



DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
OFFICE OF STATEWIDE HOSPITAL PLANNING AND DEVELOPMENT

APPLICATION FOR HCAI SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0379

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: HVAC Manufacturing, Inc

Manufacturer's Technical Representative: John Karamanos

Mailing Address: 1010 W Corsicana St, Athens, TX 75751

Telephone: (408) 254-5420

Email: JKaramanos@hvacmfg.com

Product Information

Product Name: VRU (VAV ready unit with piping)

Product Model Number(s): See attachment

Product Category: Air Conditioning Units

Product Sub-Category: Variable Air Volume Units

General Description: The certified units are variable air volume units with piping. Each unit comes pre-assembled with factory-installed piping and pre-commissioned, factory-installed controls.

Mounting Description: Suspended Rigid

Tested Seismic Enhancements: None

Applicant Information

Applicant Company Name: DCL Labs, LLC

Contact Person: Nastya Veyngerova

Mailing Address: 1315 Greg Street, Suite 109, Sparks, NV 89431

Telephone: (775) 358-5085

Email: nastya.veyngerova@shaketest.com

Title: Seismic Test Engineer



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California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)

Company Name: THE VMC GROUP

Name: Kenneth Tarlow

California License Number: S2851

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: (800) 569-8423

Email: ken.tarlow@thevmcgroup.com

Certification Method

☐ GR-63-Core

☒ ICC-ES AC156

☐ IEEE 344

☐ IEEE 693

☐ NEBS 3

☐ Other (Please Specify): _____

Testing Laboratory

Company Name: DYNAMIC CERTIFICATION LABORATORY (DCL)

Contact Person: Josh Sailer

Mailing Address: 1315 Greg St., Ste 109, Sparks NV 89431

Telephone: (775) 358-5085

Email: josh@shaketest.com

BY: Mohammad Karim

DATE: 09/16/2026



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Seismic Parameters

Certified Response Spectral Acceleration Factors: (F_p/W_p)

Horizontal (A Flx-H), $g =$ 4.00 (A Rig-H), $g =$ 2.69

Vertical (A Flx-V), $g =$ 1.67 (A Rig-V), $g =$ 0.67

SDS (Design spectral response acceleration at short period, g) = 2.50

H_f (Force amplification height factor) = 3.5 at $z/h=1.0$; 1.0 at $z/h=0$

R_u (Structure ductility reduction factor) = 1.3 at $z/h=1.0$; 1.0 at $z/h=0$

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 0 and 1

HCAI Approval (For Office Use Only) - Approval Expires on 09/16/2032

Date: 9/16/2026

Name: Mohammad Karim

Title: Supervisor, Health Facilities

Condition of Approval (if applicable): _____

OSP-0379

BY: Mohammad Karim

DATE: 09/16/2026



Special Seismic Certification

Table 1 - Certified Components



DCL Project Number: 28162-2601

Manufacturer: Johnson Controls, Incorporated (alternately branded as HVAC Manufacturing, Inc)

Product Line: VRU (VAV ready unit with piping)

Certified Product Construction: Single duct units feature a double wall construction with 22 gage galvanized steel cabinet with 1.0" thick fiberglass insulation. Dual duct units feature a 22 gage galvanized steel cabinet with 1/2" thick fiberglass insulation

Mounting: Ceiling Suspended and Braced with Cables

Certified Seismic Levels: Sds=2.50g with z/h=1 and 0

Factors for Force Amplification and Structure Ductility Reduction: $H_f = 3.5$ at $z/h=1.0$; 1.0 at $z/h=0$ and $R_u = 1.3$ at $z/h=1.0$; 1.0 at $z/h=0$

Tag	Model Number ¹	VAV Box Dimension [in.]			Max. Operating Weight [lb.]	Unit
		Max. Length ²	Width ³	Height		
VRU (Single Duct)						
VAV-04	JHx0460x0xxx	67.0	19.5	10.0	87	UUT1
VAV-05	JHx0560x0xxx	67.0	19.5	10.0	87 to 220	Interpolated
VAV-06	JHx0660x0xxx	63.0	19.5	10.0		Interpolated
VAV-08	JHx0860x0xxx	63.0	21.5	10.0		Interpolated
VAV-10	JHx1060x0xxx	63.0	23.5	12.5		Interpolated
VAV-12	JHx1260x0xxx	63.0	25.5	15.0		Interpolated
VAV-14	JHx1460x0xxx	63.0	29.5	17.5		Interpolated
VAV-16	JHx1660x0xxx	63.0	33.5	17.5		Interpolated
VAV-19	JHx1960x0xxx	64.5	39.5	17.5		Interpolated
VAV-22	JHx2260x0xxx	64.5	43.5	17.5	220	UUT2
VRU (Dual Duct)						
VAV-04-04	JHx0410x00xx	41.0	35.5	10.0	82	Extrapolated
VAV-05-05	JHx0510x00xx	41.0	35.5	10.0	82	Extrapolated
VAV-06-06	JHx0610x00xx	37.0	35.5	10.0	82	UUT3
VAV-08-08	JHx0810x00xx	37.0	39.5	10.0	82 to 163	Interpolated
VAV-10-10	JHx1010x00xx	43.0	43.5	12.5		Interpolated
VAV-12-12	JHx1210x00xx	43.0	47.5	15.0		Interpolated
VAV-14-14	JHx1410x00xx	49.0	53.5	17.5		Interpolated
VAV-16-16	JHx1610x00xx	49.0	63.5	17.5	163	UUT4

Notes:

- All units are certified with and without water coils (4-row). UUT1 and UUT2 are certified with and without sound attenuator. UUT3 and UUT4 are certified with standard casing.
- Maximum length and maximum operating weights includes coils and/or sound attenuator. Dimension length is based on inlet collar + VAV casting + 6 1/2" water coil outlet casting.
- Width is based on VAV casting + hydronic unit (piping).

Special Seismic Certification Nomenclature Chart



Product Line: VRU (VAV ready unit with piping)

Sample Part Number: A-B-C-D-E-F-G-H-I

Character	Category	Allowable Value	Description	Unit
A	Brand	JH	JCI / HVAC Manufacturing VRU (with or without water coils)	UUT1,2,3,4
B	VAV Type	1	TSS	Extrapolated
		3	TSS with water coil	UUT1,2
		2	TDS	Extrapolated
		D	TDS with water coil	UUT3,4
C	Inlet Size	04	4"	UUT1
		05	5"	Interpolated
		06	6"	Interpolated
		08	8"	UUT3
		10	10"	Interpolated
		12	12"	Interpolated
		14	14"	Interpolated
		16	16"	UUT4
D	Liner	1	1" fiberglass	UUT3,4
		6	Metal w/1" fiberglass	UUT1,2
E	Fan Case Size	0	None	UUT1,2,3,4
F	Hot Water Coil Rows	0	None	Extrapolated
		1	1 Row HW Coil	Extrapolated
		2	2 Row HW Coil	Extrapolated
		3	3 Row HW Coil	Extrapolated
G	Fan Voltage	4	4 Row HW Coil	UUT1,2,3,4
		0	None	UUT1,2,3,4
H	Options	0	None	UUT3,4
		1	Sound attenuator	UUT1,2
I	LL/LR/RR/RL	RR	Right hand controls / right hand piping	UUT3,4
		RL	Right hand controls / left hand piping	Interpolated
		LL	Left hand controls / left hand piping	UUT1,2
		LR	Left hand controls / right hand piping	Interpolated

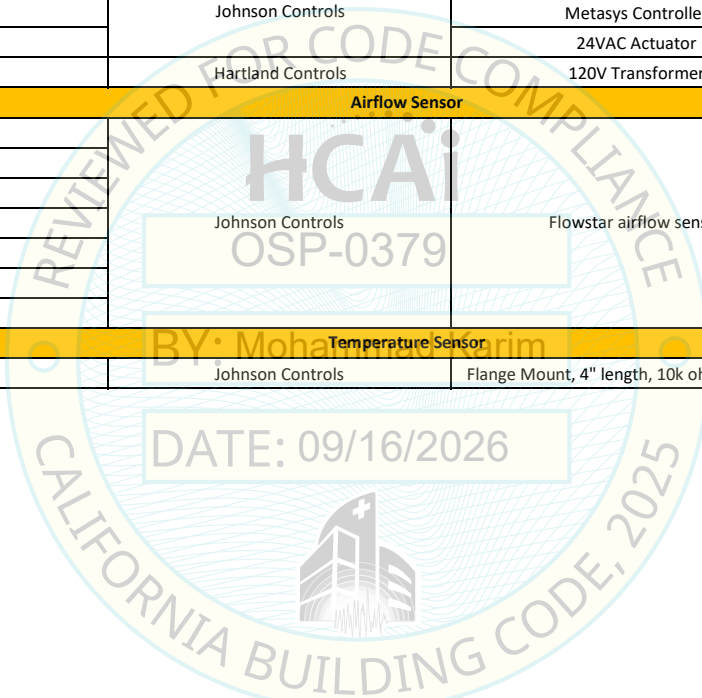
Special Seismic Certification

Table 2 - Certified Subcomponents



Product Line: VRU (VAV ready unit with piping)

Model Number	Manufacturer	Material	Unit
Coils - Single Duct			
4-row, Size 04	Johnson Controls	Aluminum fin with copper tubes	UUT1
4-row, Size 05 to 19			Interpolated
4-row, Size 22			UUT2
Coils - Dual Duct			
4-row, Size 04, 05, 06	Johnson Controls	Aluminum fin with copper tubes	UUT3
4-row, Size 08 to 14			Interpolated
4-row, Size 16			UUT4
Note: Coils may be 1 to 4 rows. The worst cast (4 rows) was tested.			
Controls			
Model Number	Manufacturer	Description	Unit
M4 CVM	Johnson Controls	VAV Controller	Extrapolated
VMA-1630		Metasys Controller	UUT1, UUT2, UUT3, UUT4
VA2104		24VAC Actuator	UUT1, UUT2, UUT3, UUT4
PE-10-2105	Hartland Controls	120V Transformer	UUT1, UUT2, UUT3, UUT4
Airflow Sensor			
Size 04	Johnson Controls	Flowstar airflow sensor	UUT1
Size 05			Interpolated
Size 06			UUT3
Size 05 to 14			Interpolated
Size 16			UUT4
Size 19			Interpolated
Size 22			UUT2
Temperature Sensor			
TE-636GV-2	Johnson Controls	Flange Mount, 4" length, 10k ohm thermistor	UUT1, UUT2, UUT3, UUT4



Special Seismic Certification

Table 3 - Tested Units



DCL Project Number: 28162-2601

Manufacturer: Johnson Controls, Incorporated (alternately branded as HVAC Manufacturing, Inc)

Product Line: VRU (VAV ready unit with piping)

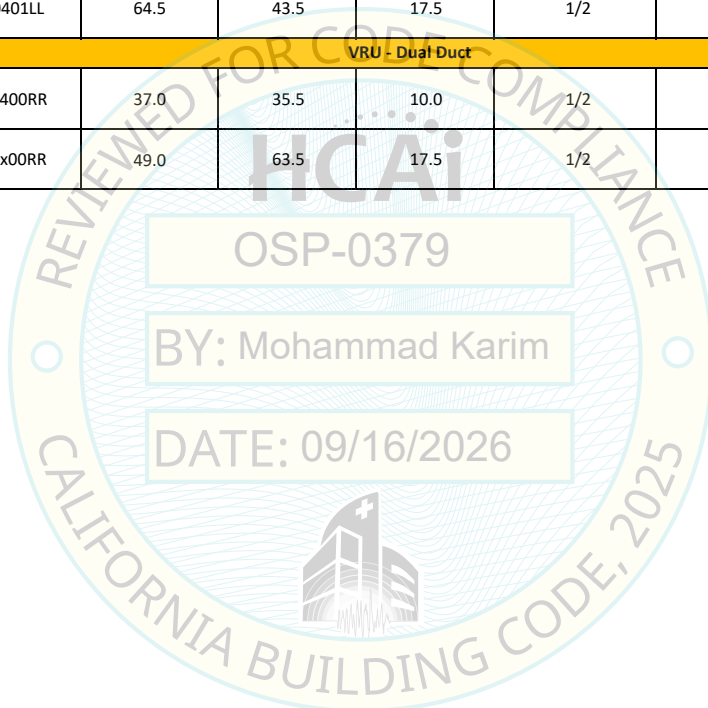
Certified Product Construction: Single duct units feature a double wall construction with 22 gage galvanized steel cabinet with 1.0" thick fiberglass insulation. Dual duct units feature a 22 gage galvanized steel cabinet with 1/2" thick fiberglass insulation

Mounting: Ceiling Suspended and Braced with Cables

Certified Seismic Levels: Sds=2.50g with z/h=1 and 0

Factors for Force Amplification and Structure Ductility Reduction: $H_f = 3.5$ at $z/h=1.0$; 1.0 at $z/h=0$ and $R_u = 1.3$ at $z/h=1.0$; 1.0 at $z/h=0$

Tag	Model Number	VAV Box Dimensions [in.]			Mounting Details		Weight [lb.]	Unit
		Length	Width	Height	Threaded Rod Diameter [in.]	Maximum Threaded Rod Spacing [in.]		
VRU - Single Duct								
VAV-04	JH30460401LL	67.0	19.5	10.0	1/2	36	87	UUT1
VAV-22	JH32260401LL	64.5	43.5	17.5	1/2	36	220	UUT2
VRU - Dual Duct								
VAV-06-06	JHD0610400RR	37.0	35.5	10.0	1/2	22	82	UUT3
VAV-16-16	JHD1610x00RR	49.0	63.5	17.5	1/2	34	163	UUT4



UNIT UNDER TEST (UUT) Summary Sheet



UUT1

DCL Report Number: 38749-1301

Test Dates: 11/18/2013 - 11/19/2013

Manufacturer: Johnson Controls, Incorporated (alternately branded as HVAC Manufacturing, Inc)

Product Line: VRU (VAV ready unit with piping)

Model Number: JH30460401LL (Tag VAV-04)

Product Construction Summary: Double wall construction with 22 gage galvanized steel cabinet with 1.0" thick fiberglass insulation

Options / Component Summary:

Subcomponent Type	Model Number	Manufacturer	Material / Description
Coil	4-row, Size 04	Johnson Controls	Aluminum fin with copper tubes
Controls	VMA-1630	Johnson Controls	Metasys Controller
	PE-10-2105	Hartland Controls	120V Transformer
	VA2104	Johnson Controls	24VAC Actuator
Airflow Sensor	Size 04	Johnson Controls	Flowstar airflow sensor
Temperature Sensor	TE-636GV-2	Johnson Controls	Flange Mount, 4" length, 10k ohm thermistor

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained before and after the AC 156 test.

UUT Properties

Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
87	67.0	19.5	10.0	N/A	N/A	N/A

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	H _r	R _μ	I _p	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2025	ICC-ES	2.50	1.0	3.5	1.3	1.5	4.00	3.00	N/A	N/A
	AC156-24	2.50	0.0	1.0	1.0		N/A	NA	1.67	0.67

Unit Mounting Description: UUT1 was ceiling-suspended from the DCL shake table interface frame using 1/2" all-thread rod spaced approximately 22.5" widthwise and approximately 53" lengthwise and (4) manufacturer-provided 12-gage 90-degree brackets, each attached to the unit with (4) #14 sheet metal screws. Shear brackets were placed on top of each 12-gage, 90-degree bracket; each shear bracket was attached to the unit with (4) #14 sheet metal screws each. Lateral bracing consisted of 3/16" steel cable and Mason SCBH-2/SSB-2 brackets. The bottom of the unit was supported by 12 gage unistrut, 3"x3"x1/4" plate washer, circular washer, and bolt. The 12 gage unistrut was attached to the unit with (4) #14 sheet metal screw. The Mason brackets were attached to the interface frame with 1/2-inch diameter Grade 5 bolts.



UNIT UNDER TEST (UUT) Summary Sheet



UUT2

DCL Report Number: 38749-1301

Test Dates: 11/18/2013 - 11/19/2013

Manufacturer: Johnson Controls, Incorporated (alternately branded as HVAC Manufacturing, Inc)

Product Line: VRU (VAV ready unit with piping)

Model Number: JH32260401LL (Tag VAV-22)

Product Construction Summary: Double wall construction with 22 gage galvanized steel cabinet with 1.0" thick fiberglass insulation

Options / Component Summary:

Subcomponent Type	Model Number	Manufacturer	Material / Description
Coil	4-row, Size 22	Johnson Controls	Aluminum fin with copper tubes
Controls	VMA-1630	Johnson Controls	Metasys Controller
	PE-10-2105	Hartland Controls	120V Transformer
	VA2104	Johnson Controls	24VAC Actuator
Airflow Sensor	Size 22	Johnson Controls	Flowstar airflow sensor
Temperature Sensor	TE-636GV-2	Johnson Controls	Flange Mount, 4" length, 10k ohm thermistor

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained before and after the AC 156 test.

UUT Properties

Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
220	64.5	43.5	17.5	N/A	N/A	N/A

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	H _r	R _μ	I _p	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2025	ICC-ES	2.50	1.0	3.5	1.3	1.5	4.00	3.00	N/A	N/A
	AC156-24	2.50	0.0	1.0	1.0		N/A	NA	1.67	0.67

Unit Mounting Description: UUT2 was ceiling-suspended from the DCL shake table interface frame using 1/2" all-thread rod spaced approximately 32.5" widthwise and approximately 54.5" lengthwise and (4) manufacturer-provided 12-gage 90-degree brackets, each attached to the unit with (4) #14 sheet metal screws. Shear brackets were placed on top of each 12-gage, 90-degree bracket; each shear bracket was attached to the unit with (4) #14 sheet metal screws each. Lateral bracing consisted of 3/16" steel cable and Mason SCBH-2/SSB-2 brackets. The bottom of the unit was supported by 12 gage unistrut, 3"x3"x1/4" plate washer, circular washer, and bolt. The 12 gage unistrut was attached to the unit with (4) #14 sheet metal screw. The Mason brackets were attached to the interface frame with 1/2-inch diameter Grade 5 bolts.



UNIT UNDER TEST (UUT) Summary Sheet



UUT3

DCL Report Number: 38749-1301

Test Dates: 11/18/2013 - 11/19/2013

Manufacturer: Johnson Controls, Incorporated (alternately branded as HVAC Manufacturing, Inc)

Product Line: VRU (VAV ready unit with piping)

Model Number: JHD0610400RR (Tag VAV-06-06)

Product Construction Summary: 22 gage galvanized steel cabinet with 1/2" thick fiberglass insulation

Options / Component Summary:

Subcomponent Type	Model Number	Manufacturer	Material / Description
Coil	4-row, Size 04, 05, 06	Johnson Controls	Aluminum fin with copper tubes
Controls	VMA-1630	Johnson Controls	Metasys Controller
	PE-10-2105	Hartland Controls	120V Transformer
	VA2104	Johnson Controls	24VAC Actuator
Airflow Sensor	Size 06	Johnson Controls	Flowstar airflow sensor
Temperature Sensor	TE-636GV-2	Johnson Controls	Flange Mount, 4" length, 10k ohm thermistor

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained before and after the AC 156 test.

UUT Properties

Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
82	37.0	35.5	10.0	N/A	N/A	N/A

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	H _r	R _μ	I _p	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2025	ICC-ES	2.50	1.0	3.5	1.3	1.5	4.00	3.00	N/A	N/A
	AC156-24	2.50	0.0	1.0	1.0		N/A	NA	1.67	0.67

Unit Mounting Description: UUT3 was ceiling-suspended from the DCL shake table interface frame using 1/2" all-thread rod spaced approximately 32.5" widthwise and approximately 12" lengthwise and (4) manufacturer-provided 12-gage 90-degree brackets, each attached to the unit with (4) #14 sheet metal screws. Shear brackets were placed on top of each 12-gage, 90-degree bracket; each shear bracket was attached to the unit with (4) #14 sheet metal screws each. Lateral bracing consisted of 3/16" steel cable and Mason SCBH-2/SSB-2 brackets. The bottom of the unit was supported by 12 gage unistrut, 3"x3"x1/4" plate washer, circular washer, and bolt. The 12 gage unistrut was attached to the unit with (4) #14 sheet metal screw. The Mason brackets were attached to the interface frame with 1/2-inch diameter Grade 5 bolts.



UNIT UNDER TEST (UUT) Summary Sheet



UUT4

DCL Report Number: 38749-1301

Test Dates: 11/18/2013 - 11/19/2013

Manufacturer: Johnson Controls, Incorporated (alternately branded as HVAC Manufacturing, Inc)

Product Line: VRU (VAV ready unit with piping)

Model Number: JHD1610x00RR (Tag VAV-16-16)

Product Construction Summary: 22 gage galvanized steel cabinet with 1/2" thick fiberglass insulation

Options / Component Summary:

Subcomponent Type	Model Number	Manufacturer	Material / Description
Coil	4-row, Size 16	Johnson Controls	Aluminum fin with copper tubes
Controls	VMA-1630	Johnson Controls	Metasys Controller
	PE-10-2105	Hartland Controls	120V Transformer
	VA2104	Johnson Controls	24VAC Actuator
Airflow Sensor	Size 16	Johnson Controls	Flowstar airflow sensor
Temperature Sensor	TE-636GV-2	Johnson Controls	Flange Mount, 4" length, 10k ohm thermistor

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained before and after the AC 156 test.

UUT Properties

Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
163	49.0	63.5	17.5	N/A	N/A	N/A

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	H _r	R _μ	I _p	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2025	ICC-ES	2.50	1.0	3.5	1.3	1.5	4.00	3.00	N/A	N/A
	AC156-24	2.50	0.0	1.0	1.0		N/A	NA	1.67	0.67

Unit Mounting Description: UUT4 was ceiling-suspended from the DCL shake table interface frame using 1/2" all-thread rod spaced approximately 60.5" widthwise and approximately 20" lengthwise and (4) manufacturer-provided 12-gage 90-degree brackets, each attached to the unit with (4) #14 sheet metal screws. Shear brackets were placed on top of each 12-gage, 90-degree bracket; each shear bracket was attached to the unit with (4) #14 sheet metal screws each. Lateral bracing consisted of 3/16" steel cable and Mason SCBH-2/SSB-2 brackets. The bottom of the unit was supported by 12 gage unistrut, 3"x3"x1/4" plate washer, circular washer, and bolt. The 12 gage unistrut was attached to the unit with (4) #14 sheet metal screw. The Mason brackets were attached to the interface frame with 1/2-inch diameter Grade 5 bolts.

