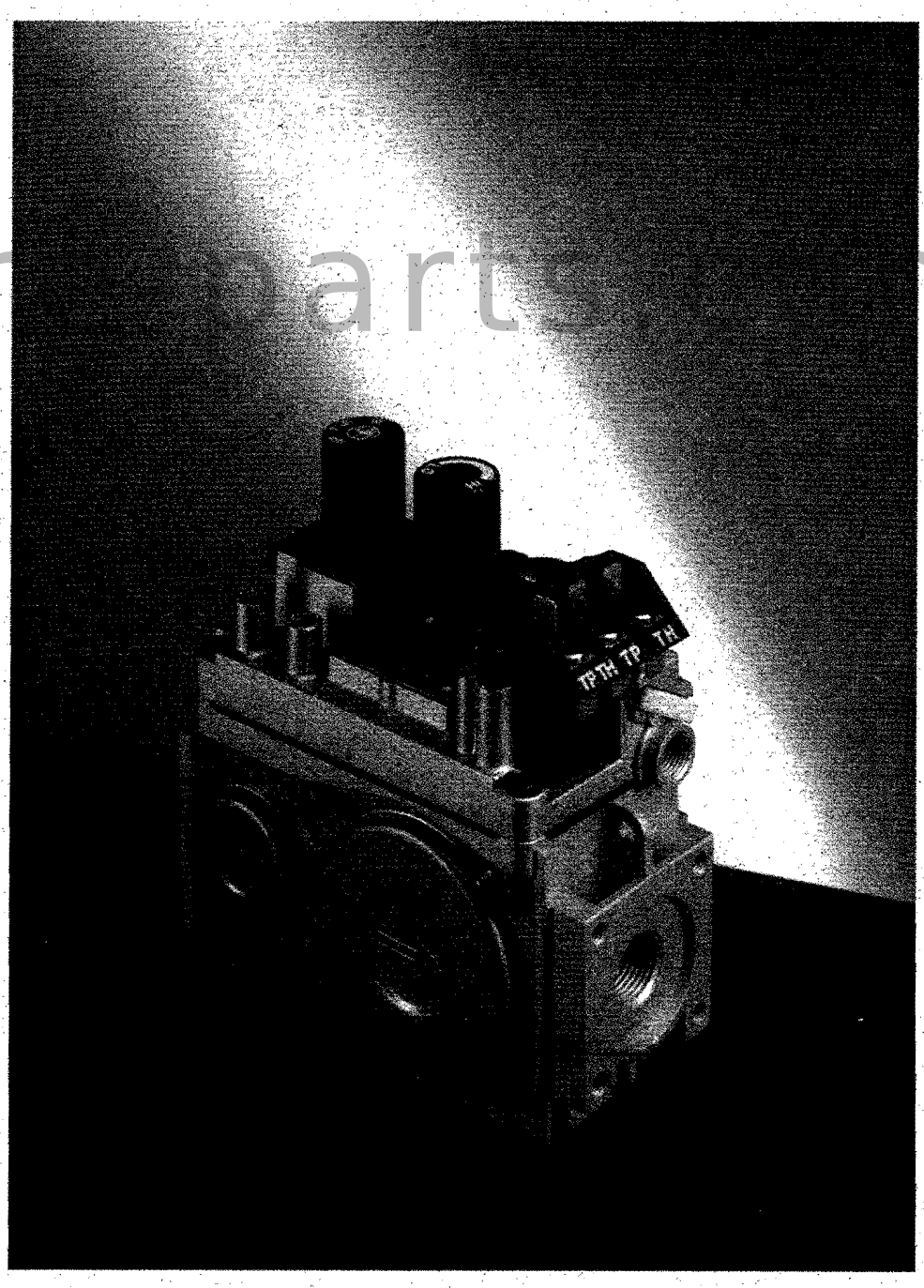
SIT 820 NOVA MV
TROUBLE-SHOOTING GUIDE



820 NOVA MV
TROUBLE-SHOOTING GUIDE

The 820 Nova millivolt control is available in three different configurations. Millivolt Plus vented, Millivolt Plus vent-free, and the Millivolt.

The Millivolt Plus is a split system millivolt control for use in direct vented appliances which require fast shut-off in the event of a pilot flame failure. A thermocouple powers the safety magnet, and a thermo-generator powers the main operator.

The Millivolt Plus control is also available in an un-vented version that is used in conjunction with an ODS pilot. As with the standard Millivolt Plus control, it uses a thermocouple to power the safety magnet, and a thermo-generator to power the main operator.

Finally, the Millivolt system is used in gravity vented appliances where rapid shut-off is not necessary in the event of a pilot flame outage. It uses a single thermo-generator to power both the safety magnet circuit, and the main operator. A spill switch could be used in the safety magnet circuit of this system.

All Nova controls are fitted with a safety interlock device which prevents unsafe ignition of the pilot burner after the control knob has been turned to the OFF position. Each type of system is also capable of being used with a wall switch, wall thermostat, or remote control unit for cycling the main operator.

Following is the electrical data for the 820 Nova Millivolt gas control valve:

TABLE 1

VALVE TYPE	MAIN OPERATOR		SAFETY MAGNET	
NOVA MV PLUS VENTED	Minimum voltage	145mV	Hold-in current	Less than 285mA
	Coil Resistance	2.25Ω ±0.5Ω	Drop-out current	Greater than 125mA
			Coil resistance	0.018Ω ±0.003Ω
NOVA MV PLUS UN-VENTED	Minimum voltage	145mV	Hold-in current	Less than 200mA
	Coil Resistance	2.25Ω ±0.5Ω	Drop-out current	Greater than 80mA
			Coil resistance	0.018Ω ±0.003Ω
NOVA MILLIVOLT VENTED	Minimum voltage	145mV	Hold-in current	Less than 12mA
	Coil Resistance	2.25Ω ±0.5Ω	Drop-out current	Greater than 4mA
			Coil resistance	10.2Ω ±0.5Ω

Millivolt circuits are easily affected by electrical resistance. If enough resistance is present in the circuit, two things can occur. Either the main operator will work intermittently, or not at all. There are several areas where excess resistance can be found.

In new installations, the thermostat itself can be a problem. Always use a thermostat rated for millivolt control. Wire gage is also important. The following table can be used to determine the recommended gauge of wire to use when connecting a thermostat to the main operator. This list refers to the total length of the wire in the circuit; out to the thermostat, and back to the valve.

TABLE 2

WIRE SIZE	Maximum Length	Wire Size	MAXIMUM LENGTH
12 Gauge	150 ft.	18 Gauge	40 ft.
14 Gauge	100 ft.	20 Gauge	25 ft.
16 Gauge	64 ft.	22 Gauge	16 ft.

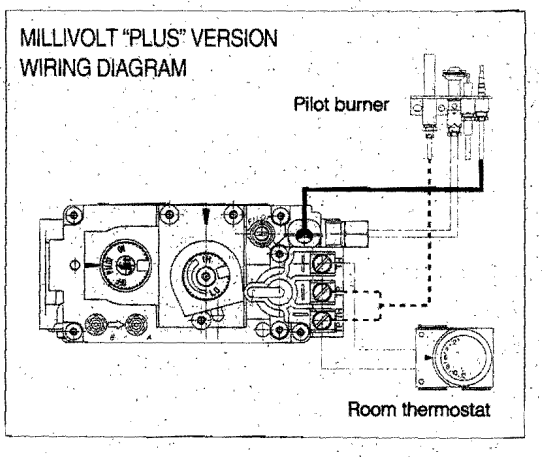
And finally, all electrical connections must be tight, clean, and free from corrosion. Corrosion can build up over time, and therefore, connections should be inspected periodically.

Pilot drops out. Continued...	Spill switch activated.	Examine venting system. Repair as necessary.
No gas to main burner. Thermostat / wall switch will not cycle main burner.	Low gas pressure to appliance.	Refer to item # 2 in the set-up guide.
	Pilot not lit.	Light pilot and wait for thermo-generator to heat up sufficiently to power the main operator. If pilot fails to light, or hold, refer to above sections.
	Control knob not in ON position.	Rotate OFF/PILOT/ON control knob to the ON position.
	Thermostat not in ON position.	Turn thermostat ON, and adjust temperature control to call for heat.
	Thermo-generator output voltage not within design parameters.	Refer to item # 7 in the set-up guide. If unable to meet minimum requirements, replace thermo-generator.
	Defective thermostat or thermostat wiring.	(A) With the pilot adjusted properly, (Set-up section, step #7), place a jumper wire between TPTH and TH. Take a mV reading across the TPTH and TP terminals on the valve. This closed circuit voltage should not fall below 300mV. Record reading. (B) Remove jumper wire from the TPTH and TH connections, and re-connect the thermostat wires to the same terminals. Take the closed circuit voltage as described in the previous step. If the mV reading drops below 150mV, excessive resistance exists in the thermostat circuit, and must be isolated and eliminated.
	Defective wall switch.	Repeat the above troubleshooting items covered under "Defective thermostat or thermostat wiring", except substitute the words "wall switch" where the word "thermostat" appears in the instructions.
	Excessive wire resistance.	Make certain that all mV connections are made using wire of the proper size. (Reference table 2).
	Valve wired wrong.	Thermo-generator leads must be connected to the TPTH and TP connections of the main operator. Thermostat wires must be connected to the TPTH, and TH terminals of the valve.
	Main operator coil Defective.	Verify electrical resistance of main operator coil in the following manner. (A) Remove all wires from operator head. (B) With an Ohm meter, measure electrical resistance between TP and TH terminals. If the resistance does not fall within specification, replace valve. (See table 1).
Main burner cycles on and off, (Not on T'Stat)	Flue gas spillage present. (Non-DV appliances only)	Check the appliance manufacturer's installation instructions to verify that flue dimensions are in specification, and that proper make-up air is provided for the particular appliance.
		Verify that flue is installed according to manufacturers instructions.
		Check for flue blockage. If blocked, clean flue.
Main burner lights in the PILOT position.	Debris on seat of main valve	Replace valve.
	Main seat blown out as a result of exposing LPG gas valve to unregulated line pressure in excess of 15PSI.	Replace valve.

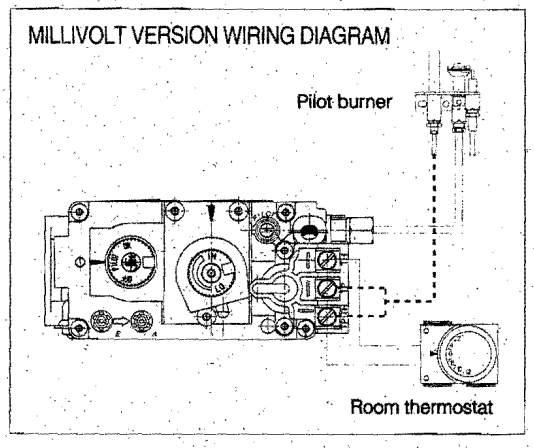
GENERAL GUIDE FOR SET-UP OF NOVA MV SYSTEM

1. Bleed all air from gas lines.
2. With the main burner functioning, adjust the inlet pressure regulator to supply gas to the appliance within the design parameters of the appliance manufacturer. (Typically 7"NG, 11"LPG).
3. Make certain that the thermocouple and thermo-generator are fully inserted and tightened into their receptacles in the pilot head. The thermocouple should be threaded into the valve hand–tight, plus ¼ turn with a wrench.
4. Verify that system is wired properly, and that all connections are clean and tight. Thermo-generator leads are connected to the TPTH and TP connections of the main operator. Thermostat and wall switch wires are connected to the TPTH, and TH terminals of the valve.
5. Turn OFF/PILOT/ON knob to the PILOT position and depress knob, while lighting the pilot with a match or piezo igniter.
6. Continue to hold the knob down until enough current is generated to engage the safety magnet. (Mill-Volt Plus systems use a thermocouple to power the safety magnet, Millivolt systems utilize power from the thermo-generator).
7. After the pilot has been lit for approximately three minutes, and only the thermo-generator wires connected to the main operator head, measure the voltage across TPTH and TP. This open circuit voltage should be between 500mV and 750mv. Tune the pilot adjustment screw until the mV reading falls within these parameters. (Counter-clockwise increases mV reading, clockwise decreases.)
8. With the pilot adjusted properly, place a jumper wire between TPTH and TH. Take a mV reading across the TPTH and TP terminals on the valve. This closed circuit voltage should remain above 300mV.
9. Remove jumper wire from the TPTH and TH connections, and re-connect the thermostat and wall switch wires to the same terminals. Take the closed circuit voltage as described in the previous step. This closed circuit voltage should remain above 175mV.
10. Rotate OFF/PILOT/ON knob to the ON position. Main burner will light.
11. Verify operation of the thermostat and wall switch by cycling each individually, while observing the main burner operation.
12. Rotate the OFF/PILOT/ON knob to the OFF position. Both the pilot and main burner will be extinguished.

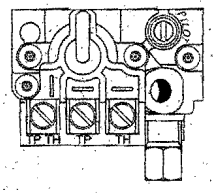
MILLIVOLT "PLUS" VERSION WIRING DIAGRAM



MILLIVOLT VERSION WIRING DIAGRAM



TP = thermogenerator
TH = thermostat



SYSTEM CHECKS:

PROBLEM	POSSIBLE CAUSE	SOLUTION
Pilot will not light.	Air in gas lines.	Refer to item # 1 in the set-up guide.
	Defective spill switch.	Check for continuity across spill switch leads. Replace spill switch if excessive resistance is present, or if circuit is electrically open.
	Wrong inlet pressure.	Refer to item # 2 in the set-up guide.
	Defective spark electrode.	Replace electrode if the insulator is cracked or the tip is corroded. Verify that the spark gap between the pilot and the electrode is correct.
	Defective piezo wire.	Replace piezo wire if insulation is damaged, or the wire is broken or corroded.
	Safety interlock function engaged.	Allow thermocouple to cool until the mV drops below the hold-in requirements of the safety magnet, (30 seconds or less). Re-light pilot.
Pilot will not hold.	Wrong inlet pressure.	Refer to item # 2 in the set-up guide.
	Pilot adjustment screw not adjusted properly.	Refer to item # 7 in the set-up guide.
	Thermocouple or thermo-generator not properly inserted into the pilot housing.	Refer to item # 3 in the set-up guide.
	Thermocouple or thermo-generator has film build-up on tip.	With the thermocouple and thermo-generator tips cool, clean the upper 3/8" with an a very fine emery cloth.
	Electrical resistance too high.	Using a very fine emery cloth, clean thermo-generator and thermocouple connections at valve. Tighten thermocouple into valve hand tight, plus ¼ turn with a wrench.
	Defective thermocouple. (mV Plus systems)	Verify that thermocouple is not kinked or damaged. Check open circuit voltage of thermocouple. Voltage should be between 18mVand 28mv. If voltage is less than 14mV, replace thermocouple.
	Defective thermo-generator. (Millivolt system)	Refer to item # 7 in the set-up guide.
	Defective safety magnet. (mV Plus systems)	Verify operation of safety magnet in the following manner. (A) Depress and hold pilot button. (B) Verify open-circuit thermocouple voltage as described in previous step. (C) Reconnect thermocouple to valve. (D) Measure the Millivoltage between the solder button on the base of the safety magnet, and the valve body. If the mV reading is above 6mVfor vented appliances, or 8.5mV for un-vented appliances, and the safety magnet does not hold, replace the valve. (E) If closed circuit mV reading is the same as the open circuit reading, the coil is electrically open. Replace the valve.
	Defective Safety Magnet (Millivolt system)	Verify operation of safety magnet in the following manner. (A) Remove all wires from the terminals of the main operator. (B) Measure the electrical voltage between the terminals TPTH and TP. If the voltage is above 110mV and the safety magnet does not hold, replace the valve.
	Pilot orifice blocked.	Replace orifice with a new orifice of the exact size and type.
Pilot drops out.	Wrong pilot orifice.	Replace the orifice with a new orifice supplied specifically for the appliance and gas type in question.