ECON-ZIP-BASE

ZIP Economizer™ Base Module

BELIMO

71413-00001_F

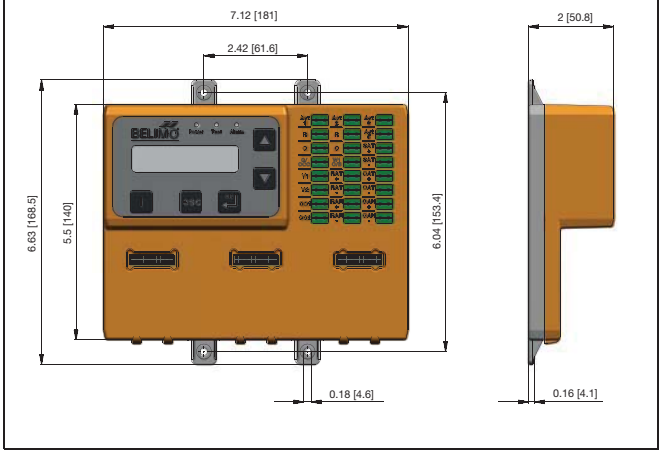
MOUNTING INSTRUCTION

5 YEAR WARRANTY

Technical Data

Power supply	24 VAC ± 20%, 50/60 Hz; Class 2 power source
Power consumption rating*	4 VA base control (ECON-ZIP-BASE)
	5.5 VA base control with Energy Module (ECON-ZIP-BASE + ECON-ZIP-EM)
	5 VA base control with Communication Module (ECON-ZIP-BASE + ECON-ZIP-COM)
	6.5 VA base with Energy Module and Communication Module. (ECON-ZIP-BASE + ECON-ZIP-EM + ECON-ZIP-COM)
Rated impulse voltage	330V
Connectors	¼" male spade connectors
Environmental	RoHS, conformally coated
Software class	A
Control pollution degree	3
Temperature input signal	NTC 10 kΩ, Type II
Humidity	5 to 95% RH non-condensing
Humidity input signal	0-10 VDC; corresponds to 0 to 100%
Housing	NEMA 1
Housing material	UL94-5VA
Ambient temperature range	-40°F to +158°F (-40°C to +70°C)
Storage temperature range	-40°F to +176°F (-40°C to +80°C)
Display	2x16 character LCD; LED backlight; transflective
Display op. range**	-22°F to +176°F (-30°C to +80°C)
Agency listing	cULus acc. to UL873, CAN/CSA C22.2, No. 24-93
Energy code compliant	ASHRAE 90.1, CA Title 24, NECB

Dimensions (Inches [mm])



Installation

You can mount the ZIP Economizer in any orientation; it is recommended that you mount it in a position that will allow full utilization of the LCD and key pad and proper clearance for nstallation, servicing, wiring, and removal.

Take the overall dimensions of 6.63" [168.5] x 7.12" [181] x 2" [50.8]and mount in the interior of the RTU in a convenient location that you can access. Secure the ZIP utilizing #8 self-tapping screws (included). A minumum of two tabs need to be secured, one which is a top tab. Ideally secure all four tabs. Wire the electrical connection using ¼" female insulated spade connectors to prevent corrosion.

Input/Output Specifications

Type	Name	Description	Electrical Specification
Input	R	Supply Hot	24 VAC, ± 20%, 50/60Hz
Input	G/OCC	Fan Signal (occupied)	On/Off, 24 VAC, ± 20%, 50/60Hz
Input	C	Supply Common	Common
Input	Y1	Cooling requirement Stage 1	On/Off, 24 VAC, ± 20%, 50/60Hz
Input	Y2	Cooling requirement Stage 2	On/Off, 24 VAC, ± 20%, 50/60Hz
Input	W1/ O/B	Heating requirement Stage 1	On/Off, 24 VAC, ± 20%, 50/60Hz
Input	SAT ±	Supply Air Temperature Sensor	Type: 10K NTC (Type II thermistor)
Input	OAT ±	Outdoor Air Temperature	Type: 10K NTC (Type II thermistor)
Input	OAH ±	Outdoor Air Humidity	0-10 VDC Auto Detection: Sensor present if voltage 0.5V-10V
Input	RAT ±	Return Air Temperature	Type: 10K NTC (Type II thermistor)
Input	RAH ±	Return Air Humidity	0-10 VDC Auto Detection: Sensor present if voltage 0.5V-10V
Output	CC1	Compressor 1 RTU Stage 1 Mechanical Cooling Circuitry	100'000 cycles @ inrush current of 3A, normal current 1.5A Impedance for Auto detection @ 24 V: <600 Ω @ 60Hz <800 Ω @ 50Hz
Output	CC2	Compressor 2 RTU Stage 2 Mechanical Cooling Circuitry	100'000 cycles @ inrush current of 3A, normal current 1.5A Impedance for Auto detection @ 24 V: <600 Ω @ 60Hz <800 Ω @ 50Hz
Output	Act 1	Actuator supply common	Common
Output	Act 2	Actuator supply hot	24 VAC, 50/60Hz
Output	Act 3	Actuator control output	2-10 VDC
Input	Act 5	Actuator feedback signal	2-10 VDC

* The power consumption is for the control only and does not include connected loads such as actuator, compressors, fans, and sensors. For transfomer sizing, the power consumption of these attached components must be included.

** At low temperature the display has decreased response time. Below -22°F [-30°C] it will not function.

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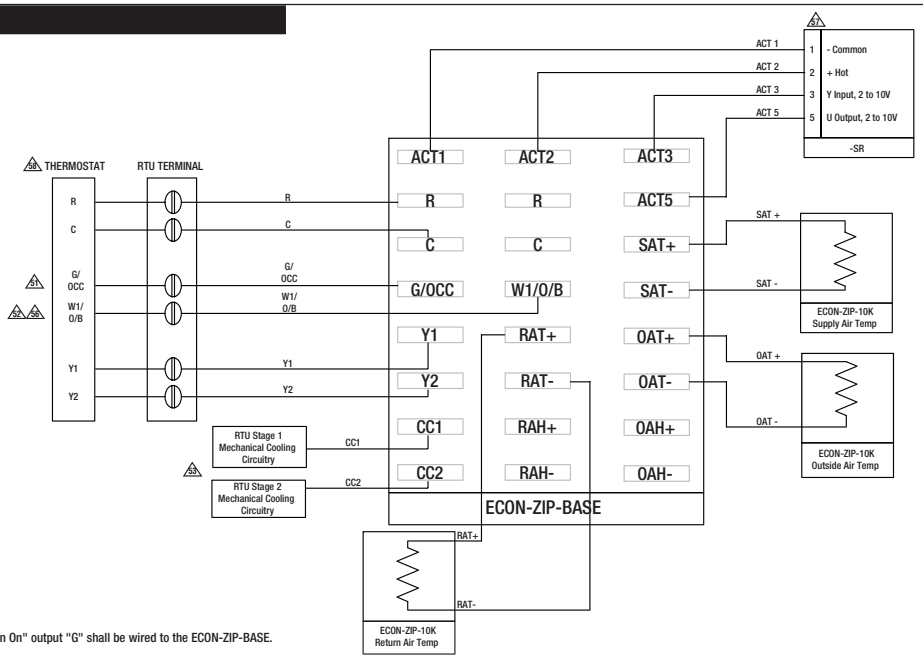
Wiring Diagrams

Differential Dry Bulb



50 Power source should be the same as ECON-ZIP-BASE.

51 When the thermostat is not equipped with occupancy control, "Fan On" output "G" shall be wired to the ECON-ZIP-BASE.

52 W1 must be wired for Heat Pump operation if conventional thermostat is used in conjunction with Defrost Board.
If Thermostat and RTU use O/B control reversing valve position, O/B must be wired to W1 on ECON-ZIP-BASE.

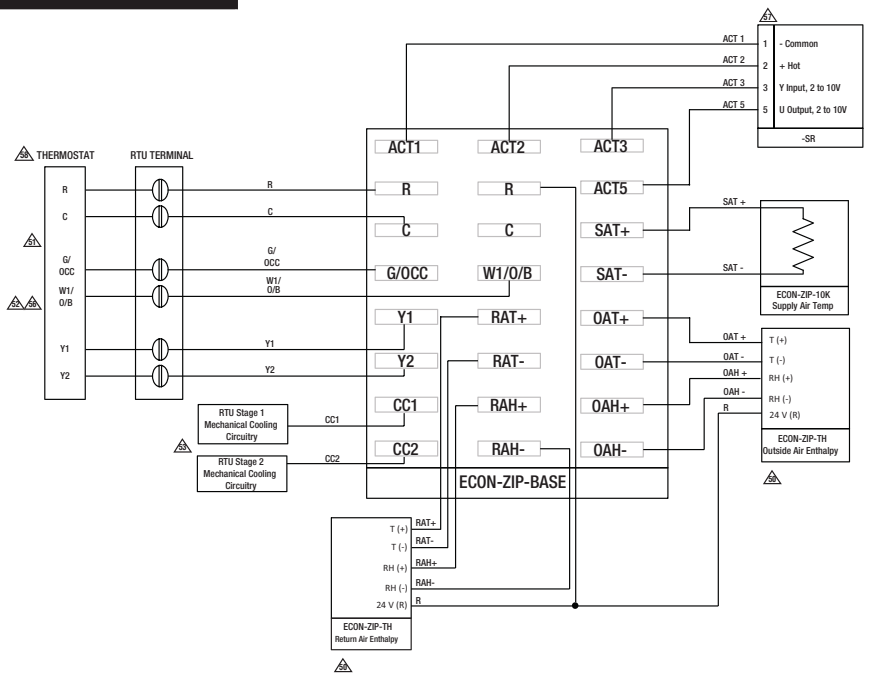
53 Existing refrigeration safety devices may exist, consult RTU wiring diagram

56 If RTU is not a Heat Pump using a conventional thermostat and it is desired to record heating operation hours, connect W1 to ECON-ZIP-BASE.

57 Actuators can be mounted in parallel with the ACT3 output from the ZIP Economizer. The ACT5 feedback input should be wired to the Outside Air damper actuator feedback wire.

58 Thermostat with two (2) stages of cooling required. Thermostats with mercury switches are not compatible with the ZIP Economizer.

Differential Enthalpy



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Quick Setup

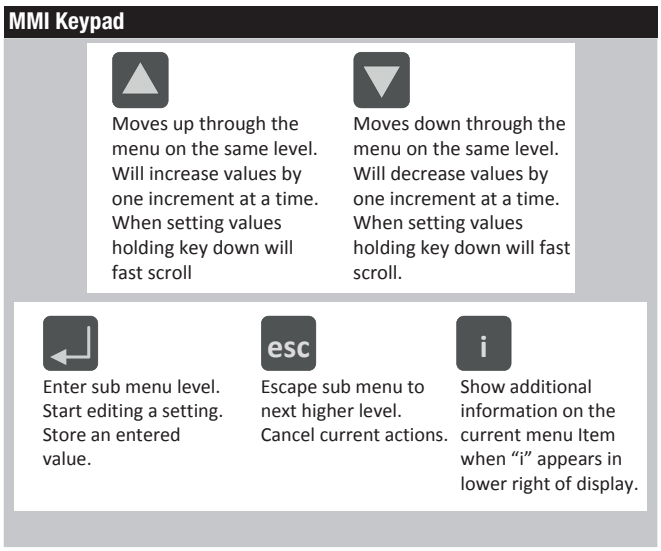
WARNING Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

Installation

1. Shut off power to RTU before beginning installation.
2. Note orientation, opening rotation, and spring return rotation of damper assembly. Mount Actuator to Outside Air and Return Damper assembly. To ensure tight outside air shutoff; while tightening actuator clamp push damper closed.
3. Terminate required Inputs and Outputs(I/O): For the ZIP Economizer to function correctly, the following I/O, at a minimum, are required to be terminated, wired, and functioning (R, C, Y1, Y2, G, CC1, OAT, SAT, ACT1, ACT2, ACT3, ACT5). See wiring diagrams.
4. Sensor configuation: The ZIP Economizer automatically detects sensors attached and automatically configures for single dry bulb, single enthalpy, differential dry bulb and differential enthalpy.

MMI Keypad



Settings

"Settings" is the menu displayed when the ZIP Economizer is first powered. Press "OK" to parameterize required settings. Reference above Keypad Key definition instructions and navigate as needed.

Functions

1. "Monitor Live Conditions" is used to display settings and live values.
2. "Settings" is used to parameterize the ZIP Economizer. (Note: Devices 1 is for CC1, CC2, EF, IF; Devices 2 is for OAH, RAH)
3. "Present Devices" is used to verify that the ZIP Economizer's Auto Detected connections are terminated properly. If connected device is not shown, verify wiring. If wiring has continuity and device is verified operational re-enter "Settings" and enable missing device by changing from "Auto" to "Available" or "Installed".
4. "Alarms" is used to view current and historical alarms and delete inadvertently caused alarms.
5. "Service and Commissioning" submenu is used to operate the RTU in "Manual Mode" or to perform "Acceptance Test". "Settings" must to be completed to access.
6. "Status" is a display of the current operating mode. It can be accessed by pressing "esc". The action of pressing any key will drop the user down from Status to the next level, so repeatedly pressing "esc" will toggle the display between Status and Monitor Live Conditions. **(Note: If status "Setup incomplete" is displayed the RTU cooling operation will be disabled and additional parameters must be set to achieve "Setup complete".)**

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Quick Setup

Required "Settings" Parameters for All Configurations

Note: you may enter parameters in any order - eg: Vent min Pos before ZIP Code - If the RTU is a heat pump or uses a 2 speed indoor fan, these paramaters should be enabled first, otherwise the logic may go to Setup Complete prematurely.

1. ZIP Code US or Canada (sets the free cooling changeover high limit and temperature units F/C)
   a. When the Zip Code submenu is displayed enter "OK" to begin "US" Zip Code parameterization. If "Canada" Postal Code is desired press the up/down arrow to access.
      i. Press OK to access digit 1 (flashing) then use the up/down arrow to parameterize; enter OK when complete. Repeat until all digits are complete. If a mistake is made press "esc" and repeat from beginning

      ii. When all Zip Code or Postal Code digits are entered press "esc" to move up a level then press the up/down arrow to access next settings parameter.
2. Vent Min Pos (Outdoor Air Damper Ventilation Minimum Position)
   a. When the "Vent Min Pos" submenu is displayed press "OK" to parameterize (flashing).

   b. Use the up/down arrow to parameterize, press "OK" when complete. The actuator will immediately drive the damper to the minimum position.
3. Additional Parameters may require setting. The ZIP Economizer will auto-detect added Devices such as a CO2 sensor etc. When the ZIP Economizer detects a new device, it will prompt the user in the Status level; navigate to Settings and parameterize blank fields. If the devices are connected upon first start up their settings will require parameterization then.
4. When all parameters have been set, the ZIP Economizer will show "Setup Complete" if there are still parameters to set, there will be no action. You can verify by pushing esc until status level is reached and it will display "Setup Incomplete". If this is the case, re-enter settings menu and use up down arrows to find the parameter with blank fields and parameterize as described above.

Setup Complete - Initializing Automatic Mode

1. When all entries have been completed, the ZIP Economizer will switch to Status display and show "Setup Complete", and will immediately show a "Damper scaling starts in 10secs" and will countdown to 0 (**be aware, at 0 the damper will start to move at high speed**) . A message will scroll saying "Damper scaling for better operation if obstruction is present rescale damper in commissioning menu". (For detailed instructions on this – please see the section "Service and Commissioning" below. This will open damper to 100% (re-scale control signal if needed). (Note: failure to identify obstructions or improper setup of damper assembly may result in an improper scaling and operation of the damper.)

   Once scaling is complete, a message will appear saying "Damper scaling successful". The ZIP will then show "maximum at 80° = 100%" That message will show maximum rotation of the damper. This process ensures the damper is always operating and displayed from 0-100%.
2. Once the message has appeared, the actuator immediately closes the damper and a countdown begins, until the unit starts to operate in Automatic Mode **(be aware, when countdown complete, the RTU will respond to thermostat calls which may enable mechanical cooling).**

Service and Commissioning (Acceptance Test & Manual Mode)

The ZIP Economizer has built in commissioning processes found in Acceptance Test.

1. **Economizer Test.** Use "Economizer Test" to verify RTU Integrated Economizer operation. Navigate to the "Service and Commissioning" menu, press "OK"; press the down arrow to access "Acceptance Test". Press OK again when "Economizer Test" appears. Press "OK" again to confirm running test. Follow prompts during test. This test will open damper to 100%, enable power exhaust fan (if connected), enable 1st stage of Mechanical Cooling, reverse this process and then drive to Vent Min Position. When used with a Belimo actuator, the actuator will speed up to reduce test time.
2. **Manual Mode** is used to override outputs after entering a "Timeout" duration.
3. **Damper Scaling.** The test will re-scale the control signal range to maximum resolution (0-100%) over the calibrated (reduced) angle. When using a Belimo actuator, the actuator will speed up to reduce test time.

Note: Failure to identify obstructions or improper setup of damper assembly may result in an improper scaling and operation of the damper.)

Note: Additional testing can be found on page 36 of this document.

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