

Congratulations on purchasing the ST2E/ST3E series *ULTRA-ZONE* Control Panel. The ST series of zone control panels are still the same popular, field proven zone control panels that have been in use for the last seventeen years! The new "E" series revision has a few upgrades to enhance the reliability, protection and operation of the board.

First and most important is the replacement of the old 3 amp slo-blo fuse, with an integrated Thermal Circuit breaker or Polyfuse. This means no more running to the electronics store to buy a fuse, after the spare fuse that was provided has blown. The Polyfuse protects the panel against shorts in the thermostat or damper field wiring. It does not protect against shorts in the HVAC equipment field wiring. See page 2.

The location of the J1 jumper on the panel has also changed, and there is now an arrow pointing to it. The J1 jumper enables fan operation in Heat mode as well as Cooling mode.

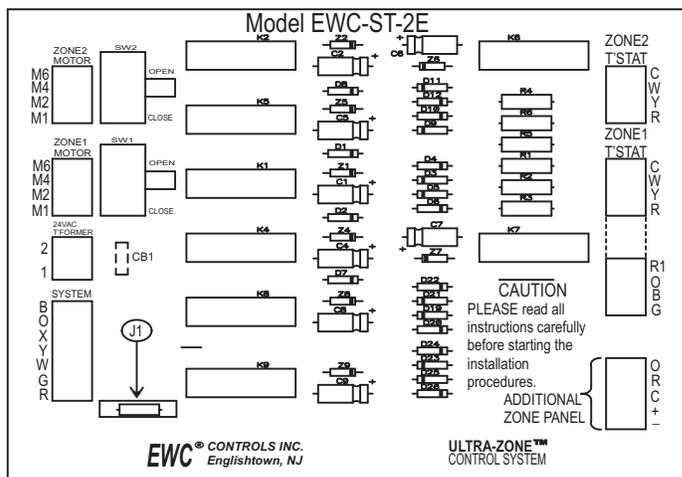
With the exception of the Polyfuse and the J1 jumper, all other changes have no direct bearing on the wiring, installation, or operation of the control panel.

The ST series zone control panels are the most versatile and rugged relay based logic control systems in use today. The Master/Slave circuitry of these panels can be utilized to satisfy numerous control applications and job specifications.

The heating/cooling changeover operation is still controlled by a changeover subbase on the zone 1 thermostat, or a separate remote selector switch can be used instead. This allows for inexpensive standard 2 or 3 wire thermostats to be used in all zones depending on the field application.

The table on Page 6 shows the types of digital programmable thermostats that are compatible with the ST2E or ST3E panels.

The diagrams included with this bulletin are based upon the most frequently asked questions regarding the wiring of these panels. There are additional diagrams available through the Technical Support Hotline@ 1-800-526-4048. Contact the Hotline if you find yourself on the job site and unsure of the exact wiring for your ST Series Control Panel.



EWC-ST-2E

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SPECIFICATIONS

- Power Requirements:** 24V 60Hz 40VA
- Wiring Connections:** Screw Terminal blocks for Thermostat gauge wire connections.
- Mounting:** Mounts with 4 screws and mollies (included).
- Panel Dimensions:** Length: 10" (254mm); Width: 9 7/8" (251mm); Depth: 1 9/16" (40mm).

WARNING: THESE PANELS ARE DESIGNED FOR USE WITH 24 VOLTS. DO NOT USE ANY OTHER VOLTAGE! USE CAUTION TO AVOID ELECTRIC SHOCK OR EQUIPMENT DAMAGE

OPERATION

1. HEAT MODE:

To operate the system in the heat mode, the "B" terminal has to be made to the "R1" terminal on the zone 1 terminal block. This allows any zone thermostat to call for heat. When a zone calls for heat, the control panel closes the circuit from "R" to "W" activating the furnace. The zone damper calling for heat remains open and zones satisfied will close. The fan and limit control in the furnace will operate the fan.

2. COOL MODE:

To operate the system in the cool mode, the "O" terminal has to be made to the "R1" terminal on the zone 1 terminal block. This allows for any thermostat to call for cooling. On call for cooling, terminals "R", "G" and "Y" are made to bring on the fan and compressor. The dampers for zones calling will remain open; the dampers satisfied will close.

3. OFF POSITION:

When the subbase on zone 1 is in the "OFF" position the entire system is disabled.

4. CONTINUOUS FAN:

When placing the fan switch on the subbase from "AUTO" to "ON" position, the panel closes the circuit between "R" and "G" terminals to energize the fan relay.

5. OPEN-CLOSE SWITCHES:

If left in the open position when all zones satisfy, the damper will drive to open position. If left in closed position, when all zones satisfy, the damper will remain closed unless it is the last zone to satisfy; then it will remain open.

NOTE: The last zone to satisfy will always be open regardless of position of switch.

WIRING

1. HVAC SYSTEM:

Wiring the HVAC system to the EWC-ST-2E or EWC-ST-3E is typical of wiring a subbase to a heating/cooling system. (4 wires required.)

The following terminals are on the system terminal block:

R-Wire to the RH heating transformer and/or the RC cooling transformer.

Y- Wire to the Compressor Relay.

W-Wire to Heat Control (gas valve, oil burner relay) on system terminal block.

G-Wire to Fan Relay.

2. TRANSFORMER 24V 40VA:

A separate 24V 40VA transformer is required to be wired to terminals 1 and 2 of the terminal block labeled "T-Former". (2 wires required.) This transformer powers the panel board, thermostats and damper motors. It does not power the furnace or the air conditioner. The board is now protected by a **Thermal Polyfuse** at the transformer input. When the polyfuse trips it will get quite hot. To reset the breaker, remove the 24 VAC for approximately 30 seconds. Check the damper motors and field wiring for shorts. If adding two panels together, be sure of wiring in (+ and -) circuit.

3. ZONE DAMPER MOTORS:

Use 3 conductor wire from each set of MAN or RDN zone damper terminals or 2 conductor wire on "SR" dampers to the panel. See diagrams #4 and 5 when wiring more than one damper per zone.

4. THERMOSTATS:

ZONE 1: Thermostats that have subbases with "B" and "O" terminals are required to enable system changeover. These include mechanical and battery operated thermostats (6 wires required - terminals W, Y, G, R, B and O), and electro-mechanical and programmable digital thermostats (24 VAC, 7 wires required - terminals C, W, Y, G, R, B and O).

If model MCS-DXB remote selector switch is used, it will be wired to the zone 1 terminal block in place of the changeover subbase (7 wires required total: 4 on the MCS-DXB - B, G, O and R1; 3 on the thermostat - W, Y and R). See diagram #3.

OTHER ZONES: 3 wires are required for mechanical and battery operated thermostats - terminals W, Y and R. 4 wires are required for electro-mechanical and 24 VAC digital thermostats - terminals C, W, Y and R. No subbases required.

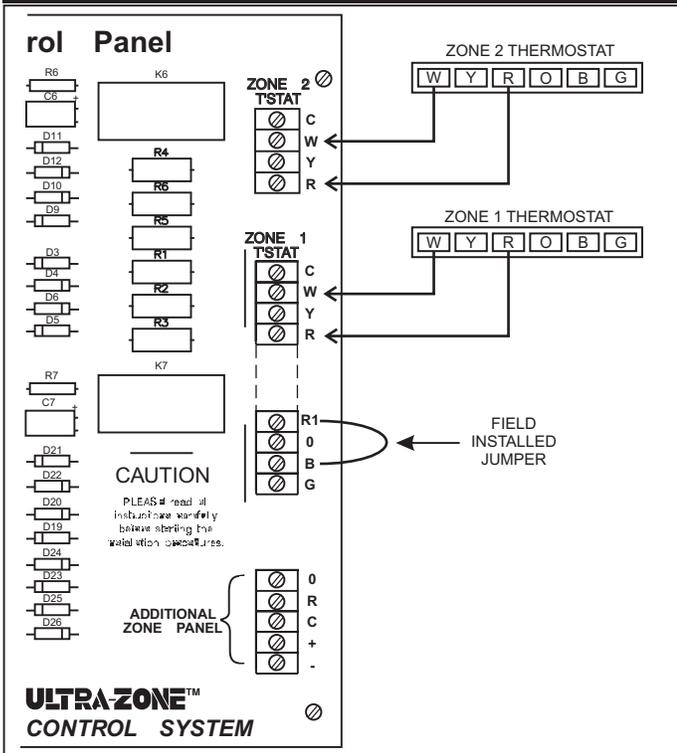
See page 6 for specific types of thermostats required.

5. HEAT ONLY OR COOL ONLY APPLICATIONS:

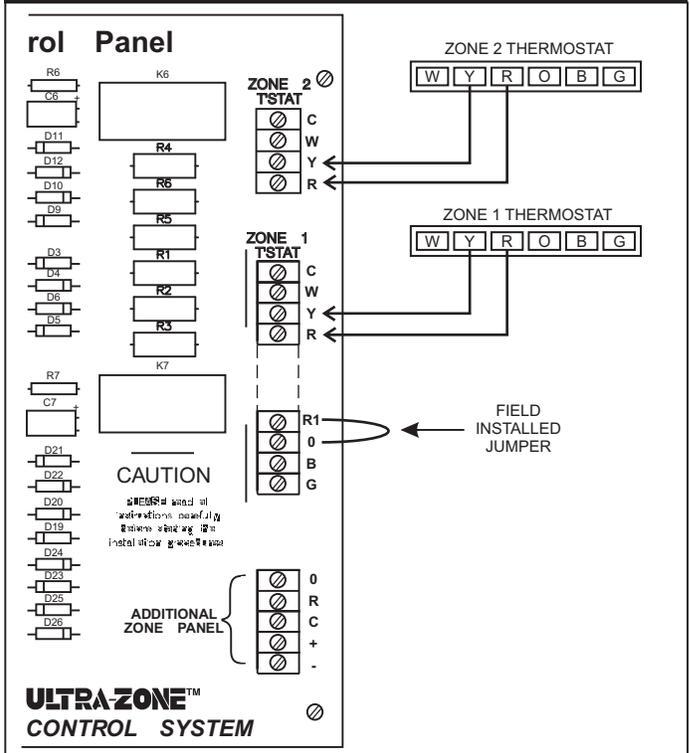
Zone 1 no longer requires a subbase or remote switch. All zones need only a two or three wire thermostat to operate in either heat or cool.

APPLICATION NOTES

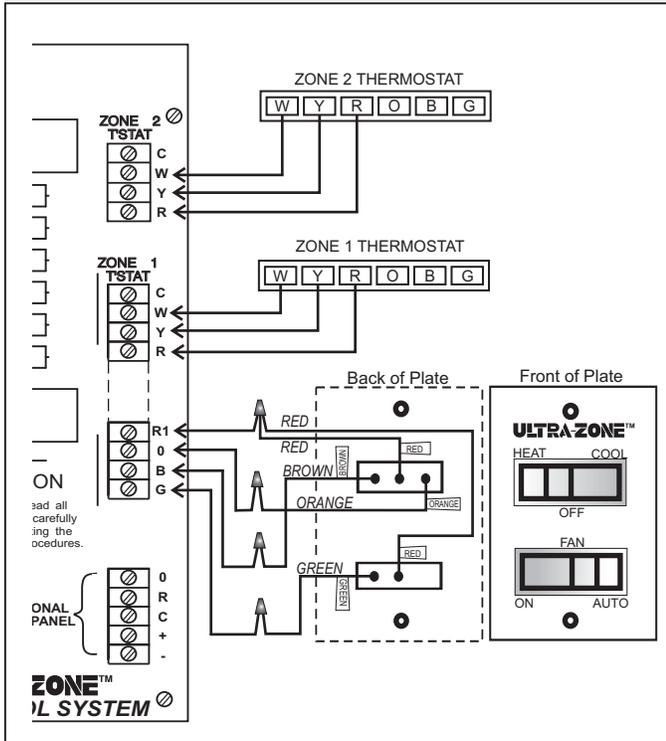
#1: WIRING DIAGRAM HEATING ONLY INSTALLATION



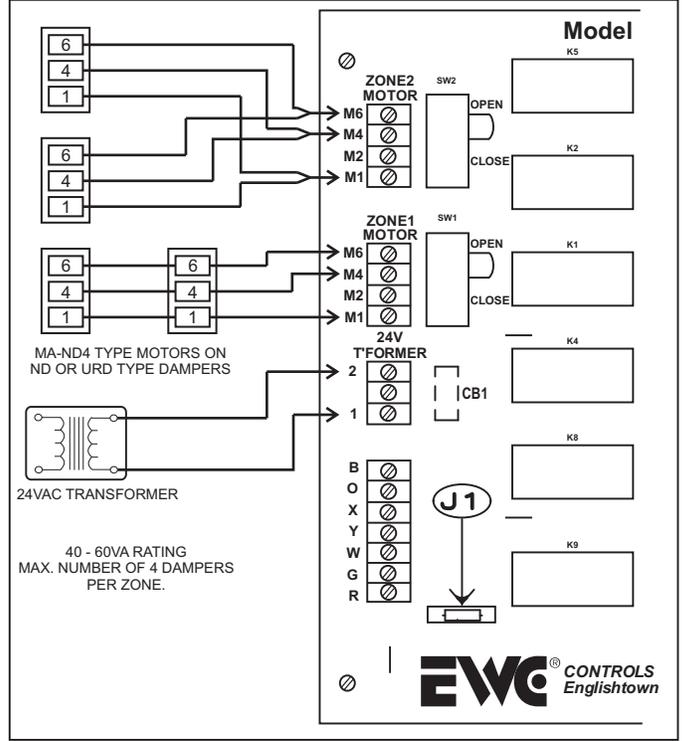
#2: WIRING DIAGRAM COOLING ONLY INSTALLATION



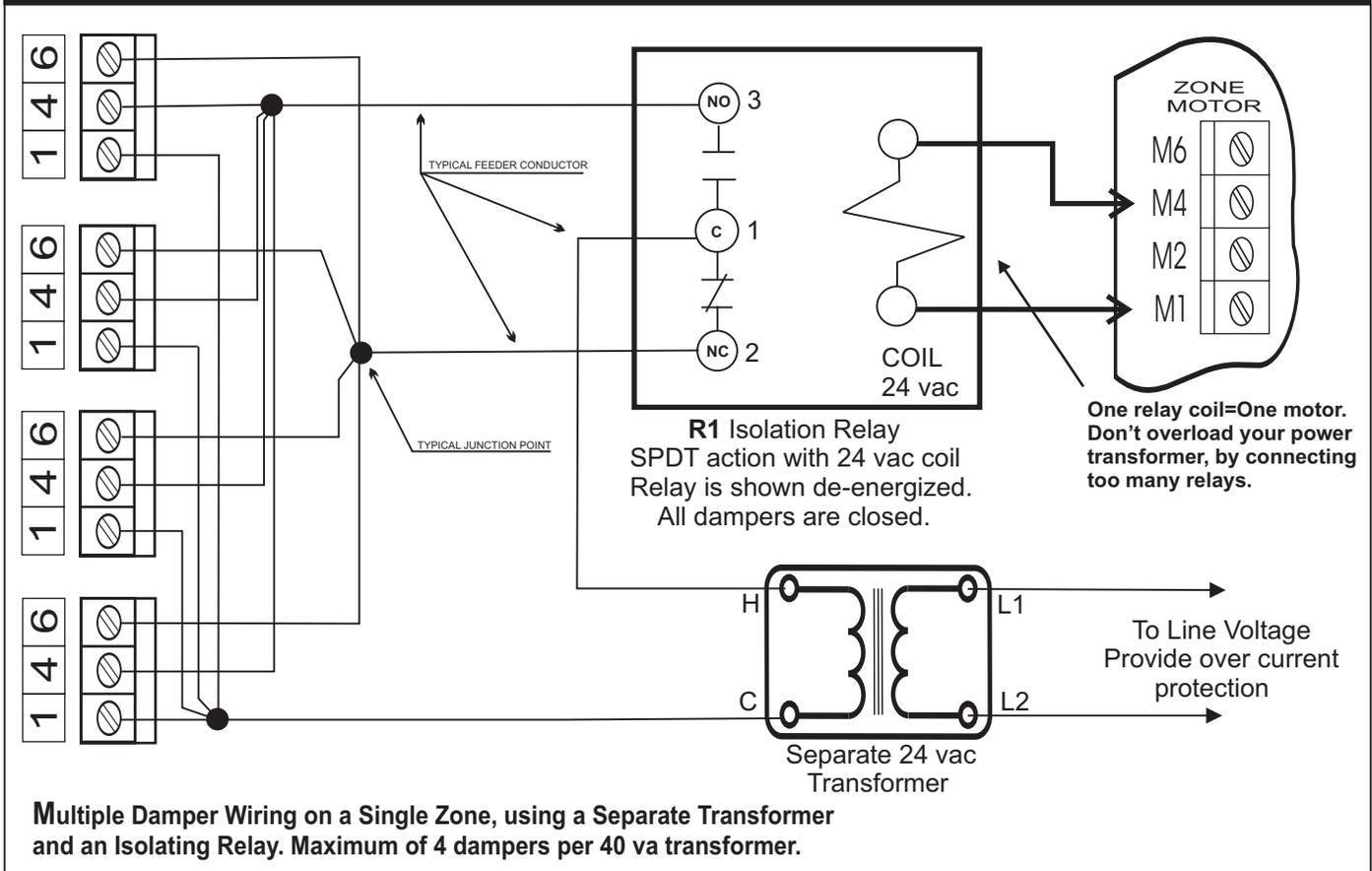
#3: EWC-ST-2E WITH MCS-DXB REMOTE SELECTOR SWITCH



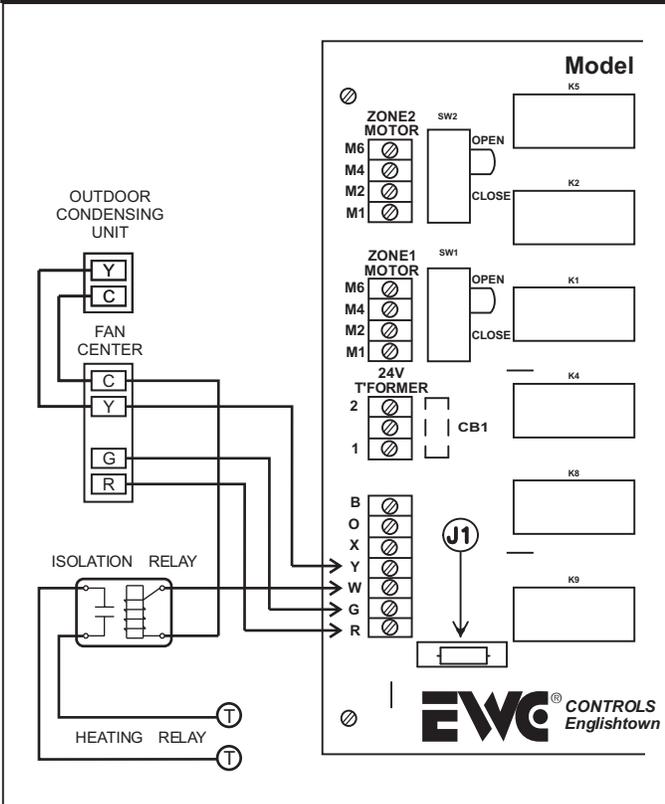
#4: TYPICAL TANDEM DAMPER WIRING



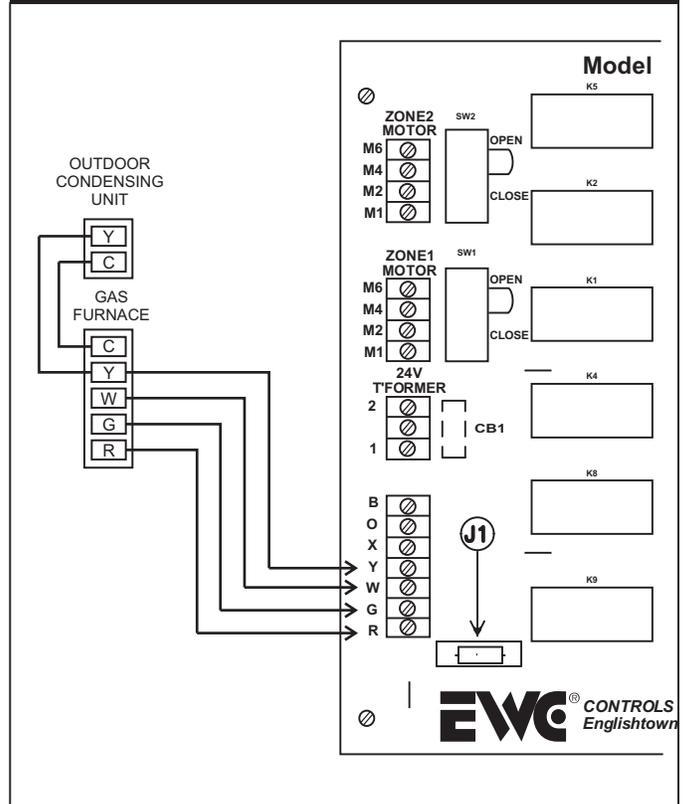
#5: CONTROL OF UP TO FOUR DAMPERS PER ZONE USING EXTERNAL RELAY



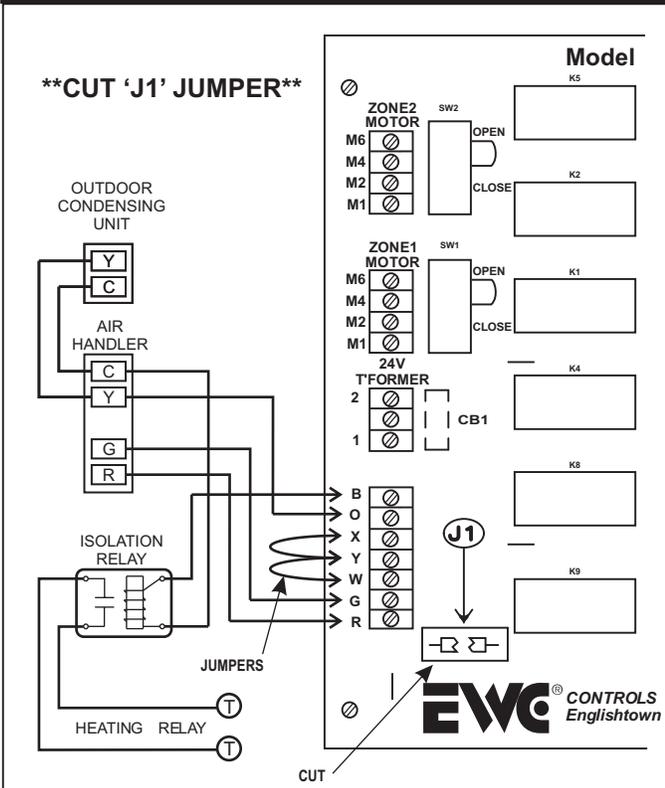
#6: TYPICAL FAN CENTER AND OIL BURNER WITH ISOLATION RELAY



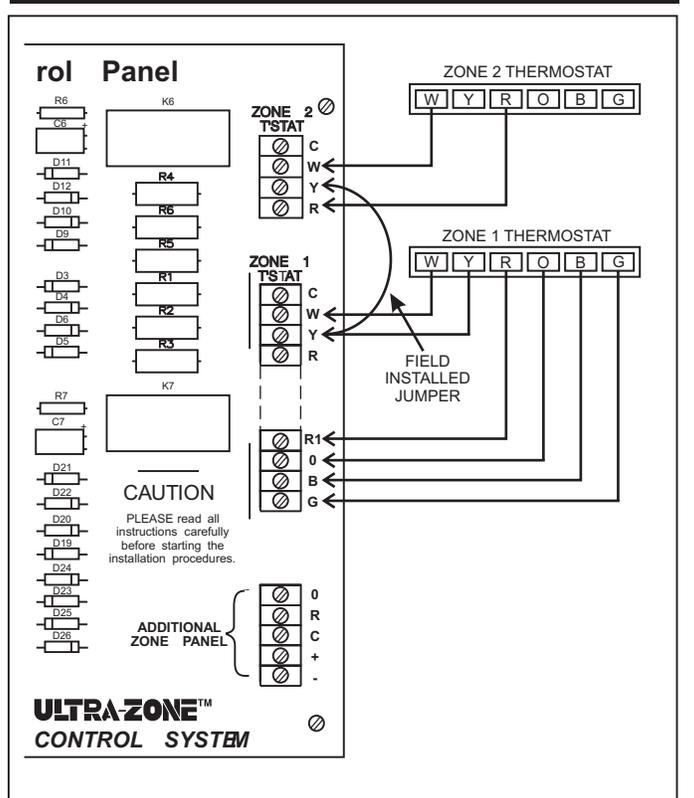
#7: TYPICAL GAS FURNACE



#8: FAN CONTROL WITH HOT WATER COIL

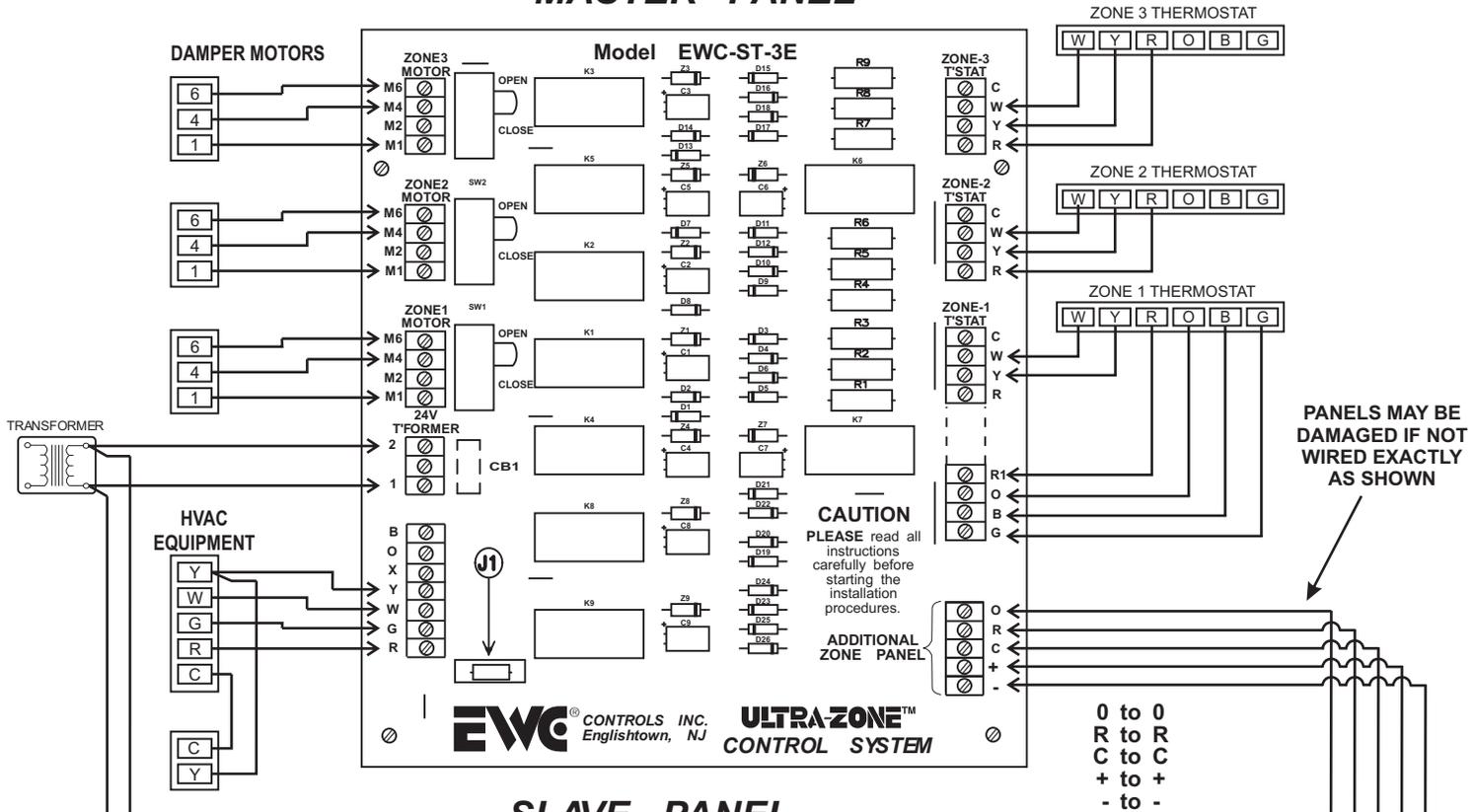


#9: ZONING IN HEATING ONLY NO ZONE CONTROLLED COOLING

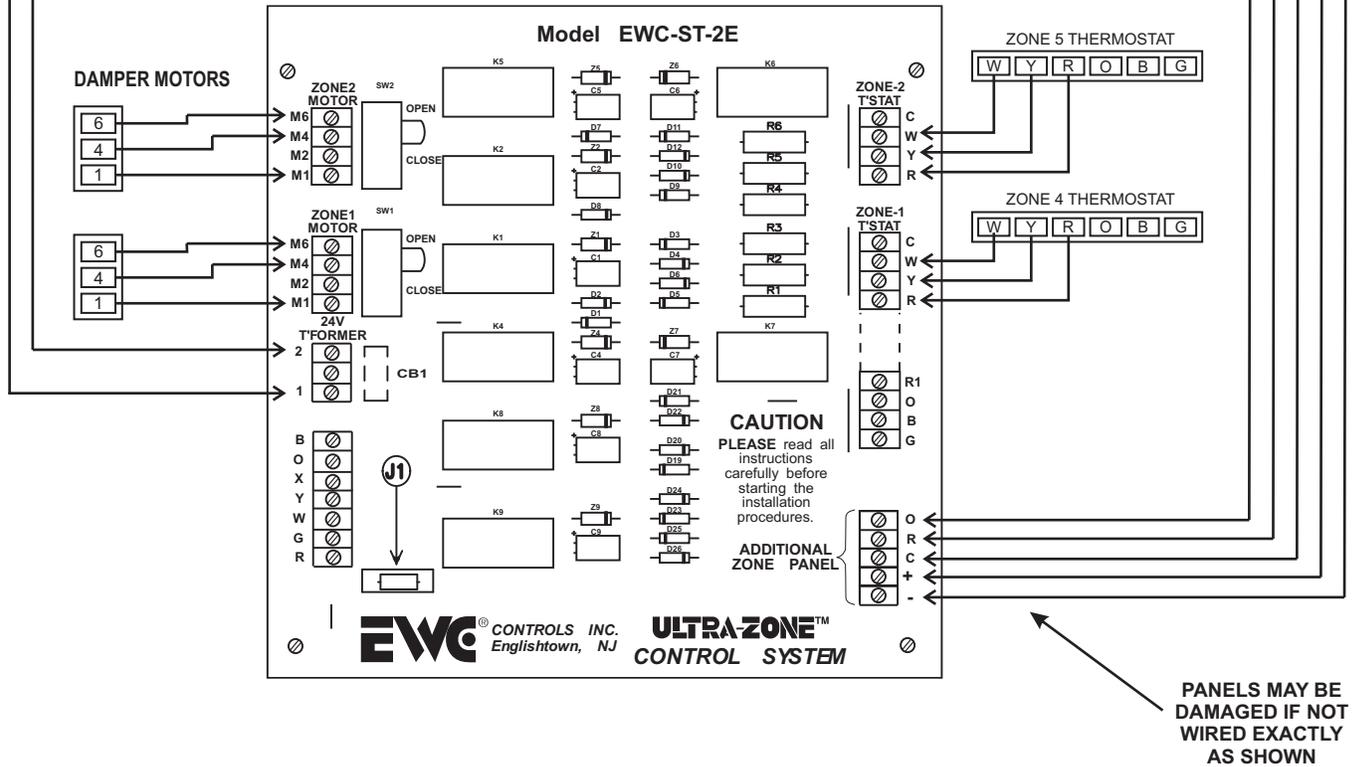


#10: WIRING DIAGRAM INTERCONNECTION OF TWO PANELS FOR ADDITIONAL ZONES

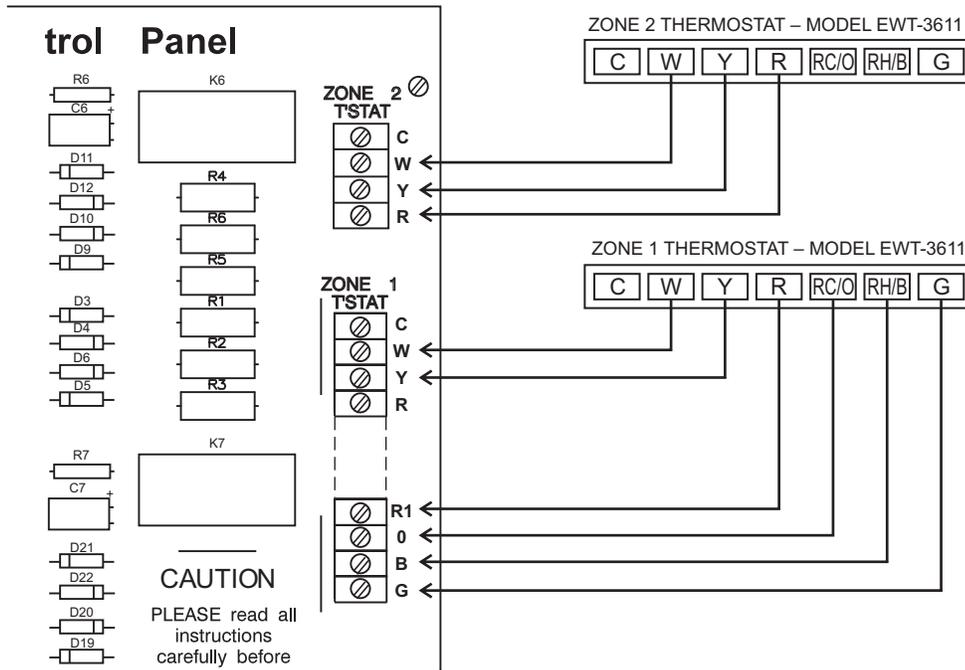
MASTER PANEL



SLAVE PANEL



THERMO STAT REQUIREMENTS



- NOTES**
- 1 If application is heat only, cool only or using MCS-DXB remote system selector switch, these thermostats may be used on Zone 1.
 - 2 If thermostat has a switching subbase the switch must be in the same mode as the Zone 1 thermostat.

ZONE 1

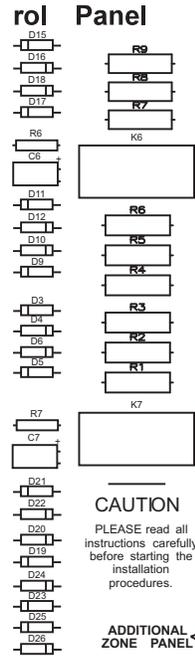
	6 WIRES REQUIRED	
SUPPLIER	DIGITAL NON-PROGRAMMABLE THERMOSTATS (Battery Operated)	DIGITAL PROGRAMMABLE THERMOSTATS (Battery Operated)
EWC CONTROLS®	EWT - 3611	EWT - 3707
WHITE RODGERS®	1F78-144	1F80-261
ROBERT-SHAW®	9500	9610
HONEYWELL®	TH3110D	TH4110D

ZONES 2 & HIGHER

	3 WIRES REQUIRED 1 2	
SUPPLIER	DIGITAL NON-PROGRAMMABLE THERMOSTATS (Battery Operated)	DIGITAL PROGRAMMABLE THERMOSTATS (Battery Operated)
EWC CONTROLS®	EWT - 3611	EWT - 3707
WHITE RODGERS®	1F86-244 1F78-144	1F97-1271 1F80-261
ROBERT-SHAW®	9400 9500	9610 9600
HONEYWELL®	TH3110D	TH4110D

CHECK OUT PROCEDURE

#11: THERMOSTAT CIRCUIT



ULTRAZONE™ CONTROL SYSTEM

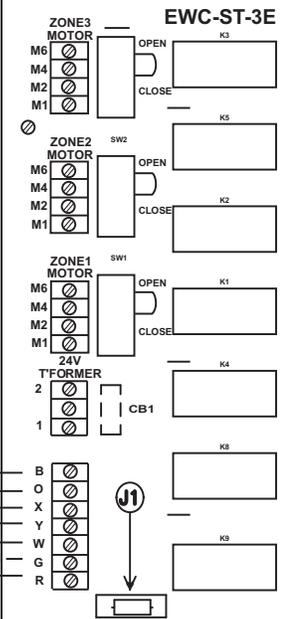
	HEATING MODE		OFF MODE		COOLING MODE	
	NOT CALLING	CALLING			CALLING	NOT CALLING
	STAT @ 59° F	STAT @ 85° F	STAT @ 55° F	STAT @ 85° F	STAT @ 55° F	STAT @ 85° F
ZONE 3 TSTAT	C	COMMON	COMMON	COMMON	COMMON	COMMON
	W	<1.0V	24V	<1.0V	<1.0V	<5.0V
	Y	24V	24V *	<1.0V	<1.0V	24V
ZONE 2 TSTAT	C	COMMON	COMMON	COMMON	COMMON	COMMON
	W	<1.0V	24V	<1.0V	<1.0V	<5.0V
	Y	24V	24V *	<1.0V	<1.0V	24V
ZONE 1 TSTAT	C	COMMON	COMMON	COMMON	COMMON	COMMON
	W	<1.0V	24V	<1.0V	<1.0V	<5.0V
	Y	<1.0V	<1.0V	<1.0V	<1.0V	24V
R1	C	24V	24V	24V	24V	24V
	W	<1.0V	<5.0V	<1.0V	<1.0V	24V
	Y	24V	24V	<1.0V	<1.0V	<5.0V
R2	C	<1.0V	<1.0V	<1.0V	<1.0V	24V
	W	24V	24V	24V	24V	<1.0V
	Y	<1.0V	<1.0V	<1.0V	<1.0V	<5.0V *
R3	C	24V	24V	24V	24V	24V
	W	<1.0V	<5.0V	<1.0V	<1.0V	24V
	Y	24V	24V	<1.0V	<1.0V	<5.0V
R4	C	<1.0V	<1.0V	<1.0V	<1.0V	24V
	W	24V	24V	24V	24V	<1.0V
	Y	<1.0V	<1.0V	<1.0V	<1.0V	<5.0V *
R5	C	24V	24V	24V	24V	24V
	W	<1.0V	<5.0V	<1.0V	<1.0V	24V
	Y	24V	24V	<1.0V	<1.0V	<5.0V
R6	C	<1.0V	<1.0V	<1.0V	<1.0V	24V
	W	24V	24V	24V	24V	<1.0V
	Y	<1.0V	<1.0V	<1.0V	<1.0V	<5.0V *
R7	C	24V	24V	24V	24V	24V
	W	<1.0V	<5.0V	<1.0V	<1.0V	24V
	Y	24V	24V	<1.0V	<1.0V	<5.0V
R8	C	<1.0V	<1.0V	<1.0V	<1.0V	24V
	W	24V	24V	24V	24V	<1.0V
	Y	<1.0V	<1.0V	<1.0V	<1.0V	<5.0V *
R9	C	24V	24V	24V	24V	24V
	W	<1.0V	<5.0V	<1.0V	<1.0V	24V
	Y	24V	24V	<1.0V	<1.0V	<5.0V
ADDITIONAL ZONE PANEL	0	<1.0V	<1.0V	<1.0V	<1.0V	24V
	R	24V	24V	<1.0V	<1.0V	24V
	C	COMMON	COMMON	COMMON	COMMON	COMMON
DC COMMON	+	<+5.0V DC	+30V DC	<+5.0V DC	<+5.0V DC	+30V DC
	-	DC COMMON				
	0	DC COMMON				

ALL READINGS ARE AC VOLTAGE EXCEPT (+ & -) READINGS, THESE ARE DC VOLTAGE.
 ALL READINGS TAKEN WITH MECHANICAL THERMOSTATS WITH COOLING ANTICIPATORS.
 * WILL BE LESS THAN 1.0V WHEN USING THERMOSTATS WITHOUT COOLING ANTICIPATORS, SUCH AS DIGITAL TYPE THERMOSTATS.

#12: SYSTEM CIRCUIT

IMPORTANT

Remove all wires from system terminal block prior to checking continuity readings.



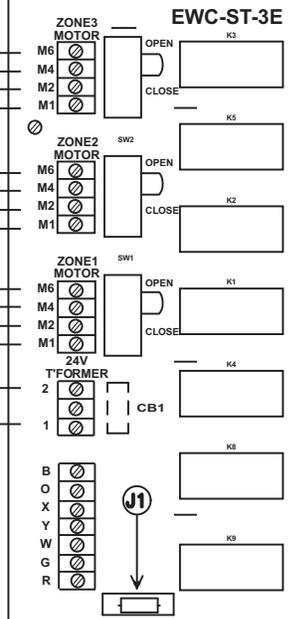
EWC CONTROLS Englishtown

CONTINUITY TO "X" IN HEAT & OFF MODE
 CONTINUITY TO "X" IN COOL MODE
 CONTINUITY TO "R" AT ALL TIMES *
 CONTINUITY TO "R" ON CALL FOR COOL
 CONTINUITY TO "R" ON CALL FOR HEAT
 CONTINUITY TO "R" ON CALL FOR COOL OR FAN SWITCH IN "ON" POSITION COMMON

* UNLESS JUMPER "J1" IS CUT

#13: DAMPER CIRCUIT

STAT DAMPER	CALLING	NOT CALLING
OPEN	0 VOLTS	24 VOLTS
CLOSE	24 VOLTS	0 VOLTS
COMMON	24 VOLTS	24 VOLTS
COMMON	COMMON	COMMON

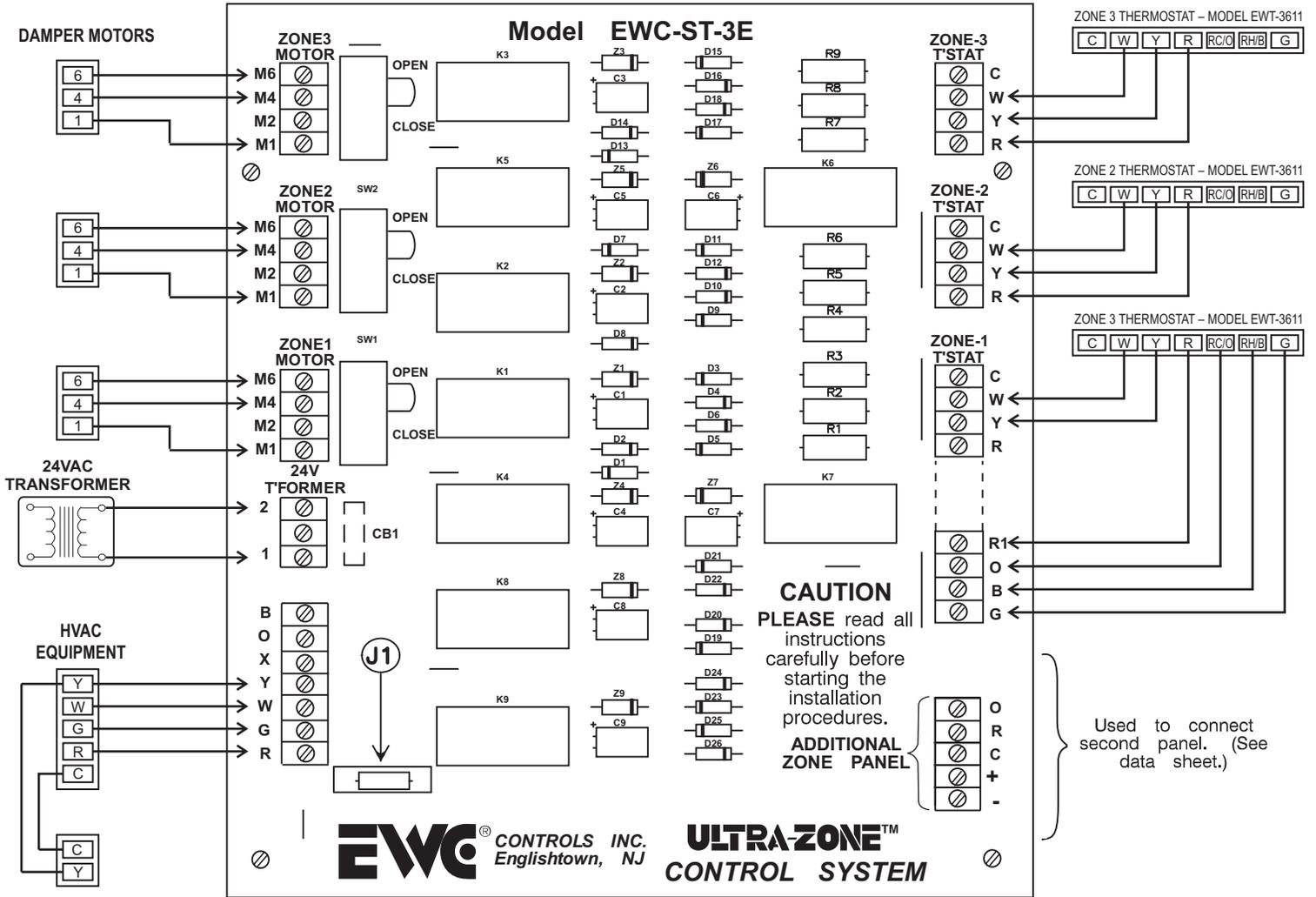


EWC CONTROLS Englishtown

NOTE: Conditions shown are with at least one thermostat always calling. When all thermostats satisfy, damper position will depend on position of "OPEN-CLOSED" switch. In "OPEN" position, damper will drive to open position. In "CLOSED" position, all voltage is removed from damper motor; motor will remain in whatever position it was in when all thermostats satisfied.

If 24 volts is present from M1 to M4 and M1 to M6, damper motor may either be turning or stuck between open and closed positions.

#14: WIRING DIAGRAM MODEL EWC-ST-3E ULTRA-ZONE™ CONTROL PANEL



All wiring should be done to local and national codes and ordinances. Use color-coded multi-conductor wire. Wire number to number or letter to letter on each control.

WARNING: THIS PANEL IS DESIGNED FOR USE WITH 24 VOLTS. DO NOT USE ANY OTHER VOLTAGE!



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