

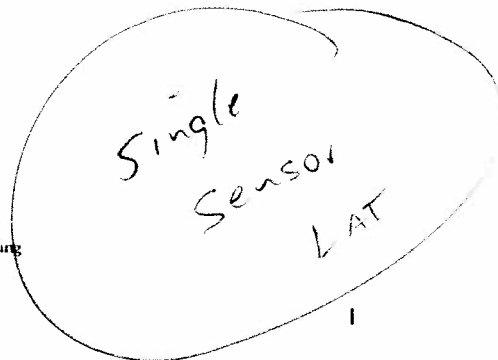
Installation Instructions

ARZEL™ ZONING SYSTEM

Models 402, 403 & 404 **A**



*For
Comfort,
Reliability,
Ease of Installation.*



*LAT Dip Switch
4 - High
3 - Low
Page 6*

Installation Instructions
Arzel 400 Series Zoning System
402 - 2 Zone Unit, 403 - 3 Zone Unit, 404 - 4 Zone Unit,

All zones have full function heating, cooling and fan capability from all thermostats.

FEATURES

1. All systems have heat pump capability.
2. Emergency Heat / back-up change over switch on PC board(for heat pump operation only).
3. Single stage heating, cooling, & fan operation is available from all zones.
4. Use any standard 4 or 5 wire thermostat, Programmable/Non-programmable, / Auto Change-over. Heat pump thermostats are required for heat pump operation.
5. Compressor time delay "OFF". When the compressor is turned off, it cannot restart for 4 to 5 minutes. This feature allows the refrigerant pressure to balance before restarting.
6. Bypass damper terminals for pressure switch operated bypass damper.
7. Built in heating and cooling leaving air temperature sensor.(LAT) Sensor with 8 ft cable is included.
8. Diagnostic Test Pad for easy temperature read-out of "LAT" temperatures.
9. On board heating / cooling temperature selection with easy to set Dip- switches for leaving air temperature control (LAT). Range, 44 to 58 degree for cooling and 100 to 175 degree for heating.
10. Slave zone(s) can be added for additional control. A slave zone thermostat controls dampers only. Does not control HVAC equipment.
11. Dampers remain open in the last zone that called for heating or cooling, to take advantage of additional energy savings from blower over-run features that exist on all heating equipment and some cooling equipment.
12. Built-in heating/cooling and fan priority system.
13. Round and rectangular blade damper system.
14. Damper position indicator for round and rectangular dampers .
15. "FAN ON HEAT" switch, to start fan if immediate fan operation is desired on a call for heating.
16. A 40 VA 24VAC transformer is provided to power all Arzel equipment & all dampers.

NOTE: The Arzel zoning system uses a self contained, very low pressure air operation, which provides noiseless, long life and economical service.

SELF DIAGNOSTIC FEATURES:

1. LED light for power ON indication.
2. LED lights to indicate output signal on Heating, Cooling, Fan and O/B Signal for reversing valve.
3. LED lights to indicate any zone when solenoid valve is energized (Calling for service). (1, 2, 3, 4).
4. LED light to indicate vacuum and pressure pump operation. (Pump).
5. LED light to indicate Automatic Bypass Damper Operation. (Bypass Solenoid LED).
6. LED light to indicate that Emergency Heat Back Up mode is being used. (Emer. Heat).
7. Flashing LED light to indicate 4 to 5 minute "lockout" on Compressor. (Comp. Lockout).
8. Flashing LED light to indicate LAT Interruption of the Cooling Mode. (LAT Low).
9. Flashing LED light to indicate LAT Interruption of the Heating Mode. (LAT High).
10. Low Voltage "Test Pads" to verify Sensor Temperature Settings. (see Temperature Chart).

PRIORITY SYSTEM

The logic board is designed for heating to have priority over cooling and cooling to have priority over 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.

GENERAL OPERATION INFORMATION

A call from any zone thermostat will turn on the HVAC equipment, energize the solenoid air valve and open the dampers for its zone. Both pumps, vacuum and pressure, are energized at the same time to position the dampers in their open or closed position as required. The vacuum pump opens the dampers, the pressure pump closes the dampers. When the thermostat is satisfied, the air pumps, the HVAC equipment and the solenoid air valve are turned off. Dampers will remain in whatever position they were in when the last thermostat call was finished. Leaving the last zone dampers open allows the HVAC system to utilize the residual energy in the system in both the heating and cooling cycles.



CONTROL PANEL DANGER!

WHEN INSTALLING THIS PRODUCT.....

1. **Disconnect power supply to the HVAC system and the ARZEL system before making any wiring connections to prevent danger, electrical shock and equipment damage. (See Wiring Note #1.)**
2. Read these instructions carefully. Failure to follow them could damage the zoning system or cause a hazardous condition.
3. The Arzel System is designed for indoor use only.
4. You must touch a grounded metal object before handling the Arzel Control Panel to avoid potential loss of internal programs, due to electro-static discharge.
5. Install in ambient temperature between 32° F and 120° F, in a non condensing area.
6. Be sure that the manufacturers operating specification for the HVAC equipment are compatible for zoning equipment.
7. Check out all system operations after installation is complete.
8. All wiring must comply with all 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 this instruction with installed system for future use.

24 VOLT POWER SUPPLY

The Arzel 24 volt AC transformer (provided with the system) powers all the thermostats plus the Arzel equipment. (See wiring Note #2).

The HVAC system transformer provides power for the heating and air-conditioning equipment only. Be sure to bring the Hot ("R") side of the HVAC system transformer to the ("R") output terminal on the Arzel PC board. (See Wiring Note #3).

LOCATING & MOUNTING THE CONTROL PANEL

Locate the control panel on a wall area near the HVAC air handling equipment (furnace - fan coil, etc.) 5 ft. above the floor. Do not mount on duct work or HVAC equipment.

IDENTIFYING THE ZONES

To avoid zone mix-ups, mark all supply ducts clearly with room designation and proper zone number.

THERMOSTATS

"Heat/Cool and Fan-Auto-On" sub-base switching is available from any zone thermostat. Use any standard 4 or 5 wire thermostat: Programmable/ Non programmable/Auto change-over. Panel provides terminals for "O / B" signal. A "C" terminal (common) is available for all zones. Heat pump thermostats are required for heat pump operation.

LOCATIONS FOR THERMOSTATS

Locate the thermostats for each zone in a central area within the zone on an inside wall, 5-ft. from an outside wall and 5-ft. from the floor. Avoid areas near register outlets, lights and other equipment that could cause a false reading.

THERMOSTATS, APPLIANCES & ACCESSORY WIRING

Wires coming from the zone thermostats must be connected to input terminals in their respective zones. (See Wiring Note # 8 for 402 / 403 or # 16 for 404 system).
Output terminals are connected to the HVAC Equipment. (See Wiring Note # 3, 4, 5, 6 & 7).

EMERGENCY HEAT - FOSSIL FUEL - HEAT PUMP - APPLICATION

An Emergency switch (change-over switch) is provided on all Arzel 400 System boards. See wiring Notes #19 for 402 / 403 and 404. Terminals for switching Emergency Heat change- over by outdoor stat is also provided. See wiring Notes # 20 for 402 / 403 and 404

Note: Wiring Notes can be found on pages 7 and 9.

HEATING CYCLE

Heating has priority over cooling and fan operation. A thermostat call for heating in any zone will open its zone dampers and start the heating cycle. The last zone served stays open. Be sure to set heating anticipator to the longest cycle (if adjustable.) Heating operation is indicated by LED light. (W).

COOLING CYCLE

Cooling has priority over fan operation. If there are no heating calls, a cooling call from a thermostat will start the cooling cycle and will open its zone dampers. The last zone served stays open. Cooling operation is indicated by LED light. (Y & G).

ANTI RECYCLE COMPRESSOR TIME DELAY "OFF"

When the compressor is turned off, it will stay locked out for 4 to 5 minutes. This allows the refrigerant pressures to equalize. Time delay operation is indicated by flashing LED light. (Comp. Lockout).

Note: A momentary contact, Time Delay Override switch is provided on the P.C. board to speed the checkout of the compressor system. Before using the TDO switch, you must disconnect the HVAC "R" wire, in order to avoid short cycling the equipment.

FAN & FAN - ON - HEAT OPERATION

Unless other zones call for heating or cooling, any thermostat 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. The Fan ON-HEAT switch can be used if immediate fan operation is desired on a call for heating, such as in electric furnace, hot water coils, steam coils, etc. (See Wiring Notes # 14 for 402 / 403 or # 15 for 404 system). Fan operation is indicated by LED light. (G).

DOE ENERGY SAVINGS REQUIREMENT (DOE= Department of Energy)

The dampers in the last zone that received heating, cooling or fan service will remain open. Leaving the last zone dampers open allows the HVAC System to use the residual energy in the system in both the heating and cooling cycles. The fan continues to run after a heating call (also after a cooling call on some cooling equipment) to deliver this residual energy.

AIR PUMP OPERATION

- * Both pumps will start when service is required for heating, cooling or fan operation.
- * Both pumps will stop when the cycle is completed. Pumps will restart for any call for heating, cooling or fan call from any thermostat. Pump operation is indicated by LED light. (Pump).

SLAVE ZONES Non - Primary/Sub Zone (Slave thermosta(s))

Slave zones may be added to any Arzel unit. The slave thermostat will only open and close the zone dampers. The slave thermostat does not control the HVAC equipment. When it needs service, the slave zone will open its dampers and wait for conditioned air from any zone that calls for service. When the slave zone is satisfied, it will close its dampers. A thermostat is needed for each slave zone addition. A slave zone operation is indicated by LED light on its PC board.

SLAVE ZONE WIRING AND TUBE CONNECTIONS

- 1.) Connect R W Y thermostat terminals to R W Y terminals on the slave zone terminals.
- 2.) A slave zone thermostat must have heating-cooling sub-base switch if both heating and cooling services are used.
- 3.) A slave zone functions only when another zone is operating

BUILT-IN OPTIONS -READY TO USE

- * Terminals for pressure switch operated By-pass damper operation. (See Wiring Note # 9 & 10 for 402/403 or # 9 & 10 for 404 system).
- * LAT Sensor for overheating & overcooling protection with built in temperature selection Dip switches. (See Wiring Notes # 11, 12, 13 & 15 for 402 / 403 or 11, 12, 13, & 14 for 404 system).
- * Emergency Heat change-over switch provided on the PC board.
- * Test pads for easy temperature read-out of "LAT".
- * "FAN ON HEAT" switch to start fan if immediate fan operation is desired on a call for heating. Such as, electric furnace, hot water coils, steam coils, etc.
(See Wiring Notes #14 for 402 / 403 or 15 for 404 system).

INSTALLING THE ROUND DAMPERS - BDR TYPE

The BDR damper is designed to be inserted in existing round ducts without cutting off or removing sections of the duct. A "stick-on" template is provided with each damper. Remove backing paper and place template on duct, observing direction of air flow 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 (not the side with the connecting rods) is positioned to face air flow. Fasten with four sheet metal screws.

INSTALLING THE RECTANGULAR DAMPERS - BDS TYPE

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

INSTALLING AIR LINES TO DAMPERS

Each zone has one air line bulkhead fitting the top of the Arzel panel. All 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.

LED LIGHTS

LED lights on the P.C. board output terminals indicate the type of service called for in the zones:

Red light	= Heating	Flashing Yellow light	= LAT cooling interruption
Yellow light	= Compressor	Flashing Red light	= LAT Htg. interruption
Green light	= Fan	Flashing Yellow light	= Compressor locked out
Orange light	= O/B Circuit for heat pump *	Red light	= Bypass damper is open

* LED (Light on "O" call only. "B" terminal is energized when light is off).

Red LED light at each solenoid terminal identifies the zone where the zone dampers are open. (1, 3, 3, 4,).

Red LED light near air pump relay indicates air pump operation. (Pump).

Red LED light to indicate that the system is in the **Emergency Back-Up** heat mode. (Emer. Heat).

SOLENOID AIR VALVES

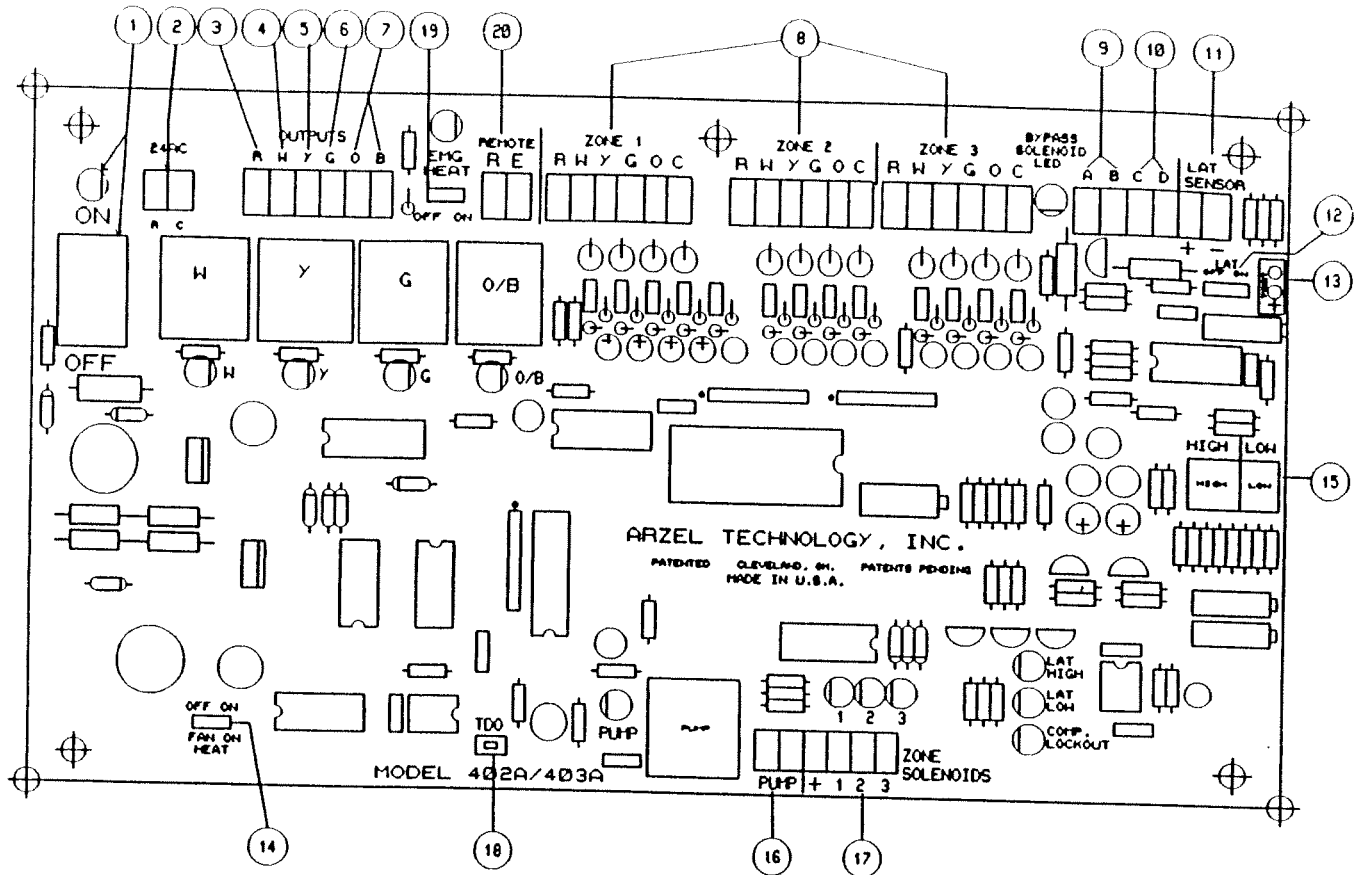
The Solenoids are energized by the thermostats. Solenoids are energized to open the dampers (vacuum position). The solenoids for the closed dampers are not energized (pressure position). (See Wiring Notes #17 for 402/403 or #8 for 404 system).

LAT OVERHEATING - OVERCOOLING CONTROLS

(See wiring Notes # 11, 12, 13, & 15 for 402 / 403 or 11, 12, 13, & 14 for 404 system).

Note: Wiring Notes can be found on pages 7 and 9.

400 A
402/403 SYSTEM WIRING LAYOUT



HIGH TEMP. GAS/OIL/HP				LOW TEMP. FOR HP/AC			
1	2	3	4	1	2	3	4
175	1	1	1	60.0	1	1	1
165	1	1	1	56.0	1	1	1
160	1	1	1	52.5	1	1	1
156	1	1	1	49.0	1	1	1
151	1	1	1	45.5	1	1	1
146	1	1	1	42.0	1	1	1
142	1	1	1	38.5	1	1	1
137	1	1	1	35.0	1	1	1
133	1	1	1				
128	1	1	1				
123	1	1	1				
119	1	1	1				
114	1	1	1				
109	1	1	1				
105	1	1	1				
100	1	1	1				

New Lower Temperature Settings for LAT System:
The new setting Range is 60° F / 35° F

CAUTION:
Freeze-up may occur on some applications when the leaving air temperature is below 49° F.

Temperature Setting & D. C. Voltage Reading Chart
See Notes #11, 12, 13 and 15.

To Compare existing Duct Temperature With Voltage Reading:
Proceed as follows:

1. Insert test thermometer into duct as near to LAT sensor as possible.
2. Place "Plus" probe & "Minus" probe of voltmeter (VDC Mode) to test pad + - .
3. Voltage reading (chart on left) should indicate the same temperature as test thermometer, plus or minus 2 degrees.

4. Voltage Readings for LAT Temperatures beyond Dip Switch Settings are as follows:

Degree F	Voltage DC
65	- 2.21
70	- 2.38
75	- 2.55
80	- 2.72
85	- 2.89
90	- 3.06
95	- 3.2

* Sensor NOT being used...
See note next page

WIRING NOTES for 402 & 403 System only:
(See wiring layout on page 6)

- # 1. On/Off Switch
W / LED The Arzel System is powered by a 40VA 24-VAC transformer (provided).
This switch and the HVAC power switch must always be in the "Off" position when connecting wires to any of the terminals. (See control panel DANGER-SECTION.)
Board has a 20 second warm up period, when board is turned on.
- # 2. 24 VAC Terminals The Arzel 40VA transformer (provided) must be connected to these two terminals.
- # 3. R Terminal Connect Hot or + side of HVAC equipment transformer (24 VAC) to this terminal.
- # 4. W Terminal Connect to gas valve or heat relay. (Back-up heating terminal if Heat-Pump is installed.)
- # 5. Y Terminal Connect to compressor contactor or relay.
- # 6. G Terminal Connect to equipment fan relay.
- # 7. 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.
- # 8. Thermostat Terminals Connect zone thermostat to these terminals. A common "C" terminal is available, if needed. The "O" Terminal of all heat pump thermostats must be used for heat pump operation.
- # 9. Terminals A & B Terminals for pressure switch operated Bypass damper. Use normally open (NO) and the common terminal on the pressure switch. Adjust as needed. Pressure switch must be mounted in a vertical position. Pressure switch is included if ordered with factory-installed By-pass option.
- # 10. Terminals C & D
(Factory connection) Factory connection for By-pass damper solenoid. Factory installed By-pass option must be ordered at the time of purchase.
- # 11. LAT Sensor Drill a 1/4" hole in duct, carefully push the solid state sensor through the hole, snap the locking bushing into place. Connect the two wires from sensor to these terminals. Red wire must go to + (plus) terminal, white wire must go to - (minus) terminal. Caution, use Arzel sensor only. When using the LAT sensor the LAT switch must be in ON position. Sensor comes with 8 ft. leads. Thermostat wire may be added to extend sensor lead wires up to 30 ft. Sensor should be placed downstream and as close to the AC coil as possible. On Heat Pump installations, be sure that the LAT sensor is located between the refrigeration coil and the Backup electric heat coils.
- # 12. LAT OFF / ON switch If LAT sensor is not used for either heating or cooling, this switch must be in the OFF position, and the LAT leads must NOT be connected to the sensor terminals.
- # 13. LAT Test Pad Low voltage test pad to verify LAT Sensor temperature readings. (see chart).
- # 14. 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.
- # 15. LAT Temperature settings: See example & chart. Select your desired high and low temperature "DIP SWITCH" setting.
- 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 equipment to correct these temperature levels.
- For Example : A low temp setting of 52° will break the Y circuit at 52°. The compressor will restart after 4 to 5 minutes delay. A high temperature setting of 152 degrees for gas/oil furnace will break the (W) circuit at 152 degrees. The high temperature setting has a built-in non adjustable 15 degree differential. In this example, the gas valve or heating relay will re-energize at 137 degrees (152° - 15°).
- # 16. Pump terminals
(Factory connection) These terminals provide power for the pressure and vacuum pumps.
The pumps operate only when a thermostat calls for a Heat/Cool or Fan operation.
- # 17. Solenoid Terminals
(Factory connection) Factory connection for zone solenoid.
- # 18. T.D.O. Time Delay Override. Note: A momentary contact, time delay override switch is provided on the P.C. board to speed the checkout of the compressor system. Before using this T.D.O. switch, you must disconnect the HVAC "R" wire, in order to avoid short cycling the equipment.
- # 19. Emergency Heat Emergency Heat Change-over switch, to be used for heat pump applications only.
- # 20. Emergency Heat Emergency or, Back-up Heat Change-over terminals, for remote switching by outdoor thermostat.

FAN CHECK - OUT

- 1.) Set all thermostats to the Off position and all fan switches to Auto before starting the fan system check out.
- 2.) Turn the HVAC and the ARZEL power switch "ON". The LED light above the switch will come on.
- 3.) Turn Zone 1 thermostat fan switch "ON". The Zone 1 Solenoid and the Fan and Pump output LED lights will come on. The fan in the HVAC system will turn on. The pressure and vacuum pumps will position all the dampers. Check all register outlets to determine that Zone 1 dampers are open and all other dampers are closed.
- 4.) Follow the above procedure for all other zones.

HEATING & COOLING CHECK - OUT

- 1.) Set all thermostats to the Off position and all fan switches to Auto before starting heating system check out.
- 2.) Set Zone 1 thermostat to the Heat position. Turn thermostat up so that the thermostat is calling for heat. The Zone 1 Solenoid, the W output and the Pump LED lights will come on. The pressure and vacuum pumps will position all the dampers. Check to see that the heating valve or relay is energized. Check operation of Emergency Back-Up heating, if heat pump is installed. Turn the thermostat down until the thermostat is satisfied. The LED lights will go out and the pumps will stop. Dampers will remain open in the last zone that called.
- 3.) Set thermostat for Zone 1 to the Cool position. Turn thermostat down so that the thermostat is calling for cooling. The Zone 1 Solenoid, the Y and G and the pump output LED lights will come on. The pressure and vacuum pumps will position all the dampers. Check to see that the relay or contactor is energized. Rapid cycle each zone to see that 4 to 5 minute lockout takes place.
- 4.) Place Zone 1 thermostat in the "Off" position.
- 5.) Follow the above procedure for all other zones.

BYPASS DAMPER INSTALLATION, SIZES, ADJUSTMENT & CHECK - OUT

Barometric or pressure switch operated Bypass damper systems are installed to relieve excess air pressure that sometimes is caused by zoning. Excess air pressure may create high air velocity and air noise.

Recommended pressure switch operated	6" By-pass for 2-Tons	10" By-pass for 6-Tons	14" By-pass for 12 Tons
Bypass Damper - In Round Sizes:	8" By-pass for 4-Tons	12" By-pass for 7 1/2 Tons	

- 1.) If a barometric bypass damper is used instead of a pressure switch operated damper, set counter weight and adjust to suit the installation.
- 2.) If a pressure switch operated Bypass damper system is used, connect the pressure switch to terminals A and B on PC board. USE NORMALLY OPEN and COMMON terminals on the pressure switch. Pressure switch must be mounted in a vertical position (See PC board wiring Note # 9).
- 3.) The by-pass solenoid is connected to terminals C & D (See Note # 10). (Factory Connection).
- 4.) Minimum pressure required to activate bypass damper is .05 in. WC.
- 5.) Adjust Bypass pressure switch setting to open bypass damper to eliminate air noise. This is usually found when only the smallest zone is calling. A call for heating/cooling or fan must exist to operate the pump during this check out.

Damper Position Indicator

Observe the movements of the damper position indicator:

- (1) In the damper down or closed position, the indicator is down.
- (2) In the damper up or open position, the indicator is up.

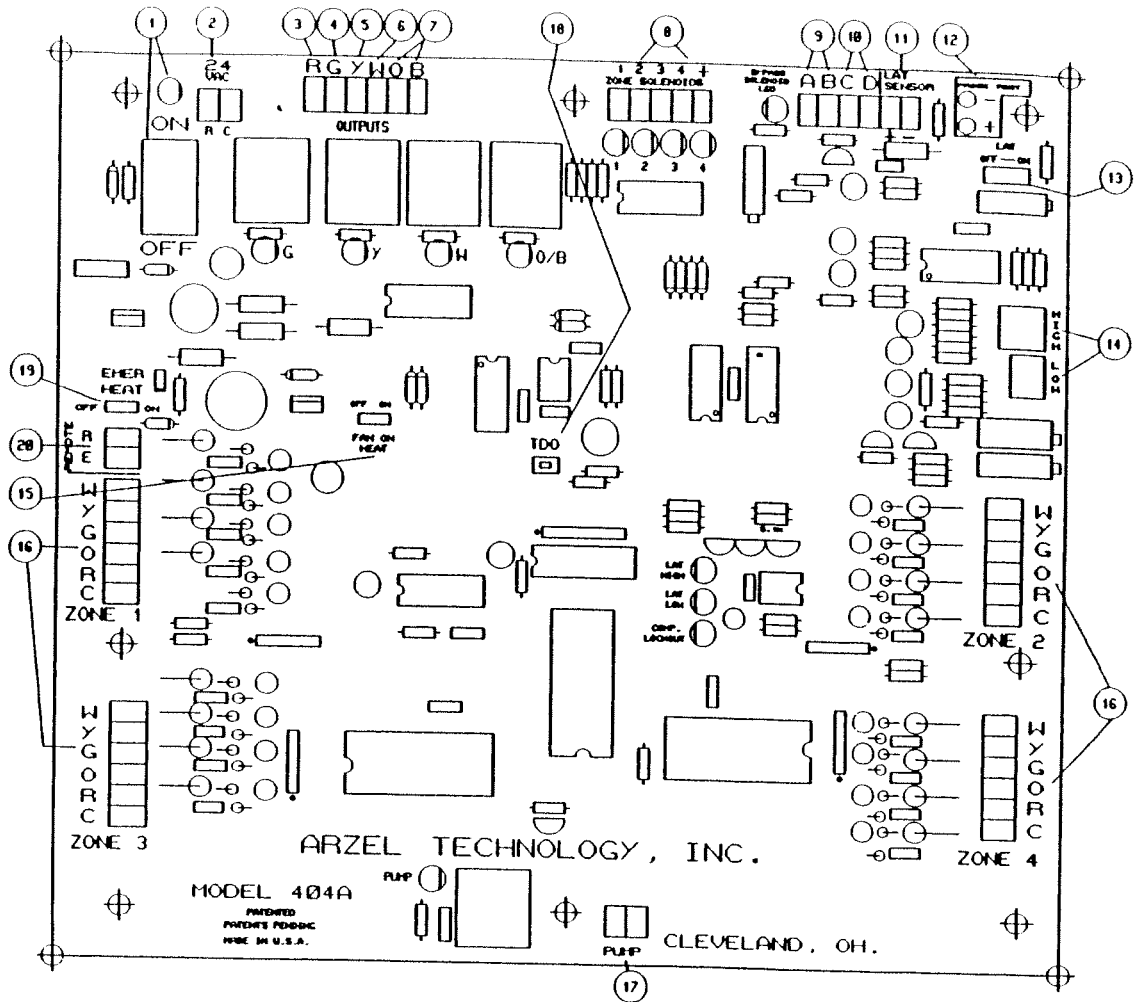
LED DIAGNOSTIC DISPLAY

LED Code	Function Indication	Problem ?	Corrective Action required
ON	24 VAC is supplied to board Board will power-up in 20 seconds	No LED ?	Check transformer output
W	Gas valve or heating relay is energized	No heat ?	Check gas valve etc. "R" wire from HVAC system not connected to Arzel System
Y	Compressor contactor energized	No cooling ?	Check compressor etc.
G	Fan relay is energized	No fan ?	Check fan & fan relay
1 - 2 - 3 - 4	Zone solenoid is energized, dampers are open to zones, conditioned air is delivered to the requesting zones.	Damper not open?	Check to see that zone dampers are properly connected.
Pump (Air)	Vacuum & pressure pumps are running, zones are open or closed, as required	No damper action ?	Check for open airline. Check for air pressure Manometer reading should be between 20 to 40 " WC"
Bypass Solenoid (optional)	Bypass damper is activated by the pressure switch	Duct pressure is higher than switch setting ?	Adjust pressure switch so that no air - noise is heard when the smallest zone is served
"Flashing" LAT High	W circuit (or Y circuit in heat pump installation) is open, due to high LAT temp.	Check LAT setting	W or Y will reconnect after a drop of 15 degrees in duct air temperature
"Flashing" LAT Low	Y circuit is open, due to low LAT temp.	Check LAT setting	Y circuit will reconnect after 4 to 5 minutes lockout
"Flashing" Comp. lockout	Compressor is locked out for 4 to 5 minutes	None .	This is your "Rapid Cycle Protection" in progress. If needed, the compressor will restart in 4 to 5 minutes

TROUBLE - SHOOTING - CHART

Symptoms	Possible Causes	Corrective Action
No power to System	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 Dampers don't open or close.	Insufficient pressure in System Leakage in System	Plug up unused or open tubes Check airlines, repair leak Check for damaged dampers
Dampers open & close but HVAC System does not operate	Missing "R" wire from HVAC equipment transformer to Arzel output terminal	Bring hot "R" wire from HVAC equipment transformer to Arzel output "R" terminal See: 24V 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 test pad, per chart High reading above 10 VDC indicates short Replace the probe and recheck voltage per chart
"LAT LOW" is flashing, but the HVAC System is not calling for service	LAT switch is in "Off" position The LAT probe is open (faulty) or, LAT leads are reversed	Turn on LAT switch Check voltage at test pad, per chart No voltage indicates open probe Replace the probe and recheck voltage per chart. Check LAT connection. Red wire must be on + terminal, white wire on - terminal

404 SYTEM WIRING LAYOUT



HIGH TEMP. GAS/OIL/HP			
1	2	3	4
175	█	█	█
165	█	█	█
160	█	█	█
156	█	█	█
151	█	█	█
146	█	█	█
142	█	█	█
137	█	█	█
133	█	█	█
128	█	█	█
123	█	█	█
119	█	█	█
114	█	█	█
109	█	█	█
105	█	█	█
100	█	█	█

LOW TEMP. FOR HP/AC			
1	2	3	PROBE TEST
60.0	█	█	2.040 VDC
56.0	█	█	1.904 VDC
52.5	█	█	1.785 VDC
49.0	█	█	1.666 VDC
45.5	█	█	1.547 VDC
42.0	█	█	1.428 VDC
38.5	█	█	1.309 VDC
35.0	█	█	1.190 VDC

New Lower Temperature Settings for LAT System:

The new setting Range is 60° F / 35° F

CAUTION:

Freeze-up may occur on some applications when the leaving air temperature is below 49° F.

Temperature Setting & D. C. Voltage Reading Chart

See Notes #11, 12, 13 and 14.

To Compare Existing Duct Temperature With Voltage Reading

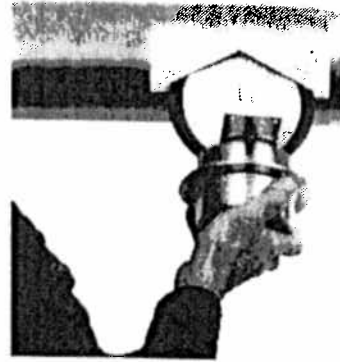
Proceed as follows:

1. Insert a test thermometer into duct as near to LAT sensor as possible.
2. Place "Plus" probe & "Minus" probe of voltmeter (VDC Mode) to test pad + -.
3. Voltage reading (chart on left) should indicate the same temperature as test thermometer, plus or minus 2 degrees.
4. Voltage Readings for LAT Temperatures beyond Dip Switch Settings are as follows:

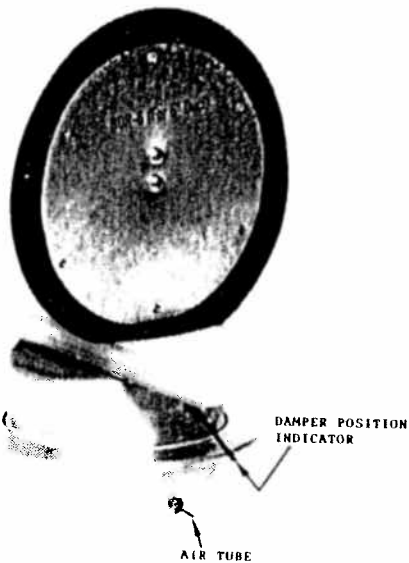
Degree F°	Voltage DC
65	- 2.21
70	- 2.38
75	- 2.55
80	- 2.72
85	- 2.89
90	- 3.06
95	- 3.23

WIRING NOTES for 404 System only:
(See wiring layout on page 6)

- # 1. On/Off Switch
W / LED
The Arzel System is powered by a 40VA 24-VAC transformer (provided). *This switch and the HVAC power switch must always be in the "Off" position when connecting wires to any of the terminals. (See control panel DANGER-SECTION.)* Board has a 20 second warm up period, when board is turned on.
- # 2. 24 VAC Terminals
3. R Terminal
4. G Terminal
5. Y Terminal
6. W Terminal
The Arzel 40VA transformer (provided) must be connected to these two terminals. Connect Hot or + side of HVAC equipment transformer (24 VAC) to this terminal. Connect to equipment fan relay. Connect to compressor contactor or relay. Connect to gas valve or heat relay. (Back-up heating terminal if Heat-Pump is installed.)
- # 7. 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.
- # 8. Solenoid Terminals
(Factory connection)
9. Terminals A & B
Factory connection for zone solenoids. Terminals for pressure switch operated Bypass damper. Use normally open (NO) and the common terminal on the pressure switch. Adjust as needed. Pressure switch must be mounted in a vertical position. Pressure switch is included if ordered with factory-installed By-pass option.
- # 10. Terminals C & D
(Factory connection)
Factory connection for By-pass damper solenoid. Factory installed By-pass option must be ordered at the time of purchase.
- # 11. LAT Sensor
Drill a 1/4" hole in duct, carefully push the solid state sensor through the hole, snap the locking bushing into place. Connect the two wires from sensor to these terminals. Red wire must go to + (plus) terminal, white wire must go to - (minus) terminal. Caution, use Arzel sensor only. When using the LAT sensor the LAT switch must be in ON position. Sensor comes with 8 ft. leads. Thermostat wire may be added to extend sensor lead wires up to 30 ft. Sensor should be placed downstream and as close to the AC coil as possible. On Heat Pump installations, be sure that the LAT sensor is located between the refrigeration coil and the Backup electric heat coil.
- # 12. LAT Test Pad
Low voltage test pad to verify LAT Sensor temperature readings. (see chart).
- # 13. LAT OFF / ON switch
If LAT sensor is not used for either heating or cooling, this switch must be in the OFF position, and the LAT leads must NOT be connected to the sensor terminals.
- # 14. LAT Temperature settings:
See example & chart. Select your desired high and low temperature "DIP SWITCH" setting.
- 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 equipment to correct these temperature levels.
- For Example: A low temp setting of 62° will break the Y circuit at 62°. The compressor will restart after 4 to 5 minutes delay. A high temperature setting of 152 degrees for gas/oil furnace will break the (W) circuit at 152 degrees. The high temperature setting has a built-in non adjustable 15 degree differential. In this example, the gas valve or heating relay will re-energize at 137 degrees (152° - 15°).
- # 15. 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.
- # 16. Thermostat Terminals
Connect zone thermostat to these terminals. A common "C" terminal is available, if needed. The "O" Terminal of all heat pump thermostats must be used for heat pump operation.
- # 17. Pump terminals
(Factory connection)
These terminals provide power for the pressure and vacuum pumps. The pumps operate only when a thermostat calls for a Heat/Cool or Fan operation.
- # 18. T.D.O.
Time Delay Override. Note: A momentary contact, time delay override switch is provided on the P.C. board to speed the checkout of the compressor system. Before using this T.D.O. switch, you must disconnect the HVAC "R" wire, in order to avoid short cycling the equipment.
- # 19. Emergency Heat
20. Emergency Heat
Emergency Heat Change-over switch, to be used for heat pump applications only. Emergency or Back-up Heat Change-over terminals, for remote switching by outdoor thermostats.



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

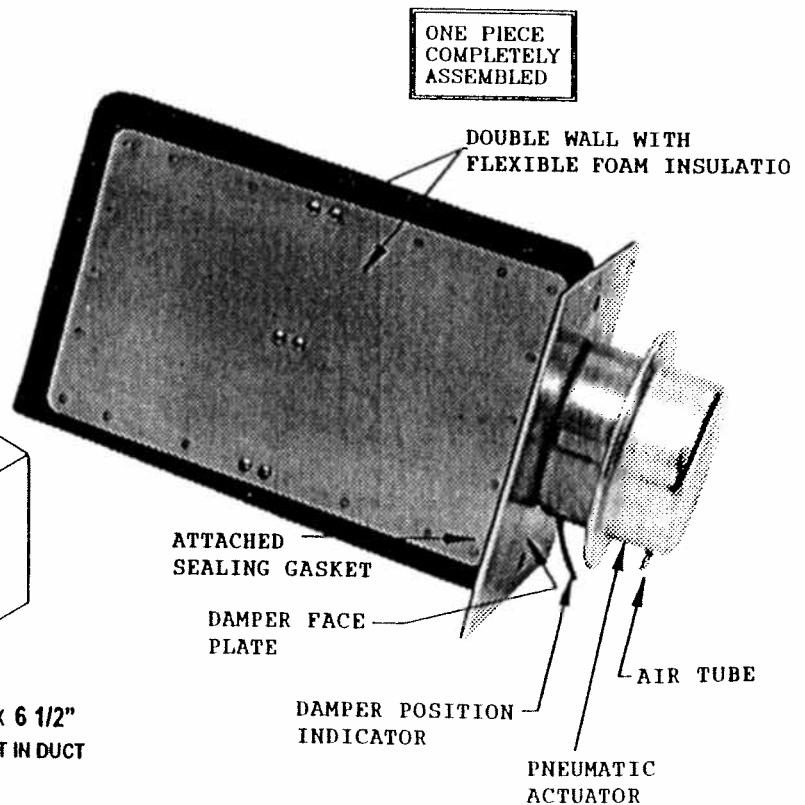
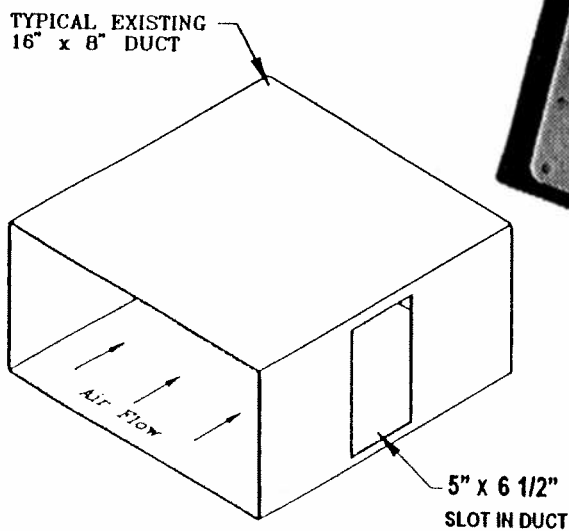


Quick Retrofit, Fast Action Blade Dampers

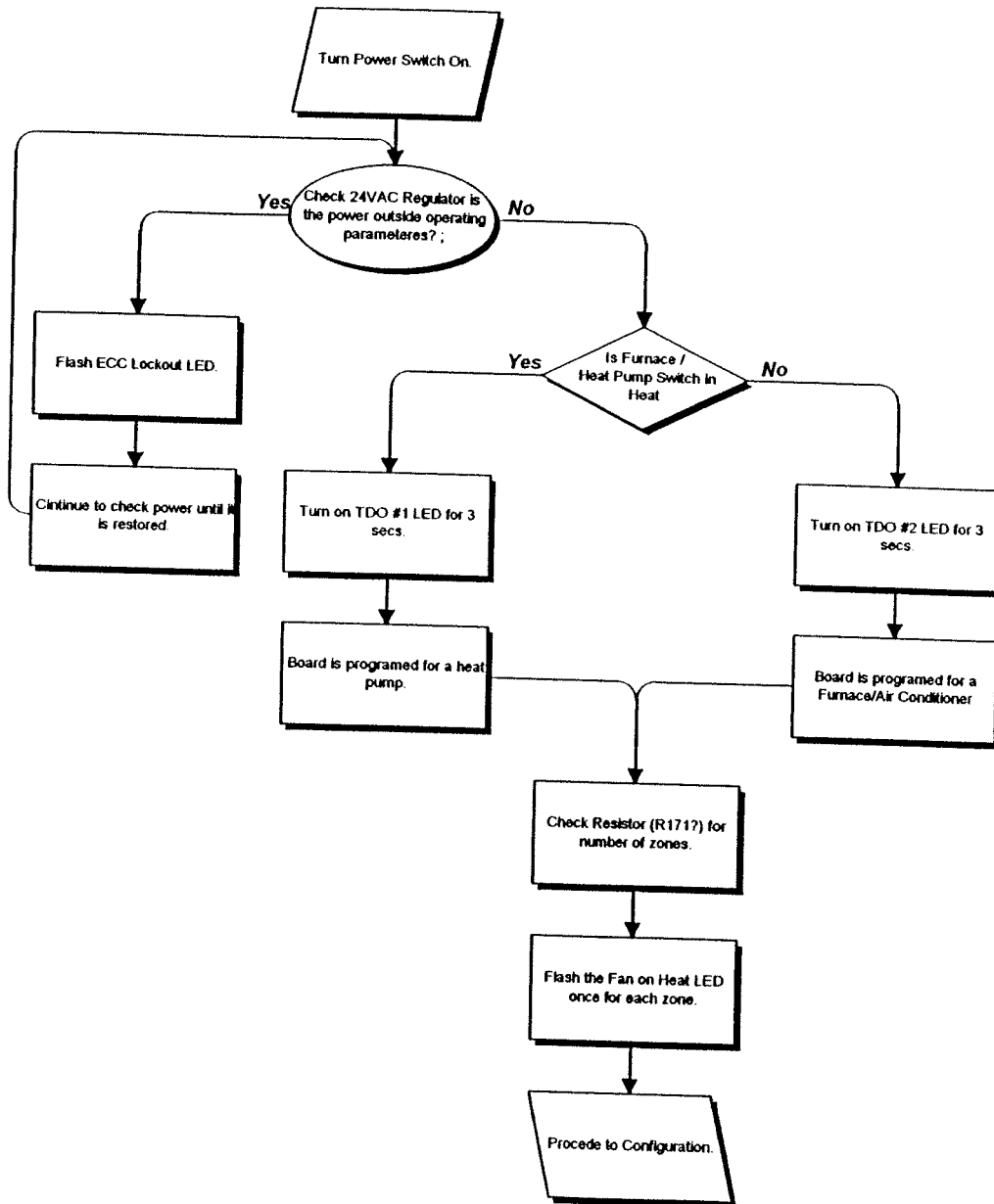
FOR SIDE & BOTTOM MOUNT DAMPERS:
CUT A 5" SLOT BY ANY REQUIRED LENGTH. LEAVE 3/4" SHEET METAL ON BOTH ENDS FOR SHEET METAL SCREW.

3-EASY STEPS TO INSTALL:

1. CUT SLOT IN DUCT
2. INSERT BLADE DAMPER ASSEMBLY
3. SCREW FACE PLATE TO DUCT



Self Test



MACRO VIEW

Arzel Theory of Operations

