Excellence Without Compromise

EWC® CONTROLS INC.

TECHNICAL BULLETIN

TB-231 Model EWC-300 Zone Control System

LEAVE THIS BULLETIN ON THE JOB SITE FOR FUTURE REFERENCE

The New EWC-300 panel provides intelligent control of Heat Pump or Conventional forced air zoning systems at a maximum of three zones using motorized dampers and practically any off-the-shelf thermostat. With features like Automatic changeover, Thermostatic staging (Heat Pumps ONLY), Field selectable Features and Supply air Sensing capability, the EWC-300 provides the highest level of performance and versatility in a non-expandable zone control panel. Perfect for new construction and retro-fit applications.

Zone Capacity Will control two or three forced air zones with 24vac Power Open/Close or Spring Assisted motorized dampers.

Compatible HVAC Systems Will control Single stage Heat Pumps with Electric auxiliary heat. Will also control Single stage Gas or Oil furnaces, Straight Electric furnaces or Hydronic Heat with Single stage cooling.

Compatible Thermostats **The EWC-300 is compatible with most single stage Heat/Cool Thermostats and Two stage Heat Pump Thermostats, depending on your application. Thermostats can be Hard Wired, Power Robbing or Battery Powered.**

Automatic Heat/Cool Changeover The EWC-300 panel features automatic changeover from any thermostat allowing for individual zone comfort from the zoned HVAC system.

Status LED The Green STATUS LED blinks slowly during normal operation to indicate the Zone Control panel is powered and the micro processor is operating properly.

Damper LEDs LEDs labeled ZONE 1 OPEN through ZONE 3 OPEN illuminate green to indicate which dampers are energized to open. *When the system is idle and no demand for Heat or Cool exists, all zones are defaulted open.*

System LEDs A total of 4 color specific LED's indicate the current mode of operation for the system. Red for heating operations, Yellow for compressor operations, and Green for fan operation.

Operating Power **INPUT VOLTAGE:** 19-30VAC 60 Hz

Transformer 40-60VA MAX. NEC Class 2.

CURRENT DRAW: Max 10VA @ 24VAC.

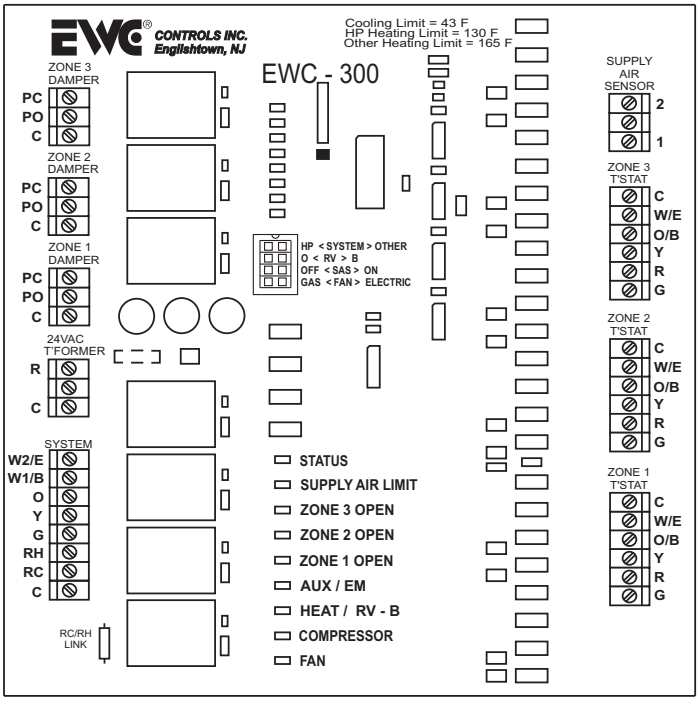

Figure 1. EWC-300 panel

Thermal Breaker The EWC-300 has a 2.5amp thermal circuit breaker in place of a fuse that protects it from short circuits in the thermostat and damper field wiring. **It will not protect against shorts in the HVAC system wiring.** *DO NOT exceed a 60va transformer to power the panel.*

NOTE: When the circuit breaker is tripped it will get hot and all of the panel LED's will stop functioning. To reset the breaker, locate the short by removing all wires connected to the panel, one at a time. When the shorted wire is removed the panel will resume normal operation. Now you must repair or replace the shorted wire before you re-connect it.

Operating Conditions **TEMPERATURE:** -20° to 160°F (-29° to 71°C)

HUMIDITY: 0% - 95% RH Non-Condensing

Indoor Fan Control Any zone can activate the indoor fan and only the dampers in zones calling for continuous fan operation will open. Continuous fan operation will only occur when there are no active or pending heat or cool demands.

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Built-In Timer Settings

The panel has built-in timers that insure safe HVAC system operations. *All timers are fixed, non-adjustable.*

*Start-up Delay -- 4 minutes.

*Minimum Run Timer -- 2 minutes.

*Short Cycle Timer -- 2 minutes.

*Changeover Timer -- 4 minutes.

*Purge Timer -- 2 minutes.

*Opposing System Service Timer -- 20 minutes.

TIMER DEFINITIONS

Start-Up Delay Timer A 4 minute delay occurs every time the panel is powered up or after a power failure.

Minimum Run Timer When a call is activated, the zone panel will run the HVAC system in that mode for a minimum of 2 minutes.

Short Run Timer When the HVAC system is satisfied, the zone panel will not resume the same call for a minimum of 2 minutes.

Changeover Timer At the end of a call, a 4 minute timer is started and the zone panel will not switch to the opposite mode of operation until the timer has expired.

Purge Timer At the end of a call, the panel keeps the last zone to satisfy open for an additional 2 minutes to purge the excess conditioned air. After the purge cycle has ended, the panel defaults all Zones open.

Opposing System Service Timer *A 20 minute delay must expire, or the active zone(s) must satisfy, before the panel will honor a thermostat demand to changeover to the opposite mode of system operation.*

Heating Limit Settings The Heating Limit is fixed at 130°F for Heat Pumps and 165°F for backup and Other Heating Mode. If the supply air temperature exceeds the limit the heating demand is cycled off and the fan continues to run until, the supply air temperature has dropped below the fixed heating limit. 3 Minutes minimum.

Cooling Limit Settings The Cooling Limit is fixed at 43°F for all Modes. If the supply air temperature exceeds the limit the cooling demand is cycled off and the fan continues to run until, the supply air temperature has risen above the fixed cooling limit. 3 Minutes minimum.

Selecting the Options Using the DIP Switches

4 DIP switches allow you to select the features specific to your zoned HVAC system.

HP<SYSTEM>OTHER Select the type of HVAC system the panel will control. Heat Pump (**HP)** or Gas/Oil/Hydronic with A/C. (**OTHER)**

If HP is selected Heat Pump Thermostats MUST be used.

O<RV>B Select **O** or **B** for the type of Reversing Valve operation of your heat pump.

OFF<SAS>ON Select **ON** if you are using a Supply Air Sensor with the EWC-300. Select **OFF** if you have not installed a sensor. *The Supply Air Sensor is optional and is not included with the EWC-300*

GAS<FAN>ELECTRIC Select the **GAS** position when setting up for **gas** or **heat pump** systems. Select **ELECTRIC** when setting up for **Straight Electric** or **Hydronic** (Steam/Hot Water) heating systems.

DAMPER WIRING

Zone Damper Terminal Block Designations

Terminal PC - 24vac to Close Damper
Terminal PO - 24vac to Open Damper
Terminal C - 24vac COMMON

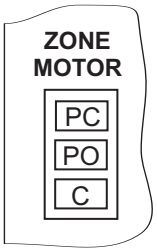


Figure 2

Model ND & URD Damper Wiring

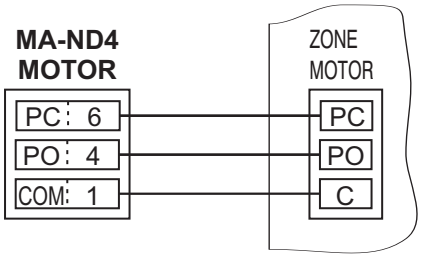


Figure 3 -- Power Open/Power Close Dampers

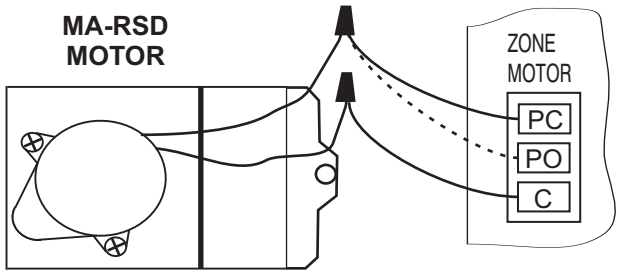
Note: All zone dampers default to the "OPEN" position after a purge delay has occurred. Dampers also default “OPEN” during changeover & short cycle delays, when all zone demands are satisfied, and no signals are detected from the thermostats.

WIRING INSTRUCTIONS

WARNING: THESE PANELS ARE DESIGNED FOR USE WITH 24VAC. DO NOT USE OTHER VOLTAGES! USE CAUTION TO AVOID ELECTRIC SHOCK OR EQUIPMENT DAMAGE. ALL WORK SHOULD BE PERFORMED TO LOCAL AND NATIONAL CODES AND ORDINANCES. USE 18 AWG SOLID COPPER, COLOR-CODED, MULTI-CONDUCTOR THERMOSTAT CABLE.

Damper Wiring

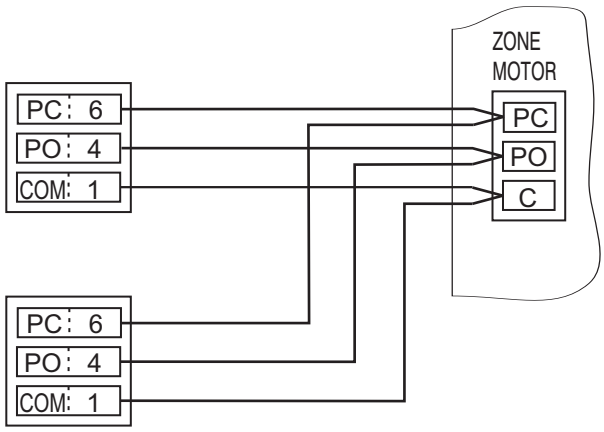
Model RSD & ND-RSD Damper Wiring



A Spring Open Damper is wired to C & PC
A Spring Close Damper is wired to C & PC

Figure 4 -- Spring Return Dampers

Model ND & URD Multiple Damper Wiring



NOTE: ***Do not connect more than 4 motor actuators in a series configuration. That will increase the chances of poor electrical connections and voltage drop issues.***

Figure 5 -- Multiple Damper Parallel Wiring

Thermostat Wiring

OTHER MODE
HEAT/COOL THERMOSTAT WIRING

The EWC-300 zone control panel requires standard 1 stage Heat/Cool Thermostats in all zones for OTHER mode (Gas, Oil, Hydro, Electric).

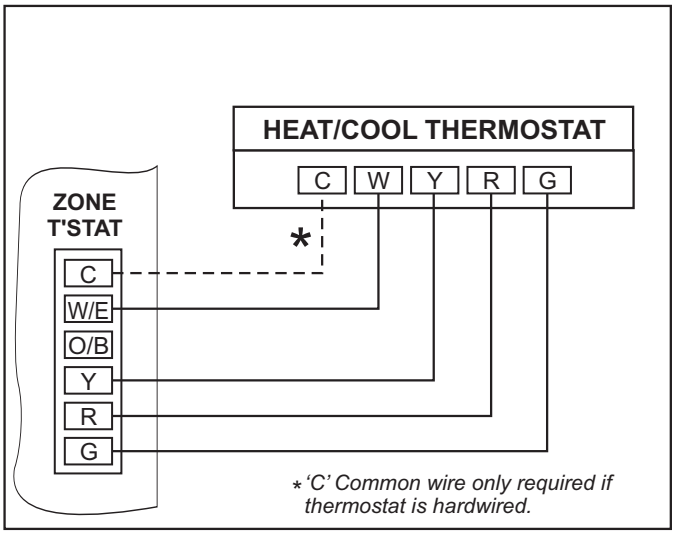


Figure 6 -- Typical Heat/Cool thermostat wiring.

HEAT PUMP MODE
Heat Pump THERMOSTAT WIRING

The EWC-300 zone control panel requires Heat Pump Thermostats in all zones for Heat Pump mode.

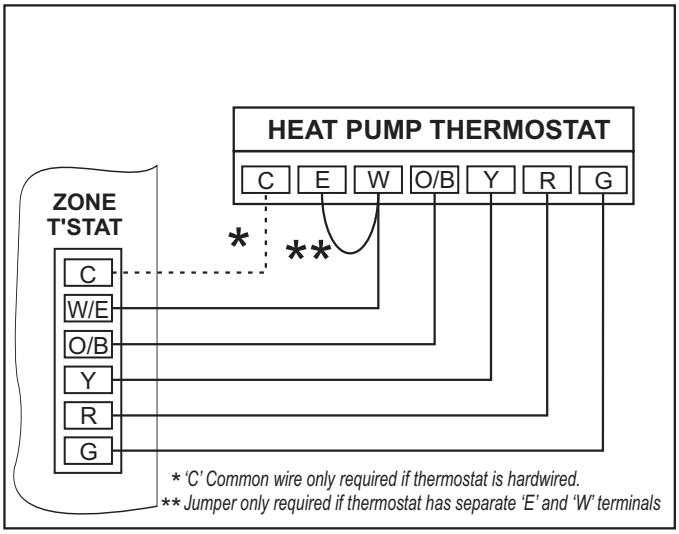


Figure 7 -- Typical Conventional Heat Pump thermostat

Contact EWC Controls Technical Support when you are on the job site for assistance with wiring and troubleshooting. Please have a Multi-Meter, pocket screw driver and wire snips on hand.

WIRING INSTRUCTIONS *(Continued)*

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Equipment Wiring

The EWC-300 panel was designed to be easy to understand and wire up. Several typical field wiring diagrams have been provided to review. Your actual field wiring may vary.

Single Transformer Gas/Electric Equipment Wiring

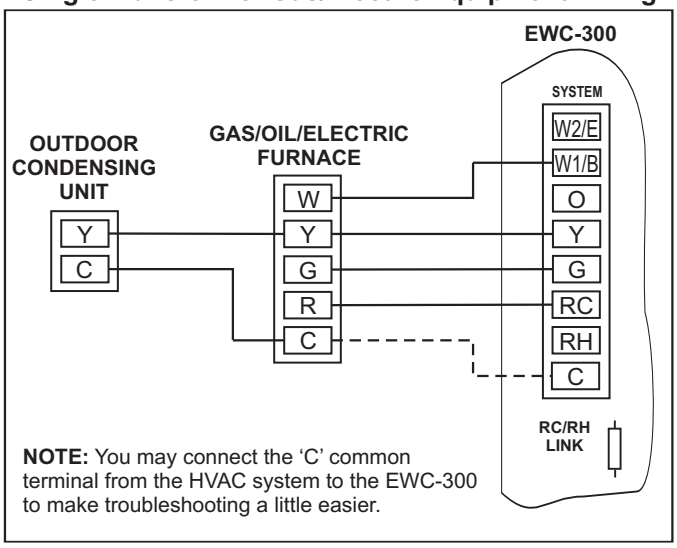


Figure 8 -- Single Stage Gas/Electric system. ***Note the jumper (link) between RC and RH. There is no need to install your own jumper.***

Conventional Heat Pump Equipment Wiring

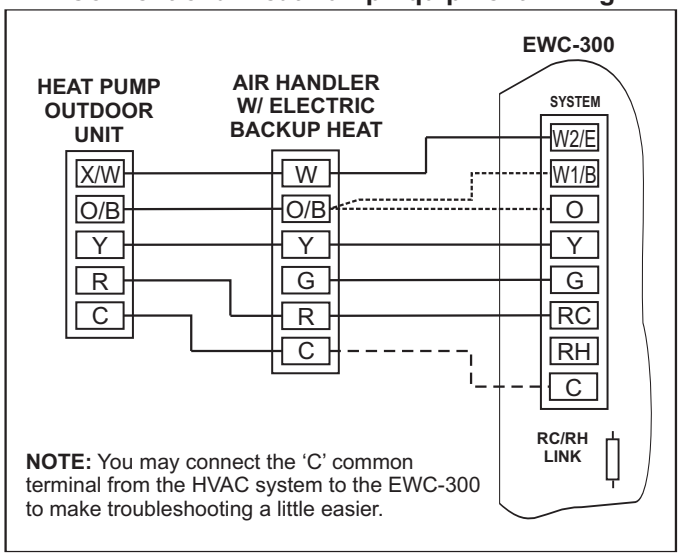


Figure 9 -- Typical Heat Pump system wiring with electric resistance backup heat. Wire up the reversing valve to either O or W1/B, depending on your type of system. Applies to air cooled or geothermal / ground source HVAC systems.

Two Transformer Hydro-Air Equipment Wiring

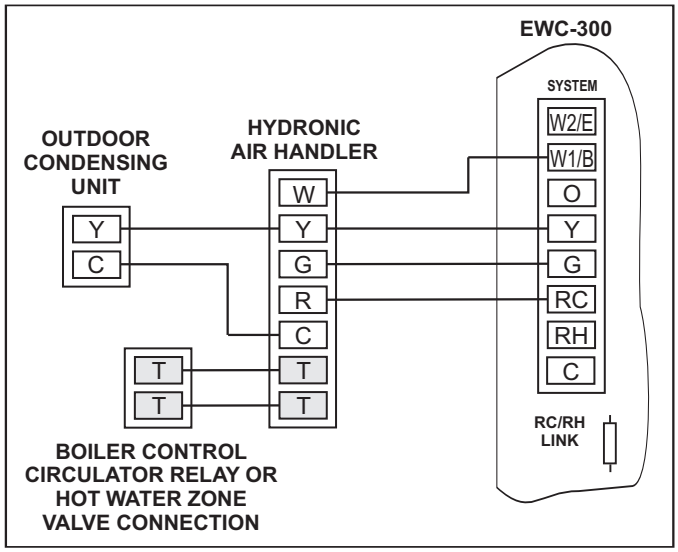


Figure 10 --Single Stage Hydro-Air / Oil system with Air Handler provided isolation for Two Transformers. If air handler does not provide voltage isolation refer to figure 11.

Two Transformer Oil Heat Equipment Wiring

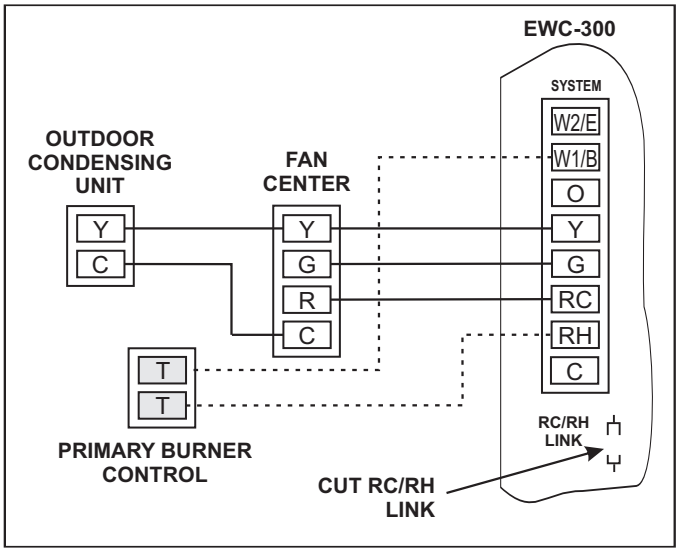
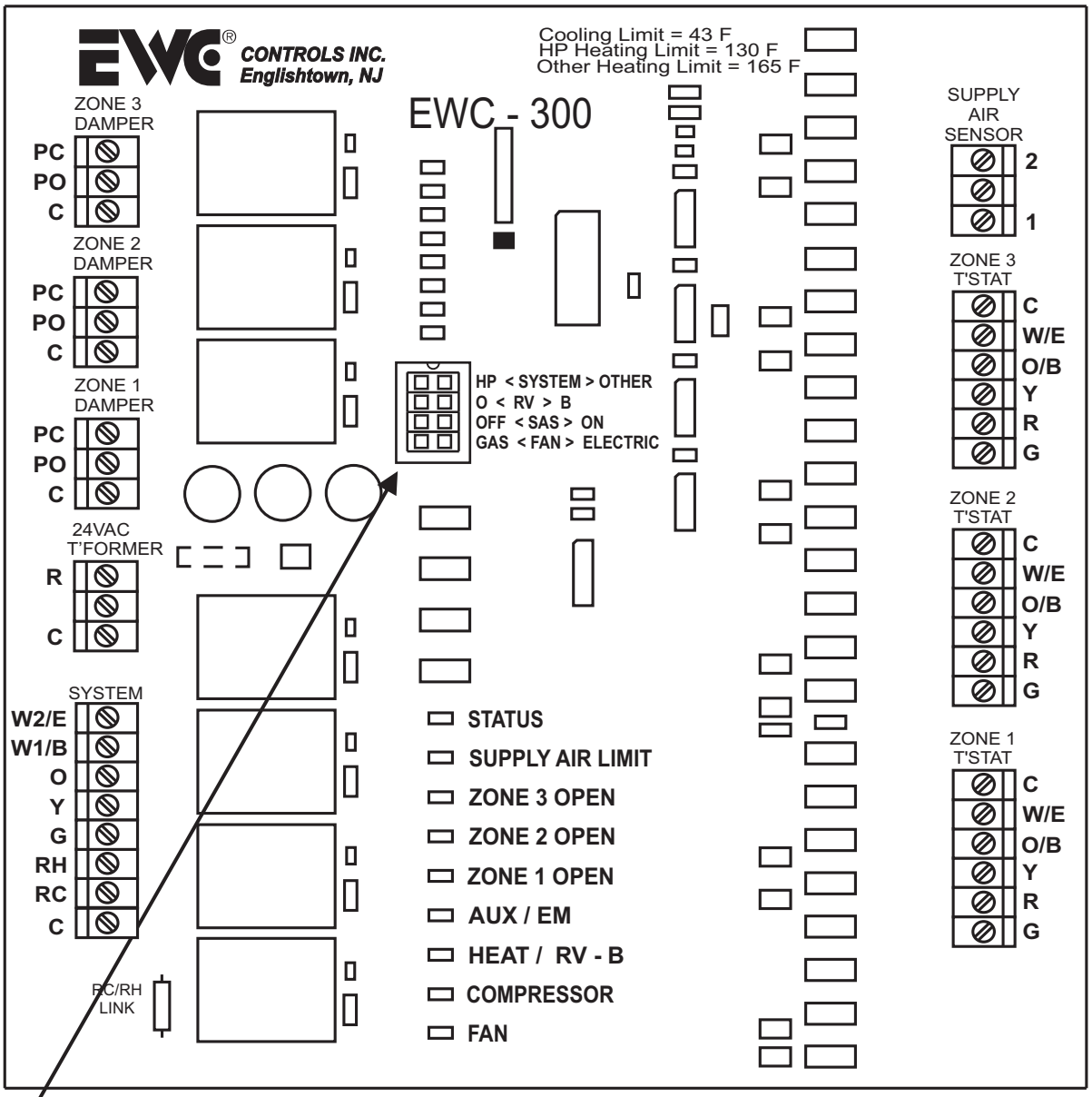


Figure 11 --Single Stage Oil / Hydro-Air system with Two transformers. **RC/RH LINK MUST BE CUT.** If air handler provides voltage isolation, Refer to figure 10.

NOTE: *You may connect the 'C' common terminal from the HVAC system to the EWC-300 to make troubleshooting a little easier.*

Contact EWC Controls Technical Support when you are on the job site for assistance with wiring and troubleshooting. Please have a Multi-Meter, pocket screw driver and wire snips on hand.

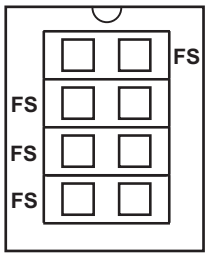
BLOW-UP VIEW



Blow-up view of EWC-300 showing Factory Dip Switch settings.

RECORD YOUR OWN DIP SWITCH SETTINGS HERE →

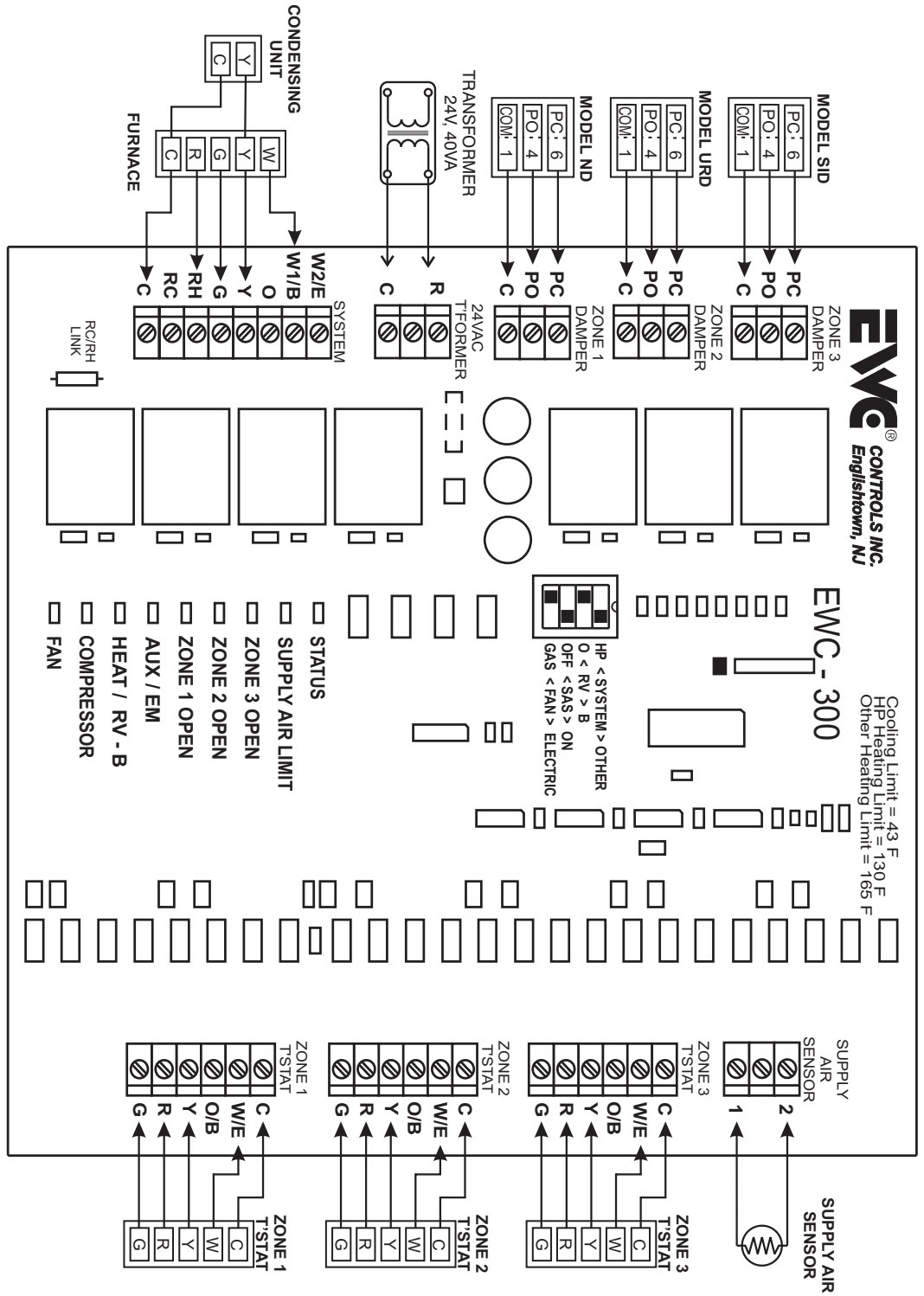
Use a pencil and shade the boxes that correspond to your settings!



HP < SYSTEM > OTHER
O < RV > B
OFF < SAS > ON
GAS < FAN > ELECTRIC

FS = FACTORY SETTING

WIRING DIAGRAM



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.

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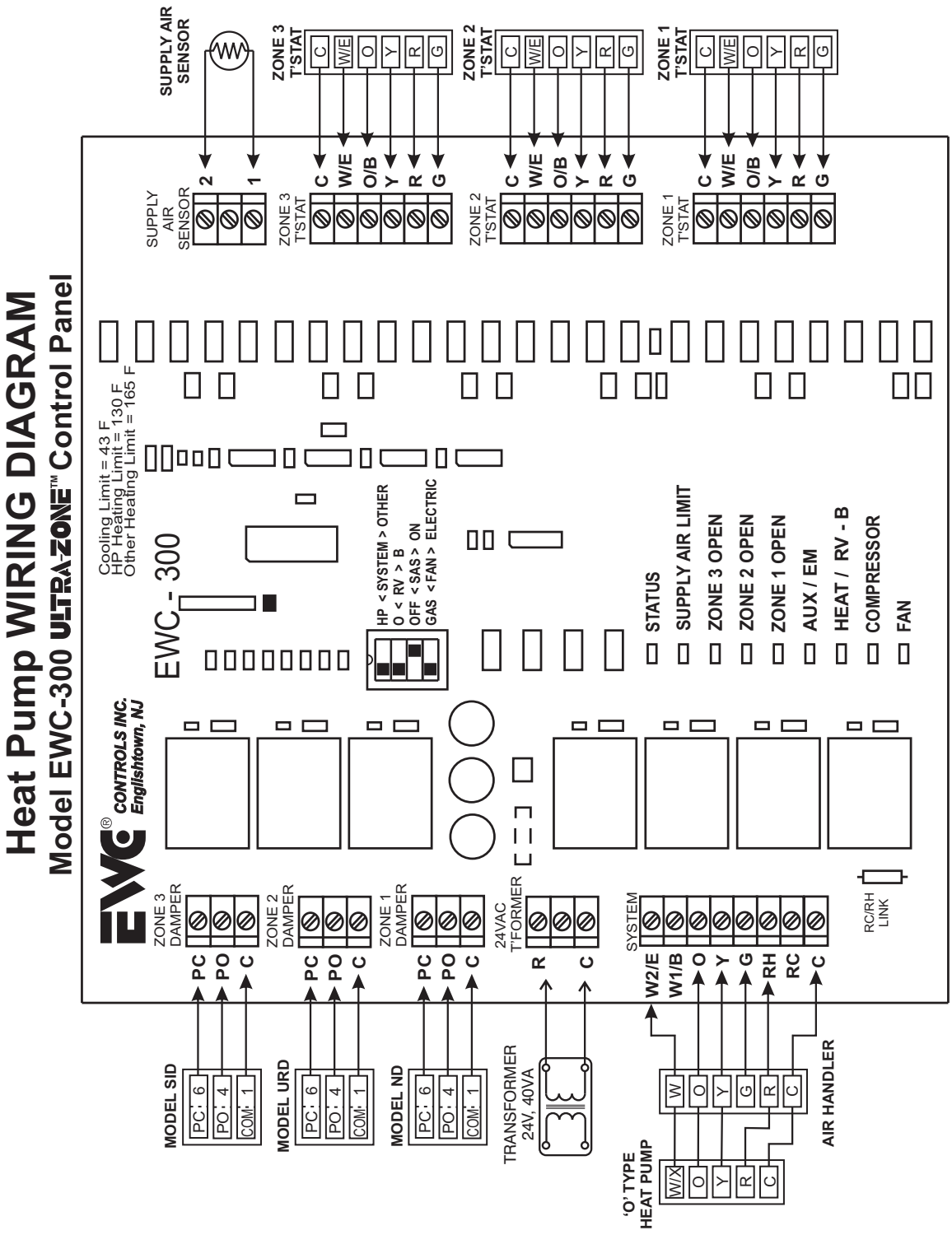
WIRING DIAGRAM



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TROUBLESHOOTING

SYMPTOM	SOLUTIONS
LED'S are responding properly but HVAC system is malfunctioning.	Check HVAC system wiring for proper connections. Check HVAC system wiring for shorts/miswiring. Check HVAC System. Refer to Technical Bulletin for correct Setup/Wiring/Dip Switch settings.
LED's are not responding properly and HVAC system is malfunctioning.	Check HVAC system wiring for shorts/miswiring. Check HVAC system wiring for proper connections. Check HVAC thermostat for proper connections. Refer to Technical Bulletin for correct Setup/Wiring/Dip Switch settings.
LED's illuminate and HVAC system functions normally but dampers do not respond.	Check damper motor wiring for proper connections. Check damper motor wiring for shorts/miswiring. Refer to Technical Bulletin for correct Setup/Wiring.
	REFER TO THE DAMPER MOTOR TESTING PAGE 8
LED's do not illuminate and HVAC system does not respond.	Check HVAC & EWC-300 system transformer supply voltage. Check HVAC & EWC-300 system 24vac transformer voltage, fuse & the EWC-300 circuit breaker. Check HVAC & EWC-300 system wiring for shorts/miswiring.

CHECK YOUR WIRING

DETECTING 24vac SHORTS	SYMPTOMS: Module(s) appear to be dead!
HVAC system not responding and EWC-300 LED's are off.	If 24vac short has occurred, 24vac will be present at the *EWC-300 Module Input terminals R & C;* but 24vac will not be present at the *Thermostat R&C.*
Dampers not responding and THE EWC-300 LED's are off.	**SOLUTIONS:** Remove 24vac power from EWC-300 and allow circuit breaker to cool! Find and repair short(s) in damper and/or thermostat field wiring. Restore 24 vac power.
ISOLATING 24vac SHORTS *F1 circuit breaker protects the EWC-300 and reacts to a short in the damper motor or thermostat component and field wiring.*	Disconnect the wire(s) from the 'R' *terminals on the EWC-300 thermostat terminal blocks ,* and the '*PO/PC' terminals* on the EWC-300 damper motor terminal blocks. Restore power. If the short is no longer present, Ohm out the thermostat and damper field wiring for shorts/misconnections. Replace or repair wires as necessary. Restore power. Module(s) will resume operation.

TESTING THERMOSTATS

Check to make sure that the thermostat Rc and Rh terminals are connected together, unless your application requires separation of these circuits.

Use the (C) Common terminal provided at each thermostat terminal block to wire up full 24 vac hard-wired thermostats.

You should reference the (C) Common terminal when troubleshooting incoming thermostat demand signals, even if no wire is connected there.

Make sure that you wire and configure your thermostats for the correct application. Most thermostats built today can be field configured to operate as regular Heat/ Cool type or as Heat Pump type.

TECHNICAL SUPPORT

EWC Controls provides superior toll free Troubleshooting Support for the EWC-300 when you are on the job site!
Call 1-800-446-3110 Monday - Friday 8am to 5pm EST
Otherwise call 1-732-446-3110 for information on the EWC-300 and other ULTRA-ZONE products..

When calling for Technical Support, please have a multi-meter, pocket screwdriver, and wire cutter/stripper handy.