

## **Damper Control Without Electronic Bypass**

This application note describes a way to control the damper and prevent the drive from running in Hand or Auto modes unless the damper is open. Additional parts needed are: a three pole switch (to select Hand or Auto mode-called the HOA switch), a two pole normally open switch (closes when damper is open-called the damper end switch) and a 24 Vdc relay (for damper control - called damper relay).

What is done in this situation is to have the damper end switch provide the drive enable signal. The damper is controlled by the drive relay in Auto mode and by the HOA (hand/off/auto) switch in Hand mode. The HOA switch will be used with the Hand and Auto buttons on the drive keypad.

### **Wiring**

The three pole switch's common terminal should be wired to 24 Vdc which is terminal 22 on the Affinity or terminal 4 on the H300. The contact that closes when the switch is in the Auto position should be wired to the run input which is terminal 26 on the Affinity or terminal 24 on H300. The contact that closes when the switch is in the Hand position should be wired to one side of the 24 Vdc relay that opens the damper; this is the same for both the Affinity and H300 drives. The 24 Vdc relay that will open the damper will have two wires attached to one side, the same side that the wire from the Hand contact on the HOA switch is connected to should also be connected to drive terminal 42 on the Affinity or terminal 44 on the H300. The other side of the 24 vdc relay should go to terminal 11 on the Affinity or terminal 9 on the H300. The two pole switch should be mounted so it is closed when the damper is open and it should be wired to terminals 22 and 31 on the Affinity or terminals 4 and 29 on the H300. The next bit of wiring is a jumper wire that needs to be installed between terminals 22 and 41 on the Affinity or terminals 4 and 41 on the H300. The contacts on the 24 Vdc relay should be used as a switch to open the damper (when the 24 Vdc relay is active the damper is open). Refer to the appropriate attached schematic for detailed info. The analog input for Auto mode should be wired to terminals 7 (signal) and 11 (0 V com) on the Affinity. On the H300 the analog input should be wired to terminals 6 (signal) and 4 (0 V com).

### **Programming**

Assuming the motor data has already been entered the only parameter changes that need to made are to program the drive relay so it closes when the drive receives a run command in Auto mode and setting up the analog input for auto mode. For an Affinity set Pr 8.27 to 8.03 press reset, set Pr 7.10 to 0.00, Pr 7.14 to 1.36 then press reset, now set the mode in Pr 7.11 (set to VOLT for 0-10 vdc or 4-20 for a 4 mA-20 mA signal) now save the parameters. For a H300 set Pr 8.027 to 8.003 press reset, set Pr 7.010 to 00.000, Pr 7.014 to 1.036 press reset, now set the mode in Pr 7.011 (set to VOLT for 0-10 Vdc or 4-20 for a 4 mA - 20 mA signal) now save the parameters.

### Operation

Once power is applied Hand or Auto mode needs to be selected on the drive keypad. The mode must be set first on the drive keypad. After selecting Hand or Auto on the drive keypad then select Hand or Auto on the three pole HOA switch. It is important that the mode is selected on the keypad first then on the HOA switch and the selection must match (if Hand is selected on the keypad Hand must also be selected on the HOA switch).

If Auto mode is selected, once the damper opens the drive will be enabled and the motor will start to turn. If the damper closes the drive will lose its enable signal and the drive will coast to a stop.

If Hand mode is selected the damper will open and once it's open the end switch will enable the drive. Once the drive is enabled you can then press Hand (green button) on the drive keypad to start the motor and the red button will stop it and the up and down arrow will adjust the speed, again if the damper closes and the end switch opens the motor will coast to a stop. You must wait for the damper to open before pressing the HAND button on the keypad, the top line of the drives display will display "inh" on the Affinity and "inhibit" on the H300 until the drive is enabled, once the enable signal is received the display will read Off (both the H300 and Affinity).

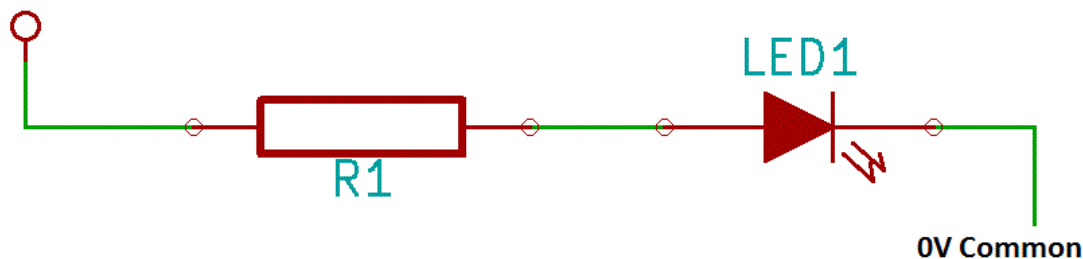
See below for info on adding an LED to show when the damper is open and the drive is ready to run.

The damper should remain open until the HOA switch is placed back into its "off" position.

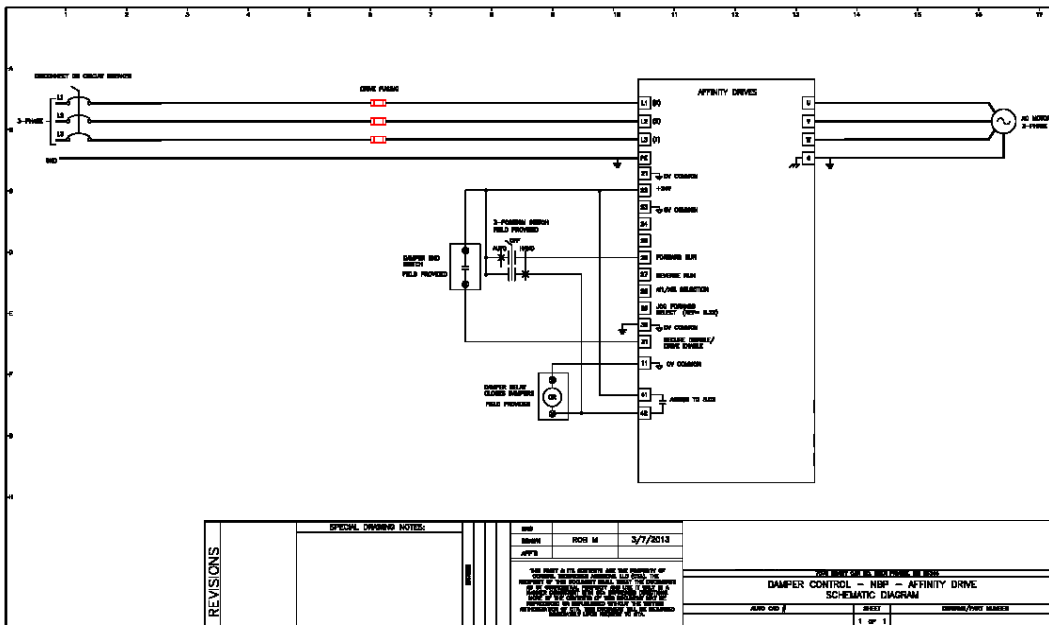
### Optional Status LED

It may be helpful to install an LED on one of the drive outputs to signal that the damper has opened and the drive is enabled and ready to run. Additional parts needed are: a LED and a 1K 1/4W resistor. The resistor and LED should be wired per the drawing below. The Affinity drive output terminal is terminal 24 and the 0 V common terminal is 21. To program the Affinity output set Pr 8.21 to 6.29, press reset then save. The H300 drive output terminal is terminal 22 and the 0 V common terminal is 21. To program the H300 output set Pr 8.021 to 6.029, press reset then save.

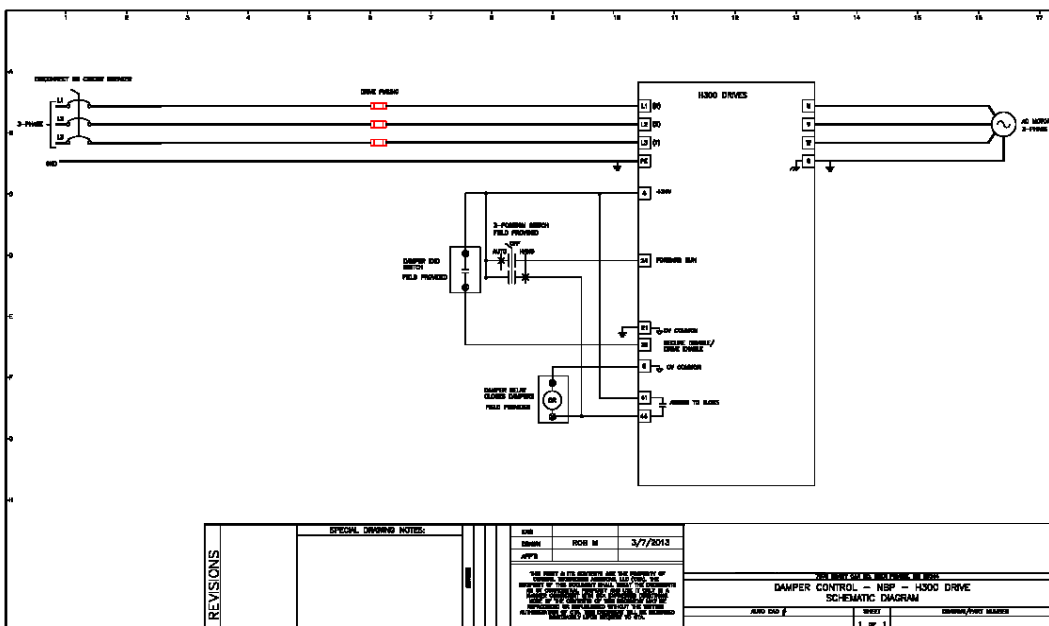
#### Drive Output Terminal



### DAMPER CONTROL\_NBP\_AFFINITY DRIVE (schematic)



### DAMPER CONTROL\_NBP\_H300 DRIVE (schematic)



**Resources:** can be found on our website: [www.controltechniques.com](http://www.controltechniques.com)

For help contact techsupport.cta@mail.nidec.com, or call Technical Support at 952-995-8000, 24/7/365