

Diagnostic Use of Controller

- 1. To Display Maintenance Codes: Press the 'On/Off' button once to turn the controller off. Press and hold the 'On/Off' button followed by thermostat button to cycle through the maintenance codes.
- 2. To Display Water Flow through the water heater: Press the A thermostat button and hold for 2 seconds and then press the 'On/Off' button while continuing to hold the A thermostat button.
- To Display Outlet Water Temperature: Press the Thermostat button and hold for 2 seconds and then press the 'On/Off' button while continuing to hold the T thermostat button.

To Change the Temperature Display from °F to °C (or °C to °F)

 Press the 'On/Off' button once to turn the controller unit off. With the controller off press and hold the 'On/Off' button until the display changes to °C (°F), approximately 5 seconds.

To Turn Off the Sound (Mute)

 To turn the sound off (mute) press and hold both the A and thermostat buttons until an audible "beep" is heard, approximately 5 seconds.

Gas Pressure Setting

NOTE: For additional installation and commissioning Information refer to Operation / Installation Manual



THIS APPLIANCE MUST BE INSTALLED, SERVICED AND REMOVED BY AN AUTHORISED PERSON DURING PRESSURE TESTING OF THE CONSUMER PIPING ENSURE GAS COCK SITUATED BEFORE UNIT IS SHUT-OFF. FAILURE TO DO SO MAY RESULT IN SERIOUS DAMAGE TO THE APPLIANCE AND POSSIBLE INJURY.

APPLIANCE OPERATING PRESSURES

	Water Inlet Max.	Min./	Inlet Max	Forced Low		Forced High	
	mict max.	NAT.G	LPG	NAT.G	LPG	NAT.G	LPG
705(Outdoor)	450 DOI	5"W.C. 8"W	8"W.C.	8"W.C.	0.00 \	2 0 0 0 0	0.0004.0
705(Outdoor-ASME)	150 PSI	/10.5"W.C.	5"W.C. /13.5"W.C. 0.65"W.C.		0.80 W.C.	2.8 W.C.	3.6 W.C.

With all gas appliances in operation at maximum gas rate, the flowing inlet pressure at the incoming test point on the Water Heater should read 5"W.C. - 10.5"W.C. on Natural Gas and 8"W.C. - 13.5"W.C. on Propane Gas. If the pressure is lower, the gas supply is inadequate and the appliance unit will not operate to specification. Check gas meter, regulator and pipework for correct operation/sizing and rectify as required.

GAS PRESSURE SETTING

(Ensure gas pressure check under Commissioning has been completed

The regulator is electronically controlled and factory pre-set. Under normal circumstances it does not require adjustment during installation. Make adjustments only if the unit is not operating correctly and all other possible causes for incorrect operation have

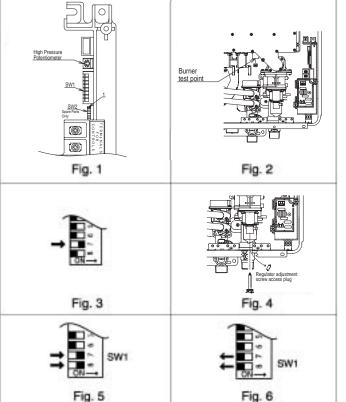
- 1. Turn 'OFF' the gas supply.
- 2. Turn 'OFF' 120V power supply.
- 3. Remove the front cover from the appliance. Check gas type using data plate on side of unit.
- If using spare PC board, check gas type switches (Fig.1) are in the correct position. (dip switch 1 of SW2 'ON' = NG, 'OFF' = LPG) See Dip Switch Settings section below.

Note: 'ON' towards right, 'OFF' towards left.

- 5. Attach pressure gauge to burner test point, located on the gas control. (Fig.2).
- 6. Turn 'ON' the gas supply.
- 7. Turn 'ON' 120V power supply.
- 8. If remote controllers are fitted, turn the unit 'ON' at the controller, select the maximum delivery temperature and open all available hot water taps full including the shower. (CAUTION: Ensure building occupants do not have access to hot water
- outlets during this procedure). 9. Set the Water Heater to 'Forced Low' combustion by setting No.7 dip
- switch of the (SW1) set of dip switches to 'ON'. (Fig.3). Check the burner test point pressure.
- 11. Remove rubber access plug and adjust the regulator screw on the modulating valve (Fig.4) as required in Table 1. Replace rubber access
- 12 Set the Water Heater to 'Forced High' combustion by setting both No.7 and No.8 dip switches of the bottom (SW1) set of 'ON'. (Fig.5). Ensure maximum water flow!
- Check the burner test point pressure.
- 14. Adjust the high pressure Potentiometer (POT) on the Printed Circuit Board (PCB) as required to the pressure shown in Table 1.

IMPORTANT: Set dip switches 7 and 8 on the bottom (SW1) to 'OFF' to return the appliance to 'Normal' combustion. (Fig. 6)

- 15. Close hot water tap.
- 16. Turn 'OFF' the gas supply and 120V power supply.
- 17. Remove pressure gauge & replacing sealing screw. Turn 'ON' the gas supply and 120V power supply.
- 19. Operate unit and check for gas leaks at test point.
- 20. Replace the front cover of the appliance.



Troubleshooting

IMPORTANT SAFETY NOTES:

product. Extreme care should be used at all times to avoid contact with energized components inside the water heater, Only trained and qualified service agencies should attempt to repair this product. Remember, before checking for resistance readings, you should disconnect the power source to the unit and isolate the item to be checked from the circuit (unplug it).

(SV1, SV2, SV3 and POV) Gas valve and Modulating solenoids: (Set meter above 2K)

Wire color	Voltage	Resistance	Connector #	Pin #'s
(Main) Pink - Black	11 ~ 13 VDC	24 ~ 28 ohms	H3	6 - 7
(SV1) Black - Red	11 ~ 13 VDC	37 ~ 43 ohms	H4	5 - 6
(SV2) Black - Orange	11 ~ 13 VDC	37 ~ 43 ohms	H5	4 - 6
(SV3) Black - Yellow	11 ~ 13 VDC	37 ~ 43 ohms	H6	3 - 6
(POV) Orange - Orange	2 ~ 15 VDC	67 ~ 81 ohms	H2	9 - 10

(M) Water Flow Control Device Servo or Geared Motor:					
Red - Blue	11 ~ 13 VDC	22 ~ 28 ohms	F5	9 - 10	
Grey - Brown	4 ~ 6 VDC	N/A	F5	5 - 7	
Grev - Yellow	N/A	N / A	F5	5 - 8	

NOTE: The grey wire listed above turns to black at F connector on the PCB.					
Grey - Yellow	N/A	N/A	F5	5 - 8	
Grey - Brown	4 ~ 6 VDC	N/A	F5	5 - 7	
Rea - Blue	11 ~ 13 VDC	22 ~ 28 Onms	ro	9 - 10	

(QS) Water Flow Sensor:

Black - Red

Yellow - Black	4 ~ 7 VDC	1 ~ 1.4 Mega ohms	F2	2-3
By-pass Flow Control	:			
Brown - White			G1	1 - 5
Orange - White	2 ~ 6 VDC	15 ~ 35 ohms	G1	2 - 5
Yellow - White	(Unit in operating mode)	15 ~ 55 011115	G1	3 - 5
Red-White - Ground			G1	4 - 5
(IG) Ignition System:				

(IG) Ignition Syste	m:					
Grey - Grey	90 ~ 110 VAC	N/A	C1	1 - 2		
(FM) Combustion Fan Motor:						
Red - Black	6 ~ 45 VDC	N/A	E1	1 - 2		
White - Black	5 ~ 10 VDC	9.2 ~ 9.4 K ohms	E1	2 - 4		
Yellow - Black	11 ~ 13 VDC	3.5 ~ 3.9 K ohms	E1	2 - 3		
Set your meter to the hertz scale. Reading across the white and black wires at terminals 2 and 4						

you should read between 60 and 420 hertz.

Thermal Fuse / Overheat Switch:					
Red - White	11 ~ 13 VDC	Below 1 ohms	F6 H1	F6 - H12	

Place one lead of your meter to the flame rod and the other to earth or ground. With the unit running you should read between 5 - 150 VAC. Set your meter to the µ amp scale, series your meter in line with the flame rod. You should read 1µ or greater for proper flame circuit. In the event of low flame circuit remove the flame rod and check for carbon and/or damage.

Heat Exchanger and Outgoing Water Temperature Thermistors:

Check all thermistors by inserting meter leads into each end of the thermistor plug. Set your meter to the 20K scale and read resistance. You should be able to apply heat to the thermisto bulb and see the resistance decrease. Then apply some ice to the thermistor and the resistance should increase. See below for examples of temperatures and resistance reading at those

Example:	59° F = 11.4 ~ 14KΩ	140 °F = $2.2 \sim 2.7$ KΩ
	$86^{\circ}F = 6.4 \sim 7.8K\Omega$	$221^{\circ}F = 0.6 \sim 0.8K\Omega$

Example:	59° F = 11.4 ~ 14KΩ	140 °F = $2.2 \sim 2.7$ KΩ
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 •••	
$86^{\circ}F = 6.4 \sim 7.8K\Omega$	$221^{\circ}F = 0.6 \sim 0.8K\Omega$
113°F = 3.6 ~ 4.5KO	

00°F	$= 0.4 \sim 7.0 \text{N}_{22}$	$221^{\circ}F = 0.0 \sim 0.0N$
113°F	= $3.6 \sim 4.5 \text{K}\Omega$	

utgoing Water Theri	mistor:
/hita - Whita	N / A

Outgoing Water Theri	mistor:								
White - White	N/A	See example above	F4	3 -					
Heat Exchanger Temperature Thermistor:									
Dink White	NI / A	Soo ovample above	E2	2					

a. =xaagaa		
Pink - White	N/A	See exa
Surge Protector		

Surge Protector:				
Black - White	108 ~ 132 VAC	N/A	D2	1 - 3
Black - White	108 ~ 132 VAC	N/A	D1	1 - 3
		tinuity through the surg		

Then check across top pin #3 and bottom pin #1, if you read continuity across these two points the surge protector is good. If you do not get continuity, replace the surge protector. 10 ~ 13 VDC 1.5 ~ 3.0 K ohms B

Terminals B1

ost Protection:			
OOL FIGURESHITS			

This unit has six frost protection heaters mounted at different points inside the unit, to protect the water heater from freeze ups. There are two heaters located on the outlet hot water line Using a voltage meter set on the 200 ohm scale, you should have a resistance reading. The

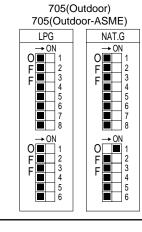
heater located on the heat exchanger piping should have a resistance reading of 139 ~ 161 ohms and the one located in the water flow sensor valve has a resistance reading of 335 ~ 385 ohms. The one located in the outlet valve has a resistance reading of 335 ~ 385. Voltage throughout this circuit should be 120 VAC.

This unit has an inline (3) amp glass fuse. Remove the fuse and check continuity through it. If you have Continuity through the fuse, it is good. If you can not read continuity, the fuse is blown

Dip Switches Settings

Adjust switches 2 and 3 in the bank of 8 depending on your altitude according to the table below.

The original PC boards on the water heaters do not have the bank of 6 dip switches. Only spare PC boards have this bank.



High Altitude

WARNING

DO NOT adjust the other dip switches unless specifically instructed to do so. Incorrect Dip Switch Settings can cause the water heater to operate in an unsafe condition and may damage the water heater and void the warranty.

SW No.	NOTES											
2	High Altitude	Off	Level 0 0-2000ft	Off	Level 1 2001-5200ft	On	Level 2 5201-7800ft	On	Level 3 7801-10200ft			
3	High Altitude	Off	(0-610m)	On	(610-1585m)	Off	(1585-2377m)	On	(2377-3109m)			

Error Codes

02 No burner operation during freeze protection mode

• Turn off all hot water taps. Press ON/OFF twice.

• Ensure approved venting materials are being used.

• Check all vent components for proper connections.

• Ensure condensation collar was installed correctly.

• Check that nothing is blocking the flue inlet or exhaust.

• Check that the gas is turned on at the water heater, gas meter,

• Ensure gas line, meter, and/or regulator is sized properly.

• Disconnect multi-unit connections to isolate the problem.

• Remove burner cover and ensure all burners are properly

• Check that the gas is turned on at the water heater and gas

• Ensure gas line, meter, and/or regulator is sized properly.

• Disconnect multi-unit connections to isolate the problem.

• Check power supply for proper voltage and voltage drops.

• Disconnect and re-connect all wiring harnesses on unit and PC

• Check gas type of unit and ensure it matches gas type being

· Check for restrictions in air flow around unit and vent terminal.

· Check for low water flow in a circulating system causing short-

blockage due to scale build up. Refer to instructions in manual

Check for foreign materials in combustion chamber and/or

• Ensure high fire and low fire manifold pressure is correct.

• Check gas solenoid valves for open or short circuits.

Remove burner plate and inspect burner surface for

meter. Check for obstructions in the flue outlet.

Ensure gas type and pressure is correct.

• Ensure proper venting material was installed.

• Ensure condensation collar was installed properly.

03 Power interruption during Bath fill (Water will not flow when

Service Call

power returns)

10 Air Supply or Exhaust Blockage

· Ensure vent length is within limits.

• Verify dip switches are set properly.

· Ensure gas type and pressure is correct.

Verify dip switches are set properly.

Ensure appliance is properly grounded.

• Check igniter wiring harness for damage.

• Check fan for blockage.

· Bleed all air from gas lines.

Ensure igniter is operational.

condensation or debris.

· Bleed all air from gas lines.

Disconnect keypad.

board.

14 Thermal Fuse

cycling.

exhaust piping

for flushing heat exchanger.

• Measure resistance of safety circuit.

• Check for improper conversion of product.

• Ensure vent length is within limits.

Verify dip switches are set properly.

• Ensure flame rod wire is connected.

Check flame rod for carbon build-up.

condensation or debris.

· Check all components for electrical short.

· Check gas solenoid valves for open or short circuits.

· Remove burner plate and inspect burner surface for

• Ensure dip switches are set to the proper position.

• Check heat exchanger for cracks and/or separations. • Check heat exchanger surface for hot spots which indicate

• Ensure appliance is properly grounded.

• Check power supply for loose connections.

11 No Ignition

or cylinder.

seated.

12 Flame Failure

- 16 Over Temperature Warning
 - · Check for restrictions in air flow around unit and vent terminal. · Check for low water flow in a circulating system causing short-
- · Check for foreign materials in combustion chamber and/or exhaust piping.
- Check for clogged heat exchanger.

32 Outgoing Water Temperature Sensor Fault

- Check sensor wiring for damage.
- Measure resistance of sensor.
- Clean sensor of scale build up. · Replace sensor.

33 Heat Exchanger Outgoing Temperature Sensor Fault

- Check sensor wiring for damage.
- Measure resistance of sensor. · Clean sensor of scale build up.
- Replace sensor.

34 Combustion Air Temperature Sensor Fault

- Check for restrictions in air flow around unit and vent terminal.
- · Check sensor wiring for damage.
- · Measure resistance of sensor.
- Clean sensor of scale build up. • Ensure fan blade is tight on motor shaft and is in good
- condition. Replace sensor.

52 Modulating Solenoid Valve Signal Abnormal

- Check modulating gas solenoid valve wiring harness for loose or damage terminals.
- · Measure resistance of valve coil.

61 Combustion Fan Failure

- Ensure fan will turn freely.
- Check wiring harness to motor for damaged and/or loose
- connections. · Measure resistance of motor winding.
- 65 Water Flow Servo Faulty (does not stop flow properly)

If blank screen is present on remote control then the flow control has shorted out. Unplug flow control. If remote lights up and unit starts operating then replace flow control assembly.

71 SV0, SV1, SV2, and SV3 Solenoid Valve Circuit Fault · Check wiring harness to all solenoids for damage and/or loose

· Measure resistance of each solenoid valve coil.

72 Flame Sensing Device Fault

- Ensure flame rod is touching flame when unit fires.
- Check all wiring to flame rod for damage.
- Remove flame rod and check for carbon build-up; clean with
- Check inside burner chamber for any foreign material blocking flame at flame rod. · Measure micro amp output of sensor circuit with flame present.
- · Replace flame rod.

C Scale Build-up in Heat Exchanger (when checking maintenance code history "00" is substituted for "LC")

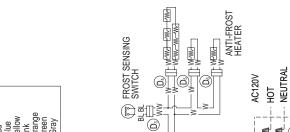
- Flush heat exchanger. Refer to instructions in manual. · Replace heat exchanger.
- **No Code** (Nothing happens when water flow is activated.)

· Clean inlet water supply filter.

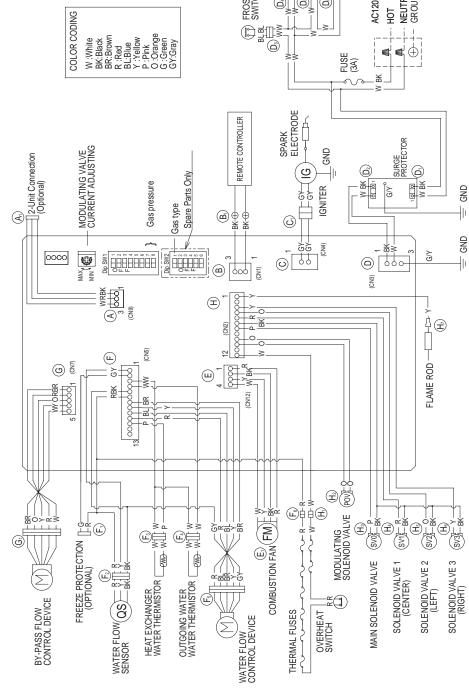
- On new installations ensure hot and cold water lines are not
 - hot water line to building. Isolate the circulating system if
 - present. Open your pressure relief valve; if unit fires, there is bleed over in your plumbing. • Ensure you have at least the minimum flow rate required to fire

· Check for bleed over. Isolate unit from building by turning off

- Ensure turbine spins freely.
- Measure the resistance of the water flow control sensor.
- Remote control does not light up but you have 12 VDC at the terminals for controls.



Wiring Diagram



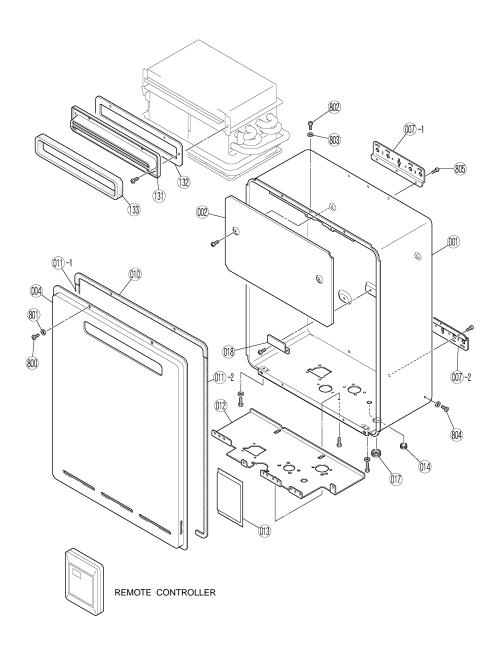


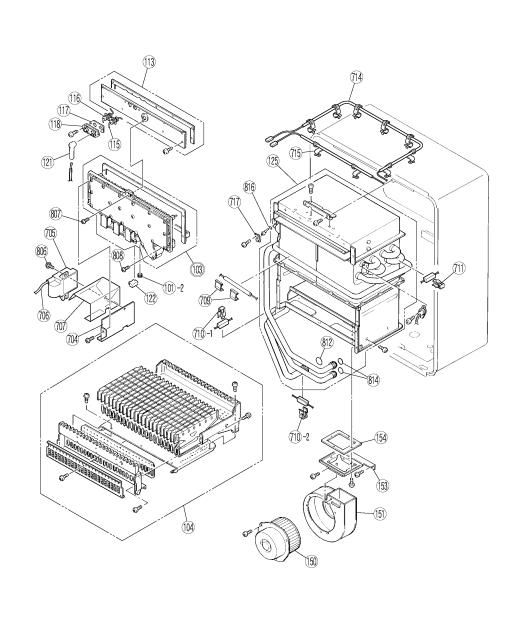
705(VA3237W)

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EXPLODED VIEW - CABINET

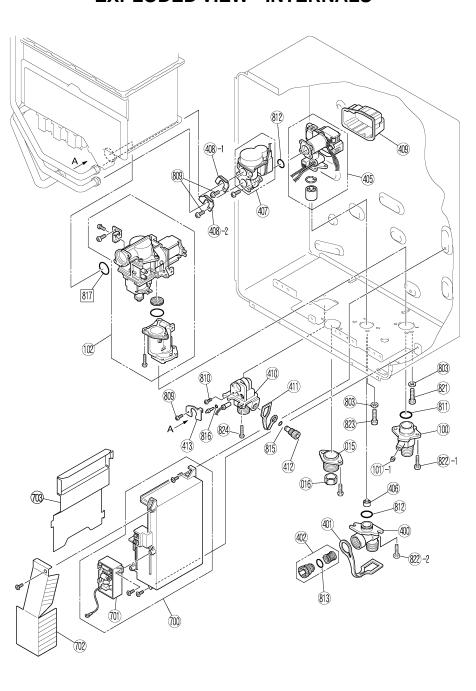
EXPLODED VIEW - INTERNALS

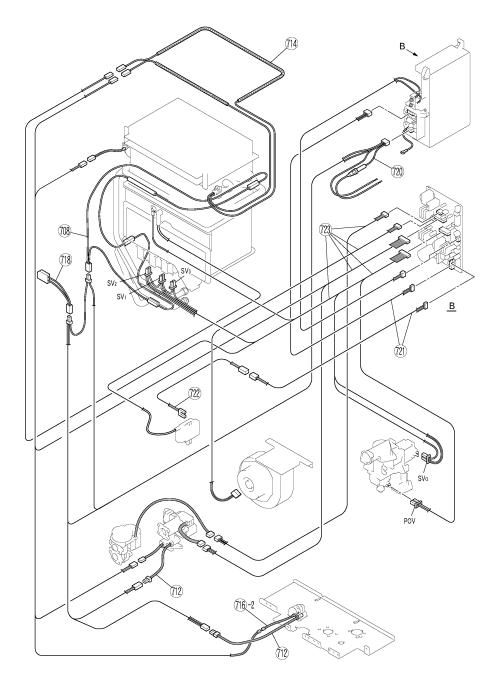




EXPLODED VIEW - INTERNALS

EXPLODED VIEW - ELECTRICAL





			Qu 705	antity 705		PARTS LI	Quan 705	ntity 705				Qua 705	ntity 705	
Number	Description	Parts Number		(Outdoor-ASME)	Number	Description	Parts Number			Number	Description	Parts Number		(Outdoor-ASME)
001	Casing Assembly	701022-152	1	1	132	Flue Outlet Packing	701022-278	1	1	716	Thermistor	701022-120	2	2
002	Heat Protection Plate	701022-154	1	1	133	Flue Outlet Packing-4	701022-277	1	1	717	Thermistor Clip	701022-095	1	1
004	Front Panel Assembly	701022-157	1	1	150	Blower Motor	701022-194	1	1	718	Frost Sensing Switch	701022-223	1	1
007	Wall Installation Bracket	701022-007	2	2	151	Fan Casing Assembly	701022-196	1	1	720	Fuse Harness	701022-225	1	1
010	Front Panel Packing-Top	701022-162	1	1	153	Fan Connecting Bracket	701022-197	1	1	721	Power Supply Harness	701022-226	1	1
011	Front Panel Packing-Side	701022-163	2	2	154	Fan Connecting Packing	701022-198	1	1	722	Ignitor Harness	701022-227	1	1
012	Connection Reinforcement Panel	701022-164	1	1	400	Water Inlet (3/4"NPT)	701022-069	1	1	723	Sensor Harness	701022-228	1	1
013	Bag for Installation Manual	701022-165	1	1	401	Plug Band	701022-200	1	1	800	Screw	701022-122	4	4
014	Seal Packing	701022-023	1	1	402	Water Filter Assembly	701022-082	1	1	801	Washer	701022-232	4	4
015	Cable Access	701022-019	1	1	405	Water Flow Control Assembly Kit	701022-203	1	1	802	Screw	701022-233	2	2
016	Cable Access Packing	701022-045	1	1	406	Rectifier	701022-204	1	1	803	Washer	701022-128	7	7
017	Rubber Bushing	701022-020	1	1	407	Bypass-Servo Assembly	701022-074	1	1	804	Screw	701022-234	8	8
018	Reinforcement Plate	701022-166	1	1	408	Stop Bracket	701022-075	2	2	805	Screw	701022-129	5	5
100	Gas Connection (3/4"NPT)	701022-027	1	1	409	Water Flow Servo Cover	701022-205	1	1	806	Screw	701022-235	1	1
101	Screw	701022-171	2	2	410	Hot Water Outlet (3/4"NPT)	701022-206	1	1	807	Screw	701022-236	5	5
102	Gas Control Kit	701022-172	1	1	411	Plug Band	701022-207	1	1	808	Screw	701022-237	2	2
103	Manifold Assembly-A (LPG)	701022-173	1	1	412	Drain Valve	701022-081	1	1	809	Screw	701022-238	3	3
103	Manifold Assembly-B (Nat.G)	701022-174	1	1	413	Stop Bracket	701022-208	1	1	810	Screw	701022-125	1	1
104	Burner Unit Assembly (Nat.G)	701022-175	1	1	700	PCB	701022-209	1	1	811	O-ring	701022-137	1	1
104	Burner Unit Assembly (LPG)	701022-153	1	1	701	Surge Protector	701022-210	1	1	812	O-ring	701022-133	3	3
113	Combustion Chamber Front Plate	701022-182	1	1	702	PCB Cover-Front	701022-211	1	1	813	O-ring	701022-134	1	1
114	Combustion Chamber Front Plate Packing	701022-183	1	1	703	PCB Cover-Side	701022-089	1	1	814	O-ring	701022-135	2	2
115	Electrode Kit	701022-036	1	1	704	Ignitor Bracket	701022-213	1	1	815	O-ring	701022-136	1	1
116	Flame Rod Kit	701022-184	1	1	705	Ignitor	701022-091	1	1	816	O-ring	701022-130	2	2
117	Electrode Packing	701022-185	1	1	706	High Tension Cord	701022-214	1	1	817	Packing	701022-239	1	1
118	Electrode Holder	701022-039	1	1	707	Ignitor Cover	701022-215	1	1	821	Screw	701022-241	1	1
121	Electrode Sleeve	701022-093	1	1	708	120V Anti Frost Heater Assembly	701022-217	1	1	822	Screw	701022-141	4	4
122	Solenoid Valve Cover	701022-186	1	1	709	Anti Frost Heater Clip	701022-102	2	2	823	Screw	701022-242	2	2
123	Upper Combustion Chamber Packing	701022-187	1	1	710	Anti Frost Heater Clip	701022-151	2	2	824	Screw	701022-142	3	3
124	Lower Combustion Chamber Packing	701022-188	1	1	711	Anti Frost Heater Clip	701022-218	1	1	888	Manual	701022-144	1	1
125	Heat Exchanger Kit	701022-190	1	-	712	120V Valve Heater Assembly	701022-219	2	2	889	Installation Manual (Tech Sheet)	701022-245	1	1
125	Heat Exchanger Kit(ASME)	701022-161	-	1	714	Thermal Fuse Harness	701022-221	1	1	-	Package Spec Sheet	701022-246	1	1
131	Flue Outlet	701022-243	1	1	715	Thermal Fuse Clip	701022-222	9	9	-	Manual 3/4" Gas Control Valve	701022-247	1	1
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