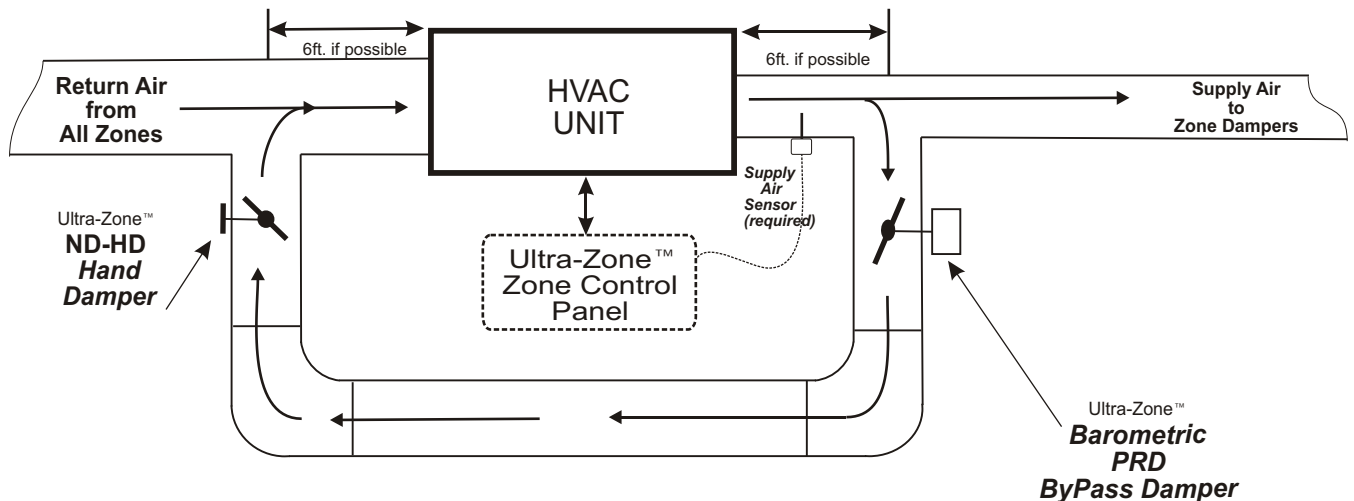


### GENERAL DESCRIPTION

The model PRD Pressure Regulating Bypass Dampers are a single blade rectangular barometric damper assembly with a counter balanced weighted arm. The barometric bypass damper is an economical way to manage the duct static pressure when zone dampers close. Bypass Damper adjustment is achieved by off-setting the hex shaped arm, securing weight #1 towards the bottom of that arm and moving the extra weight(s) (optional) up or down the arm, until the desired action is achieved. Additional weights can be added if necessary. See Page 3 for details. The damper can be mounted to relieve static pressure by returning the air back to the return air duct or by dumping it into a non-critical conditioned area. *A restricting hand damper (part# ND-HD) should be installed downstream of the PRD by-pass damper, which allows the installer to set the desired pressure drop across the bypass duct, thereby controlling how much by-pass air mixes with the return air. See Application Note 090376A0169 rev F.* Together, the PRD and ND-HD are an effective low cost bypass solution, for any residential zoned HVAC system.



**Note:** This drawing of the Bypass damper, Hand Damper, Static Pressure control and Related duct work is intended to serve only as a guide. Your actual duct work layout and components may differ. Use the graphic as a guide when planning or designing a Zone system regardless of the Equipment type, Duct layout and Airflow configuration.

**Use the Cfm table provided below to size your bypass damper using the guideline provided on page 4. Use the 1400 Fpm column to achieve smaller bypass runs at higher velocities. Use the 900Fpm column if you have the space to accommodate a large bypass run at a nominal velocity.**

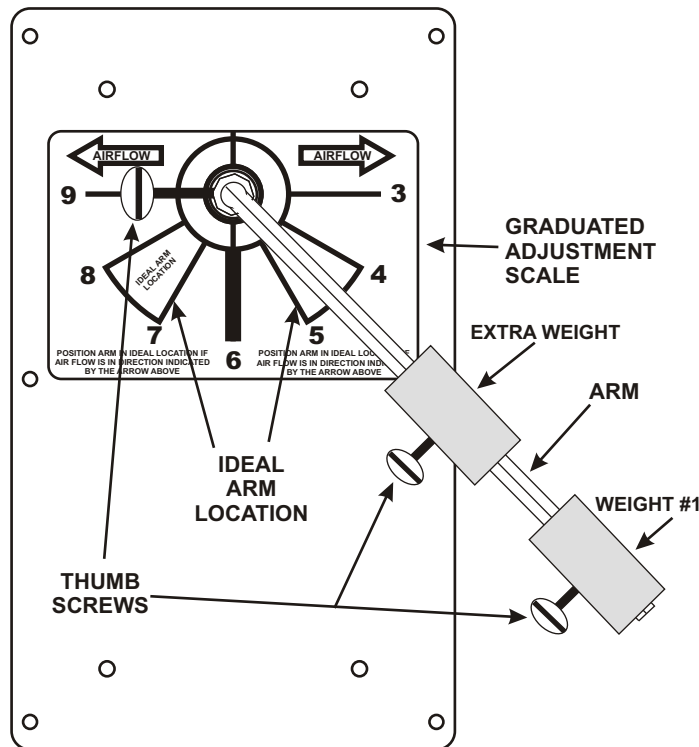
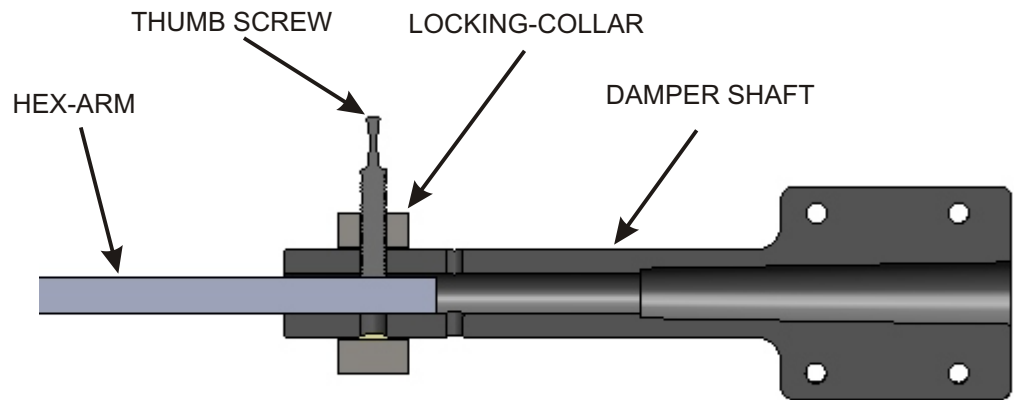
MODEL #	SIZE	# WEIGHTS	BYPASS Cfm*	BYPASS Cfm*
PRD 12 x 8	12" x 8"	2	560 Cfm	850 Cfm
PRD 12 x 10	12" x 10"	2	700 Cfm	1100 Cfm
PRD 12 x 12	12" x 12"	2	825 Cfm	1300 Cfm
PRD 20 x 8	20" x 8"	2	900 Cfm	1300 Cfm
PRD 20 x 10	20" x 10"	3	1125 Cfm	1750 Cfm
PRD 20 x 12	20" x 12"	3	1375 Cfm	2000 Cfm

\* CFM @ 900Fpm (.15"wc friction loss)      \* CFM @ 1400Fpm (.3"wc friction loss)

# BAROMETRIC BYPASS DAMPER

## Installation & Assembly of the PRD and Weighted Arm Assembly

- 1 - Install the bypass damper into the bypass duct by cutting a rectangular 4.25" opening on the side of the rectangular bypass duct, that allows the proper direction of airflow AND allows access to the weighted hex arm assembly for setup and adjustments. Select a level and stable location that is closer to the Supply Plenum, rather than the Return plenum.
- 2 - Slide the locking-collar over the damper shaft and insert the hex arm into the damper shaft.
- 3 - Align the locking-collar thumb screw with one of the 4 available holes on the damper shaft, while holding the hex arm at the desired angle. See page 3.
- 4 - Tighten the thumb screw securing the hex arm at the desired angle.
- 5 - Position each weight on the hex arm and tighten the thumb screw(s) to secure the weight(s) in place.
- 6 - Refer to the other pages for additional guidance.



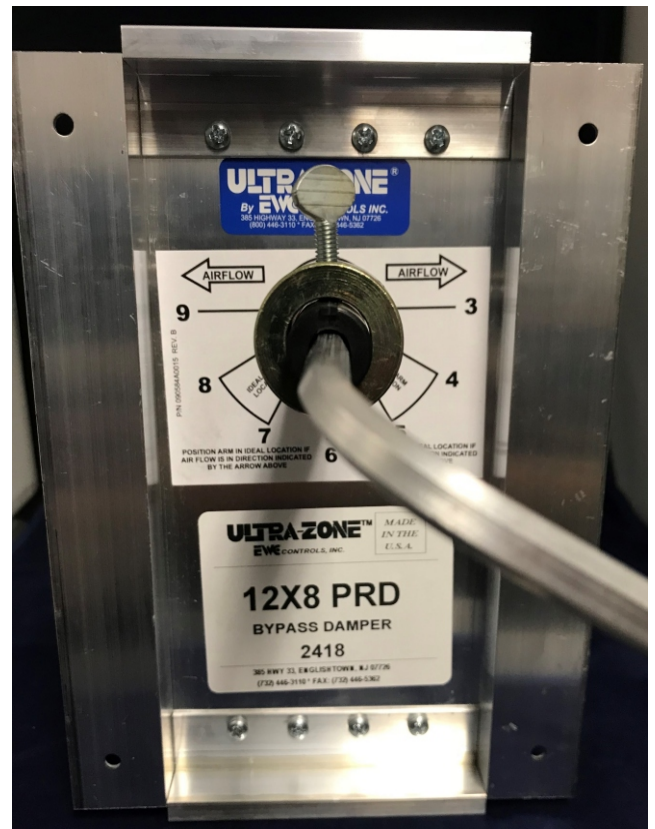
## Model PRD - Rectangular Bypass Damper



The direction of airflow can be reversed on the PRD if necessary, by pushing the blade over the stop bar on the bottom of the damper frame. Then, adjust the arm to the proper position based on the new airflow direction. Contact EWC Controls Inc., Technical support if necessary for further details.



***This arm position reflects Air-flow from Right to Left!***



***This arm position reflects Air-flow from Left to Right!***



***Be sure to adjust "push" the blade over the stop bar on the bottom frame for your direction of air flow!***

# BYPASS SIZING CALCULATIONS

1. Start with the system's Total Cfm (2000Cfm) 3 zone system (Zone 1 = 750Cfm, Zone 2 = 750Cfm, Zone 3 = 500Cfm plus 4 open runs @ 50Cfm)
2. Calculate the Cfm for the smallest zone that can run by itself (500Cfm)
3. Calculate the Cfm for any non-dampered (open) duct runs (4 x 50Cfm = 200 Cfm)
4. Calculate Damper stop leakage (20%) on both inactive zones (750cfm x .20 = 150 x 2 = 300Cfm)
5. Subtract all values from total Cfm (2000 - 500 - 300 - 200 = 1000 Cfm bypass flow)
6. The left over amount is the bypass Cfm. Refer the bypass Cfm to the chart on Page 1, match to the closest size. If you don't have enough room for that size, then go down one size. By-pass velocity will increase on smaller bypass ducts. **Regardless of the bypass size, you should install a "Balancing" Hand Damper after the PRD Bypass Damper, in order to set sufficient pressure drop and control the volume of bypass air mixing with the return air. (See graphic on page 1)**

<b>EXAMPLE:</b> 5 ton system @ 400 Cfm Per ton = 2000 Cfm	2000 Cfm
Subtract Smallest Zone = 500 Cfm	-500 Cfm
Subtract Damper Stop Leakage = 300 Cfm	-300 Cfm
Subtract Open Runs = 200 Cfm	<u>-200 Cfm</u>

1000 Cfm bypass volume

**Rated for 1100 Cfm @1400Fpm = 12x10 PRD**

**Or**

**Rated for 900 Cfm @ 900 Fpm = 20x8 PRD**

# BAROMETRIC BYPASS SET-UP PROCEDURE

1. The bypass damper must be installed horizontal & level between the supply duct and the return duct.
2. Position the damper to open in the direction of airflow back to the return duct or into a conditioned area.
3. Place the duct connection on the return so that the bypass air has a minimum 6 feet of return duct. before it enters the air handler, if space permits. *If a Bypass Hand Damper is installed, refer to Application Note #090376A0169 rev F. for setup instructions. Otherwise, close the bypass hand damper approximately 1/2 way.*
4. Position the ARM in the "IDEAL ARM LOCATION" for the correct direction of air flow and tighten the thumb screw. (Refer to page 3).
5. Position the **Extra Weight (optional)** high up on the ARM and tighten the thumb screw. Position **Weight#1** towards the bottom of the arm and tighten the thumb screw. (Refer to page 3).
6. Energize **ALL** Zones to operate the unit with the fan running on the highest speed. (Usually a Cooling demand, 2nd stage if applicable).
7. Return to the damper & confirm that the bypass damper is closed. If necessary, reposition the **Extra Weight or Weight #1** lower on the ARM until the damper closes completely. (It should be closed to the point where any additional force will start to open it) (Refer to page 3).
8. Turn off all Zones but the Smallest Zone & Wait about 45 seconds.

**Monitor the airflow for the Smallest Zone.** Is there too much Airflow or Noise? Proceed to **Step 9.**

Is there Insufficient Airflow? Proceed to **Step 10.**

Is the Airflow Acceptable? Proceed to **Step 11.**

9. **Excess Airflow:** Reposition the **Extra Weight** higher up on the ARM until the airflow/noise in the smallest zone has subsided to an acceptable level. If the airflow remains high, reposition **Weight #1** higher up on the arm, or if necessary, reposition the ARM closer towards #6 on the scale.
10. **Insufficient Airflow:** Reposition the **Extra Weight** lower on the ARM until the airflow is at an acceptable level. If the airflow remains low, reposition the ARM closer towards the #3 or #9 on the scale (depending on direction of flow). If the airflow still remains low for the smallest zone, too much air is being forced through the barometric damper. You can close the bypass hand damper a little more and/or add additional weight to the ARM.
11. **Congratulations, your PRD By-Pass damper is now properly adjusted.**