

Atlas Building Group Submittal Stamp Page

Project Name: NVA - Clark Animal Hospital Submittal Section:

Project Number: 23-035 Submittal Description: Mechanical Submittals

Submittal Number: 15000-001 Date:

Atlas Building Group

Reviewed By: Jeremy Boettler

Date: 9.29.23

This approval/review is for general arrangements and outline coordination only. The review by ABG does not constitute any change in the contract documents nor relieve vendor of any responsibility to provide proper design and manufacturer of reviewed item. No responsibility is assumed by Atlas Building Group, LLC for any errors or omissions in vendor or subcontractor drawings/specifications.



Submittal

01-0

Air Devices

325 Sun Valley Circle
Fenton, MO 63026
636-349-4990

Clark Animal Hospital (23-398)
10320 Manchester Rd.
Kirkwood, MO 63122

Air Devices

Subject

Air Devices

Status

Submitted ●

Spec Section

23 37 13 - Diffusers, Registers, and Grilles

Date: 9/26/2023

Due Date: 10/10/2023

Type

Product Data

Importance

Normal

From

R.F. Meeh Company
Rob Meeh
rjmeeh@rfmeeh.com
636-349-4990

To

Atlas Building Group
Jeremy Boettler
jeremy.boettler@abgbuilds.com
636-724-000

DOCUMENTS FOR REVIEW



File

Clark Animal Hosp...
Rob Meeh

MEEH FAMILY OF COMPANIES

Since 1910



**H. C. Sharp
Company**

Mechanical Equipment
Est. 1947

8301D Crest Industrial Drive • St. Louis, MO 63123 • Phone (314) 351-6900 • Fax (314) 351-6901

DATE:9/25/23

JOB: Clark Animal Hospital

TO:Rob Meeh
ATTN:

Valid until 11/25/23

Your cost for the attached air devices is \$10,424. This is on a standard 3 week lead time.

Please do not hesitate to call if you have any questions or need any additional
information.

Matthew Majino

Matthew Majino

Square Ceiling Diffusers

Model: XG-5700 2 Cone Ceiling Diffuser

Dimensions

ID#	Tag	Qty	Model	Round Neck (in.)	Module (in.)
1-1	S1	13	XG-5700	6	24x24
1-2	S1	27	XG-5700	8	24x24
1-3	S1	16	XG-5700	10	24x24
1-4	S1	4	XG-5700	12	24x24

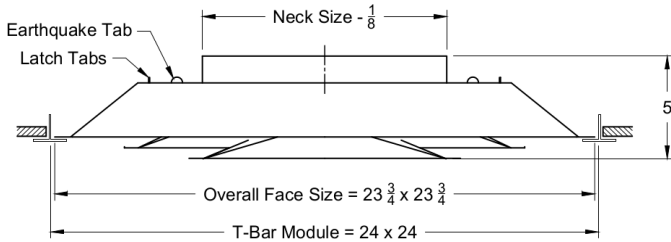
Note:

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- Submittal information is deemed correct at time of printing, however in the interest of product improvement Greenheck reserves the right to make changes without notice.

Square Ceiling Diffusers

Model: XG-5700 2 Cone Ceiling Diffuser

Model



Construction

ID#	Border Type	Special Metal	Finish Color	Beaded Collar
1-1	T-Bar Lay-In	Steel	White	Standard Inlet Collar
1-2	T-Bar Lay-In	Steel	White	Standard Inlet Collar
1-3	T-Bar Lay-In	Steel	White	Standard Inlet Collar
1-4	T-Bar Lay-In	Steel	White	Standard Inlet Collar

Accessories

ID#	Damper	Grid	Plaster Frame	Baffle	Fiberglass Backpan	Earthquake Straps	Snap 58	MRI Construction	Insulation
1-1	None	None	None	None	No	No	No	Standard Const.	N/A
1-2	None	None	None	None	No	No	No	Standard Const.	N/A
1-3	None	None	None	None	No	No	No	Standard Const.	N/A
1-4	None	None	None	None	No	No	No	Standard Const.	N/A

Included

ID#	Tag	Qty	Round Neck Size (in.)
1-1	S1	13	6
1-2	S1	27	8
1-3	S1	16	10
1-4	S1	4	12

Square Ceiling Diffusers

Model: XG-5700 2 Cone Ceiling Diffuser

Dimensions

ID#	Tag	Qty	Model	Round Neck (in.)	Module (in.)
2-1	S3	1	XG-5700	6	12x12

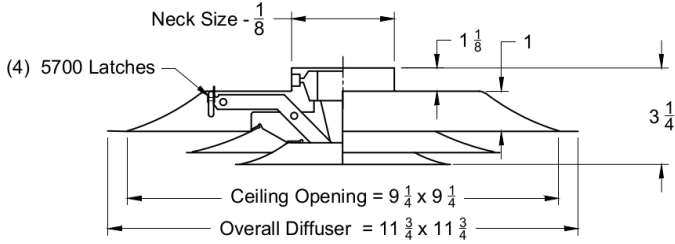
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Square Ceiling Diffusers

Model: XG-5700 2 Cone Ceiling Diffuser

Model



For surface mount installations, use of plaster frame is recommended.

Construction

ID#	Border Type	Special Metal	Finish Color	Beaded Collar
2-1	Flush Surface Mount	Steel	White	Standard Inlet Collar

Accessories

ID#	Damper	Grid	Plaster Frame	Baffle	Fiberglass Backpan	Earthquake Straps	Snap 58	MRI Construction	Insulation
2-1	Butterfly	None	None	None	No	No	No	Standard Const.	None

Included

ID#	Tag	Qty	Round Neck Size (in.)
2-1	S3	1	6

Linear Slot Diffusers

Model: XG-6600 Aluminum Linear Slot Diffuser

Dimensions

ID#	Tag	Qty	Model	Length (in.)	Width (in.)	Slots
3-1	S2	2	XG-6600	48	N/A	2

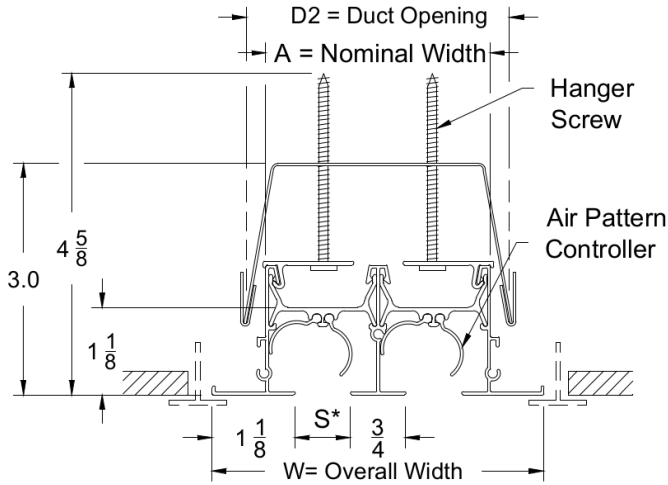
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Linear Slot Diffusers

Model: XG-6600 Aluminum Linear Slot Diffuser

Model



Grid

Model 6610 (10-6 & 12-6)								
S=1"	Number Of Slots							
Slot	1	2	3	4	5	6	7	8
A	1 13/16	3 9/16	5 5/16	7 1/16	8 13/16	10 9/16	12 5/16	14 1/16
D1	2 1/4	4	5 5/8	7 1/2	9 1/4	11	12 3/4	14 1/2
D2	2 3/4	4 1/2	6 1/8	8	9 3/4	11 1/2	13 1/4	15
W	3 1/4	5	6 3/4	8 1/2	10 1/4	12	13 3/4	15 1/2

Construction

ID#	Border Type	Frame Type	Finish Color
3-1	T-Bar Lay-In	Std Border Concealed Mount	White/Black

Accessories

ID#	Slot Width	MRI Construction	Insulation	Mounting	Flow Direction	End Caps
3-1	1	Standard Const.	No	None	Supply	Two End Caps

Items Included on This Submittal

ID#	Tag	Qty	Length (in.)	Width (in.)
3-1	S2	2	48	N/A

Universal Plenums

Model: XG-UPI Universal Plenum - Insulated

Dimensions

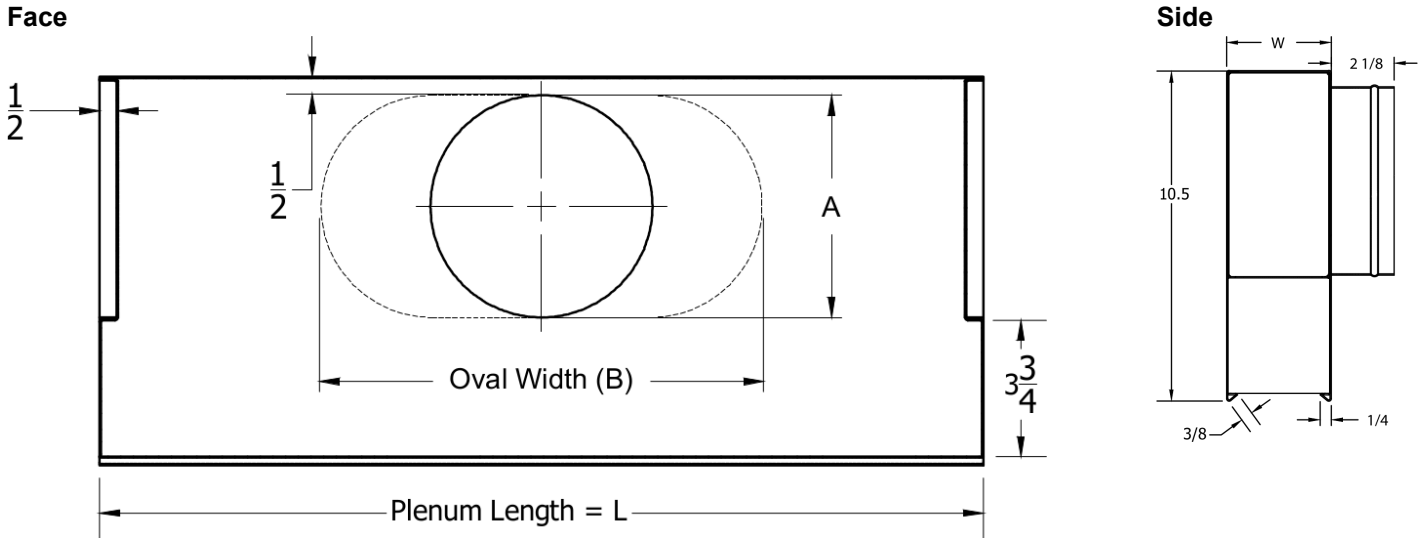
ID#	Tag	Qty	Model	Sizing	Custom Height (in.)	Custom Length (in.)	Length(in.)	Width (in.)	Slots	Inlet Type
4-1	S2	2	XG-UPI	Standard	N/A	N/A	48	N/A	2	8 Inch Oval

Note:

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Universal Plenums

Model: XG-UPI Universal Plenum - Insulated



Slots Grid

Model 6610	20-6 22-6	30-6 32-6	40-7/42-7 40-8/42-8 40-9/42-9	12-1/11-1 10-6/12-6 50-1/52-1
NUMBER OF SLOTS	DIM W	DIM W	DIM W	DIM W
2	4-7/16	4-3/4	4-5/16	4-1/2

Inlet Grid

Inlet Chart			
Size	Type	A	B
8	Oval	5 7/8	8 3/8

L = Listed Size ± Linear End Types

Description	FRAME	Border Size	2 EB / MM	1 EB / MO	No Ends	2 EC	1 EC
T-Bar Lay-In	12-6	1 - 1/8"	-2 1/2	- 1 3/8	± 0	-13/16"	- 7/8"

Construction

ID#	Plenum Sub Type	Border Type	Core Type	Frame Type	Frame Width (in.)	Insulation	Slot Width (in.)
4-1	6600 Series	T-Bar Lay-In	N/A	1-1/8" Std Border Concealed Mount	N/A	1/2" Internal Fiberglass	1

Accessories

ID#	Damper	End Caps	MRI Construction	Drawing
4-1	None	Two End Caps	Standard Const.	Slot Width: 1"

Items Included on This Submittal

ID#	Tag	Qty
4-1	S2	2

VAV Diffusers

Model: XG-MSE Electronic VAV Diffuser - Heating/Cooling

Dimensions

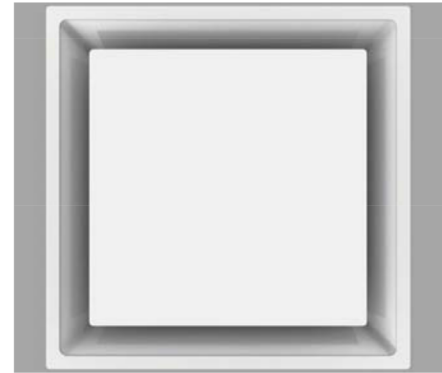
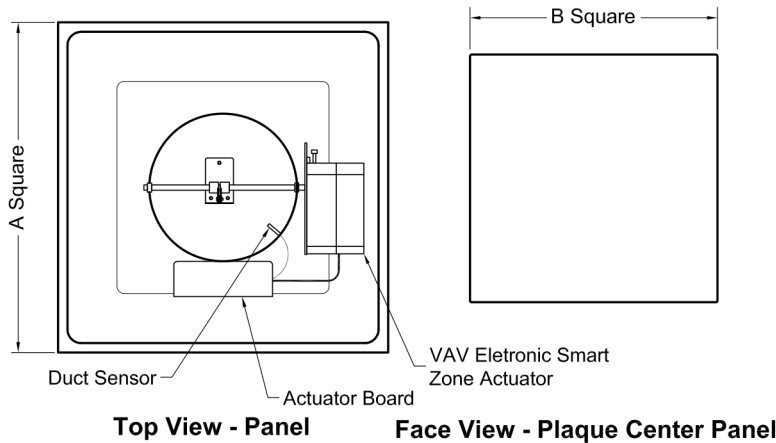
ID#	Tag	Qty	Model	Round Neck (in.)	Module Size
5-1	SVAV	9	XG-MSE	6	24x24
5-2	SVAV	1	XG-MSE	8	24x24

Note:

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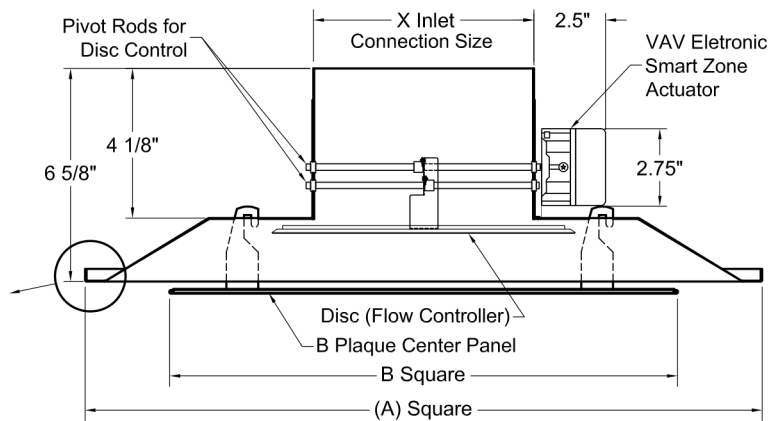
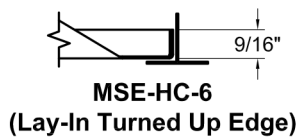
VAV Diffusers

Model: XG-MSE Electronic VAV Diffuser - Heating/Cooling



X = Inlet sizes (Dia. in Inches)

Model	A - Diffuser Panel	B - Plaque Panel	X
MSE-HC 6-24	24"	18"	6 - 14

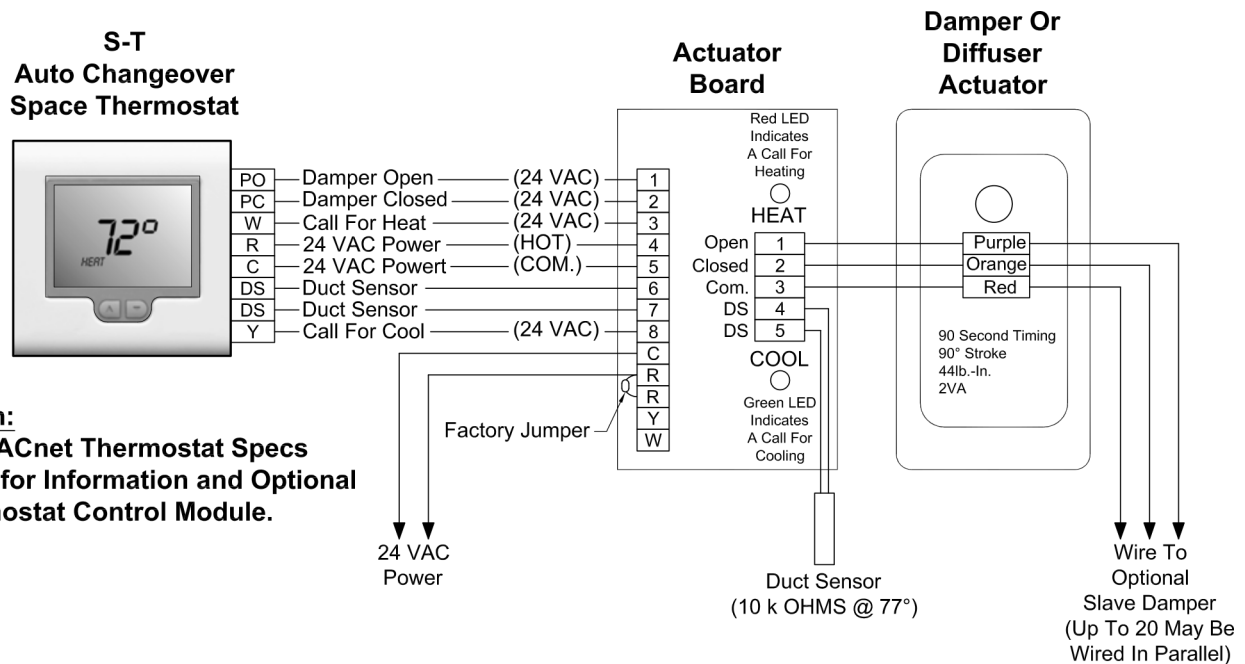


Construction:

Unitary stamped seamless backpan with Removable Face Plate. Steel construction with Baked White Enamel Finish. 4-way discharge pattern.

Operation:

Incorporates an Integral Modulating Disk that continually regulates the volume of Supply Air in response to the Wall-Mounted Thermostat.



Sequence of operation

- The Automatic Changeover Duct Sensor (located on the Smart Zone™ Damper) senses whether there is warm air or cool air in the duct.
- If the S-T (Smart Thermostat) is calling for cooling and the duct sensor determines there is cool air in the duct, the damper will modulate open.
- If the S-T (Smart Thermostat) is calling for heating and the duct sensor determines there is warm air in the duct, the damper will modulate open.
- The "Green LED" located on the Actuator Board indicates when the space temperature is 1.5°F above the thermostat is calling for cooling. The "Red LED" located on the Actuator Board indicates when the space temperature is 1.5°F below the thermostat set-point and the thermostat is calling for heating.

Application and installation notes:

- Use standard 18 gauge thermostat wire.
- A 24 VAC 40 VA Transformer will power a single "Smart Zone™" system and up to 20 Actuators.
- The Actuator Board is located on the side of the Actuator.
- If the duct temperature is above 72°F the Zone Damper will open on a call for heating.
- If the duct temperature is below 72°F the Zone Damper will open on a call for cooling.
- If a single "Smart Zone™" system or multiple "Smart Zone™" systems are used to zone more than 30% of the total cfm served by the HVAC system, a Bypass Damper may be required to maintain constant system static pressure.
- The HVAC system should be controlled by it's own space thermostat or discharge air controller. If a space thermostat is used to control the HVAC system, it must never be located in an area served by a "Smart Zone™".
- A Suction Line "freeze stat", (fs-38) should be installed when zoning more than 30% of the total cfm served by the HVAC system to protect the equipment in the event the Suction Line temperature drops too low, (wire in series with the Cooling Control Circuit).

SMART ZONE™ S-T SMART THERMOSTAT MODULATING ZONE THERMOSTAT WITH AUTO CHANGEOVER



DISASSEMBLING THERMOSTAT

Insert a small coin (dime) into the release slot located on the bottom of the thermostat. Gently twist the coin to release the thermostat from the subbase. Avoid twisting the case as this may stress the LCD and cause it to crack or bend the wiring terminal connection pins.

SWITCH FUNCTIONS

There are eight dip switches located on the thermostat PC board. Only dip switches 1, 2 and 3 are active.

SWITCH 1 - Switch 1 is used to lock the thermostat after setup is completed. When the thermostat is locked (ON position) a padlock icon will show on the LCD. When locked, only setpoint changes and status functions can be accessed by the user. **Do not set Switch 1 in the ON position until all SETUP functions are completed.**

SWITCH 2 - Switch 2 is used to display the space temperature and setpoint in Celsius (ON position) or Fahrenheit (OFF position). Select Celsius or Fahrenheit before proceeding to the thermostat SETUP menu.

SWITCH 3 - Switch 3 is used to select two-position (ON) or fully modulating (OFF) damper control to best suit the specific application requirement.

KEY FUNCTIONS

ON/OFF KEY - When the S-T is not locked, this key allows the thermostat to be turned ON or OFF. When in the OFF position, the damper is also driven closed

STATUS KEY - Pressing the STATUS key displays the UNIT number, ZONE number, DUCT temperature and DAMPER position.

UP/DOWN KEYS - These keys are used to increase or decrease the setpoint as well as change thermostat setup values.

ENTER KEY - This key is used to enter changes as well as exit the setup menu. (Refer to Installation / Operation Manual for complete setup instructions)

OPERATION

The duct sensor wired to the S-T is designed to select the mode of operation of the damper. If the discharge air temperature is above 72° F, the damper will open on a call for heating. If the discharge air temperature is below 72° F, the damper will open on a call for cooling

TERMINAL DESIGNATIONS

C	24 Vac (Common)
R	24 Vac (Hot)
PO	Power Open
PC	Power Close
DS (2)	Duct Sensor
Y	Cooling Relay
W	Heating Relay
A / B	Modbus Communications

FACTORY DEFAULT SETTINGS

Minimum Heating Damper Position	10%
Minimum Cooling Damper Position	10%
Maximum Damper Position	100%
Unit Number	00
Zone Number	00
Heating Limit	76° F
Cooling Limit	68° F
Actuator Speed	90
Modbus Address	01
Temperature Calibration Offset	0

Construction

ID#	Border Type	BMS Protocol	Controller Configuration	Finish Color	Drawing
5-1	T-Bar Lay-In	None	Main/Primary	White	T-Bar Lay-In
5-2	T-Bar Lay-In	None	Main/Primary	White	T-Bar Lay-In

Accessories

ID#	Plaster Frame	Cat5 Cable Length	Transformer	Thermostat	Relief Ring
5-1	None	0	None	Standard	Yes
5-2	None	0	None	Standard	Yes

Included

ID#	Tag	Qty	Round Neck
5-1	SVAV	9	6
5-2	SVAV	1	8

Perforated Ceiling Diffusers

Model: XG-7550R Steel Perforated Face Ceiling Diffuser / Square Inlet / Hinged Face / Return

Dimensions

ID#	Tag	Qty	Model	Neck 1 (in.)	Neck 2 (in.)	Round Neck (in.)	Module (in.)	Nominal Face (in.)
6-1	R1	13	XG-7550R	22	22	N/A	24x24	
6-2	E1	28	XG-7550R	22	22	N/A	24x24	

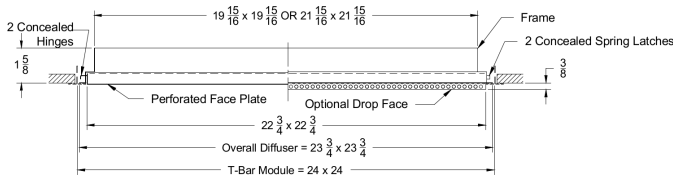
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Perforated Diffusers

Model: XG-7550R Steel Perforated Face Ceiling Diffuser / Square Inlet / Hinged Face / Return

Model



Dimensions

ID#	Tag	Qty	Model	Neck 1 (in.)	Neck 2 (in.)	Round Neck (in.)	Module (in.)	Nominal Face (in.)
6-1	R1	13	XG-7550R	22	22	N/A	24x24	
6-2	E1	28	XG-7550R	22	22	N/A	24x24	

Construction

ID#	Border Type	Face Type	Finish Color	Air Pattern
6-1	T-Bar Lay-In	Steel	White	None
6-2	T-Bar Lay-In	Steel	White	None

Accessories

ID#	Damper	Grid	Earthquake Straps	Plaster Frame
6-1	None	None	No	None
6-2	None	None	No	None

Included

ID#	Tag	Qty	Round Neck (in.)
6-1	R1	13	N/A
6-2	E1	28	N/A

Perforated Ceiling Diffusers

Model: XG-7550R Steel Perforated Face Ceiling Diffuser / Square Inlet / Hinged Face / Return

Dimensions

ID#	Tag	Qty	Model	Neck 1 (in.)	Neck 2 (in.)	Round Neck (in.)	Module (in.)	Nominal Face (in.)
7-1	R2	1	XG-7550R	10	10	N/A	12x12	

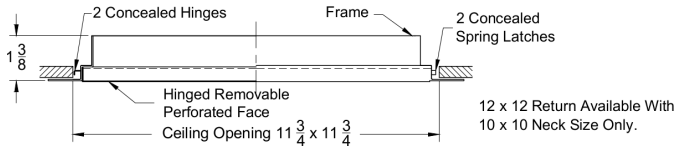
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Perforated Diffusers

Model: XG-7550R Steel Perforated Face Ceiling Diffuser / Square Inlet / Hinged Face / Return

Model



Dimensions

ID#	Tag	Qty	Model	Neck 1 (in.)	Neck 2 (in.)	Round Neck (in.)	Module (in.)	Nominal Face (in.)
7-1	R2	1	XG-7550R	10	10	N/A	12x12	

Construction

ID#	Border Type	Face Type	Finish Color	Air Pattern
7-1	Flush Surface Mount	Steel	White	None

Accessories

ID#	Damper	Grid	Earthquake Straps	Plaster Frame
7-1	Steel	None	No	None

Included

ID#	Tag	Qty	Round Neck (in.)
7-1	R2	1	N/A



Submittal 02-0 Dampers

325 Sun Valley Circle
Fenton, MO 63026
636-349-4990

Clark Animal Hospital (23-398)
10320 Manchester Rd.
Kirkwood, MO 63122

Dampers

Subject

Dampers

Status

Submitted ●

Spec Section

23 33 13 - Dampers

Date: 9/26/2023

Due Date: 10/10/2023

Type

Product Data

Importance

Normal

From

R.F. Meeh Company
Rob Meeh
rjmeeh@rfmeeh.com
636-349-4990

To

Atlas Building Group
Jeremy Boettler
jeremy.boettler@abgbuilds.com
636-724-000

DOCUMENTS FOR REVIEW



File

Clark Animal Hosp...
Rob Meeh



MEEH FAMILY OF COMPANIES

Since 1910



SUBMITTAL

Job Name: Clark Animal Hospital, 9-6-2023

Engineer: -

Elevation: (ft) 709

Date: 9/25/2023

Submitted By: Steve Jacobs

H C SHARP COMPANY INC - 399

8301D CREST INDUSTRIAL DR

SAINT LOUIS, MO 63123

US

Phone: (314)351-6900

Fax: (314)351-6901

Email Address: steve@hcsharpco.com



P.O. Box 410 Schofield, WI 54476 (715) 359-6171 FAX (715) 355-2399 www.greenheck.com

VCDR-50 Round Volume Control Damper

APPLICATION & DESIGN

Model VCDR-50 is a round control damper intended for applications in low to medium pressure and velocity systems.

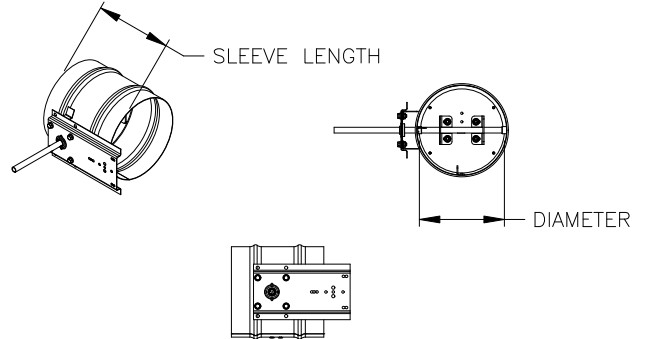
DAMPER RATINGS

Pressure: Up to 4 in. wg - pressure differential
Velocity: Up to 3,000 ft/min
Temperature: Up to 250 F

SLEEVE LENGTH = 8.125 IN. IF NOMINAL DIAMETER ≤ 14
SLEEVE LENGTH = 11.688 IN. IF NOMINAL DIAMETER > 14

PRODUCT DETAILS

Frame/Blade Material: Galvanized
Frame Thickness: 20 ga
Axle Material: Steel
Axle Bearings: Bronze
Sizing: Nominal
Damper Temp. Rating: 180 F



- This drawing shows a general damper configuration and is not intended to depict the exact configuration of all dampers in this submittal.
- Width and Height furnished approximately 0.125 in. under size.
- Factory supplied actuators are sized for 1,500 fpm and a fully-closed differential pressure of 2 in. wc. Contact factory for actuator sizing on applications exceeding those levels.
- Installation instructions available at www.greenheck.com.

ACTUATOR INFORMATION

Actuator Type: 24 VAC
Operating Mode: Two Position
Actuator Operation: Spring Return
Actuator Mounting: External
Fail Position: Open
NEMA Enclosure: Least Cost
Auxiliary Switches: No
Transformer: None

OPTIONS & ACCESSORIES

Clean Wrap: No
Union Label: Required

SUMMARY

ID #	TAG	QTY	DIAMETER	CONFIGURATION	
3-1		3	8.000 in.	Actuator Model: TFB24	Actuator Mfr: Belimo

VCDR-50 Round Volume Control Damper

APPLICATION & DESIGN

Model VCDR-50 is a round control damper intended for applications in low to medium pressure and velocity systems.

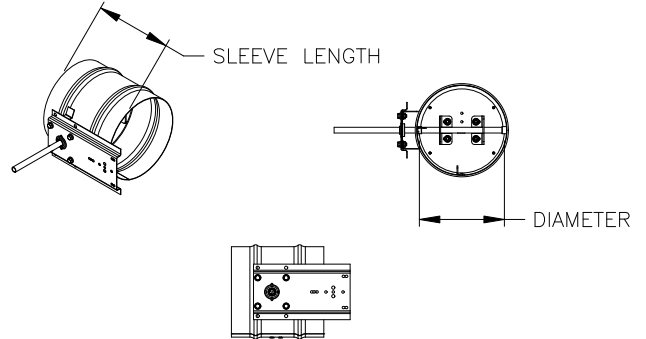
DAMPER RATINGS

Pressure: Up to 4 in. wg - pressure differential
Velocity: Up to 3,000 ft/min
Temperature: Up to 250 F

SLEEVE LENGTH = 8.125 IN. IF NOMINAL DIAMETER ≤ 14
SLEEVE LENGTH = 11.688 IN. IF NOMINAL DIAMETER > 14

PRODUCT DETAILS

Frame/Blade Material: Galvanized
Frame Thickness: 20 ga
Axle Material: Steel
Axle Bearings: Bronze
Sizing: Nominal
Damper Temp. Rating: 180 F



- This drawing shows a general damper configuration and is not intended to depict the exact configuration of all dampers in this submittal.
- Width and Height furnished approximately 0.125 in. under size.
- Factory supplied actuators are sized for 1,500 fpm and a fully-closed differential pressure of 2 in. wc. Contact factory for actuator sizing on applications exceeding those levels.
- Installation instructions available at www.greenheck.com.

ACTUATOR INFORMATION

Actuator Type: 24 VAC
Operating Mode: Two Position
Actuator Operation: Spring Return
Actuator Mounting: External
Fail Position: Closed
NEMA Enclosure: Least Cost
Auxiliary Switches: No
Transformer: None

OPTIONS & ACCESSORIES

Clean Wrap: No
Union Label: Required

SUMMARY

ID #	TAG	QTY	DIAMETER	CONFIGURATION	
4-1		3	8.000 in.	Actuator Model: TFB24	Actuator Mfr: Belimo

VCD-23 Low Leakage 3V Blade Volume Control Damper

APPLICATION & DESIGN

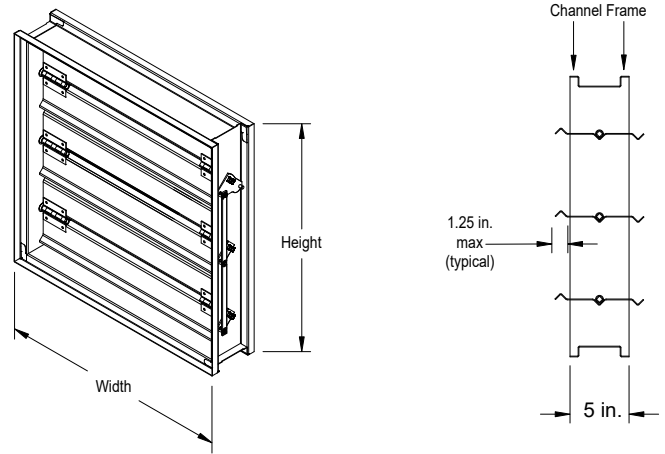
The VCD-23 is a ruggedly built low leakage control damper intended for applications in low to medium pressure and velocity systems. A wide range of electric actuators are available.

DAMPER RATINGS

Pressure:	Up to 5 in. wg - pressure differential
Velocity:	Up to 3,000 ft/min
Leakage:	Class 1A @ 1 in. wg Class 1 @ up to 5 in. wg
Temperature:	Up to 250 F

PRODUCT DETAILS

Frame Type:	Channel
Frame Thickness:	16 ga
Material:	Galvanized
Blade Type:	3V
Blade Action:	Parallel
Blade Seal:	TPE
Axle/Linkage Material:	Steel
Axle Bearings:	Synthetic
Jamb Seal Material:	Stainless Steel
Damper Temp. Rating:	180 F
Jackshafting:	No Preference
Actuator Sizing:	Default SqFt
Ext. Shaft Length:	Standard (6 in.)
Multi-Section Fastening:	Standard
Sizing:	Nominal



- This drawing shows a general damper configuration and is not intended to depict the exact configuration of all dampers in this submittal.
- Width and height furnished approximately 0.250 in. undersize.
- Factory supplied actuators are sized for 1,500 fpm and a fully-closed differential pressure of 2 in. wc. Contact factory for actuator sizing on applications exceeding those levels.
- Installation instructions available at www.greenheck.com.

ACTUATOR INFORMATION

Actuator Type:	24 VAC
Actuator Mounting:	External
Operating Mode:	TwoPosition
Actuator Operation:	Spring Return
Fail Position:	Closed
NEMA Enclosure:	Least Cost
Auxiliary Switches:	No
Spring Return Time:	Standard

CODES APPROVED

IECC (International Energy Conservation Code) compliant
The AMCA Certified Ratings Seal applies to Air Leakage and Air Performance ratings.

OPTIONS & ACCESSORIES

Union Label:	Required
--------------	----------

SUMMARY

ID #	Tag	Qty	Width	Height	Configuration			
5-1		1	24.000 in.	16.000 in.	Drive Arrangement:	Actuator Mfr:	Actuator Model:	Actuator Location:
					Drive-CC-11-1FER-0	Honeywell	MS8103F1025	Right Side
5-2		1	26.000 in.	20.000 in.	Actuator Qty:	Act. Orientation:	Standoff Size:	
					1	Perp Up	1.500 in.	
5-2		1	26.000 in.	20.000 in.	Drive Arrangement:	Actuator Mfr:	Actuator Model:	Actuator Location:
					Drive-CC-11-1FER-0	Honeywell	MS8103F1025	Right Side
5-2		1	26.000 in.	20.000 in.	Actuator Qty:	Act. Orientation:	Standoff Size:	
					1	Perp Down	1.500 in.	

VCD-23 Low Leakage 3V Blade Volume Control Damper

APPLICATION & DESIGN

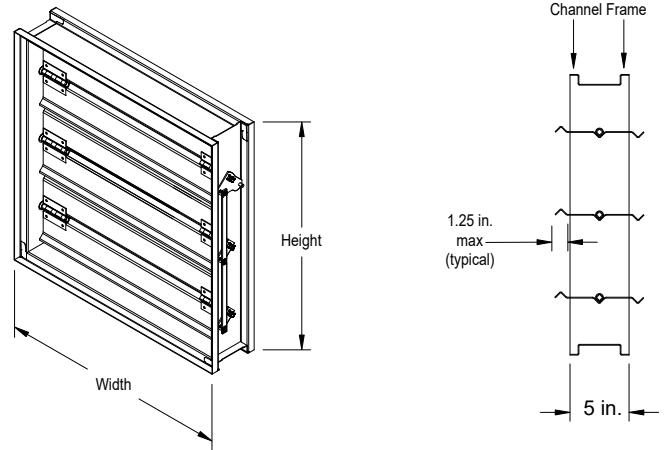
The VCD-23 is a ruggedly built low leakage control damper intended for applications in low to medium pressure and velocity systems. A wide range of electric actuators are available.

DAMPER RATINGS

Pressure:	Up to 5 in. wg - pressure differential
Velocity:	Up to 3,000 ft/min
Leakage:	Class 1A @ 1 in. wg Class 1 @ up to 5 in. wg
Temperature:	Up to 250 F

PRODUCT DETAILS

Frame Type:	Channel
Frame Thickness:	16 ga
Material:	Galvanized
Blade Type:	3V
Blade Action:	Opposed
Blade Seal:	TPE
Axle/Linkage Material:	Steel
Axle Bearings:	Synthetic
Jamb Seal Material:	Stainless Steel
Damper Temp. Rating:	180 F
Jackshafting:	No Preference
Actuator Sizing:	Default SqFt
Ext. Shaft Length:	Standard (6 in.)
Multi-Section Fastening:	Standard
Sizing:	Nominal



- This drawing shows a general damper configuration and is not intended to depict the exact configuration of all dampers in this submittal.
- Width and height furnished approximately 0.250 in. undersize.
- Factory supplied actuators are sized for 1,500 fpm and a fully-closed differential pressure of 2 in. wc. Contact factory for actuator sizing on applications exceeding those levels.
- Installation instructions available at www.greenheck.com.

ACTUATOR INFORMATION

Actuator Type:	Manual Quadrant
Actuator Mounting:	External

OPTIONS & ACCESSORIES

Union Label:	Required
---------------------	----------

SUMMARY

ID #	Tag	Qty	Width	Height	Configuration			
6-1		1	24.000 in.	16.000 in.	Drive Arrangement:	Actuator Mfr:	Actuator Model:	Actuator Location:
					Drive-CC-11-1FER-0	Greenheck	MANUAL QUADRANT	
6-2		1	26.000 in.	20.000 in.	Actuator Qty:	Act. Orientation:	Standoff Size:	
					1	N/A	1.500 in.	
6-2		1	26.000 in.	20.000 in.	Drive Arrangement:	Actuator Mfr:	Actuator Model:	Actuator Location:
					Drive-CC-11-1FER-0	Greenheck	MANUAL QUADRANT	
6-2		1	26.000 in.	20.000 in.	Actuator Qty:	Act. Orientation:	Standoff Size:	
					1	N/A	1.500 in.	

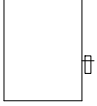
CODES APPROVED

IECC (International Energy Conservation Code) compliant

The AMCA Certified Ratings Seal applies to Air Leakage and Air Performance ratings.

Damper Drive Arrangements Job Summary -Start-

Drive Arrangement: Drive-CC-11-1FER-0



Damper Drive Arrangements Job Summary -End-

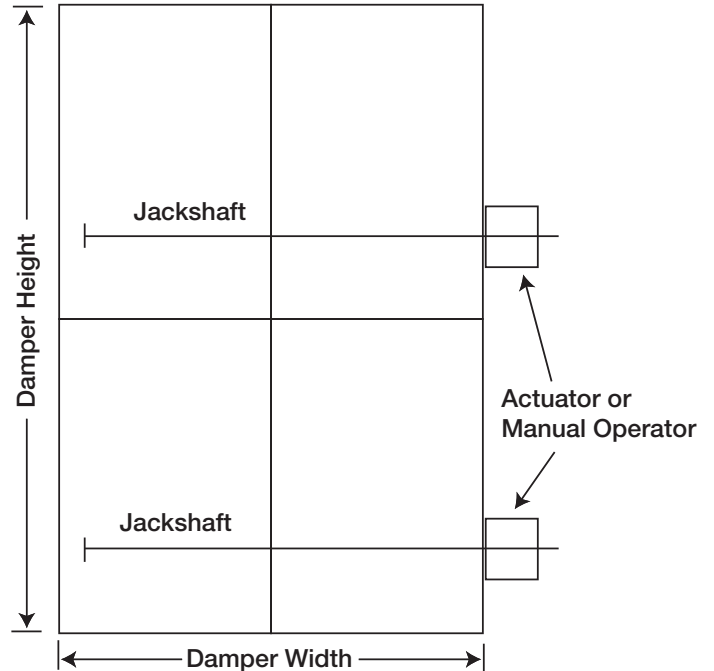
Drive Arrangement Definition

Actuator driven dampers are supplied with a drive arrangement code that helps describe the configuration of the damper. The following breaks down what each number and letter represents.

22-2FER-2

① ② ③④ ⑤⑥ ⑦

- ① Number of sections wide
- ② Number of sections high
- ③ Number of actuators or manual operators (such as quadrants, pull chain, etc.)
- ④ Who supplies the actuators or manual operators
F - Factory
C - Customer Supplied (field mounted)
- ⑤ Actuator or manual operators mounting
E - External
I - Internal
B - Both internal and external
- ⑥ Actuator or manual operators location
L - Left hand drive
R - Right hand drive
B - Both right and left
- ⑦ Number of jackshafts



Each damper is supplied with a Drive Arrangement Prefix to help describe its construction. See the following examples:

Model	Drive Arrangement Prefix
AMD series, AMD-TD series	AMD
FBH & FBV	FB
DFD-210; DFDAF-310, DFDAF-330; SEDFD-210 FSD, OFSD, CFSD, SMD, SEFSD, SSFSD, SESMD, SSSMD series (except vertical blade models)	MLS
ICD series, MBD-15 & VCD series (except vertical blade models)	CC
FSD-311V, SMD-301V, VCD-xxV	VB



Submittal 03-0 ERV Unit

325 Sun Valley Circle
Fenton, MO 63026
636-349-4990

Clark Animal Hospital (23-398)
10320 Manchester Rd.
Kirkwood, MO 63122

ERV Unit

Subject

ERV Unit

Status

Submitted ●

Spec Section

23 72 00 - Air-to-Air Energy Recovery Equipment

Date: 9/26/2023

Due Date: 10/10/2023

Type

Product Data

Importance

Normal

From

R.F. Meeh Company
Rob Meeh
rjmeeh@rfmeeh.com
636-349-4990

To

Atlas Building Group
Jeremy Boettler
jeremy.boettler@abgbuilds.com
636-724-000

DOCUMENTS FOR REVIEW



File

Clark Animal Hosp...
Rob Meeh



MEEH FAMILY OF COMPANIES

Since 1910



SUBMITTAL

Job Name: Clark Animal Hospital, 9-6-2023

Engineer: -

Elevation: (ft) 709

Date: 9/25/2023

Submitted By: Steve Jacobs

H C SHARP COMPANY INC - 399

8301D CREST INDUSTRIAL DR

SAINT LOUIS, MO 63123

US

Phone: (314)351-6900

Fax: (314)351-6901

Email Address: steve@hcsharpco.com



P.O. Box 410 Schofield, WI 54476 (715) 359-6171 FAX (715) 355-2399 www.greenheck.com

ERV-90-30L

Unit Performance

Design Conditions					
Elevation (ft)	Summer		Winter DB (F)	Outdoor Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)			
709	95.6	79.4	4.1	7,255	7,455

Unit Specifications			
Qty	Weight (lb)	Unit Installation	Unit ETL Listing
1	2,964 (+/- 5%)	Outdoor	UL-1812

Configuration			
Outdoor Air		Exhaust Air	
Intake	Discharge	Intake	Discharge
End	Bottom	Bottom	Side

Energy Recovery Performance									
Design Condition	Temperature (F)								Capacity Reduction (BTU/h)
	Outdoor Air		Supply Air		Return Air		Exhaust Air		
	DB	WB	DB	WB	DB	WB/RH	DB	WB	
Summer	95.6	79.4	79.1	66.9	75.0	62.4/50	90.9	75.7	381,975.0
Winter	4.1	2.2	57.2	46.7	72.0	55.7/35	18.9	18.3	419,527.0

Air Performance							
Type	Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	FRPM	Fan		
					Qty	Type	Drive-Type
Supply	7,255	0.1	0.704	791	1	Forward Curve	Belt
Exhaust	7,455	0.1	0.546	771	1	Forward Curve	Belt

Motor Specifications						
Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	3.77	7-1/2	ODP	PE	1725
Exhaust	1	3.84	7-1/2	ODP	PE	1725

Electrical Specifications					
Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	Fan Power (W/CFM)*	SCCR
Unit	460/60/3	26.8	35.0	0.783	5kA

*Fan Power (W/CFM) = (Supply BHP + Exhaust BHP) / Supply CFM

Construction Features And Accessories

Unit	
UL-1812	Std
Unit Installation - Outdoor	Std
Outdoor Air Filters - 2" MERV 13, 7-16x25	X
Exhaust Air Filters - 2" MERV 13, 7-16x25	X
Energy Recovery Device - Polymer Wheel w/ Silica Gel Desiccant	Std
Unit Construction - Double Wall	X
Insulation - 1 inch 3# R4 fiberglass	Std
Corrosion Resistant Fasteners	Std
Access - Hinged	X
Unit Finish - Galvanized	Std
Fan VFDs	
Single Point Power	Std
Factory Wired Non-Fused Disconnect Switch	Std
Supply Weatherhood: Downturn	Std
Exhaust Weatherhood: Downturn	Std
Fan Vibration Isolation - Neoprene	Std
Controls	
Unit Controls - Microprocessor	X
Sensors - OAI, OAD	Std
Unit On/Off Control - Microprocessor	X
Sensor Monitoring Package	
Heating Enable - None	
Cooling Enable - None	
Supply Fan Control - Constant Volume (on/off)	X
Exhaust Fan Control - Constant Volume (on/off)	X
Network Protocol - None	
Energy Wheel Economizer Control - Stop Wheel, Temperature	X
Exhaust Only Operation	
Control Accessories	
Remote Display	
CO2 Sensor	
Dirty Filter Sensor(s)	
Airflow Monitoring - None	
Wheel Rotation Sensor	

Accessories	
Frost Control - Modulating Wheel	X
Service Outlet - 120 VAC GFCI Service Outlet, Shipped Loose	X
Spare Filters	
Spare Energy Wheel Segments	
Spare Fan Belts	
Shipped Loose Smoke Detectors	
Outdoor Air Damper	
Return Air Damper	
Roof Curb - GKD - 80.5/120.38-G16	X
Spare Energy Wheel Belt	
Warranty Options	
Unit Warranty - 18 Months (Std.)	Std
Energy Wheel Warranty - 5 Yrs Less Motor	Std

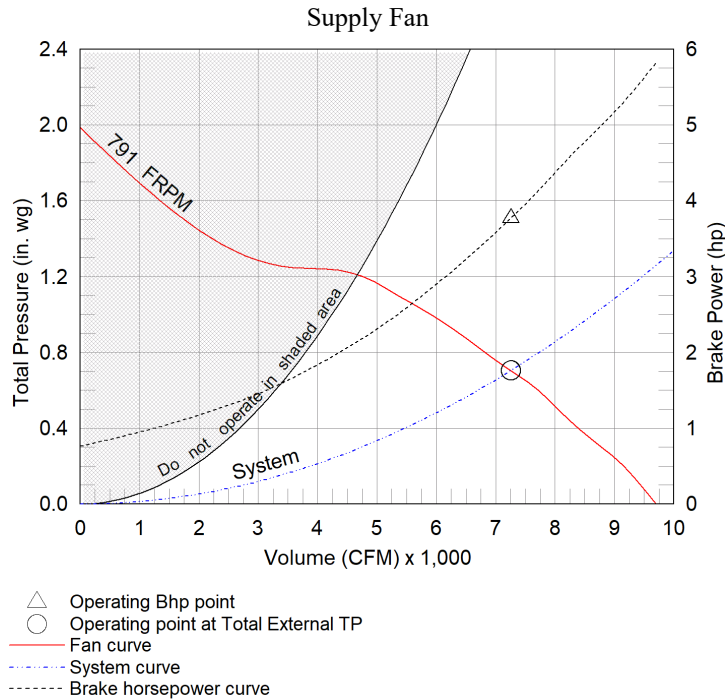
Standard Option	Std
Not Included	
Included	X

Notes
A backdraft damper is included as an integral part of the exhaust weatherhood assembly.

Supply Fan Charts And Performance

Supply Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
7,255	0.1	0.704	791	3.77	1	7-1/2	1	Forward Curve	Belt

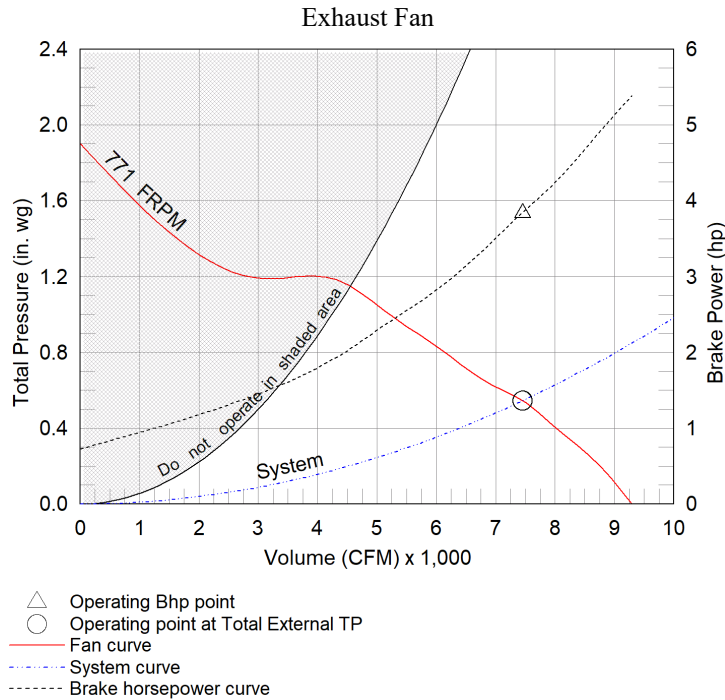
Pressure Drop (in. wg)				
Weatherhood	Filter	Damper	External	Total
0.278	0.326	-	0.1	0.704



Exhaust Fan Charts And Performance

Exhaust Fan Performance									
Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	RPM	Operating Power (hp)	Motor		Fan		
					Qty	Size (hp)	Qty	Type	Drive-Type
7,455	0.1	0.546	771	3.84	1	7-1/2	1	Forward Curve	Belt

Pressure Drop (in. wg)				
Weatherhood	Filter	Damper	External	Total
0.101	0.345	-	0.1	0.546



Energy Recovery Summer Performance

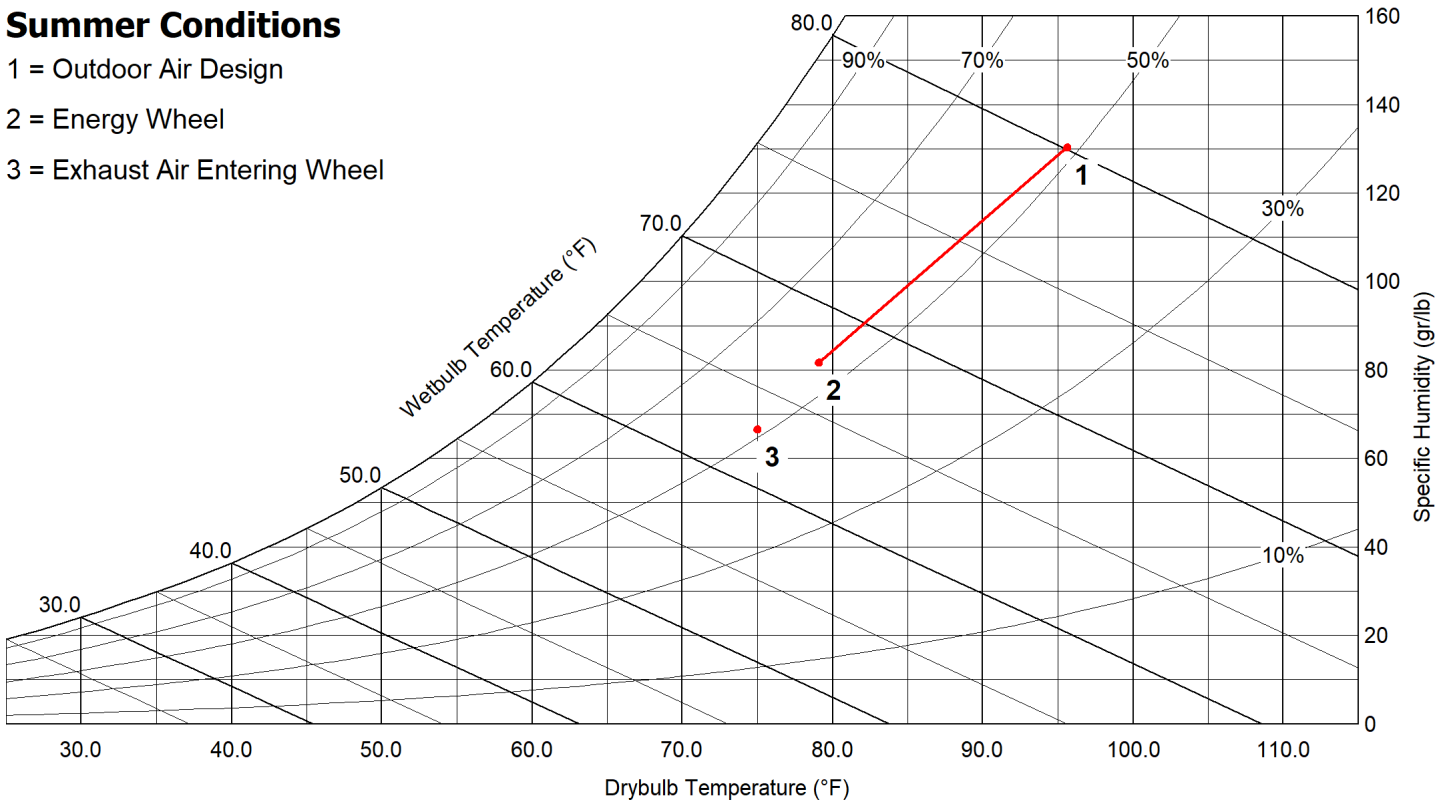
Outdoor Air		Supply Air	
Dry Bulb (F)	95.6	Dry Bulb (F)	79.1
Wet Bulb (F)	79.4	Wet Bulb (F)	66.9
Specific Humidity (gr/lb)	130	Specific Humidity (gr/lb)	82
Enthalpy (BTU/lb)	43.5	Enthalpy (BTU/lb)	31.8
Exhaust Air		Return Air	
Dry Bulb (F)	90.9	Dry Bulb (F)	75.0
Wet Bulb (F)	75.7	Rel. Humidity (%)	50
Specific Humidity (gr/lb)	113	Specific Humidity (gr/lb)	67
Enthalpy (BTU/lb)	39.5	Enthalpy (BTU/lb)	28.4

Design Air Flow Conditions			
OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
7,255	77.6	7,455	76.1

Outdoor Air Cooling Reduction				
OA Load w/o Energy Recovery		OA Load with Energy Recovery		Equipment Reduction (tons)
(BTU/h)	(tons)	(BTU/h)	(tons)	
492,977.0	41.08	111,002.0	9.25	31.83

Summer Conditions

- 1 = Outdoor Air Design
- 2 = Energy Wheel
- 3 = Exhaust Air Entering Wheel



Energy Recovery Winter Performance

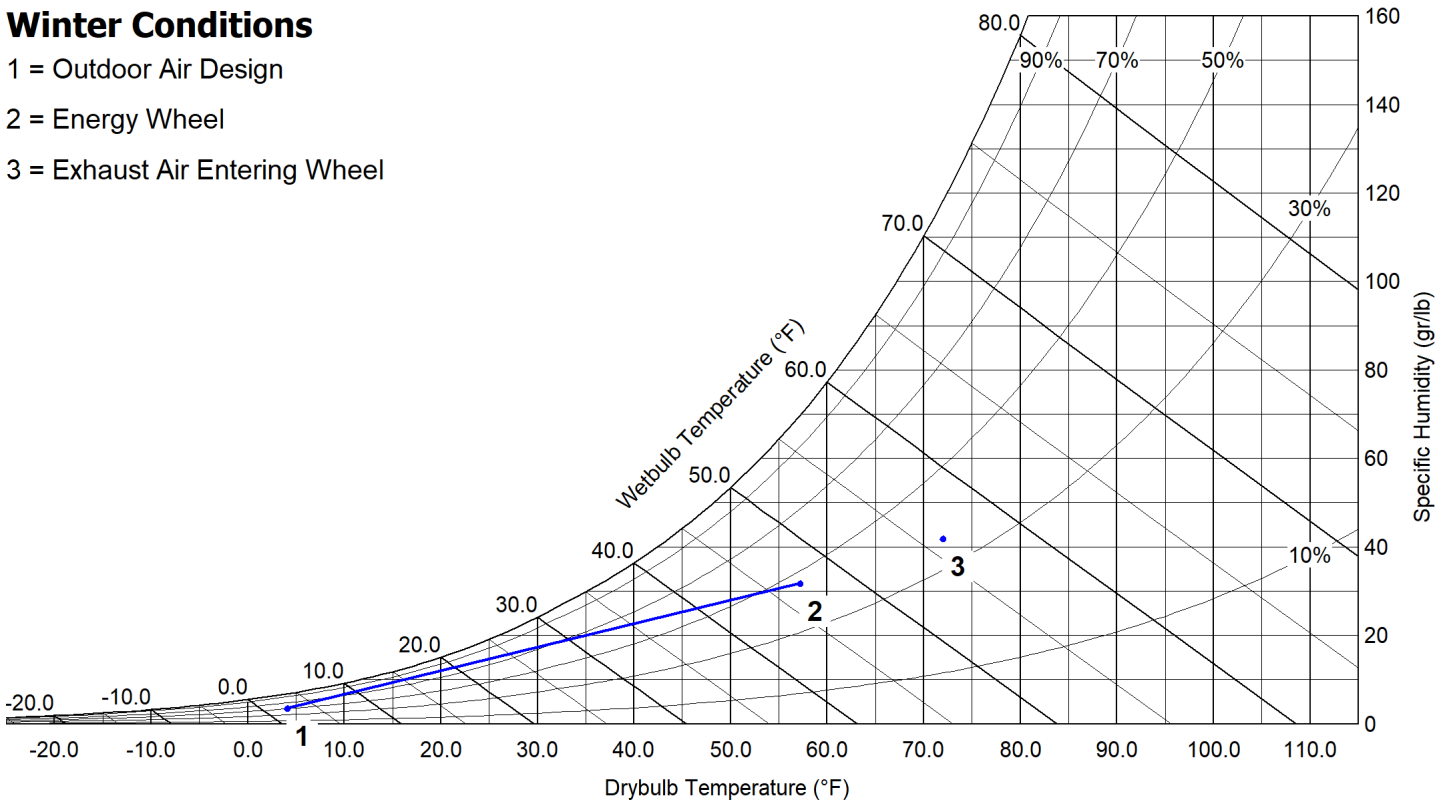
Outdoor Air		Supply Air	
Dry Bulb (F)	4.1	Dry Bulb (F)	57.2
Wet Bulb (F)	2.2	Wet Bulb (F)	46.7
Specific Humidity (gr/lb)	4	Specific Humidity (gr/lb)	32
Enthalpy (BTU/lb)	1.5	Enthalpy (BTU/lb)	18.7
Exhaust Air		Return Air	
Dry Bulb (F)	18.9	Dry Bulb (F)	72.0
Wet Bulb (F)	18.3	Rel. Humidity (%)	35
Specific Humidity (gr/lb)	13	Specific Humidity (gr/lb)	42
Enthalpy (BTU/lb)	6.6	Enthalpy (BTU/lb)	23.8

Design Air Flow Conditions			
OA Volume (CFM)	ASHRAE 90.1 OA Enthalpy Recovery Ratio	EA Volume (CFM)	EA Wheel Effectiveness
7,255	76.9	7,455	76.6

Outdoor Air Heating Reduction			
OA Load w/o Energy Recovery (BTU/h)	OA Load with Energy Recovery (BTU/h)	Equipment Reduction (BTU/h)	Sensible Effectiveness (%)
536,457.0	116,930.0	419,527.0	77.9

Winter Conditions

- 1 = Outdoor Air Design
- 2 = Energy Wheel
- 3 = Exhaust Air Entering Wheel




AHRI Performance Ratings

Energy Recovery Performance Rating in accordance with AHRI Standard 1060 (I-P)							
Rated Airflow (SCFM)		Net Supply Airflow (SCFM)	EATR (%)	OACF	Pressure Drop (in. wg)		Purge Angle (degrees)
Leaving Supply	Entering Exhaust				Supply	Exhaust	
7669	7869	7255	5.4	0.99	0.79	0.81	0

Thermal Effectiveness Ratings							
Enthalpy Recovery Ratio (%)		Sensible Effectiveness (%)		Latent Effectiveness (%)		Total Effectiveness (%)	
Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
77.6	76.9	78.9	77.9	74.5	73.7	76.1	76.6

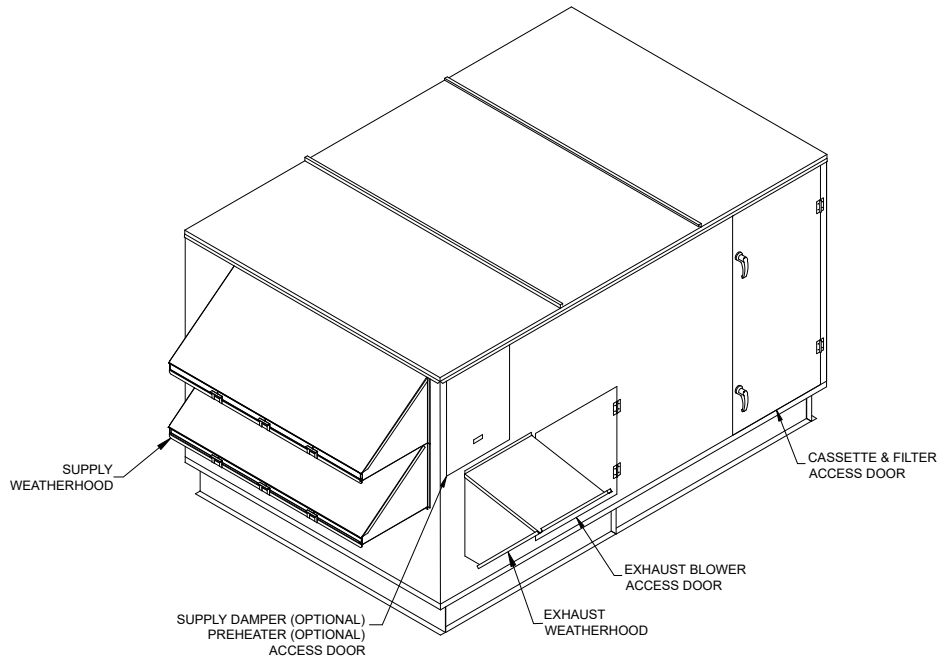
Note(s)

Summer Design Conditions:
 Certified in accordance with the AHRI ERV Certification Program, which is based on AHRI Standard 1060. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

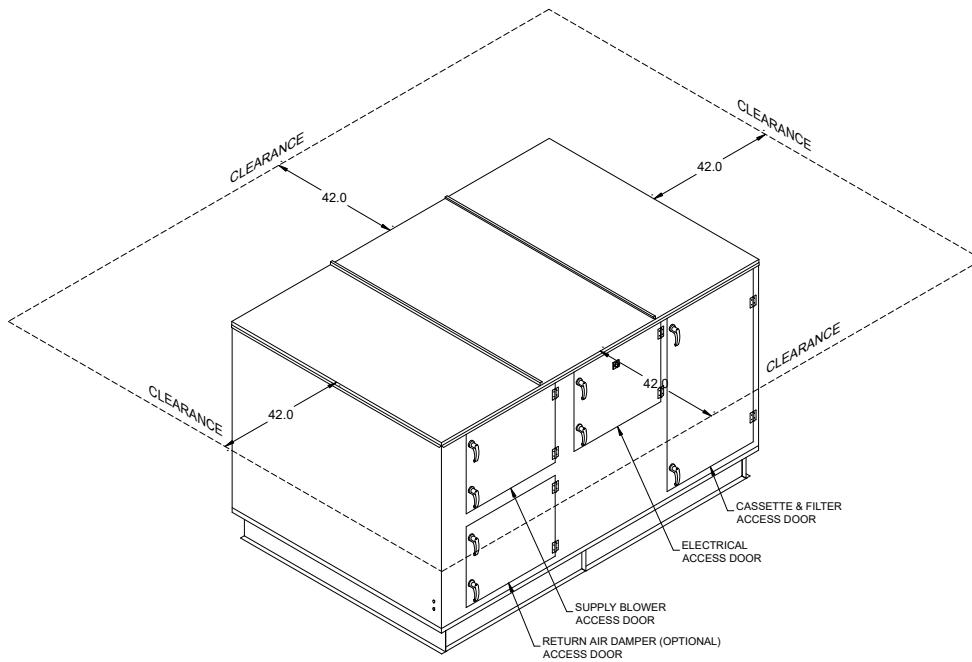


Winter Design Conditions:
 Application Rating is outside the scope of the AHRI ERV certification Program but is rated in accordance with AHRI Standard 1060.

Isometric Drawings

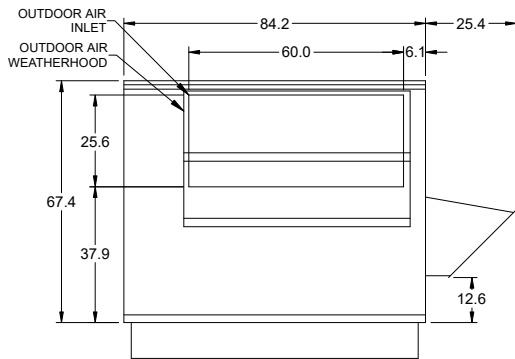
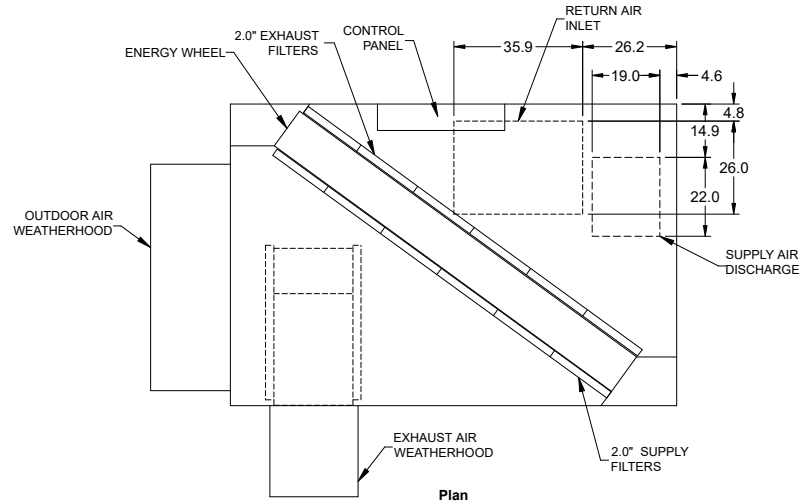


Back Right Isometric

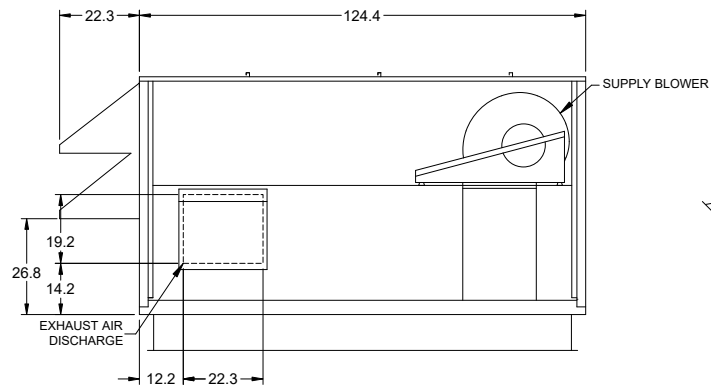


Front Left Isometric

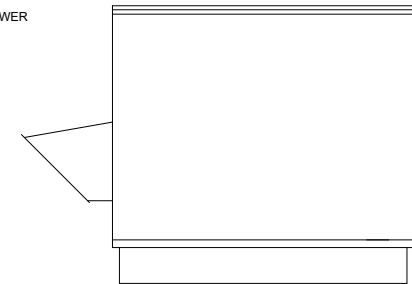
Overview Drawings



Left End

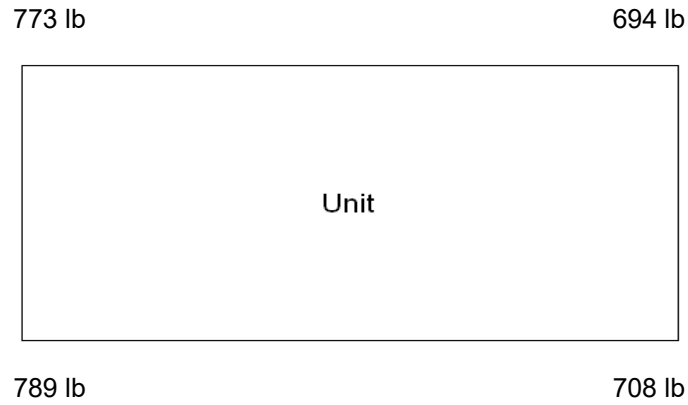


Elevation



Right End

Corner Weights



Note

Estimated corner weights are shown looking down on unit and the outside air intake will be on the left. Weights are applied at the base of the unit. Images not drawn to scale.

Microprocessor Controller Sequence of Operation

MICROPROCESSOR CONTROLLER

Controller shall be provided with the required sensors and programming for the preconditioner. Controller shall be factory programmed, mounted, and tested. Controller shall have an LCD readout for changing set points and monitoring unit operation.

UNIT START COMMAND (Unit will be enabled to start once a jumper is placed between R to G)

- Factory mounted and wired outdoor air damper actuator is powered.
- Exhaust blower starts after a (adj.) delay.
- Supply blower and energy wheel start after a (adj.) delay.

UNIT STOP COMMAND (OR DE-ENERGIZED)

- Supply blower, exhaust blower, and energy wheel de-energized.
- Outdoor air damper actuator is spring return closed.

SUPPLY BLOWER SEQUENCE

The supply blower speed will be controlled with the following sequence:

Constant Volume (on/off)

The supply blower is intended to operate at a constant speed during operation. This speed needs to be set during the test and balance of the unit.

EXHAUST BLOWER SEQUENCE

The exhaust blower speed will be controlled with the following sequence:

Constant Volume (on/off)

The exhaust blower is intended to operate at a constant speed during operation. This speed needs to be set during the test and balance of the unit.

ECONOMIZER SEQUENCE

When the application requires cooling and the outdoor air conditions are suitable for free cooling, the energy wheel will be de-energized.

Temperature

The economizer will be locked out when the outdoor air is less than 50 F (adj.) or greater than 65 F (adj.).

FROST CONTROL

Frost control for the energy wheel is enabled when frost is present on the wheel; based on the outside air temperature and the pressure drop across the wheel. If the outdoor air temperature is below 5 F (adj.) and the differential pressure across the wheel is about 1.5", frost control will enable.

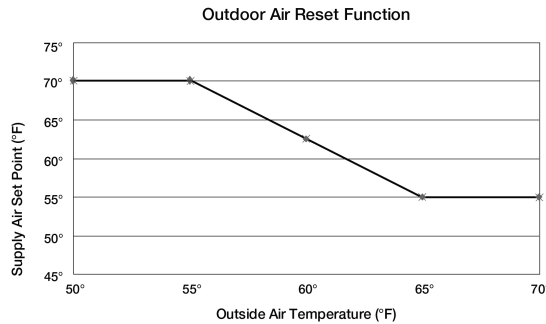
Modulating Wheel

When frosting is occurring, the VFD modulates the wheel down to a slow rotational speed to defrost the wheel. Once the outdoor air temperature increases above 5 F OR the pressure drop decreases below the pressure switch set point, the unit will resume normal operation.

SUPPLY SET POINT RESET FUNCTION

Outside Air Reset

The controller will monitor the outdoor air temperature and will adjust the desired supply temperature set point accordingly. For example, when the outdoor air temperature is below 55 F, the controller will change the supply temperature set point to 70 F. When the outdoor air is above 65 F, the controller will change the supply set point to 55 F. When the outdoor air temperature is between 55 F and 65 F, the supply temperature set point changes according to the OA reset function. A visual representation of this is shown below.



Local (Supply Temp Control)

The supply temperature set point will be a constant temperature that is adjusted through the controller.

ALARMS

The controller will display alarms and have one digital output for remote indication of an alarm condition. Possible alarms include:

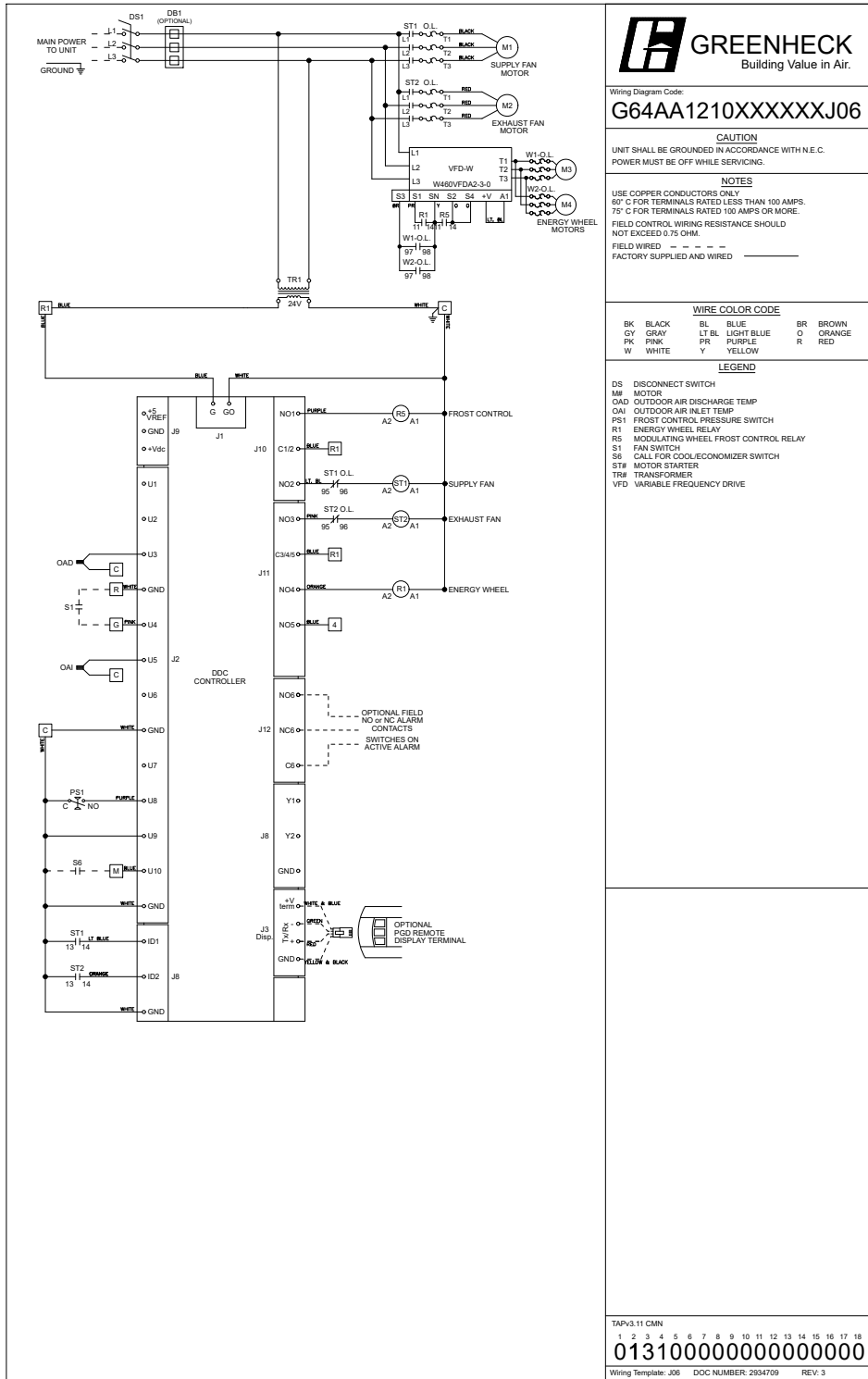
AIRFLOW ALARM

The controller monitors the airflow proving switch on each blower. The controller will send an alarm if either of the airflow proving switches are not engaged.

TEMPERATURE SENSOR ALARM

The controller sends an alarm if the temperature sensor fails.

Wiring Diagram



Warranty Statement for ERV Preconditioners

Unit Warranty

Greenheck warrants the equipment to be free from defects in material and workmanship for a period of 18 months from the date of shipment. Initial startup must be completed within six months of the shipment date, and a startup report must be submitted to Greenheck.

Energy Wheel Warranty

The energy recovery wheel is warranted to be free from defects in material and workmanship for a period of 5 years from the shipment date. This warranty applies to all parts and components in the energy recovery cassettes with the exception of the motor.

Warranty Notes

Any component which proves defective during the warranty period will be repaired or replaced at Greenheck's sole option when returned to our factory, transportation prepaid. All warranties do not include labor costs associated with troubleshooting, removal, or installation. Greenheck will not be liable for any consequential, punitive, or incidental damages resulting from use, repair, or operation of any Greenheck product. These warranties are exclusive and are in lieu of all other warranties, whether written, oral, or implied, including the warranty of merchantability and the warranty of fitness for a particular purpose. No person (including any agent or salesperson) has authority to expand Seller's obligation beyond the terms of this warranty, or to state that the performance of the product is other than that published by Seller.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

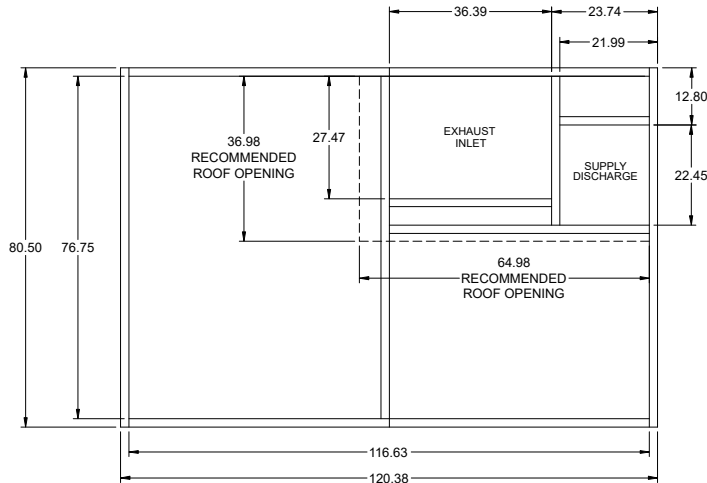
GKD Roof Curb

Model: GKD-80.5/120.38-G16

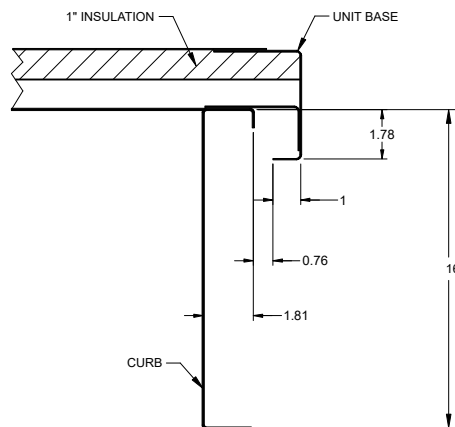
Curb Height (in.)	Curb Length (in.)	Curb Width (in.)	Material	Finish Type	Duct Adapter	Curb Weight (lb)
16	120.38	80.5	Galvanized	Galvanized	Yes	158

Standard Construction Features:
All dimensions shown in inches.
Weight shown is within +/-5%.
If unit is selected with side or end discharge/return, there will not be bottom connections supplied with the curb.
18 gauge galvanized steel (perimeter channels).
18 gauge galvanized steel (interior channels).
Ships knocked down for field assembly.
Curb insulation to be provided by others.

Top View of Curb



Cross-Section View of Unit on Curb





Submittal 05-0 Exhaust Fan

325 Sun Valley Circle
Fenton, MO 63026
636-349-4990

Clark Animal Hospital (23-398)
10320 Manchester Rd.
Kirkwood, MO 63122

Exhaust Fan

Subject

Exhaust Fan

Status

Submitted ●

Spec Section

23 34 23 - HVAC Power Ventilators

Date: 9/26/2023

Due Date: 10/10/2023

Type

Product Data

Importance

Normal

From

R.F. Meeh Company
Rob Meeh
rjmeeh@rfmeeh.com
636-349-4990

To

Atlas Building Group
Jeremy Boettler
jeremy.boettler@abgbuilds.com
636-724-000

DOCUMENTS FOR REVIEW



File

Clark Animal Hosp...
Rob Meeh



MEEH FAMILY OF COMPANIES

Since 1910



SUBMITTAL

Job Name: Clark Animal Hospital, 9-6-2023

Engineer: -

Elevation: (ft) 709

Date: 9/25/2023

Submitted By: Steve Jacobs

H C SHARP COMPANY INC - 399

8301D CREST INDUSTRIAL DR

SAINT LOUIS, MO 63123

US

Phone: (314)351-6900

Fax: (314)351-6901

Email Address: steve@hcsharpco.com



P.O. Box 410 Schofield, WI 54476 (715) 359-6171 FAX (715) 355-2399 www.greenheck.com

Model: SP-A70

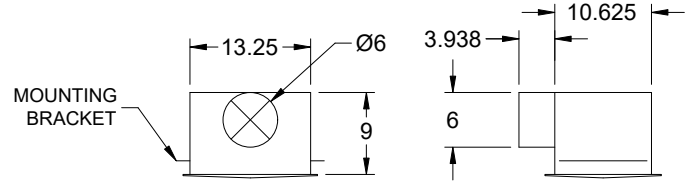
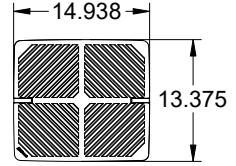
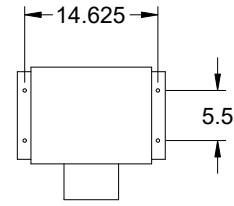
Ceiling Exhaust Fan

Standard Construction Features:

- Corrosion resistant galv steel scroll and housing - Sound absorbing insulation - White non-yellowing grille - Round outlet duct collar with integral backdraft damper - Double inlet forward curved wheel - Plug type disconnect - Adj. mounting brackets - Field rotatable discharge - Energy Star Compliant

Selected Options & Accessories:

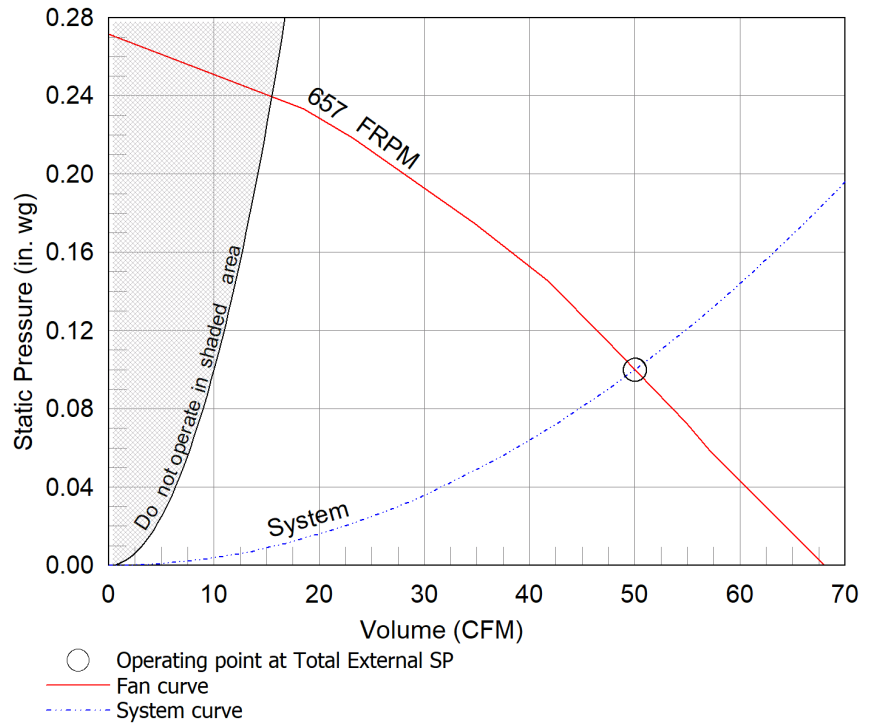
Motor rated for continuous use
Motor with Thermal Overload
Motor with CSA Approval
Motor with 40 Degree C Ambient Temperature
UL/cUL 507 Listed - Electric Fan
Solid State Speed Control, 6 Amp, Shipped Loose
Round Duct Connection
Adjustable easy installation mounting bracket
Energy Star Certified
Standard Grille
Polypropylene Wheel Material
Can Be Used to Comply with: ASHRAE 62.2, California Title 24, and Washington State Energy Code



Dimensional	
Quantity	1
Weight w/o Acc's (lb)	12
Weight w/ Acc's (lb)	13

Performance	
Requested Volume (CFM)	50
Actual Volume (CFM)	50
Total External SP (in. wg)	0.1
Fan RPM	657
* FLA (A)	0.14
Elevation (ft)	709
Airstream Temp.(F)	70
Air Density (lb/ft3)	0.073
Sones	< 0.3

Motor	
Motor Mounted	Yes
** Input Watts (W)	6
Voltage/Cycle/Phase	115/60/1
Enclosure	ODP



Notes:

All dimensions shown are in units of in.
*FLA is approximate and will vary slightly with the motor.
Sones - calculated using AMCA 301 at 5 ft
** Wattage is approximate and may vary between motors.





Submittal

04-0

Split Systems

325 Sun Valley Circle
Fenton, MO 63026
636-349-4990

Clark Animal Hospital (23-398)
10320 Manchester Rd.
Kirkwood, MO 63122

Split Systems

Subject

Split Systems

Status

Submitted ●

Spec Section

23 81 00 - Decentralized Unitary HVAC Equipment

Date: 9/26/2023

Due Date: 10/10/2023

Type

Product Data

Importance

Normal

From

R.F. Meeh Company
Rob Meeh
rjmeeh@rfmeeh.com
636-349-4990

To

Atlas Building Group
Jeremy Boettler
jeremy.boettler@abgbuilds.com
636-724-000

DOCUMENTS FOR REVIEW



File

Clark Animal Hosp...
Rob Meeh

MEEH FAMILY OF COMPANIES

Since 1910





Submittal

Prepared For:
R F Meeh Company
Attn: Rob Meeh

Date: September 26, 2023

Job Name:
Clark Animal Hospital

Trane U.S. Inc. is pleased to provide the following submittal for your review and approval.

Product Summary

Qty Product

4 Ductless Split (M Series)

Joe Zweifel/John Nekić
Trane U.S. Inc.
101 Matrix Commons Drive
Fenton, MO 63026
Office Phone: (636) 305-3600

The attached information describes the equipment we propose to furnish for this project and is submitted for your approval.

Submittal acceptance and return is a critical step, so please ensure submittals are returned with approval to release to production within 14 days of submittal date.

Product performance and submittal data is valid for a period of 6 months from the date of submittal generation. If six months or more has elapsed between submittal generation and equipment release, the product performance and submittal data will need to be verified. It is the customer's responsibility to obtain such verification.

Tag Data - Ductless Split (M Series) (Qty: 4)

Item	Tag(s)	Qty	Description
A1	CU/MS-1 CU/MS-2 CU/MS-3 CU/MS-4	4	Ductless Split (M Series) (JV_M)

Item: A1 Qty: 4 Tag(s): ODU-A1, ODU-B1, ODU-C1, ODU-D1
NTXSKH09A112AA Heat Pump HyperHeat – Outdoor Unit
NTXDKS09A112AA Horizontal Ducted – Indoor Unit

Field Installed Items:

COMBI-REFCO Condensate Pump 100-240 VAC 50/60 Hz
QSMS1801M – 18" Tall Condenser Stand
TAC-YT53CRAU-J Wired Controller

NTXDKS09A112AA & NTXSKH09A112AA
9,000 BTU/H LOW STATIC HORIZONTAL-DUCTED INDOOR UNIT
9,000 BTU/H HYPER-HEATING UNIVERSAL OUTDOOR UNIT



Job Name:

System Reference:

Date:



Indoor Unit.....NTXDKS09A112AA

Outdoor Unit.....NTXSKH09A112AA

INDOOR UNIT FEATURES

- Concealed horizontal-ducted unit for applications with short duct runs
- Quiet operation
- Ultra-thin body: 7-7/8" high
- Fresh air intake provided in the main body
- Built-in drain condensate lift mechanism

Multiple control options available:

- kumo cloud® smart device app for remote access
- Third-party interface options
- Wired or wireless controllers

OUTDOOR UNIT FEATURES

- The outdoor unit powers the indoor unit, and should a power outage occur, the system is automatically restarted when power returns
- INVERTER-driven compressor and LEV provide high efficiency and comfort while using only the energy needed to maintain maximum performance
- Pro-Heat performance offers 100% heating capacity at 5° F
- Hot-Start Technology: no cold air rush at equipment startup or when restarting after Defrost Cycle
- Quiet operation
- Blue Fin anti-corrosion treatment applied to the outdoor unit heat exchanger for increased coil protection and longer life
- Built-in base pan heater
- Innovative Joint Lap DC Motor leads to high efficiency and reliability
- Pulse Amplitude Modulation technology

SPECIFICATIONS: NTXDKS09A112AA & NTXSKH09A112AA

Cooling at 95°F ¹	Maximum Capacity	BTU/H	9,000
	Rated Capacity	BTU/H	9,000
	Minimum Capacity	BTU/H	4,500
	Maximum Power Input	W	690
	Rated Power Input	W	690
	Moisture Removal	Pints/h	1.7
	Sensible Heat Factor		0.79
Heating at 47°F ²	Maximum Capacity	BTU/H	13,300
	Rated Capacity	BTU/H	12,500
	Minimum Capacity	BTU/H	8,100
	Maximum Power Input	W	1,300
	Rated Power Input	W	1,300
	Power Factor [208V / 230V]	%	95.0 / 95.0
Heating at 17°F ³	Maximum Capacity	BTU/H	12,500
	Rated Capacity	BTU/H	8,700
	Maximum Power Input	W	1,670
	Rated Power Input	W	1,120
Heating at 5°F ⁴	Maximum Capacity	BTU/H	12,500
	Maximum Power Input	W	2,300
Efficiency	SEER		17.3
	EER ¹		13.0
	HSPF [IV]		9.8
	COP at 47°F ²		2.8
	COP at 17°F at Maximum Capacity ³		2.15
	COP at 5°F at Maximum Capacity ⁴		1.59
Electrical	ENERGY STAR® Certified		Yes
	Voltage, Phase, Frequency		208/230, 1, 60
	Guaranteed Voltage Range	V AC	187 - 253
	Voltage: Indoor - Outdoor, S1-S2	V AC	208/230
	Voltage: Indoor - Outdoor, S2-S3	V DC	24
	Short-circuit Current Rating [SCCR]	kA	5
	Recommended Fuse/Breaker Size (Outdoor)	A	15
	Recommended Wire Size [Indoor - Outdoor]	AWG	14
	Power Supply		Indoor unit is powered by the outdoor unit
	Indoor Unit	MCA	A
Fan Motor Full Load Amperage		A	0.51
Fan Motor Type			DC Motor
Airflow Rate at Cooling, Dry		CFM	194-247-317
Airflow Rate at Cooling, Wet		CFM	-174-222-285
Airflow Rate at Heating, Dry		CFM	194-247-317
Sound Pressure Level [Cooling]		dB[A]	23-26-30
Sound Pressure Level [Heating]		dB[A]	23-26-30
External Static Pressure		in.WG	0.02-0.06-0.14-0.2
Drain Pipe Size		In. [mm]	1-1/4 [32]
Condensate Lift Mechanism, Maximum Distance		In. [mm]	2,121/32 [550]
Coating on Heat Exchanger			—
External Finish Color			Galvanized
Unit Dimensions		W x D x H: In. [mm]	31-1/8 x 27-9/16 x 7-7/8 [790 x 700 x 200]
Package Dimensions		W x D x H: In. [mm]	39-9/8 x 35-7/16 x 14-3/16 [1,000 x 900 x 360]
Unit Weight	Lbs. [kg]	42 [19.0]	
Package Weight	Lbs. [kg]	64 [29]	
Indoor Unit Operating Temperature Range	Cooling Intake Air Temp [Maximum / Minimum]*	°F	90 DB, 72 WB / 68 DB, 61 WB
	Heating Intake Air Temp [Maximum / Minimum]	°F	77 DB / 59 DB

NOTES:

AHRI Rated Conditions

(Rated data is determined at a fixed compressor speed)

¹Cooling (Indoor // Outdoor)

°F 80 DB, 67 WB // 95 DB, 75 WB

²Heating at 47°F (Indoor // Outdoor)

°F 70 DB, 60 WB // 47 DB, 43 WB

³Heating at 17°F (Indoor // Outdoor)

°F 70 DB, 60 WB // 17 DB, 15 WB

Conditions

⁴Heating at 5°F (Indoor // Outdoor)

°F 70 DB, 60 WB // 5 DB, 4 WB

*Indoor/Outdoor Unit Operating Temperature Range (Cooling Air Temp [Maximum / Minimum]):

• Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions.

**Outdoor Unit Operating Temperature Range (Cooling Thermal Lock-out / Re-start Temperatures; Heating Thermal Lock-out / Re-start Temperatures):

• System cuts out in heating mode to avoid thermistor error and automatically restarts at these temperatures.

SPECIFICATIONS: NTXDKS09A112AA & NTXSKH09A112AA

Outdoor Unit	MCA	A	14.0	
	MOCP	A	24	
	Fan Motor Full Load Amperage	A	0.7	
	Fan Motor Output	W	77	
	Airflow Rate [Cooling / Heating]	CFM	1,691 / 1,691	
	Refrigerant Control		LEV	
	Defrost Method		Reverse Cycle	
	Coating on Heat Exchanger		Blue Fin Coating	
	Sound Pressure Level, Cooling ¹	dB(A)	49	
	Sound Pressure Level, Heating ²	dB(A)	51	
	Compressor Type		DC INVERTER-driven Twin Rotary	
	Compressor Model		SNB130FHB2M2T	
	Compressor Rated Load Amps	A	10	
	Compressor Locked Rotor Amps	A	12.5	
	Compressor Oil [Type // Charge]	oz.	FV50S // 22	
	External Finish Color		Ivory Munsell 3Y 7.8/1.1	
	Base Pan Heater		Built-in	
	Unit Dimensions	W x D x H: In. [mm]	38-1/16 x 13 x 34-5/8 [840 x 330 x 880]	
	Package Dimensions	W x D x H: In. [mm]	38-3/4 x 16-3/4 x 39 [980 x 420 x 990]	
	Unit Weight	Lbs. [kg]	129 [58.5]	
	Package Weight	Lbs. [kg]	148 [67]	
	Outdoor Unit Operating Temperature Range	Cooling Air Temp [Maximum / Minimum]*	°F	115 DB / 14 DB
		Cooling Thermal Lock-out / Re-start Temperatures**	°F	-1 / 3
Heating Air Temp [Maximum / Minimum]		°F	75 DB, 65 WB / -13 DB, -14 WB	
Heating Thermal Lock-out / Re-start Temperatures**		°F	-25 / -14	
Refrigerant	Type		R410A	
	Maximum Charge Quantity	Lbs, oz	3.0, 9.0	
	Initial Charge Quantity	Ft. [m]	65.0 [20.0]	
	Additional Refrigerant Charge Per Additional Piping Length	oz./Ft. [g/m]	0 [0]	
Piping	Gas Pipe Size O.D. [Flared]	In.[mm]	3/8 [9.52]	
	Liquid Pipe Size O.D. [Flared]	In.[mm]	1/4 [6.35]	
	Maximum Piping Length	Ft. [m]	65 [20]	
	Maximum Height Difference	Ft. [m]	40 [12]	
	Maximum Number of Bends		10	

NOTES:

AHR1 Rated Conditions
(Rated data is determined at a fixed compressor speed)

¹ Cooling (Indoor // Outdoor)	°F	80 DB, 67 WB // 95 DB, 75 WB
² Heating at 47°F (Indoor // Outdoor)	°F	70 DB, 60 WB // 47 DB, 43 WB
³ Heating at 17°F (Indoor // Outdoor)	°F	70 DB, 60 WB // 17 DB, 15 WB

Conditions

⁴ Heating at 5°F (Indoor // Outdoor)	°F	70 DB, 60 WB // 5 DB, 4 WB
---	----	----------------------------

*Indoor/Outdoor Unit Operating Temperature Range (Cooling Air Temp [Maximum / Minimum]):

- Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions.

**Outdoor Unit Operating Temperature Range (Cooling Thermal Lock-out / Re-start Temperatures; Heating Thermal Lock-out / Re-start Temperatures):

- System cuts out in heating mode to avoid thermistor error and automatically restarts at these temperatures.

INDOOR UNIT ACCESSORIES: NTXDKS09A112AA

Control Interface	3-Pin Connector	PAC-715AD
	BACnet® and Modbus® Interface	PAC-UKPRC001-CN-1
	CN24 Relay Kit	CN24RELAY-KIT-CM3
	Connector and wire for Operation status/error using CN51	PAC-725AD
	Connector cable for remote display	PAC-SA88HA-EP
	IT Extender	PAC-WHS01IE-E
	kumo station® for kumo cloud®	TAC-WHS01HC-E
	Lockdown bracket for remote controller	RCMKP1CB
	Remote Operation Adapter†	PAC-SF40RM-E
	Thermostat Interface	PAC-US444CN-1
	Thermostat Interface	PAC-US445CN-1
	USNAP Adapter	PAC-WHS01UP-E
	Wireless Interface for kumo cloud®	PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Remote Temperature Sensor	PAC-USSEEN002-FM-1
	Flush Mount Temperature Sensor	PAC-USSEEN001-FM-1
	Remote Temperature Sensor	PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	PAC-USWHS003-TH-1
Wired Remote Controller	Airzone ZBS Wired Blueface Principal Controller White	AZZBSBLUEFACECB
	Airzone ZBS Wired Lite Controller White	AZZBSLITECB
	Airzone ZBS Wired Think Controller White	AZZBSTHINKCB
	Airzone ZBS Wireless Lite Controller White	AZZBSLITERB
	Airzone ZBS Wireless Think Controller White	AZZBSTHINKRB
	Deluxe Wired MA Remote Controller†	TAR-40MAAU
	Simple MA Remote Controller†	TAC-YT53CRAU-J
Wireless Remote Controller	Touch MA Controller†	TAR-CT01MAU-SB
	kumo touch™ RedLINK™ Wireless Controller	MHK2
	Wireless MA Receiver	PAR-SR32MA-E
Bottom Return Plate	Wireless MA Remote Controller	TAR-FL32MA-E
	Converts low-profile ducted unit from rear to bottom	BRP1
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	X87-721
	Blue Diamond (MicroBlue) Mini Condensate Pump (110/208/230V) up to 18,000 BTU/H	X86-003
	Blue Diamond Alarm Extension Cable — 6.5 Ft.	C13-192
	Blue Diamond MultiTank — collection tank for use with multiple pumps	C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	C13-103
	Refco Condensate Pump (100-240 VAC) up to 120,000 BTU/H	COMBI
	Sauermann Condensate Pump	SI30-230
Control Wire	20/2PR, 1PR shielded + 1PR plenum wire for Airzone, 100 ft reel	CW2042S2-100
	20/2PR, shielded + 1PR plenum wire for Airzone, 500 ft reel	CW2042S2-500
Disconnect Switch	(30A/600V/UL) [fits 2" X 4" utility box] - Black	TAZ-MS303
	(30A/600V/UL) [fits 2" X 4" utility box] - White	TAZ-MS303W
Filter Box	Filter Box with MERV 8 Filter	FBL1-1
Lineset	15' x 1/4" x 15' / 3/8" Lineset (Twin-Tube Insulation)	MLS143812T-15
	30' x 1/4" x 30' / 3/8" Lineset (Twin-Tube Insulation)	MLS143812T-30
	50' x 1/4" x 50' / 3/8" Lineset (Twin-Tube Insulation)	MLS143812T-50
	65' x 1/4" x 65' / 3/8" Lineset (Twin-Tube Insulation)	MLS143812T-65

NOTES:

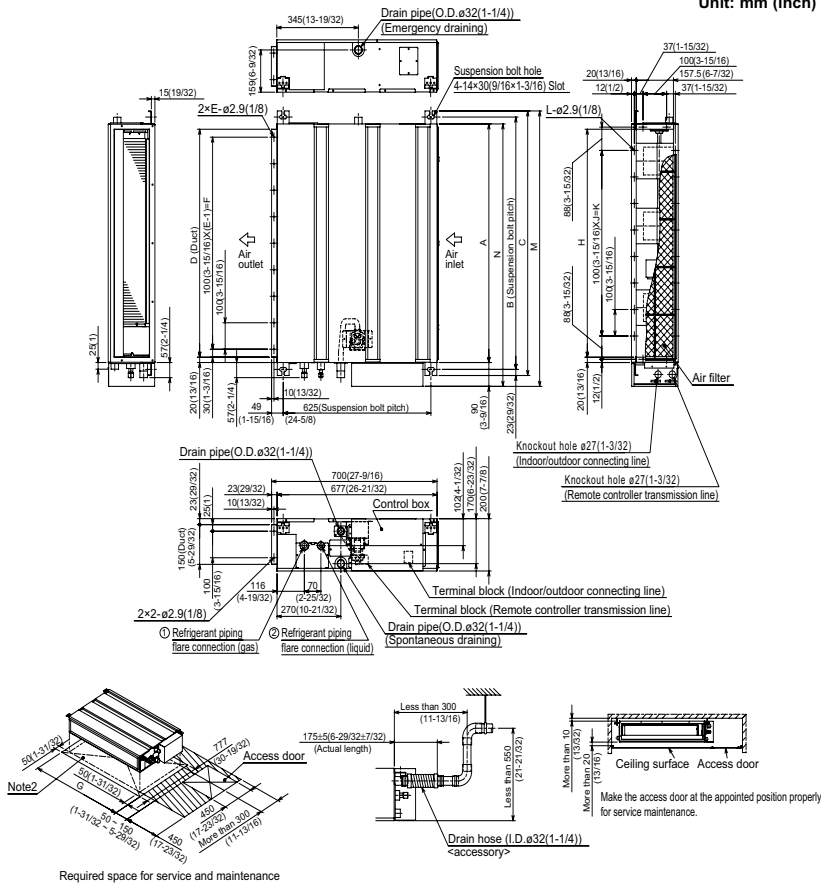
†PAC-SF40RM-E (Unable to use with wireless remote controller)

OUTDOOR UNIT ACCESSORIES: NTXSKH09A112AA

Control/Service Tool	M- & P-Series Maintenance Tool Cable Set	M21EC0397
Mini-Split Wire	14 Gauge, 4 wire MiniSplit Cable—250 ft. roll	S144-250
	14 Gauge, 4 wire MiniSplit Cable—250 ft. roll	SW144-250
	14 Gauge, 4 wire MiniSplit Cable—50 ft. roll	S144-50
	14 Gauge, 4 wire MiniSplit Cable—50 ft. roll	SW144-50
	16 Gauge, 4 wire MiniSplit Cable—250 ft. roll	S164-250
	16 Gauge, 4 wire MiniSplit Cable—250 ft. roll	SW164-250
	16 Gauge, 4 wire MiniSplit Cable—50 ft. roll	S164-50
	16 Gauge, 4 wire MiniSplit Cable—50 ft. roll	SW164-50
Mounting Pad	Condensing Unit Mounting Pad: 16" x 36" x 3"	ULTRILITE1
Stand	18" Single Fan Stand	QSMS1801M
	24" Single Fan Stand	QSMS2401M
	Condenser Wall Bracket	QSWB2000M-1
	Outdoor Unit Stand — 12" High	QSMS1201M

INDOOR UNIT DIMENSIONS: NTXDKS09A112AA

Unit: mm (inch)



Required space for service and maintenance

mm (in.)

Sizes	A	B	C	D	E	F	G	H	J	K	L	M	N	① Gas pipe	② Liquid pipe
09 KBTU/H	700 (27-9/16)	752 (29-3/8)	798 (31-7/16)	660 (26)	7	600 (23-5/8)	800 (31-1/2)	660 (26)	5	500 (19-11/16)	16	839 (33-1/8)	790 (31-1/8)	ø9.52(3/8)	ø6.35(1/4)
12 KBTU/H	900 (35-7/16)	952 (37-1/2)	998 (39-5/16)	860 (33-7/8)	9	800 (31-1/2)	1000 (39-3/8)	860 (33-7/8)	7	700 (27-9/16)	20	1039 (40-29/32)	990 (39)		
15 KBTU/H	1100 (43-5/16)	1152 (45-3/8)	1198 (47-3/16)	1060 (41-3/4)	11	1000 (39-3/8)	1200 (47-1/4)	1060 (41-3/4)	9	900 (35-7/16)	24	1239 (48-25/32)	1190 (46-7/8)	ø12.7(1/2)	
18 KBTU/H															

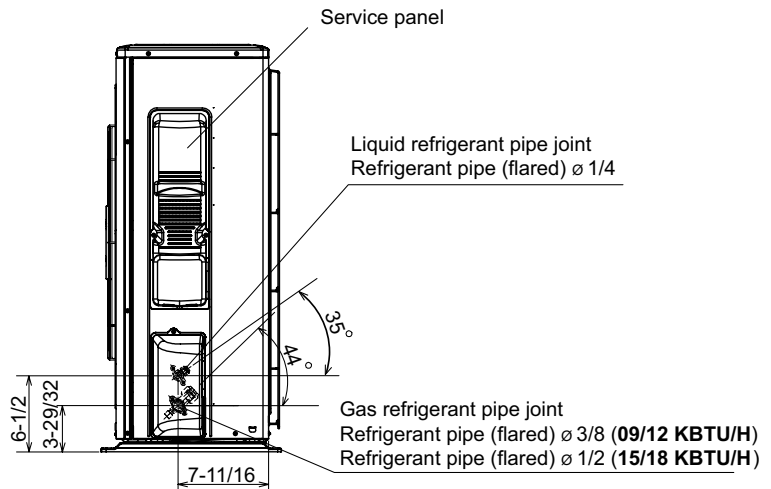
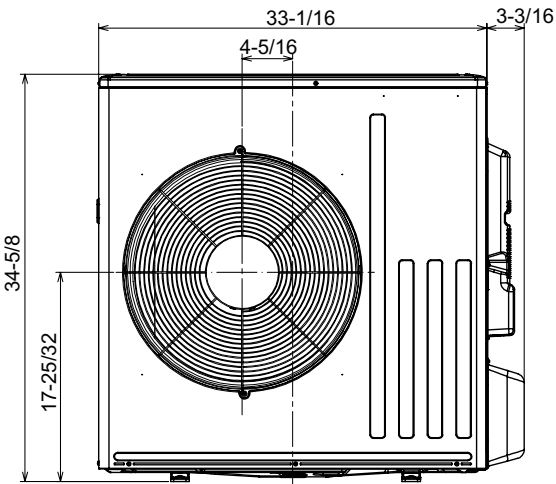
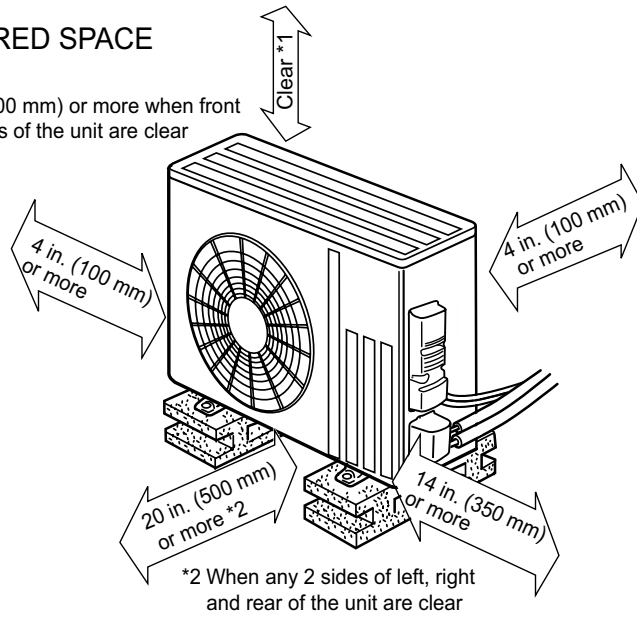
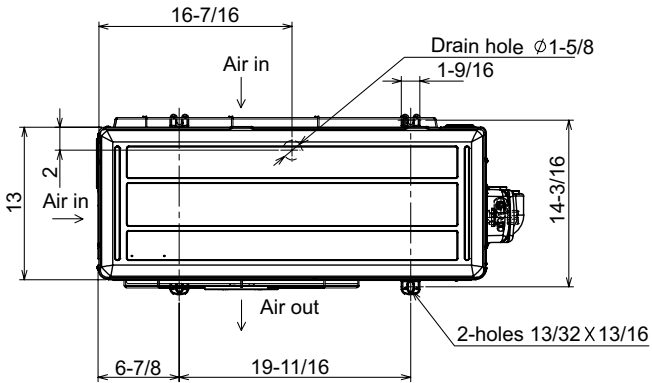
- Note1. Use M10 screw for the suspension bolt (field supply).
 2. Keep the service space for the maintenance at the bottom.
 3. This chart indicates for size 15 kBTU/h model, which has 3 fans.
 Sizes 09,12 kBTU/h models have 2 fans.
 Sizes 08 kBTU/h model has 4 fans.
 4. When an inlet duct is used, remove the air filter (supply with the unit), then install the filter (field supply) at suction side.

OUTDOOR UNIT DIMENSIONS: NTXSKH09A112AA

Unit: inch

REQUIRED SPACE

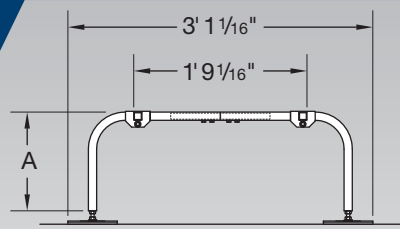
*1 20 in. (500 mm) or more when front and sides of the unit are clear



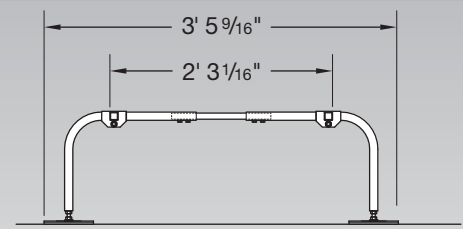
SINGLE FAN MINI-STAND MODEL NO. QSMS1201M

U.S. Patent No. 8,827,232 B2

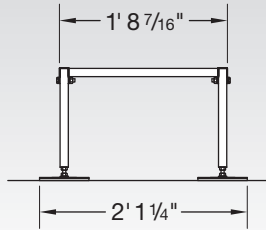
Height A:
 QSMS1201M = 12"
 QSMS1801M = 18"
 QSMS2401M = 24"



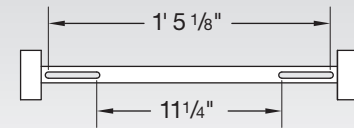
Side View – Retracted



Side View – Expanded



End View – Fixed

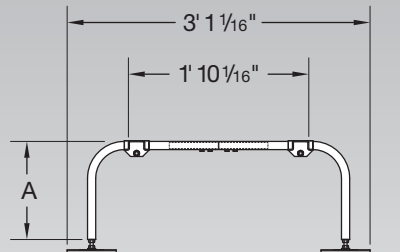


Spacer Bar Detail
(Showing Range of Bolt Spacing)

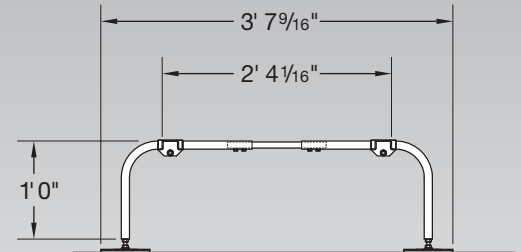
DUAL FAN MINI-STAND MODEL NO. QSMS1202M

U.S. Patent No. 8,827,232 B2

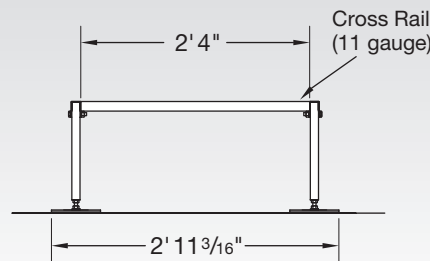
Height A:
 QSMS1202M = 12"
 QSMS1802M = 18"
 QSMS2402M = 24"



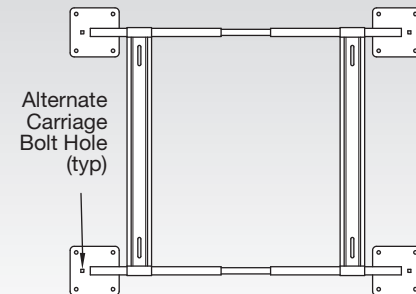
Side View – Retracted



Side View – Expanded

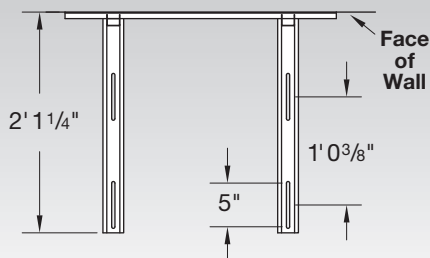


End View – Fixed

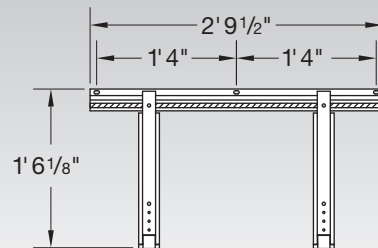


Plan View – Expanded

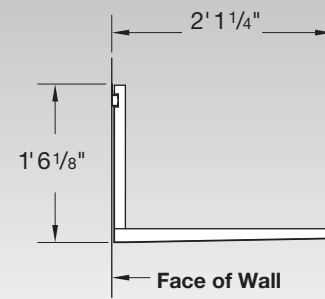
WALL BRACKET MODEL NO. QSWB2000M-1 & QSWBSS



Plan View



Elevation

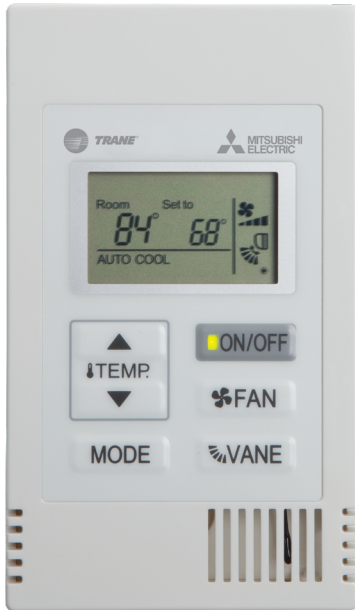


Side View

Job Name:

System Reference:

Date:

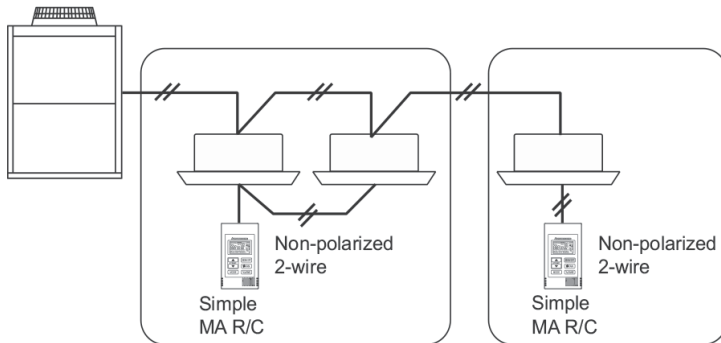


SIMPLE MA REMOTE CONTROLLER (TAC-YT53CRAU-J) SPECIFICATIONS

- Controls group operation for up to 16 indoor units in a single group
- Supports both Fahrenheit and Celsius
- User defined functions:
 - ON/OFF
 - Operation mode: AUTO (R2-Series only), COOL, HEAT, FAN, DRY, SETBACK, or ADD
 - Set temperature
 - Fan speed setting
 - Air flow direction
 - Set temperature range: depending on operation mode and indoor unit connected.
- Set temperature range limit: Simple MA allowable set temperature range can be reduced for cool and heat modes.
- LOSSNAY®: Simple MA for interlocked system can set high/low/Stop on LOSSNAY.
- Room temperature can be sensed either at the indoor unit (default) or at the remote controller.
- Diagnostics: Displays four-digit error code and error unit address.
- Grouping: Same group use only with other TAC-YT53CRAU-J Simple MA Controllers with up to two remote controllers per group.
- Addressing: No addressing required.
- Wiring: Uses two-wire, stranded, non-polar control wire for connecting TB15 connection terminal on the indoor unit.
- Requires crossover wiring for grouping across indoor units.
- Dimensions: 2-3/4 x 9/16 x 4-3/4" (70 x 14.5 x 120mm).

NOTE: A MAC-334IF-E may be needed in order to connect to the indoor unit. Please see the compatibility charts for more information.

SAMPLE SYSTEM



System example

NOTES:

Blank area for notes.

DIMENSIONS: TAC-YT53CRAU-J

Unit:mm[in.]

