

# Remote Controller

Digital Display  
Indicates the selected water temperature. Error message flash in the event of a failure.

Thermostat  
Increases or decreases the desired water temperature.

In Use Indicator  
Indicates that the hot water tap is in operation.

Priority Indicator  
Indicates whether this controller has priority control over the water temperature.

Priority  
Pressing takes control of the water temperature by this controller only when all taps are off.

ON/OFF  
Used to switch the water heater on and off.

Hot water temp.

Hot water temp.

Priority

On/Off

## 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 the thermostat button to cycle through the maintenance codes.

2. To Display Water Flow through the water heater: Press the thermostat button and hold for 2 seconds and then press the 'On/Off' button while continuing to hold the thermostat button.

3. 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 thermostat button.

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

1. 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)

1. To turn the sound off (mute) press and hold both the 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**

**WARNING**

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

Table 1

	Water Inlet Min.	Gas Inlet Min./Max		Forced Low		Forced High	
		NAT.G	LPG	NAT.G	LPG	NAT.G	LPG
505	150 PSI	5"W.C.	8"W.C.	0.56"W.C.	0.88"W.C.	3.3"W.C.	5.1"W.C.
305		10.5"W.C.	13.5"W.C.				

## COMMISSIONING

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

**IMPORTANT SAFETY NOTES:**  
There are a number of (live) tests that are required when fault finding this 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	36.8 ~ 44.8 ohms	H5	6 - 7
(SV1) Black - Yellow	11 ~ 13 VDC	36.8 ~ 44.8 ohms	H6	5 - 6
(SV2) Black - Blue	11 ~ 13 VDC	36.8 ~ 44.8 ohms	H7	4 - 6
(SV3) Black - Brown	11 ~ 13 VDC	36.8 ~ 44.8 ohms	H8	3 - 6
(POV) Pink - Pink	2 ~ 15 VDC	67 ~ 81 ohms	H3	9 - 10

**(M) Water Flow Control Device Servo or Geared Motor:**

Red - Blue	11 ~ 13 VDC	22 ~ 28 ohms	F7	9 - 10
Grey - Brown	4 ~ 6 VDC	N/A	F7	5 - 7
Grey - Yellow	N/A	N/A	F7	5 - 8

NOTE: The grey wire listed above turns to black at B connector on the PCB, the orange wire turns to red.

**(QS) Water Flow Sensor:**

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 Control (By-pass servo model ONLY):**

Brown - White	2 ~ 6 VDC (Unit in operating mode)	15 ~ 35 ohms	G1	1 - 5
Orange - White			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
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**(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	3 - 4

Set your meter to the hertz scale. Reading across the white and black wires at terminals 2 and 3 you should read between 60 and 420 hertz.

**Thermal Fuse / Overheat Switch:**

Red - Red	11 ~ 13 VDC	Below 1 ohms	F6 H1	F6 - H12
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# GAS PRESSURE SETTING

(Ensure gas pressure check under Commissioning has been completed first !)  
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 been eliminated.**

1. Turn 'OFF' the gas supply.  
2. Turn 'OFF' 120V power supply.  
3. Remove the front cover from the appliance.  
4. 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).  
10. 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 plug.  
12. Set the Water Heater to 'Forced High' combustion by setting both No.7 and No.8 dip switches of the bottom (SW1) set to 'ON'.  
**(Fig.5). Ensure maximum water flow !**  
13. 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.  
18. 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. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

# 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 EZConnect or MSA controls 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 EZConnect or MSA controls 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.
- Disconnect and re-connect all wiring harnesses on unit and PC board.
- Check all components for electrical short.
- 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 used.
- 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-cycling.
- 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 connections.
- 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 sand paper.
- 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.

**LC 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 reversed.
- 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.
- Ensure you have at least the minimum flow rate required to fire unit.
- 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

BY-PASS SERVO MODEL ONLY

FREEZE PROTECTION OPTION

WATER FLOW SENSOR

INDOOR MODEL ONLY

AIR TEMPERATURE THERMISTOR

HEAT EXCHANGER THERMISTOR

OUTGOING WATER THERMISTOR

WATER FLOW CONTROL DEVICE

COMBUSTION FAN

THERMAL FUSES

OVERHEAT SWITCH

MODULATING SOLENOID VALVE

FLAME ROD

MAIN SOLENOID VALVE

SOLENOID VALVE 1

SOLENOID VALVE 2

SOLENOID VALVE 3

SPARK ELECTRODE

IGNITER

ANTI-FROST HEATER

ANTI-FROST HEATER

AC120V

HOT

NEUTRAL

GROUND

COLOR CODING

W :White  
BK:Black  
BR:Brown  
R :Red  
BL:Blue  
Y :Yellow  
P :Pink  
O :Orange  
G :Green  
GY:Gray

# 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.

505

LPG

NAT.G

305

LPG

NAT.G

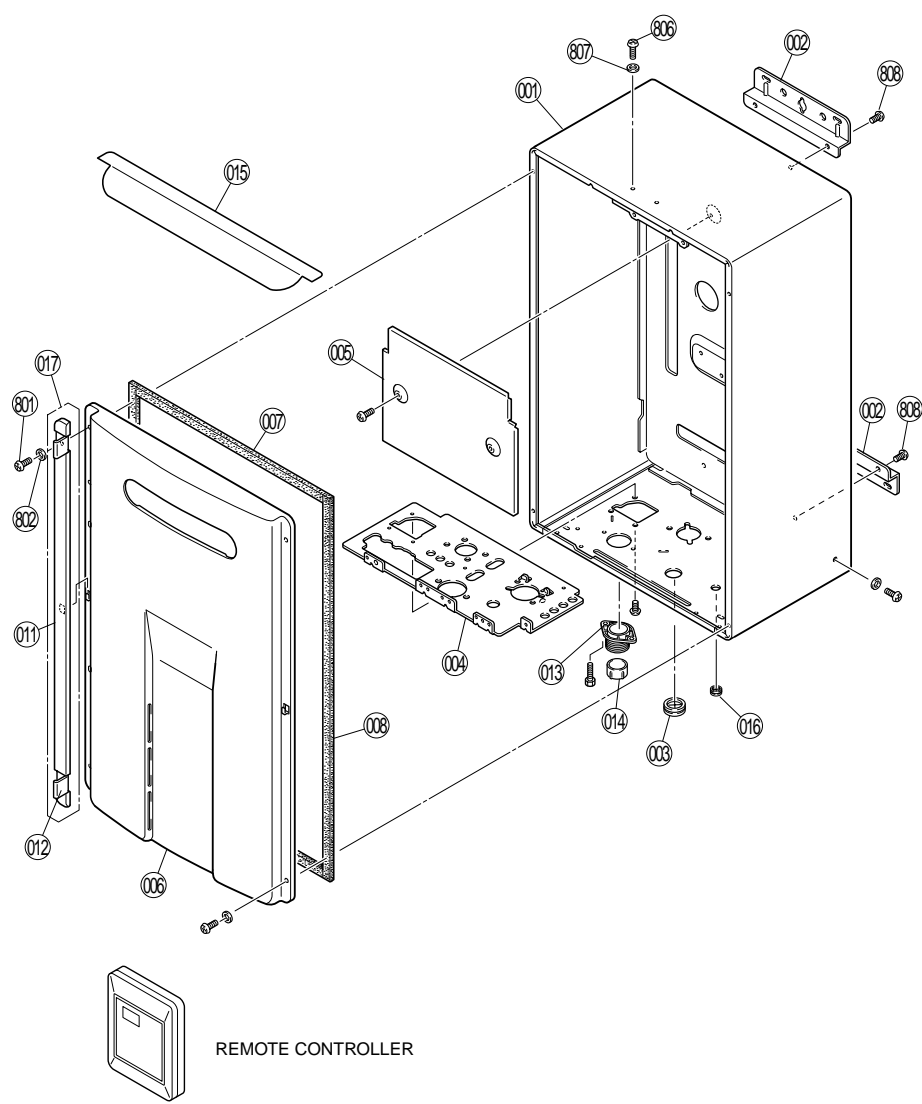
**WARNING**

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.

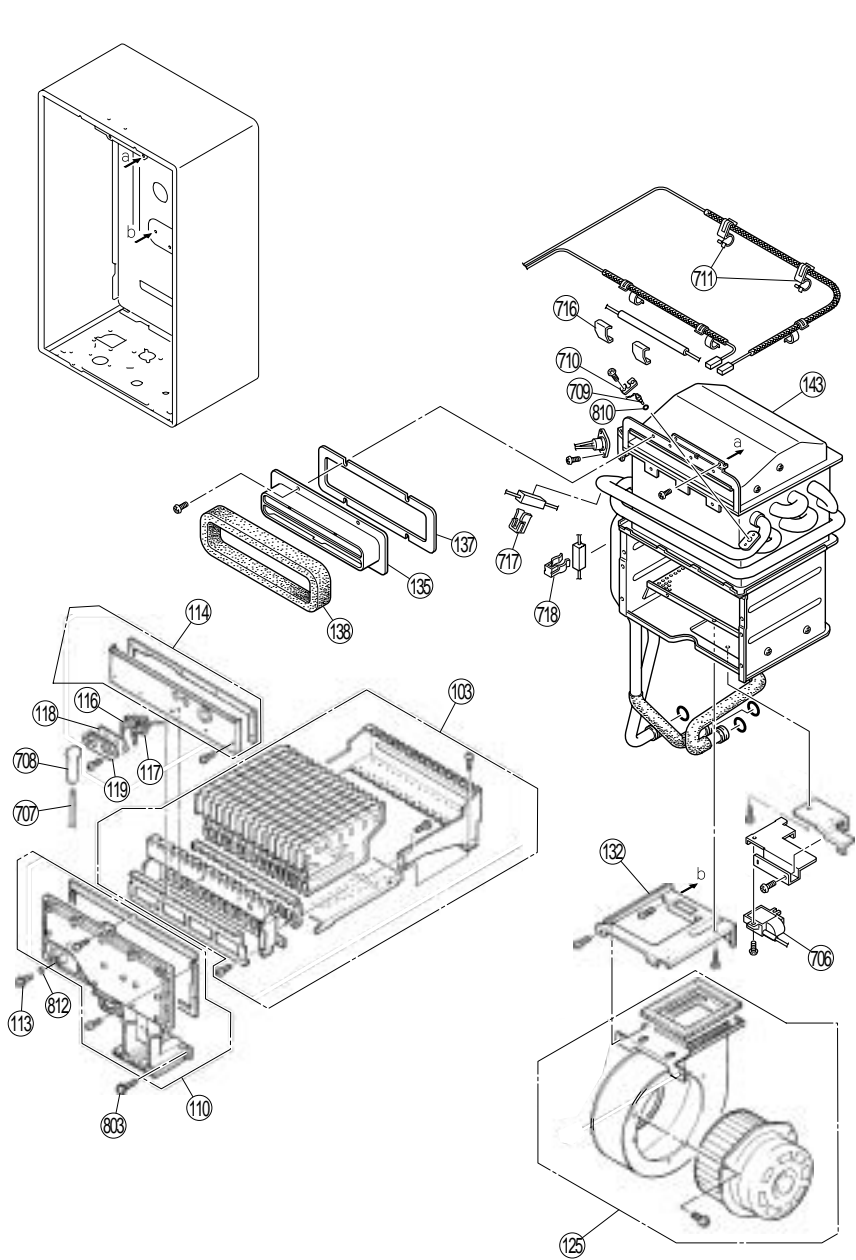
SW No.	NOTES								
2	High Altitude	Off	Level 0 0-2000ft (0-610m)	Off	Level 1 2001-5200ft (610-1585m)	On	Level 2 5201-7800ft (1585-2377m)	On	Level 3 7801-10200ft (2377-3109m)
3		Off		On	Off		On		



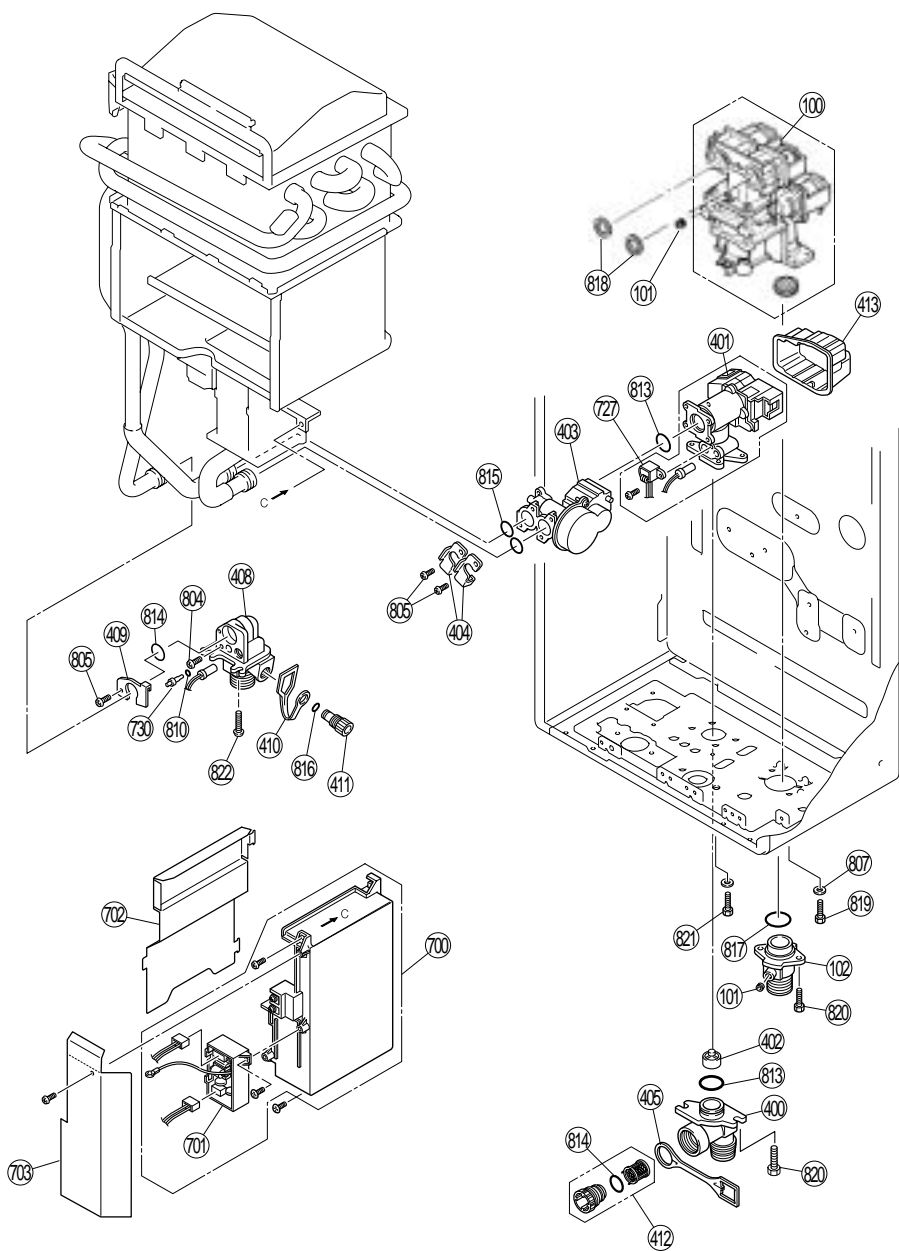
EXPLODED VIEW - CABINET



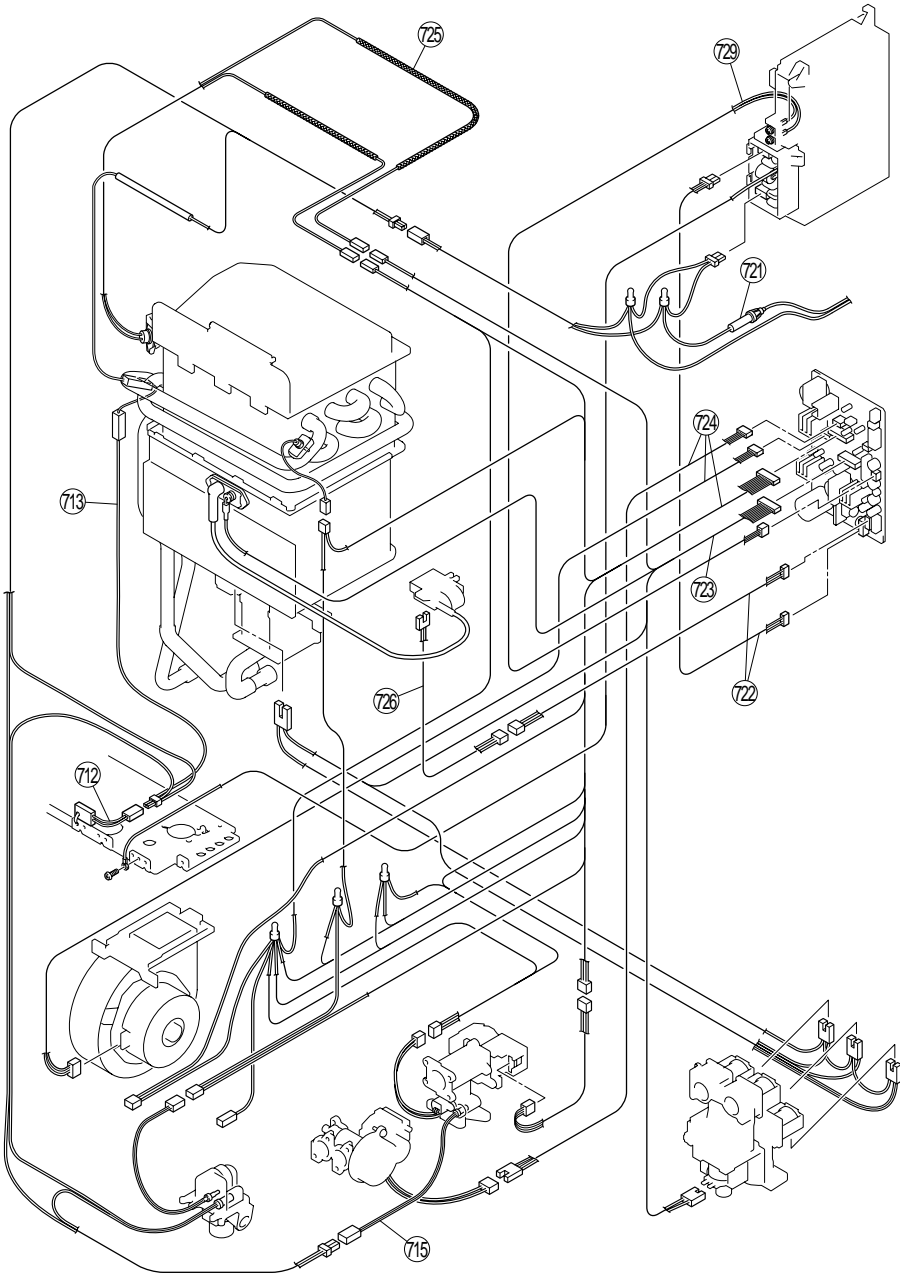
EXPLODED VIEW - INTERNALS



EXPLODED VIEW - INTERNALS



EXPLODED VIEW - ELECTRICAL



					PARTS LIST									
		Quantity		Parts Number			Quantity		Parts Number			Quantity		Parts Number
Number	Description	505	305		Number	Description	505	305		Number	Description	505	305	
001	Main Body (W)	1	1	701022-005	137	Flue Outlet Gasket	1	1	701022-052	717	Antifrost Heater Clip A	1	1	701022-103
002	Wall Mounting Bracket (W)	1	1	701022-007	138	Seal Packing	1	1	701022-054	718	Antifrost Heater Clip C	1	1	701022-105
003	Rubber Bushing	1	1	701022-008	143	Heat Exchanger Assembly	1	-	701022-061	721	Fuse Harness (W)	1	1	701022-109
004	Connection Reinforcement Panel	1	1	701022-009	143	Heat Exchanger Assembly	-	1	701022-062	722	Power Harness	1	1	701022-110
005	Heat Protection Plate	1	1	701022-010	400	Water Inlet (3/4" NPT)	1	1	701022-070	723	Solenoid Valve Harness	1	1	701022-111
006	Front Panel	1	1	701022-012	401	Water Flow Servo & Sensor Assembly	1	-	701022-071	724	Sensor Harness	1	-	701022-114
007	Front Panel Packing	1	1	701022-013	401	Water Flow Servo & Sensor Assembly	-	1	701022-072	724	Sensor Harness	-	1	701022-115
008	Front Panel Packing Side	2	2	701022-014	402	Rectifier	1	1	701022-073	725	Thermal Fuse Harness Assy	1	1	701022-116
011	Screw Cover	2	2	701022-017	403	By-pass Servo Assembly	1	-	701022-074	726	Ignitor Harness	1	1	701022-117
012	Screw Cover Lid	4	4	701022-018	404	Stop Bracket	2	-	701022-075	727	Flow Sensor	1	1	701022-118
013	Cable Access Assy	1	1	701022-019	404	Stop Bracket	-	1	701022-076	729	Remote Controller Harness	1	1	701022-119
014	Rubber Bushing	1	1	701022-021	405	Plug Band	1	1	701022-077	730	Thermistor	1	1	701022-120
015	Rain Hood	1	1	701022-022	408	Hot Water Outlet (3/4" NPT)	1	1	701022-078	801	Screw	4	4	701022-122
016	Packing	1	1	701022-023	409	Stop Bracket	1	1	701022-079	802	Resin Washer	4	4	701022-123
017	Screw Cover Assy	2	2	701022-024	410	Plug Band (small)	1	1	701022-080	803	O-ring	3	3	701022-124
100	Gas Control Assembly	1	1	701022-025	411	Drain Valve	1	1	701022-081	804	Thermistor Stop Screw	1	1	701022-125
101	Test Port Set Screw	2	2	701022-026	412	Water Filter Assy	1	1	701022-082	805	Screw	3	2	701022-126
102	Gas Connection (3/4" NPT)	1	1	701022-027	413	Cover	1	1	701022-083	806	Screw	2	2	701022-127
103	Burner Unit Assy (LPG)	1	1	701022-028	700	PCB	1	-	701022-084	807	Resin Washer	2	2	701022-128
103	Burner Unit Assy (NG)	1	1	701022-029	700	PCB	-	1	701022-085	808	Screw	4	4	701022-129
103A	24 Damper (NG)	1	1	701022-030	701	Surge Protector	1	1	701022-086	810	O-ring	2	2	701022-131
110	Manifold Assembly (LPG)	1	1	701022-031	701	Surge Protector with terminal (optional)	1	1	701022-087	812	O-ring	1	1	701022-132
110	Manifold Assembly (W-NG)	1	1	701022-033	702	PCB cover - side	1	1	701022-089	813	O-ring	2	1	701022-133
113	Pressure Point Sealing Screw	1	1	701022-034	703	PCB cover - front	1	1	701022-090	814	O-ring	2	2	701022-134
114	Combustion Chamber Sightglass Plate	1	1	701022-035	706	Ignitor	1	1	701022-091	815	O-ring	2	1	701022-135
116	Electrode	1	1	701022-036	707	High Tension Cord	1	1	701022-092	816	O-ring	1	1	701022-136
117	Flame Rod	1	1	701022-037	708	Electrode Sleeve	1	1	701022-093	817	O-ring	1	1	701022-137
118	Electrode Packing	1	1	701022-038	709	Thermistor - Heat Exchanger	1	1	701022-094	818	Packing	2	2	701022-138
119	Electrode Holder	1	1	701022-039	710	Thermistor Clip Large	1	1	701022-095	819	Screw	2	2	701022-139
119A	Sparker Bracket	1	1	701022-040	711	Temperature Fuse Clip	5	5	701022-096	820	Screw	4	4	701022-140
125	Fan Assembly	1	1	701022-044	712	Frost Sensing Switch	1	1	701022-097	821	Screw	2	2	701022-141
125B	Fan Casing All Assembly	1	1	701022-045	713	Anti Frost Heater (120V)	1	1	701022-099	822	Screw	3	3	701022-142
132	Combustion Chamber Fan Bracket	1	1	701022-047	715	Valve Heater (120V) Assembly	1	1	701022-100	888	Manual	1	1	701022-144
135	Flue Outlet	1	1	701022-049	716	Antifrost Heater Clip B	2	2	701022-102	889	Tech Sheet	1	1	701022-146