DAMMON ENGINEERING, INC

Date: 3/11/2013 Project: USDA Aphis Facility

Reviewed: David Dammon

Reviewed as noted: David Dammon

Revise and ReSubmit: _____

Rejected: _____

Other: _____

Correction or comments made on the shop drawings during this review do not relieve the contractor from compliance with requirements of the drawings and specifications. This check is only for review of the general conformance with the design concept of the project and general compliance with the information given in the contract documents. This contractor is responsible for: confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction; coordinating his or her work with that of all other trades and performing all in a safe and satisfactory manner.

Submittal item: VVTs and Heater Elements

Comments: Since the VVT Barometric By-Pass Damper is not an integral mechanism of the VVT with the heating element, ensure that the heater element can not be entergized when air is in By-Pass mode.

ENVIRO-TEC®
BY JOHNSON CONTROLS

Submittal Cover Letter

Date: 3/1/2013

Installer's Name:
Architect Name:
Engineer's Name:

Project Name: USDA - Aphis Facility
Project Location:
Product Name: Variable Air Volume

Sales Rep Name:
Sales Rep Address:

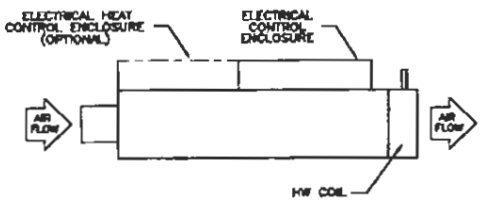
Sales Person:

SINGLE DUCT SCHEDULE - ELECTRIC HEAT

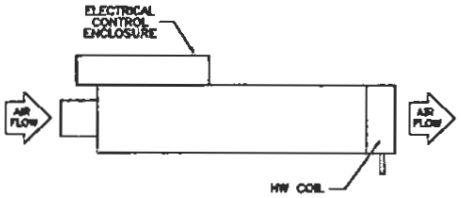
RESULTS												ELECTRIC HEAT							SOUND			RAD SOUND POWER						DIS SOUND POWER					
TAG	MFG	QTY	MODEL	SIZE	CONTROLS	MAX PRIMARY CFM	MIN PRIMARY CFM	INLET SP IN WG	MIN IN WG	DOWN IN WG	ARRANGEMENT	HEAT CFM	EAT DEG F	LAT DEG F	HTR KW	HTR AMPS	HTR VOLT	PHASE	STEPS	RAD NC	DIS NC	ATTEN METHOD	125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
VVT-1	ETI	1	SDR	08		500	500	1	0.1	0.25	LH Controls / LH Coil	500	55	67.84	2	9.62	208	1	1	-	-	AHRI-885E	51	43	37	32	29	27	53	52	49	46	43	41
VVT-2	ETI	1	SDR	12		1050	1050	1	0.06	0.25	RH Controls / RH Coil	1050	55	70.05	5	24.04	208	1	1	18	-	AHRI-885E	51	46	44	37	34	31	54	55	54	49	47	45
VVT-3	ETI	1	SDR	08		400	400	1	0.07	0.25	LH Controls / LH Coil	400	55	70.8	2	9.62	208	1	1	-	-	AHRI-885E	50	42	36	31	28	26	51	49	47	44	42	40

"-" signifies a NC value (radiated or discharge) that is less than 15
* Actual coil APD shown is at max airflow, not heating airflow

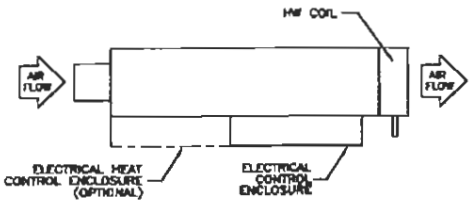
Job Name:	USDA - Aphis Facility	**Date:**	3/1/2013
Drawing Name:	SDR Arrangements	**Sales Rep:**	



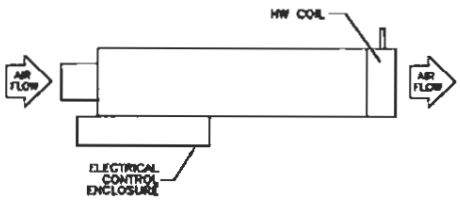
☐ **ARRANGEMENT 1**
LEFT HAND CONTROL UNIT
WITH LEFT HAND COIL



☐ **ARRANGEMENT 2**
LEFT HAND CONTROL UNIT
WITH RIGHT HAND COIL



☐ **ARRANGEMENT 3**
RIGHT HAND CONTROL UNIT
WITH RIGHT HAND COIL



☐ **ARRANGEMENT 4**
RIGHT HAND CONTROL UNIT
WITH LEFT HAND COIL

NOTES:
1. ELECTRIC HEATING CONTROL ENCLOSURE IS ON THE SAME SIDE AS STANDARD CONTROL ENCLOSURE.
2. ELECTRIC HEAT ONLY AVAILABLE ON ARRANGEMENTS 1 & 3.
3. ELECTRIC HEAT NOT AVAILABLE WITH HW COIL.

TITLE:
ARRANGEMENTS – MODEL SDR

ENVIRO-TEC
BY JOHNSON CONTROLS

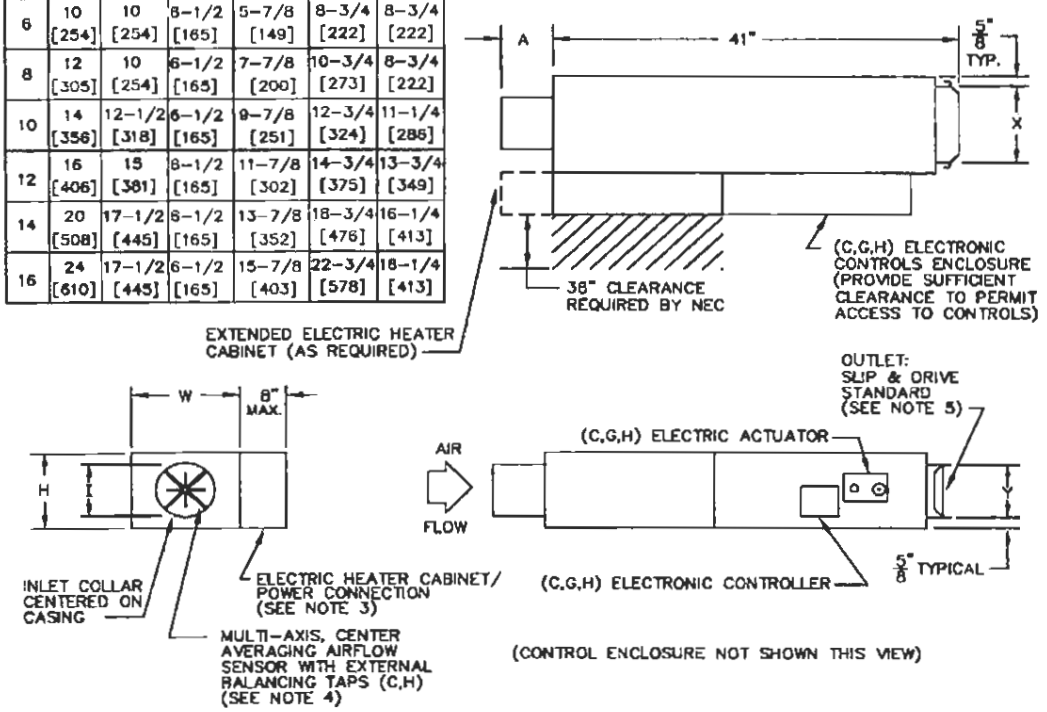
DRN BY	DATE	SCALE
SM	1/21/04	N/A
CKD BY	DATE	REV
KAM	11/17/04	01

01-80012

Job Name:	USDA - Aphis Facility	Date:	3/1/2013
Drawing Name:	Model SDR-EH Electronic Controls	Sales Rep:	

DIMENSIONAL DATA

UNIT SIZE	W	H	A	I	X	Y
4	10 [254]	10 [254]	10-1/2 [267]	3-7/8 [98]	8-3/4 [222]	8-3/4 [222]
5	10 [254]	10 [254]	10-1/2 [267]	4-7/8 [124]	8-3/4 [222]	8-3/4 [222]
6	10 [254]	10 [254]	8-1/2 [165]	5-7/8 [149]	8-3/4 [222]	8-3/4 [222]
8	12 [305]	10 [254]	6-1/2 [165]	7-7/8 [200]	10-3/4 [273]	8-3/4 [222]
10	14 [356]	12-1/2 [318]	6-1/2 [165]	9-7/8 [251]	12-3/4 [324]	11-1/4 [286]
12	16 [406]	15 [381]	8-1/2 [165]	11-7/8 [302]	14-3/4 [375]	13-3/4 [349]
14	20 [508]	17-1/2 [445]	6-1/2 [165]	13-7/8 [352]	18-3/4 [476]	16-1/4 [413]
16	24 [610]	17-1/2 [445]	6-1/2 [165]	15-7/8 [403]	22-3/4 [578]	18-1/4 [413]



CONSTRUCTION NOTES:

1. MATERIAL: Galvanized steel; Casing -22 gauge; Air valve casing -22 gauge.
2. INSULATION: 1/2" thick fiberglass complying with NFPA 90-A and UL 181.
3. POWER CONNECTION: Units have single point power connection for compatible voltages only. Non-compatible voltages require two separate connections.
4. AIRFLOW SENSOR: Sizes 4 & 5 utilize single-axis linear averaging type.
5. INSTALLATION: A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream.
   B) Inlet & Outlet collars should be externally insulated by others (in the field) if required.
   C) Minimum of 1 1/2 equivalent duct diameters of straight inlet duct required to assure proper heater operation.

NOTE: All drawings subject to change without prior notice.

(C) TEMPERATURE RESPONSIVE - SERIES SD600 (G) PRESSURE INDEPENDENT - SERIES SD700
(H) DIRECT DIGITAL PRESSURE INDEPENDENT - SERIES SD800 & SD900

TITLE: MODEL SDR-EH SINGLE DUCT TERMINAL UNIT ELECTRONIC CONTROLS

ENVIRO-TEC BY JOHNSON CONTROLS

DRN BY:	DATE:	SCALE:	DRAWING NO.
CV	11/05/92	N/A	15853
CKD BY:	DATE:	REV: 03	

ENVIRO-TEC
BY JOHNSON CONTROLS

VAV Submittal Form - Electric Heat

Job Name:	USDA - Aphis Facility	**Date:**	3/1/2013
ETI Order No:		**Sales Rep:**	

Tag Set	VVT-1
Quantity	1

Attribute	Description	Value	Value Description
acsplate	- Access plate	: no	No access panel
amps	- Heater amps	: 9.62	9.62
armgmnt	- Unit arrangement	: 1	1 - LH Controls / LH Coil
circamp	- Amps per circuit	: 9.62	9.62
contmeth	- Contactor Method	: 1	Magnetic
conltype	- Contactor Type	: 2	Magnetic disconnecting
ctltype	- Control Type	: 5	Field DDC
disctype	- Disconnect Type	: 3	Non-fused, door interlocking
ehvolt	- Line Voltage	: 208	208V line volt
Family	- Model	: SDR	Single Duct Variable Air Volume Terminal
fidencl	- Control Enclosure	: elect	Electronic
fusingtype	- Fusing Type	: 3	No Fusing unless >/=to 48 Amps per NEC
htype	- Heating Type	: 3	Electric heat
kw	- Heater kW	: 2.00	2.00
nocontactor	- Contactors (#)	: 1	1 contactor
Nooftransformer	- Transformer (#)	: 1	1 transformer
nopoles	- Contactor Poles	: 2	2 poles
phase	- Htr Phase	: 1	Single phase
size	- Unit Size	: 08	Size 8
spclinsul	- Fiberglass Options	: 1/2 inch	1/2" Fiberglass
steps	- Steps	: 1	1 step
Transformer	- Transformer?	: yes	Yes
transize	- Transformer VA	: 75	75 VA transformer

TagSet Tags:

Tag Set	VVT-2		
Quantity	1		
Attribute	**Description**	**Value**	**Value Description**
acsplate	- Access plate	: no	No access panel
amps	- Heater amps	: 24.04	24.04
armgmnt	- Unit arrangement	: 3	3 - RH Controls / RH Coil
circamp	- Amps per circuit	: 24.04	24.04
contmeth	- Contactor Method	: 1	Magnetic
conttype	- Contactor Type	: 2	Magnetic disconnecting
ctltype	- Control Type	: 5	Field DDC
disctype	- Disconnect Type	: 3	Non-fused, door interlocking
elvolt	- Line Voltage	: 208	208V line volt
Family	- Model	: SDR	Single Duct Variable Air Volume Terminal
fldencl	- Control Enclosure	: elect	Electronic
fusingtype	- Fusing Type	: 3	No Fusing unless >/=to 48 Amps per NEC
htype	- Heating Type	: 3	Electric heat
kw	- Heater kW	: 5.00	5.00
nocontactor	- Contactors (#)	: 1	1 contactor
Nooftransformer	- Transformer (#)	: 1	1 transformer
nopoles	- Contactor Poles	: 2	2 poles
phase	- Htr Phase	: 1	Single phase
size	- Unit Size	: 12	Size 12
spclinsul	- Fiberglass Options	: 1/2 inch	1/2' Fiberglass
steps	- Steps	: 1	1 step
Transformer	- Transformer?	: yes	Yes
transize	- Transformer VA	: 75	75 VA transformer
TagSet Tags:			

Tag Set	VVT-3		
Quantity	1		
Attribute	**Description**	**Value**	**Value Description**
acsplate	- Access plate	: no	No access panel
amps	- Heater amps	: 9.62	9.62
arrngmnt	- Unit arrangement	: 1	1 - LH Controls / LH Coil
circamp	- Amps per circuit	: 9.62	9.62
contmeth	- Contactor Method	: 1	Magnetic
conttype	- Contactor Type	: 2	Magnetic disconnecting
ctltype	- Control Type	: 5	Field DDC
disctype	- Disconnect Type	: 3	Non-fused, door interlocking
ehvolt	- Line Voltage	: 208	208V line volt
Family	- Model	: SDR	Single Duct Variable Air Volume Terminal
fidencl	- Control Enclosure	: elect	Electronic
fusingtype	- Fusing Type	: 3	No Fusing unless >/=to 48 Amps per NEC
htype	- Heating Type	: 3	Electric heat
kw	- Heater kW	: 2.00	2.00
nocontactor	- Contactors (#)	: 1	1 contactor
Nooftransformer	- Transformer (#)	: 1	1 transformer
nopoles	- Contactor Poles	: 2	2 poles
phase	- Htr Phase	: 1	Single phase
size	- Unit Size	: 08	Size 8
spclinsul	- Fiberglass Options	: 1/2 inch	1/2' Fiberglass
steps	- Steps	: 1	1 step
Transformer	- Transformer?	: yes	Yes
transize	- Transformer VA	: 75	75 VA transformer
TagSet Tags:			

Excellence Without Compromise

EWC® CONTROLS INC.

TECHNICAL BULLETIN

Model PRD & PRD- RD
Barometric By-Pass Damper

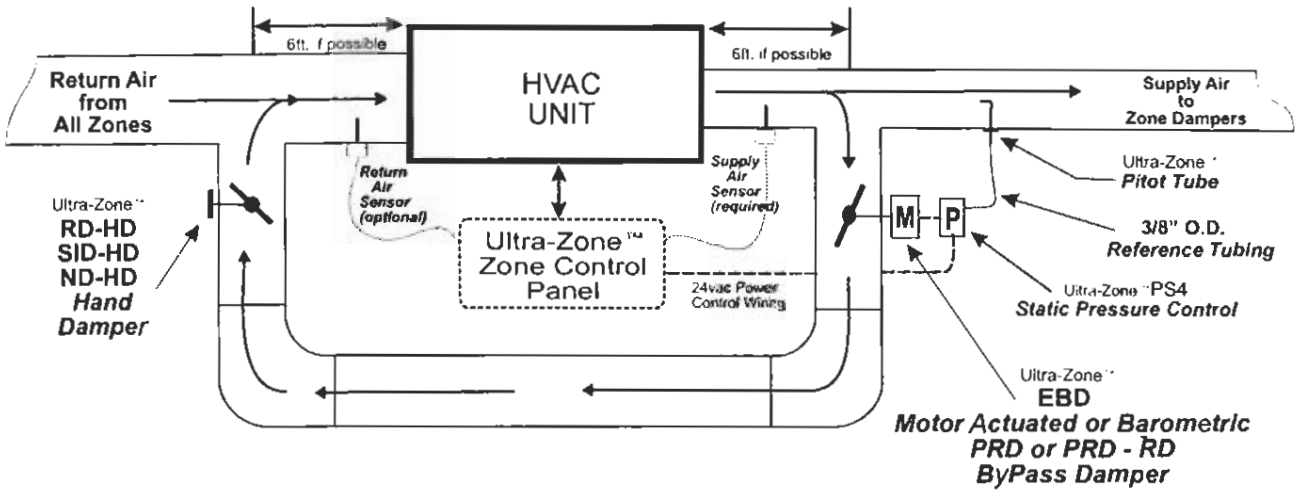
Leave this bulletin on the job site for future reference!

GENERAL DESCRIPTION

The model PRD & PRD-RD pressure regulating dampers are a single blade rectangular or round barometric damper assemblies with a counter balanced weighted arm. The barometric by-pass damper is an economical way to manage airflow when zone dampers close. 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 correct bypass flow is achieved. See Page 2 for details. For field versatility, the hex shaped arm can be inserted into either side of the damper. Additional weights can be added if necessary.

The barometric by-pass damper is installed in the duct-work to regulate excess air pressure and volume. The damper can be mounted to relieve 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 can be installed downstream of the by-pass damper, which allows the installer to set sufficient differential pressure across the bypass duct, controlling how fast the by-pass air mixes with return air. See Application Note 090376A0169D.*

The PRD & PRD-RD are effective By-Pass solutions for any Constant Speed or Variable Speed Zoned HVAC system up to 4 ton capacity.



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 tables provided below to size your by-pass damper using the guideline provided on the next page. Use the 1400Fpm 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"	2	1125 Cfm	1750 Cfm
PRD 20 x 12	20" x 12"	2	1375 Cfm	2000 Cfm
			* CFM @ 900Fpm (.15"wc friction loss)	* CFM @ 1400Fpm (.3"wc friction loss)

MODEL #	SIZE	# WEIGHTS	BYPASS Cfm*	BYPASS Cfm*
PRD-RD 8	8"	1	320 Cfm	500 Cfm
PRD-RD 10	10"	1	500 Cfm	750 Cfm
PRD-RD 12	12"	1	720 Cfm	1100 Cfm
PRD-RD 14	14"	2	950 Cfm	1400 Cfm
PRD-RD 16	16"	2	1250 Cfm	1900 Cfm
			* CFM @ 900Fpm (.15"wc friction loss)	* CFM @ 1400Fpm (.3"wc friction loss)

EWC Controls Inc. • 385 Highway 33 • Englishtown, NJ 07726 • 800-446-3110 • FAX 732-446-5362 • E-Mail- info@ewccontrols.com

P/N 090375A0224 REV. M

BYPASS SIZING CALCULATIONS

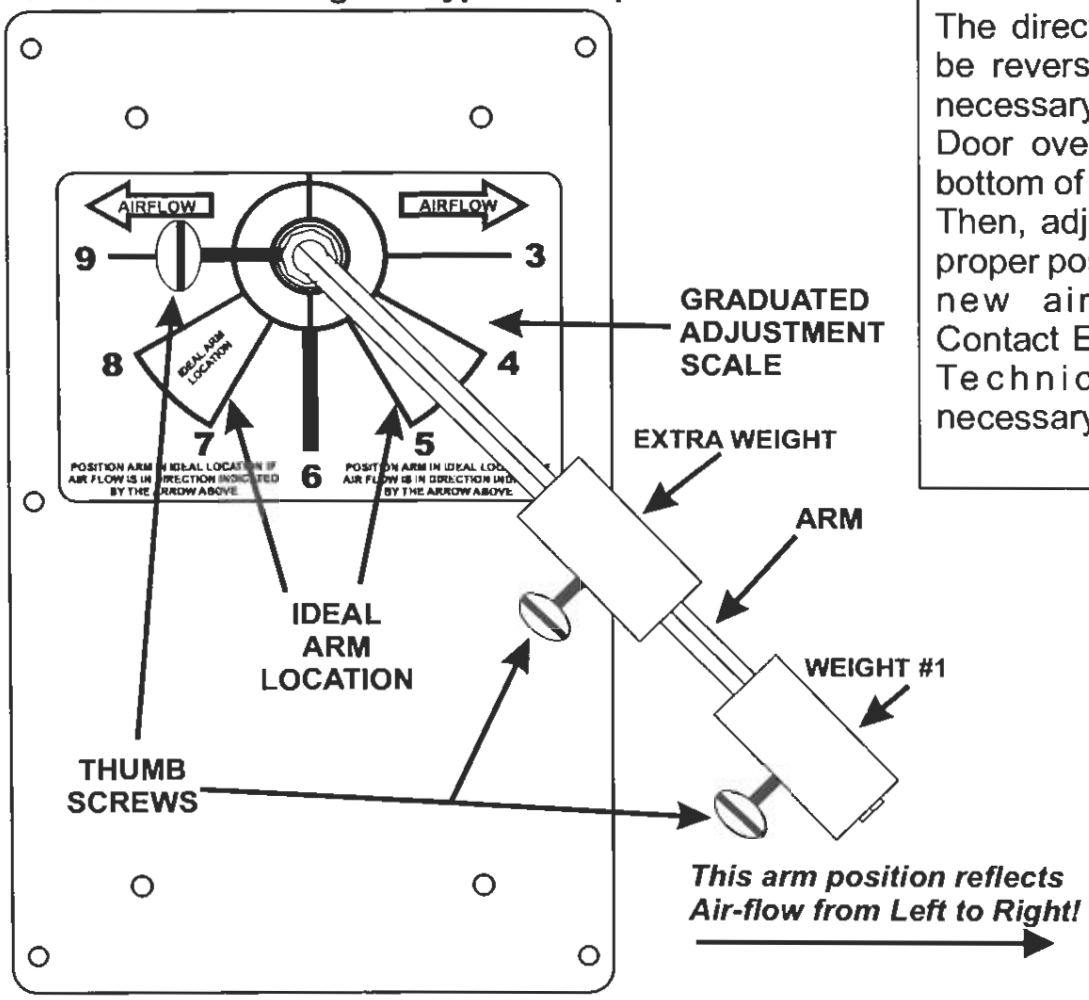
1. Start with the system's Total Cfm (2000Cfm) 3 zone system (Zone 1 – 750Cfm, Zone 2 – 750Cfm, Zone 3 – 500Cfm plus 4 open runs @ 50Cfm)
2. Calculate the Cfm for the smallest zone that can run by itself (500Cfm)
3. Calculate the Cfm for any non-dampered (open) duct runs (4 x 50Cfm – 200 Cfm)
4. Calculate 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, consider installing a Restricting Hand Damper after the Bypass damper, in order to set sufficient differential pressure and control how fast the bypass air mixes with the return air. (See graphic on page 1)***

EXAMPLE:	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	-200 Cfm
		1000 Cfm
		1000 Cfm @1400Fpm = 12x10 PRD
		or
		1000 Cfm @ 900 Fpm = 20x10 PRD

BAROMETRIC BYPASS SET-UP PROCEDURE

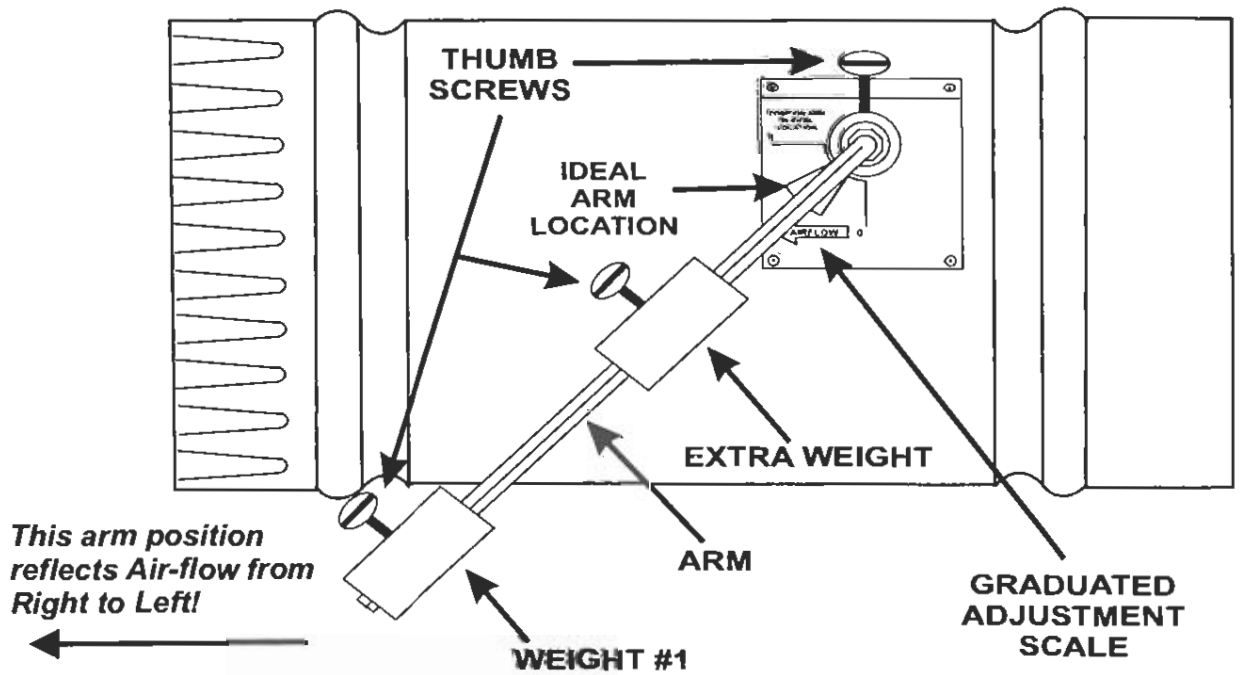
1. The bypass damper must be installed horizontal & level between the supply duct and the return duct.
2. Position the damper to open in the direction of airflow back to the return duct or into a conditioned area.
3. Place the duct connection on the return so that the bypass air has a minimum 6 feet of return duct. before it enters the air handler, if space permits. *If a Restricting Hand Damper is installed, it should have been setup already. If not, refer to Application note 090376A0169D. Otherwise, close the hand damper ½ 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 4)
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 by-pass 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 to 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 Velocity:** Reposition the **Extra Weight** higher up on the ARM until the velocity in the smallest zone has subsided to an acceptable level. If the velocity remains high, reposition **Weight #1** higher up on the arm, or if necessary, reposition the ARM closer towards "6 or 0" on the scale. (Depending on the model).
10. **Insufficient Velocity:** Reposition the **Extra Weight** lower on the ARM until the velocity is at an acceptable level. If the velocity remains low, reposition the ARM closer towards the "3 or 9" on the scale ((Depends on model. Refer to page 3&4) depending on direction of flow). If velocity still remains low for the smallest zone, to much air is being forced through the barometric damper. You can order additional weights or you should consider installing an Electronic By-Pass Damper (Model EBD).
11. ***Congratulations, your PRD By-Pass damper is now properly adjusted.***

Model PRD - Rectangular Bypass Damper



The direction of airflow can be reversed on the PRD if necessary, by pushing the Door over the stop 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.

Model PRD - RD Round Bypass Damper



ASSEMBLY OF PRD & PRD-RD BY-PASS DAMPER

1 - INSTALL BY-PASS DAMPER PER INSTRUCTIONS ON PAGE 2.

2 - SLIDE LOCKING-COLLAR OVER DAMPER SHAFT.

3 - INSERT HEX ARM INTO DAMPER SHAFT.

4 - ALIGN LOCKING-COLLAR THUMB SCREW WITH ONE OF THE 4 HOLES ON THE DAMPER SHAFT WHILE HOLDING ARM AT THE DESIRED ANGLE.

5 - TIGHTEN THUMB SCREW TO SECURE HEX ARM IN PLACE.

6 - POSITION WEIGHT ON HEX ARM AND TIGHTEN THUMB SCREW TO SECURE IN PLACE.

7 - REFER TO PAGE 2 FOR SET-UP PROCEDURE.

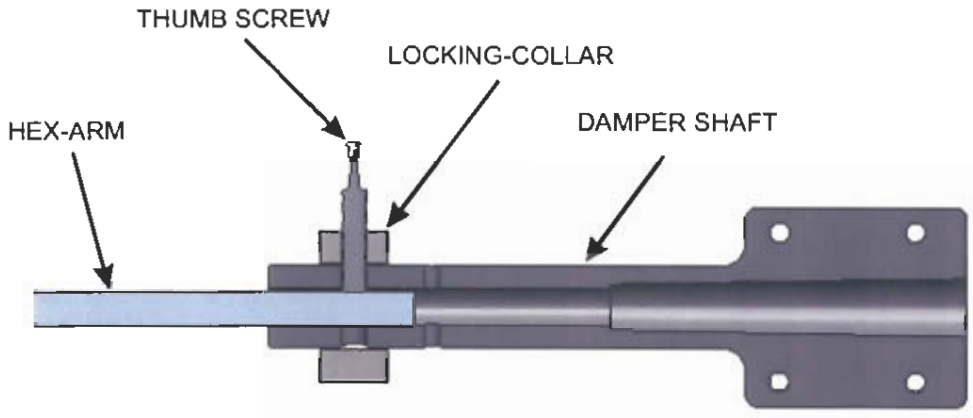


FIGURE 3 -- CUT AWAY VIEW OF ASSEMBLY

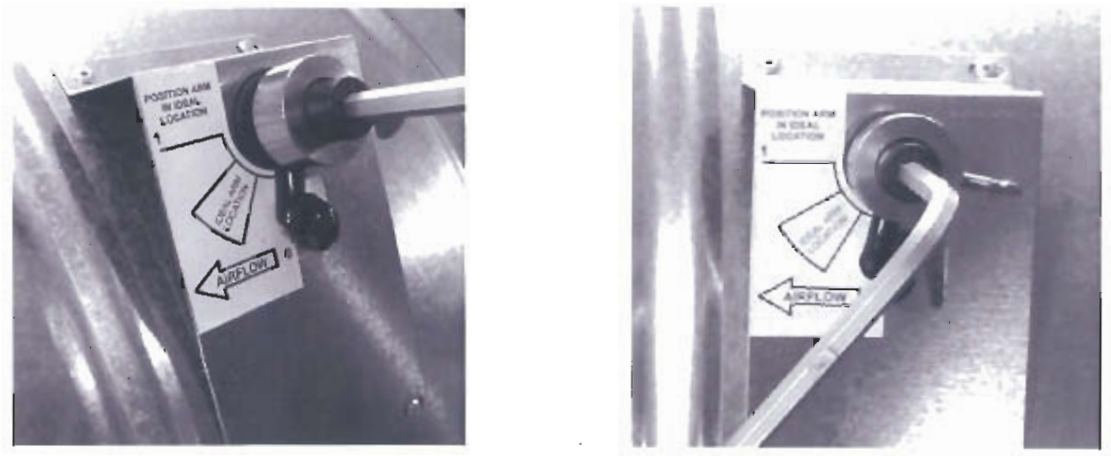


FIGURE 4 -- CLOSE-UP VIEWS OF ASSEMBLY