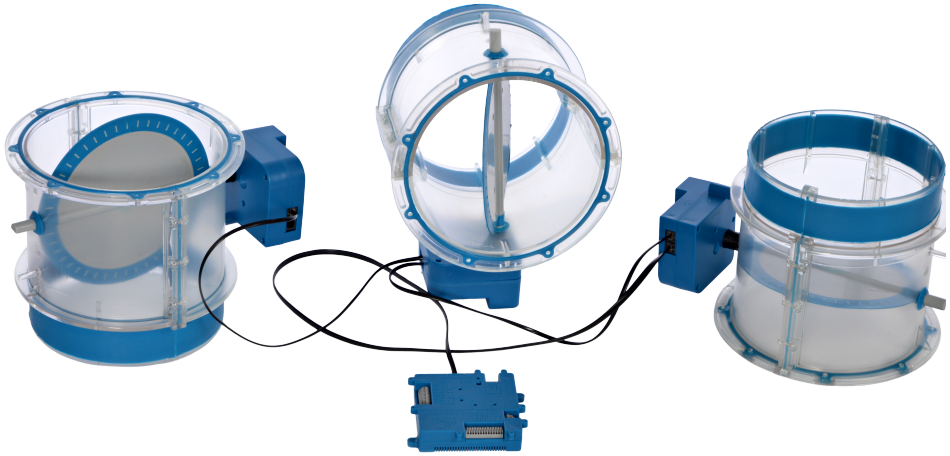
INSTALLATION INSTRUCTIONS AND HOMEOWNER'S MANUAL

Smart Zoning System



Models:
B40775 (2 zones)
B40776 (3 zones)
B40777 (4 zones)

INSTALLER / SERVICE TECHNICIAN:

USE THE INFORMATION IN THIS MANUAL FOR THE INSTALLATION AND SERVICING AND KEEP THE DOCUMENT NEAR THE UNIT FOR FUTURE REFERENCE.

HOMEOWNER:

PLEASE KEEP THIS MANUAL NEAR THE FURNACE FOR FUTURE REFERENCE.

Caution:

Do not tamper with the unit or its controls. Call a qualified service technician.

Manufactured by:

Dettson Industries Inc.
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X40241Rev.G

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1 SAFETY

1.1 Danger, Warning and Caution

The words **DANGER, WARNING and CAUTION** are used to identify the levels of seriousness of certain hazards. It is important that you understand their meaning. You will notice these words in the manual as follows:

⚠ DANGER

Immediate hazards which WILL result in death or serious bodily and/or material damage.

⚠ WARNING

Hazards or unsafe practices which CAN result in death or serious bodily and /or material damage.

⚠ CAUTION

Hazards or unsafe practices which CAN result in minor bodily and /or material damage.

1.2 Important Information

⚠ WARNING

Non-observance of the safety regulations outlined in this manual will potentially lead to consequences resulting in death, serious bodily injury and/or property damage.

⚠ WARNING

Installation and repairs performed by unqualified persons can result in hazards to them and to others. Installations must conform to local codes or, in the absence of such codes, to codes of the country having jurisdiction.
The information contained in this manual is intended for use by a qualified technician, familiar with safety procedures and who is equipped with the proper tools and test instruments.
Failure to carefully read and follow all instructions in this manual can result in death, bodily injury and/or property damage.

It is the homeowner's responsibility to engage a qualified technician for the installation and subsequent servicing of this furnace;

IMPORTANT: All local and national code requirements governing the installation of central electric heating equipment, wiring and the flue connection MUST be followed. Some of the codes that may apply are:
ANSI/NFPA 70: National Electrical Code; **CSA C22.1 or CSA C22.10**: Canadian Electrical Code Only the latest issues of these codes may be used, and are available from either:

The National Fire Protection Agency
1 Batterymarch Park
Quincy, MA 02269

or

The Canadian Standards Association
178 Rexdale Blvd.
Rexdale, Ontario M9W 1R3

2 INSTALLATION

⚠ CAUTION

ELECTRICAL SHOCK HAZARD.
Before installing or servicing, turn off electrical power to the unit. There may be more than one disconnect switch. Electrical shock can cause personal injury or death.

This zoning system is intended to work only with modulating units, as part of the HVAC in a box product. See the Smart Duct Manual (X40240) for the ductworks installation.

Installation steps:

1. Make sure the power to the furnace is off.
2. Install the assembled dampers (B40878) on the distribution box at a convenient position (see figure 2).
   - If the dampers are not already assembled, use the 6 plastic screws provided to assemble both half-damper (B40821) with the flap (B40820) installed between. Then install the actuators (B40873) onto the flap shaft, as shown in figure 1. Fix in place using the provided screw.
   - It is recommended to identify on the damper which zone it is associated with.
3. Tape and seal all other 8" knock-offs on the distribution box.
4. Wire the zoning system as shown in figure 3.
   (a) Wire the zone thermostats (R02P033, or any 2-stage thermostats) to the zoning control (B40787). The thermostat wires shoud not be bigger than 20 AWG gauge to properly fit in the connector.
   (b) Wire the zoning control to the furnace (1, 2, R, C).
   (c) Wire the zoning control to the the actuators using the provided RJ-12* connectors (A6ZZX2601-04). Each actuator may be connected from the previous one.
   (d) If the outdoor unit is installed, wire the interface board (K03081) to the furnace board using the provided RJ-11* connector (A00443). Adjust the balance point using the dip switches on the interface board (refer to the balance point adjustment table in the setup guide for the interface board, option 2 - for legacy systems)
   (e) Wire the optional ERV/HRV to the zoning control between R and ERV.
5. Secure all wiring to the zoning control using tie-wraps.
6. Install the zoning control using 2 screws on a duct nearby the furnace.
7. Turn the power on and configure the zone for each damper actuator, as per section 3.1.

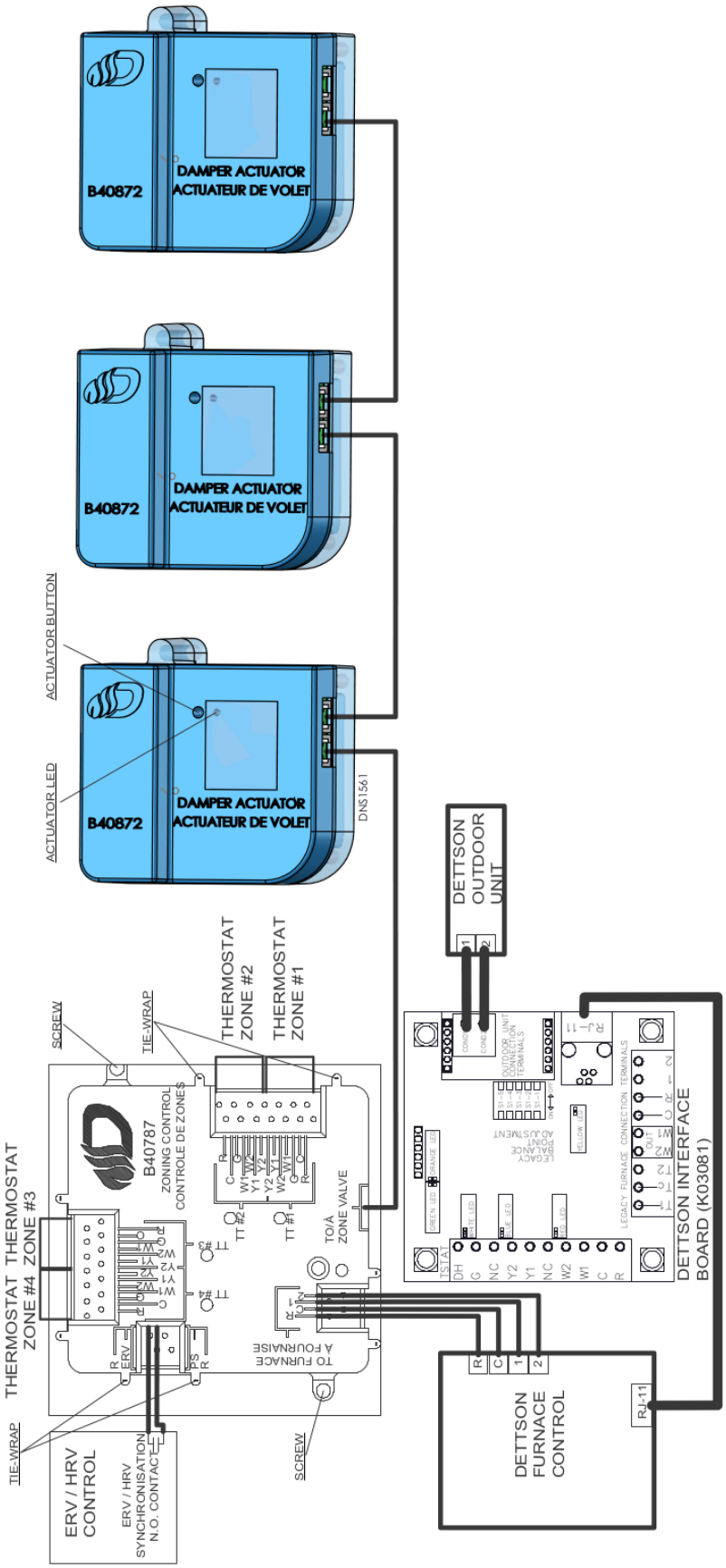
Figure 1 – Installing the actuator on the damper

Figure 2 – Dampers installed on distribution box over a Chinook

NOTE: Make sure to install all control boxes above the furnace, safe from water and moisture.

*Not standard RJ-11/RJ-12 cables. Only use provided parts.

Figure 3 – Zoning system wiring



3 CONFIGURATION

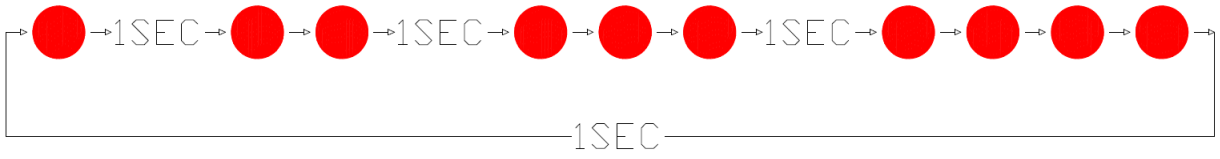
3.1 Actuator

Each actuator must be properly configured for the system to work correctly. If an actuator is not configured, its red LED will blink steadily at a rate of approximately 2.5 flashes per second.

To program the zone for the actuator:

1. Press and hold the actuator button.
2. The LED will turn off and blink a number of times corresponding to the zone numer (e.g.: The LED will blink twice for zone #2). The blinking sequence is shown in figure 4.
3. Once the desired zone number is reached (1, 2, 3 or 4), release the button.
4. The LED will repeat the registered zone number for confirmation.
5. Make sure no two actuators are programmed with the same zone number.
6. If an actuator has been programmed with the wrong zone number, repeat from step 1.

Figure 4 – Programming the zone number



3.2 Operating Mode

The zoning system allows for four different operating modes, as described in section 4.3. To change the operating mode:

1. Press and hold the button on the zoning control.
2. The Status LED should turn green and slowly blink. The four other LEDs will indicate the current operating mode, as per table 1.
3. Once the desired operating mode is shown, release the button.

The default operating mode is "Comfort".

Table 1 – Operating Mode Display

Zone #1	Zone #2	Zone #3	Zone #4	Operating Mode
Green	Green	Green	Green	Balanced
Red	Green	Green	Green	Master
Blue	Blue	Blue	Blue	Energy Saving
Red	Red	Red	Red	Comfort

3.3 Thermostats

The thermostats must be configured in *convetionnal* mode, and not in heat pump mode. The system does not use the **O** and **B** signals.

4 SYSTEM BEHAVIOUR

4.1 Requirements

Each zone must be able to handle the minimum CFM of the installed appliances. There can only be two, three or four zones and the damper actuators must be properly configured. There must not be more that 25% variation of the heating and cooling loads between the zones.

For best perfomances, the gap between the setpoints of all thermostat should be less than 4°F (2.2°C), and the deadbands should be at least of 5°F (2.8°C). Also, he thermostats should also all be in the same mode (heating or cooling).

4.2 Priorities

A second stage demand will have more priority than a first stage demand. In a three-zones system, if zone #1 calls for a first stage demand and zone #2 calls for a second stage demand, the first zone will only be half-opened, and the furnace will run at 50% of its maximum capacity. The same logic is applied for two-zones and four-zones systems.

Continuous ventilation demand is not a priority, and will only be allowed when there are no other demands. If information of the system's maximum CFM is available, the airflow will be the ratio of the number of zones calling for fan applied to half of the maximum CFM for the system. Otherwise, the airflow will be 1/6 of the maximum CFM of the appliance per demanding zone.

If the total demands in heating and cooling are equal, the priority will be:

1. Heating
2. Cooling
3. Ventilation

In order to avoid oscillating operation, there is a delay for which the system is not allowed to change the operation type (heating or cooling) after the last action. This delay varies depending on the mode of operation. During this delay, only Fan and ERV demands will be addressed.

4.3 Operating Modes

Four modes of operation are available. Table 2 shows the outcome for various scenarios.

4.3.1 Balanced Mode

Running in balanced mode (recommended) requires the equivalent of a quarter of the total demand for heating or cooling to start. If there is only a first stage demand, the unit will only fan the demanding zones.

In cooling, if not half the zones have a second stage cooling demand, the unit will fan for 30 minutes before starting to cool (F30C).

The delay before switching between heating and cooling is 2h.

Balanced mode is ideal for optimized comfort and energy savings.

4.3.2 Master Mode

Master mode works the same as the balanced mode, but zone #1 weighs for two zones. Therefore, zone #1 (master zone) will have more priority.

4.3.3 Energy Saving Mode

With the energy saving mode, heatng or cooling will only start when at least half the zones have a second stage demand. Otherwise, the unit will only fan the demanding zones.

The delay before switching between heating and cooling is 24h.

4.3.4 Comfort Mode

In comfort mode (default), all demands will be met. There will be no delay before switching between heating and cooling and there will be no 30 minutes of ventilation before cooling.

Table 2 – Operating Scenarios for a 3-Zone System

Mode	Z1	Z2	Z3	Status	Cmd.[1]	Damper 1	Damper 2	Damper 3
Balanced	Idle	Idle	Idle	Idle	0%	Opened	Opened	Opened
	W1	Idle	Idle	Fan On	17%	Opened	Closed	Closed
	W1	W1	Idle	Heating	34%	Opened	Opened	Closed
	W2	W1	W2	Heating	85%	Opened	Half-Opened	Opened
	W2	Y2	Idle	Heating	34%	Opened	Closed	Closed
	Y2	Y1	G	F30C[2]	50%	Opened	Opened	Opened
	Y2	Y2	Idle	Cooling	67%	Opened	Opened	Closed
Master	W1	W1	Idle	Heating	34%	Opened	Closed	Closed
	Y1	W2	W2	Heating	67%	Closed	Opened	Opened
	Y2	W2	W2	Cooling	34%	Opened	Closed	Closed
Saving	W1	W1	W1	Fan On	50%	Opened	Opened	Opened
	W2	W1	W1	Heating	67%	Opened	Half-Opened	Half-Opened
	Y2	Y1	Idle	Fan On	34%	Opened	Opened	Closed
	Y2	Y2	W2	F30C[2]	67%	Opened	Opened	Closed
Comfort	Idle	Y1	Idle	Cooling	34%	Closed	Opened	Closed
	W1	Idle	Idle	Heating	34%	Opened	Closed	Closed

[1]**Cmd.**: Target command to the modulating system. Will be restrained by the modulation limits of the installed equipment.

[2]**F30C**: Fan On 30 minutes before cooling.

5 TROUBLESHOOTING

If a zone damper does not seem to respond correctly to demands, or if air does not flow to the right zone, assert that the zone number was properly programmed in the actuator (see section 3.1).

If the red LED on a damper actuator is blinking steadily (between 2 and 5 times per second), the zone number is not programmed. If it blinks irregularly and at the same time for all zones, it means the actuator is communicating properly. If it never turns on, either it is not communicating or it is not powered and the wiring should be verified.

To make sure the actuator functions properly, doing a power cycle may be helpful. Once the power is restored, each actuator will blink to indicate its programmed zone number and each one will, turn by turn, fully open and close.

If the interface board (K03081) is connected, the blue LED on the interface board will be turned ON when connected to the zoning system. This indicates good communication between the control boards.

Table 3 defines the various states of the LEDs on the zoning control, which can be helpful for troubleshooting.

Table 3 – LED status

LED	Color	Blinking	Status
Main	Off	-	The board is not powered
	Green	No	Idle - No command
	Green	Yes	Mode configuration (Button pushed)
	Red	No	Auxiliary Heat
	Red	Yes	Heating
	Blue	No	Cooling
	Blue	Yes	Fan 30 minutes before cooling
	Yellow	No	Continuous Fan
	Yellow	Yes	Ventilation for delay between heating and cooling or ERV
	White	No	No communication with the furnace
	Magenta	Yes	All zones stuck closed
Zone	Off	-	The zone is offline
	Green	No	Idle - No command
	Red	Yes	Call for first stage heating (W1)
	Red	No	Call for second stage heating (W2)
	Blue	Yes	Call for first stage cooling (Y1)
	Blue	No	Call for second stage cooling (Y2)
	Yellow	No	Call for ventilation (G)
	Magenta	Yes	Damper stuck closed

6 REPAIR PARTS

Table 4 – Repair Parts List

Part Number	Description
A6ZZX2601-04	Zoning wire (RJ-12) 4’
A6ZZX2601-15	Zoning wire (RJ-12) 15’
B40765	Plastic damper assembly
B40767	Damper and actuator assembly
B40872	Actuator in a box
B40787	Zoning control in a box
B40878-01	Distribution box Chinook 15-30-45
B40878-02	Distribution box Chinook 60-75
B40878-03	Distribution box Compact
B40878-04	Distribution box Supreme
R02P033	2-stage WiFi Thermostat

⚠ CAUTION

Only use approved official replacement parts. The replacement parts, including the wires, are not standard and cannot be replaced by an unofficial equivalent.