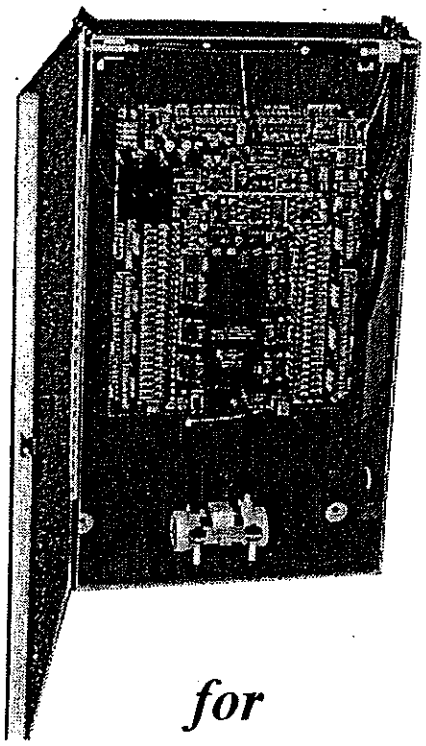
COMFORT BY ATi

# Installation Instructions

# ARZEL® ZONING SYSTEM

## Universal Priority System (UPS Plus...™)

**Models 1202, 1203, 1204, 1206, 1208**



*for*
*Comfort,*
*Reliability*
*and*
*Easy Installation*

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# Arzel 1200 UPS Plus..." Series Zoning System

## FEATURES AND BENEFITS

1. All zones have full-function heating, cooling, and fan capability from all thermostats.
2. All 1200 systems have heat pump capability.
3. Use any standard thermostat: programmable/non-programmable, auto-changeover. Heat pump thermostats are required on all zones for heat pump installation.
4. Universal Priority System (UPS Plus...™) provides a selection of Heating, Cooling, or Automatic priority systems. In Automatic mode, the first call establishes priority. Heating and cooling calls will always override fan-only operation.
5. CallWaiting™: Under any priority system, an opposing call, after waiting 20 minutes, will take control of the system and serve its zone for up to 20 minutes.
6. Automatic Master Zone Control (MZC™) can be initiated either by a programmable thermostat, manual switch, or a time clock. It gives control of the entire HVAC system to the Zone 1 thermostat. Use for occupied / unoccupied set-back or set-up.
7. Emergency Heat changeover switch (manual or remote) is on PC board for heat pump operation only.
8. Fossil Fuels switches customize system operation for Fossil Fuel backup furnace when used with a heat pump and eliminates the need for a fossil fuel kit.
9. Two-stage heating, two-stage cooling, and fan operation is available from all zones with either two-stage or single-stage thermostats. Second-stage time delay can be adjusted from two to 30 minutes if single-stage thermostat is used. Second-stage (both heating and cooling) is delayed by 30 seconds to prevent starting both stages simultaneously.
10. Compressor time delay OFF - When the compressor is turned off, it cannot restart for four minutes. This feature allows the refrigerant pressure to balance before restarting.
11. Automatic, pressure-switch operated bypass damper is available. (must be ordered separately)
12. Self-testing, heating and cooling Leaving Air Temperature sensor (LAT) with 15-ft. cable is included.
13. Diagnostic capability for easy temperature (DC Voltage) read-out of "LAT" temperatures in the supply ducts.
14. Easy to set Leaving Air Temperature Control (LAT) with rotary switches. Range is 40° F to 56° F for cooling and 110° F to 180° F for heating.
15. Any number of Smart Slave Zones (SSZ™) can be added for additional control. A Smart Slave Zone thermostat controls dampers only. It does not control the HVAC equipment and only opens its dampers when the conditioned air in the ducts matches its requirements.
16. Energy Conservation Cycle (ECC™). Dampers remain open for two minutes in the last zone that called for heating or cooling to take advantage of additional energy savings from blower overrun features that are built into the HVAC system.
17. Damper delay: On a furnace call for heat, the damper closure will delay for two minutes to allow air handler to start before any dampers close to provide a SofStart™.
18. Round and rectangular EzySlide™ blade dampers, available from 4" to 40".
19. Damper position indicator makes your installation easy.
20. Manual Pump Switch (MPS™) opens all dampers during emergency or test operations.
21. Fan-On-Heat switch starts fan if immediate fan operation is desired on a call for heating.
22. A 24 VAC Transformer (40 / 75 / 100 VA) is provided to power all Arzel equipment, dampers, and thermostats.
23. On-board auto / fuse helps protect systems from power surges or faults.

Note: The Arzel® Zoning System uses self-contained, very low-pressure micro pumps to open and close dampers. They provide noiseless, long-life, and economical service.

## SELF-DIAGNOSTIC AND LED INDICATORS:

LEDs indicate:

- Power ON indication (green)
- Output signal on Heating, Cooling, Fan, and O/B signal for reversing valve (W1, W2-red, Y1, Y2-yellow, G-green, O/B-yellow)
- When a zone is receiving service (zones 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, green)
- Automatic Bypass Damper Operation (Bypass Solenoid, red)
- Emergency Heat Backup mode is being used (Emer. Heat, red)
- Master Zone Control (MZC) operation (Master Zone, red)
- LAT interruption of the cooling mode Stage 1 and Stage 2 (LAT Clg, yellow)
- LAT interruption of the heating mode Stage 1 and Stage 2 (LAT Htg, red)
- Fan-on-Heat operation (Fan on Heat, green)
- Vacuum and pressure pump operation (Pump, red)
- Each thermostat input to show exactly which zones are calling and the type of service requested
- Four-minute "lockout" of compressor Stage 1 and Stage 2 (Comp. Lockout, yellow)
- Three-minute Energy Conservation Cycle (ECC) in progress (Energy Conservation, yellow)
- LAT fault conditions: Open (flashing yellow) Short (flashing red)

"DC Test" to verify Sensor Temperature Settings (See LAT Temperature Setting and DC Voltage Chart 1. 2. 3. on page 7.)


## WHEN INSTALLING THIS PRODUCT...

1. Read these instructions carefully. Failure to follow them could damage the Arzel® Zoning System and/or cause a hazardous condition.
2. Disconnect power supply to the HVAC system and the Zoning System before making any wiring connections to prevent danger of electrical shock or equipment damage. **(See Wiring Note #1.)**
3. The Arzel System is designed for indoor use only.
4. You must touch a grounded metal object before handling the Control Panel to avoid potential loss of internal programs due to electrostatic discharge.
5. Install in ambient temperature between 32° F and 120° F in a non-condensing area.
6. Be sure the HVAC manufacturer's operating specifications are compatible with the Arzel Zoning System
7. Check all system operations after installation is complete.
8. All wiring must comply with applicable electrical codes, ordinances, and regulations.
9. Use properly grounded tools, safety glasses, and gloves when drilling or cutting sheet-metal ducts, fiberglass, or any hard objects.
10. Leave these instructions with the installed system for future use.
11. Terminals may be AC or DC as required. Do not intermingle wires.
12. All LAT limit controls are to be used as secondary controls only. The LAT control setting must be below your primary factory protection level.

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## 24-VOLT POWER SUPPLY AND GROUNDING

The 24-volt AC transformer (provided with the system) powers all zone thermostats, and the Arzel® Control Panel. **(See Wiring Note #1.)**

The HVAC system transformer provides power for the heating and air-conditioning equipment **outputs** only. Be sure to bring both the hot "R" and "C" side of the HVAC system transformer to the "R" and "C" Output terminals on the Arzel PC board. Do not mix HVAC and Arzel transformer outputs. **(See Wiring Notes #4 and #9.)**

A positive ground terminal is provided for grounding connection. **(See Wiring Note #3.)**

## LOCATING AND MOUNTING THE CONTROL PANEL

Locate the control panel on a wall area near the HVAC air-handling equipment (furnace, fan, coil, etc.) five feet above the floor. Do not mount on ductwork or HVAC equipment.

## IDENTIFYING THE ZONES

Tubing is available in eight colors for easy tracing and identification of dampers. The Arzel Duct-Finder™ makes duct tracing easy. To avoid zone mix-ups, mark all supply ducts clearly with room designation and proper zone number.

## THERMOSTATS

Wires coming from the zone thermostats must be connected to input terminals in the panel for their respective zones. Use any standard thermostat: "Heat/Cool" and "Fan-Auto-On" sub-base switching, Programmable/Non-programmable/Auto-changeover. "R" and "C" terminals (common) are available for all zones. Staging can be accomplished either with two-stage thermostats or single-stage thermostats in combination with the built-in Arzel Delay Timer (ADT™). Be sure to set heating anticipator to the shortest or lowest setting (if adjustable). Heating operation is indicated by red LEDs (W1 and W2). Compressor operation is indicated by yellow LEDs (Y1 and Y2). Fan operation is indicated by green LEDs. Heat pump thermostats are required on all zones for heat pump operation. **(See Wiring Note #21.)**

## LOCATING THERMOSTATS

Locate the thermostats for each zone in a central area within the zone on an inside wall, five feet from an outside wall and five feet from the floor. Avoid areas near register outlets, lights, and other equipment that could cause a false reading.

## OUTPUTS - HVAC SYSTEM

"Outputs" terminals are connected to the HVAC equipment. **(See Wiring Notes #4, #5, #6, #7, #8, #9, and outputs LEDs #10.)**

## EQUIPMENT SETUP (NON HEAT PUMP / HEAT PUMP)

The Arzel 1200™ System is factory set for non-heat pump applications. Any time the board PWR switch is turned ON, the system will automatically check itself and display the LEDs to indicate the type of equipment it is set up to handle. For non heat pump use, leave the system as is. For heat pump use, you MUST do the following procedure after all wiring is complete:

1. Slide PWR switch to OFF.
2. Hold the TDO 1 and the TDO 2 buttons down.
3. Slide the PWR switch ON. The Comp. Lockout LED for Stage 1 (top) will come on and stay on for five seconds, then the Comp. Lockout LED for Stage 2 (bottom) will come on and stay on for five seconds. As long as you hold both buttons down, the LED lights will continue to toggle back and forth.
4. For heat pump applications, release both TDO buttons while the top LED is on.
5. For non heat pump applications, release both TDO buttons while the bottom LED is on.

## EMERGENCY HEAT OPERATION (HEAT PUMP ONLY)

All Arzel 1200 System boards have an emergency or backup heat capability. When the Emergency heat switch is ON, it will convert all "Y" signals to "W" signals, thus bypassing heat pump operation and will only turn on backup heat. Emergency heat mode can be initiated either with the Manual switch or remote (outdoor) thermostat. If an outdoor, remote thermostat is used, leave the Manual switch in the Off position. Emergency heat mode is indicated by a red (EMERGENCY) LED. **(See Wiring Note # 14.)**

## HEAT PUMP WITH FOSSIL FUEL BACKUP HEAT (DUAL FUEL SYSTEMS)

The Arzel 1200 Series lets you customize the system for fossil fuel backup heat without the need for a fossil fuels kit. If you are not using a fossil fuel backup furnace, you must leave these switches in the Off position.

The Fossil Fuel switch will, when the system is operated in emergency heat mode, add 50° F to the high limit setting on the HTG LAT rotary switch (up to a safety maximum of 190° F). This accommodates the higher temperatures required for the fossil fuel backup furnace. Use this switch only if your furnace is rated for this higher temperature.

The Fossil Fan switch will, when the system is operated in emergency heat mode, break the "G" circuit, allowing the furnace to control the fan speed.

For fossil fuel applications, do not connect W1 or W2 thermostat inputs unless fossil fuel kit is used. **(See Wiring Note #16.)**

## UNIVERSAL PRIORITY SYSTEM (UPS PLUS...™) PRIORITY SELECT: HEATING - COOLING - AUTOMATIC - FAN ON - ENERGY CONSERVATION - CALLWAITING™ AND GENERAL OPERATION

Universal Priority System (UPS Plus...) is designed to provide a selection of Heating, Cooling or Automatic Priority position.

In Heating Priority: Heating priority allows heating to have priority over cooling and cooling to have priority over constant fan operation. Any zone calling for heating will be served immediately. Any zone calling for cooling will be served immediately, if no other zone wants heating. Any zone can have constant fan, if no other zone wants either heating or cooling. Heating operation is indicated by red LEDs (W1 and W2).

In Cooling Priority: Cooling priority allows cooling to have priority over heating and heating to have priority over constant fan operation. Any zone calling for cooling will be served immediately. Any zone calling for heating will be served immediately, if no other zone wants cooling. Any zone can have constant fan, if no other zone wants cooling or heating. Compressor operation is indicated by yellow LEDs (Y1 and Y2).

In Automatic Priority: Auto priority will allow the first call (either heating or cooling) to establish the priority sequence for this cycle. A heating or cooling call will always override fan-only operation. Any zone can have constant fan if no other zone wants either heating or cooling.

In Fan ON Operation: Constant fan operation is available unless other zones call for heating or cooling. Any thermostat(s) in the fan ON position will start the fan and open its zone dampers for air circulation. All other zone dampers will be closed automatically. Fan operation is indicated by a green LED (G).

Energy Conservation Cycle (ECC™): After every cycle completion, dampers will be held in place for two minutes and supply conditioned air to the last zone(s) served. After two minutes, the micro pumps continue to operate for another minute to open all the zone dampers for a SofStart™ on the next cycle. The Energy Conservation Override switch (ECO) will override the cycle during test or set-up operation. **(See Wiring Note # 24.)**

CallWaiting: In heating, cooling, or automatic priority mode, an opposing call (i.e. a cooling call when in heating mode) waiting for 20 minutes will be served as follows. The waiting call will shut down the existing service, go through the Energy Conservation Cycle (ECC), and serve itself for up to 20 minutes. If, after this 20 minutes the earlier call is still there, then the service will revert to the original call after completing an Energy Conservation Cycle. This feature eliminates the problem of opposing service calls waiting too long to be served.

General Operation Information: A call from any zone thermostat will turn on the HVAC equipment, position the solenoid air valve, and open the dampers for its zone. Both micro pumps are energized to automatically position the dampers either open or closed, as required. The vacuum pump opens the dampers and the pressure pump closes the dampers. When the thermostat is satisfied, a three-minute Energy Conservation Cycle is initiated. The dampers are held in place for two minutes. This will deliver the residual conditioned air to the last zones(s) served. In the third minute, the micro pump continues to operate to open all the zone dampers for a SofStart on the next cycle.

Damper Delay - fossil fuel furnace only: A built-in two-minute delay is provided to allow the air handler to start before any dampers close to provide a SofStart™

## COMPRESSOR LOCKOUT TDO 1 (STAGE 1) AND TDO 2 (STAGE 2)

All Arzel® circuit boards have a four-minute compressor lockout timer (delay on break) on the compressor circuit. When the compressor is turned off, it will stay locked out for four minutes. This allows the refrigerant pressures to equalize. Time delay lockout is indicated by LEDs, Stage 1 and Stage 2 (Comp. Lockout).

Note: Two momentary-contact Time Delay Override (TDO) switches, one for each stage, are provided on the PC board to speed the checkout of the HVAC system. Before using the TDO switches you must disconnect the HVAC "R" wire in order to avoid short-cycling the compressor. **(See Wiring Note #22.)**

## FAN-ON-HEAT OPERATION

Use the Fan-On-Heat switch if immediate fan operation is desired on a call for heating, such as with electric furnaces, hot-water coils, steam coils, etc. **(See Wiring Note #18.)** Fan operation is indicated by a green LED (G).

## AIR PUMP OPERATION

- Both pumps will start and position up to 100 dampers when service is required for heating, cooling, or fan operation.
- Both pumps will stop three minutes after the last thermostat is satisfied. Pumps will restart for any call for heating, cooling, or fan from any thermostat. Pump operation is indicated by a red LED (Pump).
- Both pumps are delayed two minutes, on furnace calls for heat, to allow the air handler to start before any dampers close.
- The Manual Pump switch is provided to manually start the pumps and open all dampers. You may use this in case of a board malfunction or to test the damper system. **(See Manual Pump Switch below and Wiring Note #19.)**

## MANUAL PUMP SWITCH (MPS™): OPENS ALL ZONE DAMPERS

The Manual Pump Switch (MPS) is provided to bypass the zoning system. This switch will start the pumps manually and open ALL the zone dampers. This will aid in troubleshooting, operate the HVAC system independent of the Arzel panel or if you suspect a PC board failure.

You can bypass the zoning system by following A, B, and C below.

A. Turn the Arzel PWR switch off. You must keep this switch in Off position to block ALL zone thermostats from calling for service. **(See Wiring Note #1.)**
B. Disconnect the wires from any one zone thermostat terminal and connect them to the HVAC Output terminals.
C. Turn the MPS switch on. The HVAC equipment will now be controlled by the thermostat connected to the Output terminals. The pumps will run continuously, holding ALL the dampers open. **(See Wiring Note #19.)** Only the pump LED will be on. All other LEDs will be off.

## SMART SLAVE ZONE (SSZ™) (SLAVE THERMOSTATS)

Any number of Smart Slave Zones may be added to all Arzel units. The Smart Slave Zone thermostat does not control the HVAC equipment. It will only open its zone dampers if the air temperature in the duct is compatible with the thermostat call. Smart Slave Zone operation is indicated by LED on its PC board. Do not use heat pump thermostat for the Smart Slave Zones.

## SMART SLAVE ZONE (SSZ) WIRING AND TUBE CONNECTIONS

- A Smart Slave Zone thermostat must have a heating-cooling sub-base switch if both heating and cooling services are used.
- Connect "R", "W", and "Y" thermostat wires to "R", "W", and "Y" terminals on the Smart Slave Zone PC board.
- Connect Smart Slave Zone damper tubing to the Smart Slave Zone solenoid bulkhead fitting on top of the panel.
- Do not use a heat pump thermostat for the Smart Slave Zone.

## MASTER ZONE CONTROL (MZC™)

The Arzel® Zoning System may be operated entirely from Zone 1 thermostat by the means of the Master Zone Control switch. Moving this switch to the ON position establishes Zone 1 as the "Master Zone" and allows automatic occupied/ unoccupied set-back or set-up. All zone dampers open and the equipment is cycled based on Zone 1 thermostat settings. Master Zone operation may be initiated by manual operation of this switch or it may be operated by a time clock in the REMOTE position or a timed programmable thermostat. The switch and the remote terminal are electrically parallel. You may use either. **(See Wiring Note #15.)**

## INSTALLING ROUND DAMPERS - EzySlide™ TYPE R

The EzySlide "R" damper is designed to be inserted from the bottom, top, or side of round ducts without cutting off or removing sections of the duct. An adhesive template is provided with each damper. Remove backing paper and place template on duct, observing direction of airflow arrow on the template. Cut out required triangle. Insert damper blade with blade facing the long side of triangle. Rotate damper so that the flat side of the blade is positioned to face airflow (not the side with the connecting rods). Fasten with four sheet-metal screws.

## INSTALLING SQUARE AND RECTANGULAR DAMPERS - EzySlide™ TYPE S

The EzySlide "S" damper is designed to be inserted in an existing or a new rectangular duct from the bottom, top, or side of the duct. Cut a slot 5" wide by any required length. The slot should be cut to 3/4-inch from each duct corner. This will avoid having to cut into the "Pittsburgh Lock" in the duct and leave sheet metal for the mounting plate screws. Slide the damper into the duct at an angle to avoid cutting the gasket. Position the flat side of the blade to face airflow (not the side with the connecting rods). Fasten with sheet-metal screws.

## DAMPER POSITION INDICATOR

Observe the movements of the damper position indicator:

1. The damper indicator pointing straight (out) means the damper is closed.
2. The damper indicator pointing up (short) means the damper is open.

## CONNECTING AIR TUBES TO DAMPERS

Each zone has one air line bulkhead fitting on the top of the Arzel® panel. All additional dampers in each zone must be connected with a "T" fitting to its zone air line. The air line provides vacuum and pressure, as needed, to open and close the dampers. For example: Zone #1 air line must be connected to all the dampers in Zone #1. A cap or plug must be placed on any unused zone fittings or tubes. Tubing is available in eight colors to easily identify each zone.

## LAT LIMIT CONTROLS FOR HEATING AND COOLING

NOTE: All LAT limit controls are to be used as secondary controls only.
The LAT control setting must be below your primary factory protection level.

Heating and cooling LAT limits are set by using the two rotary switches. Heating LAT settings range from 100° F to 180° F and OFF. Cooling LAT settings range from 40° F to 56° F and OFF. **(See Wiring Note #17.)**

## LAT TEMPERATURE SETTING AND DC VOLTAGE READING CHART

| TEMP F. | Volt DC | TEMP F. | Volt DC |
|---|---|---|---|
| 40° = | 3.82 | 90° = | 2.42 |
| 42° = | 3.77 | 100° = | 2.14 |
| 44° = | 3.72 | 110° = | 1.88 |
| 46° = | 3.69 | 120° = | 1.63 |
| 48° = | 3.63 | 130° = | 1.41 |
| 50° = | 3.57 | 140° = | 1.22 |
| 52° = | 3.52 | 150° = | 1.05 |
| 54° = | 3.46 | 160° = | 0.90 |
| 56° = | 3.40 | 170° = | 0.77 |
| 61° = | 3.28 | 180° = | 0.66 |
| | | 190° = | 0.57 |

**DC test to Verify Duct Temperature**

Proceed as follows:

1. Insert test thermometer into duct as near to LAT sensor as possible.
2. Measure DC voltage across two LAT terminals; #17.
3. Voltage reading (chart on left) should indicate the same temperature as test thermometer, plus or minus 3° F.

**High LAT temperature setting cycles the first-stage heating.**
**Second-stage heating is automatically cycled 10° lower than high temperature setting.**
**Both stages will reconnect after a 15° temperature drop.**

**Low LAT temperature setting cycles the first-stage cooling.**
**Second-stage cooling is automatically cycled 5° higher than the low temperature setting.**
**If an LAT interruption occurs; Y1 will reconnect after a four-minute time delay, if the duct temperature is above setpoint. Y2 will reconnect after a four-minute time delay, if the duct temperature is 5° and above setpoint.**

## STAGING WITH SINGLE-STAGE AND TWO-STAGE THERMOSTATS

Staging can be accomplished with either single-stage or two-stage thermostats. **(See Wiring Note #17 for more information on the heating and cooling cycle.)**

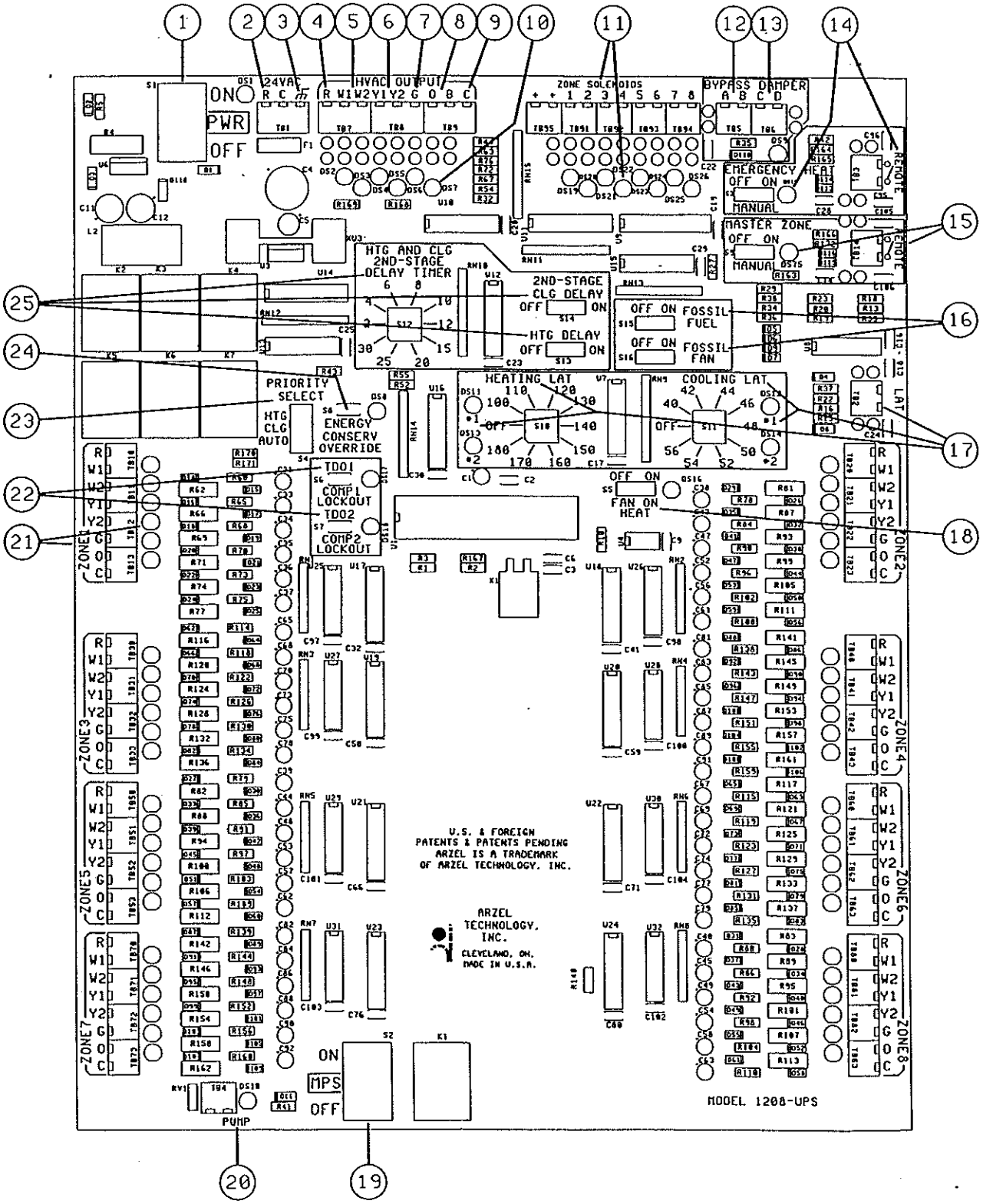
**Single-stage thermostats:** W1 and Y1 are controlled by the thermostat. W2 and Y2 are brought on by the Arzel Heating and Cooling Delay Timer. **(See below and Wiring Note #25.)**

**Two-stage thermostats:** W1, W2, Y1, and Y2 are all controlled by the thermostat. W2 and Y2 are always delayed by 30 seconds to prevent both stages from coming on simultaneously.

## SECOND-STAGE HEATING AND COOLING DELAY AND TIMER SETTINGS

Second-stage heating and second-stage cooling delay with ON or OFF switches are provided. You may select either or both. If you want to control the second-stages with single-stage thermostats, set your slide switches to ON and set your rotary Delay Timer switch for the desired delay time. The delay time will be the same for heating and cooling. **(See Wiring Note #17.)**

# WIRING LAYOUT
## 1200 UPS Plus...™ Systems (Typical)



# WIRING NOTES
## 1200 UPS Plus... " Systems (Typical)

| | | |
|---|---|---|
| 1. | On/Off PWR Switch w/ LED | The Arzel® Zoning System is powered by a 40 / 75 / 100 VA , 24 VAC transformer (provided). This switch and the HVAC power switch must always be in the Off position when connecting wires to any terminals. (See control panel DANGER-SECTION on p. 4.). Control panel has a 20-second warm-up period (self-diagnostic), when the PC board is turned on. |
| 2. | 24VAC Terminals R and C | The Arzel transformer (provided) must be connected to these two terminals only. This supplies power to the PC board, all thermostat terminals, and accessories. Do not mix with HVAC OUTPUT terminals. |
| 3. | Positive Grounding | For a positive ground, connect this terminal to a cold water pipe or to another good grounding source. |
| 4. | R Terminal HVAC System | Connect Hot or + side of HVAC equipment transformer (24VAC) to this terminal only. (See #9 below for Common.) |
| 5. | W1 and W2 Terminals | Connect to gas valve or heat relay. Stage 1 and Stage 2. (W1 is the back-up-heat terminal for Stage 1, if heat pump is installed.) |
| 6. | Y1 and Y2 Terminals | Connect to compressor contactors or relays. Stage 1 and Stage 2. |
| 7. | G Terminal | Connect to equipment fan relay. |
| 8. | O and B Terminals | (For heat pump installation only) Connect either "O" or "B" to heat pump reversing valve, as required by heat-pump manufacturer. |
| 9. | C Terminal HVAC System | Connect Common side of the HVAC equipment Transformer (24VAC) to this terminal only. (See #4 for Hot "+".) |
| 10. | Output LEDs | Indicate the type of service (W1, W2, Y1, Y2, G, or O/B) that is requested by the thermostat and the Arzel Control Panel. LED light ON, means relay is energized. O/B light OFF, means B is energized. |
| 11. | Zone Solenoid LED and Terminals | These are the factory connections for each zone solenoid (typical). LED indicates each zone solenoid's response to the thermostat call and the Arzel Control Panel request for service. |
| 12. | Bypass Terminals A and B Damper Control | These are the terminals for pressure-switch operated bypass damper. Use the Normally Open (NO) and the Common (C) terminals on the pressure switch. Pressure switch must be mounted in a vertical position. Pressure switch with pitot tube and tubing are included if factory-installed Bypass option is ordered. |
| 13. | Damper Terminals C and D | This is the factory installed bypass damper solenoid. This solenoid is included if Bypass option is ordered. |
| 14. | Emergency Heat OFF / ON Manual Switch/ Remote Operation | Emergency Heat switch (heat pump applications only). This switch will allow change from heat pump operation to back-up heat or fossil fuel operation. It can be initiated by either a manual switch or remote thermostat. If a remote thermostat is used, leave the manual switch in the OFF position. Connect the remote outdoor thermostat (normally open) terminals to R and E terminals. The Emergency Heat LED will light when the Emergency Heat switch is ON. |
| 15. | Master Zone Control (MZC™) Manual / Remote | The Master Zone Control system enables you to run all zones from one thermostat, allowing automatic occupied / unoccupied set-back or set-up. Placing this switch to ON gives control of the entire HVAC system to the Zone 1 (programmable) thermostat. Connect a time clock or other remote switch to allow for automatic remote operation of the entire system. The switch and remote terminal are electrically parallel. You may use either. |
| 16. | Fossil Fuel Switches | Use only for applications for heat pumps with fossil fuel backup heat. These switches eliminate the need for a fossil fuel kit.<br>NOTE: <u>All LAT limit controls are to be used as secondary controls only.</u><br><u>The LAT control setting must be below your primary factory protection level.</u><br><u>Fossil Fuel switch</u> - In the On position the switch adds 50° to the high LAT setpoint (up to 190° F limit) when operated in emergency heat mode to accommodate the higher temperatures required for fossil fuel backups. <u>You must check to see that your furnace is rated for this higher temperature.</u><br><u>Fossil Fan switch</u> - In the On position this switch breaks the "G" contact when operated in emergency heat mode. This allows the furnace to control the fan speed. This is usually a slower speed.<br><u>For fossil fuel applications,</u> do not connect W1 or W2 thermostat inputs unless fossil fuel kit is used. |

17. **LAT Sensors**

During the normal operation of zoning equipment, the amount of air passing through the air conditioning coil or over the heat exchanger may be reduced to a point that undesirable air temperatures may develop in the duct system (too cold or too hot). Leaving Air Temperature (LAT) controls are used to cycle the AC compressor or the heating system to correct these temperature levels.

**LAT Installation**

Drill a 1/4" hole in the duct for the sensor. Carefully push the solid-state sensor through the hole; snap the black locking bushing into place. Run LAT wires separate from other wires. Caution: Use Arzel® sensor ONLY. Sensors come with 15-ft. leads. Two-conductor twisted-pair thermostat wire may be added to extend sensor lead wires up to 100 ft. Sensors should be placed downstream and as close to the AC coil and heat exchanger as possible. On heat pump installations, be sure that the LAT sensor is located between the refrigeration coil and the backup electric heat coils.

**LAT Terminals**

Connect LAT wires to these two terminals. NOTE: All LAT limit controls are to be used as secondary controls only. The LAT control setting must be below your primary factory protection level.

**HTG/CLG Settings**

Set both rotary switches (heating LAT and cooling LAT) to the desired heating and cooling limit. If you do not wish to use either or both, place the unused rotary switch pointer to the Off position. The Arzel System automatically detects LAT faults. Therefore, you must install the sensor or place both rotary switches to the Off position. An open or shorted LAT circuit will lockout heating or cooling service.

**LAT Fault Indications "OPEN" "SHORT"**

"OPEN"- Both yellow Cooling LAT LEDs will flash to indicate that the system has detected an open condition in the LAT sensor. (Check wires / replace sensor).
"SHORT"- Both red Heating LAT LEDs will flash to indicate that the system has detected a short condition in the LAT sensor. (Check wires / replace sensor).

**Heating Cycle (Furnace) Heating System**

Single-Stage Equipment: A thermostat call for heating will start the heating system and will illuminate the Thermostat Input and W1 Output LEDs. Damper positioning is delayed two minutes to allow air handler to start before any dampers close. If the duct temperature reaches the Heating LAT setpoint, the heating system and the W1 Output LED Will be turned off and the #1 LAT LED (upper, red) will illuminate to indicate the system was tripped by the LAT control. The fan will continue to deliver heat to the zones. The heating system will be allowed to reconnect after a 15° F drop below the Heating LAT setpoint.

Two-Stage Equipment w/Two-Stage Thermostats: A thermostat call for first-stage heating will start the first-stage heating system and will illuminate the W1 Thermostat Input and Output LEDs. A thermostat call for second-stage heating will start the second-stage equipment and will illuminate the W2 Thermostat Input and Output LEDs. If the duct temperature reaches 10° F below the heating LAT setpoint, the second-stage equipment and W2 Output LED will be turned off and the #2 LAT LED (lower, red) will illuminate. The thermostat Input LED will remain on until the thermostat is satisfied. If the duct temperature reaches the Heating LAT setpoint, the first-stage equipment and the W1 Output LED will be turned off and the #1 LAT LED (upper, red) will illuminate. The first-stage will be allowed to reconnect after a 15° drop below the setpoint. If needed, the second-stage will be allowed to reconnect 30 seconds after the first-stage.

Two-Stage Equipment w/Single-Stage Thermostat: A thermostat call for heating will start the first-stage heating system and will illuminate the W1 Thermostat Input and Output LEDs. The second-stage will be started and the W2 Output LED will illuminate at the end of the heating and cooling second-stage Arzel Delay Timer™ setting. If the duct temperature rises to 10° F below the Heating LAT setpoint, the second-stage equipment and W2 Output LED will be turned off and the #2 LAT LED (lower, red) will illuminate. If the duct-temperature reaches the Heating LAT setpoint, the first-stage equipment and the W1 output LED will be turned off and the #1 LAT LED (upper, red) will illuminate. As the duct temperature falls, at 10° F below the Heating LAT setpoint, the timer starts the second-stage delay countdown. At 15° F below setpoint, the first-stage is allowed to reconnect. The second-stage will reconnect at the expiration of the delay timer.

**Cooling Cycle (Air Conditioning)**

Single-Stage Equipment: A thermostat call for cooling will start the air-conditioning system and will illuminate the Thermostat Input and Output Y1 and G LEDs. If the duct temperature drops below the Cooling LAT setpoint, the compressor will be turned off. The Y1 LED will go out and the Comp. Lockout #1 LED will light. The compressor will be locked out for four minutes to allow the refrigerant to equalize. The fan will continue to run. The #1 LAT LED (upper, yellow) will also illuminate to indicate that the compressor was tripped by the LAT system. The compressor will be allowed to reconnect after the expiration of the lockout timer if the temperature has risen above the setpoint.

Two-Stage Equipment w/Two-Stage Thermostats: A thermostat call for first-stage cooling will start the first-stage compressor and will illuminate the Thermostat Input and Output Y1 and G LEDs. A Thermostat call for second-stage cooling will start the second-stage compressor and will illuminate the Y2 Thermostat Input and Output LEDs. If the duct temperature reaches 5° F above the cooling LAT setpoint, the second-stage compressor and Y2 output LED will be turned off and the #2 LAT LED (lower, yellow) will illuminate. The Comp. Lockout #2 LED will illuminate to indicate that the second-stage compressor is locked out for four minutes to allow the refrigerant to equalize. The thermostat Input LED will remain on until the thermostat is satisfied.

| | | |
|---|---|---|
| | | If the duct temperature reaches the Cooling LAT setpoint, the first-stage compressor and the Y1 output LED will be turned off and the #1 LAT LED (upper, yellow) will illuminate. The Comp. Lockout #1 LED will illuminate to indicate that the first-stage compressor is locked out for four minutes to allow the refrigerant to equalize. The first-stage will be allowed to reconnect after a 10° rise above the Cooling LAT setpoint. If needed, the second-stage will be allowed to reconnect 30 seconds after the first-stage.<br>Two-Stage Equipment w/Single-Stage Thermostat: A thermostat call for cooling will start the first-stage compressor and will illuminate the Y1 and G Thermostat Input and Output LEDs. The second-stage compressor will be started and the Y2 Output LED will illuminate at the end of the heating and cooling second-stage delay timer setting. If the duct temperature reaches 5° F above the cooling LAT setpoint, the second-stage compressor and Y2 output LED will be turned off and the #2 LAT LED (lower, yellow) will illuminate. The Comp. Lockout #2 LED will illuminate to indicate that the second-stage compressor is locked out for four minutes to allow the refrigerant to equalize. If the duct temperature reaches the Cooling LAT setpoint, the first-stage compressor and the Y1 output LED will be turned off and the #1 LAT LED (upper, yellow) will illuminate. The Comp. Lockout #1 LED will illuminate to indicate that the first-stage compressor is locked out for four minutes to allow the refrigerant to equalize. The first-stage will be allowed to reconnect at the conclusion of the lockout timer if the duct-temperature is above the Cooling LAT setpoint. The second-stage will reconnect at the expiration of the heating and cooling delay timer if its lockout timer is finished and the temperature is above the Cooling LAT setpoint + 10° F. |
| | Heating Cycle (Heat Pump) | The heating cycle for heat pumps works the same way as for furnaces above but the signals to the equipment will be:<br>Y1, G - Single-Stage Heat<br>W1, Y1, G - Single-Stage Compressor with Emergency Heat Assistance<br>Y1, Y2, G - Two-Stage Heat<br>W1, Y1, Y2, G - Two-Stage Compressor Operation with Emergency Heat Assistance<br>W1, W2, Y1, Y2, G - Two-Stage Compressor Operation with Two-Stage Emergency Heat Assistance<br>W1, G - Single-Stage Emergency Heat. Heat Pump is in Emergency Heat mode.<br>W1, W2, G - Two-Stage Emergency Heat. Heat Pump is in Emergency Heat mode. |
| | Cooling Cycle (Heat Pump) | The cooling cycle for heat pump operation is identical to air conditioning above except thermostat and equipment signals will be:<br>Y1, G, O - Single-Stage Cooling<br>Y1, Y2, G, O - Two-Stage Cooling |
| 18. | Fan-on-Heat Switch | This switch in On position will start the fan if immediate fan operation is desired on a call for heating, such as electric furnace, hot water coils, steam coils, etc. |
| 19. | MPS™ Switch ON / OFF | MPS switch On, starts the micro pumps and opens all zone dampers. (See Manual Pump Switch Pg. 6.) Pump LED light is on any time the pump is running. |
| 20. | Pump Terminals w/ LED | This is the factory connection for the pressure and vacuum micro pumps. The pumps operate only when a thermostat calls for Heat / Cool or Fan operation or when the MPS switch is in the On position. LED light is ON any time pump is running. |
| 21. | Thermostat Terminals (Typical) | Connect thermostats to these terminals. A common "C" terminal is available, if needed. Be sure to set heating anticipator to the shortest or lowest setting (if adjustable). The "O" terminal of all heat pump thermostats must be used for heat pump operation (typical). |
| | Thermostat LEDs | There are LEDs for each thermostat to clearly indicate which zones are calling and the type of service requested. The LED will remain on any time a thermostat is calling or waiting for service. |
| 22. | TDO 1 and TDO 2 Compressor Lockout Time Delay Override | These two momentary-contact time delay override switches are provided on the PC board to speed the checkout of the compressor system. NOTE: Before using these TDO switches, you must disconnect the HVAC "R" wire, in order to avoid short cycling the compressor. |
| 23. | Universal Priority Select Sw. (UPS™) | Select Heating, Cooling or Auto priority to suit your design requirements. |
| 24. | Energy Conservation Cycle (ECC™) and Override | After a cycle of heating or cooling is completed, the dampers will be held in place for two minutes. This will deliver all the residual conditioned air only to the zones that were last served. The micro pumps will continue for one additional minute to open all the dampers for a SofStart™ on the next call. Press the Energy Conservation Override switch to bypass this feature for faster testing purposes. |
| 25. | Second-Stage Heating and Cooling Delay Switches | Select second-stage heating delay, cooling delay, ON or OFF to suit your design requirements. In On position, the delay timer will function for heating or cooling. For either, the second stage will start "T" minutes after the first stage starts (where T is the delay time set on the second-stage heating and cooling delay timer). In Off position, the delay timer will not function for heating or cooling or both. CONT... → |

| | |
|---|---|
| Second-Stage Heating and Cooling Delay Timer | Turn the selector switch to the desired time delay for the second-stage (two to 30 minutes). In this setting, a single-stage thermostat will bring in the second-stage at the end of the delay time. If you wish to use a two-stage thermostat, then shut off the corresponding second-stage heating and/or cooling switch(es). |

## FAN CHECKOUT

1. Set all thermostats to the Off position and all fan switches to AUTO before starting the fan system checkout.
2. Turn the HVAC system and the Arzel® system power (PWR) switch ON. The LED light near the switch will come on.
3. Turn Zone 1 thermostat FAN switch ON. The following LEDs will come on: Zone 1 thermostat "G", the solenoid, the pump, and the "G" output. The fan in the HVAC system will turn on. The pressure and vacuum pumps will automatically position all the dampers. Check all register outlets to determine that only Zone 1 dampers are open and all other dampers are closed.
4. Follow the above procedure for all other zones.

## HEATING AND COOLING CHECKOUT

NOTE: Do not push the TDO1 or TDO2 until you disconnect the HVAC "R" wire in order to avoid shortcycling the compressor.

1. Set all thermostats to the Off position and all fan switches to AUTO before starting heating system checkout.
2. Set Zone 1 thermostat to the HEAT position. Turn thermostat up so that the thermostat is calling for heat. The following LEDs will come on: Zone 1 thermostat W1, the solenoid, the pump and the W1 output. Check and set heating LAT and heating and cooling second-stage delay timer settings. The pressure and vacuum pumps will automatically position all the dampers. Check to see that the heating valve or relay is energized. If heat pump is installed, check operation of emergency backup heating. Turn the thermostat down until the thermostat is satisfied. The dampers and system will go through its Energy Conservation Cycle (ECC™) for three minutes. The LED lights will go out and the pumps will stop. If you wish to save checkout time, you can push the Energy Conservation Override switch to skip this automatic cycle.
3. Set thermostat for Zone 1 to the Cool position. Turn thermostat down so that the thermostat is calling for cooling. The following LEDs will come on: Zone 1 thermostats Y1 and G, the solenoid, the pump and the Y1 and G outputs. Check and set cooling LAT and heating and cooling second-stage delay timer settings. The pressure and vacuum pumps will automatically position all the dampers. Check to see that the compressor relay or contactor is energized. Rapid cycle Zone 1 to see that four-minute lockout takes place. If you wish to save checkout time, you can push TDO 1 and TDO 2 to skip the delay.
4. Place Zone 1 thermostat in the Off position. The dampers and system will go through its Energy Conservation Cycle (ECC)™. If you wish to save checkout time, you can push the Energy Conservation Override switch to skip this automatic cycle.
5. Follow the above procedure for all other zones.

## BYPASS DAMPER INSTALLATION, SIZES, ADJUSTMENT, AND CHECKOUT

Automatic pressure switch operated or barometric Bypass damper systems are installed to relieve excess air pressure that is sometimes caused by zoning. Excess air pressure may create high air velocity and air noise. Install a bypass duct directly between the supply air trunkline and the return air trunkline. The bypass supply air takeoff must be installed before any trunkline dampers. We recommend the bypass be installed as far away from the air handler as possible for optimum performance. This will allow for the supply air to mix with the maximum amount of return air.

1. If the automatic pressure switch operated Bypass damper control is used, connect the pressure switch to terminals A and B on the PC board. Use NORMALLY OPEN and COMMON terminals on the pressure switch. Pressure switch must be mounted in a vertical position. **(See Wiring Note #12.)**
2. The Bypass solenoid is connected to terminals C & D at the factory. **(See Wiring Note #13.)**
3. Minimum pressure required to activate the Bypass damper is 0.05 in. WC.
4. Start a fan call for the smallest zone. Adjust Bypass pressure switch setting to open Bypass damper to eliminate air noise. This is usually found when only the smallest zone is calling.
5. If a barometric Bypass damper is used instead of a pressure switch operated damper, set counter weight and adjust to suit the installation.

Suggested sizes for Pressure Switch operated or Barometric Bypass dampers - Round and Rectangular Sizes

| Arzel EzySlide™ dampers for built-in, automatic, pressure-switch operated Bypass Dampers | | | SPDR Sizes Round | SPDS Sizes Rectangular |
|---|---|---|---|---|
| 2 tons | 7" Bypass | Up to 3 Tons | 8" Bypass | 12" x 8" Bypass |
| 3 tons | 8" Bypass | 4 to 5 Tons | 10" Bypass | 12" x 10" Bypass |
| 4 tons | 9" Bypass | 6 to 7 1/2 Tons | 12" Bypass | 12" x 12" Bypass |
| 5 tons | 10" Bypass | 12 Tons | 14" Bypass | 20" x 8" Bypass |
| 6 tons | 12" Bypass | | | |
| 7 1/2 tons | 14" Bypass | | | |
| 12 tons | 16" Bypass | | | |

## KNOWITALL™ DIAGNOSTIC DISPLAY

| LED Code | Function Indication | Wiring Note # | Problem ? | Check-Adjust-Correct |
|---|---|---|---|---|
| ON (PWR SW.) | 24VAC is supplied to board. PC board will power-up in 20 seconds. | 1 | No LED display | Check transformer output. |
| W1 (first-stage)<br>W2 (second-stage) | Gas valve or heating relay is energized. | 10 | No heat | Check gas valve etc. The "R" wire from HVAC system may not be connected to Arzel® system. |
| Y 1 and Y 2 | Compressor contactor is energized. | 10 | No cooling | Check compressor and "R" and "C" wire. |
| G | Fan relay is energized. | 10 | No fan | Check fan, relay, and "R" wire. |
| O | Reversing Valve is energized (heat pump only). | 10 | No cooling | Check Reversing Valve and "R" wire. |
| 1 - 2 - 3 - 4 - 5 -6 - 7 - 8 - 9 - 10 -11-12 | Zone solenoid is energized, dampers are open to zones, conditioned air is delivered to the requesting zones. | 11 | Some dampers are not open | Check to see that zone dampers are properly connected. Possible mix-up of damper tubes. Open air line. |
| Bypass Solenoid (Optional Equip) | Bypass damper is activated by the pressure switch in the duct. ( Use NO and C contact only. ) | 13 | Noisy air delivery to rooms | Duct pressure too high<br>Adjust pressure switch so that no air-noise is heard when only the smallest zone is served. |
| Emergency Heat | Heat Pump is bypassed. All Y signals from the thermostats are converted to Ws. | 14 | Can't get cooling Stuck in Emer. Ht. | Check outdoor thermostat.<br>Turn Manual switch Off. |
| Master Zone Control (MZC™) | Master Zone Control is engaged. The entire HVAC system is being controlled by Zone 1. All other requests are ignored. All dampers are open. | 15 | Zones 2-12 not responding<br>Master Zone Control On erroneously | Normal Master Zone Control operation<br>Check setback time clock.<br>Turn Master Zone Control Off. |
| LAT Low #1 and #2 Yellow LED(s) on steady | Cooling is locked out due to low LAT temperature. | 17 | Cooling tripping at the wrong temp<br>Cooling not tripping | Check LAT setting.<br>Check DC voltage across sensor terminals for duct air temperature.<br>Is the LAT rotary switch set to the correct temperature setting? |
| | | | LAT Reconnecting Sequence | Y1 circuit will reconnect after four-minute lockout if temperature is above setpoint.<br>Y2 circuit will reconnect after four-minute lockout if temperature is above setpoint + 5°.<br>Y2 (w/ single-stage thermostat) will connect after four-minute lockout and expiration of the delay timer and temperature at setpoint +5°. |
| LAT Low #1 and #2 Yellow LED(s) are Flashing | Panel has detected an OPEN condition in the LAT sensor. | 17 | Sensor not installed<br>Sensor not connected properly<br>Sensor lead broken | Check sensor connection<br>Install sensor<br>Tighten terminal screws tightly.<br>Inspect sensor wire / replace sensor.<br>If you are not going to install the sensor, make sure that the LAT Rotary switches are both in the OFF position. |
| LAT HIGH #1 and #2 Red LED(s) are ON Steady | Heating is locked out due to High LAT temperature. Red LED(s) ON steady | 17 | Heating tripping at the wrong temperature<br>Heating not tripping | Check LAT setting.<br>Is the LAT rotary switch set to the correct temperature setting?<br>Check DC voltage across sensor terminals for duct air temperature. |
| | | | LAT Reconnecting Sequence | Furnace<br>W1 circuit will reconnect after temperature fall of 15°.<br>W2 circuit will reconnect after temperature fall of 15°.<br>W2 (w/ single-stage thermostat) will reconnect at expiration of the delay timer after W1 reconnects and a delay of 30 seconds.<br>Heat Pump<br>Y1 circuit will reconnect after four-minute lockout if temperature is below setpoint -15°.<br>Y2 circuit will reconnect after four-minute lockout if temperature is below setpoint -15°, and a delay of 30 seconds.<br>Y2 (w/ single-stage thermostat) will reconnect after four-minute lockout and expiration of the delay timer and temperature is below setpoint -15°. |

## KNOWITALL™ DIAGNOSTIC DISPLAY Continued

| LED Code | Function Indication | Wiring Note # | Problem ? | Check-Adjust-Correct |
|---|---|---|---|---|
| LAT HIGH<br>#1 and #2<br>Red LED(s) on Flashing | Panel has detected a SHORT condition in the LAT sensor. | 17 | Sensor not installed<br><br>Sensor not connected properly<br>Sensor Lead crushed | Check sensor connection.<br>Tighten terminal screws.<br><br>Inspect sensor wire / replace sensor.<br><br>If you are not going to install the sensor, make sure that the LAT Rotary switches are both in the OFF position. |
| Fan On Heat | Immediate Fan (G) call generated on any call for heat. | 18 | Unwanted Fan oper.<br>Fan not at "Heating Speed" | Turn FAN-ON-HEAT switch Off. |
| Pump (Air) | Vacuum and pressure pumps are running, zones are open or closed as required by each thermostat. | 20 | No damper action<br><br>Dampers wait two minutes | Check for open air line. Check for air pressure. Manometer reading should be 30- to 50-inch WC in pressure and vacuum.<br>Damper delay (fossil fuel furnace) to allow air handler to start before any dampers close for a SofStart™ |
| Thermostat Input LEDs (typical) | Indicates what each zone is calling for. LEDs are on any time there is a call.<br>Opposing call LED's may also be on and waiting to be served. | 21 | Thermostat LEDs not registering a call<br>LEDs showing an invalid call<br>Valid call not being serviced | Check thermostat and wiring (R and C are provided for your convenience).<br>Thermostat malfunction / Wiring mix-up<br>Panel may be servicing "higher priority" call.<br>Master Zone Control™ may be ON.<br>Energy Conservation Cycle or Compressor Lockout may be active. |
| Comp. Lockout<br>#1 and #2 | Compressor is locked out for four- to five-minutes. Compressor is in normal "Time Delay Off" lockout. | 22 | None | This is your "Rapid Cycle Protection" in progress. If needed, the compressor will restart in four minutes. |
| Energy Conservation Cycle (ECC™) | Three-minute cycle. For the first two minutes the dampers are held in place. For the last minute all the dampers are open to prepare for the next cycle. | 24 | None<br><br>Energy Conservation Cycle starting unexpectedly | System is delivering residual conditioned air to the last zone served.<br>Check thermostats and connections. Zone signals may be breaking intermittently causing cycle to begin or repeat. |

## TROUBLESHOOTING CHART TOLL-FREE TECHNICAL SUPPORT HOTLINE 800-611-8312

| Problem | Possible Causes | Corrective Action |
|---|---|---|
| System is not working | Switch is in OFF position | Turn switch to ON position. |
| No power to system | Transformer shorted out | Replace transformer. |
| No power to system | Transformer disconnected | Check transformer wiring. |
| Pump is running but the dampers do not open or close | Insufficient pressure in system<br>Leakage in system | Plug up spare zones or open tubes.<br>Check air lines, repair leakage.<br>Check for damaged dampers. |
| Dampers open and close but HVAC system does not operate | Missing "R" and "C" wire from HVAC equipment transformer to Arzel "R" and "C" output terminal | Bring hot "R" and "C" wire from HVAC equipment transformer to Arzel® output "R" and "C" terminal.<br>See: 24VA-power supply section |
| "LAT High" is flashing, but the HVAC system is not calling for service | The LAT probe is shorted (faulty) | Check voltage at LAT terminal per chart.<br>Zero reading indicates short.<br>Replace the LAT probe and recheck voltage per chart.<br>Turn on LAT rotary switch. |
| "LAT Low" is flashing, but the HVAC system is not calling for service | The LAT probe is open (faulty) | Check voltage at LAT terminal, per chart. High voltage above 10 VDC indicates open probe. Replace the probe and recheck voltage. Check LAT connection. Turn on LAT rotary switch. |
| System is not working | Shorted thermostat wires<br>Bad thermostat | Check wires, thermostats, and connections.<br>Check HVAC transformer |

* **IF ALL ELSE FAILS...**

**If you suspect a board failure, shut off the main power switch and you can bypass the board by disconnecting Zone 1 thermostat wires (or any other zone) and connecting them to the matching HVAC Output terminals. Move Manual Pump Switch (MPS™) to the On position. This will open all zone dampers. The system will now work without the benefit of the zoning system. The heating and air conditioning equipment is now controlled by the Zone 1 thermostat. The micro pumps will run continuously holding all dampers open. The system will now work as a one-zone system until you make the diagnosis and repair.**

## NOTES

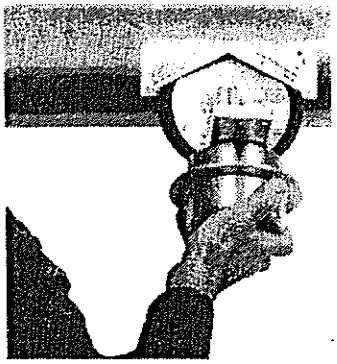
ARZEL

is

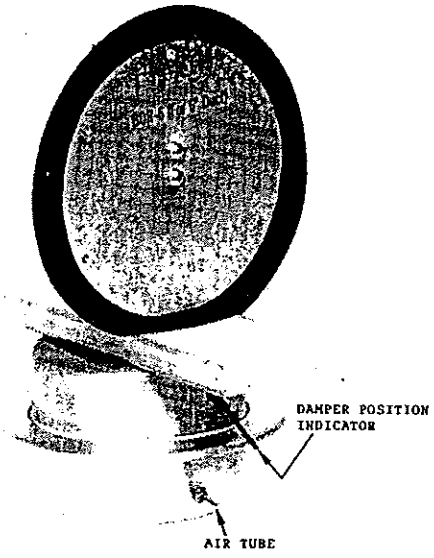
Smart...Simple...Affordable

Comfort...Savings

## ARZEL® ZONING IS THE ANSWER!



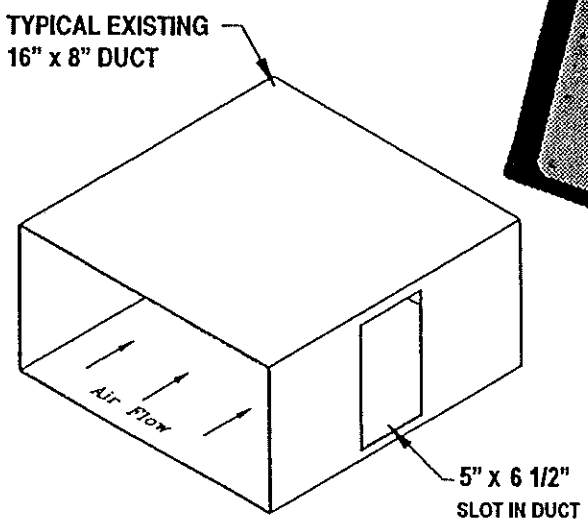
Installation through a small slit in the existing duct makes it the fastest-installed damper in the market.

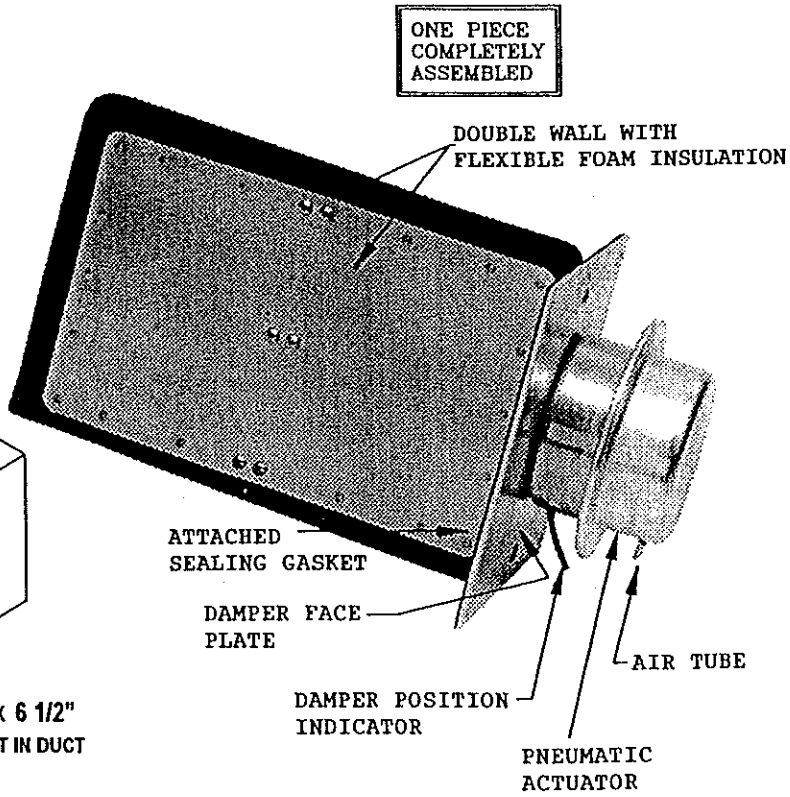



## Quick Retrofit, Fast Action Blade Dampers

**FOR SIDE, BOTTOM & TOP MOUNT DAMPERS:**
CUT A 5" SLOT BY ANY REQUIRED LENGTH. LEAVE 3/4 " SHEET METAL ON BOTH ENDS FOR SHEET METAL SCREW.

3-EASY STEPS TO INSTALL:
1. CUT SLOT IN DUCT
2. INSERT BLADE DAMPER ASSEMBLY.
3. SCREW FACE PLATE TO DUCT






*Note: All Arzel™ Systems are Patented and Patent Pending.*