

Retrozone Belimo LMB24 to Enerstat, Young, Jackson, Retrozone, Enerzone, Lennox and other compatible dampers using a Hansen Synchron two wire motor. Above names are trademarked property

Instructions for LMB24-Kit4 3150 motor upgrade kit.

Note: This kit replaces only the Synchron motor with the specific output shaft shown below. Do not order this kit until you have removed a motor to insure it has the exact output shaft (with cross pin) shown in photo.

1. After removing old motor, mount new shaft on damper as illustrated in the middle picture. Take care to place brackets where shown to avoid self-tapping screws from interfering with internal damper mechanisms .
2. If damper can be removed, then remove the spring from inside of the damper since it is no longer needed, although it can be left in place.



3. Make sure new shaft can be rotated easily. Note with marker where the fully open and fully closed positions will be. Please also note that the retainer strap (part with holes) should apply little or no pressure on the new damper shaft; its purpose is simply to keep shaft secured to damper.
4. Note the black, rectangular push button clutch on the new Belimo LMB motor. Push clutch in and rotate motor to its fully close position, and mount on new damper shaft. Note where anti-rotation bracket should be placed, mark position, and mount anti-rotation bracket (part with two holes).
5. Mount LMB motor in place, with both motor and damper is closed position. Motor should be mounted “loose” where it does not bind when traveling. Test this by depressing clutch and manually rotating damper from fully open to fully closed. If any binding is felt, remount motor and or components until damper moves with no binding.
6. **VERY IMPORTANT:** Rotate damper to fully open position using manual clutch. Then, with phillips head screwdriver, move motor travel adjustment blocks to stop the motor from further travel. **DAMAGE** can occur to the damper if the powerful motor is allowed to exert full force beyond the travel range of the damper.
7. Refer to zone control specific information on your system for electrical hook-ups, However:
 - A. If you are hooking up the three wire Belimo LMB motor to a zone control panel that provides only two damper outputs for spring return dampers, go to Retrozone.com and under “ technical resources” find the document “ Converting a 2 wire zone control board to operate a 3 wire damper’.
 - B. If your zone panel has an unused third output, simply add a third wire. Common hook-ups to the Belimo motor are:

Zone board damper outputs Belimo LMB motor terminals

M1	1
M2	
M4	2
M6	3

OR

COM	1
NO (Normally open)	2
NC (normally closed)	3

Title: ***Converting a 2 wire zone control board to operate a Belimo LMB 3wire damper***

Warning: Consult and use only a qualified electrician and verify that only 24vac low voltage is being tested. Do not proceed if any doubt exists on the following instructions since damage to system parts, especially transformer, and loss of HVAC operation can result. Always disconnect power before performing any wiring changes. Call Retrozone during normal business hours for technical assistance. Retrozone can provide at nominal cost and R4 interposing relay assembly that eliminates the need for the following instructions, and allows 3 wire damper operation from a two wire damper output.

Method 1.

If your previous 2 wire motor was connected to a board that only has two damper outputs: the LMB 24 Motor can be used by connecting 24vac common to motor terminal 1, 24vac + to terminal 2 (this is not one of the two existing damper outputs on the board) and then the “switched” leg of 24vac (is one of the two damper outputs on board) to terminal 3. A voltage meter may be needed to accomplish this,

since the terminals may not be marked. Essentially, terminal 1 to motor must be the 24vac common, while both terminals 2 and 3 must be the other, and same, "leg" of the transformer. Before hooking up the three wires to the damper motor, check to see that 24vac exists full time between wire 1 and 2, and is switched (as damper is commanded open and closed by zone controller) between 1 and 3. If you fail to get a clean reading from 24 to 28 volts ac, between 1 and 2 full time AND and 1 and 3 (when damper should close), the legs are likely mis-identified and you should not hook up damper motor.

Note 1. :

Command the damper to "close" by turning that zone's thermostat "off" while at the same time making another thermostat call for air, you should then clearly read 24-28 volts on the two damper outputs.

How this works electrically: The Belimo LMB motor is unique in that it can be wired in this manner: Full time 24 vac to terminals 1 and 2, with terminal 3 being used as "signal" voltage: when power is placed on 3, the damper closes, when power is removed from 3, the damper opens (and you can reverse this action by moving the round 0 and 1 switch on the face of the motor).

Alternate Method for connecting Belimo LMB 3 wire power open/power close motor to a zone control panel with only two damper outputs (set up to only use 2 wire spring return dampers):

Note: On zone control boards with just two damper output terminals, one of the damper output terminals is 24VAC common, the other terminal is the 24vac + "switched" leg of the transformer. The goal is to identify the two terminals, as well as the full time "hot" + wire, to enable proper operation of the 3 wire Belimo LMB 24 volt motor.

1. Find the the 24vac low voltage terminals where the main 24vac transformer connects to the zone control board. You should read a continuous 24-28 volts vac on these two main power supply terminals.
2. Turn all thermostats to the "off position. This should cause all dampers to open. Little or no voltage should be present, when using a meter, between the two damper output terminals. Verify this is correct.
3. With one meter probe on one of the main power supply terminals, test the two transformer input connections and the two damper outputs for 24-28volts AC. You should find 24-28 volts only on one pair of the transformer and damper output terminals. When you find 24vac, carefully note which two terminals:
 - 3a. On the transformers inputs, this will likely be the 24vac + Hot leg of transformer, and this will go to terminal 2 on the Belimo LMB motor
 - 3b. On the damper output terminals, the other terminal (where you found 24vac with your meter) will likely be the 24vac "common" leg of transformer, and this will go to terminal 1 on the Belimo LMB motor.
 - 3c. The opposite damper output terminal should be the 24 vac + "hot" switched leg of transformer, this will go to terminal 3 on Belimo LMB damper motor.
4. With 24vac power disconnected, connect these three wires to zone control board, and carefully label wires 1,2, and 3 as shown above, but DO NOT connect to damper motor until wiring is verified.
5. With voltage meter, test three wires as follows:
 - a. terminals 1 and 2 should show 24/28 volts all the time.
 - b. terminals 1 and 3 should show little or no voltage(assuming thermostats are still turned to off position).
 - c. terminals 2 and 3 should show little or no voltage.
6. Now Turn on a thermostat on any other zone, in order to cause the damper/zone you are working on to provide power to close the damper (which is still not connected). Now:
 - a. terminals 1 and 2 should still show 24/28 volts all the time.

- b. terminals 1 and 3 should show 24/28 volts.
- c. terminals 2 and 3 should show little or no voltage (since you should be reading same + leg of transformer.
- d. STOP if the above readings are not clear to you, and consult factory. If wiring checks out as described, carefully wire new Belimo LMB motor and test.

Confused? Unsure? STOP! you can order an R4 interposing relay from Retrozone, which eliminates any need to identify the above wires. This small relay wires into the the two wire damper output, and then provides three wires to operate damper. Polarity then no longer matters.