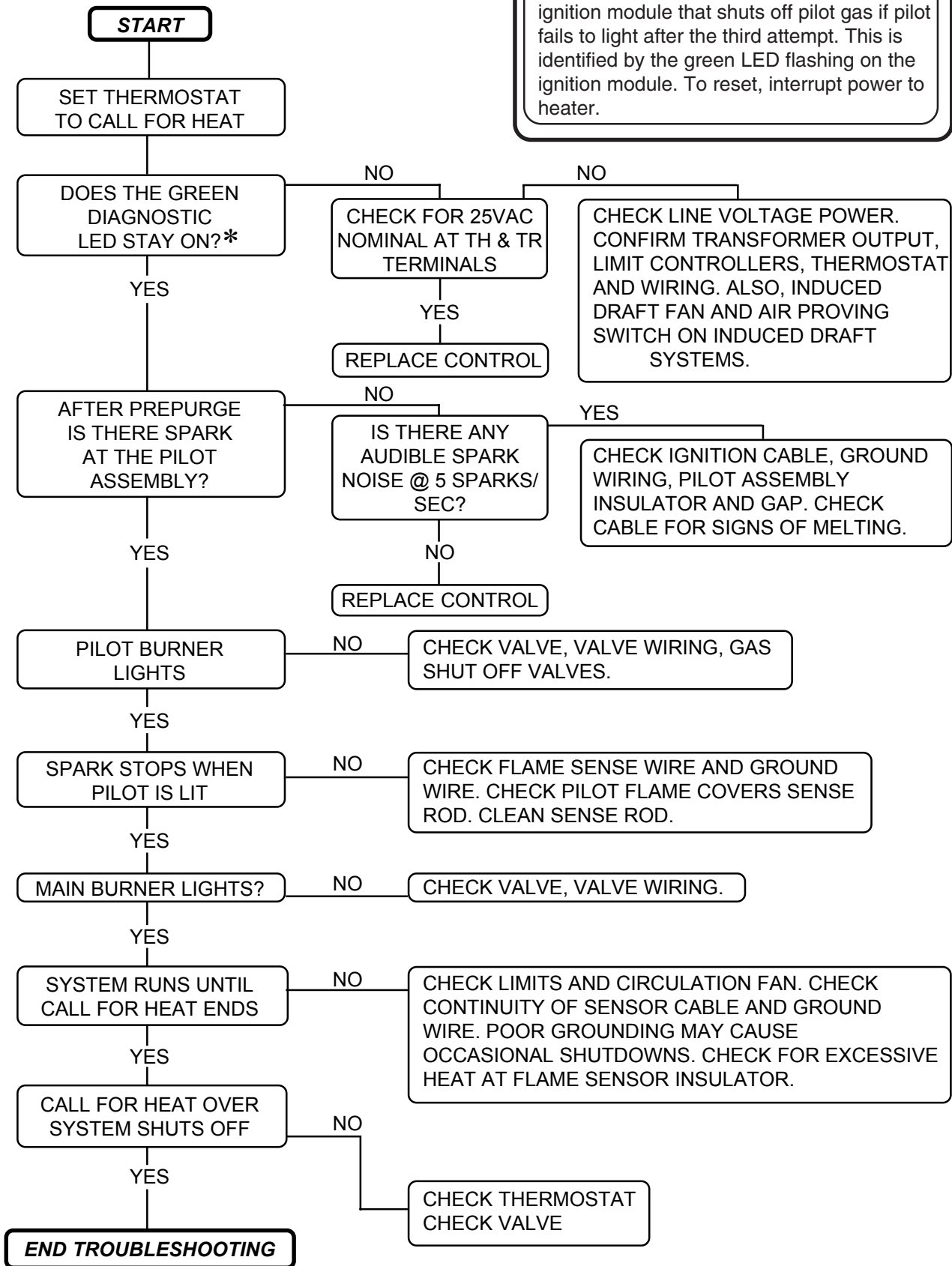
<u>PROBLEM</u>	<u>CAUSE</u>	<u>SOLUTION</u>
Pilot outage.	Low gas pressure.....	Adjust gas pressure.
	Restricted pilot.....	Clean pilot.
	Weak pilot generator..... Faulty Detection Electrode or PCB	Replace pilot.
Yellow lazy flame	Low gas pressure.....	Adjust gas pressure.
	*Insects or debris clogging burner intake ports.....	Clean burners.
Inner & Outer panels very hot (paint blistered - thermal fuse in transformer failed)	*Gaps in corner of refractory Broken refractory caused by shipping damage or improper combustion.....	Replace or re-align refractory to seal gaps. Replace transformer.
	Excessive sooting of heat exchanger.....	Determine cause of sooting & correct.
Takes long time to heat pool or spa.	Calculate temperature in °/hr.....	Heat rise (°/hr.)= $\frac{\text{Heater Output}}{\text{Pool gallonage} \times 8.33}$ or refer to heater sizing chart. This does not take into account heat loss due to weather.
	Filter not running long enough.....	Reset time clock.
	Dirty filter.....	Clean filter.
	Gas line or meter undersized.....	Refer to installation instructions.
Liming	Bypassing too much water.....	Inspect bypass for movement, if no movement, replace.
	U.G. not functioning.....	Replace if no movement when heated.
Leaking at well.	Overacid.....	Replace well and maintain water chemistry properly.
Leaking at heat exchanger.	Overacid.....	Replace heat exchanger and maintain chemistry properly.
Gasket brittle and leaking - (overheated).	Heater running after pump shuts off.....	See pressure switch adjustment.
	Refractory damage..... Sooted heater.....	Replace refractory. Determine cause of sooting and correct.

(* Usually occurs on initial start-up.)

055, 105 & 155 Models
ELECTRICAL (ELECTRONIC IGNITION IID)

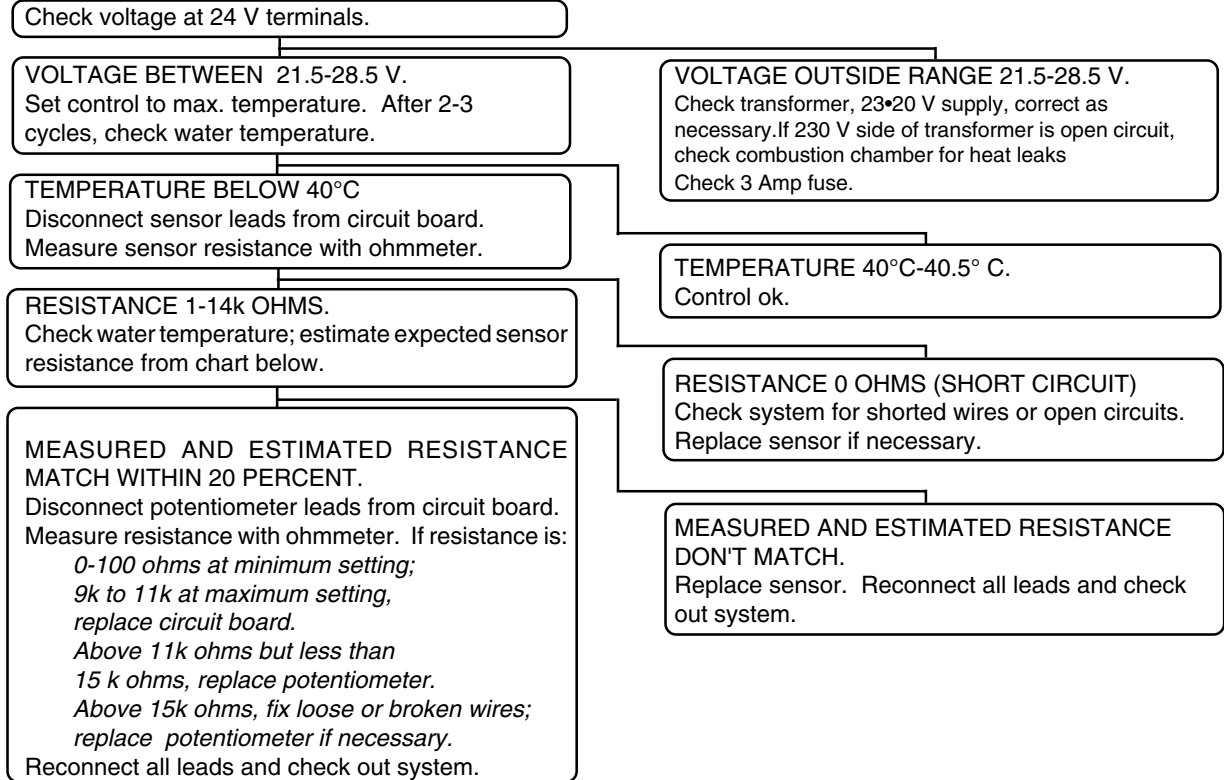
WARNING
HIGH VOLTAGE
 For qualified Technicians ONLY

*NOTE: This heater is equipped with an ignition module that shuts off pilot gas if pilot fails to light after the third attempt. This is identified by the green LED flashing on the ignition module. To reset, interrupt power to heater.

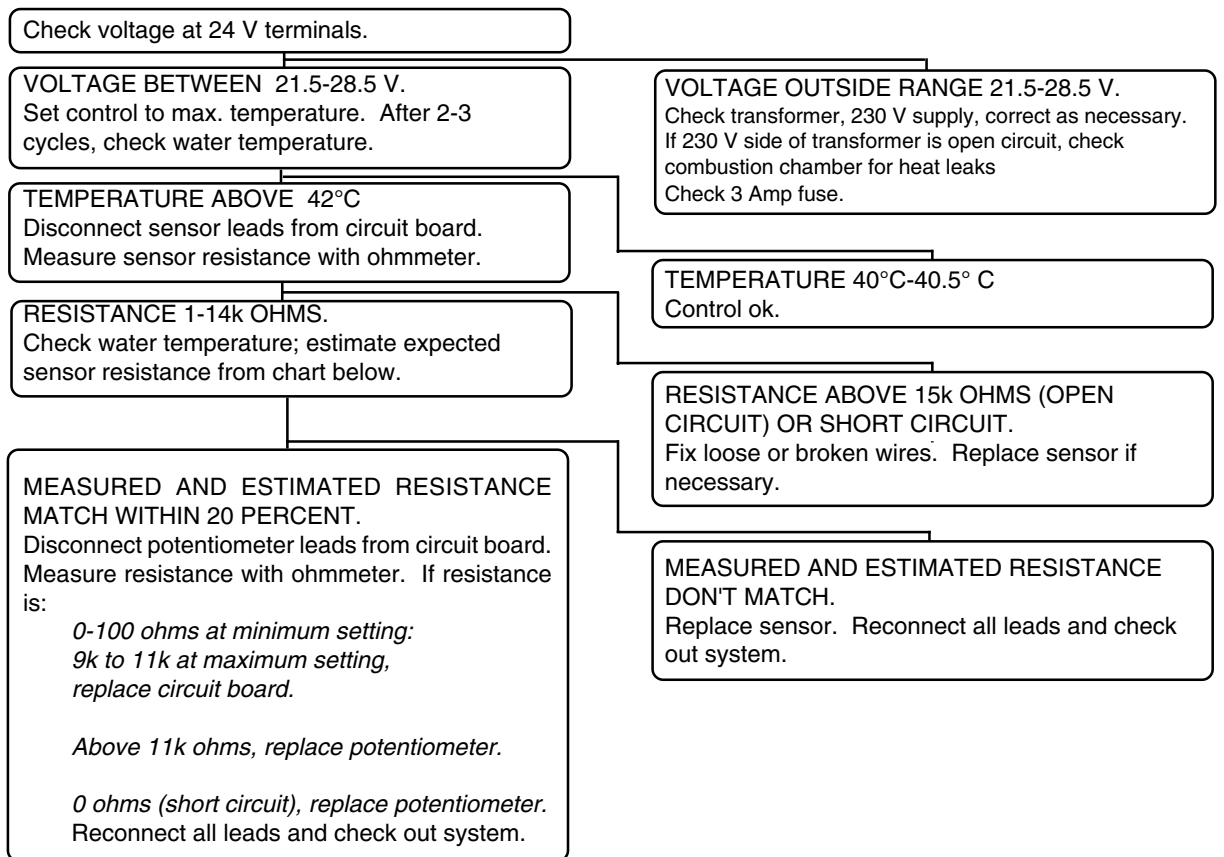


ELECTRICAL (SOLID STATE THERMOSTAT IID)

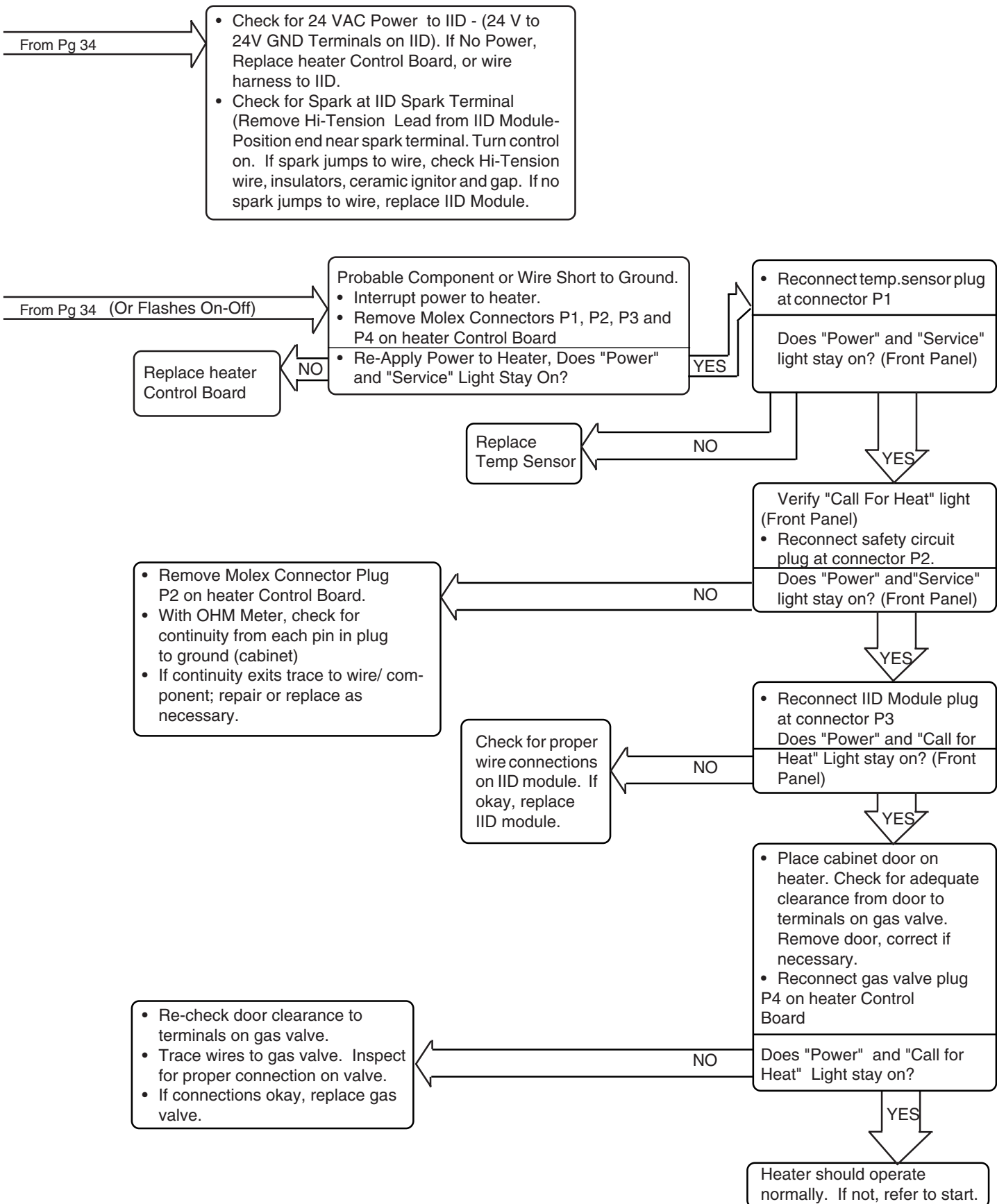
055, 105 & 155 Models If the pool/spa water is too cold, troubleshoot the system as follows:



If the pool/spa/hot tub water is too hot, troubleshoot the system as follows:



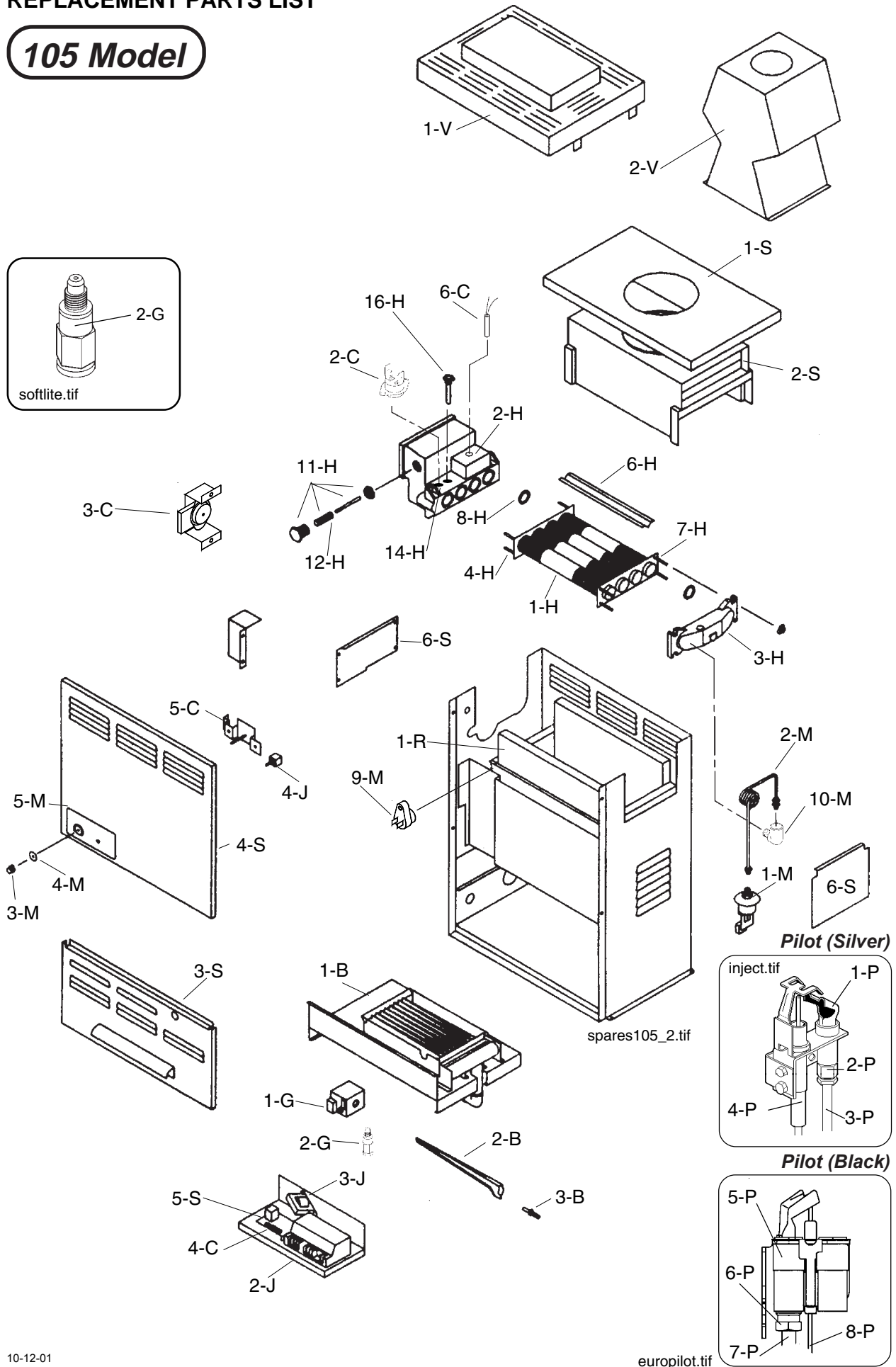
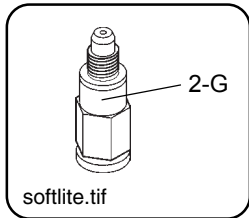
SENSOR RESISTANCE AT VARIOUS TEMPERATURES									
Temperature (deg C)	16°C	20°C	21°C	25°C	30°C	31°C	35°C	40°C	41°C
(deg. F)	61	68	70	77	86	88	95	104	106
Resistance (k ohms)	14.9	12.5	11.9	10.0	8.1	7.7	6.5	5.3	5.1



Key	Description - 055 Model		Part Code
B	BURNER TRAY		
1-B	Burner Tray w/Gas Valve Natural		-
	Burner Tray w/Gas Valve Propane		-
2-B	Burner		301210
3-B	Burner Injector Natural No.50		350079
	Burner Injector Propane No.57		350083
C	CONTROLS		
2-C	High Limit 57°C (135°F)		600889B
3-C	High Limit Manual Reset 102°C		M3029
4-C	Thermostat Control (Solid State)		600960
6-C	Potentiometer		600961
7-C	Temperature Sensor		600962
8-C	Ignition Control Robertshaw 100-00834 NL-3-L		
SPMB502	Ignition Control, Abbey		SPMB502/1
G	GAS VALVE		
1-G	Honeywell Gas Valve		M3265
2-G	L.P.G. Softlight Adapter		M3694
H	HEAT EXCHANGER		
1-H	Heat Exchanger Assembly (Complete)		063780
2-H	Header / Tubed Kit		004695F
3-H	Baffle Kit		306790
4-H	Unitherm Governer		600885
5-H	U.G. Cap		400734
6-H	U.G. Spring		850247
7-H	Drain Valve		500719
8-H	Sensor Well, High Limit		M3028
9-H	Bulb Retainer Clip		300203
10-H	U.G Gasket		800276
11-H	Inlet/Outlet Flange		350746
12-H	Flange Gasket		800013B
13-H	Bypass Baffle		306079
M	MISCELLANEOUS COMPONENTS		
1-M	Pressure Switch		650634
2-M	Pressure Switch Tube Assembly		062212
3-M	Thermostat Knob		800201
4-M	Knob Stop		305138
5-M	Dial Plate		M3060
6-M	Transformer		M650531
7-M	Toggle Switch		650595
8-M	Wire Harness IID		M3552
9-M	Thermal Fuse		651360
P	PILOT (Silver)	Part Code	PILOT (Black)
1-P	Pilot Natural/Propane	600799	5-P Pilot Natural/Propane M3685
2-P	Pilot Injector Natural	M3274	6-P Pilot Injector Natural M3687
	Pilot Injector Propane	601218	Pilot Injector Propane M3688
3-P	Pilot Tube	400013	Pilot Tube M3705
4-P	Hi-Tension Wire	651012	8-P Hi-Tension Wire M3695
R	REFRACTORY		
1-R	Refractory Kit	FT/RR LT/RR	M700348 M700349
S	SHEETMETAL		
1-S	Jacket Top		305658
2-S	Flue Collector		-
3-S	Door Assembly		063783
4-S	Upper Jacket Control Panel		M306120
5-S	Cable Clamp Bracket		M3299
V	VENTING		
1-V	Stackless Top (Outdoor)		003709
2-V	Draffhood (Indoor)		003722

REPLACEMENT PARTS LIST

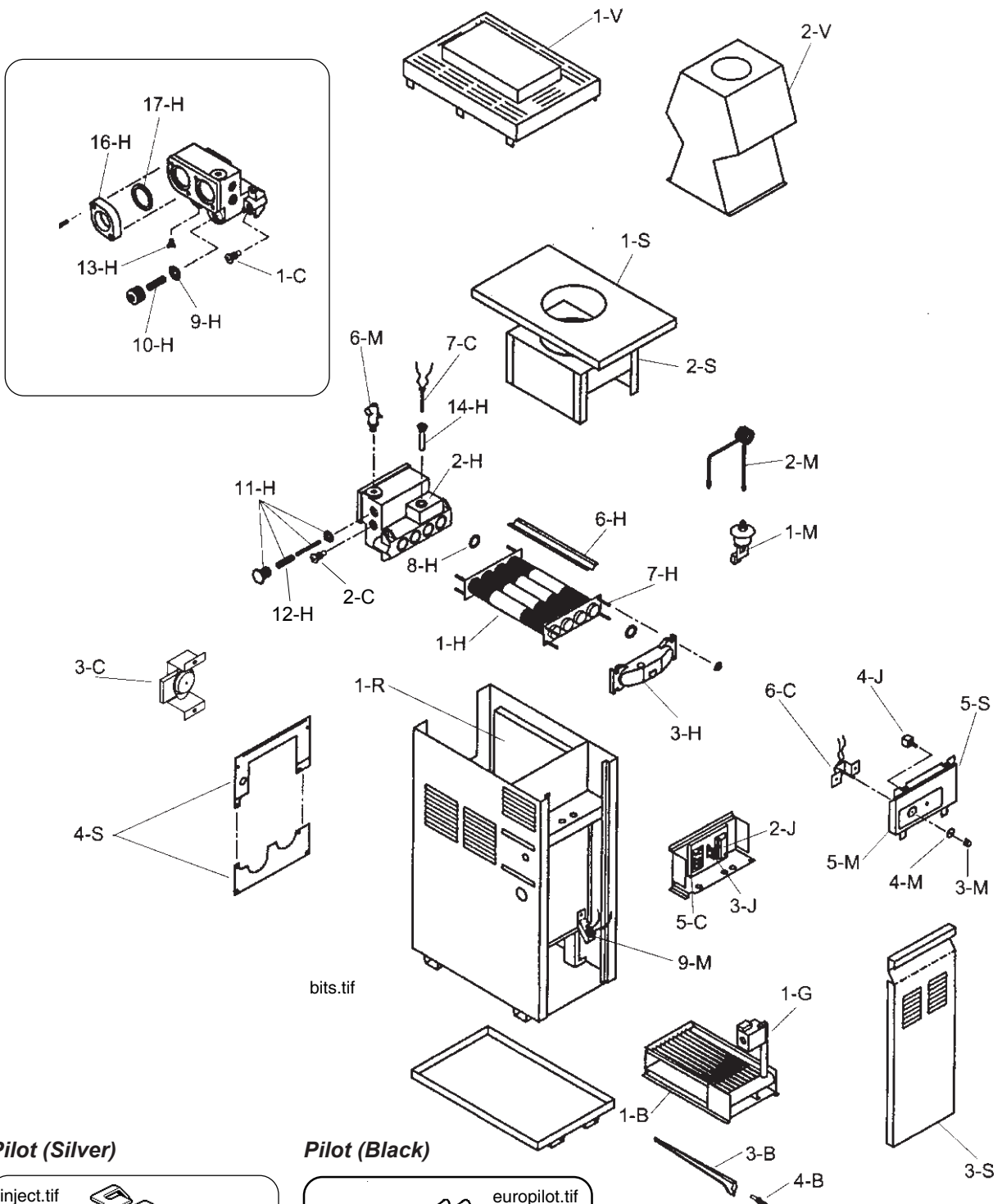
105 Model



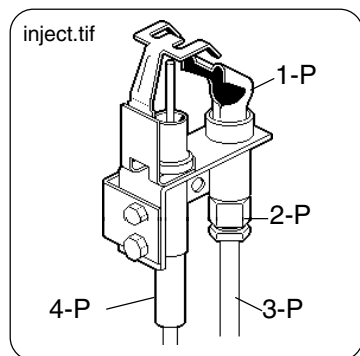
Key	Description - 105 Model	Part Code
B 1-B 2-B 3-B	BURNER TRAY Burner Tray w/Gas Valve Natural Burner Tray w/Gas Valve Propane Burner Burner Orifice Natural No.50 Burner Orifice Propane No.59	- - 301210 350079 350350
C 2-C 3-C 4-C 5-C 6-C	CONTROLS Automatic Reset Thermostat High Limit Manual Reset 102°C Thermostat Control (Solid State) Potentiometer Temperature Sensor	601549 M3029 600960 600961 600962
G 1-G 2-G	GAS VALVE Honeywell Gas Valve L.P.G. Softlight Adapter	M3265 M3694
H 1-H 2-H 3-H 4-H 6-H 7-H 8-H 11-H 12-H 14-H 15-H 16-H	HEAT EXCHANGER Heat Exchanger Assembly (Complete) Inlet/Outlet Header Return Header Tube Bundle Baffle Kit Bolt Kit Header Gasket Bypass Valve Bypass Spring Drain Valve (not shown) Sensor Well, Pool Temperature Well Retaining Clip Sensor Well, High Limit	064187 006887F 351047 006889F 306255 006890F 800014B 006716F 850252 500719 M3028 300203 M3028
J 2-J 3-J 4-J	J BOX/CONTROL BOX Ignition Control Robertshaw 100-00834 NL-3-L Transformer 230V/24V Toggle Switch	M3031 M650531 650595
M 1-M 2-M 3-M 4-M 5-M 8-M 9-M 10-M	MISCELLANEOUS COMPONENTS Pressure Switch Pressure Switch Tube Assembly Thermostat Knob Knob Stop DialPlate Wire Harness Thermal Fuse Elbow Adapter	650634 064685 800201 305138 M3060 M3551 651360 M4031
P 1-P 2-P 3-P 4-P	PILOT (Silver) Pilot Natural/Propane Pilot Injector Natural Pilot Injector Propane Pilot Tube Hi-Tension Wire	<i>Part Code</i> 600799 M3274 601218 400013 651012
5-P 6-P 7-P 8-P	PILOT (Black) Pilot Natural/Propane Pilot Injector Natural Pilot Injector Propane Pilot Tube Hi-Tension Wire	M3699 M3687 M3688 M3700 M3695
R 1-R	REFRACTORY Refractory Kit FT/RR LT/RT	700443 700444
S 1-S 2-S 3-S 4-S 5-S	SHEETMETAL Jacket Top Flue Collector Door Assembly Upper Jacket Control Panel Control Panel IID Pilot	306894 064624 M306893 M306892 M306895
V 1-V 2-V	VENTING Stackless Top (Outdoor) Draffhood (Indoor)	004898 004897

REPLACEMENT PARTS LIST

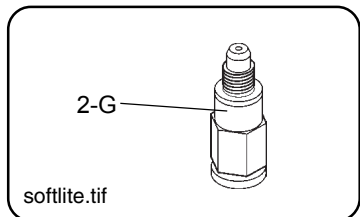
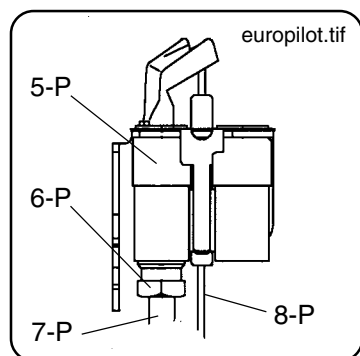
155 Model



Pilot (Silver)



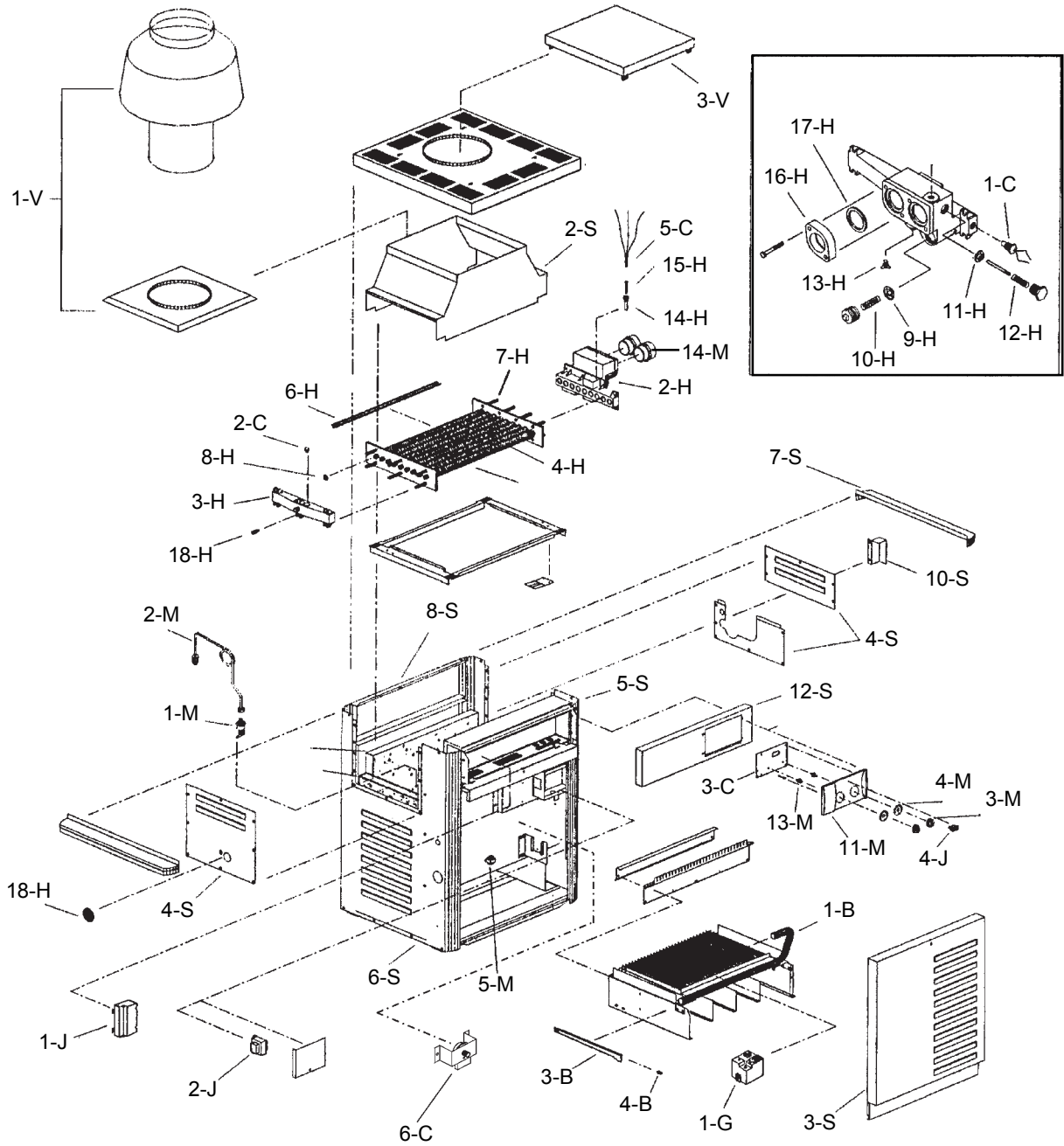
Pilot (Black)



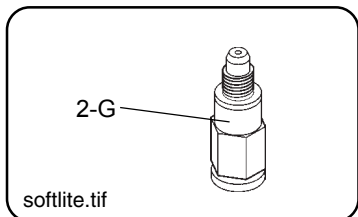
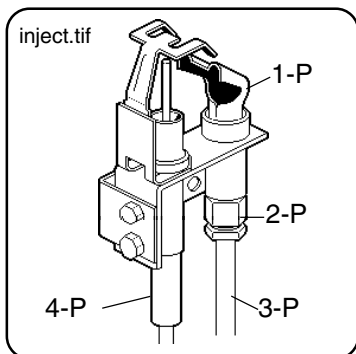
Key	Description - 155 Model		Part Code
B	BURNER TRAY		
1-B	Burner Tray w/Gas Valve Natural		-
3-B	Burner Tray w/Gas Valve Propane		-
4-B	Burner Orifice Natural	No.49	301210
	Burner Orifice Propane	No.57	350078 350083
C	CONTROLS		
1-C	Thermostat Pocket, High Limit		M3028
2-C	High Limit 60°C (140°F)		600893B
3-C	High Limit Manual Reset 102°C		M3029
5-C	Thermostat Control (Solid State)		600960
6-C	Potentiometer		600961
7-C	Temperature Sensor		600962
G	GAS VALVE		
1-G	Honeywell Gas Valve		M3265
2-G	L.P.G. Softlight Adapter		M3694
H	HEAT EXCHANGER		
1-H	Heat Exchanger Assembly (Complete)		066126
2-H	Inlet/Outlet Header		004963F
3-H	Return Header		004964F
4-H	Tube Bundle		004896F
6-H	Baffle Kit		303232
7-H	Bolt Kit		004889F
8-H	Header Gasket		800086B
9-H	Unitherm Governor		062234B
10-H	U.G. Retainer Spring		850254
11-H	Bypass Valve		062235B
12-H	Bypass Spring		850252
13-H	Drain Valve		500719
14-H	Sensor Well, Pool Temperature		003765F
15-H	Well Retaining Clip		300203
16-H	Inlet & Outlet Flange		003766F
17-H	Flange Gasket 1-1/2" Connections		800217
	Flange Gasket 2" Connections		800080B
J	J BOX/CONTROL BOX		
2-J	Ignition Control IID Robertshaw 100-00834 NL-3-L		M3031
3-J	Transformer 230V/24V		M650531
4-J	Toggle Switch		650761
M	MISCELLANEOUS COMPONENTS		
1-M	Pressure Switch		650634
2-M	Pressure Switch Tube Assembly		054374
3-M	Thermostat Knob		800201
4-M	Knob Stop		305138
5-M	DialPlate		M3060
8-M	Wire Harness IID		M3553
9-M	Thermal Fuse		651360
P	PILOT (Silver)		
1-P	Pilot Natural/Propane	Part Code 600799	5-P Pilot Natural/Propane M3685
2-P	Pilot Injector Natural	M3274	6-P Pilot Injector Natural M3687
	Pilot Injector Propane	601218	Pilot Injector Propane M3688
3-P	Pilot Tube	400381	Pilot Tube M3703
4-P	Hi-Tension Wire	651013	8-P Hi-Tension Wire M3696
R-1	REFRACTORY		
1-R	Refractory Kit	FT/RR LT/RT	M700341 M700114
S	SHEETMETAL		
1-S	Jacket Top		305703
2-S	Flue Collector		053243
3-S	Door Assembly		060146
4-S	Access Panel Group		-
5-S	Control Panel IID Pilot		063243
V	VENTING		
1-V	Stackless Top (Outdoor)		003710
2-V	Draffhood (Indoor)		003723

REPLACEMENT PARTS LIST

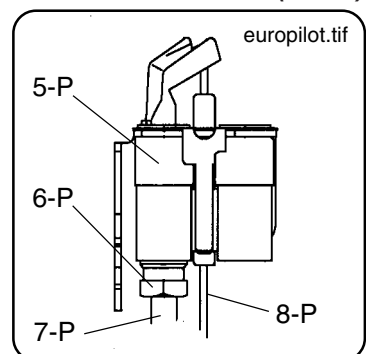
185, 265 & 405 Model



Pilot (Silver)



Pilot (Black)



Key	Description - 185, 265 & 405 Models	185	265	405
B 1-B 3-B 4-B	BURNER TRAY Burner Tray w/Burners Burner Tray w/o Burners Burner Tray w/Gas Valve Natural Burner Tray w/Gas Valve Propane Burner Burner Orifice Natural No.50 Burner Orifice Propane No.59	 301210 350079 350350	 301210 350079 350350	 SPMB405 SPMB403 301210 350079 350350
C 1-C 2-C 3-C 5-C 6-C	CONTROLS Thermostat Pocket, High Limit High Limit 60°C (140°F) P.C Board Control Units Temperature Sensor Units High Limit Manual Reset 102°C	M3028 600893B 601213 601226 M3029	M3028 600893B 601213 601226 M3029	M3028 600893B 601213 601226 M3029
G 1-G 2-G	GAS VALVE Honeywell Gas Valve L.P.G. Softlight Adapter	M3265 M3694	M3265 M3694	M3265 M3694
H 1-H 2-H 3-H 4-H 6-H 7-H 8-H 9-H 10-H 11-H 12-H 13-H 14-H 15-H 16-H 17-H 18-H	HEAT EXCHANGER Heat Exchanger Assembly CI(Complete) Inlet/Outlet Header CI Return Header CI Tube Bundle Baffle Kit (8) Bolt Kit Header Gasket Unitherm Governor U.G. Retainer Spring Bypass Valve Bypass Spring Drain Valve Sensor Well, Pool Temperature Well Retaining Clip Inlet & Outlet Flange Flange Gasket 1-1/2" Connections Flange Gasket 2" Connections Rear Drain Plug & Cover	065254 003759F 002450F 005252F 307237 001303F 800014B 062234B 850254 062235B 850252 500719 003765F 300203 003766F 800217 800080B 005264F	065258 003759F 002450F 005253F 307238 001303F 800014B 062234B 850254 062235B 850253 500719 003765F 300203 003766F 800217 800080B 005264F	065266 003759F 002450F 005255F 307240 001303F 800014B 062234B 850254 062235B 850253 500719 003765F 300203 003766F 800217 800080B 005264F
J 1-J 2-J 4-J	J BOX/CONTROL BOX Ignition Control Robertshaw 100-00834 NL-3-L Transformer 230V/24V Rocker Switch Units	 M3031 M650531 650903	 M3031 M650531 650903	 M3031 M650531 650903
M 1-M 2-M 3-M 4-M 5-M 8-M 11-M 13-M 14-M	MISCELLANEOUS COMPONENTS Pressure Switch Pressure Switch Tube Assembly Thermostat Knob (1) Knob Stop (1) Thermal Fuse Wire Harness IID Control Panel IID Thermostat Shaft IID CPVC Adapter	650634 065391 800303 305138 651360 M3554 800312 800304 501750	650634 065391 800303 305138 651360 M3555 800312 800304 501750	650634 065391 800303 305138 651360 M3555 800312 800304 501750

Parts list is continued on next page *****

185, 265 & 405 Replacement Parts List (continued)

Key	Description	185	265	405
P	PILOT (Silver)			
1-P	Pilot Natural/Propane	600799	600799	600799
2-P	Pilot Orifice Natural	M3274	M3274	M3274
	Pilot Orifice Propane	601218	601218	601218
3-P	Pilot Tube	400607	400607	400607
4-P	Hi-Tension Wire	650998	650998	650998
P	PILOT (Black)			
5-P	Pilot Natural/Propane	M3685	M3685	M3685
6-P	Pilot Orifice Natural	M3687	M3687	M3687
	Pilot Orifice Propane	M3688	M3688	M3688
7-P	Pilot Tube	M3690	M3690	M3690
8-P	Hi-Tension Wire	M3696	M3696	M3696
R-1	REFRACTORY			
1-R	Refractory Common (Left & Right)	700461	700461	700461
2-R	Refractory Uncommon	M700462	M700463	700465
S	SHEETMETAL			
1-S	Jacket Top (Louvred)	065218	065219	065221
2-S	Flue Collector	065148	065149	065151
3-S	Door Assembly	065162	065163	065364
4-S	Access Panel Set (3 Pcs.)	-	-	-
5-S	Side Panel Right	307099	307099	307099
6-S	Side Panel Left	307100	307100	307100
7-S	Side Panel Cap	307098	307098	307098
8-S	Rear Panel Kit (2 Pcs.)	-	-	-
10-S	High Limit Cover	307280	307280	307280
12-S	Up-Front Control Panel	065170	065171	065173
V	VENTING			
1-V	Indoor Stack Kit (Includes inner adapter panel)	006696	006697	006699
3-V	"Pagoda" Top	065310	065312	065311



Certikin

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