RMOD II UNIT RELAY MODULE

INSTALLATION INSTRUCTIONS

Zonex SYSTEMS
comfort you control

DESCRIPTION
The Zonex Systems RMOD is a microprocessor based, digital communicating HVAC Relay Module for the *ZonexCommander Plus* system. The RMOD controls Gas/Electric (2H/2C), as well as Heat Pump, (3H/2C) HVAC systems. The RMOD controls Heat and Cool staging, including auxiliary heat based on the supply air temperature. The RMOD also provides adjustable high and low temperature limits to protect the HVAC system components.

There can be up to 4 RMOD Relay Modules per Command Center. Each RMOD can communicate with up to 20 thermostats. The total number of thermostats cannot exceed 20 for each Command Center, regardless of the number of RMOD devices. For applications with more than 20 thermostats and devices, additional Command Centers with a Multiplexer is used. See the Installation Guide.

The RMOD and corresponding ModStats must be configured into the *ZonexCommander Plus* system before the dampers will operate and the RMODs will communicate. See Installation Guide.

INSTALLATION
The RMOD can be installed with the Command Center or in the HVAC unit it is controlling. It must be protected from the elements in an area where the temperature range is from 25° to 125° non-condensing. DO NOT install the Command Centers or RMODs in close proximity to large transformers, VFDs, or any device that produces electrical energy fields.
1. Install the RMOD where it can be properly accessed.
2. Provide 24vac power to the RMOD from either a dedicated 40 VA transformer, or transformer sized to power the total number of dampers on the HVAC system. You should not use the HVAC system control transformer to power the RMOD. Check the polarity before applying the transformer wire to R&C.
3. The RMOD is shipped from the factory to operate in the Gas Electric mode. For Heat Pump operation, place the HP jumper tab over both pins.
4. For Heat Pump "O" reversing valve operation, the O/B jumper tab is on one pin. For reversing valve "B" operation, place the jumper tab over both pins.
5. Set the FAN jumper tab (JP1) on the center and lower pin (AUTO) for Intermittent Fan. For Constant FAN in the Occupied mode, place the jumper tab over the middle and upper pins (ON).

Sensors - Supply and Return (LAT)
1. Install the RA sensor (LAT) in the return duct, ahead of the bypass take-off.
2. Install the LV AIR sensor (LAT) in the supply duct ahead of the bypass take-off (Gas Electric) or between the indoor coil and strip heat elements (Heat Pump AHU).
3. When the sensor leads are too short, you must extend the wire with shielded 2-conductor or shielded twisted pair wire. DO NOT install the sensor wiring with any other ac voltage wiring; it must be run separately.

Addressing & Calibration
1. Set the address for the RMOD (92, 93, 94 or 95) by switching the RMOD to ON from S1, and press the ADR button. To change the address from 92, continue to hold the ADR button; and press the UP button until the correct address appears, and release.
2. Energize the FAN only and check RMOD display calibration.
3. Constant display indicates Supply Air temperature. Rotate R52 to adjust calibration.
4. Return Air temperature is displayed when the UP and DN buttons are pressed simultaneously. Rotate R45 to adjust the calibration while holding down these buttons.

Wiring
1. Connect the twisted pair communication wires to RX and TX. NOTE: The twisted pair communication wire cannot be installed with any other ac voltage wiring; it must be run completely separate. Use shielded 2-conductor or shielded twisted pair if there is any potential for electrical interference (Belden 8450 or equivalent). The shield conductor must be installed continuous to every device but landed on the "G" terminal of the Command Center only.
2. Connect the Return Air sensor to the RA terminals.
3. Connect the Supply Air sensor to the LV terminals.
4. Connect the RMOD outputs to the HVAC system.
5. If Emergency Heat is to be controlled by a remote switch, wire a SPST switch to the EM terminals on the RMOD.

The RMOD is ready to be configured in the *Zonex Commander Plus* program.
See Installation Guide.

Power and Communication Wiring
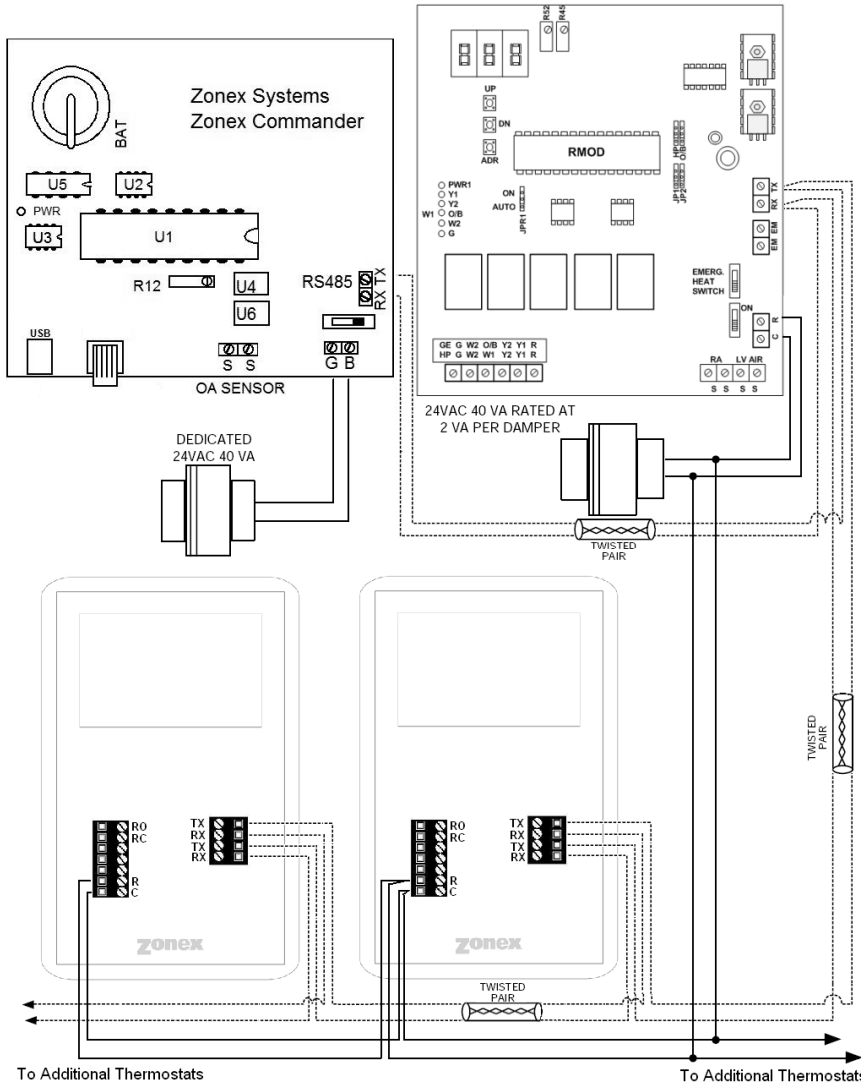
TERMINAL FUNCTIONS

TX – Data transmit
RX – Data receive

R – 24vac power input
C – 24vac power common

RA – Return air sensor input
LV AIR – Supply Air sensor input

R45 – RA calibration
R52 – LV AIR calibration

Gas/Electric
G – Fan output
W2 – Stage 2 heat output
W1 – Stage 1 heat output
Y2 – Stage 2 cool output
Y1 – Stage 1 cool output
R – 24vac from HVAC unit transformer

Heat Pump
G – Fan output
W2 – Aux Heat output
O/B – Reversing Valve signal
Y2 – Stage 2 compressor
Y1 – Stage 1 compressor
R – 24vac from HVAC unit transformer

NOTE: All RX communication wires must be connected to the RX terminals. All TX communication wires must be connected to the TX terminals. The RX and TX wires should never intersect.

Sensor Location
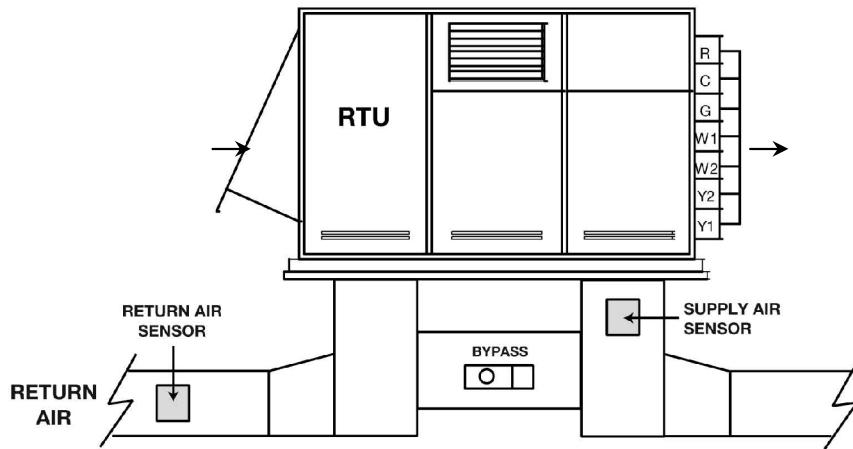
OPERATION

When heating or cooling calls are sent to the **RMOD** Relay Module by the thermostat, the Relay Module will treat these calls as votes to determine mode of operation. Adjustable factory temperature cut-outs are 48° F cool and 145° F heat (G/E).
When configured for Heat Pump operation, the cut-out is automatically set for 121° for Heat.

COOL CALLS

If the majority of calls are for cooling, the RMOD will energize Y1 and G for 1st stage cooling. After 4 minutes, the RMOD will check the leaving air temperature. If the leaving air temperature is above 58° then Y2 will energize. Y2 will stage off at 50°, and Y1 will stage off on low temperature at 48° F. Four-minute minimum run and four-minute off delays are provided for compressor safety.

HEAT CALLS

If the majority of calls are for heating, the RMOD will energize W1 for 1st stage heating. After 3 minutes, if the SA temperature is below 130°, W2 will energize. W2 will de-energize when the SA temperature reaches 140°. If it is above 145° W1 will de-energize for 3 minutes.

CHANGEOVER

If the system is running in one mode and the majority of calls changes to the other mode, a timer will start. The RMOD will give the current operating mode another 4 minutes to try to satisfy the zone(s). It will then go into the purge cycle before switching modes to the majority.

PURGE MODE

When a heat or cool call is satisfied, or before changing modes, the RMOD will go into a 3-minute purge cycle. The call for heat or cool will be removed, and all dampers will close. When the 3 minutes times out, the dampers will motor to 50% open until the next active Cool or Heat call.

VENTILATION MODES

The RMOD can be field configured for FAN Constant in the Occupied mode or FAN Automatic.

EMERGENCY HEAT

Selected by the on-board switch or remote switch.

COMMUNICATION FAILURE

If the RMOD loses communications, it will then control the HVAC unit based on the return air temperature. The RMOD will maintain 70° F heat and 75° F. cool, as measured by the RA sensor in the return air duct.

TEMPERATURE LIMITS AND STAGING

The RMOD monitors the leaving air temperature for staging and Hi / Low limit. The adjustable factory low limit is 48° F, and the high limit is 145° F. Staging is based on the limit settings.

Gas Electric & Heat Pump
Cooling Y2 cut-in temperature is low limit plus 10°F (48° + 10° = 58° F). The Y2 cut-out is cut-in minus 8° F (58° – 8° = 50° F).
Example:
Adjustable low limit = 48° F
Y2 Cut-in = 58° F (low limit plus ten)
Y2 Cut-out = 50° F (cut-in minus eight)

Gas Electric
Heating W2 cut-in temperature is high limit minus 15° F (145° - 15° = 130° F). The W2 cut-out is cut-in plus 10° F (130° + 10° = 140° F).
Example:
Adjustable high limit = 145° F
W2 Cut-in = 130° F (high limit minus fifteen)
W2 Cut-out = 140° F (cut-in plus ten)
W1 cut-out = 145°

Heat Pump
Heating – When the RMOD is configured for HP operation, the high cut-out is automatically set to 121°.
• W2 energizes when the SA temperature is 88° or less after 6 minutes of run time. W2 de-energizes when the SA temperature rises to 100°.
• Y2 energizes when the SA temperature is below 100° and de-energizes above 115°.
• Y1 cuts out for 4 minutes when the SA temperature is above 121°.

TEMPERATURE LIMIT ADJUSTMENT

The high and low cut-out temperatures are field adjustable.

NOTE: The RA and LV AIR sensors (P# **LAT**) must be installed for HVAC unit operation.