BEKOLAY & Associates. Ltd.

Consulting Engineers

Shop Drawing Review Comments

Consultant:	**Barry J. Hobin & Associates Architects** 63 Pamilla St. Ottawa On. K1S 3K7	Project:	**Dovercourt Phase 2** 411 Dovercourt Ave
Contractor:	Tal-Co	BAL No.:	**2017-09**
Attn:	**Doug van den Ham** **Sandy Davis**	Date:	2018-06-25

Mech Shop Drawing Review Comments

1. **General:**

The documents in the list have been examined for general conformance with the Contract Documents prepared by Bekolay & Associates Ltd. (BAL) for this project. This review may not be extended to any other contract, trade, division or project. Review by BAL does not imply approval or verification of information presented in these drawings and the responsibility for installation and performance lies solely with the Contractor submitting the documents including dimensional conformance and co-ordination with other trades. All changes, comments and notes by BAL shall be incorporated (at no cost to the Owner) into actual installation when indicated "Reviewed As Follows" or be included in a re-submission (when requested).

2. **Shop Drawings:** submitted in the attached files

Item	Description	Submitted File	Comments
2.1	SCDA 8"	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed
2.2	SCDA 6"	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed
2.3	RCD 6"	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed
2.4	530FF	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed
2.5	#80 (egg crate)	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed
2.6	MGE 6	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed
2.7	FDV8 Fan Power VAV	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed
2.8	Thermostat	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed
2.9	8" VAV	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed
2.10	BACnet interface	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed

Continued.

2.11	Rooftop Unit controller	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed
2.12	Roof exhaust G-085	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed
2.13	Duct Sox	1- Eh Price- G&D- For Review- May 31, 2018.pdf	Reviewed, See 3.1

3. **Additional Notes:**
   3.1. Colour to be confirmed by architect & client
   None

Grilles/Registers/Diffusers Submittals

Project Name	OPTIMUM Mechanical Solutions *Industry Leaders*
Dovercourt Rec Center	84 Bentley Avenue, Ottawa, Ontario K2E 6T9 Ph: 613-228-9500 Fax: 613-228-9218
☐ APPROVED	☐ REJECTED
☐ REVISE	☑ REVIEWED
BY NDewar	**DATE** 6/1/2018
SUBMITTAL# 1	**SPEC**

Job Name: Dovercourt Ph 2
Date Printed: 4/24/2018
Spec Section: 15 - HVAC

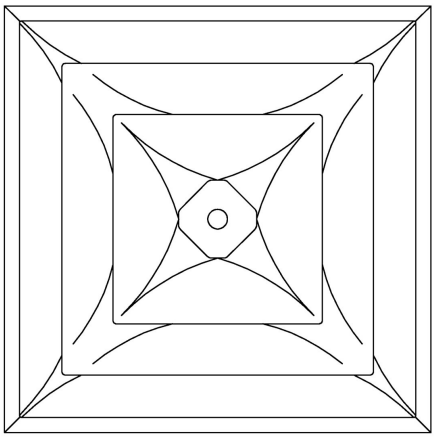
Contact: Craig Andrews
3236 Hawthorne Road
Ottawa, ON K1G 3W9

Phone: 613-725-2029 E 1309
Email: candrews@ehpricesales.com

All-In-One
Detailed Submittal Schedule
Grilles/Registers/Diffusers

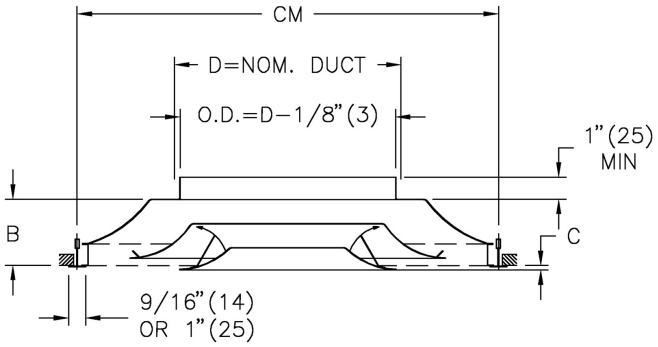
#	Qty	Model	Unit Size	Inlet Size	Border	Pattern	Panel Size	Finish	Airflow (CFM)	NC	Accessories
1	1	SCDA	8		3		24, 24	B12	0	N/A	3C, RC
Desc: 3 - T-Bar Lay-In 1" and 9/16" Flat Tee Application | B12 - White - Powder Coat											
2	4	SCDA	6		3		24, 24	B12	0	N/A	3C, RC
Desc: 3 - T-Bar Lay-In 1" and 9/16" Flat Tee Application | B12 - White - Powder Coat											
3	3	RCD	6	6				B12	0	N/A	
Desc: B12 - White - Powder Coat											
4	1	530FF	22.000, 20.000		SM	L		B12	0	N/A	2, HL
Desc: SM - Sidewall Application Surface Mount Border | L - Louver Blades parallel to Long Dimension | B12 - White - Powder Coat											
5	4	80	24.000, 6.000		CORE			B12	0	N/A	LI
Desc: CORE - Core Only | B12 - White - Powder Coat											

SCDA Steel Adjustable Square Cone Diffuser



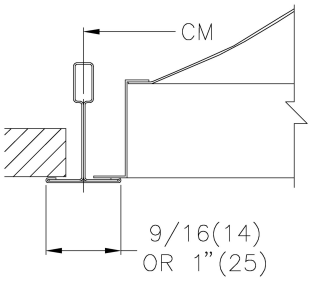
Nom Diffuser Size: 24" X 24"
Duct Diameter: 8, 6

B (Max): 4"
C (Max): 1/8"



Border: 3 T-Bar Lay-In

1" and 9/16" Flat Tee Application



Notes:

- Removable core with locking clips
- Tool free cone installation and removal

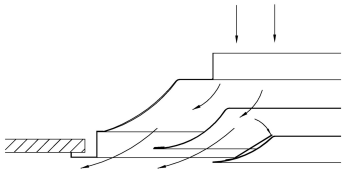
Material:

- Steel Construction

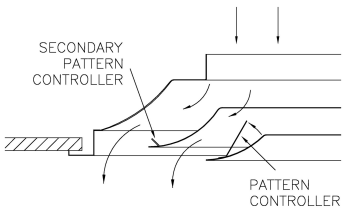
Finish:

- B12: White Powder Coat

Horizontal Airflow Pattern:



Vertical Airflow Pattern:



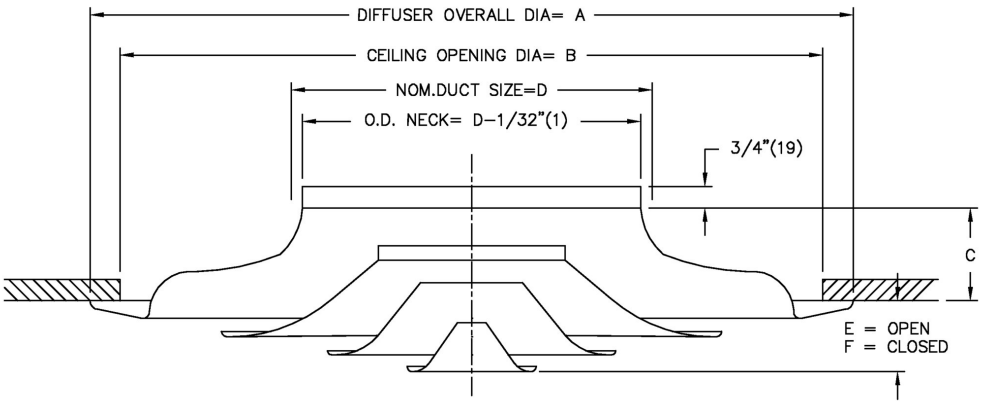
PROJECT: Dovercourt Ph 2
ENGINEER:
DESCRIPTION: Adjustable Square Cone Diffuser
SCDA//I/8,6///24/24//3/////3C/RC///////B12

SUBMITTAL NO: 258307-F
CUSTOMER:

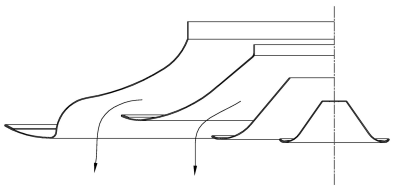
SUBMITTAL DATE: 4/24/2018

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.
Information within this document is subject to change without notice.

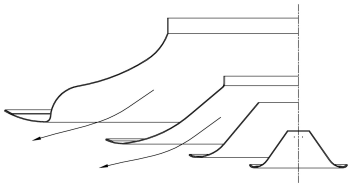
RCD Steel Round Cone Diffuser, 3 Position Adjustable



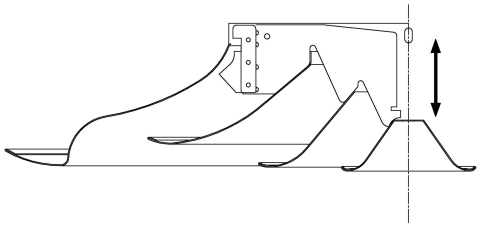
Vertical Airflow



Horizontal Airflow



Detail View:



Notes:

- Horizontal to vertical pattern adjustment, three positions
- Tool free removal of inner cone
- Factory Tolerance: ± 1/32" (1)

Material:

- Heavy Gauge Spun Steel

Finish:

- B12: White Powder Coat

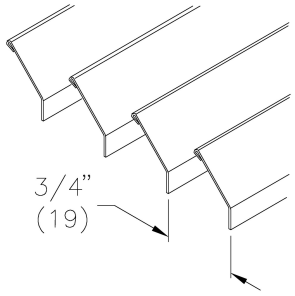
Dimensions- inches						
Inlet Size	**A**	**B**	**C**	**D**	**E**	**F**
6	13 1/2	12	1 5/8	6	1 3/4	15/16

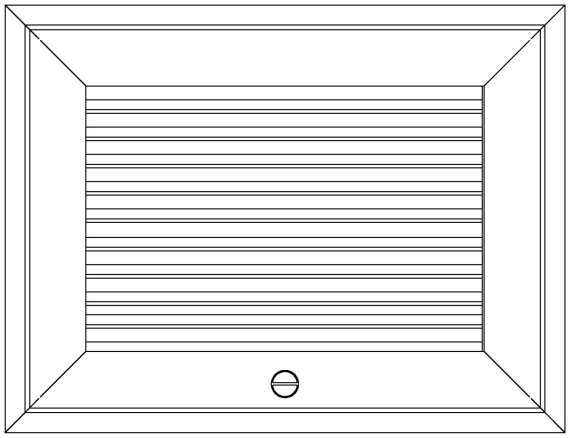
PROJECT: Dovercourt Ph 2
SUBMITTAL NO: 260677
SUBMITTAL DATE: 4/24/2018
ENGINEER:
CUSTOMER:
DESCRIPTION: Round Cone Diff-Ceiling W/3 Position Adjstmnt,Stl
RCD//I/6/////////B12

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.
Information within this document is subject to change without notice.

530FF Steel Filter Grille - 3/4" Blade Spacing

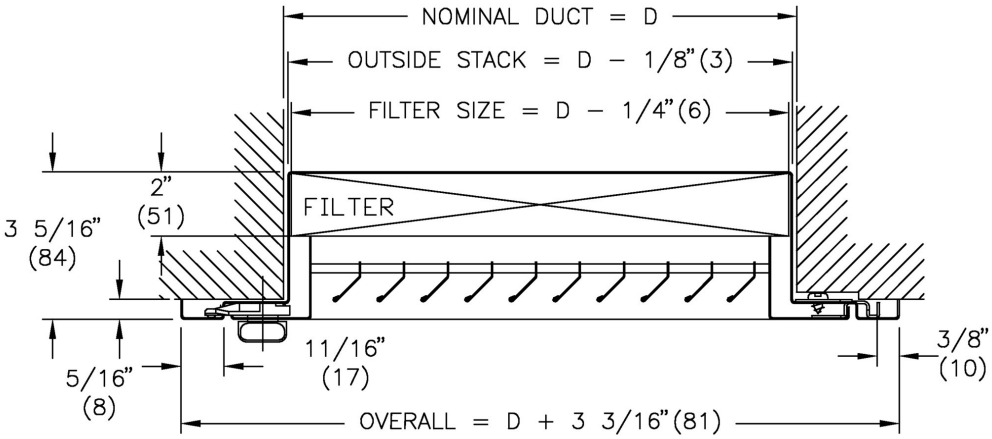
Core Style:





Border: SM

Sidewall Application Surface Mount Border



Notes:

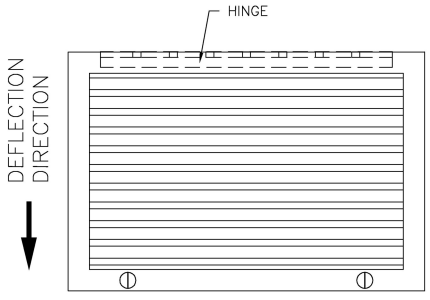
- Filter frame accepts 2" filter
- Filter media supplied by others
- Blades are on 3/4" (19) spacing
- Blades are parallel to the long dimension
- Hinge tabs are parallel to the long dimension
- For sidewall installation, hinge tabs must be at top
- Quarter turn fastener location per factory standard
- Mounting holes in filter frame by installer
- Nominal duct size listed
- Factory tolerance: ± 1/32"(1)

Material:

- Steel Construction

Finish:

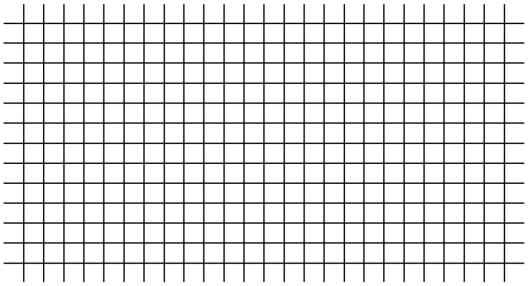
- B12: White Powder Coat



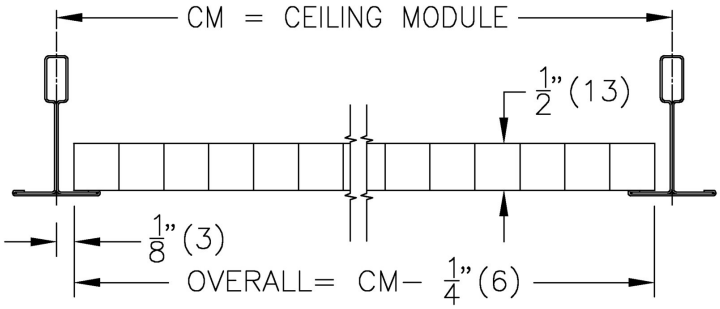
PROJECT: Dovercourt Ph 2
SUBMITTAL NO: 261070-C
SUBMITTAL DATE: 4/24/2018
ENGINEER:
CUSTOMER:
DESCRIPTION: Steel Filter Retrn Grille,45 Deg Blades 3/4" Spcng
530FF//I/22.000/20.000/SM/L///2/HL//B12

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.
Information within this document is subject to change without notice.

80 Egg Crate Grid Core Only – 1/2" x 1/2" x 1/2"



Border: CORE Core only



Material:

- Aluminum construction

Finish:

- B12 - White Powder Coat

Notes:

- 1/2" x 1/2" x 1/2" aluminum grid core
- Factory tolerance ± 1/32" (1)

PROJECT: Dovercourt Ph 2
ENGINEER:
DESCRIPTION: Egg Crate Grille, 1/2" X 1/2" X 1/2"
80//I/24.000/6.000//LI/CORE//////24/6///0//////B12

SUBMITTAL NO: 259683-E
CUSTOMER:

SUBMITTAL DATE: 4/24/2018

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.
Information within this document is subject to change without notice.

MGE 6 METAL EXHAUST GRILL

Item no. 411371

Document type: **Product card**
Document date: **2018-04-24**
Generated by: **Systemair Online Catalogue**

Description

An exhaust diffuser for installation on ceiling or wall. It can also be used for supply air. The diffuser has a lockable central cone, which is rotated to adjust the pressure and consequently the air volume. Can be used for supply air.

- Easy installation either into the mounting frame or directly onto the duct
- For supply and exhaust air
- The airflow is adjusted by rotating the valve cone

Technical parameters

Other		
Weight	2.01	lbs.

Dimensions

Model	Ø Duct
MGE 4	4 (101)
MGE 5	5 (127)
MGE 6	6 (152)
MGE 8	8 (204)

Dimensions in inch (mm)

Accessories

Documentation

401454 DG, CG, HG, MGE, MGS OIPM EN FR ES.pdf (110,93kB)

Terminals
Submittals

Job Name: Dovercourt Ph 2
Date Printed: 4/24/2018
Spec Section: 15 - HVAC

Contact: Craig Andrews
3236 Hawthorne Road
Ottawa, ON K1G 3W9

Phone: 613-725-2029 E 1309
Email: candrews@ehpricesales.com

All-In-One
Detailed Submittal Schedule
Terminals

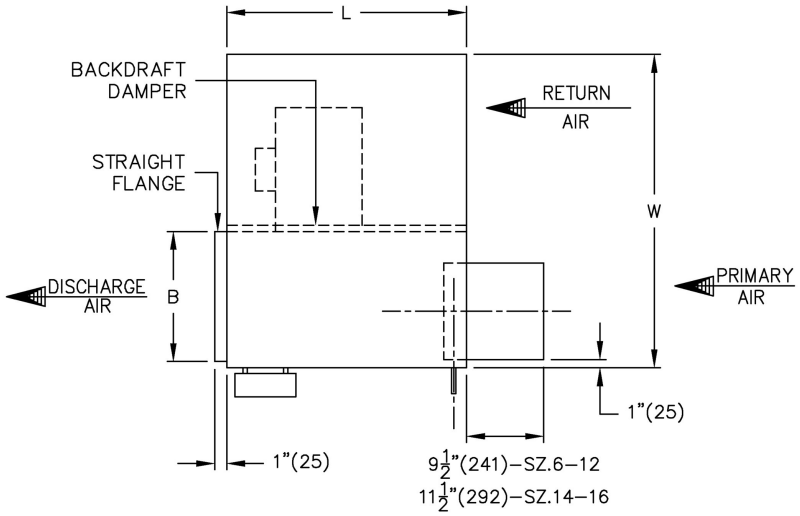
#	Qty	Model	Linestring	Size 1	Unit Size	Max Primary (CFM)	Min Primary (CFM)	Fan Flow (CFM)	Dis. H (in)	Dis. W (in)	* Max Disc NC 2008	* Max Rad NC 2008	Max Dis NC	Max Rad NC	Fan Motor Voltage	Terminal Liner	Coil	Sequence	Hot Deck	Accessories 1	Accessories 2	Accessories 3	Accessories 4	Accessories 6
6	2	SDV8	SDV8//I/2800/16/EHP/CFM///0.0//////0/1500/0/1500/0/FG50//////PS//C/VAV-LF/PIC/PRB/BAC/575/5000/0/////////	16	16	1500	0		18.00	24.00	--	--	--	--		FG50	None	2800						PS
Desc: FG50 - 1/2" Thick Fiberglass Liner(Standard) | 2800 - PIC Pressure Independent Cooling or HCCO | PS - Protective Shroud																								
7	1	FDV8	FDV8//I/8800/2006/EHP/CFM/115-ECM/300/115-24V//0.0//////0/80/FG75/PS//////C/VAV/PIC/PRB/BAC/66/450/300/790///////	2006	2006	80	0	300	12.50	14.00	--	--	--	--	115-ECM	FG75	None	8800	115-ECM	PS				
Desc: FG75 - 3/4" Thick Fiberglass Insulation (Standard) | 8800 - PIC Pressure Independent Cooling or HCCO | PS - Protective Shroud																								
9	1	PRTU	PRTU//I/NETWORKED////FB1//CB2//HB2/////PRB/PRB////////F/PRTU-MOT/////CS1////4///////////NO															NETWORKED		FB1	CB2	HB2	CS1	
Desc: NETWORKED - Polling System | FB1 - 24VAC Binary Day/Night | CB2 - 2 Stage Cooling (24VAC) | HB2 - 2 Stage Heating (24VAC) | CS1 - Average Polling																								
10	1	PRTU-FRONT-END	PRTU-FRONT-END//I/WEB-MASTER//PRTU-WEB//PRTU-IP-RTR//PRTU-BAC-RTR///															WEB-MASTER		PRTU-WEB	PRTU-IP-RTR	PRTU-BAC-RTR		
Desc: WEB-MASTER - Includes Webserver/ IP System Router/BACnet MS-TP Router | PRTU-WEB - Graphical WebServer Packages - Includes Web Server | PRTU-IP-RTR - IP Router [Web Server plugs into IP router that has 4 ports(4+1 uplink)] | PRTU-BAC-RTR - BACnet IP to MS/TP Router (Allows MS/TP Devices to communicate with Web Server and other Front end systems over BACNET IP).																								

Performance Notes

Date Printed: 4/24/2018

1. Dashes (--) indicate NC values less than 20.
2. NC values are calculated based on procedures outlined in AHRI Standard 885-2008, “A Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets.”
3. Sound power levels are given in decibels (dB).
4. "** Discharge sound power levels 2008" do not include duct end reflection. For the most current data based on ASHRAE Standard 130-2008 and AHRI Standard 880-2011 reference "Discharge sound power levels."
5. Dashes (--) indicate sound power levels below 36-29-26-22-19-17 for each octave band; values below these sound power levels are considered below significance per AHRI 880.
6. Minimum operating pressure is the minimum static pressure required to operate the terminal unit assembly at maximum primary flow with a wide open damper.
7. Airflow is given in cubic feet per minute (cfm).
8. Air pressure drop is given in inches water gauge (in. w.g.), and water pressure drop is given in feet of water gauge (ft. w.g.).
9. NC values are derived from sound power levels obtained in accordance with ASHRAE Standard 130-2008 and AHRI Standard 880-2011, which include duct end reflection corrections.
10. * NC values are derived from sound power levels obtained in accordance with ASHRAE Standard 130-2008 and AHRI Standard 880-2008.
    These values are NOT the most current method for estimating NC values because AHRI 880-2008 does not include duct end reflection corrections.

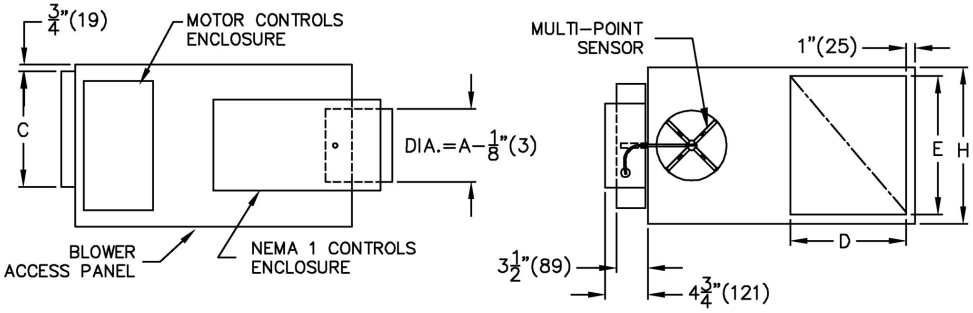
FDV8 Fan Powered Variable Volume, Digital Controls by Price



Dimensions - IMPERIAL UNITS (inches)											
Unit Size	Maximum Fan CFM	Primary Air Inlet	Return Air Inlet		Outlet Duct		W	H	L	Gauge
			D	E	B	C				
2006	750	6	12	15 ½	14	12 ½	31	17 ½	25 ½	22

ECM Motor				
Unit Size	Motor H.P.	Full Load Amps		
		115V	240V	277V
2006	1/3	3.9	1.9	1.6

Controls



- Pressure independent
- Controls are supplied and factory mounted by Price. Price thermostat factory supplied for field mounting
- Controls mounted on left hand side of unit
- PS - Controls enclosure included
- 115-24V Control Transformer supplied, factory mounted
- Multi-point primary airflow sensor supplied by Price

Notes

- 22 Ga. zinc coated steel casing. Mechanically sealed and gasketed, leak resistant construction
- Primary damper blade constructed of two layers of heavy gauge galvanized steel with a sandwiched peripheral gasket
- 1/2" (13) dia. plated solid steel shaft with end indicator mark showing damper position
- Damper leakage rated below 2% of nominal flow at 3" w.g. (747Pa). Damper closing direction - CCW
- Units not to be used for temporary heat or ventilation during construction
- Minimum 0.1" w.g. (25 Pa) external static pressure to operate
- Refer to submitted box schedule for air volumes and inlet sizes
- Rectangular discharge opening with slip connection

Intertek

Assembly UL1995 & CSA236 listed

Motor

- ECM electric motor 1 phase, 60 cycle. Speed controller included

PROJECT: Dovercourt Ph 2 **SUBMITTAL NO:** 258514-A **SUBMITTAL DATE:** 4/24/2018
ENGINEER: **CUSTOMER:**
DESCRIPTION: Fan Powered, VAV - DDC By Price
FDV8//I/8800/2006/EHP/CFM/115-ECM/300/115-24V//0.0/////////FG75/PS///////C/VAV/PIC/PRB/BAC//////////

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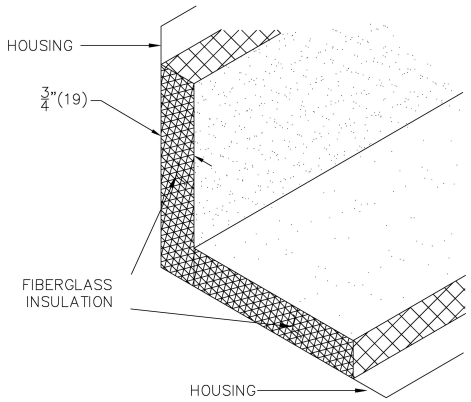
Liner

FG75

3/4" Thick Fiberglass Liner (Standard)



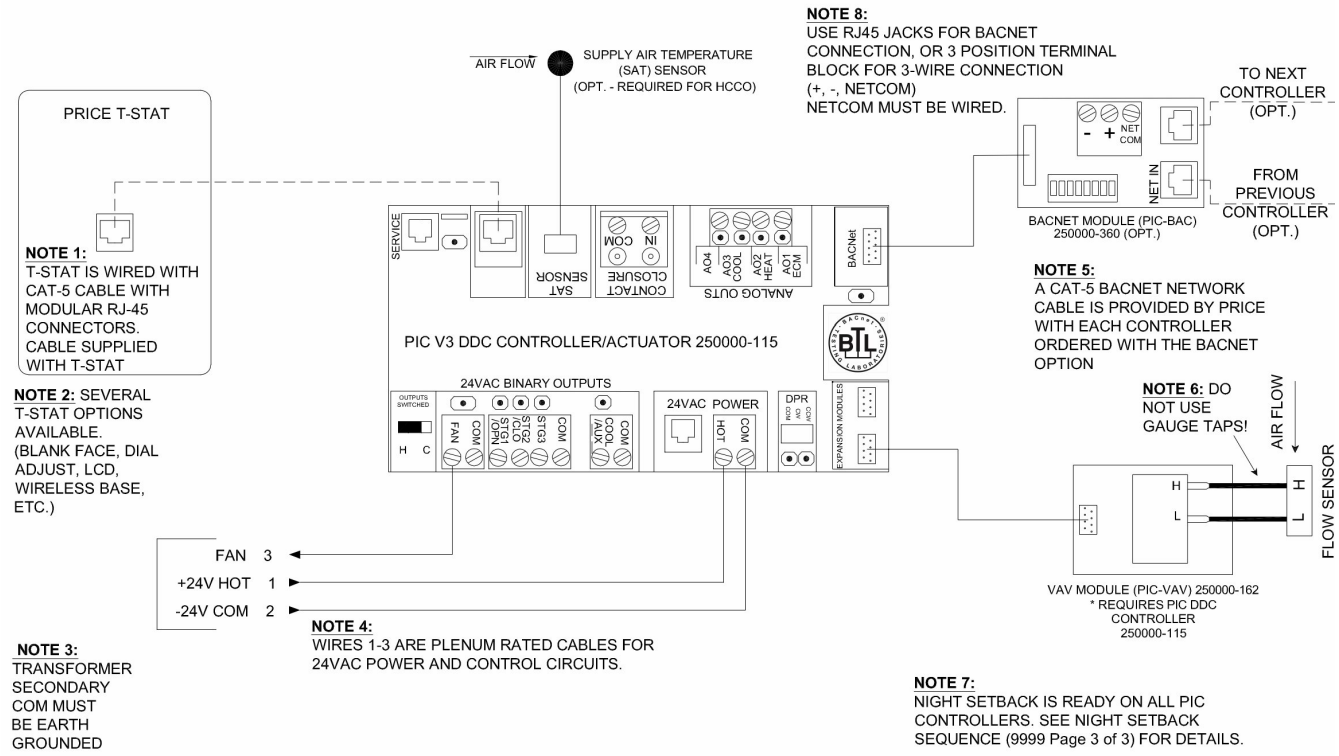
Internal Insulation - Fiberglass 3/4" (19mm) thick, min. 1.5 lb/cu.ft density, which meets the requirements of NFPA 90A and UL181.

R-value = 3.2

PROJECT: Dovercourt Ph 2 **SUBMITTAL NO:** 258514-A **SUBMITTAL DATE:** 4/24/2018
ENGINEER: **CUSTOMER:**
DESCRIPTION: Fan Powered, VAV - DDC By Price
FDV8//I/8800/2006/EHP/CFM/115-ECM/300/115-24V//0.0/////////FG75/PS///////C/VAV/PIC/PRB/BAC//////////

Control Sequence 8800

PIC - Variable Volume, Intermittent Fan, Pressure Independent VAV HCCO or Cooling Only, no local reheat



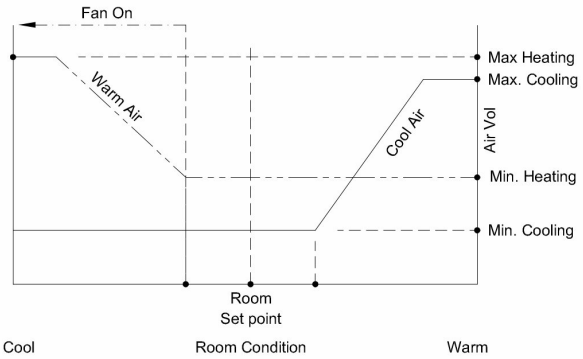
LEGEND

FACTORY FLOW SENSOR TUBING

FACTORY ELECTRICAL WIRING

FIELD ELECTRICAL WIRING

CONTROL GRAPH



Sequence of Operation -- Variable Volume Heat/cool changeover OR cooling only - Pressure Independent

On power up the damper will calibrate closed for 2 minutes.
If no SAT sensor is present, controller assumes Cool supply air at all times

Cool supply air: On an increase in space temperature the controller regulates the actuator to open the VAV damper and increase the flow of cool air. On an increase of space temperature greater than the cooling proportional band, the airflow is maintained at its pre-selected maximum flow setting.

On a decrease in space temperature the controller regulates the actuator to close the VAV damper and reduce the flow of cool air. If the space temperature decreases to less than the cooling proportional band, the airflow is maintained at the pre-selected minimum flow setting.

Warm supply air: On a decrease in space temperature the controller regulates the actuator to open the VAV damper and increase the flow of warm air. On a decrease of space temperature greater than the heating proportional band, the airflow is maintained at its pre-selected maximum flow setting.

On an increase in space temperature the controller regulates the actuator to close the VAV damper and reduce the flow of warm air. If the space temperature increases above the heating proportional band, the airflow is maintained at the pre-selected minimum flow setting.

Fan Operation: On a decrease in space temperature into the heating proportional band, the unit fan will energize.

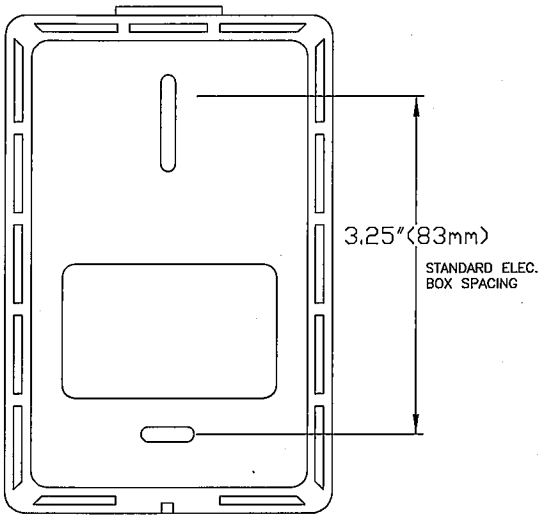
PROJECT: Dovercourt Ph 2 **SUBMITTAL NO:** 258514-A **SUBMITTAL DATE:** 4/24/2018
ENGINEER: **CUSTOMER:**
DESCRIPTION: Fan Powered, VAV - DDC By Price
FDV8//I/8800/2006/EHP/CFM/115-ECM/300/115-24V//0.0/////////FG75/PS///////C/VAV/PIC/PRB/BAC//////////

price®

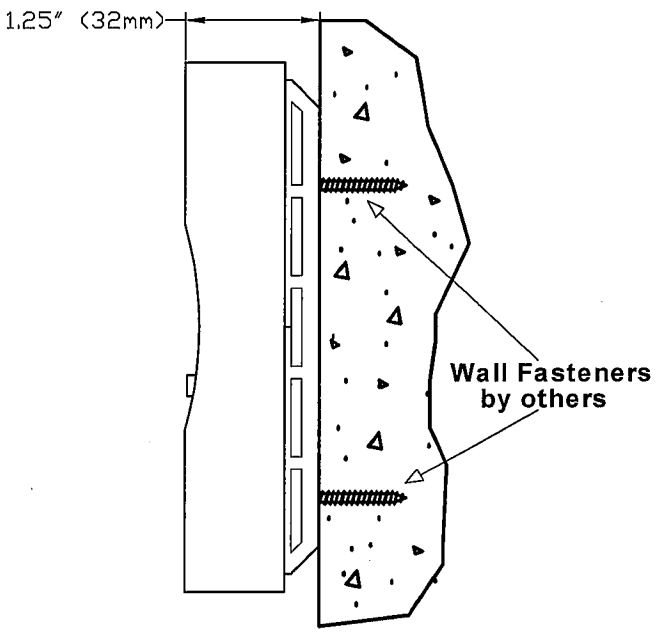
Submittal Sheet

Price LCD Thermostat
PT# 250052-100

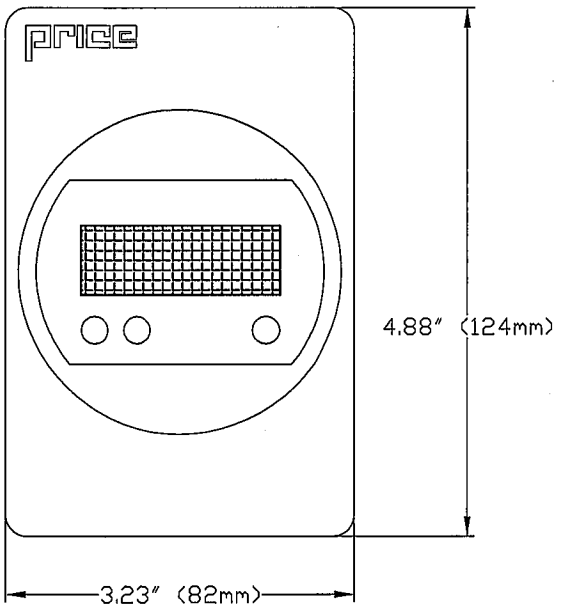
Backplate - Rear View



Surface Mount Detail



Face View



SPECIFICATIONS:

POWER REQUIREMENTS:
- POWER IS SUPPLIED FROM THE MAIN CONTROLLER (PIC, PRODIGY, ETC.)

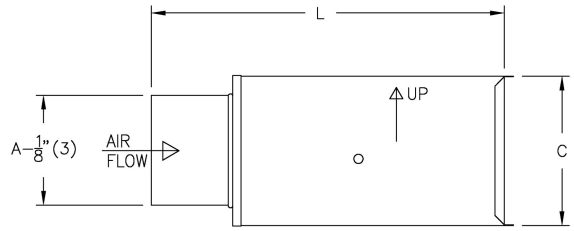
COMMUNICATION PORT:
- RJ-45 CONNECTION TO THE MAIN CONTROLLER
- RJ-12 CONNECTION TO THE PRICE USB LINKER SETUP TOOL

FEATURES:
- ROOM TEMPERATURE IS MEASURED BY AN INTERNAL 10K TYPE J THERMISTOR WITH AN ACCURACY OF +/- 0.5°F FROM 55°F TO 85°F (+/- 0.25°C FROM 13°C TO 25°C)
- LCD SCREEN WITH COOL-BLUE BACKLIGHT
- PUSH BUTTON SETPOINT ADJUSTMENT
- SYSTEM SETUP AND BALANCING DIRECTLY FROM THERMOSTAT

ALL METRIC DIMENSIONS ( ) ARE SOFT CONVERTED. IMPERIAL DIMENSIONS ARE CONVERTED TO METRIC AND ROUNDED TO THE NEAREST MILLIMETER.

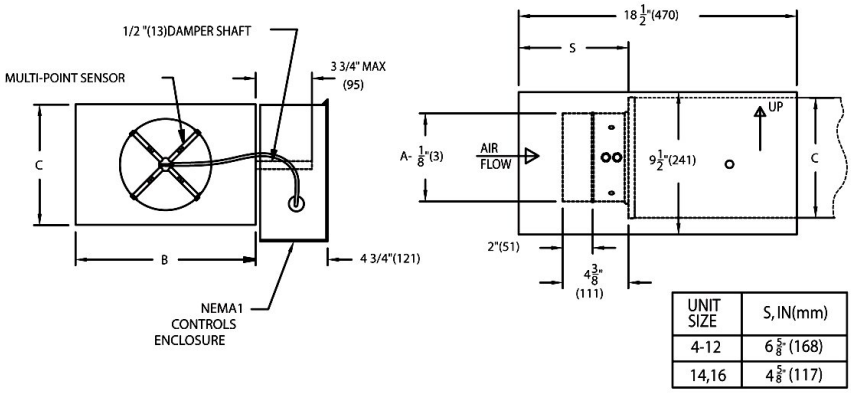
PROJECT:		price®	
ENGINEER:			**CONTROLS** PRICE LCD THERMOSTAT
CUSTOMER:		250052	
SUBMITTAL DATE:	**SPEC. SYMBOL:**	2011/07/08	

SDV8 Single Duct



Unit Size	Max Airflow	Outlet		Inlet	Length
		B	C	A	L
16	5000	24	18	16	23 5/8

Price Digital Controls



UNIT SIZE	S, IN(mm)
4-12	6 5/8"(168)
14,16	4 5/8"(117)

- Controls are supplied and factory mounted by Price. Price thermostat factory supplied for field mounting
- Controls Enclosure will be supplied as illustrated on right hand side unless specified otherwise
- PS - NEMA 1 Controls Enclosure, listed to UL50
- Multi-point Primary Airflow Sensor supplied by Price

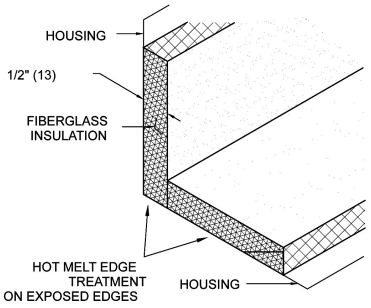
Notes

- 22 Ga. zinc coated steel housing. Mechanically sealed and gasketed, leak resistant construction
- Rectangular discharge opening with slip and drive cleat duct connection

AHRI CERTIFIED™ www.ahridirectory.org
VAV Terminals
AHRI Standard 880

Liner FG50

Internal Insulation – Fiberglass ½" (13mm) thick, min. 1.5 lb/cu.ft density, meets requirements of NFPA90A and UL 181.
R-Value = 2.1



PROJECT: Dovercourt Ph 2
ENGINEER:
DESCRIPTION: Single Duct - DDC By Price
SDV8//I/2800/16/EHP/CFM///0.0/////////FG50//////PS//C//PIC/////////////

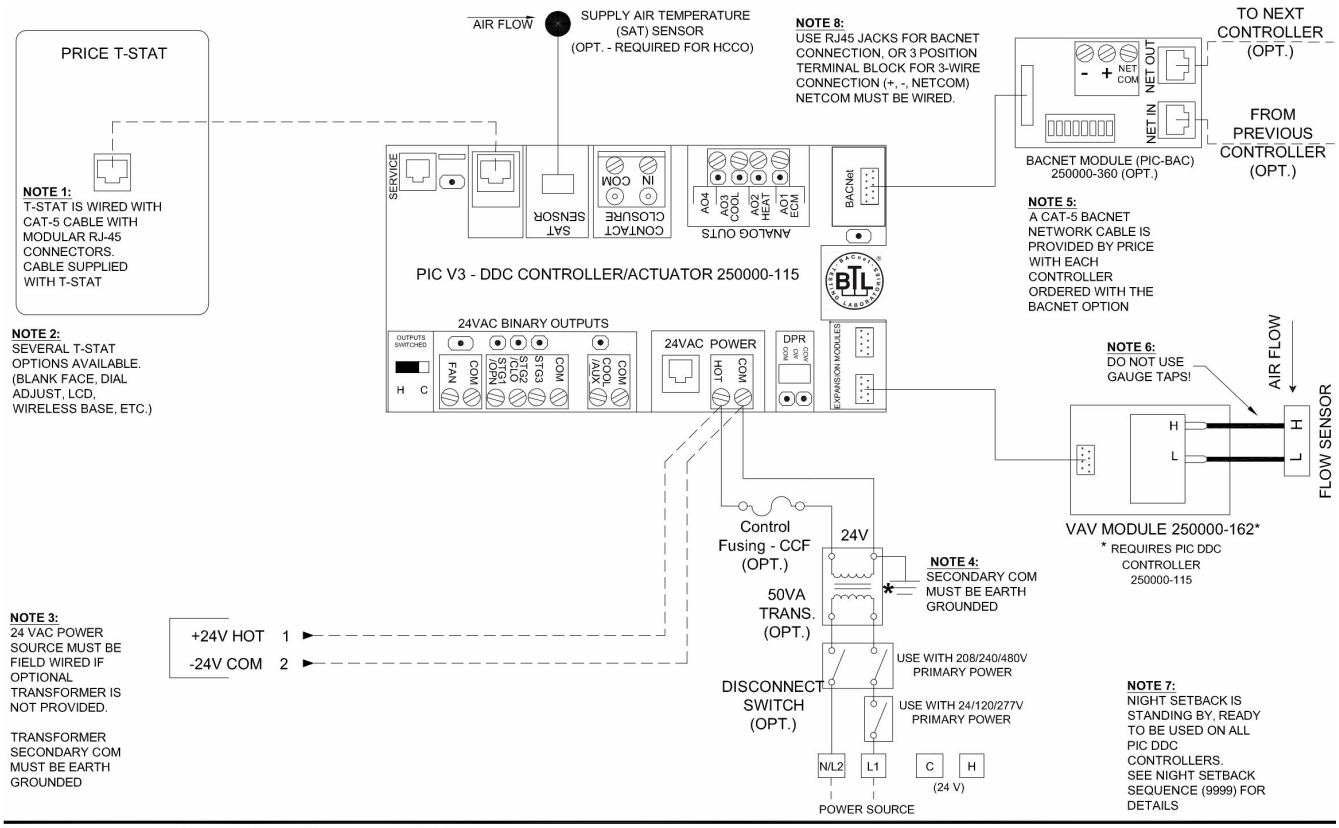
SUBMITTAL NO: 258148-L
CUSTOMER:

SUBMITTAL DATE: 4/24/2018

All metric dimensions () are soft converted. Imperial dimensions are converted to metric and rounded to the nearest millimeter.
Information within this document is subject to change without notice.

Control Sequence 2800

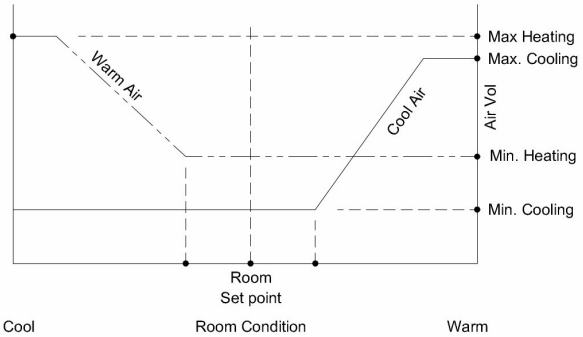
PIC - Pressure Independent HCCO or Cooling Only, No Local Reheat



LEGEND

- FACTORY FLOW SENSOR TUBING
- FACTORY ELECTRICAL WIRING
- FIELD ELECTRICAL WIRING

CONTROL GRAPH



Sequence of Operation -- Heat/cool changeover OR cooling only
Pressure Independent

On power up the damper will calibrate closed for 2 minutes.
If no SAT sensor is present, the controller assumes Cool supply air at all times

Cool supply air: On an increase in space temperature the controller regulates the actuator to open the VAV damper and increase the flow of cool air. On an increase of space temperature greater than the cooling proportional band, the airflow is maintained at its pre-selected maximum setting.

On a decrease in space temperature the controller regulates the actuator to close the VAV damper and reduce the flow of cool air. If the space temperature decreases to less than the cooling proportional band, the airflow is maintained at the pre-selected minimum setting.

Warm supply air: On a decrease in space temperature the controller regulates the actuator to open the VAV damper and increase the flow of warm air. On a decrease of space temperature greater than the heating proportional band, the airflow is maintained at its pre-selected maximum setting.

On an increase in space temperature the controller regulates the actuator to close the VAV damper and reduce the flow of warm air. If the space temperature increases above the heating proportional band, the airflow is maintained at the pre-selected minimum setting.

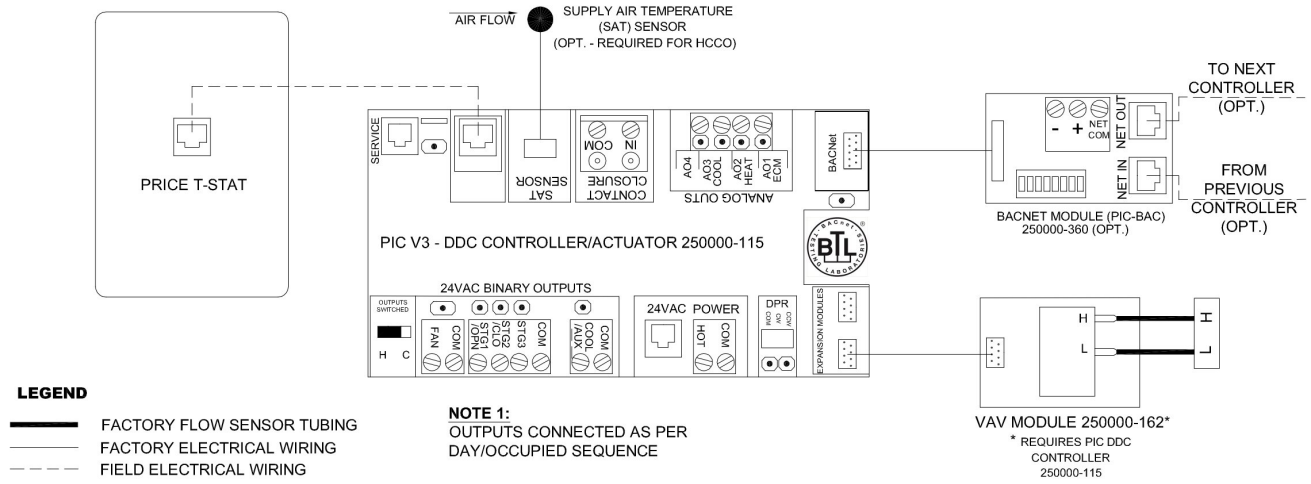
PROJECT: Dovercourt Ph 2
ENGINEER:
DESCRIPTION: Single Duct - DDC By Price
SDV8//I/2800/16/EHP/CFM///0.0/////////FG50//////PS//C//PIC/////////////

SUBMITTAL NO: 258148-L
CUSTOMER:

SUBMITTAL DATE: 4/24/2018

Control Sequence 9999

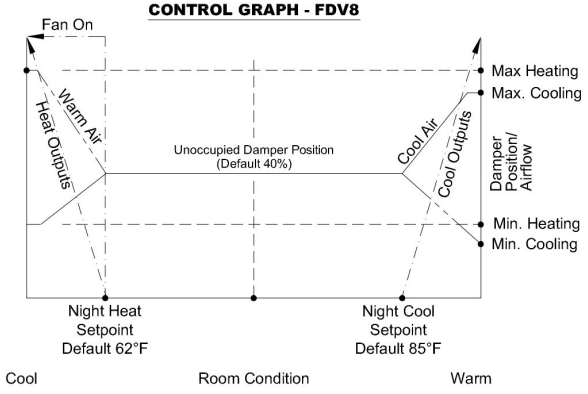
Fan Powered Variable Volume Parallel Flow - PIC Controller, Night Setback



Entering and Exiting Night Setback: There are several methods for the PIC to enter and exit night setback (unoccupied mode). All of the following methods can be enabled or disabled in software or from the T-Stat menu.

1. **Airflow Failure:** (Disabled by default) If using a Pressure Independant day sequence (with the PIC-VAV module), the controller will enter night setback when minimal airflow is sensed in the duct. The controller does this based on Day Flow Trip and Night Flow Trip (adjustable).
   Day Flow Trip is enabled when the controller sees more than 1/2 of its minimum airflow - i.e. min airflow = 132 cfm, Day Flow Trip = 66 cfm.
   Night Flow Trip is enabled when the controller sees less than 1/2 of its day flow trip value - i.e. 33 cfm
2. **Motion Sensor:** (Disabled by default) If a motion sensor T-Stat is used, the controller can enter night setback if no motion has been detetected in the space for a specified period of time (default: 4 hours).
3. **Contact Closure:** (Disabled by default) Connecting the two contact closure inputs together using a dry contact will cause the controller to enter night setback. The controller will exit night setback once the contacts are released.
4. **T-Stat Button:** The T-Stat button allows the user to exit night setback. Pressing any button on the T-Stat will cause the controller to exit night setback for the override time period. (default: 4 hours). Occupancy override by T-Stat button is always enabled and cannot be disabled.

CONTROL GRAPH - FDV8



Sequence of Operation -- FAN POWERED VARIABLE VOLUME PARALLEL FLOW - PIC CONTROLLER - NIGHT SETBACK

During night setback, the controller will respond to its night heat setpoint and its night cool setpoint.

While the room temperature is between the two night setpoints, by default the controller will maintain the damper position at 40% open. All outputs (Fan, Heat, etc.) will go to their OFF or IDLE states.

Room temperature below Night Heat Setpoint:

Fan Operation: On a decrease in space temperature into the heating proportional band, the unit fan will energize.

Reheat Operation: On a decrease in space temperature into the heating proportional band, the reheat outputs (if used) are energized proportionally.

Cool supply air: On a decrease in space temperature the controller regulates the actuator to close the VAV damper and reduce the flow of cool air. The airflow is maintained at the pre-selected minimum setting.

Warm supply air: On a decrease in space temperature the controller regulates the actuator to open the VAV damper and increase the flow of warm air. On a decrease of space temperature greater than the heating proportional band, the airflow is maintained at its pre-selected maximum setting.

Room temperature above Night Cool Setpoint:

Fan Operation: On an increase in space temperature into the cooling proportional band, the unit fan typically will not energize. It is possible to configure the controller to energize the fan if using cooling coils.

Cooling Output Operation: On an increase in space temperature into the cooling proportional band, the cooling outputs (if used) are energized proportionally.

Cool supply air: On an increase in space temperature the controller regulates the actuator to open the VAV damper and increase the flow of cool air. On an increase of space temperature greater than the cooling proportional band, the airflow is maintained at its pre-selected maximum setting.

Warm supply air: On an increase in space temperature the controller regulates the actuator to close the VAV damper and reduce the flow of warm air. The airflow is maintained at the pre-selected minimum setting.

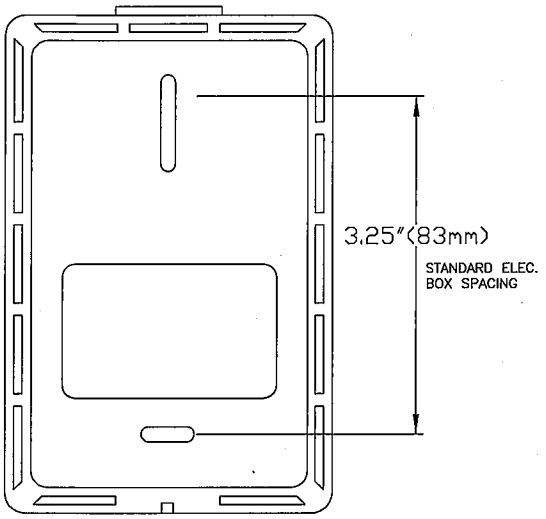
PROJECT: Dovercourt Ph 2 **SUBMITTAL NO:** 258514-A **SUBMITTAL DATE:** 4/24/2018
ENGINEER: **CUSTOMER:**
DESCRIPTION: Fan Powered, VAV - DDC By Price
FDV8//I/8800/2006/EHP/CFM/115-ECM/300/115-24V//0.0/////////FG75/PS///////C/VAV/PIC/PRB/BAC//////////

price®

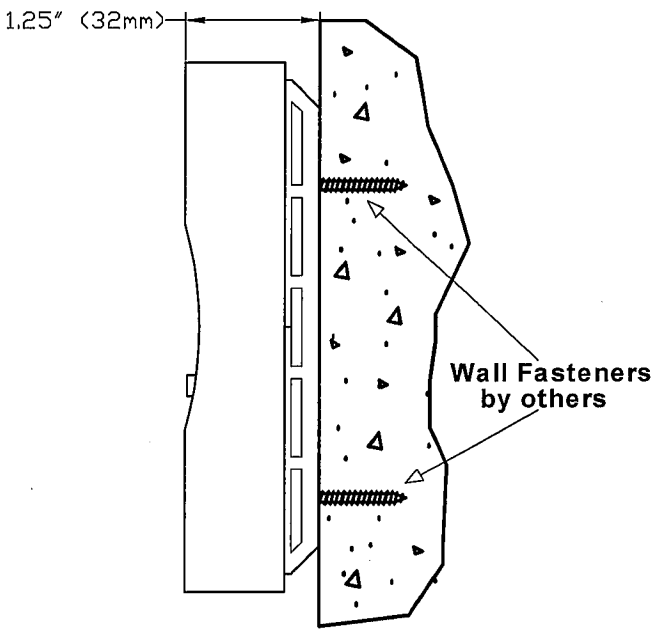
Submittal Sheet

Price LCD Thermostat
PT# 250052-100

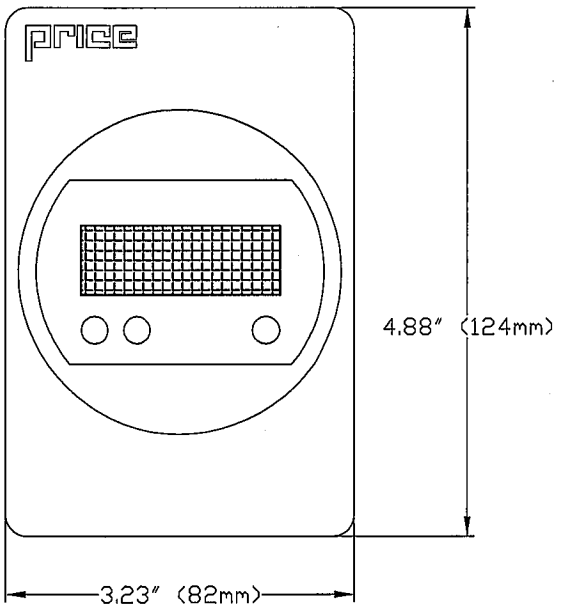
Backplate - Rear View



Surface Mount Detail



Face View



SPECIFICATIONS:

POWER REQUIREMENTS:
- POWER IS SUPPLIED FROM THE MAIN CONTROLLER (PIC, PRODIGY, ETC.)

COMMUNICATION PORT:
- RJ-45 CONNECTION TO THE MAIN CONTROLLER
- RJ-12 CONNECTION TO THE PRICE USB LINKER SETUP TOOL

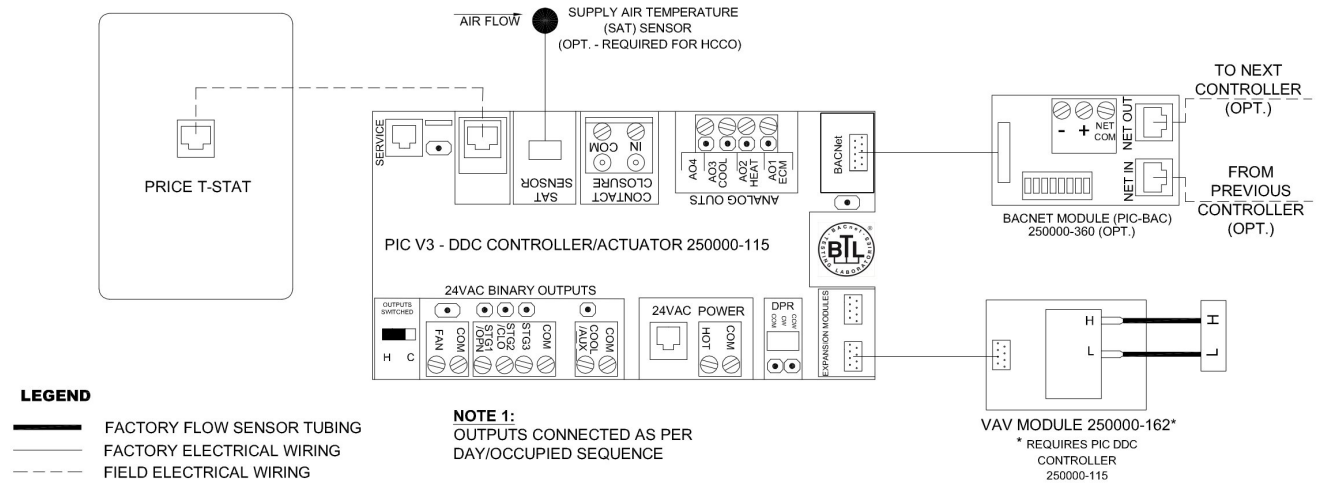
FEATURES:
- ROOM TEMPERATURE IS MEASURED BY AN INTERNAL 10K TYPE J THERMISTOR WITH AN ACCURACY OF +/- 0.5°F FROM 55°F TO 85°F (+/- 0.25°C FROM 13°C TO 25°C)
- LCD SCREEN WITH COOL-BLUE BACKLIGHT
- PUSH BUTTON SETPOINT ADJUSTMENT
- SYSTEM SETUP AND BALANCING DIRECTLY FROM THERMOSTAT

ALL METRIC DIMENSIONS ( ) ARE SOFT CONVERTED. IMPERIAL DIMENSIONS ARE CONVERTED TO METRIC AND ROUNDED TO THE NEAREST MILLIMETER.

PROJECT:		price®	
ENGINEER:			**CONTROLS** PRICE LCD THERMOSTAT
CUSTOMER:		250052	
SUBMITTAL DATE:	**SPEC. SYMBOL:**	2011/07/08	

Control Sequence 9999

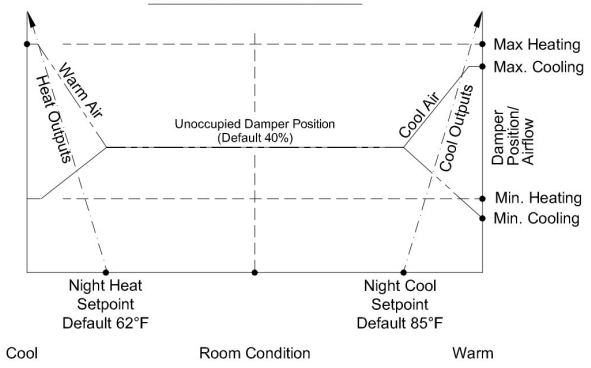
Single Duct Terminal Unit - PIC Controller, Night Setback



Entering and Exiting Night Setback: There are several methods for the PIC to enter and exit night setback (unoccupied mode). All of the following methods can be enabled or disabled in software or from the T-Stat menu.

1. **Airflow Failure:** (Disabled by default) If using a Pressure Independant day sequence (with the PIC-VAV module), the controller will enter night setback when minimal airflow is sensed in the duct. The controller does this based on Day Flow Trip and Night Flow Trip (adjustable).
   Day Flow Trip is enabled when the controller sees more than 1/2 of its minimum airflow - i.e. min airflow = 132 cfm, Day Flow Trip = 66 cfm.
   Night Flow Trip is enabled when the controller sees less than 1/2 of its day flow trip value - i.e. 33 cfm
2. **Motion Sensor:** (Disabled by default) If a motion sensor T-Stat is used, the controller can enter night setback if no motion has been detetected in the space for a specified period of time (default: 4 hours).
3. **Contact Closure:** (Disabled by default) Connecting the two contact closure inputs together using a dry contact will cause the controller to enter night setback. The controller will exit night setback once the contacts are released.
4. **T-Stat Button:** The T-Stat button allows the user to exit night setback. Pressing any button on the T-Stat will cause the controller to exit night setback for the override time period. (default: 4 hours). Occupancy override by T-Stat button is always enabled and cannot be disabled.

CONTROL GRAPH - SDV8



Sequence of Operation -- SINGLE DUCT TERMINAL UNIT - PIC CONTROLLER - NIGHT SETBACK

During night setback, the controller will respond to its night heat setpoint and its night cool setpoint.
While the room temperature is between the two night setpoints, by default the controller will maintain the damper position at 40% open. All outputs (Fan, Heat, etc.) will go to their OFF or IDLE states.

Room temperature below Night Heat Setpoint:
Reheat Operation: On a decrease in space temperature into the heating proportional band, the reheat outputs (if used) are energized proportionally.
Cool supply air: On a decrease in space temperature the controller regulates the actuator to close the VAV damper and reduce the flow of cool air. The airflow is maintained at the pre-selected minimum setting.
Warm supply air: On a decrease in space temperature the controller regulates the actuator to open the VAV damper and increase the flow of warm air. On a decrease of space temperature greater than the heating proportional band, the airflow is maintained at its pre-selected maximum setting.

Room temperature above Night Cool Setpoint:
Cooling Output Operation: On an increase in space temperature into the cooling proportional band, the cooling outputs (if used) are energized proportionally.
Cool supply air: On an increase in space temperature the controller regulates the actuator to open the VAV damper and increase the flow of cool air. On an increase of space temperature greater than the cooling proportional band, the airflow is maintained at its pre-selected maximum setting.
Warm supply air: On an increase in space temperature the controller regulates the actuator to close the VAV damper and reduce the flow of warm air. The airflow is maintained at the pre-selected minimum setting.

PROJECT: Dovercourt Ph 2
ENGINEER:
DESCRIPTION: Single Duct - DDC By Price
SDV8//I/2800/16/EHP/CFM///0.0/////////FG50//////PS//C//PIC/////////////

SUBMITTAL NO: 258148-L
CUSTOMER:

SUBMITTAL DATE: 4/24/2018

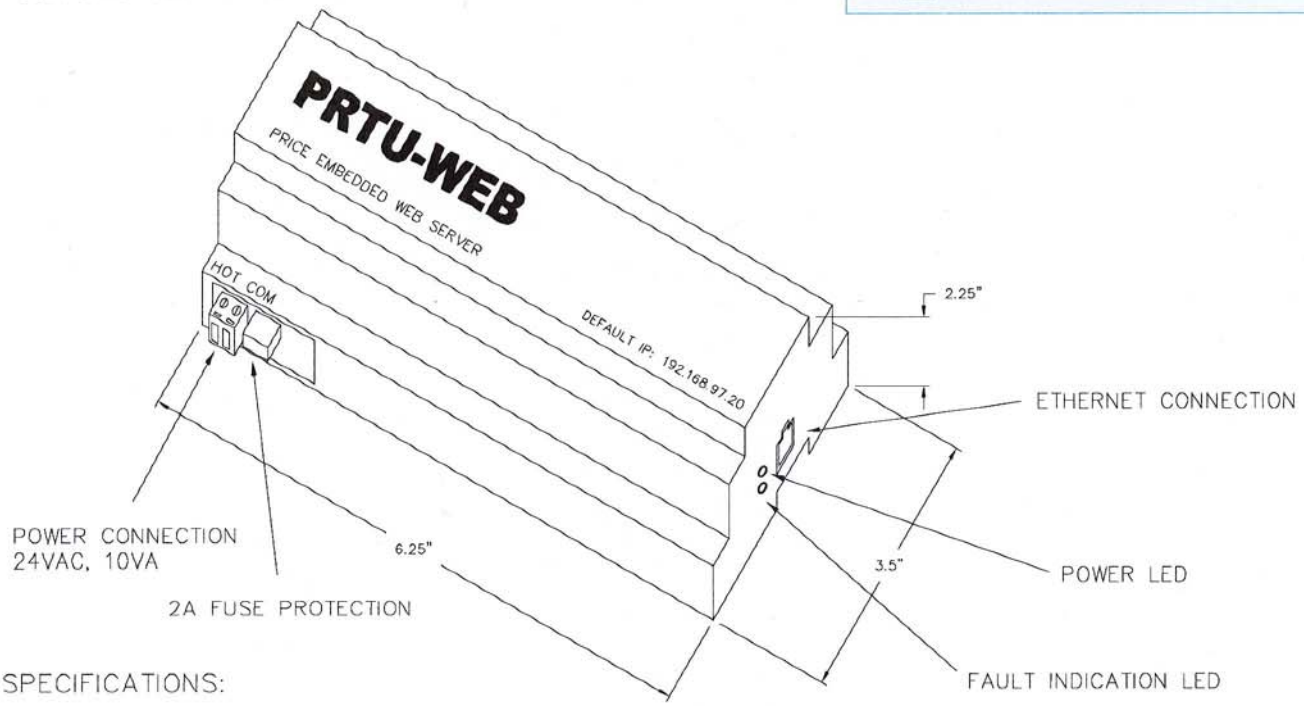
price®

Submittal Sheet

Price Embedded Web Server

FEATURES:

- INTERFACE TO BACnet MS/TP DEVICES IN BUILDING VIA WEB ADDRESS
- DISPLAYS STATUS OF ETHERNET LAN VIA GREEN AND RED LEDs
- CAN BE CONFIGURED FOR REMOTE ACCESS VIA WEB ADDRESS
- ANIMATED GRAPHIC SCREENS (BUILT-IN TEMPLATES FOR PRICE DEVICES – I.E. PRTU, PIC AND PRODIGY)
- SUPPORTS USER DEFINED GRAPHICS



SPECIFICATIONS:

- 24 VAC POWER +/- 10%, 10VA
- [1] ETHERNET PORT 10/100 Mbps (DEFAULT IP ADDRESS: 192.168.97.20)
- SERVES UP WEB PAGES IN ANY BROWSER W/ ADOBE FLASH (VER. 9 OR HIGHER)
- STAND ALONE, EMBEDDED WEB BASED GRAPHICAL INTERFACE
- BACNET/IP PROTOCOL
- SCHEDULING
- ALL SETUP AND USER INTERACTION PERFORMED VIA WEB BROWSER – NO PROGRAMMING KNOWLEDGE REQUIRED
- HISTORICAL TRENDING (SUPPORTS EXPORT TO EXCEL)
- ALARM CONDITION MONITORING WITH EMAIL NOTIFICATION
- USES FLASH MEMORY FOR INTERNAL STORAGE
- MULTIPLE USER PERMISSIONS (BASIC TO ADMINISTRATOR)
- SUPPORTS MULTIPLE SIMULTANEOUS USERS (UP TO 10)
- BATTERY BACKED REAL TIME CLOCK
- 512 MB NAND FLASH MEMORY
- STANDARD TS-35 DIN RAIL MOUNT
- SUPPORTS UP TO 2,000 TREE NODES; POINTS, GRAPHICS, TRENDS, ETC. (LIMITS ON CONTROL POINTS DEPEND ON COMMUNICATION SPEED AND NETWORK BANDWITH USED)
- RESTRICTED TO ENGLISH CHARACTERS

RECOMMENDATIONS:

- OBSERVE "24VAC HOT" AND "COMMON" POLARITY ON ALL NETWORKED DEVICES
- GROUND "24VAC COMMON" TO "EARTH GROUND"
- MAXIMUM RECOMMENDED LENGTH OF ETHERNET (10/100 Mbps) CABLE 330ft

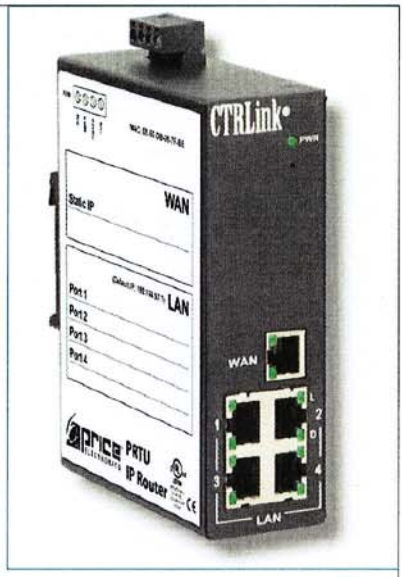
ALL METRIC DIMENSIONS ( ) ARE SOFT CONVERTED. IMPERIAL DIMENSIONS ARE CONVERTED TO METRIC AND ROUNDED TO THE NEAREST MILLIMETER.

PROJECT: Dovercourt Ph 2		price®	
ENGINEER:		MM BC	**WEB SERVER**
CUSTOMER:		265512	PRTU-WEB-SERVER
SUBMITTAL DATE: 4/24/2018	**SPEC. SYMBOL:**	2015/03/09	250000-920

price®

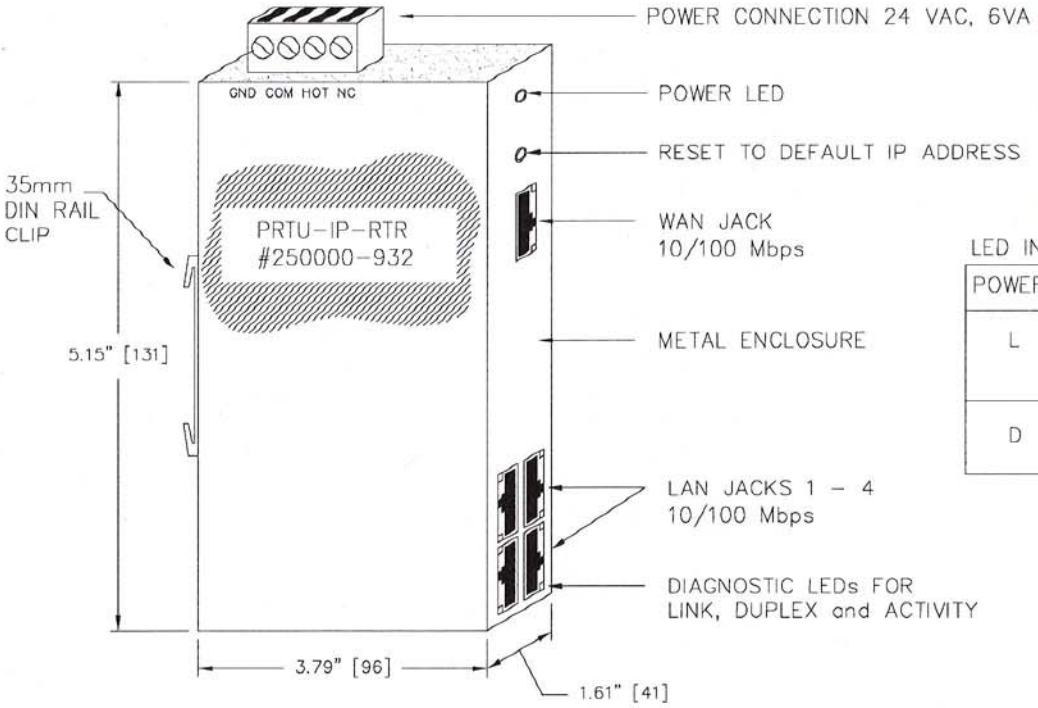
Submittal Sheet

Price IP Ethernet Router



FEATURES:

- CONNECTS BACnet IP TO BUILDING NETWORK
- DISPLAYS STATUS OF POWER, ETHERNET LAN and WAN VIA DIAGNOSITC LEDs
- CAN BE CONFIGURED IN THE FIELD VIA WEB BROWSER
- STATEFUL FIREWALL, PAT, NAT and PORT FORWARDING PROPERTIES



LED INDICATION

POWER	GREEN = POWER OK
L	GREEN = 100 Mbps COMMUNICATION ESTABLISHED YELLOW = 10 Mbps COMMUNICATION ESTABLISHED FLASH = ACTIVITY
D	GREEN = FULL-DUPLEX OPERATION OFF = HALF-DUPLEX OPERATION

SPECIFICATIONS:

- 24 VAC POWER +/- 10%, 6VA
- [1] WAN ETHERNET PORT 10/100 Mbps FOR CONNECTION TO BUILDING NETWORK (DHCP CLIENT)
- PIN SWITCH FOR RESETTING TO DEFAULT IP ADDRESS
- [4] LAN ETHERNET PORTS 10/100 Mbps FOR CONNECTION TO SEGREGATED COMPONENTS (DHCP SERVER)
  (I.E. PRICE WEB SERVER, PRICE BACnet ROUTER)
- STANDARD TS-35 DIN RAIL MOUNT
- WEB PAGE CONFIGURATION OF ROUTER SETTINGS (DEFAULT IP ADDRESS 192.168.97.1)
- ETHERNET COMMUNICATIONS:
  IEEE 802.3 10/100 Mbps DATA RATE, 10 BASE-T, 100 BASE-TX PHYSICAL LAYER

RECOMMENDATIONS:

- OBSERVE 24VAC HOT and COMMON POLARITY ON ALL NETWORKED DEVICES
- GROUND 24VAC COMMON TO EARTH GROUND
- MAXIMUM RECOMMENDED LENGTH OF ETHERNET (10/100 Mbps) CABLE 330 FEET (100m)

ALL METRIC DIMENSIONS ( ) ARE SOFT CONVERTED. IMPERIAL DIMENSIONS ARE CONVERTED TO METRIC AND ROUNDED TO THE NEAREST MILLIMETER.

PROJECT: Dovercourt Ph 2		price®
ENGINEER:	MM BC	ETHERNET ROUTER
CUSTOMER:	265511	PRTU-IP-RTR
SUBMITTAL DATE: 4/24/2018 / SPEC. SYMBOL:	2015/03/09	250000-932

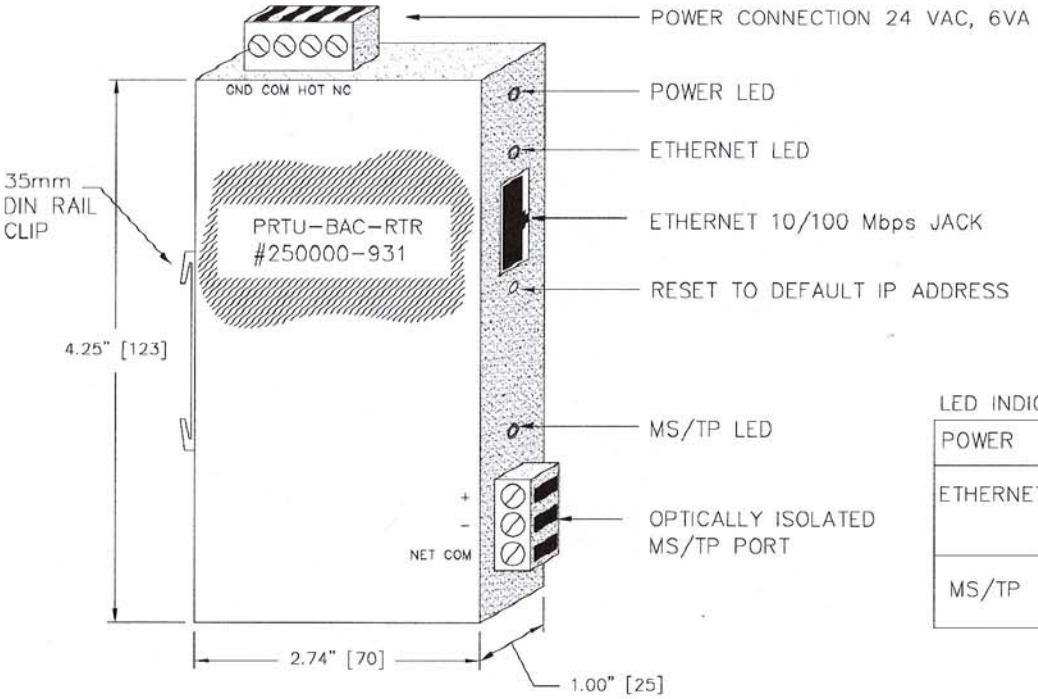
price®

Submittal Sheet

Price BACnet Router

FEATURES:

- CONNECTS BACnet IP/ETHERNET TO BACnet MS/TP SEGMENTS
- DISPLAYS STATUS OF POWER AND ETHERNET VIA DIAGNOSTIC LED
- CAN BE CONFIGURED IN THE FIELD VIA WEB BROWSER



LED INDICATION

POWER	GREEN = POWER OK
ETHERNET	GREEN = 100 Mbps COMMUNICATION ESTABLISHED YELLOW = 10 Mbps COMMUNICATION ESTABLISHED FLASH = ACTIVITY
MS/TP	FLASHING GREEN = MS/TP ACTIVITY

SPECIFICATIONS:

- 24 VAC POWER +/- 10%, 6VA
- [1] ETHERNET PORT 10/100 Mbps (DEFAULT IP ADDRESS 192.168.97.60)
- PIN SWITCH FOR RESETTING TO DEFAULT IP ADDRESS
- [1] OPTICALLY ISOLATED MS/TP PORT
- STANDARD TS-35 DIN RAIL MOUNT
- WEB PAGE CONFIGURATION OF ROUTER SETTINGS
- ETHERNET COMMUNICATIONS:
  IEEE 802.3 10/100 Mbps DATA RATE, 10 BASE-T, 100 BASE-TX PHYSICAL LAYER
- MS/TP COMMUNICATIONS:
  ANSI/ASHRAE 135 (ISO 16848-5), 9600, 19200, 38400, 76800 bps DATA RATE, EIA-485 PHYSICAL LAYER

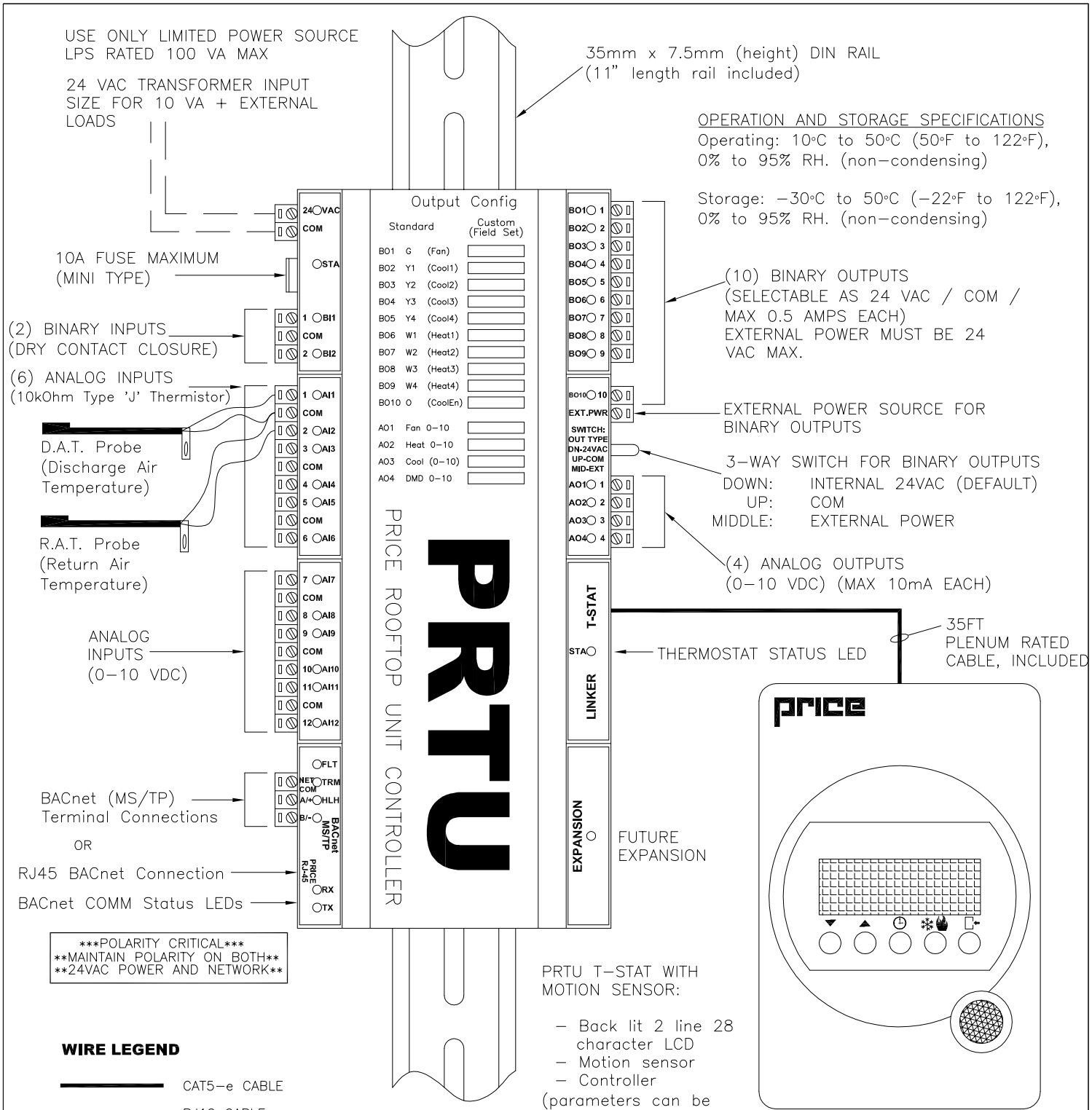
RECOMMENDATIONS:

- PRICE RECOMMENDS NO MORE THAN 30 DEVICES PER MS/TP SEGMENT
- OBSERVE 24 VAC HOT AND COMMON POLARITY ON ALL NETWORKED DEVICES
- GROUND 24 VAC COMMON TO EARTH GROUND
- DO NOT APPLY 24 VAC HOT or COMMON TO NETWORK + or NETWORK - AT ANY TIME. DAMAGE WILL OCCUR!
- MAXIMUM RECOMMENDED LENGTH OF MS/TP SEGMENT 1050 FT (365M)
- MAXIMUM RECOMMENDED LENGTH OF ETHERNET (10/100 Mbps CABLE 330 FT (100m))
- ENSURE EACH DEVICE HAS A UNIQUE MAC ADDRESS PER MS/TP SEGMENT
- ENSURE EACH DEVICE HAS UNIQUE BACnet INSTANCE PER BUILDING/SITE

ALL METRIC DIMENSIONS ( ) ARE SOFT CONVERTED. IMPERIAL DIMENSIONS ARE CONVERTED TO METRIC AND ROUNDED TO THE NEAREST MILLIMETER.

PROJECT: Dovercourt Ph 2		price®	
ENGINEER:		mn BC	BACnet Router
CUSTOMER:		265510	PRTU-BAC-RTR
SUBMITTAL DATE: 4/24/2018	SPEC. SYMBOL:	2015/03/09	250000-931

Submittal Sheet



ALL METRIC DIMENSIONS ( ) ARE SOFT CONVERTED. IMPERIAL DIMENSIONS ARE CONVERTED TO METRIC AND ROUNDED TO THE NEAREST MILLIMETER.

PROJECT: Dovercourt Ph 2		price®
ENGINEER:	SF mn	**CONTROLS**
CUSTOMER:	258516	PRICE ROOFTOP UNIT CONTROLLER PRTU 250000-900
SUBMITTAL DATE: 4/24/2018 **SPEC. SYMBOL:**	2015/6/30	

PRTU ships in Stand Alone Mode (no BACnet/Zone polling).

Stand Alone Mode

In this mode the PRTU will control the packaged RTU based on the local temperature conditions as measured at the PRTU thermostat.

On an increase in space temperature into the cooling proportional band the PRTU will progressively engage stages of cooling (up to 4) in the packaged rooftop unit. On an increase of space temperature greater than the cooling proportional band, all active cooling stages will be energized. As the space temperature approaches the cooling setpoint, the PRTU will de-energize active cooling stages.

On an decrease in space temperature into the heating proportional band the PRTU will progressively engage stages of heating (up to 4) in the packaged rooftop unit. On an decrease of space temperature greater than the heating proportional band, all active heating stages will be energized. As the space temperature approaches the heating setpoint, the PRTU will de-energize active heating stages.

Separate heating and cooling setpoints, along with adjustable changeover timers prevent system cycling between heating and cooling modes. Heating and cooling setpoints are separated by a default value of 4F (2C).

Using the two included 10k thermistor probes (Type J), the PRTU will monitor the air temperature as it is discharged (D.A.T. - measured on AI1) and returned (R.A.T - measured on AI2) to the rooftop unit.

If either of the air temperatures exceed the adjustable limits, active heating and cooling stages are de-energized to prevent low or high temperature lockouts in the packaged rooftop unit.

Adjustable minimum on/off times prevent short cycling of outputs.

Networked Mode - Average Polling

In networked mode the PRTU will poll up to 30 zone controllers (Price Intelligent Controller and/or PIC or Prodigy Smart Diffusers). The number of zones polled must be set in the field. The PRTU will poll the requested zones every 3 minutes. Data polled is room temperature and room setpoint.

In average polling mode the majority demand wins and the RTU will be controlled using that information.

Example: Cooling - 50%, Heat - 40%, Neutral - 10% = Cooling Wins.

Each zone can be weighted. The default is 1. To add more weight to a zone. (example: a large meeting room, or VIP room) increase the weight. Increasing the weight to 3 would give that zone 3 votes instead of 1.

To disable a zone set polling to 0. This is ideal for a zone which is poorly supplied and is influencing the system in a non-ideal way.

Networked Mode - Non Majority polling

Non majority favours one of the 3 modes.

Useful for:
- Heat/cool changeover systems WITH reheat at zones (favour cooling)
- Summer: Favour Cooling
- Winter: Favour heating

PRTU can be set to switch strategies automatically on season change via the real time clock and calendar.
This must be setup in the field.
Avg - spring/fall
Cooling - summer
Heating - winter

PRTU - Stat

Up/Down buttons

- Allow adjustment of stand alone setpoint and menu configurations.

Menu button

-Allows selection of info menu.
Hold for 5 seconds to enter SERVICE mode.

System mode button

Default - Automatic change over mode
Cooling mode only
Heating mode only
Ventilation/Fan only
Off
-This button is protected by default (requires passcode). However can be unlocked for user adjustment.

Time button

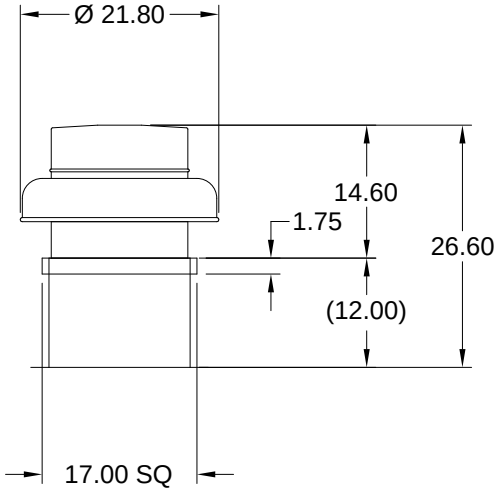
-Allows setting of real time clock and calendar.

ALL METRIC DIMENSIONS ( ) ARE SOFT CONVERTED. IMPERIAL DIMENSIONS ARE CONVERTED TO METRIC AND ROUNDED TO THE NEAREST MILLIMETER.

PROJECT: Dovercourt Ph 2	price®	
ENGINEER:	SF mn	**CONTROLS**
CUSTOMER:	258516	PRICE ROOFTOP UNIT CONTROLLER PRTU 250000–900
SUBMITTAL DATE: 4/24/2018 **SPEC. SYMBOL:**	2015/6/30	

Model: G-085-VG

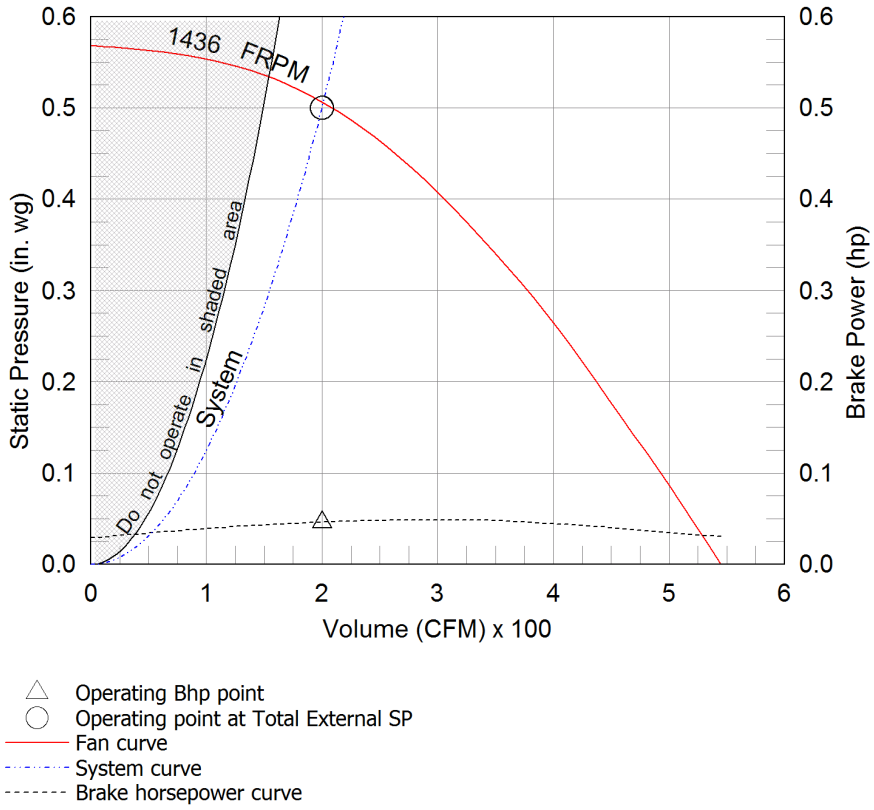
Direct Drive Centrifugal Roof Exhaust Fan



OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR.

Dimensional	
Quantity	1
Weight w/o Acc's (lb)	23
Weight w/ Acc's (lb)	37
Optional Damper (in.)	10 x 10
Roof Opening (in.)	12.5 x 12.5

Performance	
Requested Volume (CFM)	200
Actual Volume (CFM)	200
Total External SP (in. wg)	0.5
Fan RPM	1436
Operating Power (hp)	0.05
Elevation (ft)	374
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.074
Tip Speed (ft/min)	4,089
Static Eff. (%)	34



Motor	
Motor Mounted	Yes
Size (hp)	1/10
Voltage/Cycle/Phase	115/60/1
Enclosure	TENV
Motor RPM	1725
Windings	1

Sound Power by Octave Band

Sound Data	62.5	125	250	500	1000	2000	4000	8000	LwA	dBA	Sones
Inlet	71	74	69	60	56	51	44	40	65	53	6.7

Notes:

All dimensions shown are in units of in.
*NEC FLA - based on tables 430.248 or 430.250 of National Electrical Code 2014. Actual motor FLA may vary, for sizing thermal overload, consult factory.
LwA - A weighted sound power level, based on ANSI S1.4
dBA - A weighted sound pressure level, based on 11.5 dB attenuation per Octave band at 5 ft - dBA levels are not licensed by AMCA International
Sones - calculated using AMCA 301 at 5 ft

Model: G-085-VG

Direct Drive Centrifugal Roof Exhaust Fan

Standard Construction Features:

- Aluminum housing - Backward inclined wheel - Aluminum curb cap with prepunched mounting holes - Birdscreen - Ball bearing motors (sizes 85-203 and all Vari Green), sleeve bearing motors (sizes 60-80) - Motor isolated on shock mounts - Corrosion resistant fasteners

Selected Options & Accessories:

Motor - Vari-Green EC motor with Dial or 0-10VDC Input
Control - Vari-Green Remote Dial for Indoor Wall Mounting
Control - Vari-Green Transformer 85-277VAC to 24 VDC, Mounted & Wired
UL/cUL 705 Listed - "Power Ventilators"
Roof Curb-Galv., GPI-17-G12, Under Sized 1.5 in. Total, 1 in. Insulation
Damper Shipped Loose, BD-100-PB-10X10, Gravity Operated, Not Coated
Unit Warranty: 1 Yr (Standard)

DUCTSOX®
Textile Air Dispersion Products

SUBMITTAL DOCUMENTS

Dovercourt Activity Room
04/24/2018

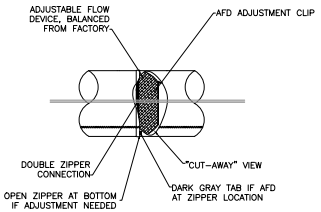
This document includes details on proposed products supplied by:

DuctSox Corporation
9866 Kapp Court
Peosta, IA 52068

Ph: 563-588-5300 or 866-382-8769
Fx: 563-588-5330 or 866-398-1646

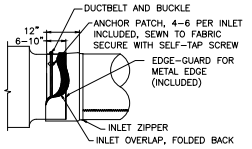
sales@ductsox.com
www.ductsox.com

E.H. Price Sales



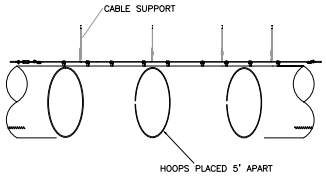
ADJUSTABLE FLOW DEVICE (AFD)

INSTALLED AT ZIPPER LOCATION AT INLET OR AS SPECIFIED IN OTHER LOCATIONS. ZIPPER TO ZIPPER CONNECTION AS SHOWN. EXTERNAL LABEL IDENTIFIES LOCATION



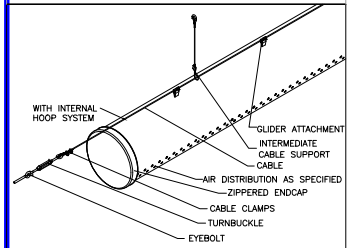
INLET ATTACHMENT DETAIL

CONSTRUCTION WITH ZIPPER AND OVERLAP



CUT AWAY VIEW OF HOOPS (IHS)

VIEW OF INTERIOR OF DUCTSOX WITH HOOPS (IHS) HANGING

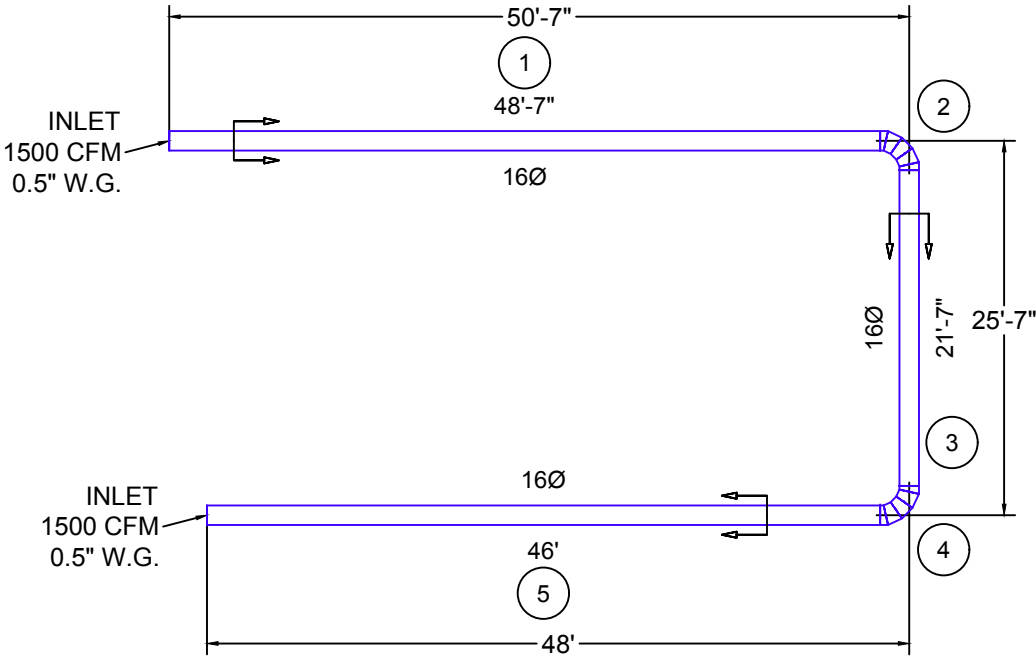


SUSPENSION DETAIL

1 ROW CABLE SUSPENSION AT 12 O'CLOCK HOOPS (IHS) CABLE

SECTION 1 - 1258 CFM
ISOTHERMAL THROW
BASED ON TERMINAL
VELOCITY OF 50, 100, & 150 FPM

SIZE 16 VENT AT 4:00 = 28' 17'-6" 11'-6"



SECTION 3 - 553 CFM
ISOTHERMAL THROW
BASED ON TERMINAL
VELOCITY OF 50, 100, & 150 FPM

SIZE 17 VENT AT 8:00 = 28'-6" 18' 12'

SECTION 5 - 1189 CFM
ISOTHERMAL THROW
BASED ON TERMINAL
VELOCITY OF 50, 100, & 150 FPM

SIZE 16 VENT AT 4:00 = 28' 17'-6" 11'-6"

DUCTSOX®
TEXTILE AIR DISPERSION PRODUCTS

9866 Kapp Court PH: 866-382-8769
Peosta, IA 52068 www.ductsox.com

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN FEET AND INCHES
LENGTH TOLERANCES: (+/-) 3" PER INITIAL 10'. (+/-) 1" EVERY 10' AFTER

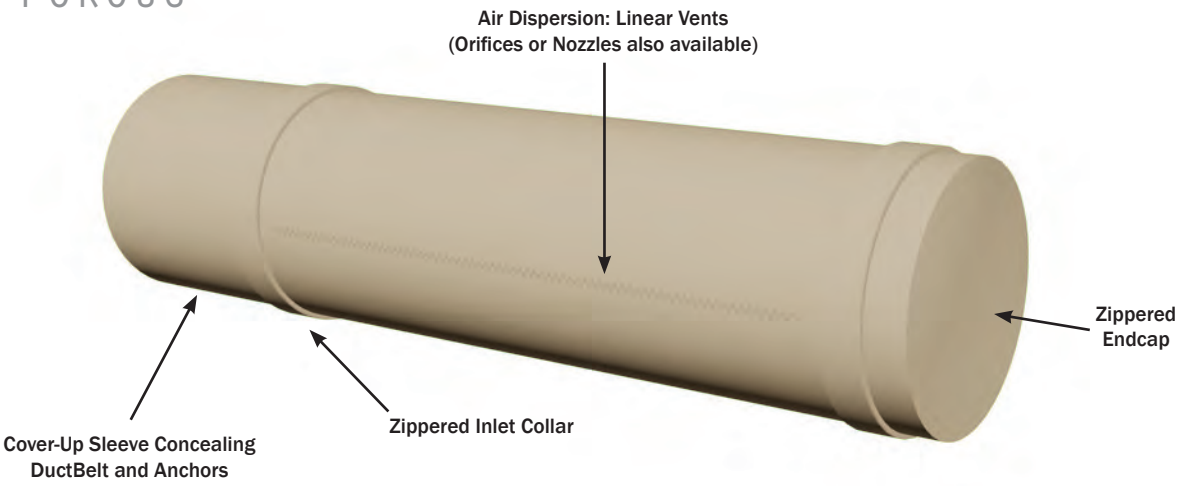
DRAWING TITLE	DUCTSOX PLAN VIEW
PROJECT NAME	DOVERCOURT ACTIVITY ROOM
REPRESENTATIVE	E.H. PRICE
DRAWING NUMBER	DS17-2052
DRAWN BY	KS
DATE	01 SEP 2017

FABRIC	VERONA	COLOR	NOT SPECIFIED
HANG HEIGHT	BOD = 15' AFF		
SUSPENSION	INTERNAL HOOP SYSTEM	FITTING ALIGNMENT	N/A
HARDWARE	GALVANIZED CABLE	SCALE	NTS
REVISION	2	PAGE NUMBER	1 OF 1

REV	DESCRIPTION	BY	DATE
1	REVISED CFM	CJK	06 SEP 2017
2	REVISED SUSPENSION	CJK	24 APR 2018
-	-	-	-

Verona™

Air Porous



Fabric

The all purpose Verona is a woven, air permeable commercial grade fabric that offers best-in-class performance and features. Features include finished seam construction, a positive inlet anchoring system with cover-up sleeve, zippered endcaps, and a zippered inlet collar for a DuctSox Final Filter or AFD. Verona comes in seven popular colors, including black, silver, white, tan, green, blue, and red. Also available in custom colors. Verona is machine washable and available with all DuctSox suspension systems.

Application

Ideal for any aesthetically-attractive environment. Common uses include retail, commercial, education, and community applications. Ideal if condensation is a concern.

Specifications

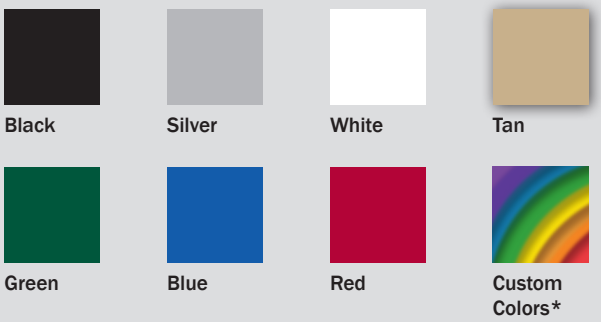
Weave: Fire Retardant Polyester Filament/Filament Twill

Weight: 6.8 oz/yd^2 (231g/m^2)

Porosity: 2 CFM/ft^2 at 0.5" w.g. (10.2L/s/m^2 @ 125Pa)

Codes:
- Classified by Underwriters Laboratories in accordance with the requirements of:
  - NFPA 90A
  - UL 2518
- UL-C (Canada)
- BS 5867 Part 2, 1980
- GB8624-2006
- DIN 4102-1

Color Options



Custom colors available, but requires a premium charge and additional lead time.

Note: Colors may vary. No two dye lots are the exact same color.

CLASSIFIED UL®
File R18856

	Warranty Period (in years)*					
	SkeleCore FTS	SkeleCore Pull-Tight	Hoops (IHS)	Hangers	1,2,or3 Row	Surface Mount
Sedona-Xm, TufTex	20 (pro-rated 11-20)	15 (pro-rated 11-15)	10	10	10	10
Verona, DuraTex	15 (pro-rated 11-15)	10	10	10	10 (pro-rated 8-10)	10 (pro-rated 8-10)
UFSox, Stat-X	5 (pro-rated 2.5-5)					
Rx, Microbe-X, LabSox, KitchenSox, ChemSox	1					
OvalSox	5 (1 year for Food Processing)					

**Application Requirements: Airflow and static pressure per original DuctSox design in accordance with published requirements. Warranty is based on inlet velocities up to 1600 FPM (8.12m/s). For SkeleCore FTS, a 10 year warranty is available for inlet velocities up to 2000 FPM (10.16m/s). Some exceptions may apply.*

Design & Performance Warranty

DuctSox Systems that are designed within our performance criteria, based on DuctSox submittal documents, are covered by a 1 year Design & Performance Warranty. We want to ensure the product performs consistently through the entire heating and cooling cycle for the first year of operation. To ensure a DuctSox System is designed correctly, our Inside Sales and Engineering group are available to provide design assistance. Our Design Manual is also available on **www.ductsox.com/media-library**.

Product Warranty

Our Product Warranty is for replacement or repair credit based on the amount of the warranty period remaining. The warranty is not available in the form of a cash payment, only as credit towards repair or replacement. The DuctSox Warranty covers materials, fabrication, and performance of the fabric portion of the DuctSox System only. Warranty coverage begins at the time of shipment.

Both the Design & Performance Warranty and the Product Warranty exclude damage to the fabric from improper installation, poor maintenance, abuse, abrasion, caustic chemicals, exposure to high temperature (over 180 degrees Fahrenheit, 82 degrees Celsius), fabric discoloration and shrinkage, or any unauthorized modifications to the DuctSox System. It also does not cover labor, equipment rental, or freight charges incurred as a result of executing the warranty.

The DuctSox Product Warranty is non-transferable.

VENTILATION

Airflow is delivered through a DuctSox system by pressure difference between the inside and outside of the system. Designed as a closed system, this “ineternal” pressure is calculated using:

SP_1 = Static Pressure
VP = Velocity Pressure = (Velocity/4005)2
FL = Frictional Pressure Loss, use metal equivalents.

Typical design standards suggest a ½” w.g. Static Pressure (SP) supplied at the inlet location.

Velocity Pressure (VP) according to extended testing and research, approximately 65% of VP is regained within the closed system as static pressure. To ensure proper inflation at the inlet, static pressure must be at least 30% higher than the velocity pressure

Static Pressure (SP) > VP x 1.3

Frictional Loss (FL) in most DuctSox systems is low due to inlet velocity and few diameter reductions.

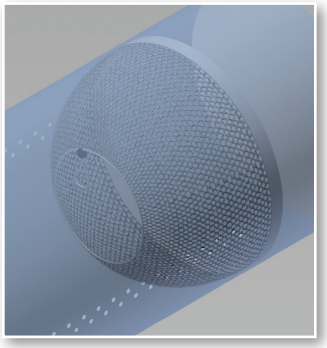
Average Pressure (AP) is the summation of these pressures acting on the system:

AP = SP + ((0.65 x VP - FL) / 1/414) (inch H20)

Fabric Airflow
If the design includes a porous fabric, this airflow can be calculated using the following equations:

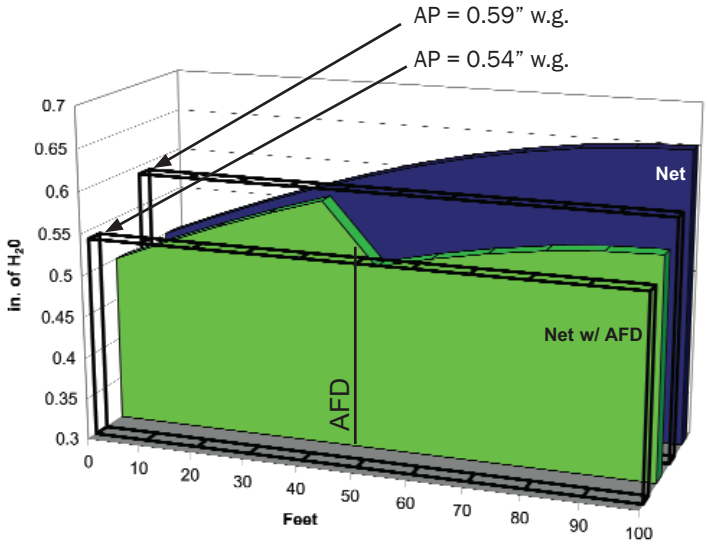
Q_{fabric} = FP x SA x √ (AP/.5) (CFM)

FP = Fabric Porosity (rated) (CFM/ft^2)
SA = Surface Area (all fabric) (ft^2)
AP = Average Pressure (inch/w.g.)

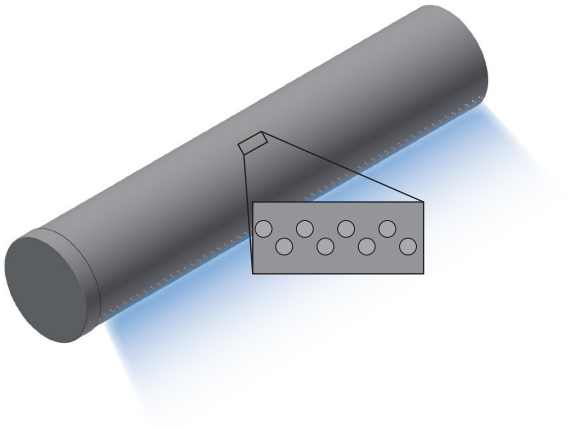


ADJUSTABLE FLOW DEVICE *(IF APPLICABLE)*

Airflow control is critical in HVAC air dispersion. The zip-in Adjustable Flow Device (AFD) offers variable resistance to balance static regain, balance airflow to branches reduce turbulence and reduce abrupt start-ups.



Linear Vents



Linear vents provide a gentle airflow. Typically used in high occupancy spaces where air diffusion and mixing are of high importance.

Vent Size and Airflow

To calculate vent size and airflow use the following steps:

1. Calculate airflow through fabric.

   Q_{fabric} = FP x SA x (AP/0.5)

2. Calculate Total Vent Size (TVS).

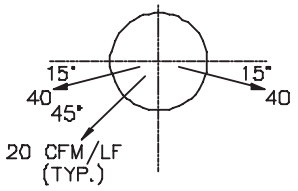
   TVS = (Q_{vent} / (Length x √ (AP/.5)

3. Select Vent Sizes.

   TVS = (VS_1 +VS_2 ...)

4. Specify Vent Orientation.

EXAMPLE



TVS = 100

100 = 40 + 40 +20

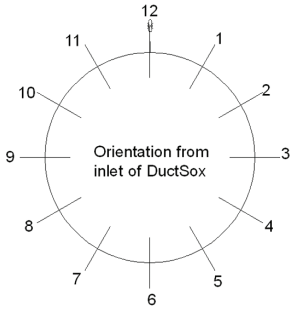
Vent Size and Airflow

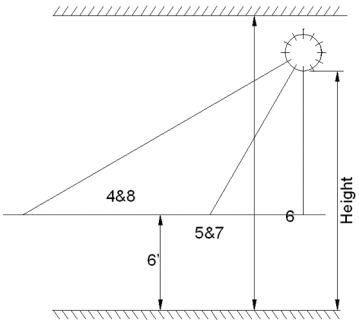
DuctSox Systems are 100% custom made, leaving room for unlimited flexibility for the locations of the Linear Vents. Some of the considerations when designing outlet orientation are:

11&1, 10&2 AND 3&9 O'CLOCK: Throw requirements focus on reaching exterior walls or filling gaps between parallel runs.

4&8, 5&7 AND 6 O'CLOCK: Throw requirements can be critical in these locations because air is delivered towards the occupied space in most cases. To calculate the throw, use the distance between the bottom of the DuctSox System and the distance above the floor using the following equations:

4&8 o'clock: (Height - 6) x 2.00 = Throw required
5&7 o'clock: (Height - 6) x 1.16 = Throw required
6 o'clock: (Height - 6) x 1.00 = Throw required





Required Maintenance

There are three different areas to consider for maintaining your DuctSox Products.

Performance:

DuctSox products have been refined to reduce or eliminate required maintenance. Over years of use, extensive dirt build up will have little, if any, effect on the air dispersion performance of our products.

Aesthetics:

Keeping the exterior of your DuctSox looking clean may be very important to you. If this is the case, your maintenance schedule should be no different than with metal duct. Although, keeping your DuctSox looking clean can be much easier and less expensive than keeping your metal duct clean. There are a few things that may help reduce the exterior dusting of a DuctSox, including selecting a porous fabric or cycling the system once daily. The most common options for cleaning your DuctSox include vacuuming and/or using compressed air, or it can be easily removed and laundered.

Hygienic:

Over its lifetime, the interior of a duct system will collect dust and/or other micro-organisms that have been known to contribute to sick building syndrome. DuctSox has a distinct advantage over metal—you can completely launder your fabric duct system. This allows you to clean both the inside and outside of your HVAC system helping to eliminate the contributors of sick building syndrome.

Overall, the laundry requirements for each space varies based on the quality of the filters in the air handling unit, the amount of dirt entrainment entering the space (on people's shoes and/or clothing), and other location related issues (e.g. near farmland). Based on our experience, average commercial spaces with relatively high traffic and 50% efficient filters may choose to launder their DuctSox after five to seven years. If your fabric is white, a more frequent schedule may be necessary.

Laundering Instructions

- Remove the DuctSox fabric from your system, being sure to unzip all sections. Take care in recording where each section was installed.
- Turn soiled side out, soak in cold water for 30 minutes.
- Any commercial washer with mild detergent should be suitable for laundering your DuctSox.
- Wash cold on a gentle cycle.
- Rinse thoroughly (repeat cycle if water/DuctSox still soiled).
- Line dry or no-heat tumble dry.

If the system becomes dirty/soiled during installation, please coordinate a proper cleaning prior to completion.

Exterior surface dirt can, most frequently, be blown off using a combination of a brush and compressed air.

NOTE: For PolyTex, the above laundering instructions do not apply. PolyTex can be sprayed with water to remove dust and dirt particles. Wash with soapy water and rinse clean, if needed.

DUCTSOX®
Textile Air Dispersion Products

Installation Guide
Hoops (IHS) Cable

Thank you for selecting a DuctSox System. This guide will be helpful for the installation of a Hoops (IHS) Cable System. Sections of fabric will be labeled, assembled, bagged, and boxed for shipping. More complicated systems will include a CAD detail of the system identifying what is in each package. NOTE: The DuctSox cable attachment (Glider) is built for 1/8" (3mm) cable only.

Overview

Inventory
The first step on any installation project is to read through this guide thoroughly and review the components that need to be installed. The best way to do this is to review the drawings of the project while reading the guide, including the CAD detail if applicable.

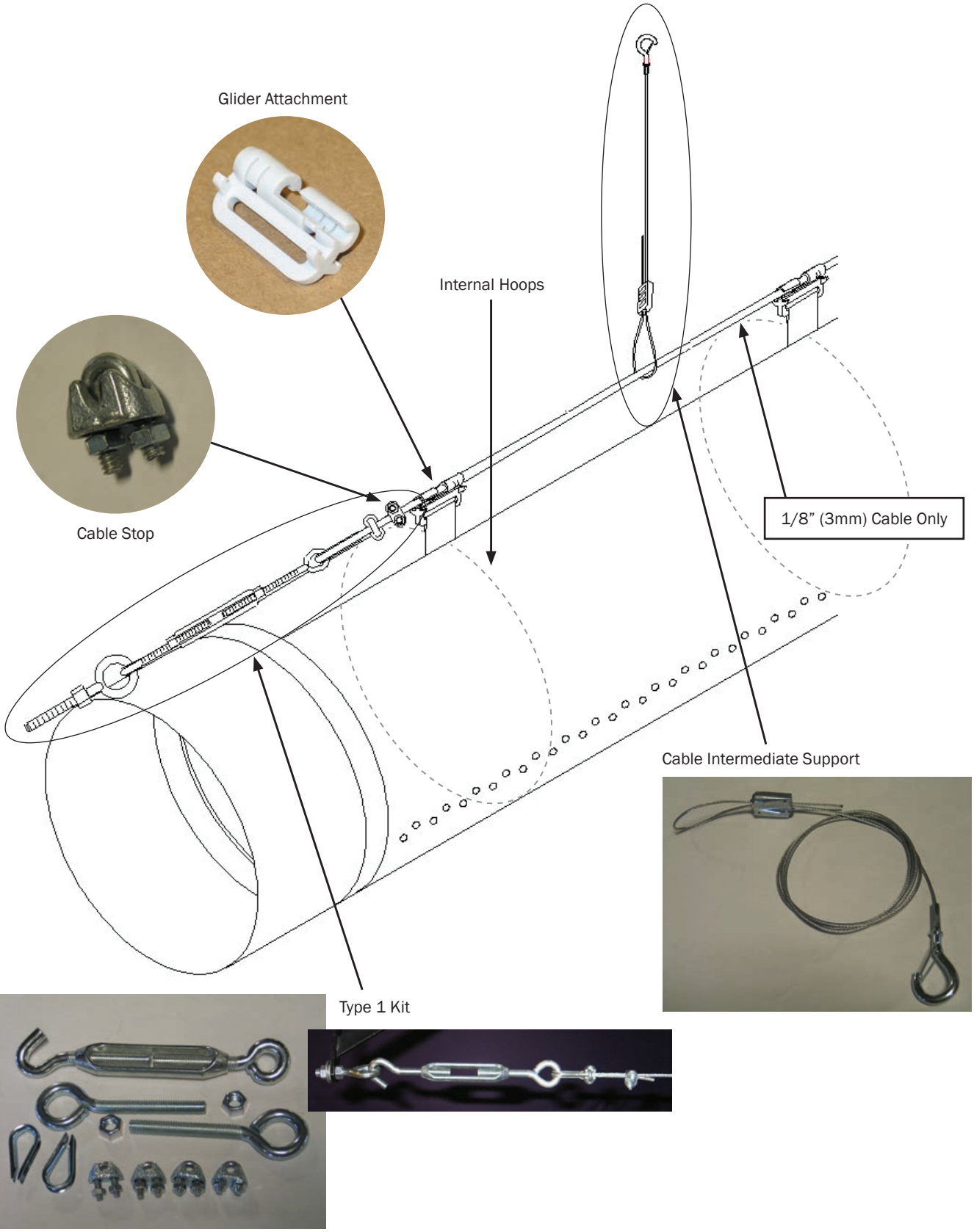
Shipping/Receiving
In some cases the DuctSox support system is delivered to the job site ahead of the DuctSox fabric sections. Depending on the size of a project or order, a DuctSox system will be shipped by common courier in a single brown box or several boxes. Larger orders will be shipped in crates by a common freight courier. Each DuctSox length should be packaged into individual plastic bags and labeled according to size and number of pieces. Other markings or labeling may also be incorporated for larger or more complicated systems. Be sure you have determined all boxes are accounted for.

Unpacking
Inspect shipment carefully and make sure all pieces are accounted for. Account for everything by emptying the box and examining all contents. Note any missing or damaged pieces listed on the Bill of Lading.

Labeling
Each DuctSox section will be marked with the size and section number either inside the belt of the inlet or on a tag inside the DuctSox near the zipper. The marking shall be the diameter, section length and total length. If custom labeling has been used, locate an identification sheet that will be included with the delivery.

Equipment Required:
- Drill
- Level
- Tape measure
- Marker or pencil
- Wrenches for cable clamps and eye bolts (5/16" and 9/16")
- Flat (standard) screwdriver
- Cable cutter

Component Details



Installation Steps

1. Review materials in box, including the CAD drawing and installed location of the DuctSox
2. Prepare metal inlet collar for fabric connection
3. Mark placement and install cable.
4. Install and assemble DuctSox components
5. Start up AHU
6. Balance airflow

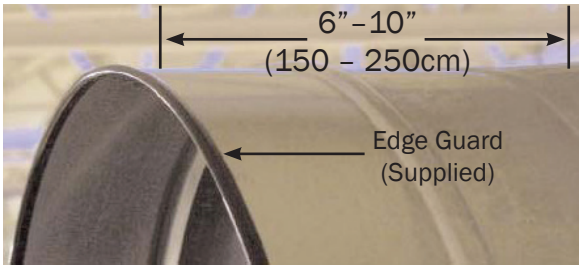
Step 1

Review materials in box, including the CAD drawing and installed location of the DuctSox. READ INSTRUCTIONS THOROUGHLY BEFORE BEGINNING.

Step 2

Prepare metal inlet collar for fabric connection.

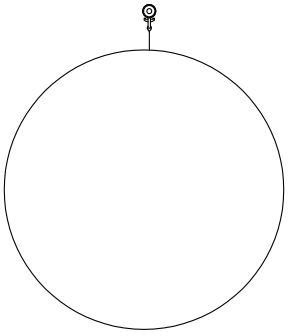
- Confirm inlet air supply location.
- Confirm inlet air supply size.
- DuctSox inlets are manufactured 1/2" (12mm) larger than specified to fit over metal inlet collar.
- Metal collar length should be 6"–10" (150 to 250cm) for secure fabric attachment.
- Edge Guard (provided) should be installed on the edge of the metal collar to reduce fabric wear from the metal edge.



Step 3

Mark Placement and Install Cable.

Step 3 – 1 Row Style



The following details are used for ALL styles.

Type 1 and Type 2 Kits

Type 1 and Type 2 kits are for straight runs of cable:

- Type 1: 50 feet (15250mm) or less
- Type 2: 50 to 100 feet (15250mm to 30500mm)
- For systems over 100 feet (30500mm), a combination of the kits should be used.

These kits include one 6" (153mm) turnbuckle (two for Type 2), two eyebolts, two cable thimbles, and four cable clamps.

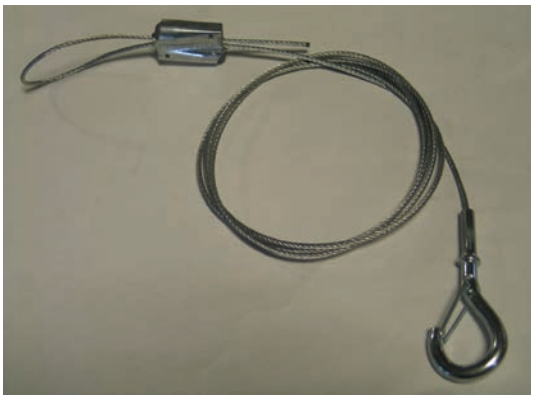
Eye bolts must be fastened into the structure of the building by others (this could include knee braces).

Cable is fastened directly to an eyebolt with a thimble and two cable clamps. Take the cable end and thread two cable clamps onto it. Now hook the thimble onto the eyebolt. Next, thread the cable onto the thimble and through the eyebolts (cable clamps are still on the cable). Now thread the cable back into the cable clamps and tighten them.

Cable is then fastened directly to the turnbuckle with a thimble and two cable clamps. Slack in the cable is taken up by the turnbuckle. If cable is still too loose after tightening the turnbuckle, loosen the cable, re-fasten cable to turnbuckle at a tighter position, and re-tighten the turnbuckle. Do not over-tighten the turnbuckle, we recommend no more than 100 lbs (445 Newtons) of tensile force.

Intermediate Support Cable

Installed every 12.5 feet (3810mm) or less to keep the DuctSox installed at a consistent elevation (reduces sag of the cable).

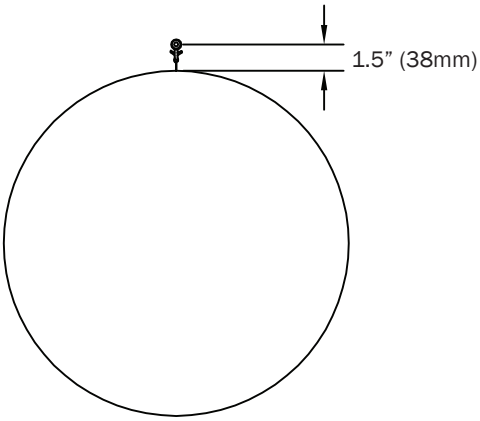


Standard

Pools

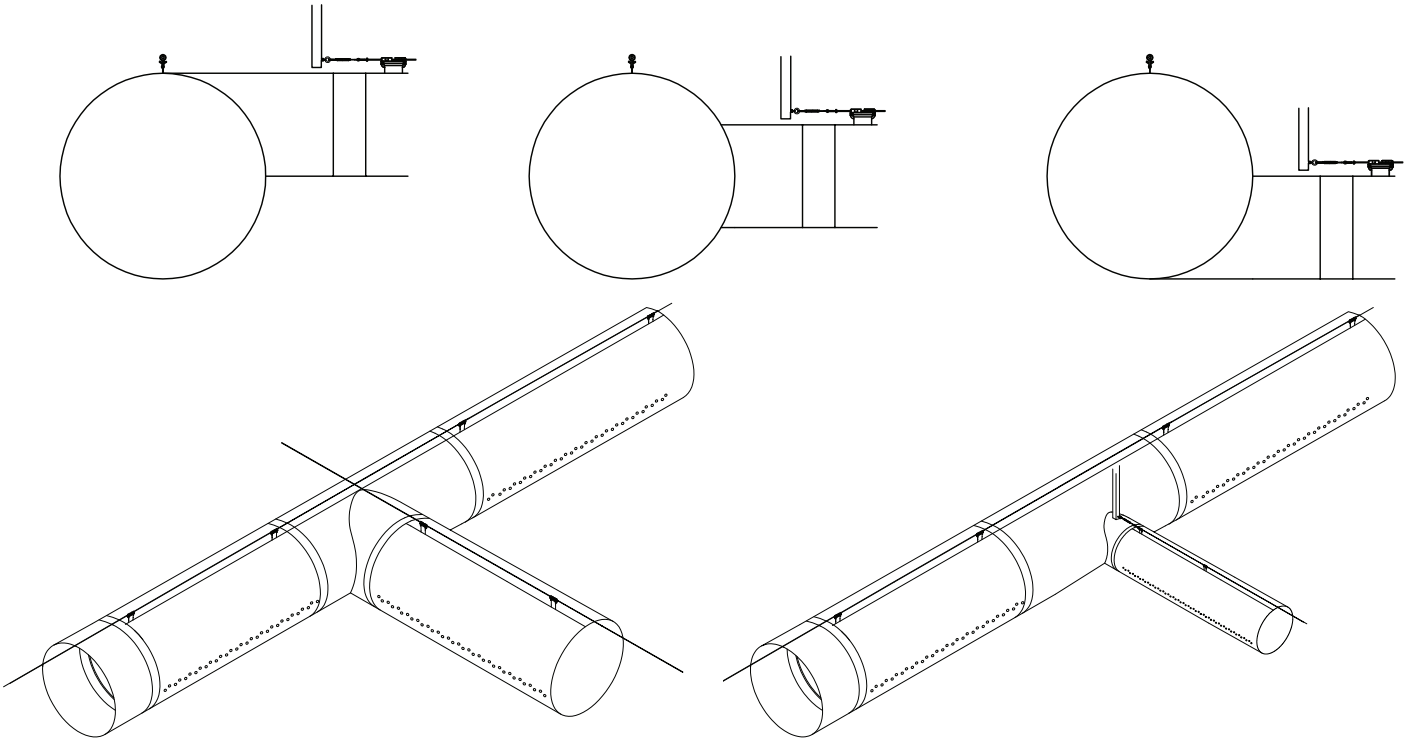
Step 3

Determine placement of cable (both cable path and elevation). The cable must be mounted 1.5” (38mm) above the 12:00 location of the DuctSox. Intermediate Cable supports are spaced no more than 30ft (9150mm).



T’s

There should be roughly 12” (305mm) from sidewall of DuctSox to the closest edge of any knee-bracing. Structure too close to the main run may cause premature failure due to abrasion from the structure. NOTE: Offset distance of branch knee-brace from main trunk is approximately half of the main trunk diameter plus 12” (305mm).



Elbows

Extended straps on heels of elbows are provided for support to cable suspension (Figure A). Vertical elbows are also supported by extended straps (Figure B).

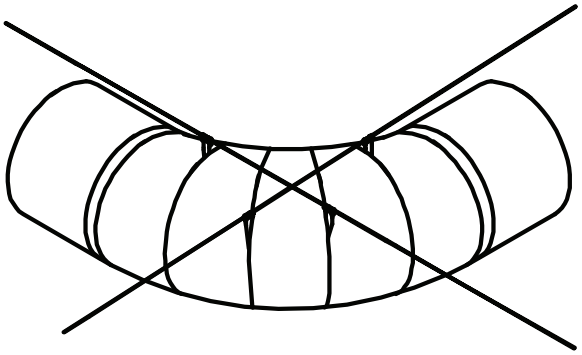


Figure A

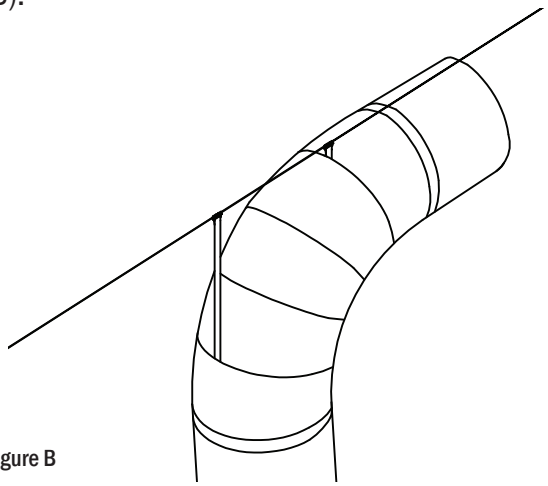
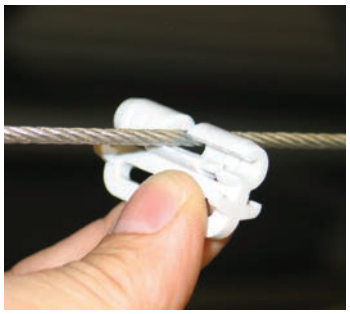


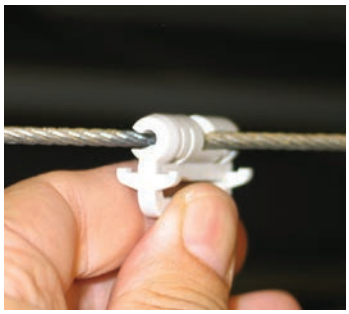
Figure B

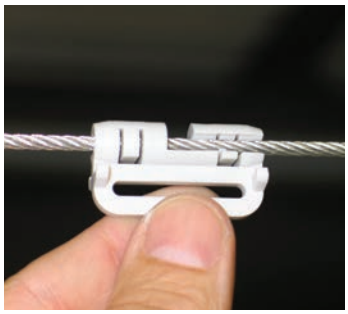
Step 4

Install DuctSox Fabric. DuctSox Inlet must be attached to the metal collar using screws (not included) through plastic patches on the Inlet Belt. Be sure to locate the zipper start and seam at the 12:00 orientation for proper alignment.

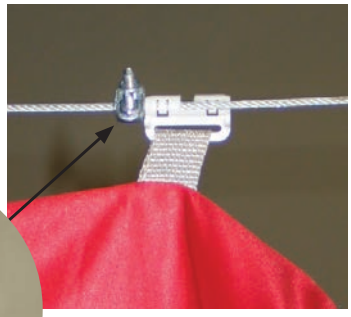
Twist and snap the Glider attachments of the DuctSox onto the cable (pliers may be helpful for installation and removal of Gliders). Unzip fittings and slide them in place independently of the straight sections. Cable Stops are installed at the Endcap Glider, at the Inlet Glider, and at each Glider immediately adjacent to all fittings. Leave them installed loose until Step 5 is complete. Close all zipper connections before moving to Step 5.

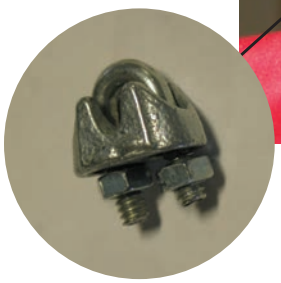






The Cable Stop is used to keep sections of DuctSox from moving lengthwise on the cable. They also are used to put a slight tension on straight sections of DuctSox (straight sections may consist of more than one zippered section of DuctSox). Nuts are tightened to lock the stop at locations where Gliders are to be locked in place (see Step 5).





Step 5

Start Up AHU. Turn on the AHU and inflate the DuctSox System. Check all Gliders and sections to ensure system is inflating properly. If required, move Gliders to eliminate puckering at binding locations. If lengths do not fit properly, double check all field measurements and compare to drawings. If all measurements are correct, contact your DuctSox factory rep to discuss options.

Once system is properly adjusted, inflate the system, pull the last Glider in each straight section (including straight sections between fittings), and secure tension using Track Stop Screws. Also, be sure to install a Track Stop Screw into the U-Track at the Endcap Glider, at the Inlet Glider, and at each Glider immediately adjacent to all fittings.

The Track Stop Screw is used to keep sections of DuctSox from moving lengthwise in the U-track. They also are used to put a slight tension on straight sections of DuctSox (straight sections may consist of more than one zippered section of DuctSox). The screw is tightened into the bottom channel to lock the stop at locations where Gliders are to be locked in place.

If the system includes elbows or T's, secure Gliders before and after these fittings. Failure to install DuctSox Systems correctly may void warranty.

Step 6

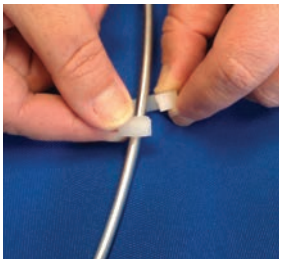
Air Balancing. System must be balanced to design CFM and static pressure immediately after installation. Most DuctSox Systems include a zipper at the inlet location for easy access to monitor flow.

If the fabric is fluttering after balancing, please contact your factory rep immediately. Solutions to the fluttering include adjusting the Adjustable Flow Device (AFD), adding AFDs, or other solutions that would result in a less turbulent airflow.

Laundering Instructions

Sedona-Xm, TufTex, Verona, DuraTex, Microbe-X, Rx, and Stat-X fabrics:

- Remove the DuctSox fabric from your system, being sure to unzip all sections. Take care in recording where each section was installed.
- Remove the hoops from the DuctSox system by simply twisting the attachment sideways. *Note: the hoop attachment only slides one way.*
- Turn soiled side out and soak in cold water for 30 minutes.
- Wash cold, gentle cycle.
- Rinse thoroughly (repeat cycle if water/DuctSox still soiled).
- Drip dry or no-heat tumble dry.



If any questions arise regarding the installation of your Hoops (IHS) Cable System, contact us.

866-382-8769 or 563-588-5300

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