

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.		Gas Inlet Min./Max		Forced Low		Forced High	
	mot max.	NAT.G	LPG	NAT.G	LPG	NAT.G	LPG
705(Indoor)	150 PSI	5"W.C. /10.5"W.C.	8"W.C. /13.5"W.C.	0.67"W.C.	0.83"W.C.	3.0"W.C.	3.7"W.C.
705(Indoor-ASME)							

COMMISSIONING

IMPORTANT SAFETY NOTES:

Wire color Voltage
(Main) Pink - Black 11 ~ 13 VD

(SV1) Black - Red 11 ~ 13 VD0

(SV2) Black - Orange 11 ~ 13 VD0 B) Black - Yellow 11 ~ 13 VDC

(POV) Orange - Orange | 2 ~ 15 VDC

(M) Water Flow Control Device Servo or Geared Motor

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.

Troubleshooting

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).

Resistance 24 ~ 28 ohms

37 ~ 43 ohms

37 ~ 43 ohms

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

GAS PRESSURE SETTING

1. Turn 'OFF' the gas supply.

(Fig.2).

See Dip Switch Settings section below.

water taps full including the shower.

Check the burner test point pressure.

Ensure maximum water flow!

Check the burner test point pressure.

15. Close hot water tap.

outlets during this procedure).

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

(Ensure gas pressure check under Commissioning has been completed

correctly and all other possible causes for incorrect operation have

If using spare PC board, check gas type switches (Fig.1) are in the

5. Attach pressure gauge to burner test point, located on the gas control.

select the maximum delivery temperature and open all available hot

9. Set the Water Heater to 'Forced Low' combustion by setting No.7 dip

11. Remove rubber access plug and adjust the regulator screw on the

12 Set the Water Heater to 'Forced High' combustion by setting both

14. Adjust the high pressure Potentiometer (POT) on the Printed Circuit

IMPORTANT: Set dip switches 7 and 8 on the bottom (SW1) to 'OFF'

Board (PCB) as required to the pressure shown in Table 1.

to return the appliance to 'Normal' combustion. (Fig. 6)

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.

(**®**)

(**®**)

Fig. 1

Fig. 3

Fig. 5

(CAUTION: Ensure building occupants do not have access to hot water

modulating valve (Fig.4) as required in Table 1. Replace rubber access

No.7 and No.8 dip switches of the bottom (SW1) set of 'ON'. (Fig.5).

8. If remote controllers are fitted, turn the unit 'ON' at the controller,

switch of the (SW1) set of dip switches to 'ON'. (Fig.3).

correct position. (dip switch 1 of SW2 'ON' = NG, 'OFF' = LPG)

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

event of low flame circuit remove the flame rod and check for carbon and/or damage.

Check all thermistors by inserting meter leads into each end of the thermistor plug. Set your

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

4 -	0	
3 -	6	Outraina Wat
9 -	10	Outgoing Wat
		White - White
		Heat Exchang
9 -	-10	D: 1 14/1:

11 ~ 13 VDC 22 ~ 28 ohms

0.0,	Diomi	. 010	14774	1 0	_
Grey -	- Yellow	N/A	N/A	F5	!
NOTE	:The grey wire	listed above turns to	black at F connector	on the PCB.	
/OC\ 14	V-1 Fl 0				

(QS) Water Flow Sell	501.			
Black - Red	11 ~ 13 VDC	5.5 ~ 6.2 K ohms	F2	1 - 3
Yellow - Black	4 ~ 7 VDC	1 ~ 1.4 Mega ohms	F2	2 - 3
By-pass Flow Contro	ol:	-		
Drown White			C1	1 5

, ,				
Brown - White	(Unit in operating mode)		G1	1 - 5
Orange - White		15 ~ 35 ohms	G1	2 - 5
Yellow - White			G1	3 - 5
Red-White - Ground			G1	4 - 5
(IG) Ignition System:				
Grey - Grey	90 ~ 110 VAC	N/A	C1	1 - 2
(FM) Combustion Far				

9.2 ~ 9.4 K ohms 5 ~ 10 VD0 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

meman ase / Over	ierman use / Overneat Owiton.				
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

Fig. 4

Fig. 6

Heat Exchanger and Outgoing Water Temperature Thermistors:

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	$140^{\circ}F = 2.2 \sim 2.7K\Omega$
	$86^{\circ}F = 6.4 \sim 7.8K\Omega$	$221^{\circ}F = 0.6 \sim 0.8K\Omega$
	4400F 0.C 4.FI/O	

$113^{\circ}\text{F} = 3.6 \sim 4.5\text{K}\Omega$	2211 - 0.0 - 0.0122	
utgoing Water Thermistor:		

Julyonny water Theri	ilistoi.					
White - White	N/A	See example a	bove	F4	3 -	4
Heat Exchanger Tem	perature Thermistor:	·				
D1 1 14/1/1/	A 1 / A			-	_	

Heat Exchanger Temp	leat Exchanger Temperature Thermistor:			
Pink - White	N/A	See example above	F3	3 - 11
Surge Protector:				
Black - White	108 ~ 132 VAC	N/A	D2	1 - 3
Black - White	108 ~ 132 VAC	N/A	D1	1 - 3
With the power off you	can check the contin	ruity through the suro	e protector. Plac	e one mete

lead on the top pin #1 of the surge protector and pin #3 on the bottom of the surge protector. 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. Remote Controls

Terminals B1 10 ~ 13 VDC 1.5 ~ 3.0 K ohms E

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

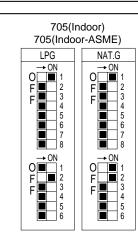
heater located on the heat exchanger piping should have a resistance reading of 139 ~ 161 ohms and the one located in the water flow sensor valve has a resistance reading of 335 ~ 385 ohms. The one located in the outlet valve has a resistance reading of 335 ~ 385. Voltage throughout this circuit should 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		Off	(0-610m)	On	(610-1585m)	Off	(1585-2377m)	On	(2377-3109m)

Error Codes

02 No burner operation during freeze protection mode

Service Call

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

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

10 Air Supply or Exhaust Blockage

- Ensure approved venting materials are being used.
- Check that nothing is blocking the flue inlet or exhaust.
- Check all vent components for proper connections.
- Ensure vent length is within limits.
- Ensure condensation collar was installed correctly.
- Verify dip switches are set properly.
- Check fan for blockage.

11 No Ignition

- Check that the gas is turned on at the water heater, gas meter, or cylinder.
- · Ensure gas type and pressure is correct.
- Ensure gas line, meter, and/or regulator is sized properly.
- · Bleed all air from gas lines.
- Verify dip switches are set properly. Ensure appliance is properly grounded.
- Disconnect multi-unit connections to isolate the problem.
- Ensure igniter is operational.
- Check igniter wiring harness for damage.
- · Check gas solenoid valves for open or short circuits.
- Remove burner cover and ensure all burners are properly seated.
- Remove burner plate and inspect burner surface for condensation or debris.

12 Flame Failure

- Check that the gas is turned on at the water heater and gas
- meter. Check for obstructions in the flue outlet. • Ensure gas line, meter, and/or regulator is sized properly.
- Ensure gas type and pressure is correct.
- · Bleed all air from gas lines.
- Ensure proper venting material was installed. • Ensure condensation collar was installed properly.
- Ensure vent length is within limits.
- Verify dip switches are set properly.
- Ensure appliance is properly grounded.
- Disconnect keypad. • Disconnect multi-unit connections to isolate the problem.
- Check power supply for loose connections.
- Check power supply for proper voltage and voltage drops.
- Ensure flame rod wire is connected.
- Check flame rod for carbon build-up.
- board. · Check all components for electrical short.

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

- · Check gas solenoid valves for open or short circuits. · Remove burner plate and inspect burner surface for
- condensation or debris.
- 14 Thermal Fuse

- 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-
- cycling. Ensure dip switches are set to the proper position.
- Check for foreign materials in combustion chamber and/or exhaust piping
- Check heat exchanger for cracks and/or separations. • Check heat exchanger surface for hot spots which indicate blockage due to scale build up. Refer to instructions in manual for flushing heat exchanger.
- · Measure resistance of safety circuit.
- Ensure high fire and low fire manifold pressure is correct. · Check for improper conversion of product.

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.

- **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.
- 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.

Replace flame rod.

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

• On new installations ensure hot and cold water lines are not

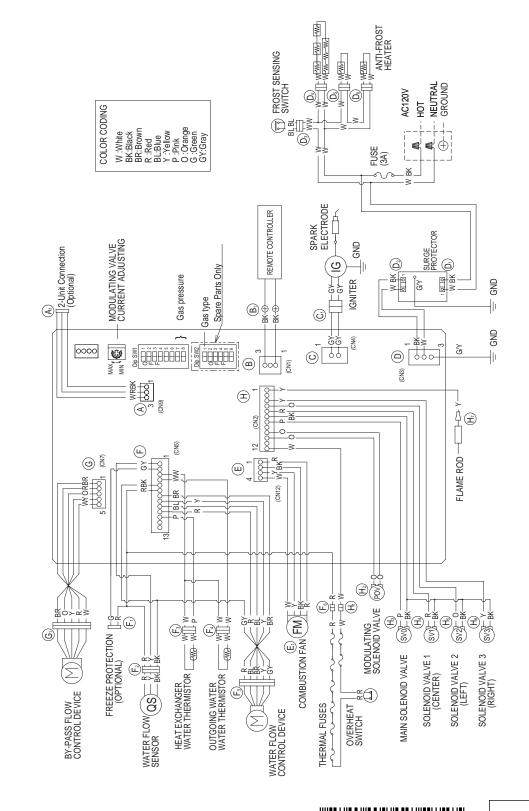
• Ensure you have at least the minimum flow rate required to fire

Remote control does not light up but you have 12 VDC at the

· Ensure turbine spins freely. Measure the resistance of the water flow control sensor.

terminals for controls.

Wiring Diagram

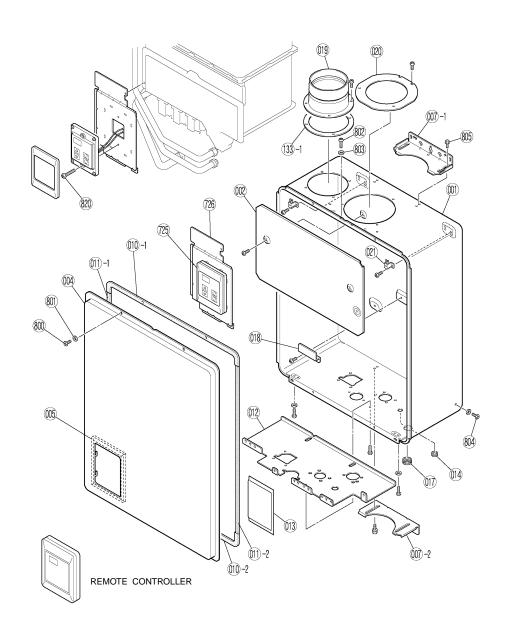




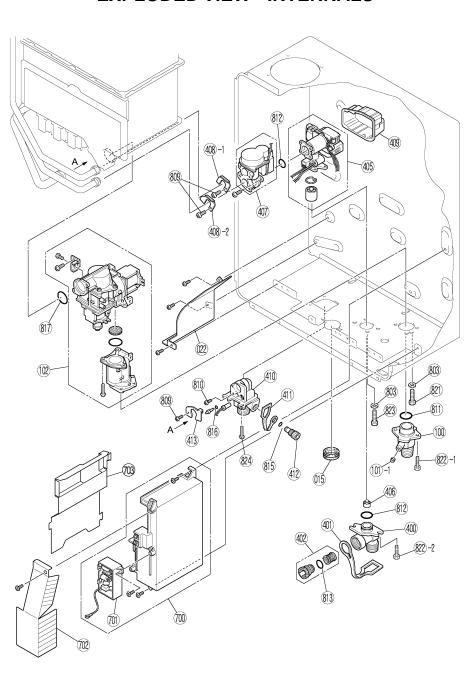
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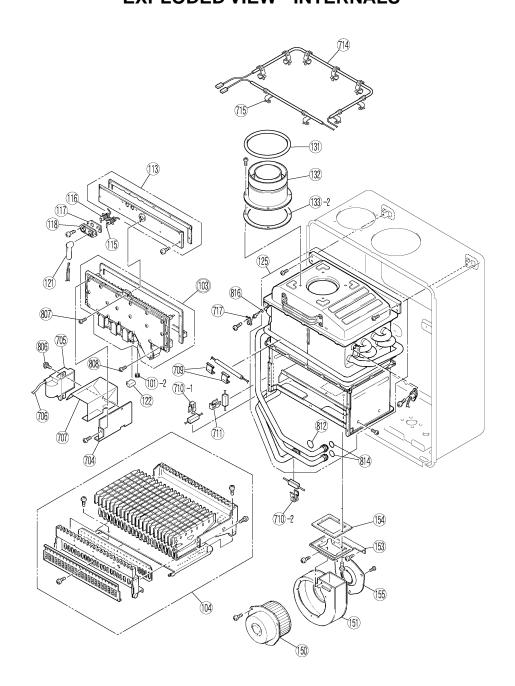
EXPLODED VIEW - CABINET



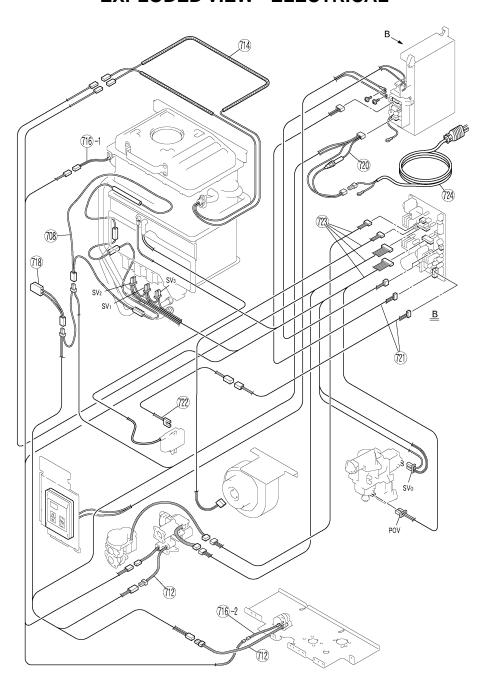
EXPLODED VIEW - INTERNALS



EXPLODED VIEW - INTERNALS



EXPLODED VIEW - ELECTRICAL



				Quantity PARTS LIST			Qu 705	uantity 705		Quantity 705 705				
Number	Description	Parts Number		(Indoor-ASME)	Number	Description	Parts Number		(Indoor-ASME)	Number	Description	Parts Number		(Indoor-ASME)
001	Casing Assembly	701022-150	1	1	131	Flue Outlet Vent Packing	701022-191	1	1	717	Thermistor Clip	701022-095	1	1
002	Heat Protection Plate	701022-154	1	1	132	Flue Outlet Vent Assembly	701022-192	1	1	718	Frost Sensing Switch	701022-223	1	1
004	Front Panel Assembly	701022-155	1	1	133	100 Packing	701022-193	2	2	720	Fuse Harness	701022-224	1	1
005	Remote Controller Packing	701022-159	1	1	150	Blower Motor	701022-194	1	1	721	Power Supply Harness	701022-226	1	1
007	Wall Fitting Bracket	701022-160	2	2	151	Fan Casing Assembly	701022-195	1	1	722	Ignitor Harness	701022-227	1	1
010	Front Panel Packing-Top	701022-162	2	2	153	Fan Connecting Bracket	701022-197	1	1	723	Sensor Harness	701022-228	1	1
011	Front Panel Packing-Side	701022-163	2	2	154	Fan Connecting Packing	701022-198	1	1	724	Power Cord	701022-107	1	1
012	Connection Reinforcement Panel	701022-164	1	1	155	39 Bell Mouth	701022-199	1	1	725	Remote Controller	701022-229	1	1
013	Bag for Installation Manual	701022-165	1	1	400	Water Inlet (3/4"NPT)	701022-069	1	1	726	Remote Controller Bracket	701022-231	1	1
014	Seal Packing	701022-023	1	1	401	Plug Band `	701022-200	1	1	800	Screw	701022-122	4	4
015	Rubber Bushing	701022-008	1	1	402	Water Filter Assembly	701022-082	1	1	801	Washer	701022-232	4	4
017	Rubber Bushing	701022-020	1	1	405	Water Flow Control Assembly Kit	701022-203	1	1	802	Screw	701022-233	2	2
018	Reinforcement Plate	701022-166	1	1	406	Rectifier	701022-204	1	1	803	Washer	701022-128	7	7
019	Air Intake Vent	701022-167	1	1	407	Bypass-Servo Assembly	701022-074	1	1	804	Screw	701022-234	10	10
020	100 Seal Plate	701022-168	1	1	408	Stop Bracket	701022-075	2	2	805	Screw	701022-121	8	8
021	Duct Bracket	701022-169	2	2	409	Water Flow Servo Cover	701022-205	1	1	806	Screw	701022-235	1	1
022	Fan Rectifier	701022-170	1	1	410	Hot Water Outlet (3/4"NPT)	701022-206	1	1	807	Screw	701022-236	5	5
100	Gas Connection (3/4"NPT)	701022-027	1	1	411	Plug Band	701022-207	1	1	808	Screw	701022-237	2	2
101	Screw	701022-171	2	2	412	Drain Valve	701022-081	1	1	809	Screw	701022-238	3	3
102	Gas Control Kit	701022-172	1	1	413	Stop Bracket	701022-208	1	1	810	Screw	701022-125	1	1
103	Manifold Assembly-A (LPG)	701022-173	1	1	700	PCB	701022-209	1	1	811	O-ring	701022-137	1	1
103	Manifold Assembly-B (Nat.G)	701022-174	1	1	701	Surge Protector	701022-210	1	1	812	O-ring	701022-133	3	3
104	Burner Unit Assembly (Nat.G)	701022-175	1	1	702	PCB Cover-Front	701022-211	1	1	813	O-ring	701022-134	1	1
104	Burner Unit Assembly (LPG)	701022-153	1	1	703	PCB Cover-Side	701022-088	1	1	814	O-ring	701022-135	2	2
113	Combustion Chamber Front Plate	701022-182	1	1	704	Ignitor Bracket	701022-213	1	1	815	O-ring	701022-136	1	1
114	Combustion Chamber Front Plate Packing	701022-183	1	1	705	Ignitor	701022-091	1	1	816	O-ring	701022-130	2	2
115	Electrode Kit	701022-036	1	1	706	High Tension Cord	701022-214	1	1	817	Packing	701022-239	1	1
116	Flame Rod Kit	701022-184	1	1	707	Ignitor Cover	701022-215	1	1	820	Screw	701022-240	2	2
117	Electrode Packing	701022-185	1	1	708	120V Anti Frost Heater Assembly	701022-216	1	1	821	Screw	701022-241	1	1
118	Electrode Holder	701022-039	1	1	709	Anti Frost Heater Clip	701022-102	2	2	822	Screw	701022-141	4	4
121	Electrode Sleeve	701022-093	1	1	710	Anti Frost Heater Clip	701022-151	2	2	823	Screw	701022-242	2	2
122	Solenoid Valve Cover	701022-186	1	1	711	Anti Frost Heater Clip	701022-218	1	1	824	Screw	701022-142	3	3
123	Upper Combustion Chamber Packing	701022-187	1	1	712	120V Valve Heater Assembly	701022-219	2	2	888	Manual	701022-143	1	1
124	Lower Combustion Chamber Packing	701022-188	1	1	714	Thermal Fuse Harness	701022-221	1	1	889	Installation Manual (Tech Sheet)	701022-244	1	1
125	Heat Exchanger Kit	701022-189	1	-	715	Thermal Fuse Clip	701022-222	9	9	-	Package Spec Sheet	701022-246	1	1
125	Heat Exchanger Kit(ASME)	701022-158	-	1	716	Thermistor	701022-120	2	2	-	Manual 3/4" Gas Control Valve	701022-247	1	1
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