



Purchasing Division
Finance Department
Room 120
411 West First Street
Duluth, Minnesota 55802

218-730-5340
purchasing@duluthmn.gov

Addendum 2
Solicitation 22-99418 REBID
REBID City Hall MEP Renewal (General Conditions Work Scope Only)

This addendum serves to notify all bidders of the following changes to the solicitation documents:

Bid information from the original solicitation is included in this REBID solicitation per the documents from KFI attached.

Please acknowledge receipt of this Addendum by checking the acknowledgment box within the www.bidexpress.com solicitation.

Posted: **6/29/22**

ADDENDUM



Date: 6/28/2022
Project: City of Duluth City Hall MEP Renewal WS1 Rebid

KFI Project Number: 21-0486.00

Addendum Number: 2

THIS ADDENDUM IS A CONTRACT DOCUMENT AND MAY APPLY TO ANY OR ALL CONTRACTS AND SUBCONTRACTS UNLESS OTHERWISE SPECIFIED HEREIN OR SHOWN ON THE ATTACHED DRAWINGS (IF ANY). ALL WORK REQUIRED BY THIS ADDENDUM SHALL BE IN COMPLETE ACCORD WITH THE CONTRACT DOCUMENTS AND SUBSEQUENT ADDENDA THERETO. THE ITEMS LISTED IN THIS ADDENDUM ARE NOT IN ANY ORDER IN REGARD TO THE DRAWINGS OR THE SPECIFICATIONS. ALL CONTRACTORS ARE CAUTIONED TO EXAMINE EACH AND EVERY ITEM OF THIS ADDENDUM.

THE FOLLOWING CHANGES OR CLARIFICATIONS TO THE PLANS & SPECIFICATIONS SHALL BE INCLUDED AS PART OF THE CONTRACT DOCUMENT

DESCRIPTION OF CHANGES:

1. Include information from original work scope 1 bid package, which was issued by City of Duluth in Addendums 1 and 3. Addendum 2, 4, 5, 6 & 7 modified bid dates only or were incorporated within the conformed set of plans and specifications as part of this solicitation.

ATTACHMENTS:

1. Addendum 1
2. Addendum 3

END OF ADDENDUM



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Addendum 1
Solicitation 22-99418
City Hall MEP Renewal Project

This addendum serves to notify all bidders of the following changes to the solicitation documents:

1. The map of areas requiring BCA compliance is attached as Exhibit A-1.
2. The pre-bid meeting sign-in sheet has been uploaded to the Bid Express solicitation and the City Purchasing website.
3. The apparent award for the VRF equipment package is Trane Technologies with a Trane-Mitsubishi-VRF system. It included multiples of the following pieces: VRF Concealed Ducted Cassette, NCC 6 VRF Concealed Ducted Cassette, NCC 8 VRF Concealed Ducted Cassette, NCC 12 VRF Concealed Ducted Cassette, NCC 15 VRF Concealed Ducted Cassette, NCC 18 VRF Concealed Ducted Cassette, NCC 24 VRF Concealed Ducted Cassette, NCC 30 VRF Concealed Ducted Cassette, NCC 36 VRF Concealed Ducted Cassette, NCC 54 VRF Concealed Ducted Cassette, NCC 72 VRF Wall Mounted Ductless, NCC 4 VRF Multiposition AHU (downflow), NCC 54 Water source heat pump, NCC 120 Water source heat pump, NCC 144 Water source heat pump, NCC 192 Water source heat pump, NCC 216 Water source heat pump, NCC 240 Branch Circuit Controller, 8 Ports, Main Branch Circuit Controller, 8 Ports, Sub Branch Circuit Controller, 12 Ports, Main Branch Circuit Controller, 16 Ports, Main. This purchase is pending council approval on May 23, 2022. The attached Exhibit A-2 contains the cut sheets for this equipment.
4. Contracted installer of the VRF equipment package must be a Trane-certified installer. The training required for this is identified in the attached Exhibit A-3. Please note that a sample training event invitation is included, but that particular course is closed. Trainings occur on a regular basis and more information will be available using the link within the invitation.
5. The apparent award for the air handling components is SVL, Inc. and the components are two Daikin Air Handling and Energy Recovery Units, a Gunter Dry Fluid Cooler, and AAON Air-cooled refrigerant heat pumps. This purchase is pending council approve on May 23, 2022. The attached Exhibit A-4 contains the cut sheets for this equipment.
6. A rough timeline of the construction schedule is provided below. We anticipate that as

lead times are confirmed and contractors are brought on board, this schedule will be shorter and much more defined.

4 th Fl west and 3 rd FL west ceiling	10 weeks
3 rd Fl west and 2 nd Fl west ceiling	10 weeks
2 nd Fl west and 1 st Fl west ceiling	10 weeks
1 st Fl west and Gnd Fl west ceiling	10 weeks
Gnd Fl west	10 weeks

4 th Fl south and 3 rd FL south ceiling	10 weeks
3 rd Fl south and 2 nd Fl south ceiling	10 weeks
2 nd Fl south and 1 st Fl south ceiling	10 weeks
1 st Fl south and Gnd Fl south ceiling	10 weeks
Gnd Fl south	10 weeks

4 th Fl east and 3 rd FL east ceiling	10 weeks
3 rd Fl east and 2 nd Fl east ceiling	10 weeks
2 nd Fl east and 1 st Fl east ceiling	10 weeks
1 st Fl east and Gnd Fl east ceiling	10 weeks
Gnd Fl east	10 weeks

2 nd Fl north and 1 st Fl north ceiling	10 weeks
1 st Fl north and Gnd Fl north ceiling	10 weeks
Gnd Fl north	10 weeks

Total time: 180 weeks

Anticipated Start: August 1, 2022

Estimated Finish: February 1, 2026

7. The City Hall garage and driveway located on the 4th Avenue (East) side of the building will be the designated area for parking and laydown.
8. The City intends to reuse all existing office and corridor lighting, ceiling tiles, decorative vents and radiator covers. Contractors should take precautions to preserve these items.
9. Each trade contractor is responsible for their own core drilling.
10. The City, State and Federal governments encourage contracting with disadvantaged businesses; however, there is no DBE goal or preference on this project.
11. Changes and clarifications to the plans and specs are identified in Exhibit A-5.

Please acknowledge receipt of this Addendum by checking the acknowledgment box within the www.bidexpress.com solicitation. Posted: **5/18/22**

Exhibit A-1



RW Fern Associates Inc. Architects, 5517 Grand Ave., Duluth, Minnesota 55807 (218) 722-8271
DULUTH CITY HALL
411 WEST FIRST STREET,
DULUTH, MN. 55802

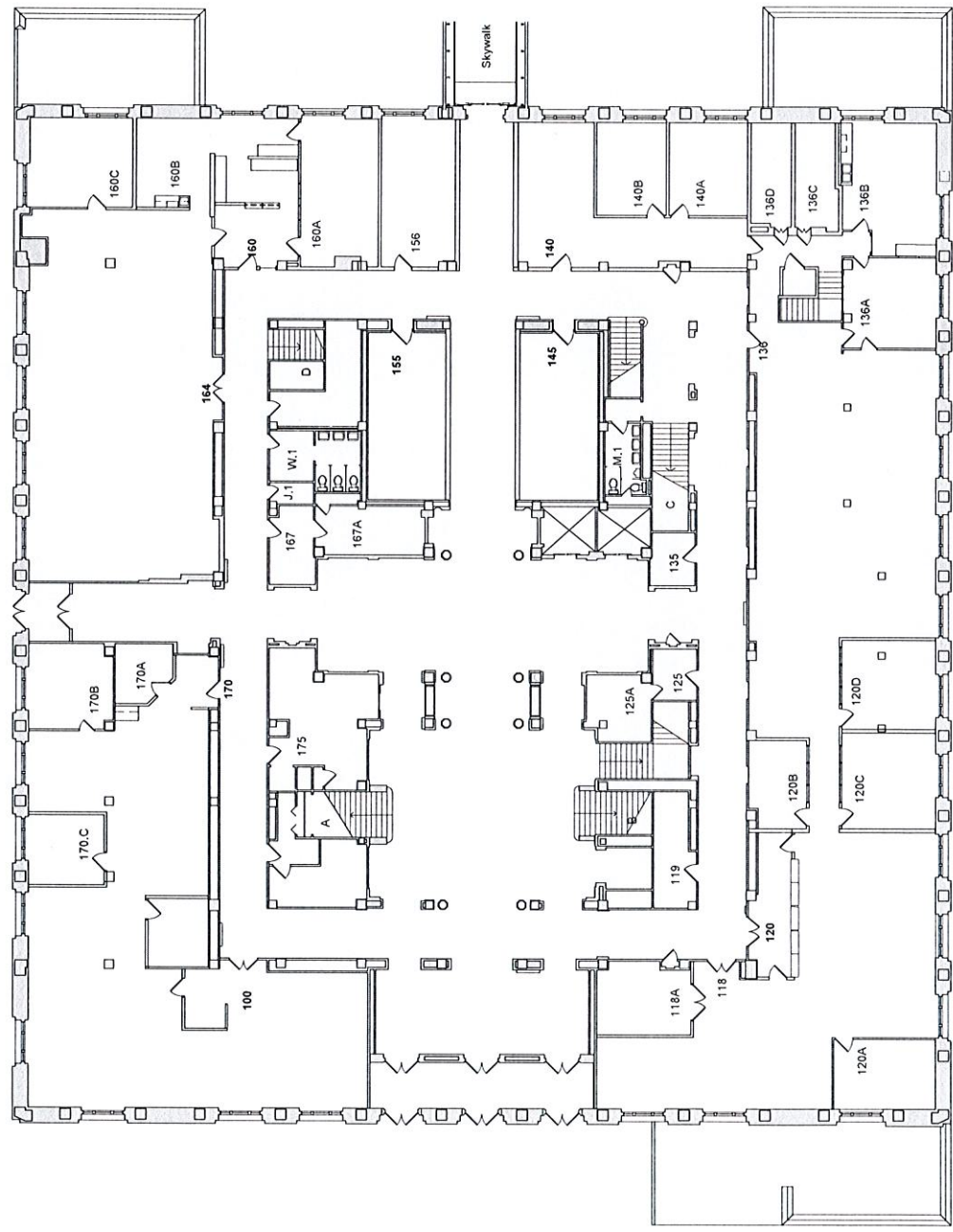
GROUND FLOOR



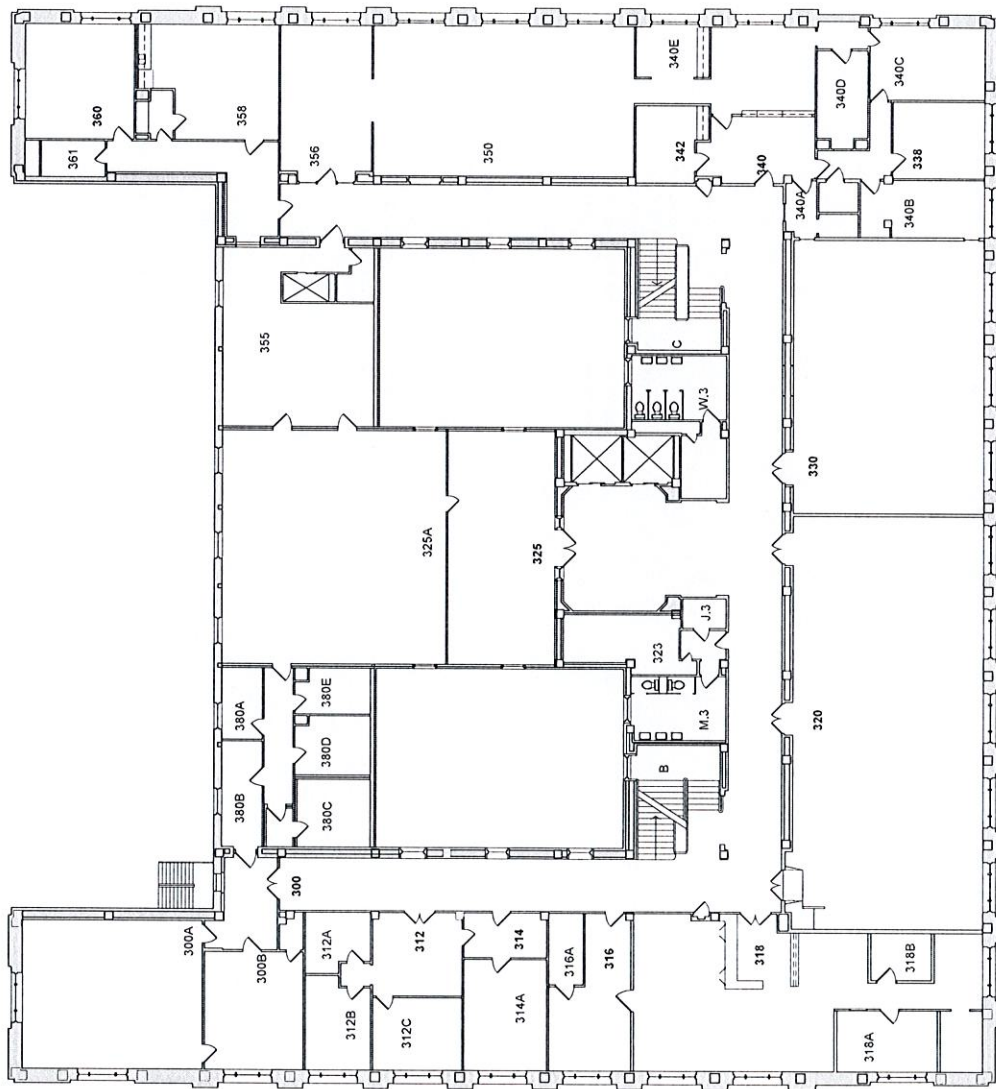
GROUND FLOOR
A1



1. 1ST FLOOR PLAN



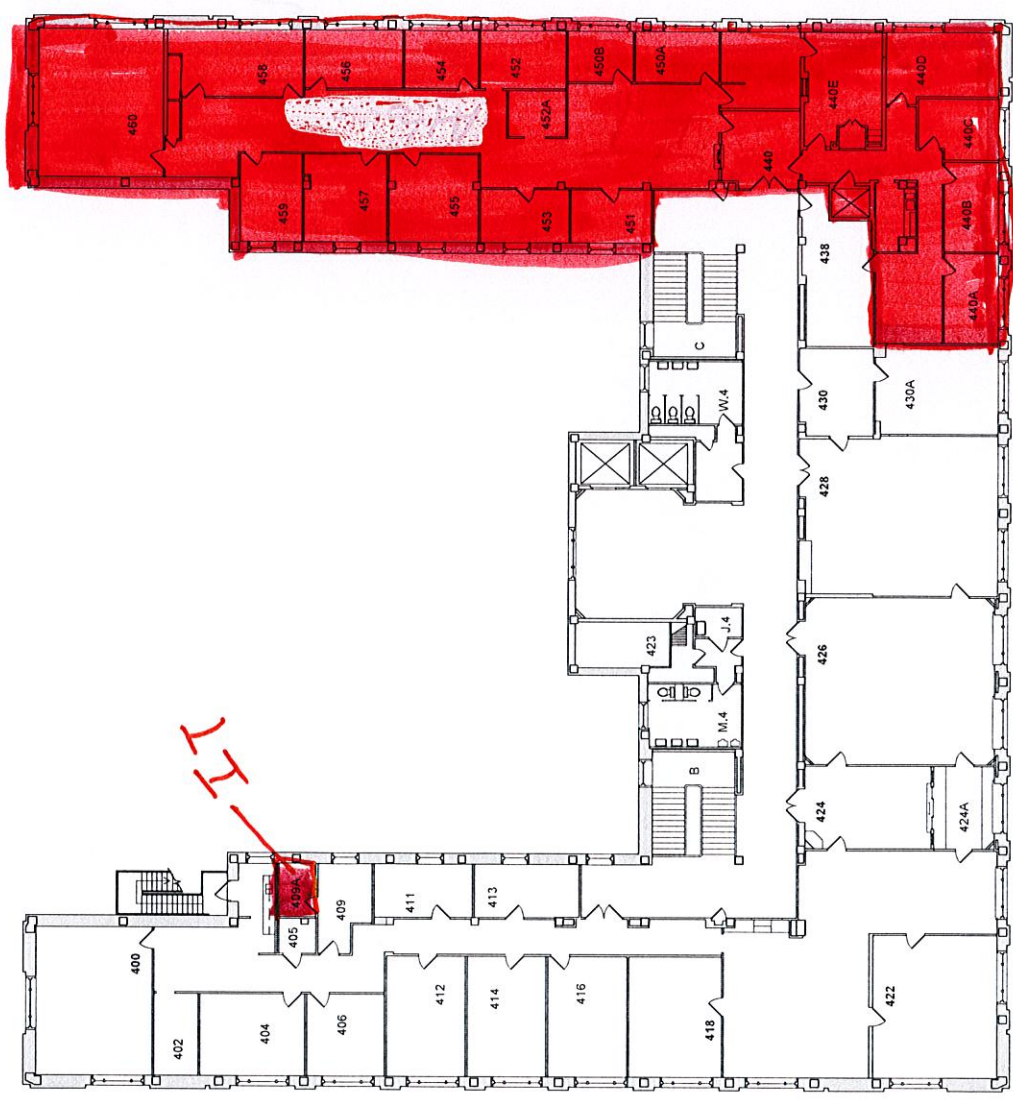




3RD FLOOR PLAN



1. 4TH FLOOR PLAN



IT

Job Name:

System Reference:

Date:



GENERAL FEATURES

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

Specifications			System
Unit Type			PEFY-P18NMAU-E4
Cooling capacity (Nominal) ¹		BTU/H	18,000
Heating capacity (Nominal) ¹		BTU/H	20,000
Power source	Voltage, Phase, Hertz		208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.082
	Heating	kW	0.08
Current	Cooling	A	0.82/0.74
	Heating	A	0.82/0.74
MCA		A	2.94
Maximum Overcurrent Protection (MOCP)		A	15
External finish		Galvanized steel sheet	
External Dimensions		In. [mm]	35-7/16 x 28-7/8 x 9-7/8 [900 x 732 x 250]
Net weight		Lbs [kg]	58 [26]
Heat exchanger		Cross fin (Aluminum fin and copper tube)	
Fan	Type x quantity		Sirocco fan x 2
	External Static pressure	in.WG	0.14, 0.2, 0.28, 0.4, 0.6 factory set to 0.2 In. WG
	Airflow rate	CFM	424–512–600
	Motor type	DC Motor	
	Motor Output	kW	0.121
	Motor FLA	A	2.35
Sound pressure level (Measured in anechoic room) ³		dB(A)	29–33–37
Air filter		PP Honeycomb fabric	
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	1/4 [6.35] Braze
	Gas (Low Pressure)	In. [mm]	1/2 [12.7] Braze
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

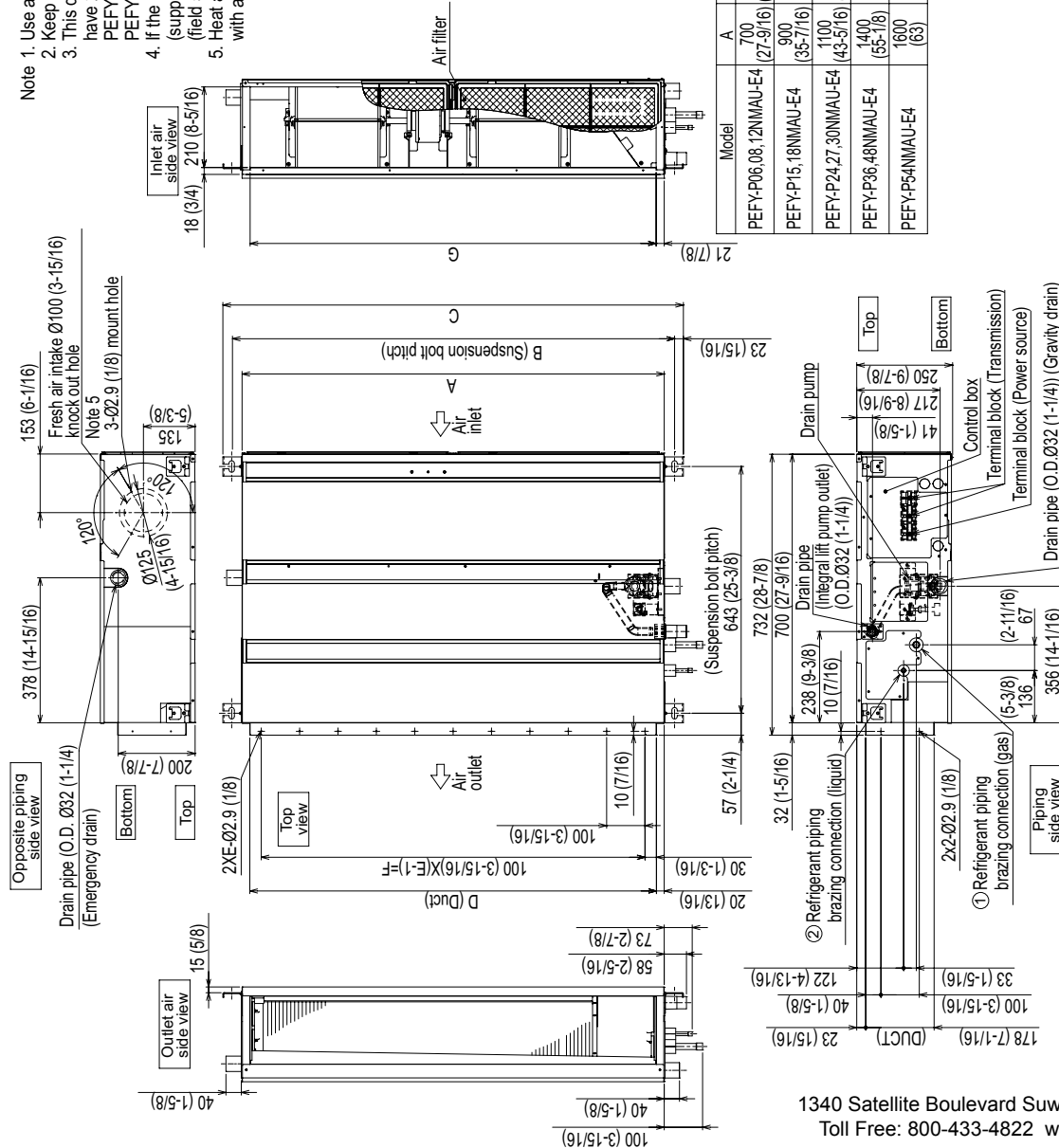
INDOOR UNIT ACCESSORIES: PEFY-P18NMAU-E4

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
	IT Extender	☐ PAC-WHS01IE-E
	kumo station® for kumo cloud®	☐ PAC-WHS01HC-E
	Thermostat Interface	☐ PAC-US444CN-1
	Wireless Interface for kumo cloud®	☐ PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	☐ PAC-USSEN001-FM-1
	Remote Temperature Sensor	☐ PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	☐ PAC-USWHS003-TH-1
Terminal Signal Adapter	Terminal Signal Adapter	☐ PAC-IT51AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	☐ PAR-40MAAU
	Simple MA Remote Controller†	☐ PAC-YT53CRAU-J
	Smart ME Remote Controller - Backlit touchscreen	☐ PAR-U01MEDU-K
	Touch MA Controller†	☐ PAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	☐ MHK2
	Wireless MA Controller Receiver	☐ PAR-FA32MA-W
	Wireless MA Remote Controller	☐ PAR-FL32MA-E
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 MultiTank — collection tank for use with multiple pumps	☐ C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	☐ C13-103
	Sauermann Condensate Pump	☐ SI30-230
Filter Box	Filter Box with MERV 13 Filter	☐ FBM2-2-A

INDOOR UNIT DIMENSIONS: PEFY-P18NMAU-E4

Unit : mm(in.)

- Note 1. Use an M10 screw for the suspension bolt (field supply).
 2. Keep the service space for maintenance at the bottom.
 3. This drawing is for PEFY-P24-27-30NMAU-E4 models, which have 2 fans. PEFY-P06-08-12NMAU-E4 models have 1 fan. PEFY-P15-18NMAU-E4 models have 2 fans. PEFY-P36-48-54NMAU-E4 models have 3 fans.
 4. If the inlet duct is used, remove the air filter (supplied with the unit), then install the filter (field supply) at the suction side.
 5. Heat air to 0°C (32°F) or higher when taking fresh air with a fresh air intake.



Model	① Gas pipe	② Liquid pipe
PEFY-P06,08,12NMAU-E4	Ø12.7 (1/2)	Ø6.35 (1/4)
PEFY-P15,18NMAU-E4	Ø15.88 (5/8)	Ø9.52 (3/8)
PEFY-P24,27,30NMAU-E4		
PEFY-P36,48NMAU-E4		
PEFY-P54NMAU-E4		

Model	A	B	C	D	E	F	G
PEFY-P06,08,12NMAU-E4	700 (27-9/16)	754 (29-11/16)	800 (31-1/2)	660 (26)	7	600 (23-5/8)	658 (25-15/16)
PEFY-P15,18NMAU-E4	900 (35-7/16)	954 (37-9/16)	1000 (39-3/8)	860 (33-7/8)	9	800 (31-1/2)	858 (33-13/16)
PEFY-P24,27,30NMAU-E4	1100 (43-5/16)	1154 (45-7/16)	1200 (47-1/4)	1060 (41-3/4)	11	1000 (39-3/8)	1058 (41-11/16)
PEFY-P36,48NMAU-E4	1400 (55-1/8)	1454 (57-1/4)	1500 (59-1/16)	1360 (53-9/16)	14	1300 (51-3/16)	1358 (53-1/2)
PEFY-P54NMAU-E4	1600 (63)	1654 (65-1/8)	1700 (66-15/16)	1560 (61-7/16)	16	1500 (59-1/16)	1558 (61-3/8)

1340 Satellite Boulevard Suwanee, GA 30024
 Toll Free: 800-433-4822 www.mehvac.com



Job Name:

System Reference:

Date:

**208/230V MODULAR WATER-SOURCE VRF HEAT PUMP
SYSTEM**

ACCESSORIES

- ☐ Optical Relay for Flow Switch (One Piece)* RIBTE24B
☐ Transformer 50VA (One Piece)** TR50VA015
☐ 1.5" Temp sensor, optional (One Piece)** ZM-TW150NPT KIT
☐ 1.5" EPIV Valve (One Piece)* EV150S396NRXME
☒ Twinning Kit (Required) CMY-Q200CBK
☒ Twinning Kit (Required) CMY-R100CBK2
☒ BC Controller (Required) for details see BC Controller Submittals
☐ Joint Kit for details see Pipe Accessories Submittal

*Requires two EPIV valves

*Requires two optical relays

**Requires four transformers

**Requires four temp sensors per two EPIV valves if optional temp sensors are used.

Specifications			System	
Unit Type			PQRY-P288TSLMU-A1	
Cooling Capacity (Nominal)		BTU/H	288,000	
Heating Capacity (Nominal)		BTU/H	323,000	
Net Weight		Lbs. [kg]	962 [436]	
Refrigerant Piping Diameter From Twinning Kit to First Joint or Header	Liquid (High Pressure)	In. [mm]	1-1/8 [28.58] Brazed	
	Gas (Low Pressure)	In. [mm]	1-3/8 [34.93] Brazed	
Max. Total Refrigerant Line Length		Ft.	2460	
Max. Refrigerant Line Length (Between ODU & IDU)		Ft.	541	
Max. Control Wiring Length		Ft.	1640	
Indoor Unit Connectable	Total Capacity		50.0~150.0% of heatsource unit capacity	
	Model/Quantity		P06~P96/2.0~50.0	
Sound Pressure Level		dB(A)	57.0/57.0	
Compressor Operating Range			9.0% to 100.0%	
AHRI Ratings (Ducted/Non-ducted)	EER		11.4/13.7	
	IEER		18.5/20.6	
	COP		4.9/5.25	
	SCHE		20.1/19.0	

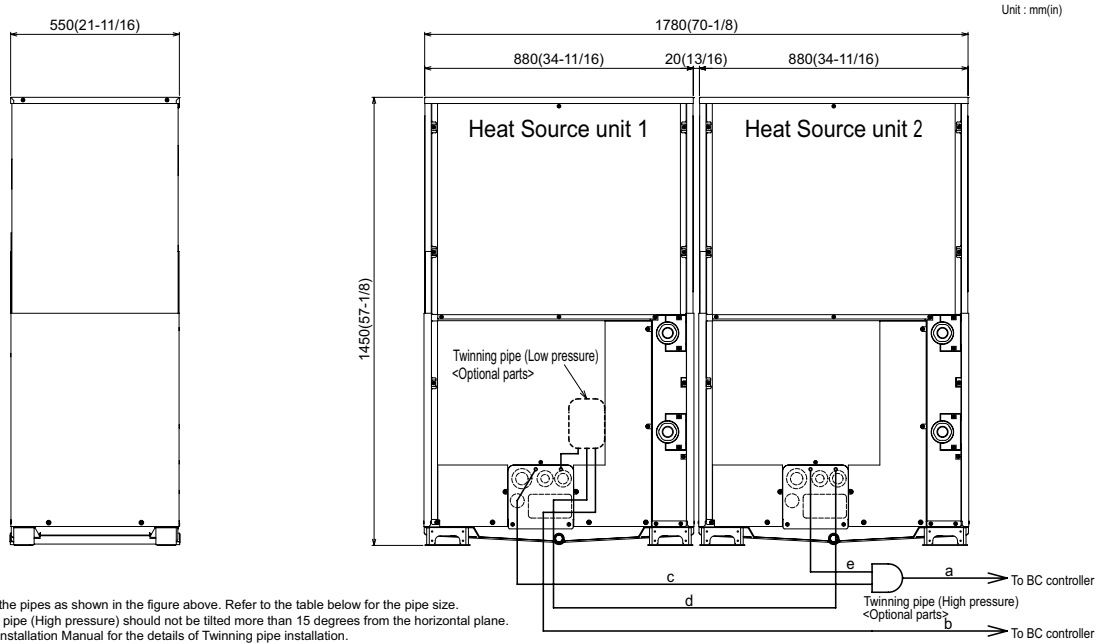
Specifications			Module 1	Module 2
Unit Type			PQRY-P144TLMU-A1	PQRY-P144TLMU-A1
Cooling Capacity (Nominal)		BTU/H	144,000	144,000
Heating Capacity (Nominal)		BTU/H	160,000	160,000
Operating Temperature Range	Cooling (Indoor)	°F WB [°C WB]	59~75 [15.0~ 24.0]	59~75 [15.0~ 24.0]
	Heating (Indoor)	°F DB [°C DB]	59~81 [15.0~27.0]	59~81 [15.0~27.0]
Operating Water Temperature Range¹	Cooling/Heating	°F [°C]	50~113 [10~45]	50~113 [10~45]
External Dimensions (H x W x D)		In. [mm]	57-1/8 x 34-11/16 x 21-11/16 [1450 x 880 x 550]	57-1/8 x 34-11/16 x 21-11/16 [1450 x 880 x 550]
Net Weight		Lbs. [kg]	481 [218]	481 [218]
External Finish			Galvanized steel sheets	Galvanized steel sheets
Electrical Power Requirements	Voltage, Phase, Hertz, Power Tolerance		208/230, 3, 60, ±10	208/230, 3, 60, ±10
Minimum Circuit Ampacity		A	35.0/0.0	35.0/0.0
Maximum Overcurrent Protection		A	60/50	60/50
SCCR		kA	5	5
Flow Rate		G/min [gpm]	31.7	31.7
		L/min	120	120
Pressure Drop		psi	6.38	6.38
		Ft.	14.7	14.7
Operation Volume Range		G/min [gpm]	19.8~50.9	19.8~50.9
		m3/h	4.5~11.6	4.5~11.6
Refrigerant Piping Diameter (From Twinning Kit)	Liquid (High Pressure)	In. [mm]	7/8 [22.2] Brazed	7/8 [22.2] Brazed
	Gas (Low Pressure)	In. [mm]	1-1/8 [28.58] Brazed	1-1/8 [28.58] Brazed
Compressor	Type x Quantity		Inverter scroll hermetic x 1	Inverter scroll hermetic x 1
Compressor Motor Output		kW	9.5	9.5
Refrigerant	Type x Original Charge		R410A x 13 lbs. + 4.0oz. [6.0 kg]	R410A x 13 lbs. + 4.0oz. [6.0 kg]
Lubricant	Lubricant		MEL32	MEL32
Protection Devices	High Pressure Protection	High Pressure Protection	High pressure sensor, High pressure switch at 4.15 Mpa (601 psi)	High pressure sensor, High pressure switch at 4.15 Mpa (601 psi)
	Inverter Circuit	Inverter Circuit	Over-heat protection, Over-current protection	Over-heat protection, Over-current protection
	Compressor	Compressor	Over-heat protection	Over-heat protection

NOTES:

¹23°F EWT (Entering water temperature) is possible with glycol.

Each individual module requires a separate electrical connection. Refer to electrical data for each individual module.

OUTDOOR UNIT: PQRY-P288TSLMU-A1 – DIMENSIONS



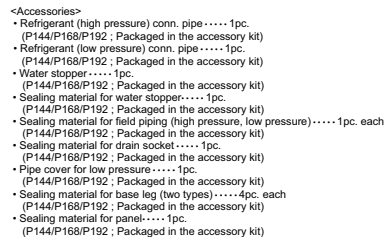
- Note 1. Connect the pipes as shown in the figure above. Refer to the table below for the pipe size.
 2. Twinning pipe (High pressure) should not be tilted more than 15 degrees from the horizontal plane.
 3. See the Installation Manual for the details of Twinning pipe installation.
 4. Only use the Twinning pipe by Mitsubishi (optional parts).

Twinning pipe connection size

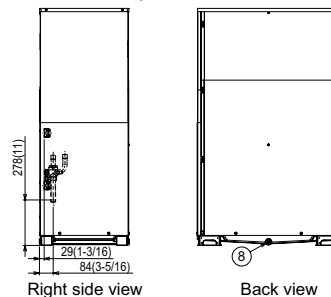
Package unit name		PQRY-P288TSLMU-A1	PQRY-P312TSLMU-A1	PQRY-P336TSLMU-A1
Component unit name	Heat Source unit 1	PQRY-P144TLMU-A1	PQRY-P168TLMU-A1	PQRY-P168TLMU-A1
	Heat Source unit 2	PQRY-P144TLMU-A1	PQRY-P144TLMU-A1	PQRY-P168TLMU-A1
Twinning pipe Kit(optional parts)		CMY-Q200CBK		
BC controller-Twinning pipe	High pressure	a	ø28.58(1-1/8)	
	Low pressure	b	ø34.93(1-3/8)	ø41.28(1-5/8)

	Unit model	High pressure	Low pressure
		c or e	d
Twinning pipe-Heat source unit	P144	ø22.2(7/8)	ø28.58(1-1/8)
	P168		

- Note1. Seal around the water piping, the refrigerant piping, the power supply, and the control wiring and plug unused knockout holes with putty, etc., to prevent moisture or dirt from entering cabinet.
- Note2. At the time of product shipment, the front side piping serves as the local drainage control.
When connecting on the rear side, please remove the rear side plug sealing corks, and attach on the front side. Ensure there is no leak in piping system once connected.
- Note3. See Fig. A and Fig. B for service clearances.
- Note4. If piping is installed from the front of unit, provide clearances as shown in Fig. A and Fig. B.
- Note5. Environmental condition for installation: -20~40°C(DB) (-4~104°F) for indoor installation.
- Note6. In case the temperature around the heat source unit has possibility to drop under 0°C(32°F), be careful for the following point to prevent the pipe burst by the water pipe freeze-up.
 - Circulate the water all the time even if heat source unit is not in operation and provide glycol for freeze protection.
 - Drain the water from inside of the heat source unit when the heat source is not operating.
- Note7. Ensure that the drain piping is downward with a pitch of more than 1/100.
- Note8. At brazing of pipes, wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C(248°F).



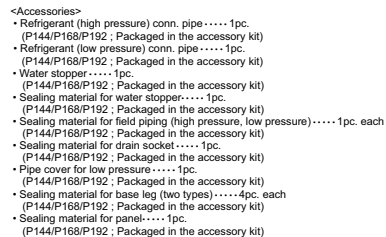
Top of unit casing not suitable for supporting system modules stacked above - field framing required for stacking modules of additional systems



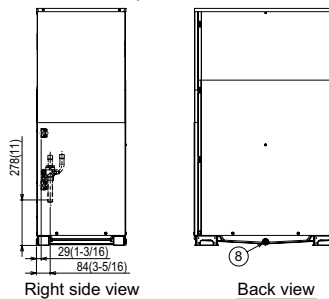
No	Usage	Specifications
①	For pipes	Front through hole 140 × 77 Knockout hole (5-9/16) (3-1/16)
②		Front through hole (Uses when turning kit (optional parts) is mounted.)
③		ø45 Knockout hole (1-13/16)
④	For wires	Front through hole ø62.7 or ø34.5 Knockout hole (2-1/2) (1-3/8)
⑤		Front through hole ø43.7 or ø22.2 Knockout hole (1-3/4) (7/8)
⑥	For transmission cables	Front through hole ø34 Knockout hole (1-3/8)
⑦	Water pipe inlet	NPT-1/2 Screw
⑧	Water pipe outlet	NPT-1/2 Screw
⑨	Drain pipe	Rc3/4 Screw

Unit : mm(in)

- Note1. Seal around the water piping, the refrigerant piping, the power supply, and the control wiring and plug unused knockout holes with putty, etc., to prevent moisture or dirt from entering cabinet.
- Note2. At the time of product shipment, the front side piping serves as the local drainage control.
When connecting on the rear side, please remove the rear side plug sealing corks, and attach on the front side. Ensure there is no leak in piping system once connected.
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 - Drain the water from inside of the heat source unit when the heat source is not operating.
- Note7. Ensure that the drain piping is downward with a pitch of more than 1/100.
- Note8. At brazing of pipes, wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C(248°F).



Top of unit casing not suitable for supporting system modules stacked above - field framing required for stacking modules of additional systems



No	Usage	Specifications
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④	Front through hole	ø43.7 or ø22.2 Knockout hole (1-3/4) (7/8)
⑤	For transmission cables Front through hole	ø34 Knockout hole (1-3/8)
⑥	Water pipe inlet	NPT1-1/2 Screw
⑦	Water pipe outlet	NPT1-1/2 Screw
⑧	Drain pipe	Rc3/4 Screw

Unit : mm(in)

Job Name:

System Reference:

Date:

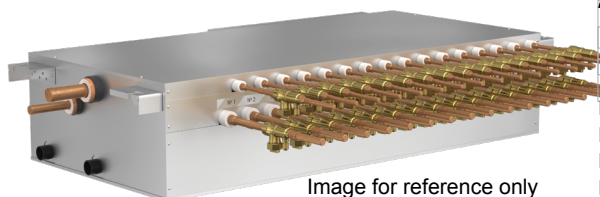


Image for reference only

ACCESSORIES

☐ Branch Joint (Downstream capacity ≤72,000 Btu/h)	CMY-Y102SS-G2*
☐ Branch Joint (Downstream capacity 73,000-96,000 Btu/h)	CMY-Y102LS-G2*
☐ Branch Joint (Downstream capacity ≤126,000 Btu/h)	CMY-R201S-G*
☐ Branch Joint (Downstream capacity 127,000-216,000 Btu/h)	CMY-R202S-G*
☐ Branch Joint (Downstream capacity 217,000-234,000 Btu/h)	CMY-R203S-G*
☐ Branch Joint (Downstream capacity 235,000-360,000 Btu/h)	CMY-R204S-G*
☐ Branch Joint (Downstream capacity ≥316,000 Btu/h)	CMY-R205S-G*
☐ Condensate Pump (Blue Diamond)	X87-721
☐ Condensate Pump (Sauerermann)	SI3100-230
☐ Reducer (Between ODU and BC)	CMY-R302S-G1*
☐ Reducer (Between Main and Sub BC)	CMY-R303S-G1

*See Data Book or Install Manual for more details

SPECIFICATIONS

Indoor Unit Capacity Connectable to 1 Branch	Btu/h	54,000
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Number Of Branches	12
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Electrical Requirements		
Electrical Power Requirements	208 / 230V, 1 phase, 60Hz	
Minimum Circuit Ampacity (MCA)	A	1.57 / 1.82
Maximum Overcurrent Protection (MOCP)	A	15

Power Input (208 / 230V)		
Cooling	kW	0.198 / 0.255
Heating		0.106 / 0.137

Current Input (208 / 230V)		
Cooling	A	0.95 / 0.11
Heating		0.52 / 0.60

External Dimensions	In. (mm)	9-7/8 x 44-11/16 x 21-1/2 (250 x 1,135 x 545)
---------------------	----------	---

Net Weight	Lbs. (kg)	156 (71)
------------	-----------	----------

External finish	Galvanized steel plate (Lower part drain pan: Pre-coated galvanized sheets + powder coating)	
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Connectable Outdoor / Heat Source Unit Capacity	72,000 to 336,000
---	-------------------

Refrigerant Piping Diameter to Indoor Unit (Brazed)			
		Liquid	Gas
Less than 18,000 Btu/h	In. (mm)	1/4 (6.35)	1/2 (12.7)
	In. (mm)	3/8 (9.52)	5/8 (15.88)
	In. (mm)	3/8 (9.52)	3/4 (19.05)
Greater than 18,000 Btu/h	In. (mm)	3/8 (9.52)	7/8 (22.2)

Field drain pipe size	In. (mm)	3/4 NPT
-----------------------	----------	---------

Refrigerant	R410A
-------------	-------

Refrigerant Piping Diameter to Outdoor Unit (Brazed)			
		High Pressure	Low Pressure
P72	In. (mm)	5/8 (15.88)	3/4 (19.05)
P96	In. (mm)	3/4 (19.05)	7/8 (22.2)
P120	In. (mm)	3/4 (19.05)	7/8 (22.2) or 1-1/8 (28.58)
P144 to P192	In. (mm)	3/4 (19.05)	1-1/8 (28.58)
P216	In. (mm)	7/8 (22.2) or 1-1/8 (28.58)	1-1/8 (28.58)
P240	In. (mm)	7/8 (22.2) or 1-1/8 (28.58)	1-3/8 (34.93)
P264 to P288	In. (mm)	1-1/8 (28.58)	1-3/8 (34.93)
P312	In. (mm)	1-1/8 (28.58)	1-3/8 (34.93) or 1-5/8 (41.28)
P336	In. (mm)	1-1/8 (28.58)	1-5/8 (41.28)

Refrigerant Piping Diameter to other BC Controller (Brazed)				
		High Pressure	Liquid Pipe	Low Pressure Pipe
P72	In. (mm)	5/8 (15.88)	3/8 (9.52)	3/4 (19.05)
P73 to P108	In. (mm)	3/4 (19.05)	3/8 (9.52)	7/8 (22.2)
P109 to P126	In. (mm)	3/4 (19.05)	1/2 (12.7)	1-1/8 (28.58)
P127 to P144	In. (mm)	7/8 (22.2)	1/2 (12.7)	1-1/8 (28.58)
P145 to P216	In. (mm)	7/8 (22.2)	5/8 (15.88)	1-1/8 (28.58)
P217 to P234	In. (mm)	1-1/8 (28.58)	5/8 (15.88)	1-1/8 (28.58)
P235 to P288	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-3/8 (34.93)
P289 to P360	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-5/8 (41.28)
P361 or above	In. (mm)	1-3/8 (34.93)	3/4 (19.05)	1-5/8 (41.28)

Sound power level (measured in anechoic room)		
Rated operation	dB(A)	68
Defrost		74

Sound pressure level (measured in anechoic room)		
Rated operation	dB(A)	50
Defrost		56

NOTES:

1. Installation/foundation work, electrical connection work, insulation work, power source switch, and other items shall be referred to the Installation Manual.
2. The equipment is for R410A refrigerant.
3. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors. (For use in quiet environments with low background noise, position the BC CONTROLLER at least 5m away from any indoor units.)
4. Sound pressure/power level differs depending on the connected outdoor/heat source unit capacity or operation condition. The sound pressure/power level at the rated operation is the value of the cooling mode.
5. The sound pressure/power level values were obtained in an anechoic room. Actual sound pressure level is usually greater than that measured in anechoic room due to ambient noise and deflection sound.
6. The sound pressure level values were obtained at the location below 1.5m from the unit.
7. The solenoid valve switching sound is 56 dB (sound pressure level) regardless of the unit model.
8. Refrigerant piping diameter for connection of plural indoor units with 1 branch shall be referred to the Installation Manual.
9. This unit is not designed for outside installations.
10. When brazing the pipes, be sure to braze, after covering a wet cloth to the insulation pipes of the units in order to prevent it from burning and shrinking by heat.
11. Indoor unit capacity connectable to 1 branch is changed depending on the indoor unit type and connection method. Please refer to the Installation Manual for more information.
12. For the refrigerant pipe size, refer to Installation Manual of outdoor units/heat source units.

TCMBM1012JA11N4BV
TCMBM1016JA11N4BV
TCMBM0108JA11N4BV

Unit: mm(in)

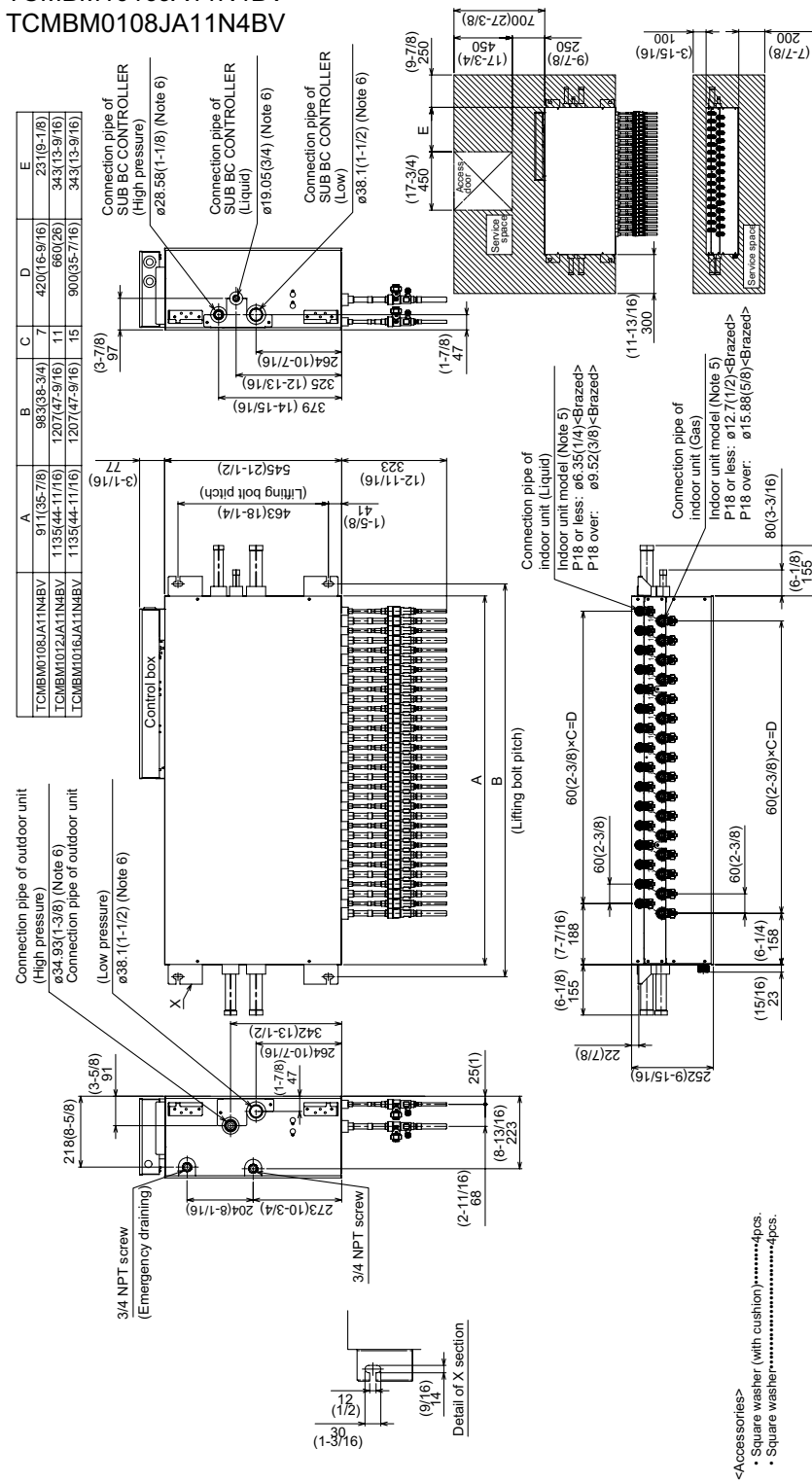


Table-2. To other BC controller (Note.6)

Total downstream Indoor unit capacity	High press. Pipe	Liquid Pipe	Low press. Pipe
-P72	ø15.88(5/8)	ø9.52(3/8)	ø19.05(3/4)
P73-108	ø19.05(3/4)	ø9.52(3/8)	ø22.27(7/8)
P109-126	ø19.05(3/4)	ø12.71(1/2)	ø28.58(1-1/8)
P127-144	ø22.27(7/8)	ø12.71(1/2)	ø28.58(1-1/8)
P145-216	ø22.27(7/8)	ø15.88(5/8)	ø28.58(1-1/8)
P159-234	ø28.58(1-1/8)	ø15.88(5/8)	ø28.58(1-1/8)
P217-283	ø28.58(1-1/8)	ø19.05(3/4)	ø34.93(1-3/8)
P289-360	ø28.58(1-1/8)	ø19.05(3/4)	ø41.28(1-5/8)
P366-411	ø34.93(1-3/8)	ø19.05(3/4)	ø44.28(1-5/8)

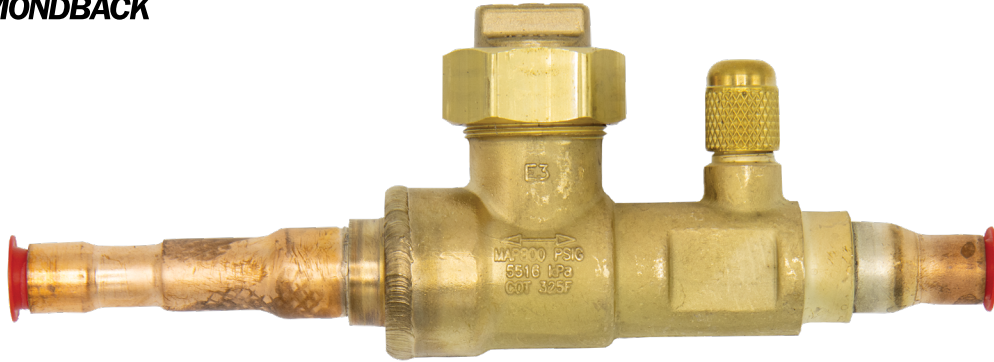
Table-1. To outdoor/heat source unit (Note.6)

Connectable unit capacity	High press. Pipe	Low press. Pipe
P72	ø15.88(5/6)	ø19.05(3/4)
P96	ø19.05(3/4)	ø22.27(7/8)
P120	ø22.27(7/8)	ø22.27(7/8) or ø28.58(1-1/8)
P144 to P192	ø22.27(7/8)	ø28.58(1-1/8)
P216	ø22.27(7/8) or ø28.58(1-1/8)	ø28.58(1-1/8)
P240	ø22.27(7/8) or ø28.58(1-1/8)	ø34.93(1-3/8)
P264 to P288	ø28.58(1-1/8)	ø34.93(1-3/8)
P312	ø28.58(1-1/8)	ø34.93(1-3/8) or ø41.28(1-5/8)
P336	ø28.58(1-1/8)	ø41.28(1-5/8)

For the refrigerant pipe size, refer to Installation Manual of outdoor units/heat source units.

- Note 1. Suspension bolt(ø10) and nut(M10) prepare in the field.
2. Take notice of service space as shown.
(Please give attention not to occupy service space by letting ducts and pipes through.)
3. Please take service space for connection pipe of SUB BC CONTROLLER.
4. Install this product in a location where noise (referant noise) emitted by the unit will not disturb the neighbors.
(For use in quiet environments with low background noise, position the BC CONTROLLER at least 5m away from any indoor units.)
5. Refer to the Installation Manual for refrigerant piping diameter size when connecting plural indoor units with 1 branch.
6. Refer to the Table-1-2 connection pipe of outdoor unit or SUB BC CONTROLLER diameter size.
7. Refer to the Installation Manual for insulation of connection pipe and drain piping.
8. Do not place the BC controller directly on the floor.

BV-BB SERIES BALL VALVES BRAZED CONNECTIONS



SPECIFICATIONS

- Engineered for Mini-split and Multi-split HVAC Units
- Full Port Design
- 800 PSIG Rated
- R-410A Compatible
- Brazed Connections
- UL listed ball valves

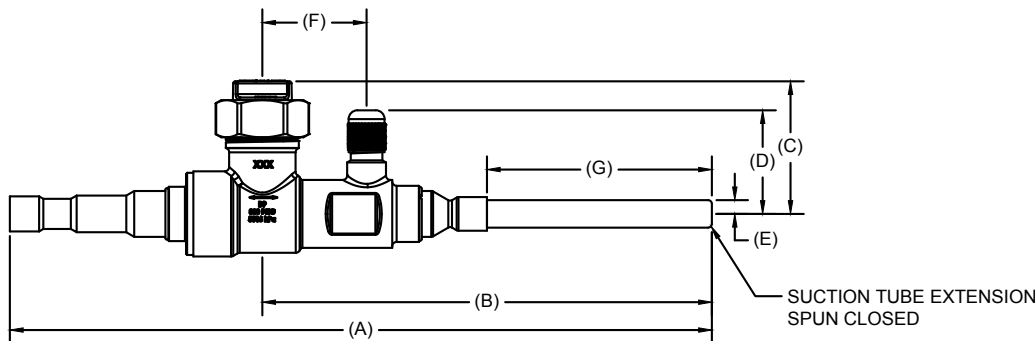
MODEL NUMBERS:

BV38BBSI and BV58BBSI

- BV38BBSI pre-installed on each liquid line with a brazed straight-pipe extension
- BV58BBSI pre-installed on each gas line with a brazed straight-pipe extension
- Fully factory assembled
- Furnace brazed and pressure tested
- Each ball valve is equipped with Schrader Valve for refrigerant service—valve rated to 800 psi
- Design working pressure: 700 PSIG
- Temperature range: -40° F to +325° F (-40° C to +149° C)
- Forged brass body and seal cap
- PTFE seals and gaskets (no synthetic O-rings)
- Seal cap design permits valve operation without removal of seal cap
- One year limited materials and workmanship warranty on Ball Valves
- Made in the U.S.A

*ball valves come with an insulation piece

Part Number	ODS	A	B	C	D	E	F	G
BV38BBSI (w/ Suction Tube)	3/8	9.57	6.13	1.81	1.41	0.19	1.42	3.07
BV58BBSI (w/ Suction Tube)	5/8	9.56	6.12	1.81	1.41	0.31	1.42	3.06



Suction Tube Extension

1. Dimensions:
 - a. Outside: Ø 3/8" and 5/8" on the BV38BBSI and BV58BBSI respectively
 - b. Thickness: 0.035, ±0.01
2. 2500 PSI burst per UL
3. Free of sharp edges, burrs and wrinkles

BV-BB SERIES BALL VALVES BRAZED CONNECTIONS (INSULATION DETAILS)



Product name: Ball valve insulation

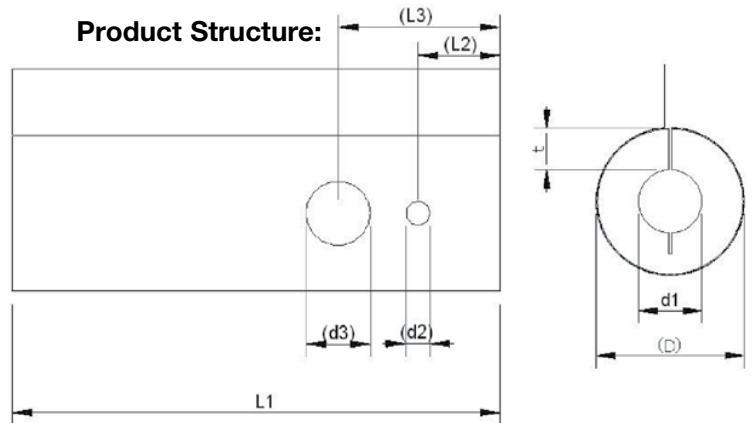
Product code: HKG-20HF

Materials:

1. Insulation: Inner and outer layer Polyethylene foam (PEF)
2. Covering: Adhesive tape of Polyvinyl chloride (PVC)
3. Separator: Soft film of Polyvinyl chloride (PVC)

Physical property:
Insulation

Product Structure:



Product Code	d1	t	(D)	L1	(d2)	(d3)	(L2)	(L3)
HKG-20HF Unit: inches (mm)	1 3/8 (30)	3/4 (20)	2 3/4 (70)	8 9/16 220	7/8 (11)	1 9/64 (29)	1 15/32 (37)	2 7/8 (73)

Performance items	Unit	Performance
Density	lb/ft3 (kg/m3)	1.87 (30)
Heat Conductivity (at 23° C)	W/m•K	0.040
Tensile Strength	N/cm2	23
Heat Resistant	° F (° C)	≤176 (≤80)
UL-94	—	HF-1

Exhibit A-3

The following information has been provided by our Trane Technologies representative and is being shared as a courtesy to bidders:

See below for the installers training course description. We host these trainings just about every month at our St. Paul Commercial sales office. Please note the attached invitation is for this month's class and registration is already closed. But the information in the invitation is still relevant. The class costs \$480 per person.

Along with this, our technical specialist, Ryan Goss, will assist the installers throughout the process, and will submit the needed warranty information to Mitsubishi.

Details

Description

This course provides hands-on experience building systems using Diamond System Builder™ design software. Participants learn Mitsubishi Electric's warranty process and the steps to register products once they have been installed. The concepts of integration and centralized control are discussed as well as the proper steps for system start-up. Proper service and diagnosis procedures are also covered.

The pre-requisite to enroll in this class is CITY MULTI Installation Essentials eLearning course. Students must register for this pre-requisite online course on <https://meushvac.force.com/contractor/s/>

Students must have a laptop computer with Windows-based 8 or newer and installation of the following software available on MyLinkDrive.com: Diamond System Builder, Maintenance Tool Software and Maintenance Tool Drivers.

Objectives

Students will be able to:

- Use Diamond System Builder to modify, layout and select specifications for a CITY MULTI system application
- Identify and discuss the extended warranty terms and submittal procedure
- Explain the settings and networking required to setup centralized control
- Discuss start-up faults and their resolution
- identify and discuss preventative maintenance tasks and the use of Maintenance Tool for system monitoring
- Discuss electrical operation and refrigerant flow paths
- Use Maintenance Tool to locate the key data points for monitoring equipment
- Resolve fault and error codes
- Perform system troubleshooting

Audience

installers and service technicians



You're Invited to Trane CITY MULTI Start Up and Service Essentials

Do you want to receive hands-on, in-person training on your Variable Refrigerant Flow (VRF) System? Join us for a 2-day Trane CITY MULTI Start Up and Service Essentials interactive session. Sign up as early, as this class is limited to a maximum of 8 attendees!

WHEN:

Tuesday, May 24, 2022 8:00 AM – 4:30 PM

Wednesday, May 25, 2022 8:00 AM – 4:30 PM

Note: You must attend both days to receive your certification

WHERE:

Trane Commercial Sales Office
775 Vandalia Street
St. Paul, MN 55114

PREREQUISITE WORK:

Complete CITY MULTI Installation Essentials, now a set of 4 online modules that are required to be completed prior to attending the 2 day in-person portion of the course.

1. Use a laptop or desktop with Google Chrome as your browser
2. Login or Create and Account: <https://meushvac.force.com/Contractor/s/>
3. Click on Learning > Find Learning
4. Select the Catalog: Commercial VRF
5. In Learning Plans, click on CITY MULTI Installation Essentials
6. Click Register and Launch

This course also requires you to bring a laptop with the following software pre-installed.

- Diamond System Builder: **Download**
- Maintenance Tool Software: **Download**
- Central Controllers AE-200, AE 50, EW-50 Initial and BACnet Setting Tool: **Download**

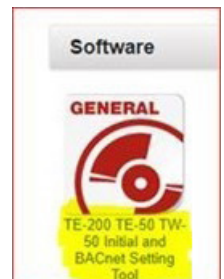
WHO:

Contractors looking to qualify CITY MULTI VRF projects for the extended 10 year parts/compressor warranty

COST:

\$480 per student

REGISTER





Unit Rating

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.316 (SN: 7661808-CEN5JAPA)

A1 A2 A3 A4 A5 1 2A 2B 3A 3B 4 5 6A 6B 6C 7 8A 8B 8C 8D 9 10 11 12 13 14 15 16 17 18 19 20 21 22

CFA-025-C-A-8-DJ00K:0-A0-00-C0-AR0-1-N000-00B0J00-CA000DB

Tag: ACCU-1, 2 (air source HP) - Rev 1

Job Information

Job Name: Duluth City Hall
Job Number: Job #6
Site Altitude: 0 ft
Refrigerant: R-410A

Unit Information

Approx. Op./Ship Weights: 1498 / 1498 lbs. (±5%)
Suction Temperature: 50.00 °F
Ambient Temperature: 95 °F DB / 75 °F WB

Cooling Section

Capacity (MBH)

Suction Temp	Total Unit	Circuit 1	Circuit 2
Design (50°)	301.9	152.1	149.8
35°	235.5	118.5	117.0
40°	256.8	129.3	127.5
45°	278.8	140.4	138.4
50°	301.9	152.1	149.8

EER - ARI Listing Information

No ARI Rating Program Exists for Units Over 250 MBH
All AAON Units Are Tested in Accordance With ARI Standards

EER @ AHRI Conditions: N/A
Application EER @ Op. Conditions: 11.3

Electrical Data

Rating: 208/3/60
Unit FLA: 110
Minimum Circuit Amp: 122
Maximum Overcurrent: 150

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	1		208	3			48.1
Compressor 2:	1		208	3			48.1
Condenser Fans:	2	0.75	208	3	1140	3.4	
Condenser Fans:	2	0.75	208	3	1140	3.4	

Connection Sizes

System	Suction Line	Liquid Line
1	1.38"	0.63"
2	1.38"	0.63"



Refrigeration Accessories

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.316 (SN: 7661808-CEN5JAPA)

CFA-025-C-A-8-DJ00K:0-A0-00-C0-AR0-1-N000-00B0J00-CA000DB

Condensing Unit Tag:

Job Information

Job Name:

Duluth City Hall

Job Number:

Job #6

Factory Supplied / Factory Installed

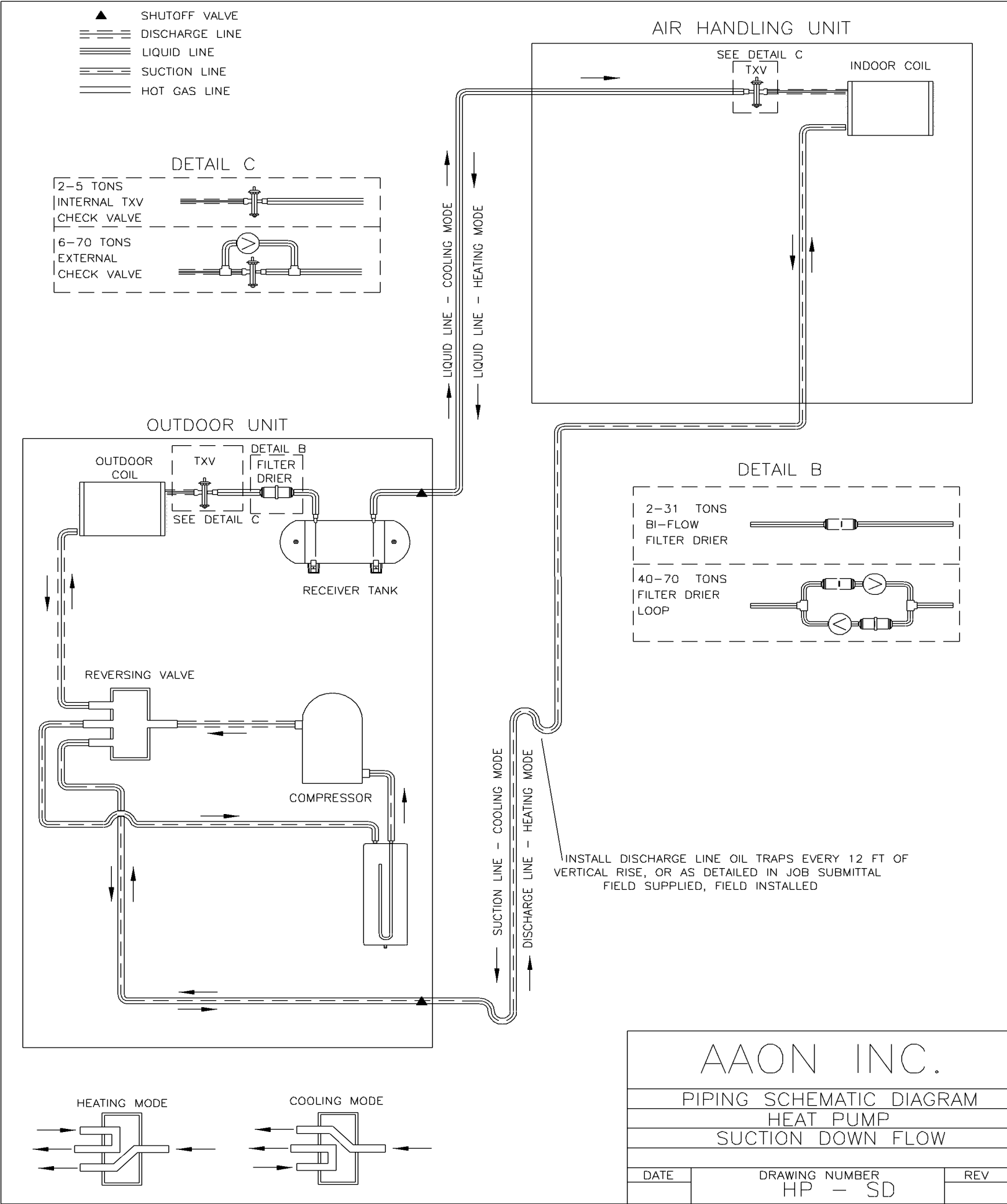
Quantity	Description	Part #:	Location

Factory Supplied / Field Installed

Quantity	Description	Part #:	Location
-	N/A	-	-

Field Supplied / Field Installed

Quantity	Description	Part #:	Location
-	P-Trap(s)		AHU





Unit Submittal

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.316 (SN: 7661808-CEN5JAPA)

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CFA-025-C-A-8-DJ00K:0-A0-00-C0-AR0-1-N000-00B0J00-CA000DB

Tag: ACCU-1, 2 (air source HP) - Rev 1

Job Name:
Job Number:

Duluth City Hall
Job #6

Unit Submittal For:
Unit Submittal Date:

January 27, 2022

	Base Option	Description
CF	Generation	CF - Condensing Unit
A	Major Rev	Major Revision
025	Unit Size	Twenty Five
C	Series	C Cabinet
A	Revision	Minor Revision
8	Voltage	208V/3Ø/60Hz
D	Compressor Style	R-410A Variable Capacity Scroll Comp
J	Condenser Style	Air-Source Heat Pump (Fin and Tube)
0	Configuration	Standard
0	Coating	Standard
K	Staging	1 Variable Refrig System + 1 On/Off Refrig System

	Feature Option	Description
0	1. Unit Orientation	Vertical Condenser Discharge with End Control Panel
A	2A. Refrigeration Control	5 Minute Compressor Off Timer & 20 Second Compressor Stage Delay
0	2B. Blank	Standard
0	3A. Refrigeration Options	Standard
0	3B. Blank	Standard
C	4. Refrigeration Accessories	Sight Glass + Compressor Isolation Valves
0	5. Blank	Standard
A	6A. Unit Disconnect Type	Single Point Power Non-Fused Disconnect
R	6B. Disconnect Size	150 Amps
0	6C. Blank	Standard
1	7. Accessories	Phase & Brown Out Protection + Suction Pressure Transducer on Each Refrigeration System + Compressor Sound Blanket
N	8A. Control Sequence	Field Installed DDC Controls Furnished by Others with Isolation Relays
0	8B. Control suppliers	Standard Terminal Block
0	8C. Control Supplier Options	Standard
0	8D. BMS Connection and Diagnostics	Standard
0	9. Blank	Standard
0	10. Blank	Standard
B	11. Maintenance Accessories	115VAC Convenience Outlet - Field Wired
0	12. Code Options	Standard ETL U.S.A. Listing
J	13. Air Cooled Condenser Accessories	Cond. Coil Guards + VFD Controlled Cond. Fans - Head Pressure Control
0	14. Blank	Standard
0	15. Blank	Standard
C	16. Electrical Options	10 KAIC
A	17. Shipping Options	Crating
0	18. Blank	Standard
0	19. Blank	Standard
0	20. Cabinet Material	Standard - Galvanized Steel Cabinet
D	21. Warranty	Extended Compressor Warranty - Years 2-5
B	22. Paint and SPAs	Premium AAON Gray Paint Exterior



Points List

2425 South Yukon Ave - Tulsa, Oklahoma 74107-2728 - Ph. (918) 583-2266 Fax (918) 583-6094
AAONEcat32 Ver. 4.316 (SN: 7661808-CEN5JAPA)

A1 A2 A3 A4 A5 1 2A 2B 3A 3B 4 5 6A 6B 6C 7 8A 8B 8C 8D 9 10 11 12 13 14 15 16 17 18 19 20 21 22

CFA-025-C-A-8-DJ00K:0-A0-00-C0-AR0-1-N000-00B0J00-CA000DB

Tag: ACCU-1, 2 (air source HP) - Rev 1

Job Name: **Duluth City Hall**

For:

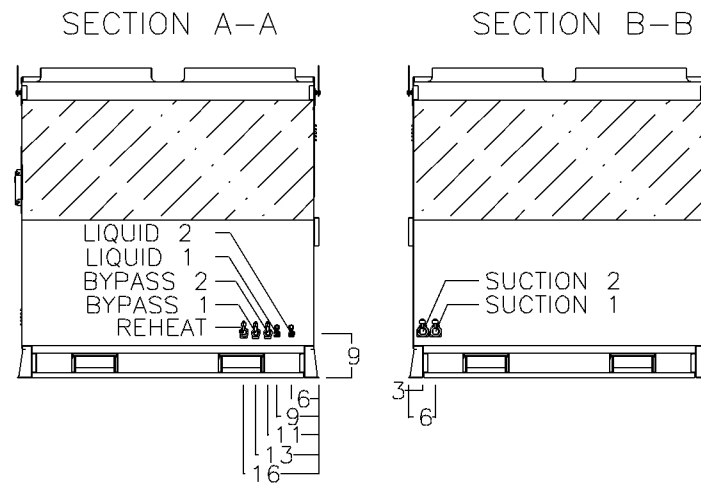
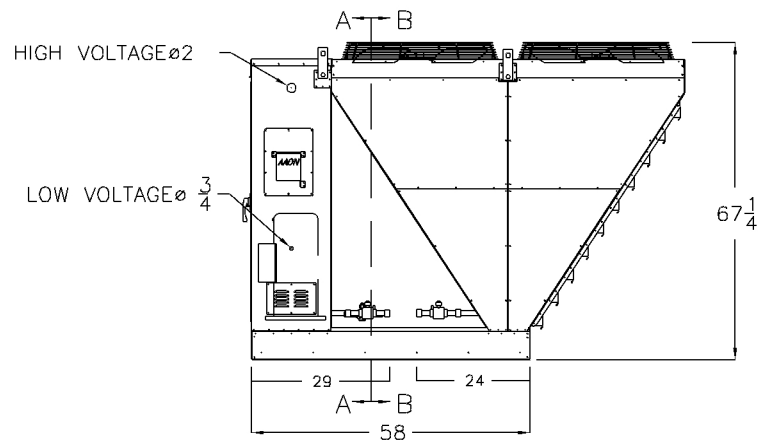
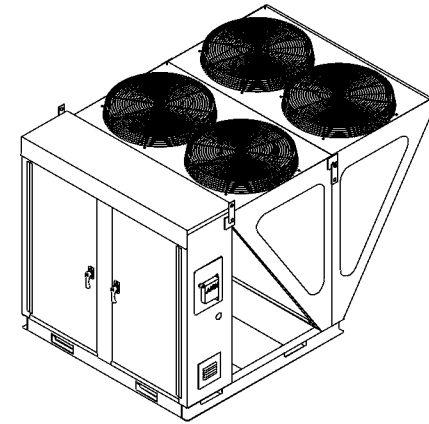
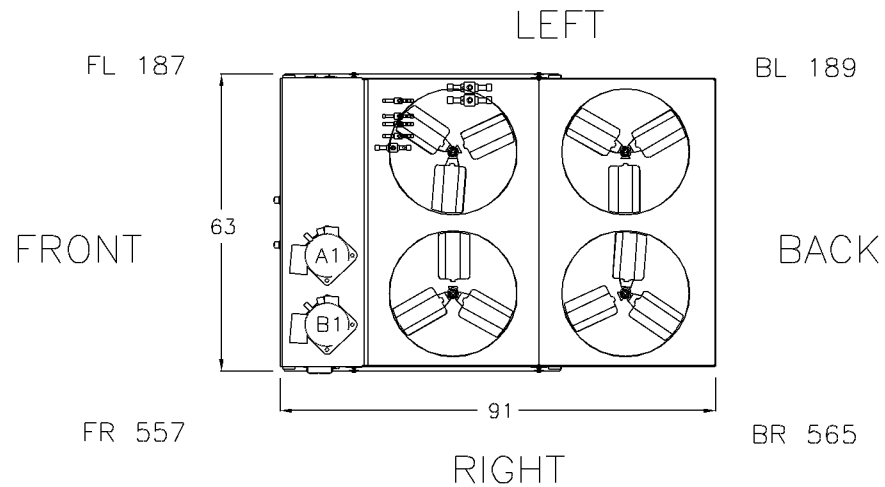
Job Number: **Job #6**

Date:

January 27, 2022

Terminals Available/Required for Controlling the Unit

Terminal	Description
[C]	Common
[Y1], [Y2]	Cooling Stage Enable + Isolation Relay
[CC1-] & [CS1+]	Variable Capacity Compressor (0-5 VDC) Signal
[O]	Cool Enable for Heat Pump
[P51-] & [P61+], [P52-] & [P62+],	Suction Pressure Sensor (0-5 VDC)
[P3]	Suction Pressor Sensor Power (+5 VDC)
[W1]	Heat Enable Stage 1
[R+], [SH], [T-]	AAON Communications



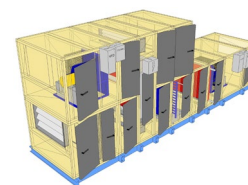
CONFIGURABLE OPTIONS SHOWN

All dimensions are in units of inches



Job Name: Duluth City Hall				Unit Tag: ACCU-1, 2 (air source HP)		Rev 1	
Configurator: CFA-025-C-A-8-DJ00K:0-A0-00-C0-AR0-1-N000-00B0J00-CA000DB							
Shipping Weight: 1498 (±5%)			Operating Weight: 1498 (±5%)				
Clearances:	Compressor End: 36		Left: 30	Right: 36	Piping Connection End: 6		Top: OPEN
Date: 1/27/2022					Software Ver. 4.316		v2.6.0.0

Job Information		Technical Data Sheet
Job Name	Duluth City Hall	
Date	January 27 2022	
Submitted By	CV	
Software Version	12.71	
Unit Tag	DOAS-1, 2 - Rev 5 (with heat wheel)	



Unit Overview												
Model Number	Supply						Return/Exhaust					
	Air Volume cfm	Static Pressure		External Dimensions			Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in		External inWc	Total inWc	Height in	Width in	Length in
CAH018GDGM	7000	2.00	5.25	54*	68*	290	7000	1.50	3.26	54*	68*	150

*Not including base rails, coil connectors, drain connectors and control boxes.

Unit		
Model Number:	CAH018GDGM	
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)	
Outer Panel:	Painted 24 gauge G60 Galvanized Steel	
Liner:	24 gauge Galvanized Steel (unless noted per section)	
Insulation:	R-13 Injected Foam	
Sound Baffles:	Included in Fan, Plenum, Access and Manual section (unless noted per section)	
Unit Configuration:	Stacked with opposed air flows	Drive (Handling) Location: Right
Base:	6" formed channel	Wall Thickness: 2 in
Altitude:	842 ft	Parts Warranty: Standard One Year

Exhaust Air Stream

Mixing Box			Component: 1			Length: 28 in			Shipping Section: 8		
Portion	Damper					Blade Action	Rated CFM	Air Pressure Drop	Quantity		
	Size (length x width)		Location	Type	Actuation						
	Overall	Opening									
Outside Air	No opening	No opening		None		Opposed	7000 cfm		1		
Return Air	14 in x 64 in	14 in x 64 in	End	None	NA	None	7000 cfm	0.09 insWg	1		
Filter Data											
Type		Efficiency		Face Velocity		Face Area		Air Volume		Filter Loading	
Pleated		MERV 8		371 ft/min		18.9 ft²		7000 cfm		Side	
Air Pressure Drop					Number of Filters	Height	Width	Depth			
Clean Air	Mean Air	Dirty Air	User Spec								
0.15 inWc	0.58 inWc	1.00 inWc	N/A	4	24 in	24 in	2 in				
				2	24 in	12 in	2 in				
Door											
Location			Width				Opening				
Drive side			24 in				Outward				
Special Options											
Sound Baffle					Filter Gauge						
(As casing details)					Magnehelic 0-2"						
Special Text											
Extra filters 1 set(s)											

Recirculation Section		Component: 2		Length: 24 in		Shipping Section: 6			
Length	Width	Location		Dampers		Recirculation Air Volume		Air Pressure Drop	
20.00 in	58.00 in	Bottom		UltraSeal Low Leak		7000 cfm		0.00 inWc	

Energy Recovery		Component: 3			Length: 22 in			Shipping Section: 5	
Heat Wheel Model	Media Type	Wheel Diameter	Supply Air Volume	Face Velocity				Segmented Wheel	
				Supply Air		Return Air			
				Summer	Winter	Summer	Winter		
ECW 546-3A	Synthetic fiber - 3 angstrom	54 in	7000 cfm	858 ft/min	950 ft/min	869 ft/min	882 ft/min	No	
Electrical Supply	Bypass Damper Opening	Pressure Drop				Exhaust Air Volume	VFD	Adjustable Purge Plate	Motor Power
		Supply Air		Return Air					
		Summer	Winter	Summer	Winter				
115/60/1 V/Hz/Phase	16.00 x 64.00 / 16.00 x 64.00	0.97 insWg	0.97 insWg	0.94 insWg	0.94 insWg	7000 cfm	Yes	Yes	0.75 HP

Summer Conditions

Outside Air		Return Air		Supply Air		Exhaust Air		Effectiveness			Total Energy Recovered
Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Latent	Sensible	Total	
88.0 °F	72.0 °F	75.0 °F	62.0 °F	80.0 °F	66.4 °F	83.1 °F	68.1 °F	57.97 %	63.75 %	60.27 %	
											139204 Btu/hr

Winter Conditions

Outside Air		Return Air		Supply Air		Exhaust Air		Effectiveness			Total Energy Recovered
Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb	Latent	Sensible	Total	
-20.0 °F	-20.0 °F	70.0 °F	54.0 °F	34.1 °F	31.3 °F	11.0 °F	14.5 °F	60.73 %	66.61 %	65.41 %	
											522962 Btu/hr

AHRI 1060 Certification

Application Rating is outside of the scope of AHRI ERV Certification Program but is rated in accordance with AHRI Standard 1060.

Door

Location	Width	Opening
Drive side	18 in	Outward

Special Options

Sound Baffle	Static Pressure
(As casing details)	0.94 inWc

Access Section		Component: 4		Length: 22 in		Shipping Section: 2	
Air Pressure Drop							
0.00 inWc							
Door							
Location		Width			Opening		
Drive side		18 in			Outward		
Special Options							
Sound Baffle							
(As casing details)							

Return/Exhaust Fan		Component: 5			Length: 54 in		Shipping Section: 1		
Fan Performance									
Air Volume	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power	Speed		Outlet Velocity
	External	Total	Cabinet				Operating	Maximum	
7000 cfm	1.50 inWc	3.26 inWc	0.14 inWc	1.34	4.5 kW	5.21 BHP	1675 rpm	2403 rpm	0 ft/min
Fan Data									
Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Material Type	Number of Blades	Discharge	Motor Location		
Centrifugal - Plenum	Airfoil / 2	1	22.25 in	Aluminum	9	-	Behind Fan		
Motor Data									
Power	Electrical Supply	Speed	Efficiency	Enclosure	Frame Size	Supplier	Number of Poles	Lock Rotor Current	Full Load Current
7.5 HP	200/60/3 V/Hz/Phase	1750 rpm	Premium	ODP	213 T frame	Generic	4	162.28 A	23.30 A
Fan Options									
Wheel Guard:		Provided			Shaft Grounding Kit:		Provided		
Isolator Type:		Spring							
VFD/Starter/Disconnect Data									
Selection Type:		VFD			Vendor:		Daikin Applied		
Auxiliary Control:		Disconnect			Voltage:		200 v		
Disconnect Type:		Fused			Height x Width x Depth:		19.25 in x 7.36 in x 10.15 in		
Mounting:		Door Side			Enclosure:		NEMA 1		
VFD Quantity:		1							
Custom Openings									
Custom Opening		Location		Width		Height		Rainhood w/Screen	
1		End		48 in		28 in		None	
Door									
Location		Width			Opening			Light	
Drive side		24 in			Outward			LED marine light kit with GFI outlet	
Special Options									
Sound Baffle									
(As casing details)									
Special Text									
Add damper to EA opening									

Supply Air Stream

Plenum Section		Component: 1		Length: 30 in		Shipping Section: 3	
Air Pressure Drop							
0.09 inWc							
Custom Dampers							
Custom Damper	Damper Type	Location	Size (Width x Height)		Material	Blade Action	Rainhood w/Screen
			Overall	Opening			
1	UltraSeal Low Leak	End	54 in x 28 in	44 in x 24 in	Galv. Steel	Parallel	None
Door							
Location		Width			Opening		
Drive side		26 in			Outward		
Special Options							
Sound Baffle							
(As casing details)							

Combination Filter			Component: 2			Length: 22 in		Shipping Section: 3		
Access			Face Velocity			Face Area		Air Volume		
Side			371 ft/min			18.9 ft²		7000 cfm		
Portion	Type	Efficiency	Air Pressure Drop				Number of Filters	Height	Width	Depth
			Clean Air	Mean Air	Dirty Air	User Spec				
Pre-Filter	Pleated	MERV 8	0.15 inWc	0.58 inWc	1.00 inWc	N/A	4	24 in	24 in	2 in
							2	24 in	12 in	2 in
Filter	Pre Pleat	MERV 13	0.15 inWc	0.57 inWc	1.00 inWc	N/A	4	24 in	24 in	4 in
							2	24 in	12 in	4 in
Door										
Location			Width				Opening			
Drive side			12 in				Outward			
Special Options										
Sound Baffle			Pre-Filter Gauge				Final-Filter Gauge			
(As casing details)			Magnehelic				Magnehelic			
Special Text										
Extra filters 1 set(s)										

Access Section		Component: 3		Length: 24 in		Shipping Section: 4	
Air Pressure Drop							
0.00 inWc							
Door							
Location		Width			Opening		
Drive side		20 in			Outward		
Special Options							
Sound Baffle							
(As casing details)							

Energy Recovery Section	Component: 4	Length: 22 in	Shipping Section: 5
See Exhaust Air Stream			

Recirculation Section		Component: 5		Length: 24 in		Shipping Section: 7	
Length	Width	Location		Dampers	Recirculation Air Volume	Air Pressure Drop	
20.00 in	64.00 in	Top		UltraSeal Low Leak	7000 cfm	0.00 inWc	

Direct Expansion Coil		Component: 6			Length: 34 in		Shipping Section: 9		
Coil Model	Total Capacity	Sensible Capacity	Number of Coils		Number of Rows	Fins per Inch	Tube Diameter	Tube Spacing (Face x Row)	
5EJ0806B	264502 Btu/hr	174594 Btu/hr	1		6	8	0.625 in	1.50 in x 1.299 in	
Air Volume	Air Temperature				Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity
	Entering		Leaving						
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb					
7000 cfm	80.0 °F	67.0 °F	56.5 °F	54.7 °F	0.58 insWg	42 in	55 in	16.04 ft²	436 ft/min
Fluid			Sub-Cooled Refrigerant Liquid Temp.		Suction Vapor Superheat Temp. at Coil Outlet		Design Saturated Condensing Temp.		Total Refrigerant Weight
Suction Temp.	Refrigerant								
46.0 °F	R410a	110.0 °F		8.0 °F		110.0 °F		51.00 lb	
Connection [Data Per Coil]							Min. Fin Surface Temp.		Min. Tube Wall Surface Temp.
Type	Liquid [Qty - Size]	Suction [Qty - Size]	Location		Material				
OD Sweat	2-0.88 in	2-1.63 in	Drive side		Copper tube	32.0 °F		32.0 °F	
Material						Drain Pan		Drain Side	
Fin	Tube	Header		Case					
Aluminum .0075 in	Copper .020 in	Copper		Galv. steel		Stainless steel		Drive side	

Total Refrigerant Weight is the total for all circuits of all coils in this coil section and is estimated. Refer to the AHU and Condensing Unit IOMs for recommendations on system start-up.

AHRI 410 Certification

Coil is NOT certified by AHRI

Door

Location	Width	Opening
Drive side	18 in	Outward

Special Options

Sound Baffle

(As casing details)

Future Hot Water Coil		Component: 7		Length: 28 in		Shipping Section: 10			
Number of Coils				Number of Rows					
1				1					
Coil Air Pressure Drop		Finned Height		Finned Width		Face Area		Face Velocity	
0.20 inWc		42 in		52 in		15.17 ft²		462 ft/min	
Connection Location				Connection Material					
Drive side				Carbon steel					
Coil Model		Drain Pan			Drain Pan Side				
Future Coil (Not Supplied)		None			-				
AHRI 410 Certification									
Coil is NOT certified by AHRI									
Door									
Location		Width			Opening				
Drive side		18 in			Outward				
Special Options									
Sound Baffle									
(As casing details)									
Special Text									
HGRH Coil									

Hot Water Coil		Component: 8		Length: 30 in		Shipping Section: 11	
Coil Model	Total Capacity	Number of Coils	Number of Rows	Fins per Inch	Tube Diameter	Tube Spacing (Face x Row)	
5WH0903B	726205 Btu/hr	1	3	9	0.625 in	1.50 in x 1.299 in	
Air Volume	Air Temperature		Coil Air Pressure Drop	Finned Height	Finned Length	Face Area	Face Velocity
	Entering	Leaving					
	Dry Bulb	Dry Bulb					
7000 cfm	-20.0 °F	77.9 °F	0.21 inWc	42 in	55 in	16.04 ft²	436 ft/min
Fluid		Flow Rate	Pressure Drop	Velocity	Volume	Weight	
Entering	Leaving						
160.0 °F	118.8 °F	37.50 gpm	3.80 ftHd	2.90 ft/s	7.0 gal	66.00 lb	
Connection [Data Per Coil]				Glycol Type	Min. Fin Surface Temp.	Min. Tube Wall Surface Temp.	Fouling Factor
Type	Size	Location	Material				
Threaded	2.00 in	Drive side	Carbon steel	Propylene (35%)	118.8 °F	118.8 °F	0.000
Material							
Fin		Tube		Header		Case	
Aluminum .0075 in		Copper .020 in		Copper		Galv. steel	
AHRI 410 Certification							
Coil is NOT certified by AHRI							
Door							
Location		Width			Opening		
Drive side		18 in			Outward		
Special Options							
Sound Baffle							
(As casing details)							

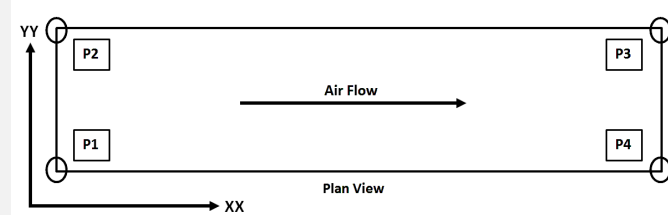
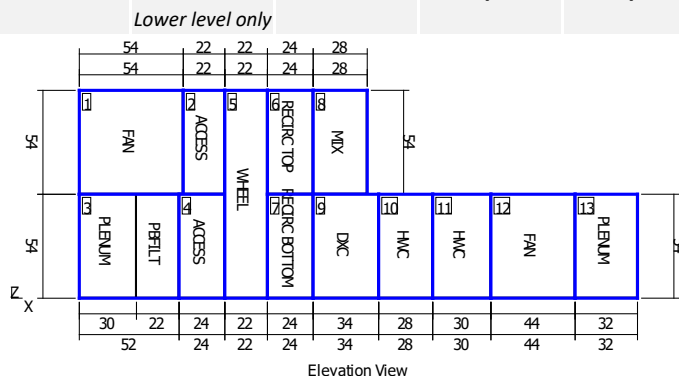
Supply Fan		Component: 9			Length: 44 in		Shipping Section: 12		
Fan Performance									
Air Volume	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power	Speed		Outlet Velocity
	External	Total	Cabinet				Operating	Maximum	
7000 cfm	2.00 inWc	5.25 inWc	0.00 inWc	1.30	7.0 kW	8.30 BHP	1951 rpm	2403 rpm	0 ft/min
Fan Data									
Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Material Type	Number of Blades	Discharge	Motor Location		
Centrifugal - Plenum	Airfoil / 2	1	22.25 in	Aluminum	9	Axial	Behind Fan		
Motor Data									
Power	Electrical Supply	Speed	Efficiency	Enclosure	Frame Size	Supplier	Number of Poles	Lock Rotor Current	Full Load Current
10.0 HP	200/60/3 V/Hz/Phase	1750 rpm	Premium	ODP	215 T frame	Generic	4	193.29 A	29.50 A
Fan Options									
Wheel Guard:		Provided			Shaft Grounding Kit:		Provided		
Isolator Type:		Spring							
VFD/Starter/Disconnect Data									
Selection Type:		VFD			Vendor:		Daikin Applied		
Auxiliary Control:		Disconnect			Voltage:		200 v		
Disconnect Type:		Fused			Height x Width x Depth:		19.25 in x 7.36 in x 10.15 in		
Mounting:		Door Side			Enclosure:		NEMA 1		
VFD Quantity:		1							
Panel									
Location			Width			Opening			
Removable panels			- in			Outward			
Special Options									
Sound Baffle									
(As casing details)									

Plenum Section		Component: 10		Length: 32 in		Shipping Section: 13			
Air Pressure Drop									
0.05 inWc									
Custom Openings									
Custom Opening		Location		Width		Height		Rainhood w/Screen	
1		End		48 in		24 in		None	
Door									
Location		Width		Opening		Light			
Drive side		20 in		Inward		LED marine light kit with GFI outlet			

Unit Sound Power (dB)								
Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	74	75	78	66	63	56	46	51
Unit Discharge:	78	75	82	77	78	76	70	64
Unit Return:	74	77	83	77	71	69	62	56

Shipping Section Details

Section	Length in	Weight lb	Corner Weights (lb)				Center of Gravity (in)		
			P1	P2	P3	P4	XX	YY	ZZ
1	54	902	281	259	169	192	22	32	28
2	22	213	46	46	60	60	12	34	33
3	52	602	143	143	159	159	27	34	29
4	24	283	64	64	78	78	13	34	27
5	22	1015	234	234	254	254	11	34	57
6	24	199	49	49	61	61	13	34	33
7	24	261	64	64	76	76	13	34	26
8	28	326	74	74	88	88	15	34	33
9	34	767	240	226	143	158	13	33	28
10	28	367	95	95	89	89	14	34	26
11	30	582	187	176	105	115	11	33	29
12	44	862	251	225	180	205	20	32	25
13	32	470	117	117	117	117	16	34	29
Entire Unit	290	6849	n/a	n/a	n/a	n/a	n/a	n/a	n/a



NOTE: Special components aren't included in the corner weights and center of gravity data.

Supply Static Pressure Drop

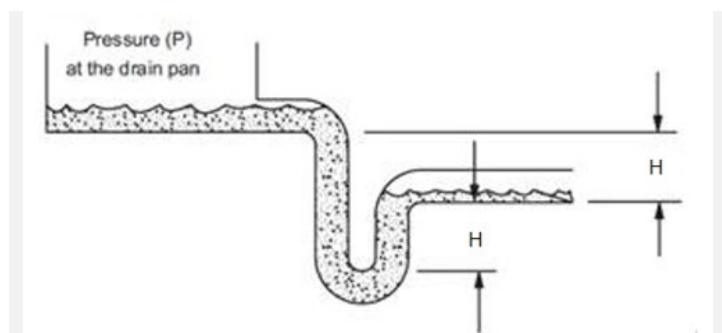
Component	Option	Static Pressure Drop
Plenum Section	Plenum Section	0.09 insWg
Panel and Bag Filter	Panel and Bag Filter	1.15 insWg
Access Section	Access Section	
Energy Recovery Section	Summer	0.97 insWg
Bottom Recirc Section	Bottom Recirc Section	
DX Coil	DX Coil	0.58 insWg
Hot Water Coil	Hot Water Coil	0.20 insWg
Hot Water Coil	Hot Water Coil	0.21 insWg
Supply Fan	Cabinet	
Plenum Section	Plenum Section	0.05 insWg
External Static	External Static	2.00 insWg
Total Supply Fan Static		5.25 insWg

Exhaust Static Pressure Drop

Component	Option	Static Pressure Drop
Mixing Box	Filter	0.58 insWg
Mixing Box	Mixing Box	0.10 insWg
Top Recirc Section	Top Recirc Section	
Energy Recovery Section	Summer	0.94 insWg
Access Section	Access Section	
Return Fan	Cabinet	0.14 insWg
External Static	External Static	1.50 insWg
Total Return/Exhaust Fan Static		3.26 insWg

Minimum Recommended Drain Pan Trap Dimensions

Shipping Section	Component	H
9	DX Coil	7.52



Dimensions provided as a courtesy and are recommended minimums only. Daikin is not responsible for supplying or designing drain pan traps and is not responsible for any damage caused by incorrect trap heights. The dimensions listed above should be reviewed and approved by a licensed plumbing professional.

AHRI Certification



Certified in accordance with the AHRI Central Station Air-Handling Unit Certification Program, which is based on AHRI Standards 430/431. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Notes

Important

1. This unit may not meet ASHRAE Standard 90.1 - 2007 fan motor power limitations for the year and system selected. If that code applies, alternate fan selections may be required.
2. The designer and installer must ensure compliance with applicable codes. A component supplier cannot determine the brake horsepower ("BHP") for other motors in the air handling system.
3. Before approving this unit, determine whether ASHRAE Standard 90.1 - 2007 has been adopted in the specific jurisdiction or contract specifications in which the unit will be installed.



Selection ID: 183953
Date: 01/28/2022

Dry Fluid Cooler

GFW 090.2D06/6SA-E255U/04P.M

Quantity: 1

Design Working Fluid Flow/Capacity:	255.0 GPM / 1203 MBH	Working Fluid:	35% Propylene Glycol
Rated Capacity vs. Design:	101.3 %	Entering Fluid Temperature:	110.0 °F
Air Flow per Unit:	93316 CFM	Leaving Fluid Temperature:	100.0 °F
Air Inlet Dry Bulb Temperature:	92.0 °F	Fluid Pres. Drop at Design Flow:	10.53 psig
Air Inlet Wet Bulb Temperature:	75.0 °F	Elevation:	0 ft

Detailed Unitary Data

Fans:	6, suitable for 230V/3Ph/60Hz	Sound Pressure @ 3ft:	73 dB(A)
Total Fan Power in/out:	15.3 kW / 18.9 HP, nominal	Sound Pressure @ 30ft:	61 dB(A)
FLA:	46.8 A	Sound Power Level:	93 dB(A)
MCA:	48.8 A		
MOCP:	50.0 A		
Angular Fan Velocity:	1050 RPM		

Casing:	Galv. Powder coated	Interior Coil Volume:	12.8 ft³
Coil:	Copper	Max Operating Pressure:	232 psia
		Number of Support Anchors:	14
		Fin Material:	Aluminum
		Fin Spacing:	12.7 FPI

Dimensions

Height:	5.7 ft
Width:	4.7 ft
Length, nominal:	26.4 ft

Weights

Shipping:	6463 lbs
Operating:	6510 lbs

Headers and Connections (Diameters)

Coil

Inlet Connections:	2 x 3.125 in
Outlet Connections:	2 x 3.125 in

Headers:

Inlet:	3.125 in
Outlet:	3.125 in

Reference Information

S-GFWD 090.1/6-U(4)-G6/01/4P.M

Options

Flange connections, ANSI 150#
BACnet MSTP

Important Remarks / Explanatory Notes

Price does not include freight unless otherwise stated

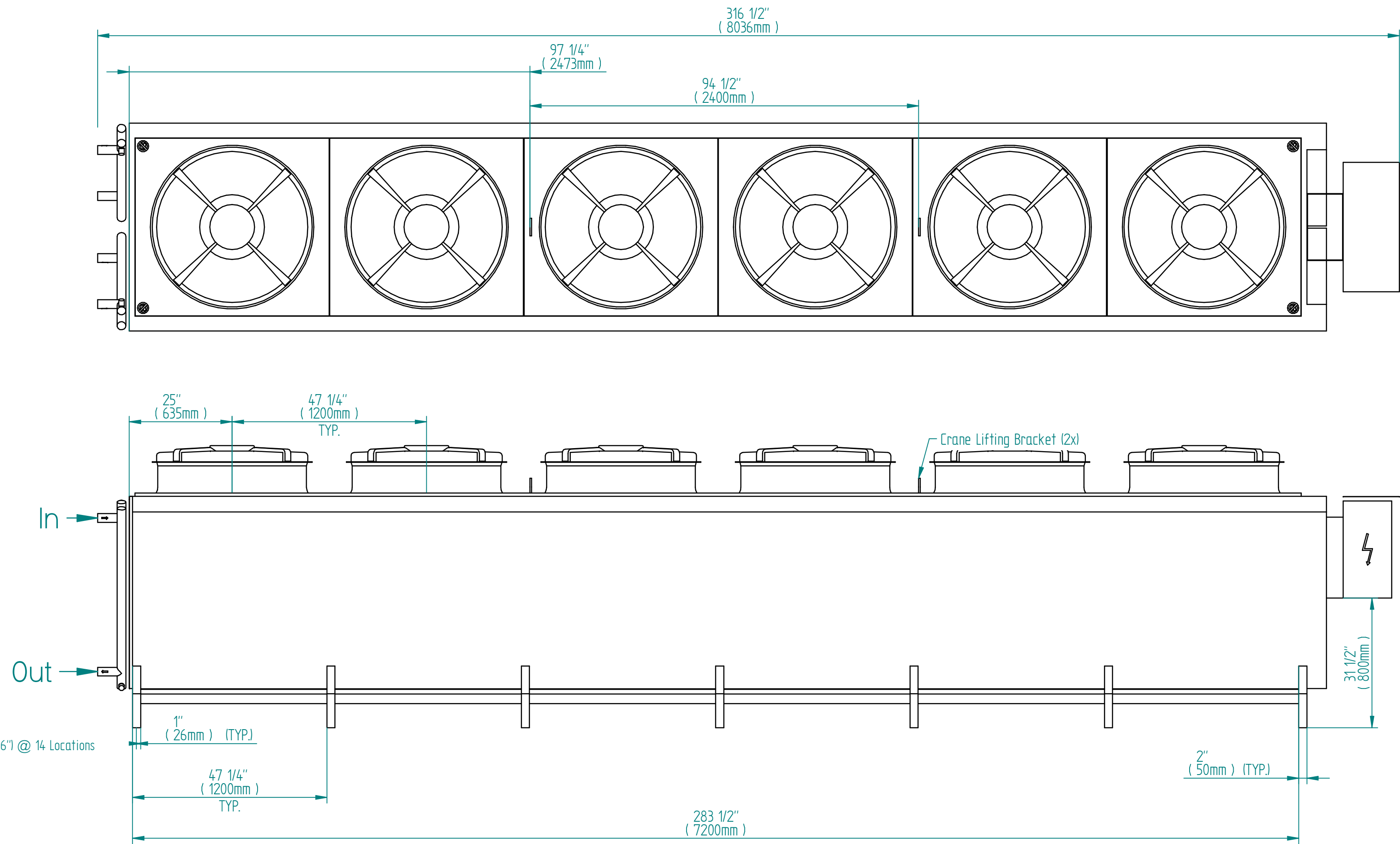
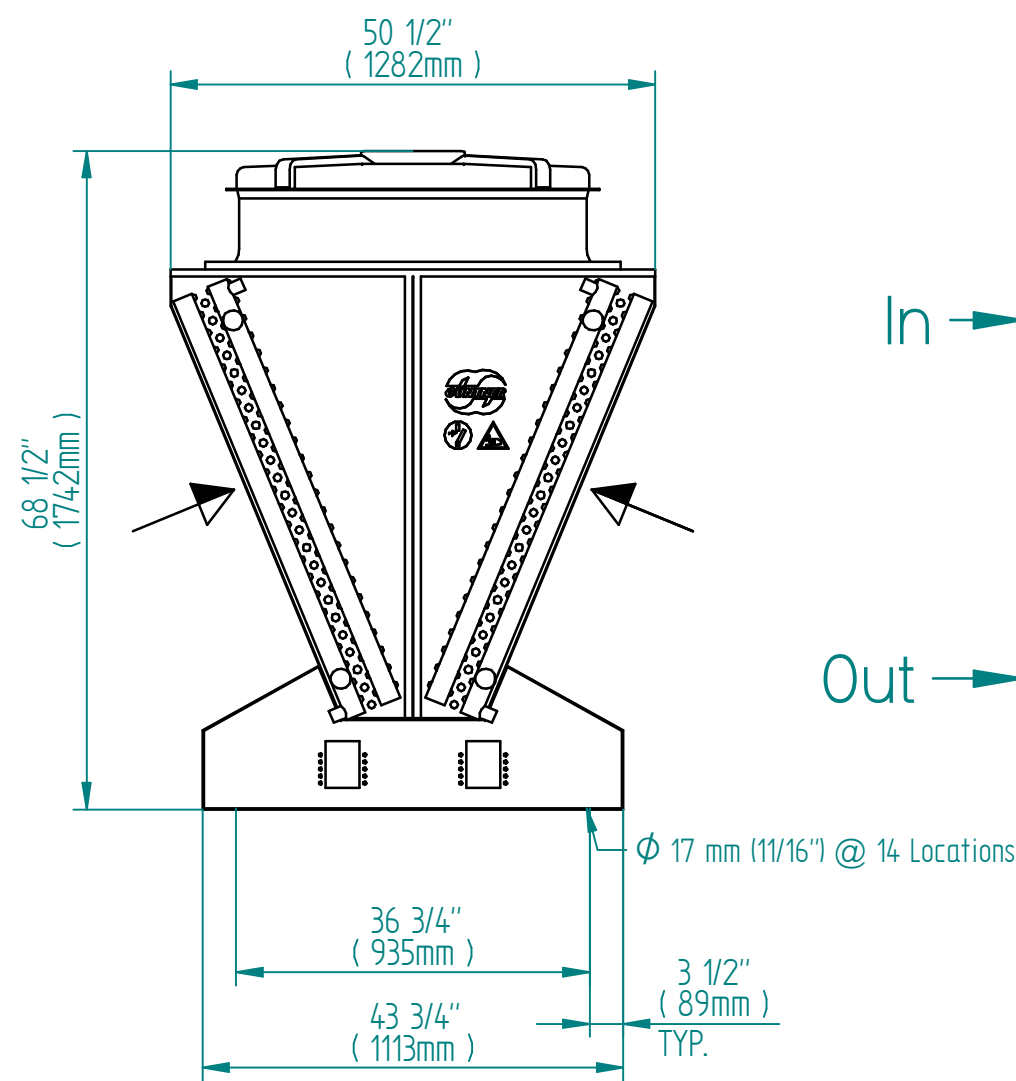
Service

Terms of Delivery:	FCA Laredo, TX
Payment Cond:	.
Delivery Time:	.
Validity:	03/29/2022

Our general terms of sales and delivery apply.

Güntner is not liable for unit and system damage due to lack of freeze protection for coils installed in freezing climates

measures without specification of tolerances:
welding / brazing: DIN EN ISO 15920, tolerance class 0
general tolerances: DIN ISO 2768-1, tolerance class component parts m / assembly sg, tolerance class component parts K / assembly L, length >3m EN 1062, tolerance straightness and flatness 0002xl (length)
protection note acc. to DIN ISO 16016



Reference #:		Project:						
Notes: Preliminary Drawing. Do not use for construction. Coil inlet and outlet details and quantities often vary from the sample shown above								
Güntner U.S. Ref. #:	Dimensions in inches (mm)		scale	1 : 20	sheet	1/1	size	DIN A2
			material					
			weight [kg]					
			notice					
			type	GWV-GFW 090.2/6				
			name	Condenser / Cooler				
			Baan-No.					
	revision	date	name	drawing number	1142021102544	index		
		date	name	customer				
drawn: 1/14/2021		cadbot	project/ quantity					
certified:			order/ position					

Güntner U.S. LLC.
3601 Algonquin Rd Ste 925
Rolling Meadows, IL 60008
USA
Tel. + 1 847 781 0900
www.guenterus.com



Purchasing Division
Finance Department
Room 120
411 West First Street
Duluth, Minnesota 55802

218-730-5340
purchasing@duluthmn.gov

Addendum 3
Solicitation 22-99418
City Hall MEP Renewal Project

This addendum serves to notify all bidders of the following changes to the solicitation documents:

1. Bidders must provide a bid amount for each unit price, alternate, and lump sum bid within Bid Express in order to have a responsive bid. If you are not bidding a particular work scope, enter \$0.00 for those bid amounts. Any work scope that has alternates or unit prices must have all prices for that work scope completed.
2. Test results from previous lead and asbestos testing in 2018 and 2021 is attached. If a contractor encounters what is suspected to be hazardous materials, it is the contractor's responsibility to immediately notify the City. The City will contract for the testing and removal of hazardous material.
3. As an alternate, the general conditions contractor will be responsible for moving and protecting furniture, and removing and replacing acoustical ceiling. This will include but not be limited to desks/work stations, filing cabinets and other officer furniture (conference tables, etc.). If the alternate is included, it is the general conditions contractor's responsibility to protect all furniture, whether moved or left in place, and to return any moved furniture to its original location and status. Contractor shall be responsible for damage. City staff will be responsible for their own personal belongings. An alternate bid item has been added to the solicitation for contractors to include the lump sum for this item, as well as an hourly rate in the event of any scope change. A layout of the furniture was included in Addendum 2.
4. Piping & Wiring Submittal and Equipment Submittal received from Trane are attached.
5. The awarded mechanical contractor installing the VRF equipment must have successfully completed the CIT MULTI MEUS approved training course prior to installation. The contractor must also submit a completed and approved MEUS Extended Warranty Process report. Per Trane, the cost as of 5/26/22 for this training is \$480/person. Trane recommends more than one installer be trained. Trane will assist the contractor with submitting the approved MEUS extended warranty process report.

6. Acoustical ceiling tiles are USG Eclipse 78775. General conditions contractor is responsible for the removal as needed and replacement of the acoustical ceiling. Contractor shall be responsible for damage.
7. The Luminaire Schedule, electrical sheet E500, is attached.
8. Some activities due to noise level, may require scheduling outside of City Hall operational hours (8am-4:30pm, M-F).
9. Project shutdown instructions are attached.
10. Additional changes and clarifications are included in KFI's Addendum 3 attached.

Please acknowledge receipt of this Addendum by checking the acknowledgment box within the www.bidexpress.com solicitation. Posted: **June 2, 2022**

Attachments:

- Lead/Asbestos Test Results
- Piping & Wiring Submittal
- Equipment Submittal
- Electrical Sheet E500
- Project Shutdown Instructions
- KFI's Addendum 3



PRE-RENOVATION LIMITED ASBESTOS & LEAD INSPECTION REPORT

City Hall
2nd & 3rd Floors
Duluth, Minnesota

TPT#18A0136

Prepared for:

**Mr. Rob Hurd
City of Duluth Property & Facilities Management
1532 West Michigan Street
Duluth, Minnesota 55806**

April 19, 2018



Twin Ports Testing Inc.

1301 N 3rd St. • Superior WI 54880 • 715-392-7114 • 1-800-373-2562 • F 715-392-7163 • www.twinportstesting.com

April 19, 2018

TPT#18A0136

Mr. Rob Hurd
City of Duluth Property & Facility Management
1532 West Michigan Street
Duluth, Minnesota 55806

**Re: Pre-Renovation Limited Asbestos Bulk & Lead Sampling
City Hall
2nd & 3rd Floors
Duluth, Minnesota**

Dear Mr. Hurd,

The following is a report outlining the asbestos bulk & lead sampling conducted at the above referenced site. This report contains the following information:

- Introduction
- Asbestos
- Lead
- Recommendation

INTRODUCTION

Twin Ports Testing II, Inc. (TPT) was contacted by Mr. Rob Hurd, of the City of Duluth, regarding asbestos bulk and lead sampling at the above mentioned property. The sampling was conducted prior to proposed renovation. Ms. Tracy Jacobs, of TPT, a Minnesota Department of Health (MDH) certified Asbestos Inspector did the asbestos inspection on April 13, 2018. Mr. Gary Christner, of TPT, a Minnesota Department of Health (MDH) certified Lead Risk Assessor conducted the partial lead renovation inspection on April 17, 2018. TPT personnel certification are attached as Appendix A.

ASBESTOS

TPT collected a total of thirty-five samples. These samples included: floor filler, mastic, ceiling tile, carpet glue, flooring (black layer), adhesive, plaster wall, brick wall, plaster (skim coat), plaster ceiling flooring (brown layer), flooring (brown fibrous layer), sheetrock wall, ceiling material and baseboard and base adhesive that were potentially asbestos containing materials (ACMs). The samples were sent to EMSL Analytical, Inc. in Minneapolis, Minnesota for analysis by polarized light microscopy (PLM). The table on the following page lists the areas that were sampled for asbestos (bold and shading indicates positive results), sample number, sample description, sample location and asbestos percent (if applicable). Laboratory analytical results are attached as Appendix B.

Table 1 – Sampled Suspect Asbestos Containing Materials (ACM)

Sample #	Sample Description	Sample Location	Asbestos %Type
1	Filler	Threshold filler, 3 rd floor, gray	None Detected
	Carpet mastic	Under carpet, 3 rd floor, tan	None Detected
2	Ceiling tile, solid	3 rd floor above grid, brown	None Detected
3	Ceiling tile, (2'x 4'), (snakes & pin-holed)	3 rd floor, gray	None Detected
4	Carpet glue	3 rd floor under carpet, (tan/red/green)	None Detected
5	Flooring	3 rd floor human resources office under carpet, black	None Detected
5	Adhesive	3 rd floor human resources office under flooring, tan	None Detected
6	Ceiling tile, (2'x 4')	3 rd floor lunchroom, gray	None Detected
7a	Plaster wall	3 rd floor, gray	None Detected
	Brick wall	3 rd floor, red	None Detected
7b	Plaster wall	3 rd floor lunchroom, gray	None Detected
	Plaster wall, (skim coat)	3 rd floor lunchroom, white	None Detected
7c, 7d, 7e	Plaster wall	2 nd floor west side, gray	None Detected
	Plaster wall, (skim coat)	2 nd floor west side, white	None Detected
7f	Plaster wall	2 nd floor SE side, (gray/beige)	None Detected
7g	Plaster wall	2 nd floor SE side, gray	None Detected
	Plaster wall, (skim coat)	2 nd floor SE side, white	None Detected
8a	Flooring	3 rd floor SW side, under carpet, brown	None Detected
	Adhesive	3 rd floor SW side, under carpet, tan	None Detected
	Fibrous layer	3 rd floor SW side, under carpet, tan	None Detected
8b	Flooring	3 rd floor east side, under carpet, brown	None Detected
	Adhesive	3 rd floor east side, under carpet, tan	None Detected
	Fibrous material	3 rd floor east side, under carpet, tan	None Detected
	Adhesive	3 rd floor east side, under carpet, brown	None Detected
8c	Mastic	2 nd floor west side, under carpet, green	None Detected

Table 1 – Sampled Suspect Asbestos Containing Materials (ACM)

Sample #	Sample Description	Sample Location	Asbestos %Type
8c	Flooring	2 nd floor west side, under carpet, brown	None Detected
	Fibrous material	2 nd floor west side, under carpet, tan	None Detected
	Mastic	2 nd floor west side, under carpet, brown	None Detected
8d	Mastic	2 nd floor SE side, under carpet, tan	None Detected
	Flooring	2 nd floor SE side, under carpet, brown	None Detected
	Fibrous material	2 nd floor SE side, under carpet, tan	None Detected
9a	Sheetrock walls	2 nd floor west side, (tan/white)	None Detected
9b, 9c	Sheetrock walls	2 nd floor west side, (tan/white)	<1% Chrysotile
9d	Sheetrock wall	2 nd floor north side, (brown/white)	None Detected
	Plaster wall	2 nd floor north side, white	None Detected
9e	Sheetrock walls	2 nd floor south side, (brown/white)	None Detected
10a,b,c	Ceiling material	2nd floor north side, above grid, (tan/white)	35% Chrysotile
11	Ceiling tile, (2'x 2'), solid	2 nd floor, white	None Detected
12	Ceiling tile, (1'x 1'), large holes	2 nd floor west side, brown	None Detected
13	Ceiling tile, (2'x 2')	2 nd floor NW side, (gray/white)	None Detected
14	Adhesive	2 nd floor NW side closet, green	None Detected
	Flooring	2 nd floor NW side closet, beige	None Detected
	Adhesive	2 nd floor NW side closet, tan	None Detected
15	Ceiling tile, (2'x 4')	2 nd floor SE side, (gray/white)	None Detected
16	Filler	2 nd floor north side threshold under carpet, white	None Detected
	Adhesive	2 nd floor north side threshold under carpet, (tan/green)	None Detected
17	Ceiling tile, (2'x 4')	2 nd floor north side, white	None Detected
18	Baseboard	2 nd floor south side, brown	None Detected
	Adhesive	2 nd floor south side, tan	None Detected
19	Floor tile, (12"x 12")	2 nd floor south side, white	None Detected
	Mastic	2 nd floor south side under tile, black	None Detected
20	Base	2 nd floor south side, white	None Detected

Table 1 – Sampled Suspect Asbestos Containing Materials (ACM)

Sample #	Sample Description	Sample Location	Asbestos %Type
20	Adhesive	2 nd floor south side, tan	None Detected

By the MDH rules and regulations, asbestos containing materials are materials that contain greater than 1% asbestos. One of the materials tested is considered to be an Asbestos Containing Material (ACM).

Table 2 – Asbestos Containing Materials Summary

Sample #’s	Sample Description	Location	Friability	Approximate Amount
10	Ceiling material	2 nd floor north side, above grid, (tan/white)	Friable	~225 square feet

Lead (XRF)

Samples of painted surfaces were tested for lead content using a NITON XLp-303A X-Ray Fluorescence (XRF) Lead Paint Analyzer, Serial Number 22293. Components were tested starting on the 1st Avenue Side of each room (Side A) going clockwise around the room from side A to side D. Twenty sampled components were above the MDH limit of 1.0 mg/cm² for painted surfaces and are considered positive for lead content. These components include:

- White plaster walls in room 330 north and south side rooms;
- White plaster walls in room 317;
- White plaster wall by elevator 3rd floor;
- White plaster column in room 210;
- White plaster ceiling in room 210;
- White plaster ceiling in room 210, south side room;
- Gray plaster wall in room 210, west side room;
- White plaster walls in room 210, west side rooms;
- White plaster walls in room 210/209, west side;
- White plaster ceiling in room 208;
- White plaster wall in room 211 center; and
- White plaster wall in room 211 hallway.

The Niton results are included for reference in Appendix B.

DISCUSSION/RECOMMENDATIONS

TPT recommends the abatement of the (tan/white) ceiling material on 2nd floor north side if this item is planned to be disturbed during renovation. If abatement is to be conducted, it must be completed by a Minnesota Certified Asbestos Abatement Company.

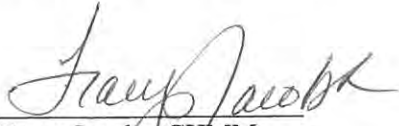
TPT recommends that lead safe work practices be utilized when working with the materials that tested positive for lead content if they are to be disturbed during renovation.

If additional materials are found during renovation that may contain asbestos and have not been sampled, the material must be sampled or assumed to be ACM and treated as such.

This inspection was conducted according to federal, state and local regulations. If you have any questions regarding this report, please feel free to contact me at (715) 392-7114 (office). Thank you for the opportunity to conduct this work.

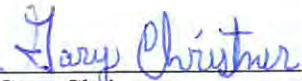
Sincerely,

Twin Ports Testing II, Inc.

Handwritten signature of Tracy Jacobs in black ink.

Tracy Jacobs, CHMM
Industrial Hygiene Services Manager
Inspector# AI3694

4/23/18
Date

Handwritten signature of Gary Christner in blue ink.

Gary Christner
Industrial Hygiene Technician
Lead Risk Assessor LR3101

4-23-18
Date

Appendix A

Licenses



MINNESOTA
MDH
DEPARTMENT OF HEALTH
ASBESTOS INSPECTOR

Certified by:

State of Minnesota
Department of Health

Expires: 04/21/2018

Tracy L. Jacobs
4748 Lavaque Bypass Rd
Duluth, MN 55811

Director, Env. Health Div.

No. A17964 - Issued: 05/01/2017



GP Christner
Director, Env. Health Div.



LEAD
Risk Assessor

Licensed by:
State of Minnesota
Department of Health
License No. LR3101
Expires 04/10/2018

Gary J Christner
2337 Pershing Street
Duluth, MN 55811

Appendix B

Asbestos Lab Results

**EMSL Analytical, Inc.**

14375 23rd Avenue North Minneapolis, Mn 55447

Tel/Fax: (763) 449-4922 / (763) 449-4924

<http://www.EMSL.com> / minneapolislab@emsl.com**EMSL Order:** 351802689**Customer ID:** TWNT42**Customer PO:****Project ID:****Attention:** Tracy Jacobs

Twin Ports Testing II, Inc.

1301 North Third Street

Superior, WI 54880

Phone: (218) 390-0162**Fax:****Received Date:** 04/16/2018 10:05 AM**Analysis Date:** 04/18/2018 - 04/19/2018**Collected Date:****Project:** 18A0136/ City Hall 2nd & 3rd**Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
1-Filler 351802689-0001	Threshold filler & carpet mastic (3rd floor)	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
1-Mastic 351802689-0001A	Threshold filler & carpet mastic (3rd floor)	Tan Non-Fibrous Homogeneous	3% Synthetic	97% Non-fibrous (Other)	None Detected
2 351802689-0002	CT above grid (solid white) (3rd floor)	Brown Fibrous Homogeneous	99% Cellulose	1% Non-fibrous (Other)	None Detected
3 351802689-0003	2x4 CT (snakes & pin holes) (3rd floor)	Gray Fibrous Homogeneous	30% Cellulose 55% Min. Wool	10% Perlite 5% Non-fibrous (Other)	None Detected
4 351802689-0004	Carpet glue (3rd floor)	Tan/Red/Green Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
Could not separate paint layer – included in analysis.					
5-Flooring 351802689-0005	Flooring (under carpet) black (3rd floor human resources)	Black Non-Fibrous Homogeneous	8% Cellulose	92% Non-fibrous (Other)	None Detected
5-Adhesive 351802689-0005A	Flooring (under carpet) black (3rd floor human resources)	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
6 351802689-0006	2x4 CT (lunchroom 3rd floor)	Gray Fibrous Homogeneous	65% Cellulose 15% Min. Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
7a-Plaster 351802689-0007	Plaster wall & brick (3rd floor)	Gray Non-Fibrous Homogeneous	3% Cellulose	97% Non-fibrous (Other)	None Detected
7a-Brick 351802689-0007A	Plaster wall & brick (3rd floor)	Red Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
7b-Plaster 351802689-0008	Plaster ceiling (3rd floor lunchroom)	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
7b-Skim Coat 351802689-0008A	Plaster ceiling (3rd floor lunchroom)	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
7c-Plaster 351802689-0009	Plaster wall (2nd floor west side)	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
7c-Skim Coat 351802689-0009A	Plaster wall (2nd floor west side)	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
7d-Plaster 351802689-0010	Plaster ceiling (2nd floor West Side)	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 04/19/2018 10:31:08

**EMSL Analytical, Inc.**

14375 23rd Avenue North Minneapolis, Mn 55447

Tel/Fax: (763) 449-4922 / (763) 449-4924

<http://www.EMSL.com/minneapolislab@emsl.com>

EMSL Order: 351802689

Customer ID: TWNT42

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	% Fibrous	Non-Asbestos		Asbestos
				% Non-Fibrous		% Type
7d-Skim Coat 351802689-0010A	Plaster ceiling (2nd floor West Side)	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)		None Detected
7e-Plaster 351802689-0011	Plaster wall (2nd floor - west side)	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)		None Detected
7e-Skim Coat 351802689-0011A	Plaster wall (2nd floor - west side)	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)		None Detected
7f 351802689-0012	Plaster ceiling (2nd floor - SE side)	Gray/Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)		None Detected
7g-Plaster 351802689-0013	Plaster wall (2nd floor - SE side)	Gray Fibrous Homogeneous	1% Hair	1% Ca Carbonate 98% Non-fibrous (Other)		None Detected
7g-Skim Coat 351802689-0013A	Plaster wall (2nd floor - SE side)	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)		None Detected
8a-Flooring 351802689-0014	Flooring (under carpet) brown (3rd floor - SW side)	Brown Non-Fibrous Homogeneous	10% Cellulose	90% Non-fibrous (Other)		None Detected
8a-Adhesive 351802689-0014A	Flooring (under carpet) brown (3rd floor - SW side)	Tan Non-Fibrous Homogeneous	2% Synthetic	98% Non-fibrous (Other)		None Detected
8a-Fibrous Layer 351802689-0014B	Flooring (under carpet) brown (3rd floor - SW side)	Tan Fibrous Homogeneous	99% Cellulose	1% Non-fibrous (Other)		None Detected
8b-Flooring 351802689-0015	Flooring (under carpet) brown (3rd floor - East side)	Brown Non-Fibrous Homogeneous	10% Cellulose	90% Non-fibrous (Other)		None Detected
8b-Tan Adhesive 351802689-0015A	Flooring (under carpet) brown (3rd floor - East side)	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)		None Detected
8b-Fibrous Material 351802689-0015B	Flooring (under carpet) brown (3rd floor - East side)	Tan Fibrous Homogeneous	99% Cellulose	1% Non-fibrous (Other)		None Detected
8b-Brown Adhesive 351802689-0015C	Flooring (under carpet) brown (3rd floor - East side)	Brown Non-Fibrous Homogeneous	10% Cellulose	90% Non-fibrous (Other)		None Detected
8c-Green Mastic 351802689-0016	Flooring (under carpet) brown (2nd floor - west side)	Green Non-Fibrous Homogeneous		100% Non-fibrous (Other)		None Detected
8c-Flooring 351802689-0016A	Flooring (under carpet) brown (2nd floor - west side)	Brown Non-Fibrous Homogeneous	10% Cellulose	90% Non-fibrous (Other)		None Detected
8c-Fibrous Material 351802689-0016B	Flooring (under carpet) brown (2nd floor - west side)	Tan Fibrous Homogeneous	99% Cellulose	1% Non-fibrous (Other)		None Detected
8c-Brown Mastic 351802689-0016C	Flooring (under carpet) brown (2nd floor - west side)	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)		None Detected
8d-Tan Mastic 351802689-0017	Flooring (under carpet) brown (2nd floor - SE side)	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)		None Detected
8d-Flooring 351802689-0017A	Flooring (under carpet) brown (2nd floor - SE side)	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)		None Detected

Initial report from: 04/19/2018 10:31:08

**EMSL Analytical, Inc.**

14375 23rd Avenue North Minneapolis, Mn 55447

Tel/Fax: (763) 449-4922 / (763) 449-4924

<http://www.EMSL.com / minneapolislab@emsl.com>

EMSL Order: 351802689

Customer ID: TWNT42

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
8d-Fibrous Material 351802689-0017B	Flooring (under carpet) brown (2nd floor - SE side)	Tan Fibrous Homogeneous	99% Cellulose	1% Non-fibrous (Other)	None Detected
9a 351802689-0018 <i>This sample only contains sheetrock.</i>	Sheetrock wall (2nd floor - west side)	Tan/White Fibrous Homogeneous	10% Cellulose 2% Glass	88% Non-fibrous (Other)	None Detected
9b 351802689-0019 <i>This is a composite result of sheetrock, joint compound, and tape.</i>	Sheetrock wall (2nd floor - west side)	Tan/White Fibrous Heterogeneous	10% Cellulose 2% Glass	88% Non-fibrous (Other)	<1% Chrysotile
9c 351802689-0020 <i>This is a composite result of sheetrock, joint compound, and tape.</i>	Sheetrock wall (2nd floor - west side)	Tan/White Fibrous Heterogeneous	10% Cellulose 2% Glass	88% Non-fibrous (Other)	<1% Chrysotile
9d-Sheetrock 351802689-0021	Sheetrock wall (2nd floor north side)	Brown/White Fibrous Heterogeneous	10% Cellulose 2% Glass	88% Non-fibrous (Other)	None Detected
9d-Plaster 351802689-0021A	Sheetrock wall (2nd floor north side)	White Non-Fibrous Homogeneous		15% Perlite 85% Non-fibrous (Other)	None Detected
9e 351802689-0022	Sheetrock wall (2nd floor south side)	Brown/White Fibrous Heterogeneous	10% Cellulose 1% Glass	89% Non-fibrous (Other)	None Detected
10a 351802689-0023	Ceiling (above grid) 2nd floor - north side)	Tan/White Fibrous Homogeneous		45% Mica 20% Non-fibrous (Other)	35% Chrysotile
10b 351802689-0024	Ceiling (above grid) 2nd floor - north side)				Positive Stop (Not Analyzed)
10c 351802689-0025	Ceiling (above grid) 2nd floor - north side)				Positive Stop (Not Analyzed)
11 351802689-0026	2x2 ceiling tile (2nd floor - solid)	White Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
12 351802689-0027	1x1 ceiling tile (large holes) 2nd floor west side	Brown Fibrous Homogeneous	98% Cellulose	2% Non-fibrous (Other)	None Detected
13 351802689-0028	2x2 ceiling tile (2nd floor - NW side)	Gray/White Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
14-Green Adhesive 351802689-0029	floor filler (2nd floor - NW side) closet	Green Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
14-Flooring 351802689-0029A	floor filler (2nd floor - NW side) closet	Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
14-Tan Adhesive 351802689-0029B	floor filler (2nd floor - NW side) closet	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
15 351802689-0030	2x4 CT (2nd floor - SE side)	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	15% Perlite 5% Non-fibrous (Other)	None Detected
16-Filler 351802689-0031	filler under carpet (threshold) (2nd fl. north side)	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 04/19/2018 10:31:08



EMSL Analytical, Inc.

14375 23rd Avenue North Minneapolis, Mn 55447

Tel/Fax: (763) 449-4922 / (763) 449-4924

<http://www.EMSL.com> / minneapolislab@emsl.com

EMSL Order: 351802689

Customer ID: TWNT42

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
16-Adhesive 351802689-0031A	filler under carpet (threshold) (2nd fl. north side)	Tan/Green Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
17 351802689-0032	2x4 CT (2nd floor - north side)	White Non-Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
18-Baseboard 351802689-0033	base & adhesive (2nd floor - south side)	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
18-Adhesive 351802689-0033A	base & adhesive (2nd floor - south side)	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
19-Floor Tile 351802689-0034	12x12 FT (2nd floor - south side)	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
19-Mastic 351802689-0034A	12x12 FT (2nd floor - south side)	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
20-Base 351802689-0035	base adhesive (2nd floor - south side)	White Fibrous Heterogeneous	8% Cellulose	92% Non-fibrous (Other)	None Detected
20-Adhesive 351802689-0035A	base adhesive (2nd floor - south side)	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

George Sullivan (15)

Michael Felzan (43)


Rachel Travis, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%

Samples analyzed by EMSL Analytical, Inc. Minneapolis, Mn NVLAP Lab Code 200019-0

Initial report from: 04/19/2018 10:31:08



EMSL ANALYTICAL, INC.
LABORATORY PRODUCTS TRAINING

Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

2689

EMSL Analytical, Inc.
14375 23rd Avenue North

Minneapolis, MN 55447

PHONE: (763) 449-4922
FAX: (763) 449-4924

Company Name: Twin Ports Testing II		EMSL Customer ID:	
Street: 1301 North 3rd Street		City: Superior	State/Province: WI
Zip/Postal Code: 54880	Country: US	Telephone #: (218) 390-0162	Fax #: 7153927163
Report To (Name): Tracy Jacobs		Please Provide Results: ☐ Fax ☒ Email	
Email Address: tracy.jacobs@twinportstesting.com		Purchase Order:	
Project Name/Number: 18A0136 / City Hall 2nd & 3rd		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken: MN		CT Samples: ☐ Commercial/Taxable ☐ Residential/Tax Exempt	
EMSL-Bill to: ☒ Same ☐ Different - If Bill to is Different note instructions in Comments** Third Party Billing requires written authorization from third party			
Turnaround Time (TAT) Options* - Please Check			
☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☒ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week			
*For TEM Air 3 hr through 6 hr, please call ahead to schedule. There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.			
PCM - Air ☐ Check if samples are from NY ☐ NIOSH 7400 ☐ w/ OSHA 8hr. TWA PLM - Bulk (reporting limit) ☒ PLM EPA 600/R-93/116 (<1%) ☐ PLM EPA NOB (<1%) Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%) Point Count w/ Gravimetric ☐ 400 (<0.25%) ☐ 1000 (<0.1%) ☐ NYS 198.1 (friable in NY) ☐ NYS 198.6 NOB (non-friable-NY) ☐ NYS 198.8 SOF-V ☐ NIOSH 9002 (<1%)		TEM - Air ☐ 4-4.5hr TAT (AHERA only) ☐ AHERA 40 CFR, Part 763 ☐ NIOSH 7402 ☐ EPA Level II ☐ ISO 10312 TEM - Bulk ☐ TEM EPA NOB ☐ NYS NOB 198.4 (non-friable-NY) ☐ Chatfield SOP ☐ TEM Mass Analysis-EPA 600 sec. 2.5 TEM - Water: EPA 100.2 Fibers >10µm ☐ Waste ☐ Drinking All Fiber Sizes ☐ Waste ☐ Drinking	
TEM - Dust ☐ Microvac - ASTM D 5755 ☐ Wipe - ASTM D6480 ☐ Carpet Sonication (EPA 600/J-93/167)		Soil/Rock/Vermiculite ☐ PLM EPA 600/R-93/116 with milling prep (<1%) ☐ PLM EPA 600/R-93/116 with milling prep (<0.25%) ☐ TEM EPA 600/R-93/116 with milling prep (<0.1%) ☐ TEM Qualitative via Filtration Prep ☐ TEM Qualitative via Drop Mount Prep ☐ Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only) Other: ☐	
☒ Check For Positive Stop - Clearly Identify Homogenous Group		Filter Pore Size (Air Samples): ☐ 0.8µm ☐ 0.45µm	
Samplers Name: Tracy Jacobs		Samplers Signature: Tracy Jacobs	
Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
1	Threshold filter & carpet master (3rd floor)		4/13/18
2	CT above grid (solid white) (3rd floor)		
3	2x4 CT (snakes, & pin holes) (3rd floor)		
4	Carpet glue (3rd floor)		
5	Flooring (undercarpet) black (3rd floor human resources)		
Client Sample # (s): 1 - 20		Total # of Samples: 35	
Relinquished (Client): Tracy Jacobs		Date: 4/13/18	Time: 3:00
Received (Lab): R. P. J. FE		Date: 4/16/18	Time: 10:05 am
Comments/Special Instructions:			

7954 2437 3045



Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

2689

EMSL Analytical, Inc.
14375 23rd Avenue North

Minneapolis, MN 55447
PHONE: (763) 449-4922
FAX: (763) 449-4924

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
6	2x4 CT (lunchroom 3 rd floor)		4/13/18
7a	Plaster wall & brick (3 rd floor)		
7b	Plaster ceiling (3 rd floor lunchroom)		
7c	Plaster wall (2 nd floor west side)		
7d	Plaster ceiling (2 nd floor west side)		
7e	Plaster wall (2 nd floor - west side)		
7f	Plaster ceiling (2 nd floor - SE side)		
7g	Plaster wall (2 nd floor - SE side)		
8a	Flooring (under carpet) brown (3 rd floor - SW side)		
8b	" " " " " - East side)		
8c	Flooring (under carpet) brown (2 nd floor - west side)		
8d	Flooring (" " " " (2 nd floor - SE side)		
9a	Sheetrock wall (2 nd floor - west side)		
9b	" " " " " " "		
9c	" " " " " " "		
9d	" " " " " - north side)		
9e	" " " " " - south ")		
10a	Ceiling (above grid) 2 nd floor - north side		
10b	" " " " "		
10c	" " " " "		
11	2x2 Ceiling tile (2 nd floor - solid)		
12	1x1 Ceiling tile (large holes) 2 nd floor west side)		
13	2x2 ceiling tile (2 nd floor - NW side)		
*Comments/Special Instructions:			



EM **EMSL ANALYTICAL, INC.**
LABORATORY PRODUCTS TRAINING

Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

2689

EMSL Analytical, Inc.
14375 23rd Avenue North

Minneapolis, MN 55447

PHONE. (763) 449-4922

FAX: (763) 449-4922
(763) 449-4924

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

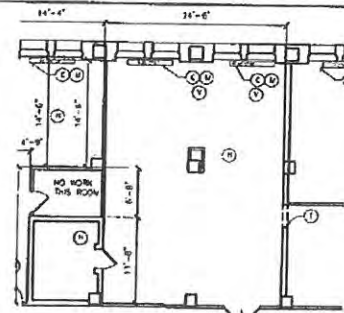
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Appendix C

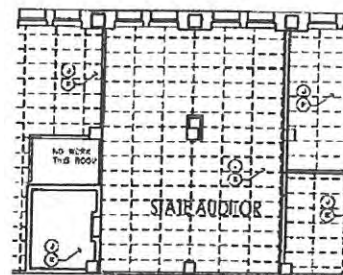
XRF Lead Results

Reading No	Time	Units	Component	Substrate	Side	Color	Room	Misc 1	M Results	Action Level	PbC	PbC Error
1	4/17/2018 13:01	cps									8.44	0
2	4/17/2018 13:03	mg / cm ^2	cal.Check 3.58						Positive		1	3.4
3	4/17/2018 13:04	mg / cm ^2	cal.Check 1.53						Positive		1	1.5
4	4/17/2018 13:04	mg / cm ^2	cal.Check 0.31						Negative		1	0.29
5	4/17/2018 13:06	mg / cm ^2	WALL	Plaster	A	White	330 N. Side		Positive		1	13.7
6	4/17/2018 13:06	mg / cm ^2	WALL	Plaster	C	White	330 N. Side		Positive		1	13.6
7	4/17/2018 13:08	mg / cm ^2	WALL	Plaster	C	White	330 S. Side		Positive		1	16.9
8	4/17/2018 13:09	mg / cm ^2	WALL	Plaster	A	White	330 S. Side		Positive		1	16.5
9	4/17/2018 13:09	mg / cm ^2	WALL	Plaster	A	White	330 S. Side		Positive		1	18.2
10	4/17/2018 13:12	mg / cm ^2	WALL	Plaster	C	White	315		Negative		1	< LOD
11	4/17/2018 13:13	mg / cm ^2	WALL	Plaster	A	White	317		Positive		1	1.8
12	4/17/2018 13:16	mg / cm ^2	WALL	Plaster	D	White	By Elevator		Positive		1	11.7
13	4/17/2018 13:17	mg / cm ^2	Door Trim	Wood	D	Brown	Elevator		Negative		1	< LOD
14	4/17/2018 13:19	mg / cm ^2	WALL	Sheetrock	D	White	210		Negative		1	< LOD
15	4/17/2018 13:19	mg / cm ^2	WALL	Sheetrock	B	White	210		Negative		1	< LOD
16	4/17/2018 13:21	mg / cm ^2	WALL	Sheetrock	C	White	210		Negative		1	< LOD
17	4/17/2018 13:21	mg / cm ^2	WALL	Sheetrock	A	White	210		Negative		1	< LOD
18	4/17/2018 13:22	mg / cm ^2	WALL	Ceiling		White	210		Negative		1	< LOD
19	4/17/2018 13:23	mg / cm ^2	WALL	Sheetrock	D	White	210		Negative		1	< LOD
20	4/17/2018 13:25	mg / cm ^2	WALL	Sheetrock	B	White	210		Negative		1	< LOD
21	4/17/2018 13:25	mg / cm ^2	WALL	Sheetrock	D	White	210		Negative		1	< LOD
22	4/17/2018 13:26	mg / cm ^2	Column	Plaster	D	White	210		Positive		1	9.6
23	4/17/2018 13:28	mg / cm ^2	WALL	Sheetrock	C	White	210 S. Side		Negative		1	< LOD
24	4/17/2018 13:28	mg / cm ^2	WALL	Sheetrock	A	White	210 S. Side		Negative		1	< LOD
25	4/17/2018 13:30	mg / cm ^2	Ceiling	Plaster		White	210 S. Side		Positive		1	13.1
26	4/17/2018 13:33	mg / cm ^2	WALL	Sheetrock	C	White	210 S. Side		Negative		1	< LOD
27	4/17/2018 13:33	mg / cm ^2	WALL	Sheetrock	A	White	210 S. Side		Negative		1	< LOD
28	4/17/2018 13:34	mg / cm ^2	WALL	Plaster	C	Gray	210 W. Side		Positive		1	7.2
29	4/17/2018 13:35	mg / cm ^2	WALL	Plaster	C	White	210 W. Side		Positive		1	8.1
30	4/17/2018 13:35	mg / cm ^2	WALL	Plaster	A	White	210 W. Side		Positive		1	13.6
31	4/17/2018 13:36	mg / cm ^2	WALL	Plaster	A	White	210 W. Side		Positive		1	14.8
32	4/17/2018 13:37	mg / cm ^2	WALL	Plaster	D	White	210/209 W. Side		Positive		1	9.7
33	4/17/2018 13:37	mg / cm ^2	WALL	Plaster	D	White	210/209 W. Side		Positive		1	10.6

34	4/17/2018 13:38	mg / cm ^2	WALL	Plaster	C	White	210/209 W. Side	Positive	1	14.9	5
35	4/17/2018 13:39	mg / cm ^2	WALL	Sheetrock	C	Gray	210 Closet	Negative	1	< LOD	0.03
36	4/17/2018 13:41	mg / cm ^2	WALL	Sheetrock	C	White	208	Negative	1	< LOD	0.17
37	4/17/2018 13:41	mg / cm ^2	WALL	Sheetrock	A	White	208	Negative	1	< LOD	0.03
38	4/17/2018 13:42	mg / cm ^2	WALL	Sheetrock	B	White	208	Negative	1	< LOD	0.03
39	4/17/2018 13:42	mg / cm ^2	WALL	Sheetrock	C	White	208	Negative	1	< LOD	0.03
40	4/17/2018 13:44	mg / cm ^2	Ceiling	Plaster		White	208	Positive	1	7.8	3.7
41	4/17/2018 13:46	mg / cm ^2	WALL	Sheetrock	D	White	210-A	Negative	1	< LOD	0.03
42	4/17/2018 13:47	mg / cm ^2	Window Frame	Metal	D	Brown	210-A	Negative	1	< LOD	0.03
43	4/17/2018 13:48	mg / cm ^2	WALL	Sheetrock	B	White	210-A	Negative	1	< LOD	0.03
44	4/17/2018 13:49	mg / cm ^2	WALL	Sheetrock	C	White	210-A Partician	Negative	1	< LOD	0.03
45	4/17/2018 13:49	mg / cm ^2	WALL	Sheetrock	A	White	210-A Partician	Negative	1	< LOD	0.03
46	4/17/2018 13:51	mg / cm ^2	WALL	Sheetrock	D	Gray	211 Overhang	Negative	1	< LOD	0.03
47	4/17/2018 13:52	mg / cm ^2	WALL	Sheetrock	C	Gray	211 Overhang	Negative	1	< LOD	0.03
48	4/17/2018 13:54	mg / cm ^2	WALL	Sheetrock	D	White	211	Negative	1	< LOD	0.03
49	4/17/2018 13:56	mg / cm ^2	WALL	Plaster	A	White	211 Center	Positive	1	10.4	3.9
50	4/17/2018 13:56	mg / cm ^2	WALL	Sheetrock	B	White	211 Center	Negative	1	< LOD	0.03
51	4/17/2018 13:56	mg / cm ^2	WALL	Sheetrock	C	White	211 Center	Negative	1	< LOD	0.03
52	4/17/2018 13:56	mg / cm ^2	WALL	Plaster	A	White	211 Center	Positive	1	11	4.3
53	4/17/2018 13:58	mg / cm ^2	WALL	Plaster	D	White	211 Hallway	Positive	1	3.2	1.8
54	4/17/2018 13:59	mg / cm ^2	WALL	Sheetrock	B	White	211-C	Negative	1	< LOD	0.03
55	4/17/2018 14:00	mg / cm ^2	WALL	Sheetrock	D	White	211-C	Negative	1	< LOD	0.03
56	4/17/2018 14:00	mg / cm ^2	WALL	Sheetrock	B	White	211-C	Negative	1	< LOD	0.03
57	4/17/2018 14:00	mg / cm ^2	WALL	Sheetrock	D	White	211-C	Negative	1	< LOD	0.03
58	4/17/2018 14:04	mg / cm ^2	Ceiling	Concrete		Gray	211-C	Negative	1	< LOD	0.4
59	4/17/2018 14:05	mg / cm ^2	Ceiling	Concrete		Gray	211-C	Negative	1	0.6	0.3
60	4/17/2018 14:07	mg / cm ^2	WALL	Sheetrock	B	White	205	Negative	1	< LOD	0.03
61	4/17/2018 14:08	mg / cm ^2	WALL	Sheetrock	D	White	205	Negative	1	< LOD	0.03
62	4/17/2018 14:12	mg / cm ^2	cal. check 3.58					Positive	1	3.7	1.3
63	4/17/2018 14:12	mg / cm ^2	cal. check 1.53					Positive	1	1.3	0.2
64	4/17/2018 14:13	mg / cm ^2	cal. check 0.31					Negative	1	0.3	0.14



1 PARTIAL 2ND FLOOR DEMO PLAN
A5 NORTH END- PHASE 5A 1/8"=1'-0"



2 PARTIAL 2ND FLOOR DEMO CLG PLAN
A5 NORTH END- PHASE 5A 1/8"=1'-0"

DEMO/REMOVAL

REMOVE EXISTING MATERIAL AND DEMO/REMOVAL

REMOVE EXISTING MATERIAL AND DEMO/REMOVAL

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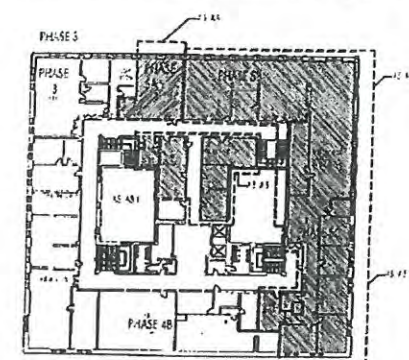
REMOVE EXISTING MATERIAL AND DEMO/REMOVAL

REMOVE EXISTING MATERIAL AND DEMO/REMOVAL

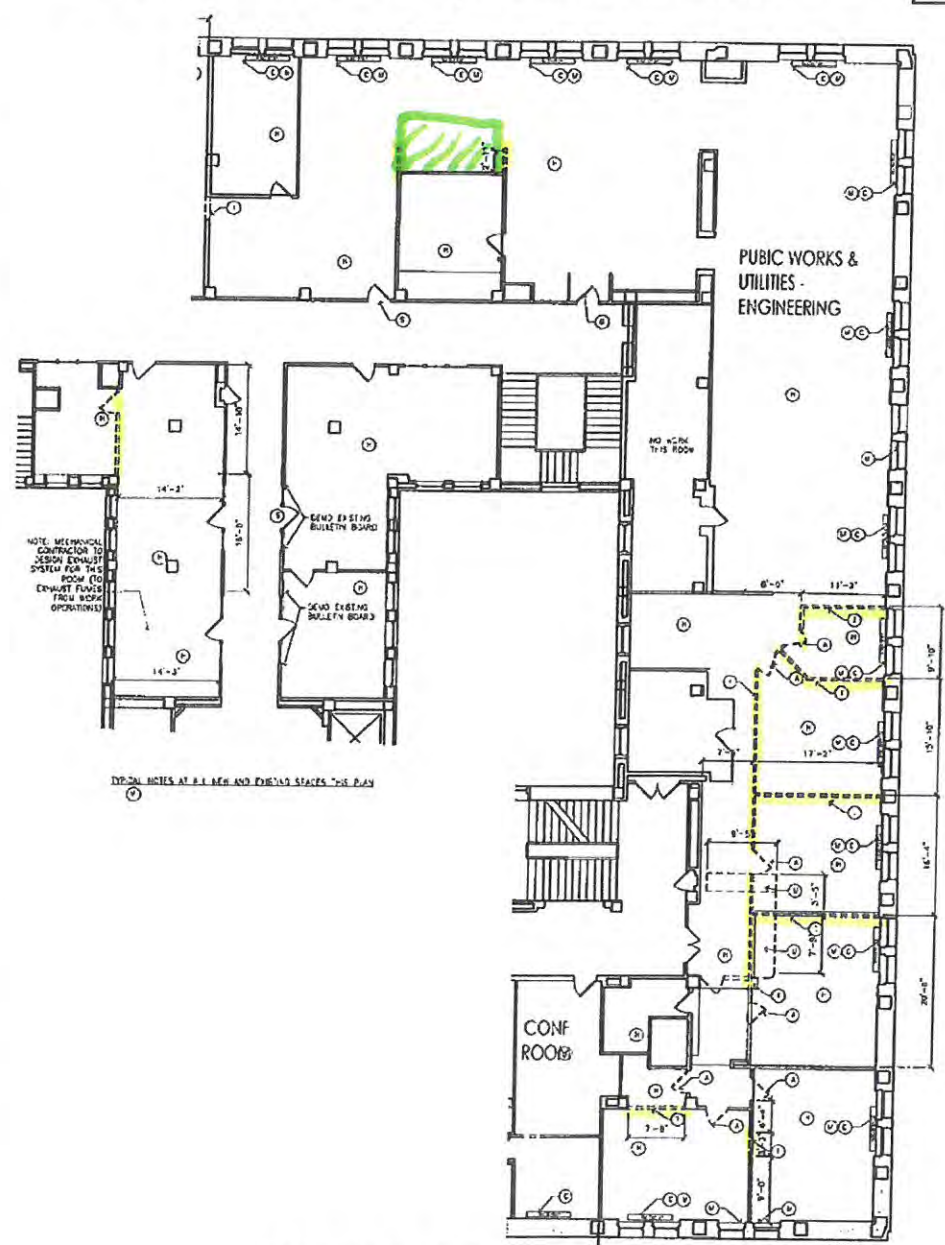
REMOVE EXISTING MATERIAL AND DEMO/REMOVAL

REMOVE EXISTING MATERIAL AND DEMO/REMOVAL

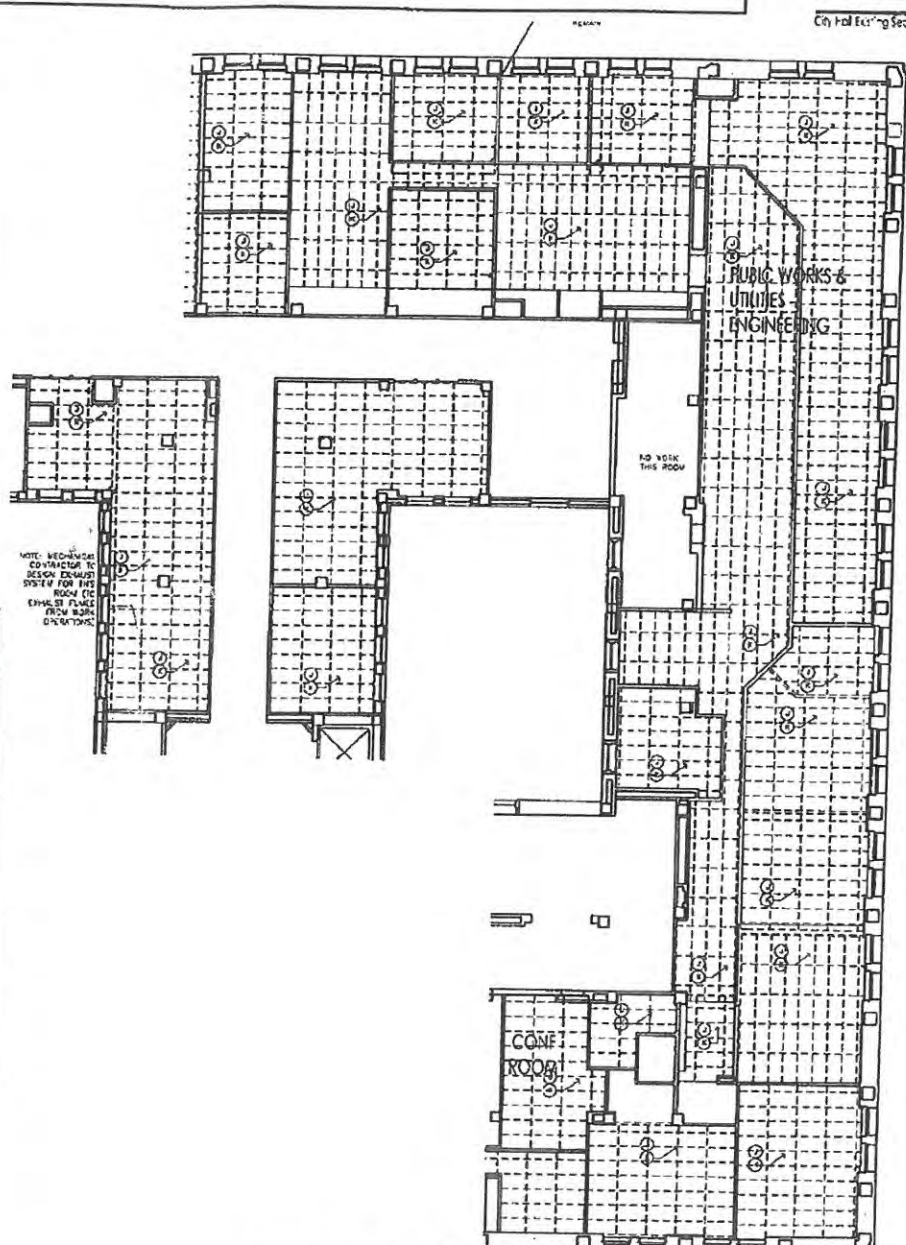
REMOVE EXISTING MATERIAL AND DEMO/REMOVAL



City Hall Existing Second Floor Plan PHASE 5A, 5B & 5C



3 PARTIAL 2ND FLOOR DEMO PLAN
A5 NORTH & SOUTH EAST- PHASE 5B & C 1/8"=1'-0"



4 PARTIAL 2ND FLOOR DEMO CLG PLAN
A5 NORTH & SOUTH EAST- PHASE 5B & 5C 1/8"=1'-0"

PHASE 5A, 5B & 5C



RW Fern Associates Inc. Architect
413 East Superior Street, Duluth, Minnesota 55802 (218) 722-4271
DULUTH CITY HALL - PROJECT # 17-426
INTERIOR RENOVATIONS
411 WEST FIRST STREET, DULUTH, MN 55802

PHASE 5- 2ND FLOOR - WEST SIDE DEMO
EXISTING

RW Fern Associates Inc. Architect, 413 East Superior Street, Duluth, Minnesota 55802 (218) 722-4271
DULUTH CITY HALL - PROJECT # 17-426
INTERIOR RENOVATIONS
411 WEST FIRST STREET, DULUTH, MN 55802

A5

Positive for Asbestos

Positive for Lead = All Plaster Walls & Ceilings



1301 N 3rd St. • Superior WI 54880 • 715-392-7114 • 1-800-373-2562 • F 715-392-7163 • www.twinportstesting.com

April 26, 2021

TPT #21A0192

Mr. Randy Rosandich
Property & Facilities Management
1532 West Michigan Street
Duluth, MN 55806

Re: **Asbestos & Lead Sampling**
Duluth City Hall, 4th, 3rd & Ground Floor
Duluth, Minnesota

Dear Mr. Rosandich:

The following is a final report outlining the asbestos bulk sampling and lead XRF sampling conducted at the subject site for renovation purposes. This report contains the following information:

- Introduction
- Results
- Recommendations

INTRODUCTION

Twin Ports Testing II, Inc. (TPT) was contacted by Mr. Randy Rosandich, Property & Facilities Management Department for the City of Duluth, to conduct asbestos bulk sampling and lead XRF sampling prior to renovation of the 4th, 3rd & Ground floors of the City Hall Building located in Duluth, Minnesota. On April 9, 2021, Mr. Gary Christner and Mr. Reis Trenary, Minnesota Department of Health (MDH) Certified Asbestos Inspectors and Lead Risk Assessor were on-site to collect material samples that potentially contain asbestos. Copies of the inspector's MDH hard cards are included in Appendix A.

RESULTS

Asbestos

TPT collected forty-two samples that were potentially asbestos containing materials (ACMs). These building materials included: carpet adhesive, plaster, skim coat, ceiling tile, adhesive, sink undercoating, wallboard, floorboard, concrete, mastic, floor tile, clay wall tile and sheetrock. TPT staff collected bulk samples from the suspect building components in accordance with the Minnesota Department of Health (MDH) regulations pertaining to asbestos inspections.

The table on the following page lists the areas that were sampled for asbestos (bold and shading indicates positive results), sample ID, location, and percent (%) asbestos (if applicable). Laboratory analytical results are included in Appendix B.

Table 1 – Sampled Material

Object or Item	Sample ID	Location	% Asbestos
Carpet adhesive	1	Ground floor lunchroom under carpet (tan)	None Detected
Plaster wall	2	Ground floor lunchroom, (brown/gray/tan)	None Detected
Skim coat		Ground floor lunchroom wall (tan)	None Detected
Ceiling tile (1' x 1')	3	Ground floor lunchroom, (gray/white)	None Detected
Carpet adhesive	4	Ground floor training room under carpet (tan)	None Detected
Ceiling tile (1' x 1')	5	Ground floor Parks & Recreation hallway (gray/white)	None Detected
Adhesive		Ground floor Parks & Recreation hallway under tile (brown)	None Detected
Sink undercoating	6	Ground floor Parks & Recreation Room #6 (gray)	None Detected
Wallboard	7	Ground floor Parks & Recreation Room #6 North wall, (brown/white)	None Detected
Ceiling tile (2' x 4'), (textured)	8	Ground floor Parks & Recreation Room #6, (gray/white)	None Detected
Plaster wall	9	Ground floor Parks & Recreation Room #9 (gray)	None Detected
Skim coat		Ground floor Parks & Recreation Room #9 (white)	None Detected
Ceiling tile (2' x 4')	10	Ground floor Parks & Recreation Room #9, (gray/white)	None Detected
Plaster ceiling	11	Ground floor Parks & Recreation Room #9 (gray)	None Detected
Skim coat		Ground floor Parks & Recreation Room #9 (white)	None Detected
Carpet adhesive	12	Ground floor Parking Services office under carpet (tan)	None Detected
Wallboard	13	Ground floor Parking Service hallway (brown/white)	None Detected
Wallboard	14	Ground floor North entrance wall (brown/white)	None Detected
Ceiling tile (2' x 2'), (Pin-holed & fissured)	15	Ground floor room across from Parking Service window, (gray/white)	None Detected
Ceiling tile (2' x 2')	16	Room in hall across from Parking Service window, (gray/white)	None Detected
Floor board	17	3 rd floor Human Resource area, Safety Office, (brown/tan)	None Detected
Adhesive		3 rd floor Human Resource area, Safety Office under floor board (tan)	None Detected

Table 1 – Sampled Material

Object or Item	Sample ID	Location	% Asbestos
Adhesive	17	3 rd floor Human Resource area, Safety Office, (brown)	None Detected
Wallboard	18	3 rd floor Safety Office north and east walls, (brown/white)	None Detected
White layer		3 rd floor Safety Office north and east walls (white)	None Detected
Concrete	19	3 rd floor north side hallway, west wall, (gray)	None Detected
Gray layer		3 rd floor north side hallway, west wall, (gray)	None Detected
Plaster	20	3 rd floor north side hallway, south wall, (gray/white)	None Detected
Ceiling tile (2' x 2'), Pin-holed & fissured)	21	3 rd floor hallway by safety office, (gray/white)	None Detected
Wall plaster	22	3 rd floor east side closet, east wall, (gray)	None Detected
Skim coat		3 rd floor east side closet, east wall, (white)	None Detected
Ceiling tile (2' x 4'), Pin-holed & fissured	23	3 rd floor Northwest side conference room, (gray/white)	None Detected
Floor board	24	3 rd floor Human Resource area, corner office, (brown/tan)	None Detected
Adhesive		3 rd floor Human Resource area, corner office under floor board, (green)	None Detected
Wall plaster	25	3 rd floor Northwest side East wall, (gray/white)	None Detected
Ceiling tile (2' x 2'), (textured)	26	3 rd floor Human Resource area, northwest room, (brown/gray/silver)	None Detected
Floor board	27	3 rd floor Human Resource area, big office space, (black)	None Detected
Mastic		3 rd floor Human Resource area, big office space under floor board, (tan)	None Detected
Wall plaster	28	3 rd floor Human Resource area, west Room #358, top layer, (gray)	None Detected
Skim coat		3 rd floor Human Resource area, west Room #358, (white)	None Detected
Clay tile	29	3 rd floor Human Resource area, west Room #358, bottom layer, (red)	None Detected
Ceiling tile (2' x 4'), (pin-holed)	30	3 rd floor east most room, (gray/white)	None Detected
Floor board	31	4 th floor Room #430, (brown/tan)	None Detected
Adhesive		4 th floor Room #430 under floor board (green)	None Detected
Mastic		4 th floor Room #430 under floor board (brown)	None Detected

Table 1 – Sampled Material

Object or Item	Sample ID	Location	% Asbestos
Floor tile (1' x 1')	32	4 th floor Mayor's office breakroom (gray)	3% Chrysotile
Adhesive		4 th floor Mayor's office breakroom, (tan/black)	None Detected
Floor tile	33	4 th floor Noah's office (tan/green)	None Detected
Wall plaster	34	4 th floor Human Rights Office, east side south wall, (gray)	None Detected
Skim coat		4 th floor Human Rights Office, east side south wall, (white)	None Detected
Clay tile	35	4 th floor Human Rights Office, east side south wall, (red)	None Detected
Gray layer		4 th floor Human Right Office, east side south wall, (gray)	None Detected
Wall plaster	36	4 th floor Mayor's office breakroom north wall, (gray)	None Detected
Skim coat		4 th floor Mayor's office breakroom north wall, (white)	None Detected
Wall sheetrock	37	4 th floor Mayor's office breakroom west wall, (brown/white)	None Detected
Wall sheetrock	38	4 th floor west office area, south wall, (brown/white)	None Detected
Skim coat		4 th floor west office area, south wall, (white)	None Detected
Wall plaster	39	4 th floor west office area, north wall, (gray)	None Detected
Skim coat		4 th floor west office area, north wall, (white)	None Detected
Ceiling tile (2' x 4'), (textured)	40	4 th floor (gray/white)	None Detected
Ceiling tile (2' x 4'), (textured)	41	4 th floor west office area, (gray/white)	None Detected
Ceiling tile (2' x 2'), (textured)	42	4 th floor conference room, (gray/white)	None Detected

By the MDH and MPCA rules and regulations, asbestos containing materials are materials that contain greater than 1% asbestos. One of the materials tested is considered to be an Asbestos Containing Material (ACM).

Table 2 – Asbestos Containing Materials Summary

Sample #'s	Sample Description	Location	Friability	Approximate Amount
Floor tile (1' x 1')	32	4 th floor Mayor's office breakroom (gray)	Non-Friable	~148 square feet

Lead

Samples of painted surfaces were tested for lead content using a NITON XLP-303A X-Ray Fluorescence (XRF) Lead Paint Analyzer, Serial Number 22293. Fourteen sampled component were above the MDH limit of 1.0 mg/cm² for painted surfaces and are considered positive for lead content. The following items tested positive for lead.

- Purple plaster wall located on the south wall in the lunchroom on the ground floor;
- Purple metal radiator located on the east side of the lunchroom on the ground floor;
- White plaster ceiling located in the hallway by the lunchroom on the ground floor;
- Brown plaster ceiling located in the hallway by the lunchroom on the ground floor;
- White plaster wall located on the south wall in room #9 in the Parks & Rec. area on the ground floor;
- White plaster wall located on the east wall in the hallway of the Parks & Rec. area on the ground floor;
- White plaster wall located on the east wall by the parking ticket window on the ground floor;
- White plaster wall located on the west wall in the Human Resource room #1 on the 3rd floor;
- White plaster wall located on the east wall in room #358 on the 3rd floor;
- White plaster wall located on the west wall in room west of room #358 on the 3rd floor;
- White plaster wall located on the south wall in room #430 on the 4th floor;
- White plaster wall located on the west wall in room #430 (safe room) on the 4th floor; and
- White plaster wall located on the north wall in the open area west of room 418 on the 4th floor.

The Niton results are located in Appendix C.

RECOMMENDATIONS

TPT recommends the abatement of the asbestos containing material if the material is to be disturbed during renovation. This material included:

- Gray floor tile located in the Mayor's office breakroom located on the 4th floor.

The abatement must be completed by a State of Minnesota licensed asbestos abatement contractor. If additional materials are discovered that may be asbestos containing during renovation, the material must be tested or assumed to be asbestos containing and treated as such.

TPT recommends that lead safe work practices be utilized when working with the materials that tested positive for lead content if they to be disturbed during demolition.

This inspection was conducted according to federal, state and local regulations. If you have any questions regarding this report, please feel free to contact me at (715) 392-7114 (office). Thank you for the opportunity to conduct this work.

Sincerely,

Twin Ports Testing II, Inc.

A handwritten signature in black ink that reads "Gary J. Christner". The signature is written in a cursive style with a large, stylized "G" and "C".

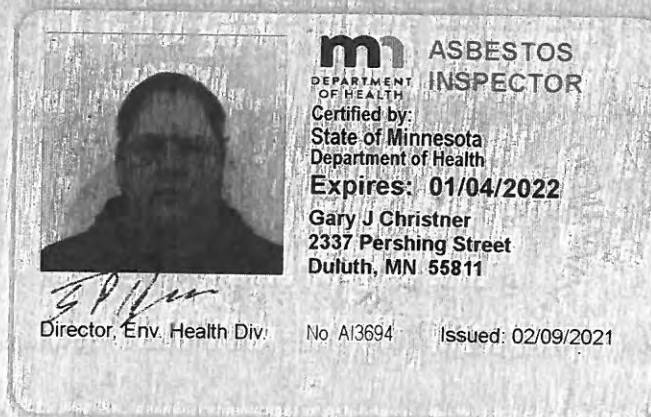
Gary Christner
Industrial Hygiene Technician
Inspector #AI3694

Date 4/24/2021

Attachments: Appendix A: Inspector Certifications
Appendix B: Asbestos Laboratory Analytical Results
Appendix C: Niton XRF Lead Results

Appendix A

Inspector Certifications



Appendix B

Asbestos Laboratory Analytical Results

**EMSL Analytical, Inc.**

3410 Winnetka Avenue North New Hope, MN 55427

Tel/Fax: (763) 449-4922 / (763) 449-4924

<http://www.EMSL.com> / minneapolislab@emsl.com

EMSL Order: 352103176

Customer ID: TWNT42

Customer PO:

Project ID:

Attention: Tracy Jacobs

Twin Ports Testing II, Inc.

1301 North Third Street

Superior, WI 54880

Phone: (715) 392-7114

Fax:

Received Date: 04/15/2021 8:52 AM

Analysis Date: 04/22/2021

Collected Date:

Project:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos % Type
			% Fibrous	% Non-Fibrous	
1 352103176-0001	Lunch Room Carpet Adhesive	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
2-Plaster 352103176-0002	Lunch Room Wall Plaster	Brown/Gray/Tan Non-Fibrous Heterogeneous	5% Cellulose	95% Non-fibrous (Other)	None Detected
2-Skim Coat 352103176-0002A	Lunch Room Wall Plaster	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
3 352103176-0003	Lunch Room 1'x1' Ceiling Tile	Gray/White Fibrous Heterogeneous	40% Cellulose 40% Min. Wool	10% Perlite 10% Non-fibrous (Other)	None Detected
4 352103176-0004	Training Room Carpet Adhesive	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
5-Ceiling Tile 352103176-0005	Parks & Rec Hallway 1'x1' C.T. w/ Adhesive	Gray/White Fibrous Heterogeneous	80% Min. Wool	20% Non-fibrous (Other)	None Detected
5-Adhesive 352103176-0005A	Parks & Rec Hallway 1'x1' C.T. w/ Adhesive	Brown Non-Fibrous Homogeneous	<1% Fibrous (Other)	100% Non-fibrous (Other)	None Detected
6 352103176-0006	Parks & Rec Room #6 Sink undercoat	Gray Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
7 352103176-0007	Parks & Rec Room #6 N. Wall Wallboard	Brown/White Fibrous Heterogeneous	10% Cellulose	90% Non-fibrous (Other)	None Detected
8 352103176-0008	Parks & Rec Room #6 2'x4' Textured C.T.	Gray/White Fibrous Heterogeneous	90% Min. Wool	10% Non-fibrous (Other)	None Detected
9-Plaster 352103176-0009	Parks & Rec Room #9 Wall	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
9-Skim Coat 352103176-0009A	Parks & Rec Room #9 Wall	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
10 352103176-0010	Parks & Rec Room #9 2'x4' C.T.	Gray/White Fibrous Heterogeneous	90% Min. Wool	10% Non-fibrous (Other)	None Detected
11-Plaster 352103176-0011	Parks & Rec Room #9 Ceiling	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
11-Skim Coat 352103176-0011A	Parks & Rec Room #9 Ceiling	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
12 352103176-0012	Parking Services office Carpet Adhesive	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 04/22/2021 15:05:42

**EMSL Analytical, Inc.**

3410 Winnetka Avenue North New Hope, MN 55427

Tel/Fax: (763) 449-4922 / (763) 449-4924

<http://www.EMSL.com / minneapolislab@emsl.com>**EMSL Order:** 352103176**Customer ID:** TWNT42**Customer PO:****Project ID:****Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy**

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
13 352103176-0013 <i>This is a composite result of wallboard and jt. compound</i>	Parking Services Hallway Wallboard Textured Wall	Brown/White Fibrous Heterogeneous	10% Cellulose	90% Non-fibrous (Other)	None Detected
14 352103176-0014	Parking Services N. Entrance Wall board	Brown/White Fibrous Heterogeneous	10% Cellulose	90% Non-fibrous (Other)	None Detected
15 352103176-0015	Room Across from Parking Services Window 2'x2' P.H. & F.C.T.	Gray/White Fibrous Heterogeneous	50% Cellulose 30% Min. Wool	10% Perlite 10% Non-fibrous (Other)	None Detected
16 352103176-0016	Room in Hall Across from Parking Window 2'x2' C.T.	Gray/White Fibrous Heterogeneous	90% Min. Wool	10% Non-fibrous (Other)	None Detected
17-Floor Board 352103176-0017	3rd Floor H.R. Safety Office Floor Board w/ Adhesive	Brown/Tan Fibrous Heterogeneous	15% Cellulose	85% Non-fibrous (Other)	None Detected
17-Tan Adhesive 352103176-0017A	3rd Floor H.R. Safety Office Floor Board w/ Adhesive	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
17-Brown Adhesive 352103176-0017B	3rd Floor H.R. Safety Office Floor Board w/ Adhesive	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
18-Wallboard 352103176-0018	3rd Floor Safety Office N & E Wall Wallboard	Brown/White Fibrous Heterogeneous	10% Cellulose	90% Non-fibrous (Other)	None Detected
18-White Layer 352103176-0018A	3rd Floor Safety Office N & E Wall Wallboard	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
19-Concrete 352103176-0019	3rd Floor N. Side of Hallway W. Wall Concrete	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
19-Gray Layer 352103176-0019A	3rd Floor N. Side of Hallway W. Wall Concrete	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
20 352103176-0020	3rd Floor N. Side of Hallway S. Wall Plaster	Gray/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
21 352103176-0021	3rd Floor Hallway by Safety Office 2'x2' C.T. P.H. & F	Gray/White Fibrous Heterogeneous	50% Cellulose 30% Min. Wool	10% Perlite 10% Non-fibrous (Other)	None Detected
22-Plaster 352103176-0022	3rd Floor E. Side Closet E. Wall Plaster	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
22-Skim Coat 352103176-0022A	3rd Floor E. Side Closet E. Wall Plaster	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
23 352103176-0023	3rd Floor N.W. Side Conference Room 2'x4' C.T. P.H. & F.	Gray/White Fibrous Heterogeneous	50% Cellulose 30% Min. Wool	10% Perlite 10% Non-fibrous (Other)	None Detected
24-Floor Board 352103176-0024	3rd Floor H.R. Corner Office Floor Board	Brown/Tan Fibrous Heterogeneous	10% Cellulose	90% Non-fibrous (Other)	None Detected
24-Adhesive 352103176-0024A	3rd Floor H.R. Corner Office Floor Board	Green Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 04/22/2021 15:05:42

**EMSL Analytical, Inc.**

3410 Winnetka Avenue North New Hope, MN 55427

Tel/Fax: (763) 449-4922 / (763) 449-4924

<http://www.EMSL.com> / minneapolislab@emsl.com**EMSL Order:** 352103176**Customer ID:** TWNT42**Customer PO:****Project ID:****Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy**

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
25 352103176-0025	3rd Floor N.W. Side E. Wall Plaster	Gray/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
26 352103176-0026	3rd Floor H.R. N.W. Room 2'x2' C.T. Textured	Brown/Gray/Silver Fibrous Heterogeneous	10% Cellulose 75% Min. Wool	15% Non-fibrous (Other)	None Detected
27-Floor Board 352103176-0027	3rd Floor H.R. Big Office Space Floor Board	Black Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
27-Mastic 352103176-0027A	3rd Floor H.R. Big Office Space Floor Board	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
28-Plaster 352103176-0028	3rd Floor H.R. W. Room #358 1st layer Plaster Wall	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
28-Skim Coat 352103176-0028A	3rd Floor H.R. W. Room #358 1st layer Plaster Wall	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
29 352103176-0029	3rd Floor H.R. W. of Room #358 Wall Base layer	Red Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
30 352103176-0030	3rd Floor E. Most Room 2'x4' C.T. P.H.	Gray/White Fibrous Heterogeneous	40% Cellulose 40% Min. Wool	10% Perlite 10% Non-fibrous (Other)	None Detected
31-Floor Board 352103176-0031	4th Floor Room #430 Floor Board	Brown/Tan Fibrous Heterogeneous	15% Cellulose	85% Non-fibrous (Other)	None Detected
31-Green Adhesive 352103176-0031A	4th Floor Room #430 Floor Board	Green Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
31-Brown Mastic 352103176-0031B	4th Floor Room #430 Floor Board	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
32-Floor Tile 352103176-0032	4th Floor Mayor Office Break Room 1'x1' F.T. W/ Adhesive	Gray Non-Fibrous Homogeneous		97% Non-fibrous (Other)	3% Chrysotile
32-Adhesive 352103176-0032A	4th Floor Mayor Office Break Room 1'x1' F.T. W/ Adhesive	Tan/Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
33 352103176-0033	4th Floor Noah's Office F.T.	Tan/Green Fibrous Heterogeneous	25% Cellulose	75% Non-fibrous (Other)	None Detected
34-Plaster 352103176-0034	4th Floor Human Rights Office E. Side S. Wall	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
34-Skim Coat 352103176-0034A	4th Floor Human Rights Office E. Side S. Wall	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
35-Red Layer 352103176-0035	4th Floor Human Rights Office E. Side S. Clay Wall	Red Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
35-Gray Layer 352103176-0035A	4th Floor Human Rights Office E. Side S. Clay Wall	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
36-Plaster 352103176-0036	4th Floor Mayor Office Break Room N. Wall Wallboard	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 04/22/2021 15:05:42

**EMSL Analytical, Inc.**

3410 Winnetka Avenue North New Hope, MN 55427

Tel/Fax: (763) 449-4922 / (763) 449-4924

<http://www.EMSL.com> / minneapolislab@emsl.com

EMSL Order: 352103176

Customer ID: TWNT42

Customer PO:

Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos % Type
			% Fibrous	% Non-Fibrous	
36-Skim Coat 352103176-0036A	4th Floor Mayor Office Break Room N. Wall Wallboard	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
37 352103176-0037	4th Floor Mayor Office Break Room W. Wall S.R.	Brown/White Fibrous Heterogeneous	10% Cellulose 2% Glass	88% Non-fibrous (Other)	None Detected
38-Sheetrock 352103176-0038	4th Floor W. Office Area S. Wall S.R. Wall	Brown/White Fibrous Heterogeneous	10% Cellulose 2% Glass	88% Non-fibrous (Other)	None Detected
38-Skim Coat 352103176-0038A	4th Floor W. Office Area S. Wall S.R. Wall	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
39-Plaster 352103176-0039	4th Floor W. Office Area N. Wall Plaster Wall	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
39-Skim Coat 352103176-0039A	4th Floor W. Office Area N. Wall Plaster Wall	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
40 352103176-0040	4th Floor 2'x4' C.T. Textured	Gray/White Fibrous Heterogeneous	90% Min. Wool	10% Non-fibrous (Other)	None Detected
41 352103176-0041	4th Floor 2'x4' W. Office Area 2'x4' C.T. Textured	Gray/White Fibrous Heterogeneous	90% Min. Wool	10% Non-fibrous (Other)	None Detected
42 352103176-0042	4th Floor Confrence Room 2'x2' C.T. Textured	Gray/White Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

Nicholas Asuncion (62)

Rachel Travis, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. New Hope, MN NVLAP Lab Code 200019-0; Colorado AL-24478

Initial report from: 04/22/2021 15:05:42



Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

03176

EMSL Analytical, Inc.
14375 23rd Avenue North

Minneapolis, MN 55447

PHONE: (763) 449-4922

FAX: (763) 449-4924

Company Name: Twin Ports Testing II		EMSL Customer ID:	
Street: 1301 North 3rd Street		City: Superior	State/Province: WI
Zip/Postal Code: 54880	Country: US	Telephone #: (218) 390-0162	Fax #: 7153927163
Report To (Name): Tracy Jacobs		Please Provide Results: ☐ Fax ☒ Email	
Email Address: tracy.jacobs@twinportstesting.com		Purchase Order:	
Project Name/Number:		EMSL Project ID (Internal Use Only):	
U.S. State Samples Taken: MN		CT Samples: ☐ Commercial/Taxable ☐ Residential/Tax Exempt	
EMSL-Bill to: ☒ Same ☐ Different - If Bill to is Different note instructions in Comments**			
Third Party Billing requires written authorization from third party			
Turnaround Time (TAT) Options* - Please Check			
☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☒ 1 Week ☐ 2 Week			
*For TEM Air 3 hr through 6 hr, please call ahead to schedule. There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.			
PCM - Air ☐ Check if samples are from NY ☐ NIOSH 7400 ☐ w/ OSHA 8hr. TWA PLM - Bulk (reporting limit) ☒ PLM EPA 600/R-93/116 (<1%) ☐ PLM EPA NOB (<1%) Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%) Point Count w/Gravimetric ☐ 400 (<0.25%) ☐ 1000 (<0.1%) ☐ NYS 198.1 (friable in NY) ☐ NYS 198.6 NOB (non-friable-NY) ☐ NYS 198.8 SOF-V ☐ NIOSH 9002 (<1%)		TEM - Air ☐ 4-4.5hr TAT (AHERA only) ☐ AHERA 40 CFR, Part 763 ☐ NIOSH 7402 ☐ EPA Level II ☐ ISO 10312 TEM - Bulk ☐ TEM EPA NOB ☐ NYS NOB 198.4 (non-friable-NY) ☐ Chatfield SOP ☐ TEM Mass Analysis-EPA 600 sec. 2.5 TEM - Water: EPA 100.2 Fibers >10µm ☐ Waste ☐ Drinking All Fiber Sizes ☐ Waste ☐ Drinking	
TEM - Dust ☐ Microvac - ASTM D 5755 ☐ Wipe - ASTM D6480 ☐ Carpet Sonication (EPA 600/J-93/167)		Soil/Rock/Vermiculite ☐ PLM EPA 600/R-93/116 with milling prep (<1%) ☐ PLM EPA 600/R-93/116 with milling prep (<0.25%) ☐ TEM EPA 600/R-93/116 with milling prep (<0.1%) ☐ TEM Qualitative via Filtration Prep ☐ TEM Qualitative via Drop Mount Prep ☐ Cincinnati Method EPA 600/R-04/004 - PLM/TEM (BC only)	
☐ Check For Positive Stop - Clearly Identify Homogenous Group		Filter Pore Size (Air Samples): ☐ 0.8µm ☐ 0.45µm	
Samplers Name: Ries Trenary		Samplers Signature: RT	
Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
1	Lunch Room Carpet Adhesive		
2	Lunch Room Wall Plaster		
3	Lunch Room 1'x1' Ceiling Tile		
4	Training Room Carpet Adhesive		
5	Parks+Rec Hallway 1'x1' C.T. w/ Adhesive		
Client Sample # (s): 1 - 42		Total # of Samples: 42	
Relinquished (Client): RT		Date: 4/13/2021	Time: 14:30
Received (Lab): Alindahl FE		Date: 4-13-4-15-21	Time: 8:52
Comments/Special Instructions: C.T. = Ceiling Tile			

796100388222

Page 1 of 3 pages



Asbestos Chain of Custody

EMSL Order Number (Lab Use Only):

03176

EMSL Analytical, Inc.
14375 23rd Avenue North

Minneapolis, MN 55447
PHONE: (763) 449-4922
FAX: (763) 449-4924

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
6	Parks + Rec Room #6 Sink under coat		
7	Parks + Rec Room #6 N. Wall Wallboard		
8	Parks + Rec Room #6 2'x4' Textured C.T.		
9	Parks + Rec Room #9 Wall		
10	Parks + Rec Room #9 2'x4' C.T.		
11	Parks + Rec Room #9 Ceiling		
12	Parking Services office Carpet Adhesive		
13	Parking Services Hallway Wallboard Textured Wall		
14	Parking Services # N. Entrance Wallboard		
15	Room Across from Parking Services Window 2'x2' P.H.+F. C.T.		
16	Room in Hall Across from Parking Window 2'x2' C.T.		
17	3 rd Floor H.R. Safety office Floor Board w/Adhesive		
18	3 rd Floor Safety office N.+E. Wall Wallboard		
19	3 rd Floor N. Side of Hallway W. Wall Concrete		
20	3 rd Floor N. Side of Hallway S. Wall Plaster		
21	3 rd Floor Hallway by Safety office 2'x2' C.T. P.H.+F.		
22	3 rd Floor E. Side Closet E. Wall Plaster		
23	3 rd Floor N.W. Side Conference Room 2'x4' C.T. P.H.+F.		
24	3 rd Floor H.R. Corner office Floor Board		
25	3 rd Floor N.W. Side E. Wall Plaster		
26	3 rd Floor H.R. N.W. Room 2'x2' C.T. Textured		
27	3 rd Floor H.R. Big office Space Floor Board		
28	3 rd Floor H.R. W. Room #358 1 st layer Plaster Wall		
*Comments/Special Instructions: H.R. = Human Resources C.T. = Ceiling Tile P.H.+F. = Pin Hole + Fissured			

EMSL Analytical, Inc.
14375 23rd Avenue North

Minneapolis, MN 55447
PHONE: (763) 449-4922
FAX: (763) 449-4924

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Page 3 of 3 pages

Appendix C

Niton XRF Lead Results

Reading No	Time	Units	Compone	Substrate	Side	Color	Floo	Room	Results	Action	PbC	PbC Error
1	4/9/2021 10:14	cps									1.47	0
2	4/9/2021 10:23	mg / cm ^2	cal. check 3.58						Positive	1	3.6	1.9
3	4/9/2021 10:24	mg / cm ^2	cal. check 1.53						Positive	1	1.5	0.3
4	4/9/2021 10:25	mg / cm ^2	cal. check 0.31						Negative	1	0.29	0.16
5	4/9/2021 10:26	mg / cm ^2	Wall	Plaster	South	White	G	Lunch	Negative	1	0.4	0.1
6	4/9/2021 10:27	mg / cm ^2	Wall	Plaster	South	Purple	G	Lunch	Positive	1	1.1	0.1
7	4/9/2021 10:29	mg / cm ^2	Radiator	Metal	East	Purple	G	Lunch	Positive	1	1.2	0.2
8	4/9/2021 10:31	mg / cm ^2	Ceiling	Plaster		White	G	Hallway	Positive	1	3.1	1.7
9	4/9/2021 10:34	mg / cm ^2	Ceiling	Plaster		Brown	G	Hallway	Positive	1	4.2	2.1
10	4/9/2021 10:36	mg / cm ^2	Wall	Plaster	North	White	G	Sign	Negative	1	<LOD	0.03
11	4/9/2021 10:49	mg / cm ^2	Wall	Plaster	South	White	G	Parks #9	Positive	1	10.9	3.8
12	4/9/2021 10:50	mg / cm ^2	Wall	Plaster	East	White	G	Parks Hall	Positive	1	10.2	3.5
13	4/9/2021 10:52	mg / cm ^2	Wall	Sheetrock	North	White	G	Parks #6	Negative	1	<LOD	0.03
14	4/9/2021 10:54	mg / cm ^2	Wall	Concrete	North	White	G	Parks by Tunnel	Negative	1	<LOD	0.03
15	4/9/2021 10:56	mg / cm ^2	Wall	Plaster	East	White	G	Park. Tic. Window	Positive	1	10.1	3.5
16	4/9/2021 10:57	mg / cm ^2	Wall	Plaster	West	White	G	E. Entryway	Negative	1	<LOD	0.03
17	4/9/2021 10:58	mg / cm ^2	Wall	Sheetrock	North	White	G	Rm. Across Park. Tic.	Negative	1	<LOD	0.03
18	4/9/2021 10:58	mg / cm ^2	Wall	Sheetrock	West	White	G	Rm. Across Park. Tic.	Negative	1	<LOD	0.03
19	4/9/2021 10:59	mg / cm ^2	Baseboard	Wood	North	Brown	G	Rm. Across Park. Tic.	Negative	1	<LOD	0.03
20	4/9/2021 11:01	mg / cm ^2	Wall	Sheetrock	East	White	G	Off. By Parking	Negative	1	<LOD	0.03
21	4/9/2021 11:01	mg / cm ^2	Cabinet	Wood	East	Brown	G	Off. By Parking	Negative	1	<LOD	0.03
22	4/9/2021 11:06	mg / cm ^2	Wall	Plaster	South	White	3rd	HR Supply	Negative	1	<LOD	0.03
23	4/9/2021 11:07	mg / cm ^2	Wall	Sheetrock	East	White	3rd	HR Hallway	Negative	1	<LOD	0.03
24	4/9/2021 11:07	mg / cm ^2	Wall	Plaster	North	White	3rd	HR Hallway	Negative	1	<LOD	0.03
25	4/9/2021 11:11	mg / cm ^2	Wall	Plaster	West	White	3rd	HR Office #1	Positive	1	8.3	2.7
26	4/9/2021 11:12	mg / cm ^2	Wall	Plaster	South	White	3rd	HR Print Room	Negative	1	<LOD	0.03
27	4/9/2021 11:13	mg / cm ^2	Wall	Plaster	North	White	3rd	HR Paper Room	Negative	1	<LOD	0.03
28	4/9/2021 11:14	mg / cm ^2	Wall	Plaster	East	White	3rd	Room 358	Positive	1	7.9	2.5
29	4/9/2021 11:16	mg / cm ^2	Wall	Plaster	West	White	3rd	Rm. West of 358	Positive	1	7.8	2.4
30	4/9/2021 11:21	mg / cm ^2	Wall	Plaster	South	White	4th	Room 430	Positive	1	8.2	2.5
31	4/9/2021 11:22	mg / cm ^2	Wall	Sheetrock	East	White	4th	Room 430	Negative	1	<LOD	0.03
32	4/9/2021 11:23	mg / cm ^2	Wall	Plaster	South	White	4th	Room 430	Positive	1	8.1	2.4
33	4/9/2021 11:23	mg / cm ^2	Wall	Plaster	West	White	4th	Room 430 Safe Room	Positive	1	8.3	2.7

34	4/9/2021 11:24	mg / cm ^2	Wall	Plaster	East	White	4th	Room 430 Closet	Negative	1	<LOD	0.05
35	4/9/2021 11:26	mg / cm ^2	Wall	Sheetrock	South	White	4th	Room 418	Negative	1	<LOD	0.03
36	4/9/2021 11:27	mg / cm ^2	Wall	Sheetrock	East	White	4th	Room 418	Negative	1	<LOD	0.03
37	4/9/2021 11:27	mg / cm ^2	Wall	Sheetrock	West	White	4th	Room 418 Breakroom	Negative	1	<LOD	0.03
38	4/9/2021 11:29	mg / cm ^2	Wall	Plaster	North	White	4th	Open area west of 418	Positive	1	7.8	2.3
39	4/9/2021 11:29	mg / cm ^2	Wall	Sheetrock	South	White	4th	Open area west of 418	Negative	1	<LOD	0.03
40	4/9/2021 11:30	mg / cm ^2	Wall	Sheetrock	West	White	4th	Open area west of 418	Negative	1	<LOD	0.03
41	4/9/2021 12:45	mg / cm ^2	Ceiling	Plaster		White	3rd	HR Supply	Negative	1	<LOD	0.12
42	4/9/2021 12:45	mg / cm ^2	Ceiling	Plaster		White	3rd	HR Supply	Negative	1	<LOD	0.64
43	4/9/2021 12:46	mg / cm ^2	Wall	Plaster	East	White	3rd	HR Supply	Negative	1	<LOD	0.03
44	4/9/2021 12:46	mg / cm ^2	Wall	Plaster	West	White	3rd	HR Supply	Negative	1	<LOD	0.03
45	4/9/2021 12:47	mg / cm ^2	Ceiling	Plaster		White	3rd	HR Supply	Negative	1	<LOD	0.03
46	4/9/2021 14:41	mg / cm ^2	cal. check 3.58						Positive	1	3.1	1.5
47	4/9/2021 14:41	mg / cm ^2	cal. check 1.53						Positive	1	1.4	0.4
48	4/9/2021 14:42	mg / cm ^2	cal. check 0.31						Negative	1	0.28	0.16



1301 N 3rd St. • Superior WI 54880 • 715-392-7114 • 1-800-373-2562 • F 715-392-7163 • www.twinportstesting.com

June 24, 2021

TPT #21A0192

Mr. Randy Rosandich
Property & Facilities Management
1532 West Michigan Street
Duluth, MN 55806

**Re: XRF Lead Paint Testing
Duluth City Hall
Rooms 314A & 315-Ceilings
Duluth, Minnesota**

Dear Mr. Rosandich:

The following is report outlining the lead paint testing conducted at the subject site for renovation purposes. This report contains the following information:

- Introduction
- Results
- Recommendations

INTRODUCTION

Twin Ports Testing II, Inc. (TPT) was contacted by Mr. Randy Rosandich, from the City of Duluth Property & Facilities Management Department, to conduct additional lead paint sampling of ceilings located on the third floor of the City Hall building in Duluth, Minnesota. The ceilings were discovered when the lower ceiling was opened up during renovation activities. On June 23, 2021, Mr. Gary Christner, of TPT, was on-site to perform the lead testing.

RESULTS

Lead

Samples of painted surfaces were tested for lead content using a NITON XLp-303A X-Ray Fluorescence (XRF) Lead Paint Analyzer, Serial Number 22293. Three of the components sampled exceeded the MDH limit of 1.0 mg/cm² for painted surfaces and are considered positive for lead content. The following items tested positive for lead.

- White plaster ceiling located in room 314A;
- Brown plaster ceiling located in room 314A; and
- Gray plaster ceiling located in room 314A.

RECOMMENDATIONS

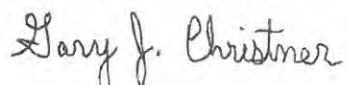
TPT recommends that lead safe work practices be utilized when working with the materials that tested positive for lead content if they to be disturbed during renovation.

If additional materials are discovered during renovation that may contain lead, the material must be tested or assumed to be lead and treated as such.

This inspection was conducted according to federal, state and local regulations. If you have any questions regarding this report, please feel free to contact me at (715) 392-7114 (office). Thank you for the opportunity to conduct this work.

Sincerely,

Twin Ports Testing II, Inc.

A handwritten signature in cursive script that reads "Gary J. Christner".

Gary Christner
Industrial Hygiene Technician

Date 6/24/2021

Attachments: Appendix A: XRF Lead Paint Results
Appendix B: Inspector Certification

Appendix A

XRF Lead Paint Results

Reading No	Time	Type	Units	Component	Substrate	Color	Floor	Results	Action Level	PbC	PbC Error
1	6/23/2021 12:56	ShutterCal	cps							1.29	0
2	6/23/2021 12:57	Paint	mg / cm ^2	cal. check 3.58				Positive	1	3.5	1.8
3	6/23/2021 12:58	Paint	mg / cm ^2	cal. check 1.53				Positive	1	1.8	0.5
4	6/23/2021 12:58	Paint	mg / cm ^2	cal. check 0.31				Negative	1	0.28	0.16
5	6/23/2021 13:09	Paint	mg / cm ^2	Ceiling	PLASTER	White	315	Positive	1	8.4	3.2
6	6/23/2021 13:09	Paint	mg / cm ^2	Ceiling	PLASTER	Brown	315	Positive	1	10.1	4.7
7	6/23/2021 13:10	Paint	mg / cm ^2	Ceiling	PLASTER	Gray	315	Positive	1	9.4	4.1
8	6/23/2021 13:13	Paint	mg / cm ^2	Ceiling	PLASTER	Brown	314-A	Negative	1	<LOD	0.04
9	6/23/2021 13:14	Paint	mg / cm ^2	Ceiling	PLASTER	White	314-A	Negative	1	<LOD	0.03
10	6/23/2021 13:15	Paint	mg / cm ^2	Ceiling	PLASTER	Brown	314-A	Negative	1	<LOD	0.03
11	6/23/2021 13:28	Paint	mg / cm ^2	Cal. check 3.58	PLASTER			Positive	1	4.1	2.1
12	6/23/2021 13:28	Paint	mg / cm ^2	Cal. check 1.53	PLASTER			Positive	1	1.3	0.4
13	6/23/2021 13:29	Paint	mg / cm ^2	Cal. check 0.31	PLASTER			Negative	1	0.27	0.12

Appendix B

Inspector Certification



GP Christner
Director, Env. Health Div.

m LEAD
DEPARTMENT OF HEALTH Risk Assessor

Licensed by:
State of Minnesota
Department of Health
License No. LR3101
Expires 02/25/2022

Gary J Christner
2337 Pershing Street
Duluth, MN 55811



Submittal

Prepared For:
City of Duluth

Date: May 17, 2022
Job Name:
Duluth City Hall - VRF

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

Product Summary

Qty Product

- 9 Trane - Mitsubishi VRF Outdoor Unit
- 13 Trane - Mitsubishi VRF Branch Controller
- 132 Trane - Mitsubishi VRF Indoor Unit

Notes:

1. Labor warranty **NOT** included.
2. Startup assistance by Trane Ductless Technical Specialist **included.**
3. Disconnect switch **NOT** included.
4. Linesets **NOT** included.

Trane Mitsubishi Products - Standard warranty: The parts are warranted to the original owner a period of one (1) year, and Compressor a period of seven (7) years from the date of installation by a licensed contractor.

Extended warranty: The parts and compressor will be warranted for a period of ten (10) years to the original owner if (1) the System is designed by a Diamond Designer using the MEUS Diamond System Builder™ (2) the installing contractor has successfully completed the CITI MULTI MEUS approved training course, and (3) the contractor has submitted a completed and approved MEUS Extended Warranty Process report.

Joey Beisbier / Richard Youngdahl
Trane U.S. Inc.
775 Vandalia Street
Saint Paul, MN 55114
Office Phone: (651) 468-2700

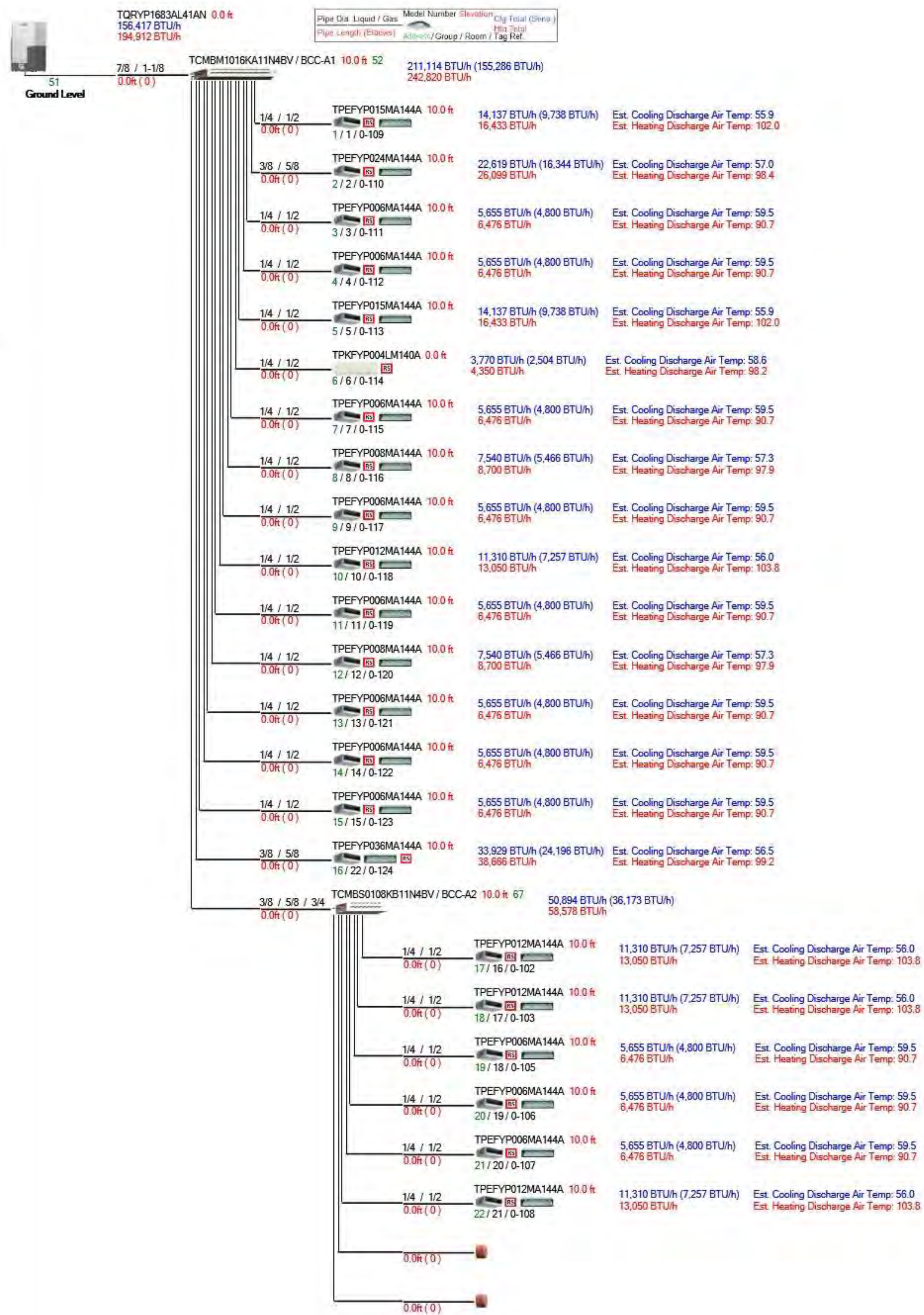
The attached information describes the equipment we propose to furnish for this project, and is submitted for your approval.

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.

Design View Piping Diagrams

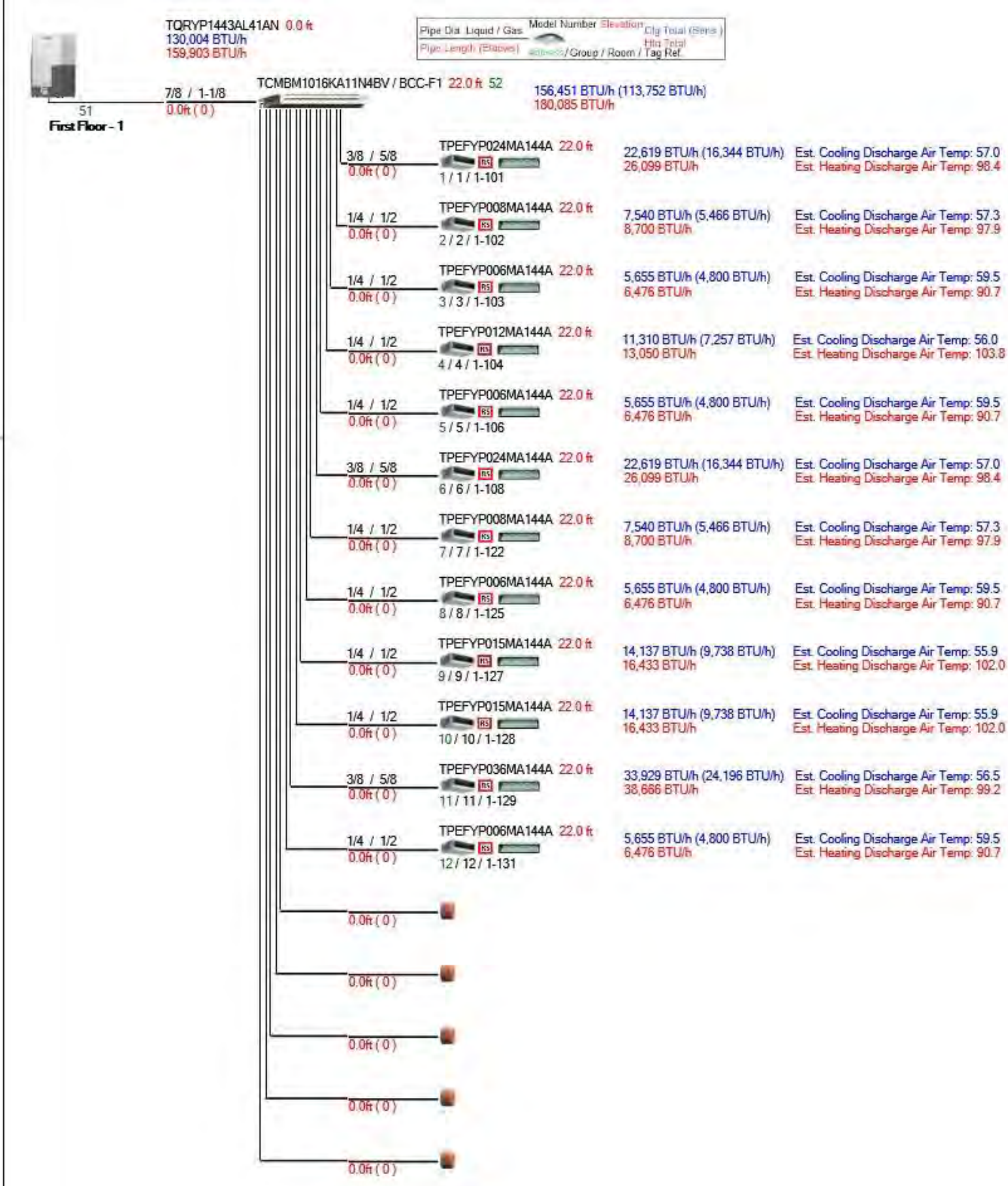
Indoor Units:	22 / 1 to 42	
Capacity:	224 / 84 to 252 (133.3%)	
* Connectable capacity is not actual capacity.		
Total Pipe Length:	0.0 / 2460.0	feet
Furthest Actual:	0.0 / 541.0	feet
Furthest Equiv.:	0.0 / 623.0	feet
Furthest IU from BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Equiv.:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Equiv.:	0.0 / 0.0	feet
Correction Factors		
Outdoor Unit Capacity:	1.06	1.04
Temperature:	1.00	1.00
Piping Length:	1.00	1.00
Water Temperature:	0.88	1.00
Water Volume:	1.00	1.00
User Derate:	1.00	1.00
Total Derate:	0.93	1.04
Water Pressure Drop:	6.33	psi/module
Additional Refrigerant:	38.6	lb
Total Refrigerant Amount:	51.8	lb

Conditions (°F)					
Cooling					
Indoor DB	75.0	Humidity	60.0%	Indoor WB	65.2
Outdoor DB	92.0	Water	105.0		
Heating					
Indoor DB	70.0	Water	65.0		
Outdoor DB	-16.0	Humidity	72.8%	Outdoor WB	-16.3



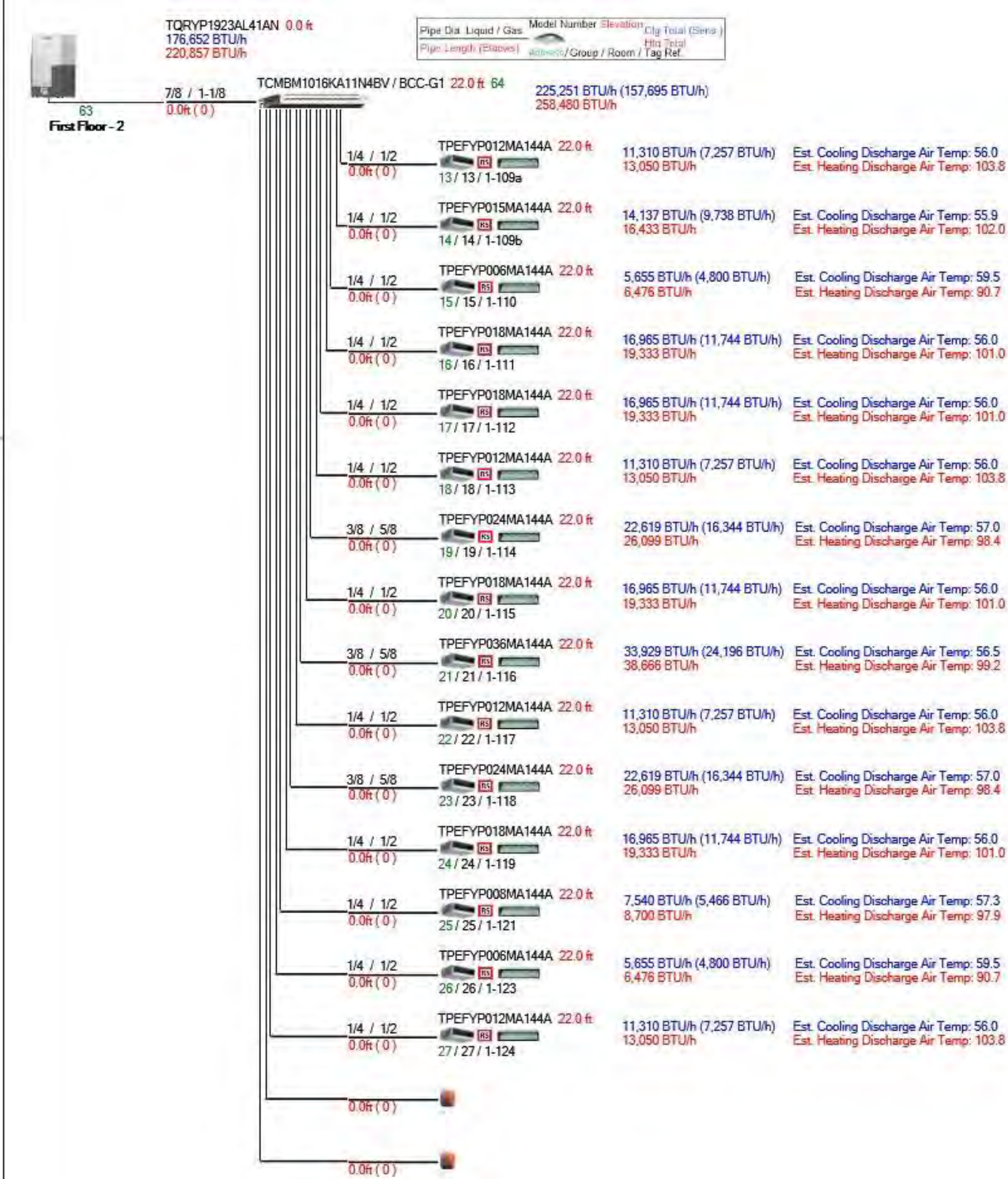
Indoor Units:	12 / 1 to 50	
Capacity:	166 / 72 to 216 (115.3%)	
* Connectable capacity is not actual capacity.		
Total Pipe Length:	0.0 / 2460.0	feet
Furthest Actual:	0.0 / 541.0	feet
Furthest Equiv.:	0.0 / 623.0	feet
Furthest IU from BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Equiv.:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Equiv.:	0.0 / 0.0	feet
Correction Factors		
Outdoor Unit Capacity:	1.03	1.02
Temperature:	1.00	1.00
Piping Length:	1.00	1.00
Water Temperature:	0.89	1.00
Water Volume:	1.00	1.00
User Derate:	1.00	1.00
Total Derate:	0.90	1.00
Water Pressure Drop:	6.59	psi/module
Additional Refrigerant:	29.0	lb
Total Refrigerant Amount:	42.3	lb

Conditions (°F)				
Cooling				
Indoor DB	75.0	Humidity	60.0%	Indoor WB 65.2
Outdoor DB	92.0	Water	105.0	
Heating				
Indoor DB	70.0	Water	65.0	
Outdoor DB	-16.0	Humidity	72.8%	Outdoor WB -16.3



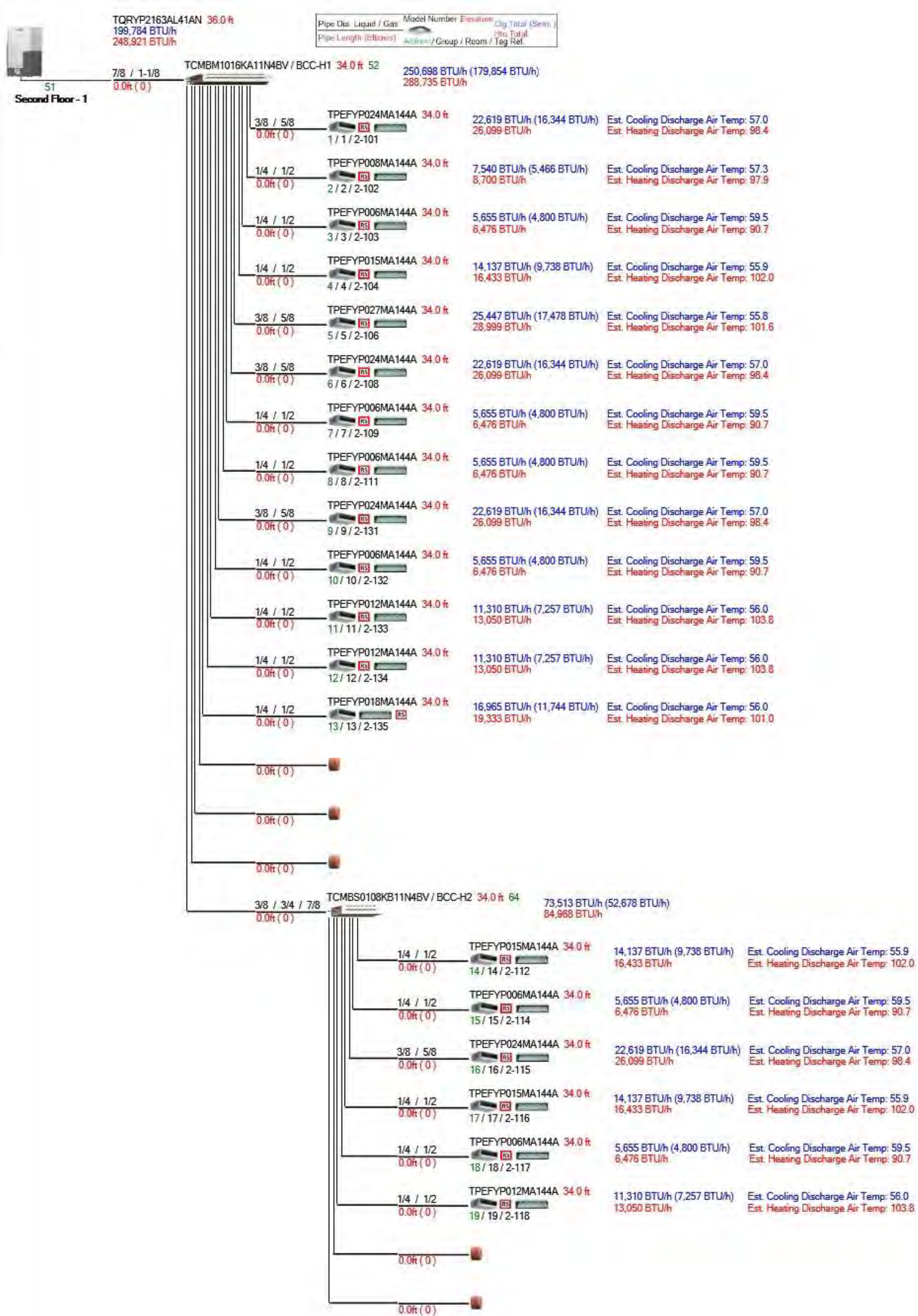
Indoor Units:	15 / 1 to 50	
Capacity:	239 / 96 to 288 (124.5%)	
* Connectable capacity is not actual capacity.		
Total Pipe Length:	0.0 / 2460.0	feet
Furthest Actual:	0.0 / 541.0	feet
Furthest Equiv.:	0.0 / 623.0	feet
Furthest IU from BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Equiv.:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Equiv.:	0.0 / 0.0	feet
Correction Factors		
Outdoor Unit Capacity:	1.05	1.03
Temperature:	1.00	1.00
Piping Length:	1.00	1.00
Water Temperature:	0.88	1.00
Water Volume:	1.00	1.00
User Derate:	1.00	1.00
Total Derate:	0.92	1.03
Water Pressure Drop:	6.33	psi/module
Additional Refrigerant:	29.9	lb
Total Refrigerant Amount:	43.1	lb

Conditions (°F)				
Cooling				
Indoor DB	75.0	Humidity	60.0%	Indoor WB 65.2
Outdoor DB	92.0	Water	105.0	
Heating				
Indoor DB	70.0	Water	65.0	
Outdoor DB	-16.0	Humidity	72.8%	Outdoor WB -16.3



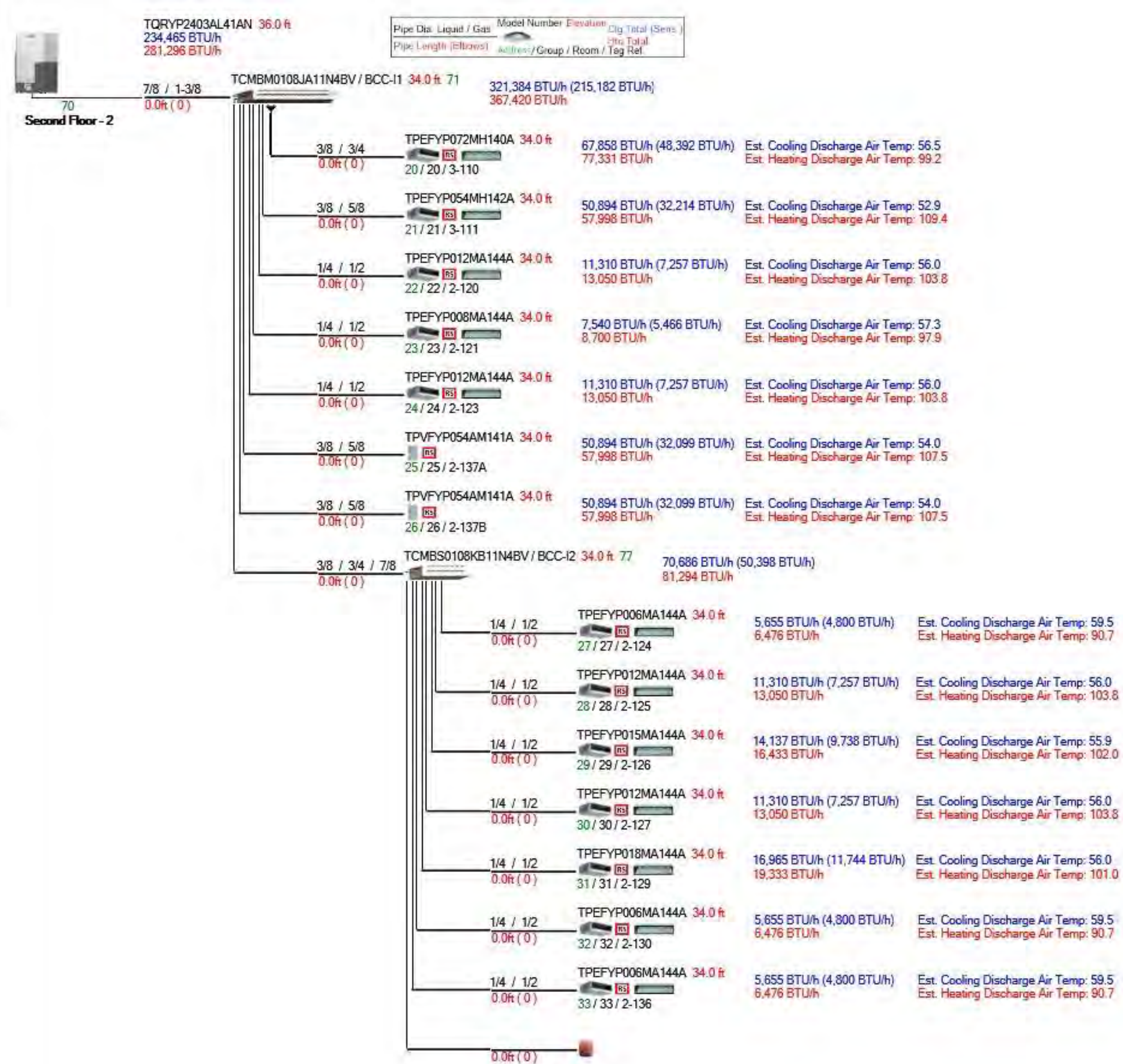
Indoor Units:	19 / 2 to 50	
Capacity:	266 / 108 to 324 (123.1%)	
* Connectable capacity is not actual capacity.		
Total Pipe Length:	0.0 / 2460.0	feet
Furthest Actual:	0.0 / 541.0	feet
Furthest Equiv.:	0.0 / 623.0	feet
Furthest IU from BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Equiv.:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Equiv.:	0.0 / 0.0	feet
Correction Factors		
Outdoor Unit Capacity:	1.05	1.02
Temperature:	1.00	1.00
Piping Length:	1.00	1.00
Water Temperature:	0.88	1.00
Water Volume:	1.00	1.00
User Derate:	1.00	1.00
Total Derate:	0.92	1.02
Water Pressure Drop:	6.52	psi/module
Additional Refrigerant:	39.2	lb
Total Refrigerant Amount:	65.0	lb

Conditions (°F)					
Cooling					
Indoor DB	75.0	Humidity	60.0%	Indoor WB	65.2
Outdoor DB	92.0	Water			105.0
Heating					
Indoor DB	70.0	Water			65.0
Outdoor DB	-16.0	Humidity	72.8%	Outdoor WB	-16.3



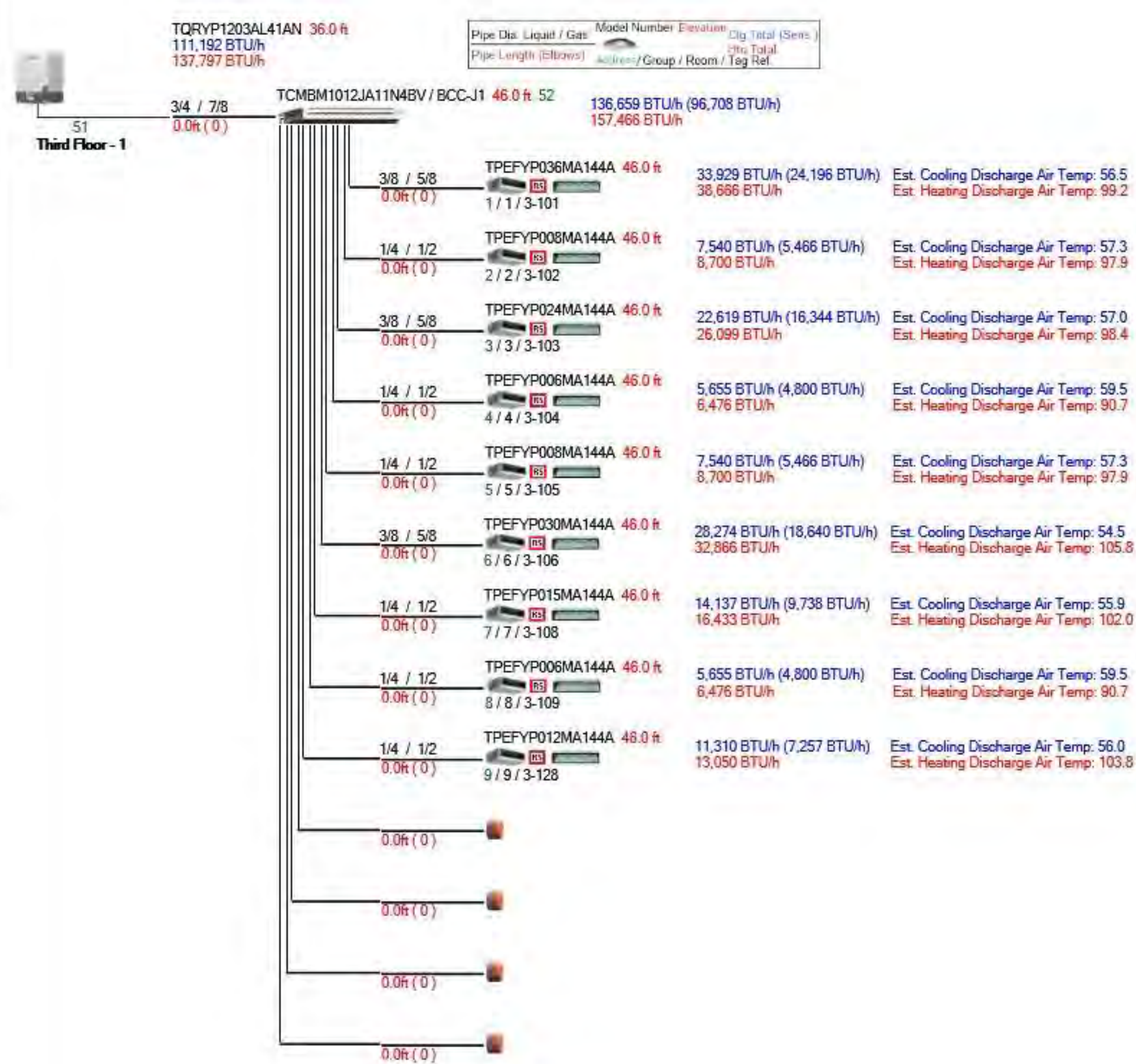
Indoor Units:	14 / 2 to 50	
Capacity:	341 / 120 to 360 (142.1%)	
* Connectable capacity is not actual capacity.		
Total Pipe Length:	0.0 / 2460.0	feet
Furthest Actual:	0.0 / 541.0	feet
Furthest Equiv.:	0.0 / 623.0	feet
Furthest IU from BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Equiv.:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Equiv.:	0.0 / 0.0	feet
Correction Factors		
Outdoor Unit Capacity:	1.11	1.04
Temperature:	1.00	1.00
Piping Length:	1.00	1.00
Water Temperature:	0.88	1.00
Water Volume:	1.00	1.00
User Derate:	1.00	1.00
Total Derate:	0.98	1.04
Water Pressure Drop:	6.52 psi/module	
Additional Refrigerant:	33.4 lb	
Total Refrigerant Amount:	59.2 lb	

Conditions (°F)		
Cooling		
Indoor DB	75.0	Humidity 60.0%
Indoor WB	65.2	
Outdoor DB	92.0	Water 105.0
Heating		
Indoor DB	70.0	Water 65.0
Outdoor DB	-16.0	Humidity 72.8% Outdoor WB -16.3



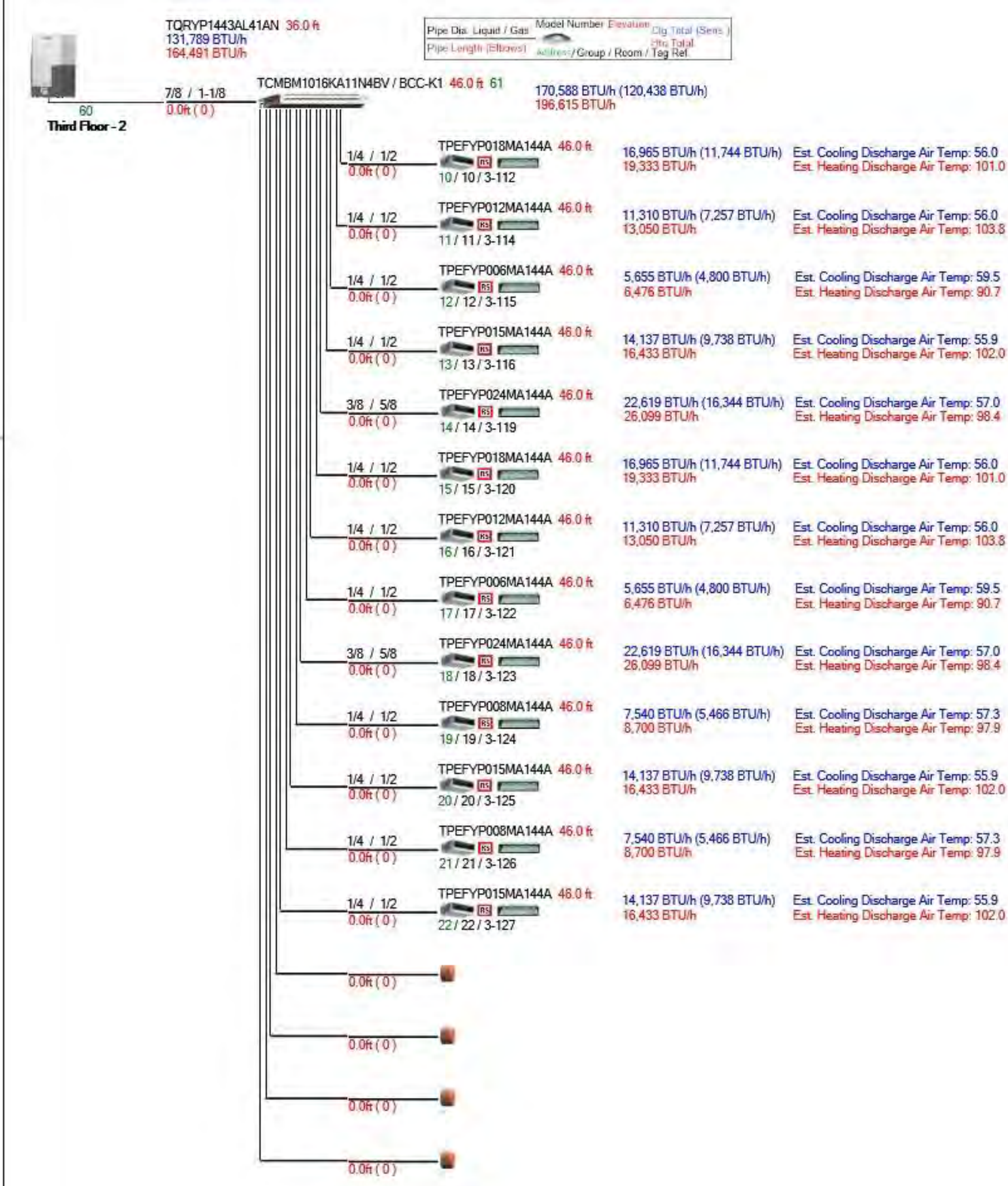
Indoor Units:	9 / 1 to 30	
Capacity:	145 / 60 to 180 (120.8%)	
* Connectable capacity is not actual capacity.		
Total Pipe Length:	0.0 / 1804.0	feet
Furthest Actual:	0.0 / 541.0	feet
Furthest Equiv.:	0.0 / 623.0	feet
Furthest IU from BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Equiv.:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Equiv.:	0.0 / 0.0	feet
Correction Factors		
Outdoor Unit Capacity:	1.06	1.02
Temperature:	1.00	1.00
Piping Length:	1.00	1.00
Water Temperature:	0.88	1.00
Water Volume:	1.00	1.00
User Derate:	1.00	1.00
Total Derate:	0.93	1.02
Water Pressure Drop:	3.49	psi/module
Additional Refrigerant:	21.6	lb
Total Refrigerant Amount:	32.6	lb

Conditions (°F)					
Cooling					
Indoor DB	75.0	Humidity	60.0%	Indoor WB	65.2
Outdoor DB	92.0	Water	105.0		
Heating					
Indoor DB	70.0	Water	65.0		
Outdoor DB	-16.0	Humidity	72.8%	Outdoor WB	-16.3



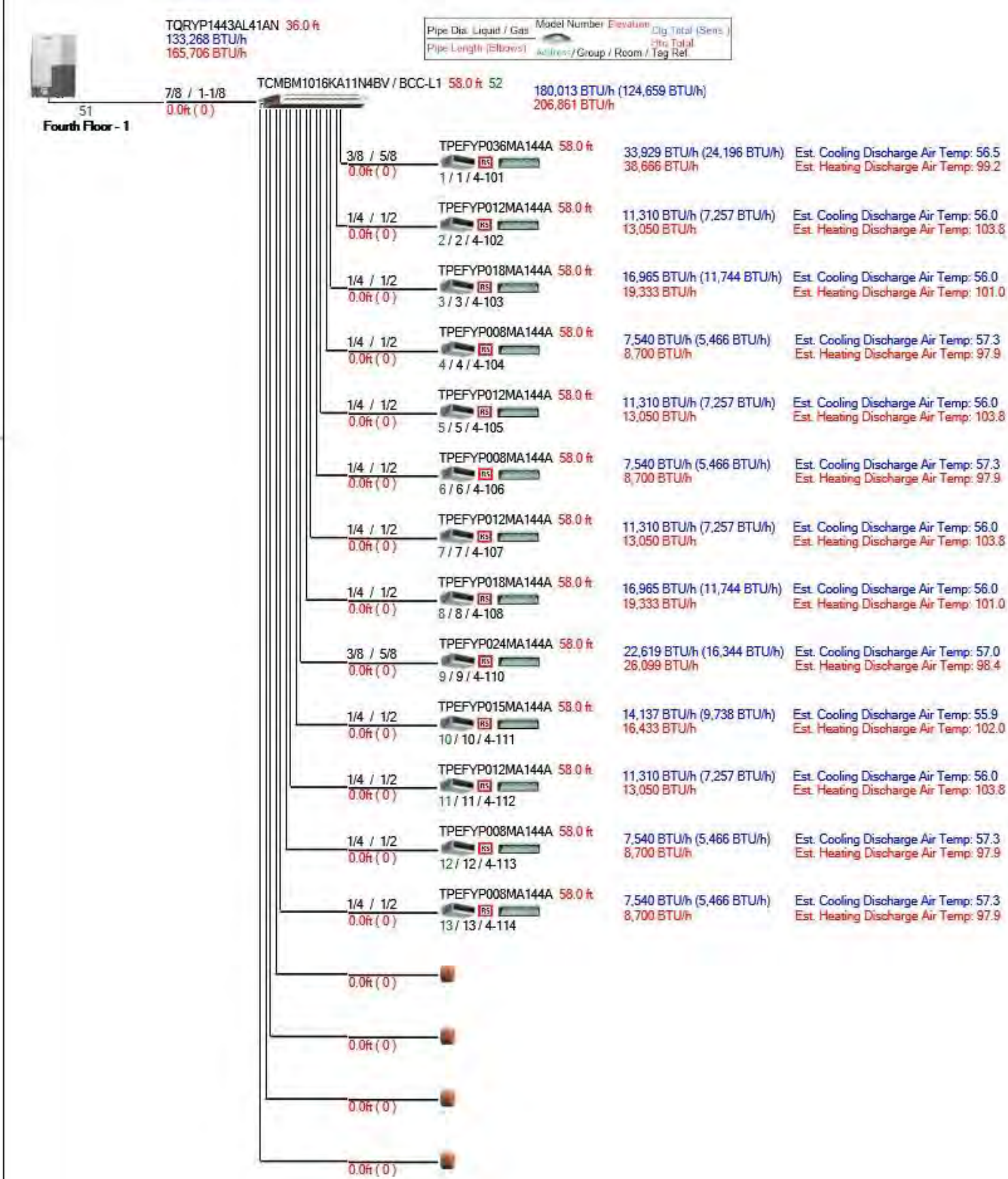
Indoor Units:	13 / 1 to 50	
Capacity:	181 / 72 to 216 (125.7%)	
* Connectable capacity is not actual capacity.		
Total Pipe Length:	0.0 / 2460.0	feet
Furthest Actual:	0.0 / 541.0	feet
Furthest Equiv.:	0.0 / 623.0	feet
Furthest IU from BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Equiv.:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Equiv.:	0.0 / 0.0	feet
Correction Factors		
Outdoor Unit Capacity:	1.04	1.03
Temperature:	1.00	1.00
Piping Length:	1.00	1.00
Water Temperature:	0.88	1.00
Water Volume:	1.00	1.00
User Derate:	1.00	1.00
Total Derate:	0.92	1.03
Water Pressure Drop:	6.33	psi/module
Additional Refrigerant:	26.4	lb
Total Refrigerant Amount:	39.7	lb

Conditions (°F)				
Cooling				
Indoor DB	75.0	Humidity	60.0%	Indoor WB 65.2
Outdoor DB	92.0	Water	105.0	
Heating				
Indoor DB	70.0	Water	65.0	
Outdoor DB	-16.0	Humidity	72.8%	Outdoor WB -16.3



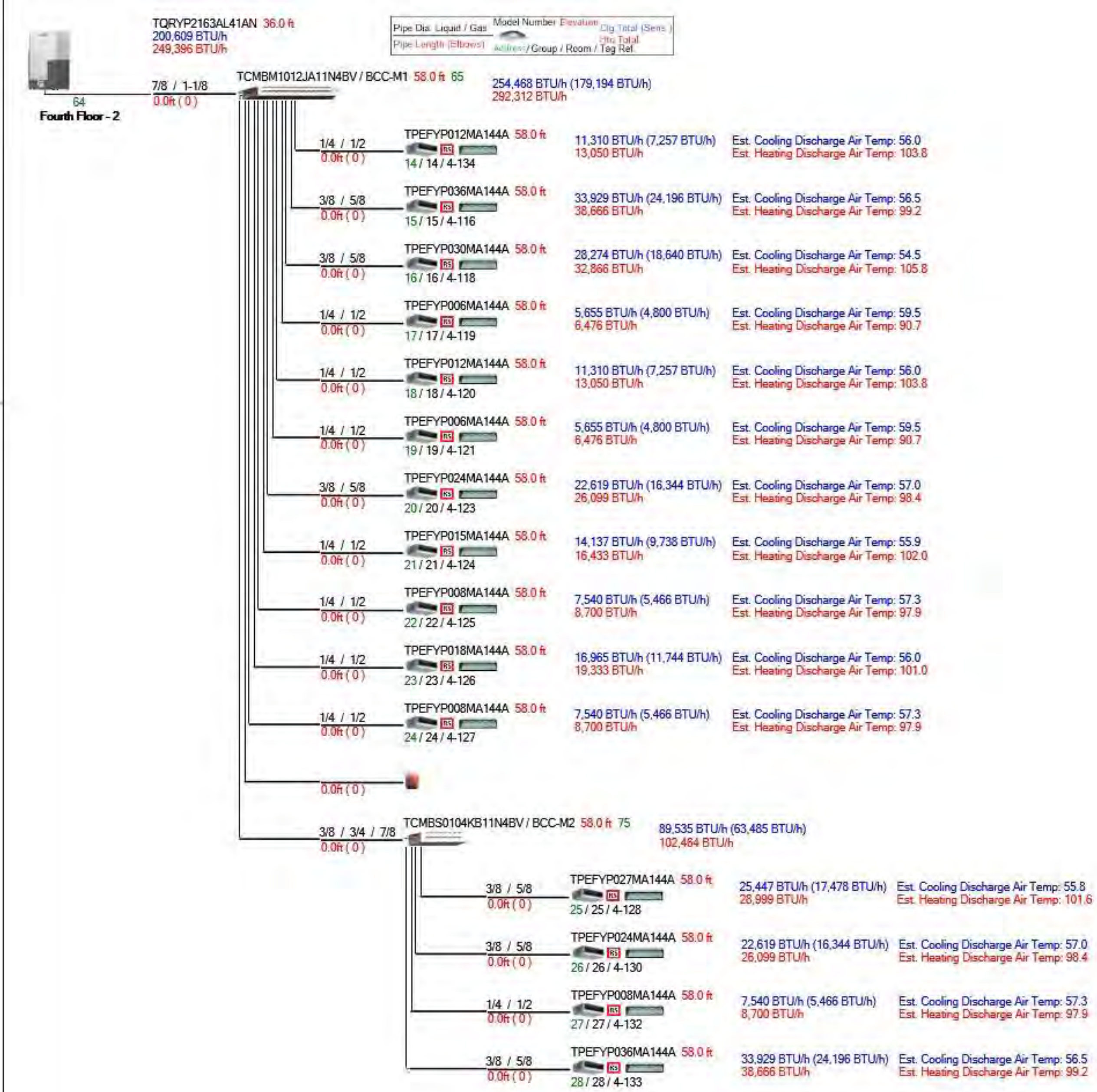
Indoor Units:	13 / 1 to 50	
Capacity:	191 / 72 to 216 (132.6%)	
* Connectable capacity is not actual capacity.		
Total Pipe Length:	0.0 / 2460.0	feet
Furthest Actual:	0.0 / 541.0	feet
Furthest Equiv.:	0.0 / 623.0	feet
Furthest IU from BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Equiv.:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Equiv.:	0.0 / 0.0	feet
Correction Factors		
Outdoor Unit Capacity:	1.06 1.04	
Temperature:	1.00 1.00	
Piping Length:	1.00 1.00	
Water Temperature:	0.88 1.00	
Water Volume:	1.00 1.00	
User Derate:	1.00 1.00	
Total Derate:	0.93 1.04	
Water Pressure Drop:	6.33 psi/module	
Additional Refrigerant:	23.9 lb	
Total Refrigerant Amount:	37.2 lb	

Conditions (°F)				
Cooling				
Indoor DB	75.0	Humidity	60.0%	Indoor WB 65.2
Outdoor DB	92.0	Water	105.0	
Heating				
Indoor DB	70.0	Water	65.0	
Outdoor DB	-16.0	Humidity	72.8%	Outdoor WB -16.3



Indoor Units:	15 / 2 to 50	
Capacity:	270 / 108 to 324 (125.0%)	
* Connectable capacity is not actual capacity.		
Total Pipe Length:	0.0 / 2460.0	feet
Furthest Actual:	0.0 / 541.0	feet
Furthest Equiv.:	0.0 / 623.0	feet
Furthest IU from BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Equiv.:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Actual:	0.0 / 0.0	feet
Furthest IU from BC Thru Sub BC Equiv.:	0.0 / 0.0	feet
Correction Factors		
Outdoor Unit Capacity:	1.06	1.03
Temperature:	1.00	1.00
Piping Length:	1.00	1.00
Water Temperature:	0.88	1.00
Water Volume:	1.00	1.00
User Derate:	1.00	1.00
Total Derate:	0.93	1.03
Water Pressure Drop:	6.52	psi/module
Additional Refrigerant:	30.5	lb
Total Refrigerant Amount:	56.3	lb

Conditions (°F)			
Cooling			
Indoor DB	75.0	Humidity	60.0%
Indoor WB	65.2		
Outdoor DB	92.0	Water	105.0
Heating			
Indoor DB	70.0	Water	65.0
Outdoor DB	-16.0	Humidity	72.8%
Outdoor WB	-16.3		



This drawing is schematic in nature. Final routing of piping & wiring shall be determined by the installing contractor and/or designer of record

Additional refrigerant charge is needed depending on the size and length of extended piping. Please refer the amount of pre-charge and the formula of calculation which is mentioned on the data book.

$1.25\text{mm}^2(16 \text{ AWG}) : 1.25\text{mm}^2(16 \text{ AWG})$ or more. $0.75\text{mm}^2(20 \text{ AWG}) : \text{between } 0.5\text{mm}^2(24 \text{ AWG}) \text{ and } 0.75\text{mm}^2(20 \text{ AWG}),$ 2^2

SYSTEM SCHEMATIC DWG.

CONT.No		PAGE	
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PIPING AND CONTROLS	
SYMBOL BRANCH PIPE MODEL NAME	
J1	CMY-R304S-G1
J2	CMY-R305S-G1
J3	CMY-R306S-G
SYMBOL LIQUID PIPE/GAS PIPE SIZE	
P1	1/4 / 1/2
P2	3/8 / 5/8
P3	3/8 / 5/8 / 3/4
P4	7/8 / 1-1/8

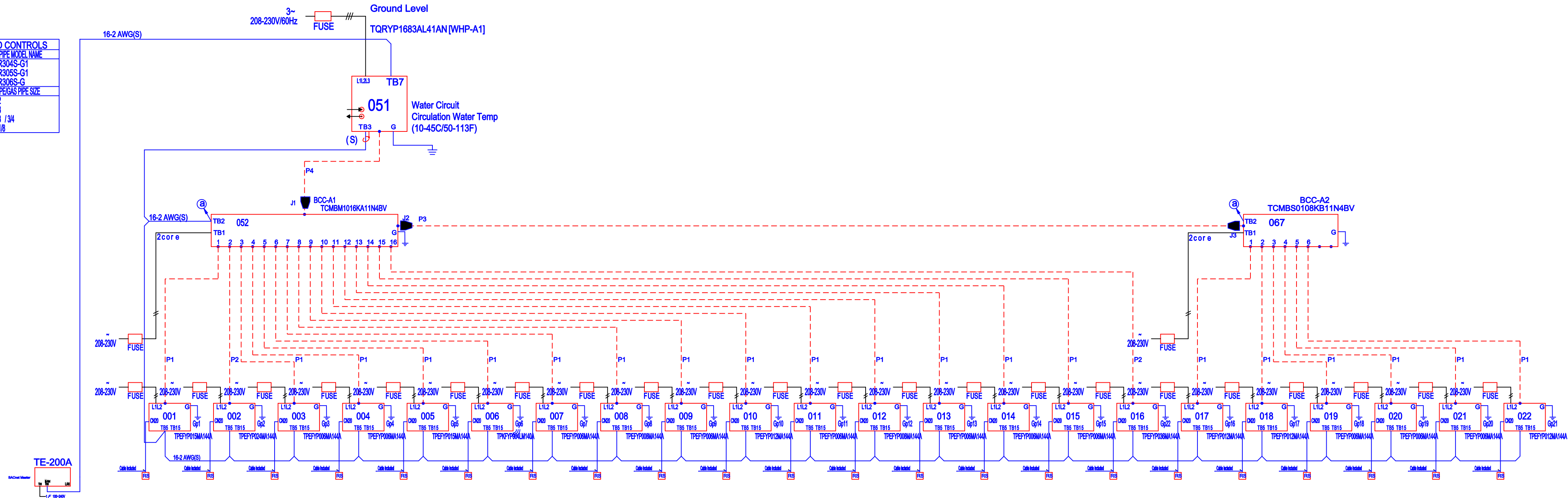
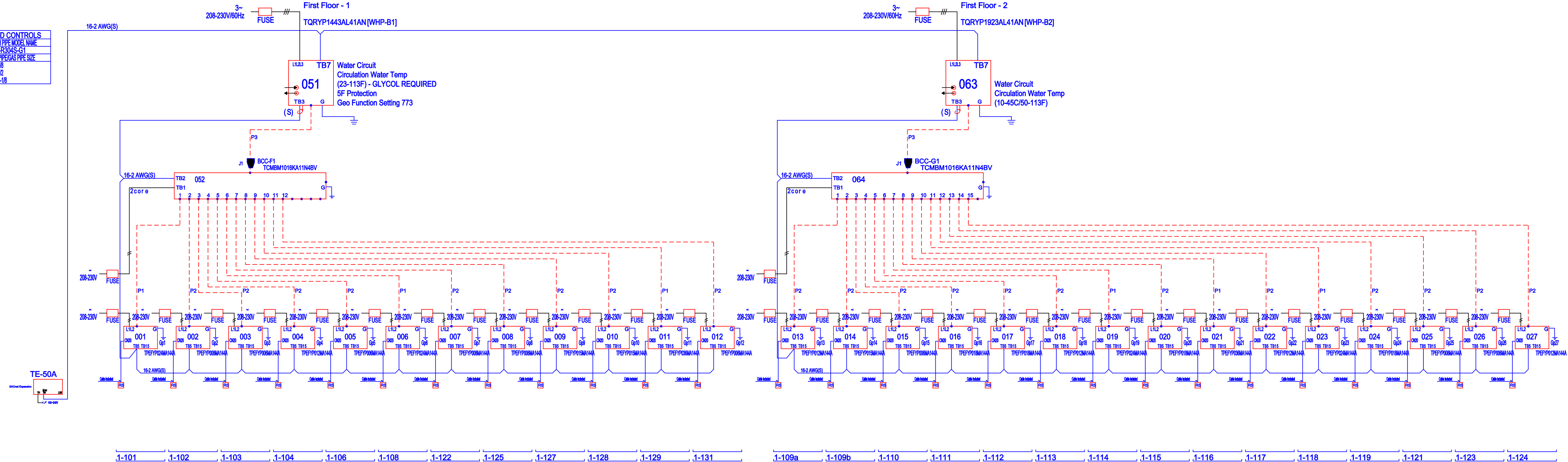


DIAGRAM SYMBOL LEGEND	
DISPLAY	DESCRIPTION
	POWER WIRE
	CONTROL WIRE
	REF. PIPE

CITY MULTI

This drawing is schematic in nature. Final routing of piping & wiring shall be determined by the installing contractor and/or designer of record. Additional refrigerant charge is needed depending on the size and length of extended piping. Please refer the amount of pre-charge and the formula of calculation which is mentioned on the data book.

PIPING AND CONTROLS	
SYMBOL BRANCH PIPE MODEL NAME	
J1	CMY-R304S-G1
SYMBOL LIQUID PIPE/GAS PIPE SIZE	
P1	3/8 5/8
P2	1/4 1/2
P3	7/8 1-1/8



Diamond System Builder

sw: 4.4.1.35
db: 4.4.1.11

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REMARKS	
Comments:	

DIAGRAM SYMBOL LEGEND		
DISPLAY	DESCRIPTION	
---	POWER WIRE	
---	CONTROL WIRE	
---	REF. PIPE	

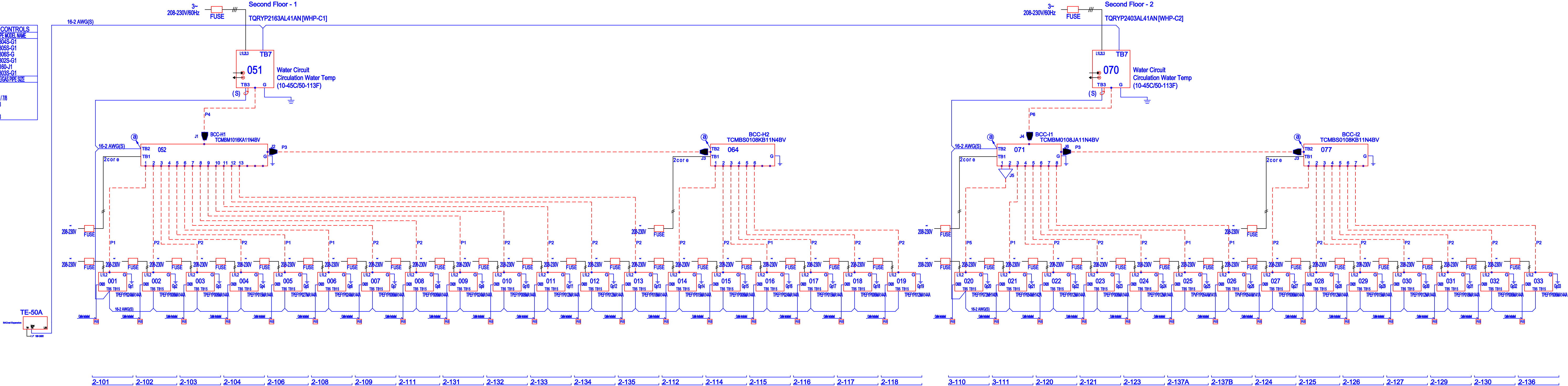
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CITY MULTI
SYSTEM SCHEMATIC DWG.

This drawing is schematic in nature. Final routing of piping & wiring shall be determined by the installing contractor and/or designer of record
Additional refrigerant charge is needed depending on the size and length of extended piping. Please refer the amount of pre-charge and the formula of calculation which is mentioned on the data book.

1.25mm²(16 AWG) : 1.25mm²(16 AWG) or more. 0.75mm²(20 AWG) : between 0.5mm²(24 AWG) and 0.75mm²(20 AWG). ²

PIPING AND CONTROLS	
SYMBOL	BRANCH PIPE MODEL NAME
J1	CMY-R304S-G1
J2	CMY-R305S-G1
J3	CMY-R306S-G
J4	CMY-R302S-G1
J5	CMY-R160-J1
J6	CMY-R303S-G1
SYMBOL LIQUID PIPE/GAS PIPE SIZE	
P1	3/8 / 5/8
P2	1/4 / 1/2
P3	3/8 / 3/4 / 7/8
P4	7/8 / 1-1/8
P5	3/8 / 3/4
P6	7/8 / 1-3/8



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REMARKS
Comments:

DIAGRAM SYMBOL LEGEND		CONT.No	PAGE
DISPLAY	DESCRIPTION		
---//---	POWER WIRE		
---	CONTROL WIRE		
---	REF. PIPE		

CITY MULTI

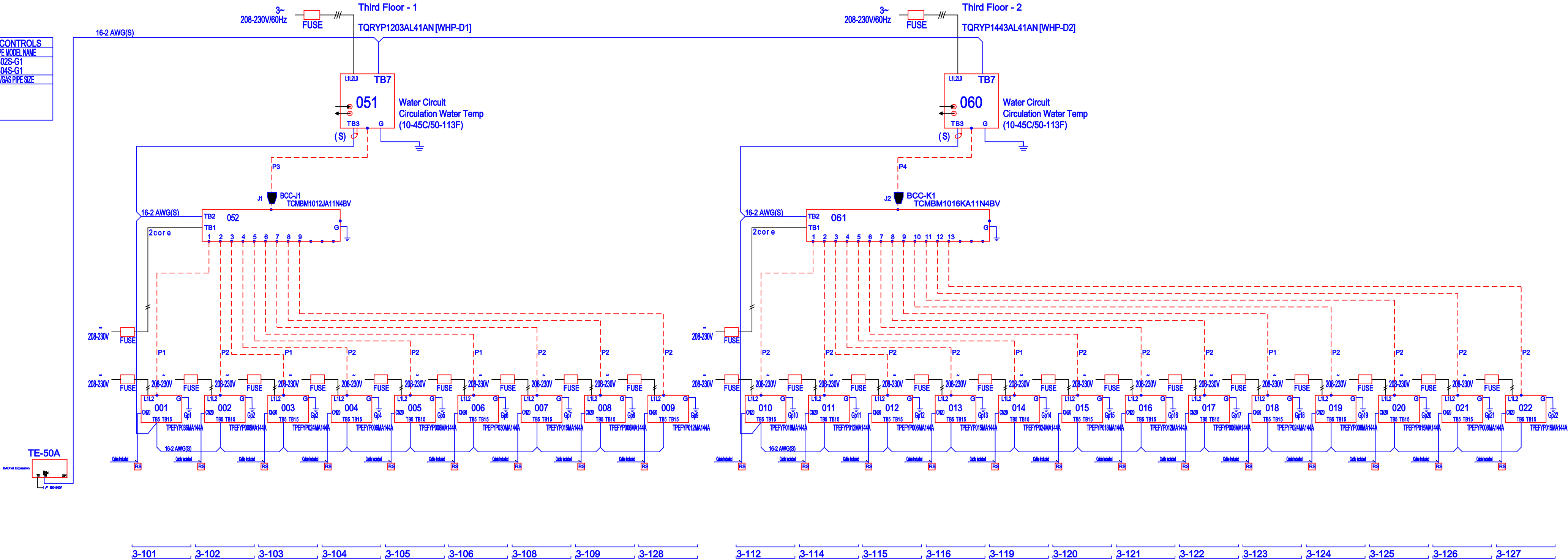
SYSTEM SCHEMATIC DWG.

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Additional refrigerant charge is needed depending on the size and length of extended piping. Please refer the amount of pre-charge and the formula of calculation which is mentioned on the data book.

1.25mm^2 (16 AWG) : 1.25mm^2 (16 AWG) or more. 0.75mm^2 (20 AWG) : between 0.5mm^2 (24 AWG) and 0.75mm^2 (20 AWG). mm^2

PIPING AND CONTROLS	
SYMBOL	BRANCH PIPE MODEL NAME
J1	CMY-R302S-G1
J2	CMY-R304S-G1
SYMBOL LIQUID PIPE/GAS PIPE SIZE	
P1	3/8 1/8
P2	1/4 1/12
P3	3/4 7/8
P4	7/8 1-1/8



Diamond System Builder

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REMARKS

Comments:

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DIAGRAM SYMBOL LEGEND	DESCRIPTION		
---	POWER WIRE		
---	CONTROL WIRE		
---	REF. PIPE		

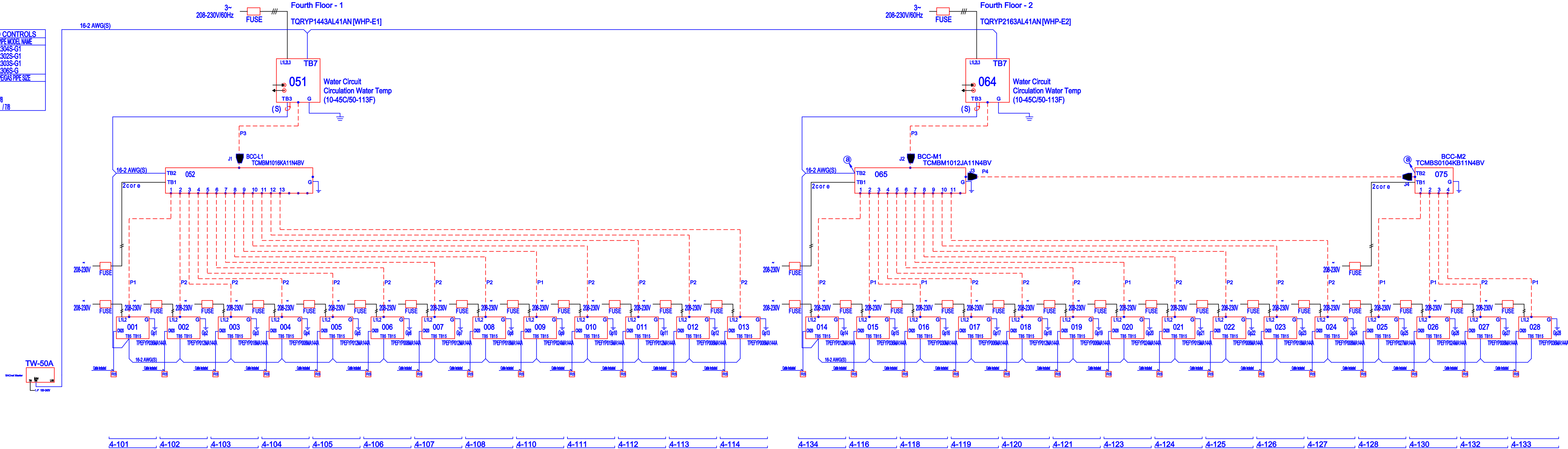
CITY MULTI
SYSTEM SCHEMATIC DWG.

This drawing is schematic in nature. Final routing of piping & wiring shall be determined by the installing contractor and/or designer of record

Additional refrigerant charge is needed depending on the size and length of extended piping. Please refer the amount of pre-charge and the formula of calculation which is mentioned on the data book.

$1.25\text{mm}(16\text{ AWG}) : 1.25\text{mm}(16\text{ AWG})\text{ or more.}$ $0.75\text{mm}(20\text{ AWG}) : \text{between } 0.5\text{mm}(24\text{ AWG})^2 \text{ and } 0.75\text{mm}(20\text{ AWG})^2.$

PIPING AND CONTROLS	
SYMBOL BRANCH PIPE MODEL NAME	
J1	CMY-R304S-G1
J2	CMY-R302S-G1
J3	CMY-R303S-G1
J4	CMY-R306S-G
SYMBOL LIQUID PIPE GAS PIPE SIZE	
P1	3/8 1/8
P2	1/4 1/12
P3	7/8 1/1-1/8
P4	3/8 1/34 1/8



Diamond System Builder

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REMARKS

Comments:



Submittal

Prepared For:
City of Duluth

Date: May 17, 2022
Job Name:
Duluth City Hall - VRF

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

Product Summary

Qty Product

- 9 Trane - Mitsubishi VRF Outdoor Unit
- 13 Trane - Mitsubishi VRF Branch Controller
- 132 Trane - Mitsubishi VRF Indoor Unit

Notes:

1. Labor warranty **NOT** included.
2. Startup assistance by Trane Ductless Technical Specialist **included.**
3. Disconnect switch **NOT** included.
4. Linesets **NOT** included.

Trane Mitsubishi Products - Standard warranty: The parts are warranted to the original owner a period of one (1) year, and Compressor a period of seven (7) years from the date of installation by a licensed contractor.

Extended warranty: The parts and compressor will be warranted for a period of ten (10) years to the original owner if (1) the System is designed by a Diamond Designer using the MEUS Diamond System Builder™ (2) the installing contractor has successfully completed the CITI MULTI MEUS approved training course, and (3) the contractor has submitted a completed and approved MEUS Extended Warranty Process report.

Joey Beisbier / Richard Youngdahl
Trane U.S. Inc.
775 Vandalia Street
Saint Paul, MN 55114
Office Phone: (651) 468-2700

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

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.

Table of Contents

Water-Source Condensing Units	4
TQRYP1203AL41AN, WHP-D1	5
TQRYP1443AL41AN, WHP-B1, D2, E1	7
TQRYP1683AL41AN, WHP-A1	9
TQRYP1923AL41AN, WHP-B2	11
TQRYP2163AL41AN, WHP-C1, E2	13
TQRYP2403AL41AN, WHP-C2	15
Branch Controllers	17
TCMBM1016KA11N4 – 16-Port Main	18
TCMBM1012JA11N4 – 12-Port Main	20
TCMBM0108JA11N4 – 8-Port Main	22
TCMBS0108KB11N4 – 8-Port Sub	24
TCMBS0104KB11N4 – 4-Port Sub	26
Indoor Units	28
TPEFYP006MA144A, 6-MBh Medium Static	29
TPEFYP008MA144A, 8-MBh Medium Static	32
TPEFYP012MA144A, 1-Ton Medium Static	35
TPEFYP015MA144A, 15-MBh Medium Static	38
TPEFYP018MA144A, 1.5-Ton Medium Static	41
TPEFYP024MA144A, 2-Ton Medium Static	44
TPEFYP027MA144A, 27-MBh Medium Static	47
TPEFYP030MA144A, 2.5-Ton Medium Static	50
TPEFYP036MA144A, 3-Ton Medium Static	53
TPVFYP054AM141A, 4.5-Ton, Multi-Position AHU	56
TPEFYP054MH142A, 4.5-Ton, High-Static	59
TPEFYP072MH140A, 6-Ton, High-Static	61
TPKFYP004LM140A, 4-MBh, Wall Mounted	63
Accessories	66
High Static Filter Box, MERV 13	67
Medium Static Filter Box, MERV 13	72
Controls	79
PAC-SE41TSE, Wall Mounted Temperature Sensor	80
TE-200A, Central Controller	82
TE-50A, Expansion Controller	86
TW-50A, Central Controller	90

Bill of Material

Qty	Model	Description
1	TQRYP1683AL41AN	R410A WR2 Series Outdoor Unit
3	TQRYP1443AL41AN	R410A WR2 Series Outdoor Unit
1	TQRYP1923AL41AN	R410A WR2 Series Outdoor Unit
2	TQRYP2163AL41AN	R410A WR2 Series Outdoor Unit
1	TQRYP2403AL41AN	R410A WR2 Series Outdoor Unit
1	TQRYP1203AL41AN	R410A WR2 Series Outdoor Unit
6	TCMBM1016KA11N4BV	BC Controller Main
3	TCMBS0108KB11N4BV	BC Controller Sub
1	TCMBM0108JA11N4BV	BC Controller Main
2	TCMBM1012JA11N4BV	BC Controller Main
1	TCMBS0104KB11N4BV	BC Controller Sub
1	CMY-R160-J1	Joint Pipe
15	TPEFYP015MA144A	Ceiling-Concealed (Ducted) Indoor Unit
15	TPEFYP024MA144A	Ceiling-Concealed (Ducted) Indoor Unit
32	TPEFYP006MA144A	Ceiling-Concealed (Ducted) Indoor Unit
1	TPKFYP004LM140A	Wall -Mounted Indoor Unit
18	TPEFYP008MA144A	Ceiling-Concealed (Ducted) Indoor Unit
25	TPEFYP012MA144A	Ceiling-Concealed (Ducted) Indoor Unit
7	TPEFYP036MA144A	Ceiling-Concealed (Ducted) Indoor Unit
11	TPEFYP018MA144A	Ceiling-Concealed (Ducted) Indoor Unit
2	TPEFYP027MA144A	Ceiling-Concealed (Ducted) Indoor Unit
1	TPEFYP072MH140A	Ceiling-Concealed (Ducted) Indoor Unit
1	TPEFYP054MH142A	Ceiling-Concealed (Ducted) Indoor Unit
2	TPVFYP054AM141A	Muli-Position Air Handler Indoor Unit
2	TPEFYP030MA144A	Ceiling-Concealed (Ducted) Indoor Unit
1	TE-200A	System Remote Controller
3	TE-50A	System Remote Controller
1	TW-50A	System Remote Controller
2	BACNET Master	Software License
3	BACNET Expansion	Software License
6	EV150S396NRXME	1.5" EPIV Valve
9	RIBTE24B	Relay
18	TR50VA015	24VAC Transformer
132	PAC-SE41TS-E	Temperature Sensor
26	FBM2-2-A	Filter Box
19	FBM2-3-A	Filter Box
75	FBM2-1-A	Filter Box
7	FBM2-4-A	Filter Box
6	CMY-R304S-G1	Reducer
2	CMY-R305S-G1	Reducer
4	CMY-R306S-G	Reducer
3	EV200S761ARXME	2" EPIV Valve
1	FBH4-4	Filter Box
1	FBH2-3	Filter Box
3	CMY-R302S-G1	Reducer
2	CMY-R303S-G1	Reducer



MITSUBISHI ELECTRIC TRANE HVAC US

Condensing Units

Job Name: **Duluth City Hall**System Reference: **WHP-D1**Date: **5-18-22****208/230V MODULAR WATER-SOURCE VRF HEAT PUMP
SYSTEM****ACCESSORIES**

- Optical Relay for Flow Switch (One Piece)..... RIBTE24B
 1.5" Temp sensor, optional (One Piece)..... ZM-TW150NPT KIT
☐ Transformer 50VA (One Piece)..... TR50VA015
☒ 1.5" EPIV Valve (One Piece)..... EV150S396NRXME
☒ BC Controller (Required)..... for details see BC Controller Submittals
☐ Joint Kit..... for details see Pipe Accessories Submittal

NOTE:

Requires two transformers

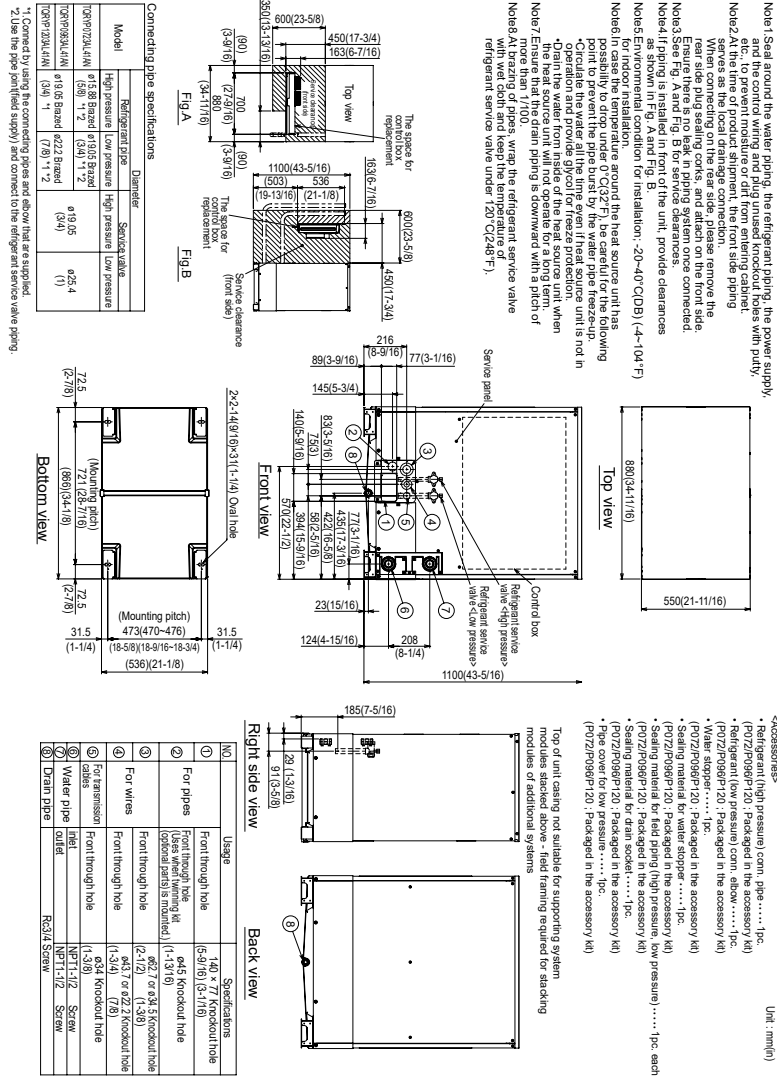
Requires one optical relay

Requires two temp sensors per one EPIV valve if optional temps sensors are used.

Specifications			System
Unit Type			TQRYP1203AL41AN
Cooling Capacity (Nominal)		BTU/H	120,000
Heating Capacity (Nominal)		BTU/H	135,000
Operating Temperature Range	Cooling (Indoor)	°F WB [°C WB]	59~75 [15.0~24.0]
	Heating (Indoor)	°F DB [°C DB]	59~81 [15.0~27.0]
Operating Water Temperature Range ¹	Cooling/Heating	°F [°C]	50~113 [10~45]
External Dimensions (H x W x D)		In. [mm]	43-5/16 x 34-11/16 x 21-11/16 [1100 x 880 x 550]
Net Weight		Lbs. [kg]	382 [173]
External Finish			Galvanized steel sheets
Electrical Power Requirements	Voltage, Phase, Hertz, Power Tolerance		208/230, 3, 60, ±10%
Minimum Circuit Ampacity		A	29.0/0.0
Maximum Overcurrent Protection		A	50/45
SCCR		kA	5
Flow Rate		G/min (gpm)	25.4
		L/min	96
Pressure Drop		psi	3.48
		Ft.	8.0
Operation Volume Range		G/min (gpm)	13.2~31.7
		m ³ /h	3.0~7.2
Refrigerant Piping Diameter	Liquid (High Pressure)	In. [mm]	3/4 [19.05] Braze
	Gas (Low Pressure)	In. [mm]	7/8 [22.2] Braze
Max. Total Refrigerant Line Length		Ft.	2460
Max. Refrigerant Line Length (Between ODU & IDU)		Ft.	541
Max. Control Wiring Length		Ft.	1640
Indoor Unit Connectable	Total Capacity		50.0~150.0% of heatsource unit capacity
	Model/Quantity		P06~P96/1.0~30.0
Sound Pressure Level		dB(A)	54.0/54.0
Compressor Operating Range			14.0% to 100.0%
Compressor			Inverter scroll hermetic x 1
Compressor Motor Output		kW	7.7
Refrigerant		Type x Original Charge	R410A x 11 lbs. + 1.0oz. [5.0 kg]
Protection Devices	High Pressure Protection		High pressure sensor, High pressure switch at 4.15 Mpa (601 psi)
	Inverter Circuit		Over-heat protection, Over-current protection
	Compressor		Over-heat protection
Lubricant			MEL32
AHRI Ratings (Ducted/Non-ducted)	EER		13.4/15.6
	IEER		23.2/29.0
	COP		5.51/5.6
	SCHE		19.7/19.7

NOTES:¹23°F EWT (Entering water temperature) is possible with glycol.

OUTDOOR UNIT: TQRYP1203AL41AN – DIMENSIONS



Job Name: **Duluth City Hall**System Reference: **WHP-B1, D2, E1**Date: **5-18-22****208/230V MODULAR WATER-SOURCE VRF HEAT PUMP SYSTEM****ACCESSORIES**

- ✓ BC Controller (Required)..... for details see BC Controller Submittals
- Joint Kit..... for details see Pipe Accessories Submittal

Specifications			System
Unit Type			TQRYP1443AL41AN
Cooling Capacity (Nominal)		BTU/H	144,000
Heating Capacity (Nominal)		BTU/H	160,000
Operating Temperature Range	Cooling (Indoor)	°F WB [°C WB]	59.0~75.0 [15.0~24.0]
	Heating (Indoor)	°F DB [°C DB]	59.0~81.0 [15.0~27.0]
Operating Water Temperature Range¹	Cooling/Heating	°F [°C]	50.0~113.0 [10.0~45.0]
External Dimensions (H x W x D)		In. [mm]	57-1/8 x 34-11/16 x 21-11/16 [1450 x 880 x 550]
Net Weight		Lbs. [kg]	481 [218]
External Finish			Galvanized steel sheets
Electrical Power Requirements	Voltage, Phase, Hertz, Power Tolerance		208/230, 3, 60, ±10%
Minimum Circuit Ampacity		A	35.0/32.0
Maximum Overcurrent Protection		A	60/50
SCCR		kA	5
Flow Rate	G/min (gpm)		31.7
	L/min		120
Pressure Drop	psi		6.38
	Ft.		14.7
Operation Volume Range	G/min (gpm)		19.8~50.9
	m3/h		4.5~11.6
Refrigerant Piping Diameter	Liquid (High Pressure)	In. [mm]	7/8 [22.2] Brazed
	Gas (Low Pressure)	In. [mm]	1-1/8 [28.58] Brazed
Max. Total Refrigerant Line Length		Ft.	2460
Max. Refrigerant Line Length (Between ODU & IDU)		Ft.	541
Max. Control Wiring Length		Ft.	1640
Indoor Unit Connectable	Total Capacity		50.0~150.0% of heatsource unit capacity
	Model/Quantity		P06~P96/1.0~36.0
Sound Pressure Level		dB(A)	54.0/54.0
Compressor Operating Range			19.0% to 100.0%
Compressor	Type x Quantity		Inverter scroll hermetic x 1
Compressor Motor Output	kW		9.5
Refrigerant	Type x Original Charge		R410A x 13 lbs. + 4oz. [6.0 kg]
Protection Devices	High Pressure Protection		High pressure sensor, High pressure switch at 4.15 Mpa (601 psi)
	Inverter Circuit		Over-heat protection, Over-current protection
	Compressor		Over-heat protection
Lubricant			MEL32
AHRI Ratings (Ducted/Non-ducted)	EER		12.1/15.4
	IEER		19.5/23.1
	COP		4.9/5.5
	SCHE		20.1/20.1

NOTES:

¹23°F EWT (Entering water temperature) is possible with glycol.

OUTDOOR UNIT: TQRYP1443AL41AN – DIMENSIONS

Note1. Seal around the water piping, the refrigerant piping, the power supply, and the control wiring and plug unused knockout holes with putty, etc., to prevent moisture or dirt from entering cabinet.

Note2. At the time of product shipment, the front side piping serves as the local drainage connection.

When connecting on the rear side, please remove the rear side plug sealing corks, and attach on the front side. Ensure there is no leak in piping system once connected.

Note3. See Fig. A and Fig. B for service clearances.

Note4. If piping is installed in front of the unit, provide clearances as shown in Fig. A and Fig. B.

Note5. Environmental condition for installation: -20~40°C(DB) (-4~104°F) for indoor installation.

Note6. In case the temperature around the heat source unit has possibility to drop under 0°C(32°F), be careful for the following point to prevent the pipe burst by the water pipe freeze-up.

- Circulate the water all the time even if heat source unit is not in operation and provide glycol for freeze protection.
- Drain the water from inside of the heat source unit when the heat source unit will not operate for a long term.

Note7. Ensure that the drain piping is downward with a pitch of more than 1/100.

Note8. At brazing of pipes, wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C(248°F).

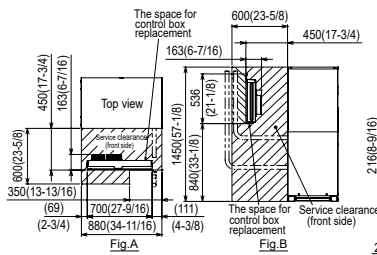


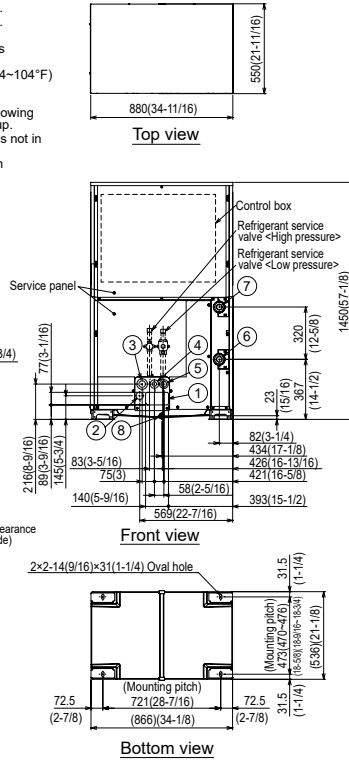
Fig. A

Fig. B

Connecting pipe specifications

Model	Diameter			
	Refrigerant pipe		Service valve	
	High pressure	Low pressure	High pressure	Low pressure
TQRYP1443AL41AN	ø22.2 Braze (7/8) *1	ø28.58 Braze (1-1/8) *1	ø25.4 (1)	ø28.58 (1-1/8)
TQRYP1883AL41AN				
TQRYP1923AL41AN				

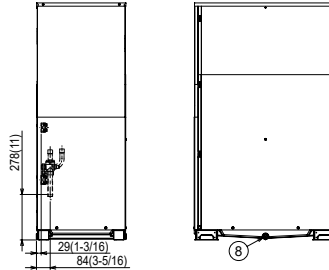
*1 Connect by using the connecting pipes that are supplied.



<Accessories>

- Refrigerant (high pressure) conn. pipe.....1pc.
(P144/P168/P192; Packaged in the accessory kit)
- Refrigerant (low pressure) conn. pipe.....1pc.
(P144/P168/P192; Packaged in the accessory kit)
- Water stopper.....1pc.
(P144/P168/P192; Packaged in the accessory kit)
- Sealing material for water stopper.....1pc.
(P144/P168/P192; Packaged in the accessory kit)
- Sealing material for field piping (high pressure, low pressure).....1pc. each
(P144/P168/P192; Packaged in the accessory kit)
- Sealing material for drain socket.....1pc.
(P144/P168/P192; Packaged in the accessory kit)
- Pipe cover for low pressure.....1pc.
(P144/P168/P192; Packaged in the accessory kit)
- Sealing material for base leg (two types).....4pc. each
(P144/P168/P192; Packaged in the accessory kit)
- Sealing material for panel.....1pc.
(P144/P168/P192; Packaged in the accessory kit)

Top of unit casing not suitable for supporting system modules stacked above - field framing required for stacking modules of additional systems



Right side view

Back view

NO.	Usage	Specifications
①	Front through hole	140 × 77 Knockout hole (5-9/16) (3-1/16)
②	For pipes	Front through hole (Uses when training kit (optional parts) is mounted.) ø45 Knockout hole (1-13/16)
③	For wires	Front through hole ø62.7 or ø34.5 Knockout hole (2-1/2) (1-3/8)
④	For transmission cables	Front through hole ø43.7 or ø22.2 Knockout hole (1-3/4) (7/8)
⑤	For transmission cables	Front through hole ø34 Knockout hole (1-3/8)
⑥	Water pipe inlet	NPT 1-1/2 Screw
⑦	Water pipe outlet	NPT 1-1/2 Screw
⑧	Drain pipe	Rc3/4 Screw

Unit : mm(in)

Submittal Documents

CITYMULTI®

14-TON TQRYP1683AL41AN



Job Name:

System Reference:

Date:

208/230V MODULAR WATER-SOURCE VRF HEAT PUMP SYSTEM



ACCESSORIES

☒ BC Controller (Required)..... for details see BC Controller Submittals

☐ Joint Kit..... for details see Pipe Accessories Submittal

Specifications			System
Unit Type			TQRYP1683AL41AN
Cooling Capacity (Nominal)		BTU/H	168,000
Heating Capacity (Nominal)		BTU/H	188,000
Operating Temperature Range	Cooling (Indoor)	°F WB [°C WB]	59.0~75.0 [15.0~24.0]
	Heating (Indoor)	°F DB [°C DB]	59.0~81.0 [15.0~27.0]
Operating Water Temperature Range¹	Cooling/Heating	°F [°C]	50.0~113.0 [10.0~45.0]
External Dimensions (H x W x D)		In. [mm]	57-1/8 x 34-11/16 x 21-11/16 [1450 x 880 x 550]
Net Weight		Lbs. [kg]	481 [218]
External Finish			Galvanized steel sheets
Electrical Power Requirements	Voltage, Phase, Hertz, Power Tolerance		208/230, 3, 60, ±10%
Minimum Circuit Ampacity		A	44.0/39.0
Maximum Overcurrent Protection		A	70/70
SCCR		kA	5
Flow Rate		G/min (gpm)	31.7
		L/min	120
Pressure Drop		psi	6.38
		Ft.	14.7
Operation Volume Range		G/min (gpm)	19.8~50.9
		m3/h	4.5~11.6
Refrigerant Piping Diameter	Liquid (High Pressure)	In. [mm]	7/8 [22.2] Brazed
	Gas (Low Pressure)	In. [mm]	1-1/8 [28.58] Brazed
Max. Total Refrigerant Line Length		Ft.	2460
Max. Refrigerant Line Length (Between ODU & IDU)		Ft.	541
Max. Control Wiring Length		Ft.	1640
Indoor Unit Connectable	Total Capacity	50.0~150.0% of heatsource unit capacity	
	Model/Quantity	P06~P96/1.0~42.0	
Sound Pressure Level		dB(A)	56.0/56.0
Compressor Operating Range			16.0% to 100.0%
Compressor	Type x Quantity		Inverter scroll hermetic x 1
Compressor Motor Output		kW	11.0
Refrigerant	Type x Original Charge		R410A x 13 lbs. + 4oz. [6.0 kg]
Protection Devices	High Pressure Protection		High pressure sensor, High pressure switch at 4.15 Mpa (601 psi)
	Inverter Circuit		Over-heat protection, Over-current protection
	Compressor		Over-heat protection
Lubricant			MEL32
AHRI Ratings (Ducted/Non-ducted)	EER		11.9/13.5
	IEER		18.0/21.8
	COP		4.73/5.39
	SCHE		19.7/19.7

NOTES:
¹23°F EWT (Entering water temperature) is possible with glycol.

Job Name: **Duluth City Hall**System Reference: **WHP-B2**Date: **5-18-22****208/230V MODULAR WATER-SOURCE VRF HEAT PUMP SYSTEM****ACCESSORIES**

- ✓ BC Controller (Required)..... for details see BC Controller Submittals
- Joint Kit..... for details see Pipe Accessories Submittal

Specifications			System
Unit Type			TQRYP1923AL41AN
Cooling Capacity (Nominal)		BTU/H	192,000
Heating Capacity (Nominal)		BTU/H	215,000
Operating Temperature Range	Cooling (Indoor)	°F WB [°C WB]	59.0~75.0 [15.0~24.0]
	Heating (Indoor)	°F DB [°C DB]	59.0~81.0 [15.0~27.0]
Operating Water Temperature Range ¹	Cooling/Heating	°F [°C]	50.0~113.0 [10.0~45.0]
External Dimensions (H x W x D)		In. [mm]	57-1/8 x 34-11/16 x 21-11/16 [1450 x 880 x 550]
Net Weight		Lbs. [kg]	481 [218]
External Finish			Galvanized steel sheets
Electrical Power Requirements	Voltage, Phase, Hertz, Power Tolerance		208/230, 3, 60, ±10%
Minimum Circuit Ampacity		A	54.0/49.0
Maximum Overcurrent Protection		A	90/80
SCCR		kA	5
Flow Rate	G/min (gpm)		31.7
	L/min		120
Pressure Drop	psi		6.38
	Ft.		14.7
Operation Volume Range	G/min (gpm)		19.8~50.9
	m3/h		4.5~11.6
Refrigerant Piping Diameter	Liquid (High Pressure)	In. [mm]	7/8 [22.2] Brazed
	Gas (Low Pressure)	In. [mm]	1-1/8 [28.58] Brazed
Max. Total Refrigerant Line Length		Ft.	2460
Max. Refrigerant Line Length (Between ODU & IDU)		Ft.	541
Max. Control Wiring Length		Ft.	1640
Indoor Unit Connectable	Total Capacity		50.0~150.0% of heatsource unit capacity
	Model/Quantity		P06~P96/1.0~48.0
Sound Pressure Level		dB(A)	58.0/58.0
Compressor Operating Range			14.0% to 100.0%
Compressor	Type x Quantity		Inverter scroll hermetic x 1
Compressor Motor Output	kW		12.4
Refrigerant	Type x Original Charge		R410A x 13 lbs. + 4oz. [6.0 kg]
Protection Devices	High Pressure Protection		High pressure sensor, High pressure switch at 4.15 Mpa (601 psi)
	Inverter Circuit		Over-heat protection, Over-current protection
	Compressor		Over-heat protection
Lubricant			MEL32
AHRI Ratings (Ducted/Non-ducted)	EER		11.5/12.4
	IEER		18.4/21.7
	COP		4.6/5.15
	SCHE		20.3/20.3

NOTES:

¹23°F EWT (Entering water temperature) is possible with glycol.

OUTDOOR UNIT: TQRYP1923AL41AN – DIMENSIONS

Note1. Seal around the water piping, the refrigerant piping, the power supply, and the control wiring and plug unused knockout holes with putty, etc., to prevent moisture or dirt from entering cabinet.

Note2. At the time of product shipment, the front side piping serves as the local drainage connection.

When connecting on the rear side, please remove the rear side plug sealing corks, and attach on the front side. Ensure there is no leak in piping system once connected.

Note3. See Fig. A and Fig. B for service clearances.

Note4. If piping is installed in front of the unit, provide clearances as shown in Fig. A and Fig. B.

Note5. Environmental condition for installation: -20~40°C(DB) (-4~104°F) for indoor installation.

Note6. In case the temperature around the heat source unit has possibility to drop under 0°C(32°F), be careful for the following point to prevent the pipe burst by the water pipe freeze-up.

- Circulate the water all the time even if heat source unit is not in operation and provide glycol for freeze protection.
- Drain the water from inside of the heat source unit when the heat source unit will not operate for a long term.

Note7. Ensure that the drain piping is downward with a pitch of more than 1/100.

Note8. At brazing of pipes, wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C(248°F).

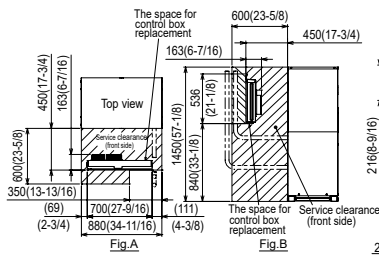


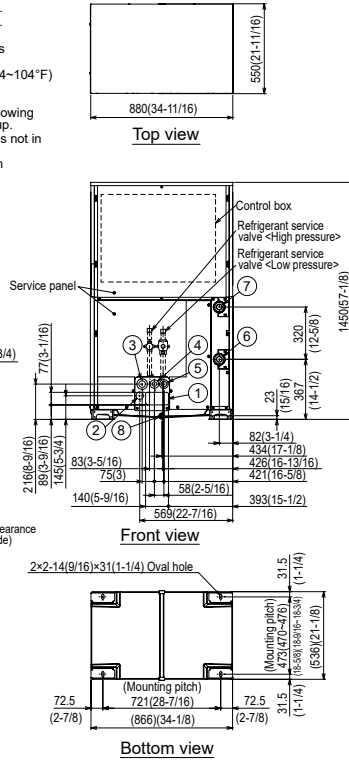
Fig. A

Fig. B

Connecting pipe specifications

Model	Diameter			
	Refrigerant pipe		Service valve	
	High pressure	Low pressure	High pressure	Low pressure
TQRYP140AL41AN	ø22.2 Braze (7/8) *1	ø28.58 Braze (1-1/8) *1	ø25.4 (1)	ø28.58 (1-1/8)
TQRYP180AL41AN				
TQRYP1923AL41AN				

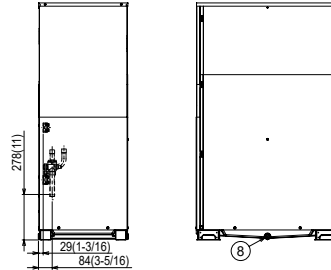
*1 Connect by using the connecting pipes that are supplied.



<Accessories>

- Refrigerant (high pressure) conn. pipe.....1pc. (P144/P168/P192; Packaged in the accessory kit)
- Refrigerant (low pressure) conn. pipe.....1pc. (P144/P168/P192; Packaged in the accessory kit)
- Water stopper.....1pc. (P144/P168/P192; Packaged in the accessory kit)
- Sealing material for water stopper.....1pc. (P144/P168/P192; Packaged in the accessory kit)
- Sealing material for field piping (high pressure, low pressure).....1pc. each (P144/P168/P192; Packaged in the accessory kit)
- Sealing material for drain socket.....1pc. (P144/P168/P192; Packaged in the accessory kit)
- Pipe cover for low pressure.....1pc. (P144/P168/P192; Packaged in the accessory kit)
- Sealing material for base leg (two types).....4pc. each (P144/P168/P192; Packaged in the accessory kit)
- Sealing material for panel.....1pc. (P144/P168/P192; Packaged in the accessory kit)

Top of unit casing not suitable for supporting system modules stacked above - field framing required for stacking modules of additional systems



Right side view

Back view

NO.	Usage	Specifications
①	Front through hole	140 × 77 Knockout hole (5-9/16) (3-1/16)
②	For pipes	Front through hole (Uses when training kit (optional parts) is mounted.) ø45 Knockout hole (1-13/16)
③	For wires	Front through hole ø62.7 or ø34.5 Knockout hole (2-1/2) (1-3/8)
④	For transmission cables	Front through hole ø43.7 or ø22.2 Knockout hole (1-3/4) (7/8)
⑤	For transmission cables	Front through hole ø34 Knockout hole (1-3/8)
⑥	Water pipe inlet	NPT 1-1/2 Screw
⑦	Water pipe outlet	NPT 1-1/2 Screw
⑧	Drain pipe	Rc3/4 Screw

Unit : mm(in)

Job Name: **Duluth City Hall**System Reference: **WHP-C1, WHP-E2**Date: **5-18-22****208/230V MODULAR WATER-SOURCE VRF HEAT PUMP SYSTEM****ACCESSORIES**

- Optical Relay for Flow Switch (One Piece)..... RIBTE24B
 Transformer 50VA (One Piece)..... TR50VA015
☐ 2" Temp sensor, optional (One Piece)..... ZM-TW200NPT KIT
☒ 2" EPIV Valve (One Piece)..... EV200S761ARXME
☒ BC Controller (Required)..... for details see BC Controller Submittals
☐ Joint Kit..... for details see Pipe Accessories Submittal

NOTE:

Requires two transformers

Requires one optical relay

Requires two temp sensors per one EPIV valve if optional temps sensors are used.

Specifications			System
Unit Type			TQRYP2163AL41AN
Cooling Capacity (Nominal)		BTU/H	216,000
Heating Capacity (Nominal)		BTU/H	243,000
Operating Temperature Range	Cooling (Indoor)	°F WB [°C WB]	59~75 [15.0~24.0]
	Heating (Indoor)	°F DB [°C DB]	59~81 [15.0~27.0]
Operating Water Temperature Range¹	Cooling/Heating	°F [°C]	50~113 [10~45]
External Dimensions (H x W x D)		In. [mm]	57-1/8 x 34-11/16 x 21-11/16 [1450 x 880 x 550]
Net Weight		Lbs. [kg]	558 [253]
External Finish			Galvanized steel sheets
Electrical Power Requirements	Voltage, Phase, Hertz, Power Tolerance		208/230, 3, 60, ±10%
Minimum Circuit Ampacity		A	69.0/0.0
Maximum Overcurrent Protection		A	110/110
SCCR		kA	5
Flow Rate		G/min (gpm)	50.7
		L/min	192
Pressure Drop		psi	6.53
		Ft.	15.1
Operation Volume Range		G/min (gpm)	26.4~63.4
		m³/h	6.0~14.4
Refrigerant Piping Diameter	Liquid (High Pressure)	In. [mm]	7/8 (1-1/8 for the part that exceeds 65 m) [22.2 (28.58 for the part that exceeds 65 m)] Braze
	Gas (Low Pressure)	In. [mm]	1-1/8 [28.58] Braze
Max. Total Refrigerant Line Length		Ft.	2460
Max. Refrigerant Line Length (Between ODU & IDU)		Ft.	541
Max. Control Wiring Length		Ft.	1640
Indoor Unit Connectable	Total Capacity		50.0~150.0% of heatsource unit capacity
	Model/Quantity		P06~P96/2.0~50.0
Sound Pressure Level		dB(A)	58.0/58.0
Compressor Operating Range			13.0% to 100.0%
Compressor	Type x Quantity		Inverter scroll hermetic x 1
Compressor Motor Output		kW	14.5
Refrigerant	Type x Original Charge		R410A x 25 lbs. + 13.0oz. [11.7 kg]
Protection Devices	High Pressure Protection		High pressure sensor, High pressure switch at 4.15 Mpa (601 psi)
	Inverter Circuit		Over-heat protection, Over-current protection
	Compressor		Over-heat protection
Lubricant			MEL32
AHRI Ratings (Ducted/Non-ducted)	EER		11.2/10.9
	IEER		19.0/21.2
	COP		4.75/5.23
	SCHE		19.7/19.7

NOTES:

¹23°F EWT (Entering water temperature) is possible with glycol.

Job Name: **Duluth City Hall**System Reference: **WHP-C2**Date: **5-18-22****208/230V MODULAR WATER-SOURCE VRF HEAT PUMP
SYSTEM****ACCESSORIES**

- Transformer 50VA (One Piece)..... TR50VA015
- ☐ 2" Temp sensor, optional (One Piece)..... ZM-TW200NPT KIT
- ☒ 2" EPIV Valve (One Piece)..... EV200S761ARXME
- ☒ Optical Relay for Flow Switch (One Piece)..... RIBTE24B
- ☒ BC Controller (Required)..... for details see BC Controller Submittals
- ☐ Joint Kit..... for details see Pipe Accessories Submittal

NOTE:

Requires two transformers

Requires one optical relay

Requires two temp sensors per one EPIV valve if optional temps sensors are used.

Specifications			System
Unit Type			TQRYP2403AL41AN
Cooling Capacity (Nominal)		BTU/H	240,000
Heating Capacity (Nominal)		BTU/H	270,000
Operating Temperature Range	Cooling (Indoor)	°F WB [°C WB]	59~75 [15.0~24.0]
	Heating (Indoor)	°F DB [°C DB]	59~81 [15.0~27.0]
Operating Water Temperature Range¹	Cooling/Heating	°F [°C]	50~113 [10~45]
External Dimensions (H x W x D)		In. [mm]	57-1/8 x 34-11/16 x 21-11/16 [1450 x 880 x 550]
Net Weight		Lbs. [kg]	558 [253]
External Finish			Galvanized steel sheets
Electrical Power Requirements	Voltage, Phase, Hertz, Power Tolerance		208/230, 3, 60, ±10%
Minimum Circuit Ampacity		A	79.0/0.0
Maximum Overcurrent Protection		A	125/125
SCCR		kA	5
Flow Rate		G/min (gpm)	50.7
		L/min	192
Pressure Drop		psi	6.53
		Ft.	15.1
Operation Volume Range		G/min (gpm)	26.4~63.4
		m3/h	6.0~14.4
Refrigerant Piping Diameter	Liquid (High Pressure)	In. [mm]	7/8 (1-1/8 for the part that exceeds 65 m) [22.2 (28.58 for the part that exceeds 65 m)] Braze
	Gas (Low Pressure)	In. [mm]	1-3/8 [34.93] Braze
Max. Total Refrigerant Line Length		Ft.	2460
Max. Refrigerant Line Length (Between ODU & IDU)		Ft.	541
Max. Control Wiring Length		Ft.	1640
Indoor Unit Connectable	Total Capacity		50.0~150.0% of heatsource unit capacity
	Model/Quantity		P06~P96/2.0~50.0
Sound Pressure Level		dB(A)	58.0/58.0
Compressor Operating Range			12.0% to 100.0%
Compressor	Type x Quantity		Inverter scroll hermetic x 1
Compressor Motor Output		kW	16.1
Refrigerant	Type x Original Charge		R410A x 25 lbs. + 13.0oz. [11.7 kg]
Protection Devices	High Pressure Protection		High pressure sensor, High pressure switch at 4.15 Mpa (601 psi)
	Inverter Circuit		Over-heat protection, Over-current protection
	Compressor		Over-heat protection
Lubricant			MEL32
AHRI Ratings (Ducted/Non-ducted)	EER		10.8/11.0
	IEER		18.8/21.2
	COP		4.52/9.05
	SCHE		19.7/19.7

NOTES:

¹23°F EWT (Entering water temperature) is possible with glycol.



MITSUBISHI ELECTRIC TRANE HVAC US

Branch Controllers

Job Name: Duluth City Hall
System Reference: 16-Port Main BC

Date: 5-18-22



SPECIFICATIONS

Indoor Unit Capacity Connectable to 1 Branch		Btu/h	54,000w
Number Of Branches		16	
Electrical Requirements			
Electrical Power Requirements		208 / 230V, 1 phase, 60Hz	
Minimum Circuit Ampacity (MCA)		A	1.57 / 1.82
Maximum Overcurrent Protection (MOCP)		A	15
Power Input (208 / 230V)			
Cooling		kW	0.258 / 0.333
Heating			0.137 / 0.176
Current Input (208 / 230V)			
Cooling		A	1.25 / 1.45
Heating			0.66 / 0.77
External Dimensions		In. (mm)	9-7/8 x 44-11/16 x 21-1/2 (250 x 1,135 x 545)
Net Weight		Lbs. (kg)	153 (69)
External finish		Galvanized steel plate (Lower part drain pan: Pre-coated galvanized sheets + powder coating)	
Connectable Outdoor / Heat Source Unit Capacity			72,000 to 432,000
Refrigerant Piping Diameter to Indoor Unit (Brazed)			
		Liquid	Gas
Less than 18,000 Btu/h	In. (mm)	1/4 (6.35)	1/2 (12.7)
	In. (mm)	3/8 (9.52)	5/8 (15.88)
Greater than 18,000 Btu/h	In. (mm)	3/8 (9.52)	3/4 (19.05)
	In. (mm)	3/8 (9.52)	7/8 (22.2)
Field drain pipe size		In. (mm)	3/4 NPT
Refrigerant		R410A	

NOTES:

1. Installation/foundation work, electrical connection work, insulation work, power source switch, and other items shall be referred to the Installation Manual.
2. The equipment is for R410A refrigerant.
3. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors. (For use in quiet environments with low background noise, position the BC CONTROLLER at least 5m away from any indoor units.)
4. Sound pressure/power level differs depending on the connected outdoor/heat source unit capacity or operation condition. The sound pressure/power level at the rated operation is the value of the cooling mode.
5. The sound pressure/power level values were obtained in an anechoic room. Actual sound pressure level is usually greater than that measured in anechoic room due to ambient noise and deflection sound.
6. The sound pressure level values were obtained at the location below 1.5m from the unit.
7. The solenoid valve switching sound is 56 dB (sound pressure level) regardless of the unit model.
8. Refrigerant piping diameter for connection of plural indoor units with 1 branch shall be referred to the Installation Manual.
9. This unit is not designed for outside installations.
10. When brazing the pipes, be sure to braze, after covering a wet cloth to the insulation pipes of the units in order to prevent it from burning and shrinking by heat.
11. Indoor unit capacity connectable to 1 branch is changed depending on the indoor unit type and connection method. Please refer to the Installation Manual for more information.
12. For the refrigerant pipe size, refer to Installation Manual of outdoor units/heat source units.

Specifications are subject to change without notice.

ACCESSORIES

Branch Joint (Downstream capacity ≤72,000 Btu/h)	CMY-Y102SS-G2*
Branch Joint (Downstream capacity 73,000-96,000 Btu/h)	CMY-Y102LS-G2*
Branch Joint (Downstream capacity ≤126,000 Btu/h)	CMY-R201S-G*
Branch Joint (Downstream capacity 127,000-216,000 Btu/h)	CMY-R202S-G*
Branch Joint (Downstream capacity 217,000-234,000 Btu/h)	CMY-R203S-G*
Branch Joint (Downstream capacity 235,000-360,000 Btu/h)	CMY-R204S-G*
Branch Joint (Downstream capacity ≥316,000 Btu/h)	CMY-R205S-G*
Condensate Pump (Blue Diamond)	X87-721
Condensate Pump (Sauerermann)	SI3100-230
Ball Valve (3/8" SAE Brazed)	BV38BBSI
Ball Valve (5/8" SAE Brazed)	BV58BBSI
Reducer (Between ODU and BC)	CMY-R302S-G1*
Reducer (Between Main and Sub BC)	CMY-R303S-G1

*See Data Book or Install Manual for more details

Refrigerant Piping Diameter to Outdoor Unit (Brazed)

		High Pressure	Low Pressure
P72	In. (mm)	5/8 (15.88)	3/4 (19.05)
P96	In. (mm)	3/4 (19.05)	7/8 (22.2)
P120	In. (mm)	3/4 (19.05)	7/8 (22.2) or 1-1/8 (28.58)
P144 to P192	In. (mm)	3/4 (19.05)	1-1/8 (28.58)
P216	In. (mm)	7/8 (22.2) or 1-1/8 (28.58)	1-1/8 (28.58)
P240	In. (mm)	7/8 (22.2) or 1-1/8 (28.58)	1-3/8 (34.93)
P264 to P288	In. (mm)	1-1/8 (28.58)	1-3/8 (34.93)
P312	In. (mm)	1-1/8 (28.58)	1-3/8 (34.93) or 1-5/8 (41.28)
P336	In. (mm)	1-1/8 (28.58)	1-5/8 (41.28)

Refrigerant Piping Diameter to other BC Controller (Brazed)

		High Pressure	Liquid Pipe	Low Pressure Pipe
P72	In. (mm)	5/8 (15.88)	3/8 (9.52)	3/4 (19.05)
P73 to P108	In. (mm)	3/4 (19.05)	3/8 (9.52)	7/8 (22.2)
P109 to P126	In. (mm)	3/4 (19.05)	1/2 (12.7)	1-1/8 (28.58)
P127 to P144	In. (mm)	7/8 (22.2)	1/2 (12.7)	1-1/8 (28.58)
P145 to P216	In. (mm)	7/8 (22.2)	5/8 (15.88)	1-1/8 (28.58)
P217 to P234	In. (mm)	1-1/8 (28.58)	5/8 (15.88)	1-1/8 (28.58)
P235 to P288	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-3/8 (34.93)
P289 to P360	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-5/8 (41.28)
P361 or above	In. (mm)	1-3/8 (34.93)	3/4 (19.05)	1-5/8 (41.28)

Sound power level (measured in anechoic room)

Rated operation	dB(A)	66
Defrost		73

Sound pressure level (measured in anechoic room)

Rated operation	dB(A)	48
Defrost		55

Model: TCMBM1016KA11N4 - DIMENSIONS

TCMBM1016KA11N4

Unit: mm(in)

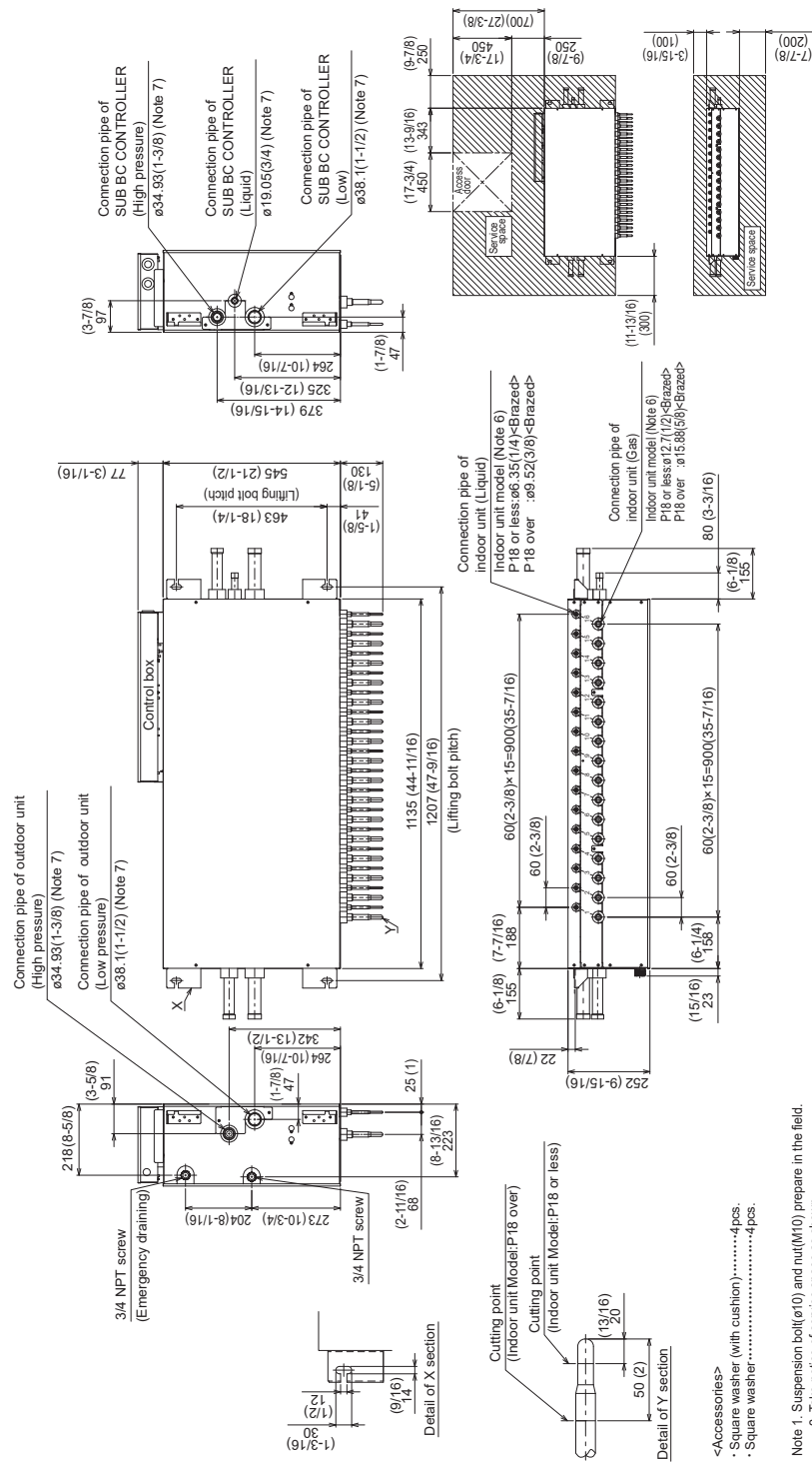


Table-2. To other BC controller (Note 7)

Total downstream indoor unit capacity	High press. Pipe	Liquid Pipe	Low press. Pipe
~072	ø15.88(5/8)	ø9.52(3/8)	ø19.05(3/4)
073~108	ø19.05(3/4)	ø9.52(3/8)	ø22.2(7/8)
109~126	ø19.05(3/4)	ø12.7(1/2)	ø28.58(1-1/8)
127~144	ø22.2(7/8)	ø12.7(1/2)	ø28.58(1-1/8)
145~216	ø22.2(7/8)	ø15.88(5/8)	ø28.58(1-1/8)
217~234	ø28.58(1-1/8)	ø15.88(5/8)	ø28.58(1-1/8)
235~288	ø28.58(1-1/8)	ø19.05(3/4)	ø34.93(1-3/8)
289~360	ø28.58(1-1/8)	ø19.05(3/4)	ø41.28(1-5/8)
361~	ø34.93(1-3/8)	ø19.05(3/4)	ø41.28(1-5/8)

Table-1. To outdoor/heat source unit (Note 7)

Connectable unit capacity	High press. Pipe	Low press. Pipe
072	ø15.88(5/8)	ø19.05(3/4)
096	ø19.05(3/4)	ø22.2(7/8) or ø28.58(1-1/8)
120	ø19.05(3/4)	ø22.2(7/8) or ø28.58(1-1/8)
144 to 192	ø22.2(7/8)	ø28.58(1-1/8)
216	ø22.2(7/8) or ø28.58(1-1/8)	ø28.58(1-1/8)
240	ø22.2(7/8) or ø28.58(1-1/8)	ø34.93(1-3/8)
264 to 288	ø28.58(1-1/8)	ø34.93(1-3/8)
312	ø28.58(1-1/8)	ø41.28(1-5/8) or ø41.28(1-5/8)
336 to 384	ø34.93(1-3/8)	ø41.28(1-5/8)
408 to 432	ø34.93(1-3/8)	ø41.28(1-5/8)

*For the refrigerant pipe size, refer to Installation Manual of outdoor units/heat source units.

Note 1. Suspension bolt(ø10) and nut(M10) prepare in the field.

2. Take notice of service space as shown.

3. Please take service space for connection pipe of SUB BC CONTROLLER.

4. When using an outdoor unit-38HP(P950) or more, use this product.

5. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors.

6. Refer to the Installation Manual for refrigerant piping diameter size when connecting plural indoor units with 1 branch.

7. Refer to the Table-1,2 for connection pipe of outdoor unit or SUB BC CONTROLLER diameter size.

8. Refer to the Installation Manual for insulation of connection pipe and drain piping.

9. Do not place the BC controller directly on the floor.

<Accessories>
 • Square washer (with cushion).....4pcs.
 • Square washer.....4pcs.

Job Name: **Duluth City Hall**
System Reference: **Duluth City Hall**

Date: **Duluth City Hall**



SPECIFICATIONS

Indoor Unit Capacity Connectable to 1 Branch	Btu/h	54,000
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Number Of Branches	12
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Electrical Requirements		
Electrical Power Requirements	208 / 230V, 1 phase, 60Hz	
Minimum Circuit Ampacity (MCA)	A	1.57 / 1.82

Power Input (208 / 230V)		
Cooling	kW	0.198 / 0.255
Heating		0.106 / 0.137

Current Input (208 / 230V)		
Cooling	A	0.95 / 0.11
Heating		0.52 / 0.60

External Dimensions	In. (mm)	9-7/8 x 44-11/16 x 21-1/2 (250 x 1,135 x 545)
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Net Weight	Lbs. (kg)	133 (60)
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External finish	Galvanized steel plate (Lower part drain pan: Pre-coated galvanized sheets + powder coating)	
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Connectable Outdoor / Heat Source Unit Capacity	72,000 to 336,000
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Refrigerant Piping Diameter to Indoor Unit (Brazed)			
		Liquid	Gas
Less than 18,000 Btu/h	In. (mm)	1/4 (6.35)	1/2 (12.7)
	In. (mm)	3/8 (9.52)	5/8 (15.88)
Greater than 18,000 Btu/h	In. (mm)	3/8 (9.52)	3/4 (19.05)
	In. (mm)	3/8 (9.52)	7/8 (22.2)

Field drain pipe size	In. (mm)	3/4 NPT
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Refrigerant	R410A
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ACCESSORIES

- ☐ Branch Joint (Downstream capacity ≤72,000 Btu/h)..... CMY-Y102SS-G2*
- ☐ Branch Joint (Downstream capacity 73,000-96,000 Btu/h)..... CMY-Y102LS-G2*
- ☐ Branch Joint (Downstream capacity ≤126,000 Btu/h)..... CMY-R201S-G*
- ☐ Branch Joint (Downstream capacity 127,000-216,000 Btu/h)..... CMY-R202S-G*
- ☐ Branch Joint (Downstream capacity 217,000-234,000 Btu/h)..... CMY-R203S-G*
- ☐ Branch Joint (Downstream capacity 235,000-360,000 Btu/h)..... CMY-R204S-G*
- ☐ Branch Joint (Downstream capacity ≥316,000 Btu/h)..... CMY-R205S-G*
- ☐ Condensate Pump (Blue Diamond)..... X87-721
- ☐ Condensate Pump (Sauer mann)..... SI3100-230
- ☐ Ball Valve (3/8" SAE Brazed)..... BV38BBSI
- ☐ Ball Valve (5/8" SAE Brazed)..... BV58BBSI
- ☐ Reducer (Between ODU and BC)..... CMY-R302S-G1*
- ☐ Reducer (Between Main and Sub BC)..... CMY-R303S-G1

*See Data Book or Install Manual for more details

Refrigerant Piping Diameter to Outdoor Unit (Brazed)			
		High Pressure	Low Pressure
072	In. (mm)	5/8 (15.88)	3/4 (19.05)
096	In. (mm)	3/4 (19.05)	7/8 (22.2)
120	In. (mm)	3/4 (19.05)	7/8 (22.2) or 1-1/8 (28.58)
144 to 192	In. (mm)	3/4 (19.05)	1-1/8 (28.58)
216	In. (mm)	7/8 (22.2) or 1-1/8 (28.58)	1-1/8 (28.58)
240	In. (mm)	7/8 (22.2) or 1-1/8 (28.58)	1-3/8 (34.93)
264 to 288	In. (mm)	1-1/8 (28.58)	1-3/8 (34.93)
312	In. (mm)	1-1/8 (28.58)	1-3/8 (34.93) or 1-5/8 (41.28)
336	In. (mm)	1-1/8 (28.58)	1-5/8 (41.28)

Refrigerant Piping Diameter to other BC Controller (Brazed)				
		High Pressure	Liquid Pipe	Low Pressure Pipe
072	In. (mm)	5/8 (15.88)	3/8 (9.52)	3/4 (19.05)
073 to 108	In. (mm)	3/4 (19.05)	3/8 (9.52)	7/8 (22.2)
109 to 126	In. (mm)	3/4 (19.05)	1/2 (12.7)	1-1/8 (28.58)
127 to 144	In. (mm)	7/8 (22.2)	1/2 (12.7)	1-1/8 (28.58)
145 to 216	In. (mm)	7/8 (22.2)	5/8 (15.88)	1-1/8 (28.58)
217 to 234	In. (mm)	1-1/8 (28.58)	5/8 (15.88)	1-1/8 (28.58)
235 to 288	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-3/8 (34.93)
289 to 360	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-5/8 (41.28)
361 or above	In. (mm)	1-3/8 (34.93)	3/4 (19.05)	1-5/8 (41.28)

Sound power level (measured in anechoic room)		
Rated operation	dB(A)	68
Defrost		74

Sound pressure level (measured in anechoic room)		
Rated operation	dB(A)	50
Defrost		56

NOTES:

1. Installation/foundation work, electrical connection work, insulation work, power source switch, and other items shall be referred to the Installation Manual.
2. The equipment is for R410A refrigerant.
3. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors. (For use in quiet environments with low background noise, position the BC CONTROLLER at least 5m away from any indoor units.)
4. Sound pressure/power level differs depending on the connected outdoor/heat source unit capacity or operation condition. The sound pressure/power level at the rated operation is the value of the cooling mode.
5. The sound pressure/power level values were obtained in an anechoic room. Actual sound pressure level is usually greater than that measured in anechoic room due to ambient noise and deflection sound.
6. The sound pressure level values were obtained at the location below 1.5m from the unit.
7. The solenoid valve switching sound is 56 dB (sound pressure level) regardless of the unit model.
8. Refrigerant piping diameter for connection of plural indoor units with 1 branch shall be referred to the Installation Manual.
9. This unit is not designed for outside installations.
10. When brazing the pipes, be sure to braze, after covering a wet cloth to the insulation pipes of the units in order to prevent it from burning and shrinking by heat.
11. Indoor unit capacity connectable to 1 branch is changed depending on the indoor unit type and connection method. Please refer to the Installation Manual for more information.
12. For the refrigerant pipe size, refer to Installation Manual of outdoor units/heat source units.

TCMB0108, 1012, 1016JA

Unit: mm(in)

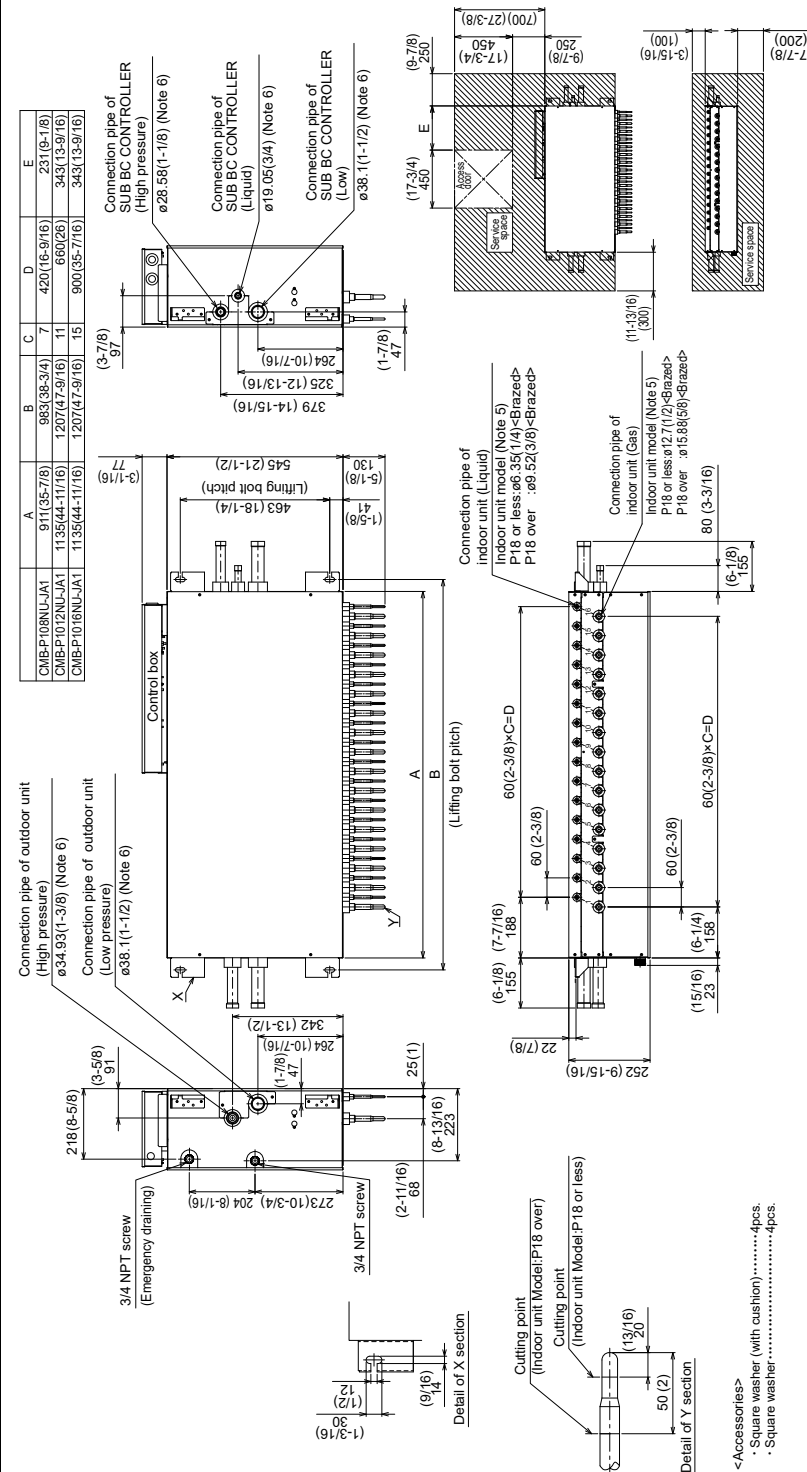


Table-1. To outdoor/heat source unit (Note 6)

Connectable unit capacity	High press. Pipe	Low press. Pipe
072	ø15.88(5/8)	ø19.05(3/4)
096	ø15.88(5/8)	ø19.05(3/4)
120	ø15.88(5/8)	ø19.05(3/4)
144	ø15.88(5/8)	ø19.05(3/4)
168	ø15.88(5/8)	ø19.05(3/4)
192	ø15.88(5/8)	ø19.05(3/4)
216	ø15.88(5/8)	ø19.05(3/4)
240	ø15.88(5/8)	ø19.05(3/4)
264	ø15.88(5/8)	ø19.05(3/4)
312	ø15.88(5/8)	ø19.05(3/4)
336	ø15.88(5/8)	ø19.05(3/4)

Table-2. To other BC controller (Note 6)

Total downstream indoor unit capacity	High press. Pipe	Liquid Pipe	Low press. Pipe
072	ø15.88(5/8)	ø15.88(5/8)	ø19.05(3/4)
096	ø15.88(5/8)	ø15.88(5/8)	ø19.05(3/4)
120	ø15.88(5/8)	ø15.88(5/8)	ø19.05(3/4)
144	ø15.88(5/8)	ø15.88(5/8)	ø19.05(3/4)
168	ø15.88(5/8)	ø15.88(5/8)	ø19.05(3/4)
192	ø15.88(5/8)	ø15.88(5/8)	ø19.05(3/4)
216	ø15.88(5/8)	ø15.88(5/8)	ø19.05(3/4)
240	ø15.88(5/8)	ø15.88(5/8)	ø19.05(3/4)
264	ø15.88(5/8)	ø15.88(5/8)	ø19.05(3/4)
312	ø15.88(5/8)	ø15.88(5/8)	ø19.05(3/4)
336	ø15.88(5/8)	ø15.88(5/8)	ø19.05(3/4)

Note 1. Suspension bolt(ø10) and nut(M10) prepare in the field.

2. Take notice of service space as shown.

3. Please give attention not to occupy service space by letting ducts and pipes through.)

4. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors.

5. For use in quiet environments with low background noise, position the BC CONTROLLER at least 5m away from any indoor units.

6. Refer to the Installation Manual for refrigerant piping diameter size when connecting plural indoor units with 1 branch.

7. Refer to the Table-1.2 connection pipe of outdoor unit or SUB BC CONTROLLER diameter size.

8. Refer to the Installation Manual for insulation of connection pipe and drain piping.

9. Do not place the BC controller directly on the floor.

Job Name: **Duluth City Hall**System Reference: **Duluth City Hall**Date: **Duluth City Hall****SPECIFICATIONS**

Indoor Unit Capacity Connectable to 1 Branch	Btu/h	54,000
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Number Of Branches	8
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Electrical Requirements		
Electrical Power Requirements	208 / 230V, 1 phase, 60Hz	
Minimum Circuit Ampacity (MCA)	A	0.83 / 0.97
Maximum Overcurrent Protection (MOCP)	A	15

Power Input (208 / 230V)		
Cooling	kW	0.137 / 0.176
Heating		0.076 / 0.098

Current Input (208 / 230V)		
Cooling	A	0.66 / 0.77
Heating		0.37 / 0.43

External Dimensions	In. (mm)	9-7/8 x 35-7/8 x 21-1/2 (250 x 911 x 545)
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Net Weight	Lbs. (kg)	106 (48)
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External finish	Galvanized steel plate (Lower part drain pan: Pre-coated galvanized sheets + powder coating)	
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Connectable Outdoor / Heat Source Unit Capacity	72,000 to 336,000
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Refrigerant Piping Diameter to Indoor Unit (Brazed)			
		Liquid	Gas
Less than 18,000 Btu/h	In. (mm)	1/4 (6.35)	1/2 (12.7)
	In. (mm)	3/8 (9.52)	5/8 (15.88)
Greater than 18,000 Btu/h	In. (mm)	3/8 (9.52)	3/4 (19.05)
	In. (mm)	3/8 (9.52)	7/8 (22.2)

Field drain pipe size	In. (mm)	3/4 NPT
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Refrigerant	R410A
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ACCESSORIES

- ☐ Branch Joint (Downstream capacity ≤72,000 Btu/h)..... CMY-Y102SS-G2*
- ☐ Branch Joint (Downstream capacity 73,000-96,000 Btu/h)..... CMY-Y102LS-G2*
- ☐ Branch Joint (Downstream capacity ≤126,000 Btu/h)..... CMY-R201S-G*
- ☐ Branch Joint (Downstream capacity 127,000-216,000 Btu/h)..... CMY-R202S-G*
- ☐ Branch Joint (Downstream capacity 217,000-234,000 Btu/h)..... CMY-R203S-G*
- ☐ Branch Joint (Downstream capacity 235,000-360,000 Btu/h)..... CMY-R204S-G*
- ☐ Branch Joint (Downstream capacity ≥316,000 Btu/h)..... CMY-R205S-G*
- ☐ Condensate Pump (Blue Diamond)..... X87-721
- ☐ Condensate Pump (Sauer mann)..... SI3100-230
- ☐ Ball Valve (3/8" SAE Brazed)..... BV38BBSI
- ☐ Ball Valve (5/8" SAE Brazed)..... BV58BBSI
- ☐ Reducer (Between ODU and BC)..... CMY-R302S-G1*
- ☐ Reducer (Between Main and Sub BC)..... CMY-R303S-G1*

*See Data Book or Install Manual for more details

Refrigerant Piping Diameter to Outdoor Unit (Brazed)			
		High Pressure	Low Pressure
072	In. (mm)	5/8 (15.88)	3/4 (19.05)
096	In. (mm)	3/4 (19.05)	7/8 (22.2)
120	In. (mm)	3/4 (19.05)	7/8 (22.2) or 1-1/8 (28.58)
144 to 192	In. (mm)	3/4 (19.05)	1-1/8 (28.58)
216	In. (mm)	7/8 (22.2) or 1-1/8 (28.58)	1-1/8 (28.58)
240	In. (mm)	7/8 (22.2) or 1-1/8 (28.58)	1-3/8 (34.93)
264 to 288	In. (mm)	1-1/8 (28.58)	1-3/8 (34.93)
312	In. (mm)	1-1/8 (28.58)	1-3/8 (34.93) or 1-5/8 (41.28)
336	In. (mm)	1-1/8 (28.58)	1-5/8 (41.28)

Refrigerant Piping Diameter to other BC Controller (Brazed)				
		High Pressure	Liquid Pipe	Low Pressure Pipe
072	In. (mm)	5/8 (15.88)	3/8 (9.52)	3/4 (19.05)
073 to 108	In. (mm)	3/4 (19.05)	3/8 (9.52)	7/8 (22.2)
109 to 126	In. (mm)	3/4 (19.05)	1/2 (12.7)	1-1/8 (28.58)
127 to 144	In. (mm)	7/8 (22.2)	1/2 (12.7)	1-1/8 (28.58)
145 to 216	In. (mm)	7/8 (22.2)	5/8 (15.88)	1-1/8 (28.58)
217 to 234	In. (mm)	1-1/8 (28.58)	5/8 (15.88)	1-1/8 (28.58)
235 to 288	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-3/8 (34.93)
289 to 360	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-5/8 (41.28)
361 or above	In. (mm)	1-3/8 (34.93)	3/4 (19.05)	1-5/8 (41.28)

Sound power level (measured in anechoic room)		
Rated operation	dB(A)	68
Defrost		74

Sound pressure level (measured in anechoic room)		
Rated operation	dB(A)	50
Defrost		56

NOTES:

1. Installation/foundation work, electrical connection work, insulation work, power source switch, and other items shall be referred to the Installation Manual.
2. The equipment is for R410A refrigerant.
3. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors. (For use in quiet environments with low background noise, position the BC CONTROLLER at least 5m away from any indoor units.)
4. Sound pressure/power level differs depending on the connected outdoor/heat source unit capacity or operation condition. The sound pressure/power level at the rated operation is the value of the cooling mode.
5. The sound pressure/power level values were obtained in an anechoic room. Actual sound pressure level is usually greater than that measured in anechoic room due to ambient noise and deflection sound.
6. The sound pressure level values were obtained at the location below 1.5m from the unit.
7. The solenoid valve switching sound is 56 dB (sound pressure level) regardless of the unit model.
8. Refrigerant piping diameter for connection of plural indoor units with 1 branch shall be referred to the Installation Manual.
9. This unit is not designed for outside installations.
10. When brazing the pipes, be sure to braze, after covering a wet cloth to the insulation pipes of the units in order to prevent it from burning and shrinking by heat.
11. Indoor unit capacity connectable to 1 branch is changed depending on the indoor unit type and connection method. Please refer to the Installation Manual for more information.
12. For the refrigerant pipe size, refer to Installation Manual of outdoor units/heat source units.

TCMB0108, 1012, 1016JA

Unit: mm(in)

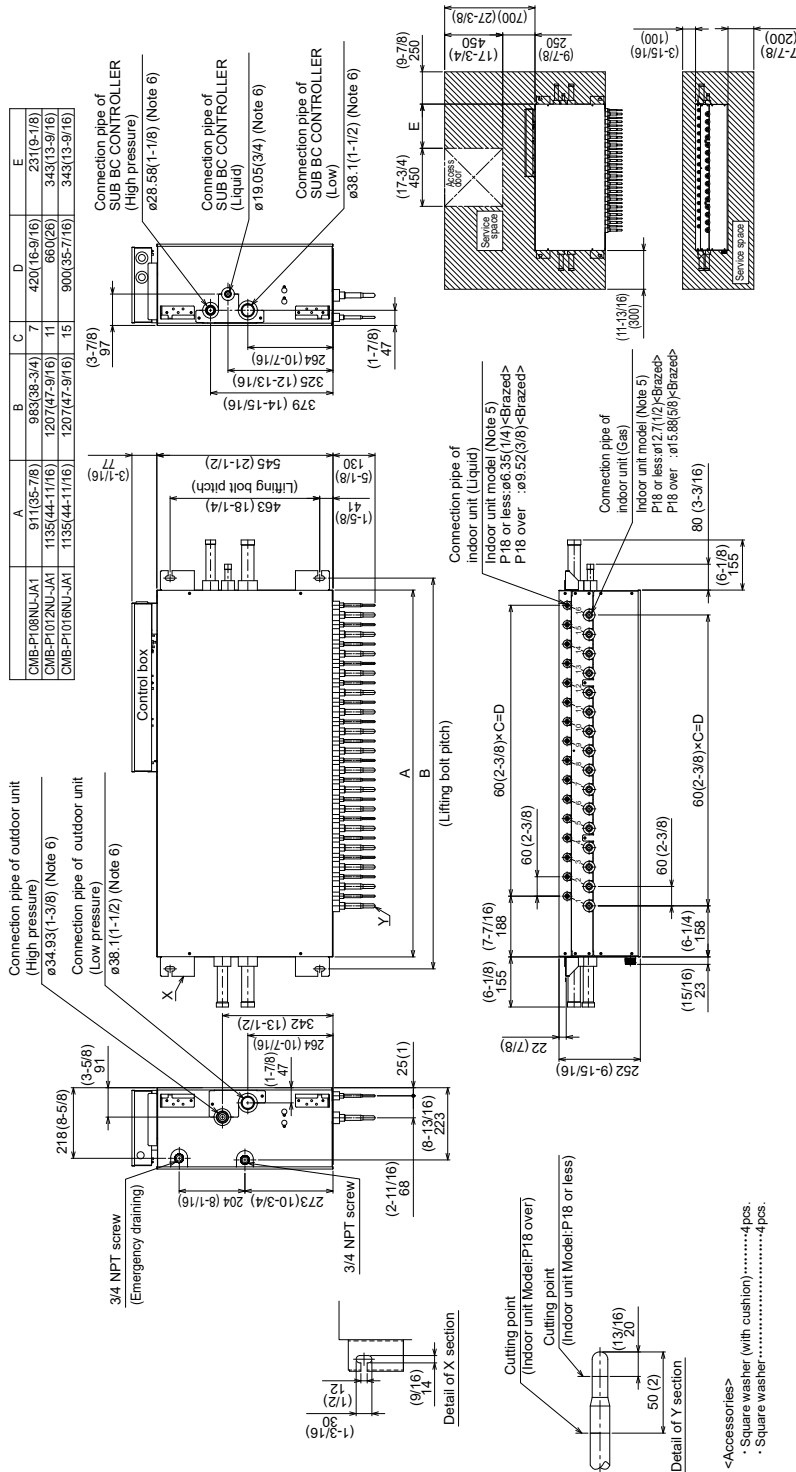


Table-2. To other BC controller (Note 6)

Total downstream Indoor unit capacity	High press. Pipe	Liquid Pipe	Low press. Pipe
~72	ø15.88(5/8)	ø8.52(3/8)	ø19.05(3/4)
73~108	ø18.03(7/8)	ø8.52(3/8)	ø22.7(7/8)
109~145	ø19.05(3/4)	ø12.7(1/2)	ø28.58(1.1)
146~216	ø22.7(7/8)	ø15.88(5/8)	ø28.58(1.1)
217~234	ø28.58(1.1)	ø19.05(3/4)	ø34.93(1.38)
235~288	ø28.58(1.1)	ø19.05(3/4)	ø41.28(1.6)
289~360	ø34.93(1.38)	ø19.05(3/4)	ø41.28(1.6)
361~	ø41.28(1.6)	ø19.05(3/4)	ø41.28(1.6)

Table-1. To outdoor/heat source unit (Note 6)

Connectable unit capacity	High press. Pipe	Low press. Pipe
072	ø15.88(5/8)	ø19.05(3/4)
096	ø18.03(7/8)	ø22.7(7/8)
144 to 192	ø22.7(7/8) or ø28.58(1.1)	ø28.58(1.1)
216	ø28.58(1.1)	ø34.93(1.38)
240	ø34.93(1.38)	ø41.28(1.6)
264 to 288	ø41.28(1.6)	ø41.28(1.6)
312	ø41.28(1.6)	ø41.28(1.6)
336	ø41.28(1.6)	ø41.28(1.6)

* For the refrigerant pipe size, refer to Installation Manual of outdoor units/heat source units.

Note 1. Suspension bolt(ø10) and nut(M10) prepare in the field.

2. Take notice of service space as shown.

3. Please take service space for connection pipe of SUB BC CONTROLLER.

4. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors.

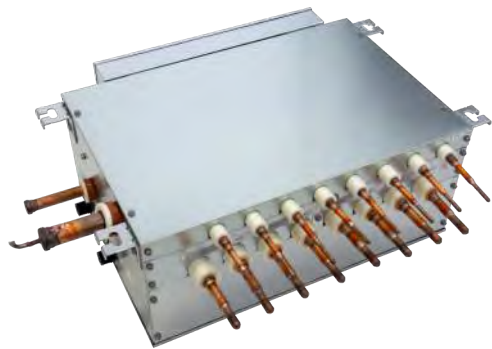
(For use in quiet environments with low background noise, position the BC CONTROLLER at least 5m away from any indoor units.)

5. Refer to the Installation Manual for refrigerant piping diameter size when connecting plural indoor units with 1 branch.

6. Refer to the Table-1.2 connection pipe of outdoor unit or SUB BC CONTROLLER diameter size.

7. Refer to the Installation Manual for insulation of connection pipe and drain piping.

8. Do not place the BC controller directly on the floor.

Job Name: **Duluth City Hall**System Reference: **Duluth City Hall**Date: **Duluth City Hall****ACCESSORIES**

- ☐ Branch Joint (Downstream capacity ≤72,000 Btu/h)..... CMY-Y102SS-G2*
☐ Branch Joint (Downstream capacity 73,000-96,000 Btu/h)..... CMY-Y102LS-G2*
☐ Condensate Pump (Blue Diamond)..... X87-721
☐ Condensate Pump (Sauerermann)..... SI3100-230
☐ Ball Valve (3/8" SAE Brazed)..... BV38BBSI
☐ Ball Valve (5/8" SAE Brazed)..... BV58BBSI
☐ Reducer (Between Main and Sub BC)..... CMY-R306S-G1

*See Data Book or Install Manual for more details

SPECIFICATIONS

Indoor Unit Capacity Connectable to 1 Branch	Btu/h	54,000
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Number Of Branches	8
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Electrical Requirements		
Electrical Power Requirements	208 / 230V, 1 phase, 60Hz	
Minimum Circuit Ampacity (MCA)	A	0.74 / 0.87
Maximum Overcurrent Protection (MOCP)	A	15

Power Input (208 / 230V)		
Cooling	kW	0.122 / 0.157
Heating		0.061 / 0.078

Current Input (208 / 230V)		
Cooling	A	0.59 / 0.69
Heating		0.30 / 0.35

External Dimensions	In. (mm)	9-7/8 x 23-1/2 x 15-11/16 (250 x 596 x 398)
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Net Weight	Lbs. (kg)	69 (31)
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External finish	Galvanized steel plate (Lower part drain pan: Pre-coated galvanized sheets + powder coating)	
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Maximum Connectable Sub BC Controllers	11
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Maximum Connectable Capacity of Indoor Units	126,000
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Refrigerant Piping Diameter to Indoor Unit (Brazed)			
		Liquid	Gas
Less than 18,000 Btu/h	In. (mm)	1/4 (6.35)	1/2 (12.7)
	In. (mm)	3/8 (9.52)	5/8 (15.88)
Greater than 18,000 Btu/h	In. (mm)	3/8 (9.52)	3/4 (19.05)

Field drain pipe size	In. (mm)	3/4 NPT
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Refrigerant	R410A
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Refrigerant Piping Diameter to other BC Controller				
		High Pressure	Liquid Pipe	Low Pressure Pipe
072	In. (mm)	5/8 (15.88)	3/8 (9.52)	3/4 (19.05)
073 to 108	In. (mm)	3/4 (19.05)	3/8 (9.52)	7/8 (22.2)
109 to 126	In. (mm)	3/4 (19.05)	1/2 (12.7)	1-1/8 (28.58)
127 to 144	In. (mm)	7/8 (22.2)	1/2 (12.7)	1-1/8 (28.58)
145 to 216	In. (mm)	7/8 (22.2)	5/8 (15.88)	1-1/8 (28.58)
217 to 234	In. (mm)	1-1/8 (28.58)	5/8 (15.88)	1-1/8 (28.58)
235 to 288	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-3/8 (34.93)
289 to 360	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-5/8 (41.28)
361 or above	In. (mm)	1-3/8 (34.93)	3/4 (19.05)	1-5/8 (41.28)

Sound power level (measured in anechoic room)		
Rated operation	dB(A)	59
Defrost		71

Sound pressure level (measured in anechoic room)		
Rated operation	dB(A)	40
Defrost		53

NOTES:

1. Installation/foundation work, electrical connection work, insulation work, power source switch, and other items shall be referred to the Installation Manual.
2. The equipment is for R410A refrigerant.
3. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors. (For use in quiet environments with low background noise, position the BC CONTROLLER at least 5m away from any indoor units.)
4. Sound pressure/power level differs depending on the connected outdoor/heat source unit capacity or operation condition. The sound pressure/power level at the rated operation is the value of the cooling mode.
5. The sound pressure/power level values were obtained in an anechoic room. Actual sound pressure level is usually greater than that measured in anechoic room due to ambient noise and deflection sound.
6. The sound pressure level values were obtained at the location below 1.5m from the unit.
7. The solenoid valve switching sound is 56 dB (sound pressure level) regardless of the unit model.
8. Refrigerant piping diameter for connection of plural indoor units with 1 branch shall be referred to the Installation Manual.
9. This unit is not designed for outside installations.
10. When brazing the pipes, be sure to braze, after covering a wet cloth to the insulation pipes of the units in order to prevent it from burning and shrinking by heat.
11. Indoor unit capacity connectable to 1 branch is changed depending on the indoor unit type and connection method. Please refer to the Installation Manual for more information.
12. For the refrigerant pipe size, refer to Installation Manual of outdoor units/heat source units.
13. Sub BC Controllers cannot be used alone or with a Single BC Controller. They must be used in conjunction with a main BC Controller

Model: TCMB0108KB11N4 - DIMENSIONS

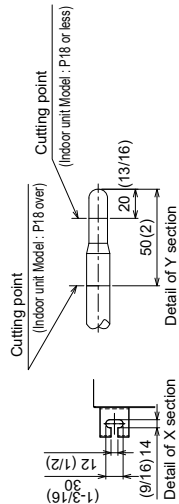
TCMB0104, 0108KB

Unit: mm(in)

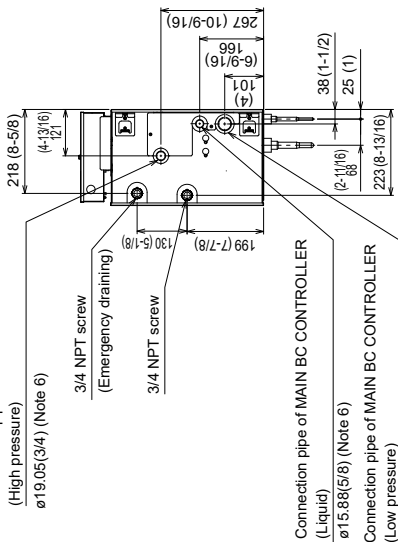
<Accessories>

- Square washer (with cushion).....4pcs.
- Square washer.....4pcs.

- Note 1. Suspension bolt(ø10) and nut(M10) prepare in the field.
- Note 2. Take notice of service space as shown.
(Please give attention not to occupy service space by letting ducts and pipes through.)
- Note 3. Can't use singleness. (MAIN BC CONTROLLER is necessary.)
- Note 4. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors.
(For use in quiet environments with low background noise, position the BC CONTROLLER at least 5m away from any indoor units.)
- Note 5. Refer to the Installation Manual for refrigerant piping diameter size when connecting plural indoor units with 1 branch.
- Note 6. Refer to the Table-1 for connection pipe of MAIN BC CONTROLLER.
- Note 7. Refer to the Installation Manual for insulation of connection pipe and drain piping.
- Note 8. Do not place the BC controller directly on the floor.



Connection pipe of MAIN BC CONTROLLER
(High pressure)
ø19.05(3/4) (Note 6)

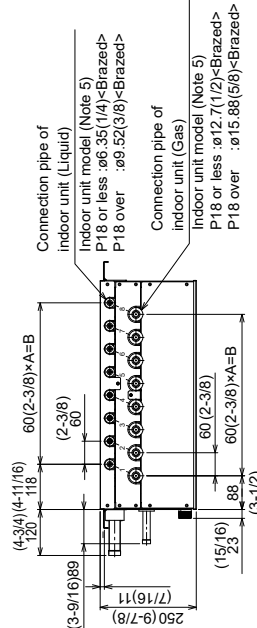
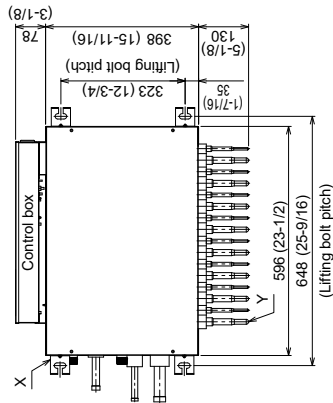


Connection pipe of MAIN BC CONTROLLER
(Liquid)
ø15.88(5/8) (Note 6)

Connection pipe of MAIN BC CONTROLLER
(Low pressure)
ø28.58(1-1/8) (Note 6)

Table-1. To other BC controller (Note 6)

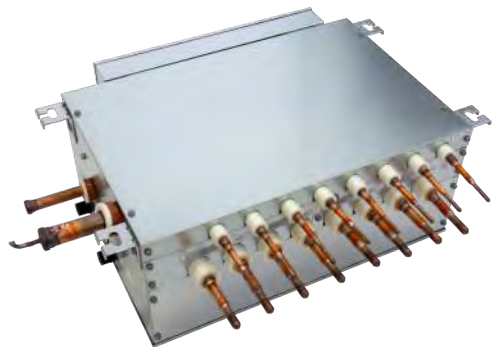
Total downstream indoor unit capacity	High press. Pipe	Liquid Pipe	Low press. Pipe
-072	ø15.88(5/8)	ø9.52(3/8)	ø19.05(3/4)
073~108	ø19.05(3/4)	ø9.52(3/8)	ø22.7(7/8)
109~126	ø19.05(3/4)	ø12.7(1/2)	ø28.58(1-1/8)
127~144	ø22.7(7/8)	ø12.7(1/2)	ø28.58(1-1/8)
145~216	ø22.7(7/8)	ø15.88(5/8)	ø28.58(1-1/8)
217~234	ø28.58(1-1/8)	ø15.88(5/8)	ø28.58(1-1/8)
235~288	ø28.58(1-1/8)	ø19.05(3/4)	ø34.93(1-3/8)
289~360	ø28.58(1-1/8)	ø19.05(3/4)	ø41.28(1-5/8)
361~	ø34.93(1-3/8)	ø19.05(3/4)	ø41.28(1-5/8)



	A	B
CMB-P104NU-KB1	3	180(7-1/8)
CMB-P108NU-KB1	7	420(16-9/16)

Job Name: **Duluth City Hall**
 System Reference: **Duluth City Hall**

Date: **Duluth City Hall**



ACCESSORIES

- ☐ Branch Joint (Downstream capacity ≤72,000 Btu/h)..... CMY-Y102SS-G2*
☐ Branch Joint (Downstream capacity 73,000-96,000 Btu/h)..... CMY-Y102LS-G2*
☐ Condensate Pump (Blue Diamond)..... X87-721
☒ Condensate Pump (Sauer mann)..... SI3100-230
☐ Ball Valve (3/8" SAE Braze d)..... BV38BBSI
☐ Ball Valve (5/8" SAE Braze d)..... BV58BBSI
☐ Reducer (Between Main and Sub BC)..... CMY-R306S-G1

*See Data Book or Install Manual for more details

SPECIFICATIONS

Indoor Unit Capacity Connectable to 1 Branch	Btu/h	54,000
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Number Of Branches	4
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Electrical Requirements		
Electrical Power Requirements	208 / 230V, 1 phase, 60Hz	
Minimum Circuit Ampacity (MCA)	A	0.34 / 0.44
Maximum Overcurrent Protection (MOCP)	A	15

Power Input (208 / 230V)		
Cooling	kW	0.061 / 0.078
Heating		0.030 / 0.039

Current Input (208 / 230V)		
Cooling	A	0.30 / 0.35
Heating		0.15 / 0.18

External Dimensions	In. (mm)	9-7/8 x 23-1/2 x 15-11/16 (250 x 596 x 398)
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Net Weight	Lbs. (kg)	51 (23)
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External finish	Galvanized steel plate (Lower part drain pan: Pre-coated galvanized sheets + powder coating)	
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Maximum Connectable Sub BC Controllers	11
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Maximum Connectable Capacity of Indoor Units	126,000
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Refrigerant Piping Diameter to Indoor Unit (Braze d)			
		Liquid	Gas
Less than 18,000 Btu/h	In. (mm)	1/4 (6.35)	1/2 (12.7)
Greater than 18,000 Btu/h	In. (mm)	3/8 (9.52)	5/8 (15.88)
	In. (mm)	3/8 (9.52)	3/4 (19.05)

Field drain pipe size	In. (mm)	3/4 NPT
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Refrigerant	R410A
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Refrigerant Piping Diameter to other BC Controller				
		High Pressure	Liquid Pipe	Low Pressure Pipe
072	In. (mm)	5/8 (15.88)	3/8 (9.52)	3/4 (19.05)
073 to 108	In. (mm)	3/4 (19.05)	3/8 (9.52)	7/8 (22.2)
109 to 126	In. (mm)	3/4 (19.05)	1/2 (12.7)	1-1/8 (28.58)
127 to 144	In. (mm)	7/8 (22.2)	1/2 (12.7)	1-1/8 (28.58)
145 to 216	In. (mm)	7/8 (22.2)	5/8 (15.88)	1-1/8 (28.58)
217 to 234	In. (mm)	1-1/8 (28.58)	5/8 (15.88)	1-1/8 (28.58)
235 to 288	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-3/8 (34.93)
289 to 360	In. (mm)	1-1/8 (28.58)	3/4 (19.05)	1-5/8 (41.28)
361 or above	In. (mm)	1-3/8 (34.93)	3/4 (19.05)	1-5/8 (41.28)

Sound power level (measured in anechoic room)		
Rated operation	dB(A)	59
Defrost		71

Sound pressure level (measured in anechoic room)		
Rated operation	dB(A)	40
Defrost		53

NOTES:

1. Installation/foundation work, electrical connection work, insulation work, power source switch, and other items shall be referred to the Installation Manual.
2. The equipment is for R410A refrigerant.
3. Install this product in a location where noise (refrigerant noise) emitted by the unit will not disturb the neighbors. (For use in quiet environments with low background noise, position the BC CONTROLLER at least 5m away from any indoor units.)
4. Sound pressure/power level differs depending on the connected outdoor/heat source unit capacity or operation condition. The sound pressure/power level at the rated operation is the value of the cooling mode.
5. The sound pressure/power level values were obtained in an anechoic room. Actual sound pressure level is usually greater than that measured in anechoic room due to ambient noise and deflection sound.
6. The sound pressure level values were obtained at the location below 1.5m from the unit.
7. The solenoid valve switching sound is 56 dB (sound pressure level) regardless of the unit model.
8. Refrigerant piping diameter for connection of plural indoor units with 1 branch shall be referred to the Installation Manual.
9. This unit is not designed for outside installations.
10. When brazing the pipes, be sure to braze, after covering a wet cloth to the insulation pipes of the units in order to prevent it from burning and shrinking by heat.
11. Indoor unit capacity connectable to 1 branch is changed depending on the indoor unit type and connection method. Please refer to the Installation Manual for more information.
12. For the refrigerant pipe size, refer to Installation Manual of outdoor units/heat source units.
13. Sub BC Controllers cannot be used alone or with a Single BC Controller. They must be used in conjunction with a main BC Controller



MITSUBISHI ELECTRIC TRANE HVAC US

Indoor Units

Job Name: **Duluth City Hall**System Reference: 0-111, 0-112, 0-115, 0-117, 0-119, 0-121, 0-122, 0-123, 0-105, 0-106, 0-107, 1-103, 1-106,
1-125, 1-131, 1-110, 1-123, 2-103, 2-109, 2-111, 2-132, 2-114, 2-117, 2-124, 2-130, 2-136,
3-104, 3-109, 3-115, 3-122, 4-119, 4-121Date: **5-18-22****GENERAL FEATURES**

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

Specifications			System
Unit Type			TPEFYP006MA144A
Cooling capacity (Nominal) ¹		BTU/H	6,000
Heating capacity (Nominal) ¹		BTU/H	6,700
Power source	Voltage, Phase, Hertz		208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.042
	Heating	kW	0.04
Current	Cooling	A	0.42/0.38
	Heating	A	0.42/0.38
MCA		A	1.75
Maximum Overcurrent Protection (MOCP)		A	15
External finish			Galvanized steel sheet
External Dimensions		In. [mm]	27-9/16 x 28-7/8 x 9-7/8 [700 x 732 x 250]
Net weight		Lbs [kg]	47 [21]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Sirocco fan x 1
	External Static pressure	in.WG	0.14, 0.2, 0.28, 0.4, 0.6 factory set to 0 In. WG
	Airflow rate	CFM	212–265–300
	Motor type		DC Motor
	Motor Output	kW	0.085
	Motor FLA	A	1.4
Sound pressure level (Measured in anechoic room) ²		dB(A)	24–28–30
Air filter			PP Honeycomb fabric
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	1/4 [6.35] Braze
	Gas (Low Pressure)	In. [mm]	1/2 [12.7] Braze
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

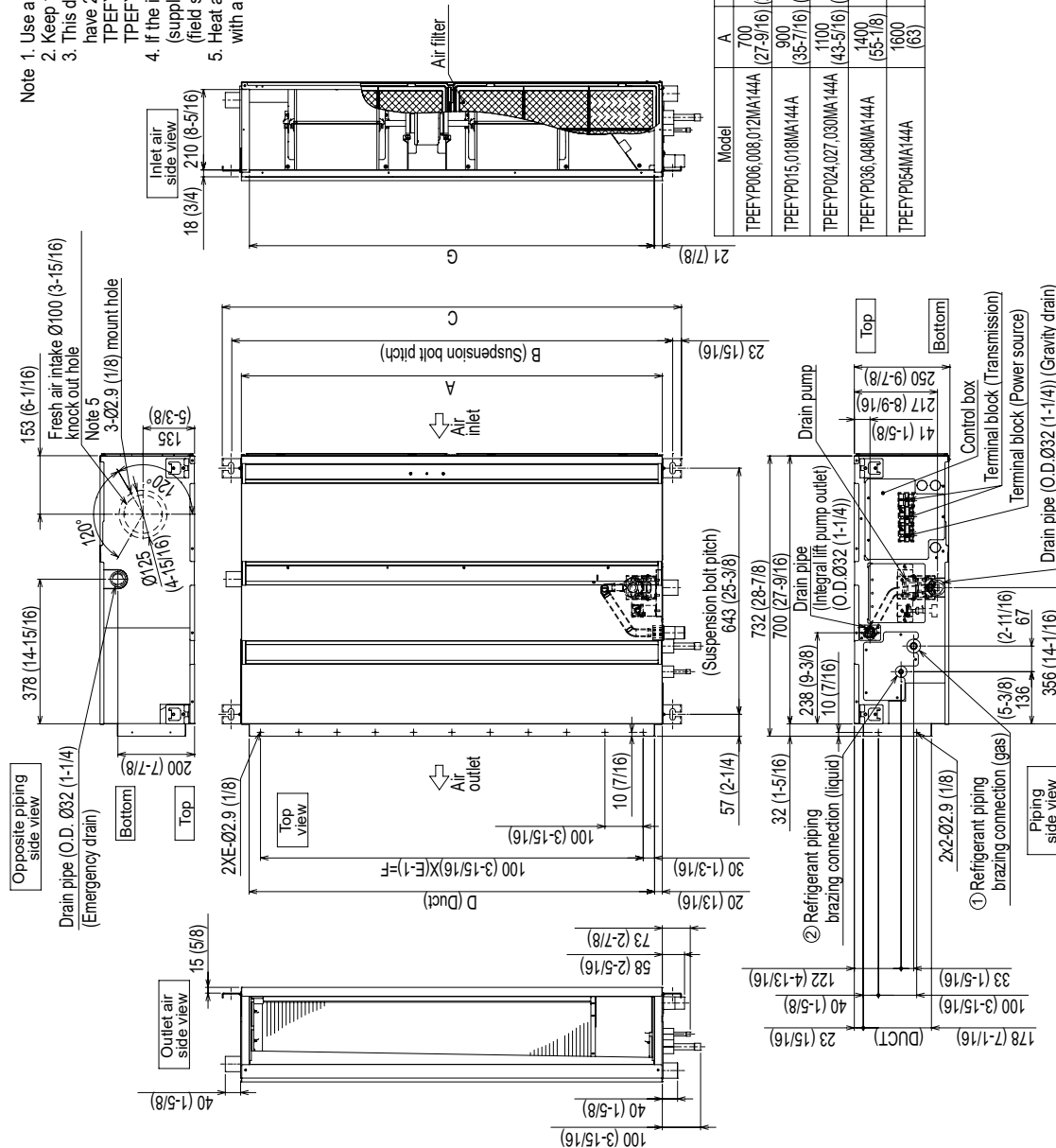
INDOOR UNIT ACCESSORIES: TPEFYP006MA144A

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
	IT Extender	☐ PAC-WHS01IE-E
	kumo station® for kumo cloud®	☐ TAC-WHS01HC-E
	Thermostat Interface	☐ PAC-US444CN-1
	Wireless Interface for kumo cloud®	☐ PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	☐ PAC-USSEN001-FM-1
	Remote Temperature Sensor	☒ PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	☐ PAC-USWHS003-TH-1
Terminal Signal Adapter	Terminal Signal Adapter	☐ PAC-IT51AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	☐ TAR-40MAAU
	Simple MA Remote Controller†	☐ TAC-YT53CRAU-J
	Touch MA Controller†	☐ TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	☐ MHK2
	Wireless MA Remote Controller	☐ TAR-FL32MA-E
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	☐ X85-003
	Blue Diamond MultiTank — collection tank for use with multiple pumps	☐ C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	☐ C13-103
	Sauermann Condensate Pump	☐ SI30-230
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	Filter Box with MERV 13 Filter	☒ FBM2-1-A
Lineset	100' x 1/4" x 100' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-100
	15' x 1/4" x 15' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-15
	30' x 1/4" x 30' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-30
	50' x 1/4" x 50' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-50
	65' x 1/4" x 65' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-65

INDOOR UNIT DIMENSIONS: TPEFYP006MA144A

Unit : mm(in.)

- Note 1. Use an M10 screw for the suspension bolt (field supply).
 2. Keep the service space for maintenance at the bottom.
 3. This drawing is for TPEFYP024-027-030MA144A models, which have 2 fans. TPEFYP006-008-012MA144A models have 1 fan. TPEFYP015-018MA144A models have 2 fans. TPEFYP036-048-054MA144A models have 3 fans.
 4. If the inlet duct is used, remove the air filter (supplied with the unit), then install the filter (field supply) at the suction side.
 5. Heat air to 0°C (32°F) or higher when taking fresh air with a fresh air intake.



Model	① Gas pipe	② Liquid pipe
TPEFYP006,008,012MA144A	Ø12.7 (1/2)	Ø6.35 (1/4)
TPEFYP015,018MA144A	Ø15.88 (5/8)	Ø9.52 (3/8)
TPEFYP024,027,030MA144A		
TPEFYP036,048MA144A		
TPEFYP054MA144A		

Model	A	B	C	D	E	F	G
TPEFYP006,008,012MA144A	700 (27-9/16)	754 (29-11/16)	800 (31-1/2)	660 (26)	7	600 (23-5/8)	658 (25-15/16)
TPEFYP015,018MA144A	900 (35-7/16)	954 (37-9/16)	1000 (39-3/8)	860 (33-7/8)	9	800 (31-1/2)	858 (33-13/16)
TPEFYP024,027,030MA144A	1100 (43-5/16)	1154 (45-7/16)	1200 (47-1/4)	1060 (41-3/4)	11	1000 (39-3/8)	1058 (41-11/16)
TPEFYP036,048MA144A	1400 (55-1/8)	1454 (57-1/4)	1500 (59-1/16)	1360 (53-9/16)	14	1300 (51-3/16)	1358 (53-1/2)
TPEFYP054MA144A	1600 (63)	1654 (65-1/8)	1700 (66-15/16)	1560 (61-7/16)	16	1500 (59-1/16)	1558 (61-3/8)

TPEFYP008MA144A
8,000 BTU/H MEDIUM STATIC CEILING-CONCEALED DUCTED



Job Name: **Duluth City Hall**

System Reference: 0-116, 0-120, 1-102, 1-122, 1-121, 2-102, 2-121, 3-102, 3-105, 3-124, 3-126, 4-104, 4-106,
 4-113, 4-114, 4-125, 4-127, 4-132

Date: **5-18-22**



GENERAL FEATURES

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

Specifications			System
Unit Type			TPEFYP008MA144A
Cooling capacity (Nominal) ¹		BTU/H	8,000
Heating capacity (Nominal) ¹		BTU/H	9,000
Power source	Voltage, Phase, Hertz		208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.042
	Heating	kW	0.04
Current	Cooling	A	0.42/0.38
	Heating	A	0.42/0.38
MCA		A	1.75
Maximum Overcurrent Protection (MOCP)		A	15
External finish			Galvanized steel sheet
External Dimensions		In. [mm]	27-9/16 x 28-7/8 x 9-7/8 [700 x 732 x 250]
Net weight		Lbs [kg]	47 [21]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Sirocco fan x 1
	External Static pressure	in.WG	0.14, 0.2, 0.28, 0.4, 0.6 factory set to 0.2 In. WG
	Airflow rate	CFM	212–265–300
	Motor type		DC Motor
	Motor Output	kW	0.085
	Motor FLA	A	1.4
Sound pressure level (Measured in anechoic room) ³		dB(A)	24–28–30
Air filter			PP Honeycomb fabric
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	1/4 [6.35] Braze
	Gas (Low Pressure)	In. [mm]	1/2 [12.7] Braze
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

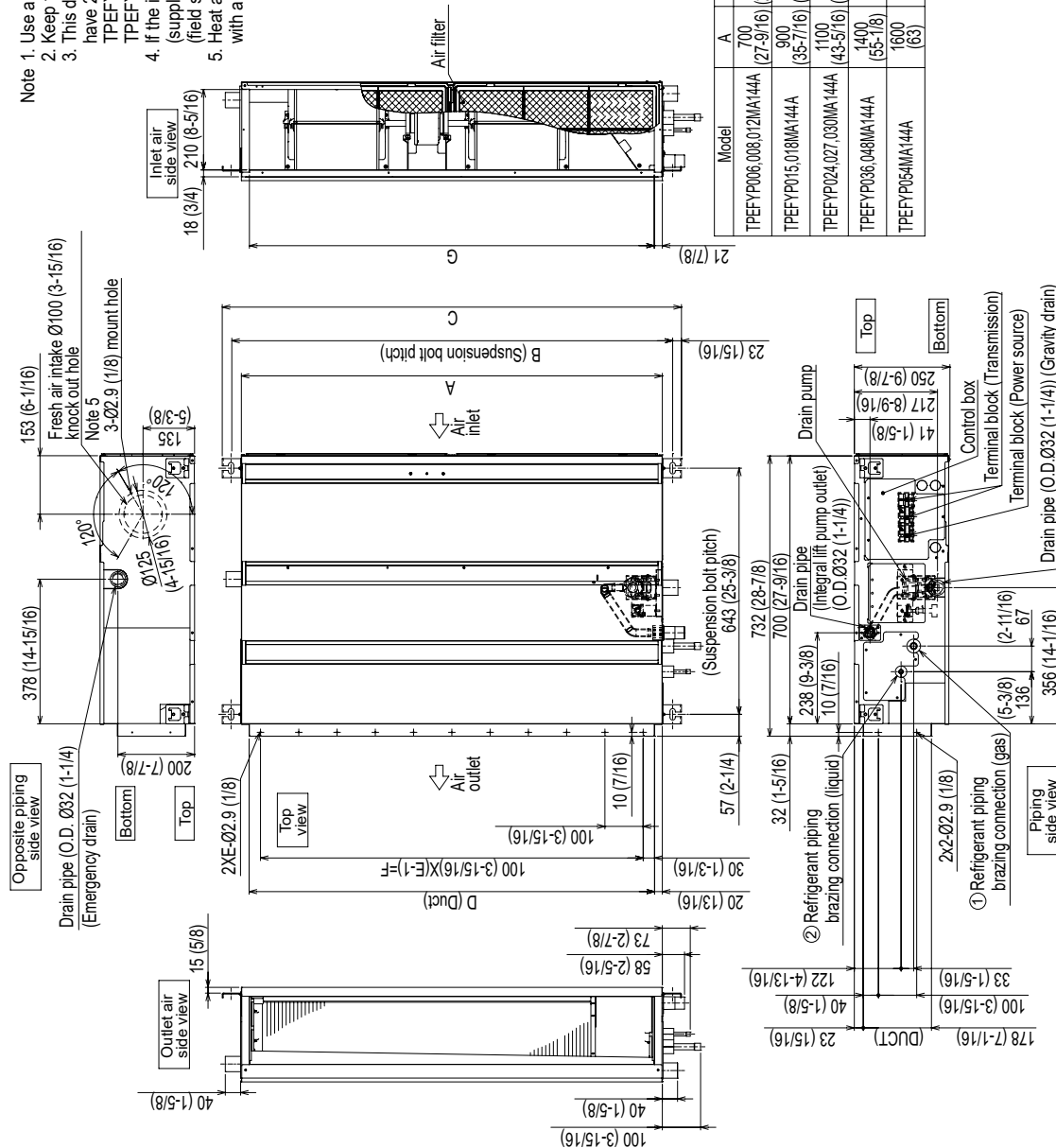
INDOOR UNIT ACCESSORIES: TPEFYP008MA144A

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
	IT Extender	☐ PAC-WHS01IE-E
	kumo station® for kumo cloud®	☐ TAC-WHS01HC-E
	Thermostat Interface	☐ PAC-US444CN-1
	Wireless Interface for kumo cloud®	☐ PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	☐ PAC-USSEN001-FM-1
	Remote Temperature Sensor	☒ PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	☐ PAC-USWHS003-TH-1
Terminal Signal Adapter	Terminal Signal Adapter	☐ PAC-IT51AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	☐ TAR-40MAAU
	Simple MA Remote Controller†	☐ TAC-YT53CRAU-J
	Touch MA Controller†	☐ TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	☐ MHK2
	Wireless MA Remote Controller	☐ TAR-FL32MA-E
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	☐ X85-003
	Blue Diamond MultiTank — collection tank for use with multiple pumps	☐ C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	☐ C13-103
	Sauermann Condensate Pump	☐ SI30-230
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	Filter Box with MERV 13 Filter	☒ FBM2-1-A
Lineset	100' x 1/4" x 100' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-100
	15' x 1/4" x 15' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-15
	30' x 1/4" x 30' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-30
	50' x 1/4" x 50' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-50
	65' x 1/4" x 65' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-65

INDOOR UNIT DIMENSIONS: TPEFYP008MA144A

Unit : mm(in.)

- Note 1. Use an M10 screw for the suspension bolt (field supply).
 2. Keep the service space for maintenance at the bottom.
 3. This drawing is for TPEFYP024-027-030MA144A models, which have 2 fans. TPEFYP006-008-012MA144A models have 1 fan. TPEFYP015-018MA144A models have 2 fans. TPEFYP036-048-054MA144A models have 3 fans.
 4. If the inlet duct is used, remove the air filter (supplied with the unit), then install the filter (field supply) at the suction side.
 5. Heat air to 0°C (32°F) or higher when taking fresh air with a fresh air intake.



Model	① Gas pipe	② Liquid pipe
TPEFYP006,008,012MA144A	Ø12.7 (1/2)	Ø6.35 (1/4)
TPEFYP015,018MA144A	Ø15.88 (5/8)	Ø9.52 (3/8)
TPEFYP024,027,030MA144A		
TPEFYP036,048MA144A		
TPEFYP054MA144A		

Model	A	B	C	D	E	F	G
TPEFYP006,008,012MA144A	700 (27-9/16)	754 (29-11/16)	800 (31-1/2)	660 (26)	7	600 (23-5/8)	658 (25-15/16)
TPEFYP015,018MA144A	900 (35-7/16)	954 (37-9/16)	1000 (39-3/8)	880 (33-7/8)	9	800 (31-1/2)	858 (33-13/16)
TPEFYP024,027,030MA144A	1100 (43-5/16)	1154 (45-7/16)	1200 (47-1/4)	1080 (41-3/4)	11	1000 (39-3/8)	1058 (41-11/16)
TPEFYP036,048MA144A	1400 (55-1/8)	1454 (57-1/4)	1500 (59-7/16)	1380 (53-9/16)	14	1300 (51-3/16)	1358 (53-1/2)
TPEFYP054MA144A	1600 (63)	1654 (65-1/8)	1700 (66-15/16)	1580 (61-7/16)	16	1500 (59-1/16)	1558 (61-3/8)

Job Name: **Duluth City Hall**System Reference: 0-118, 0-102, 0-103, 0-108, 1-104, 1-109a, 1-113, 1-117, 1-124, 2-133, 2-134, 2-118, 2-120,
2-123, 2-125, 2-127, 3-128, 3-114, 3-121, 4-102, 4-105, 4-107, 4-112, 4-134, 4-120Date: **5-18-22**

GENERAL FEATURES

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

Specifications			System
Unit Type			TPEFYP012MA144A
Cooling capacity (Nominal) ¹		BTU/H	12,000
Heating capacity (Nominal) ¹		BTU/H	13,500
Power source	Voltage, Phase, Hertz		208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.052
	Heating	kW	0.05
Current	Cooling	A	0.56/0.51
	Heating	A	0.56/0.51
MCA		A	2.13
Maximum Overcurrent Protection (MOCP)		A	15
External finish			Galvanized steel sheet
External Dimensions		In. [mm]	27-9/16 x 28-7/8 x 9-7/8 [700 x 732 x 250]
Net weight		Lbs [kg]	47 [21]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Sirocco fan x 1
	External Static pressure	in.WG	0.14, 0.2, 0.28, 0.4, 0.6 factory set to 0 In. WG
	Airflow rate	CFM	265–318–371
	Motor type		DC Motor
	Motor Output	kW	0.085
	Motor FLA	A	1.7
Sound pressure level (Measured in anechoic room) ²		dB(A)	26–30–34
Air filter			PP Honeycomb fabric
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	1/4 [6.35] Braze
	Gas (Low Pressure)	In. [mm]	1/2 [12.7] Braze
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

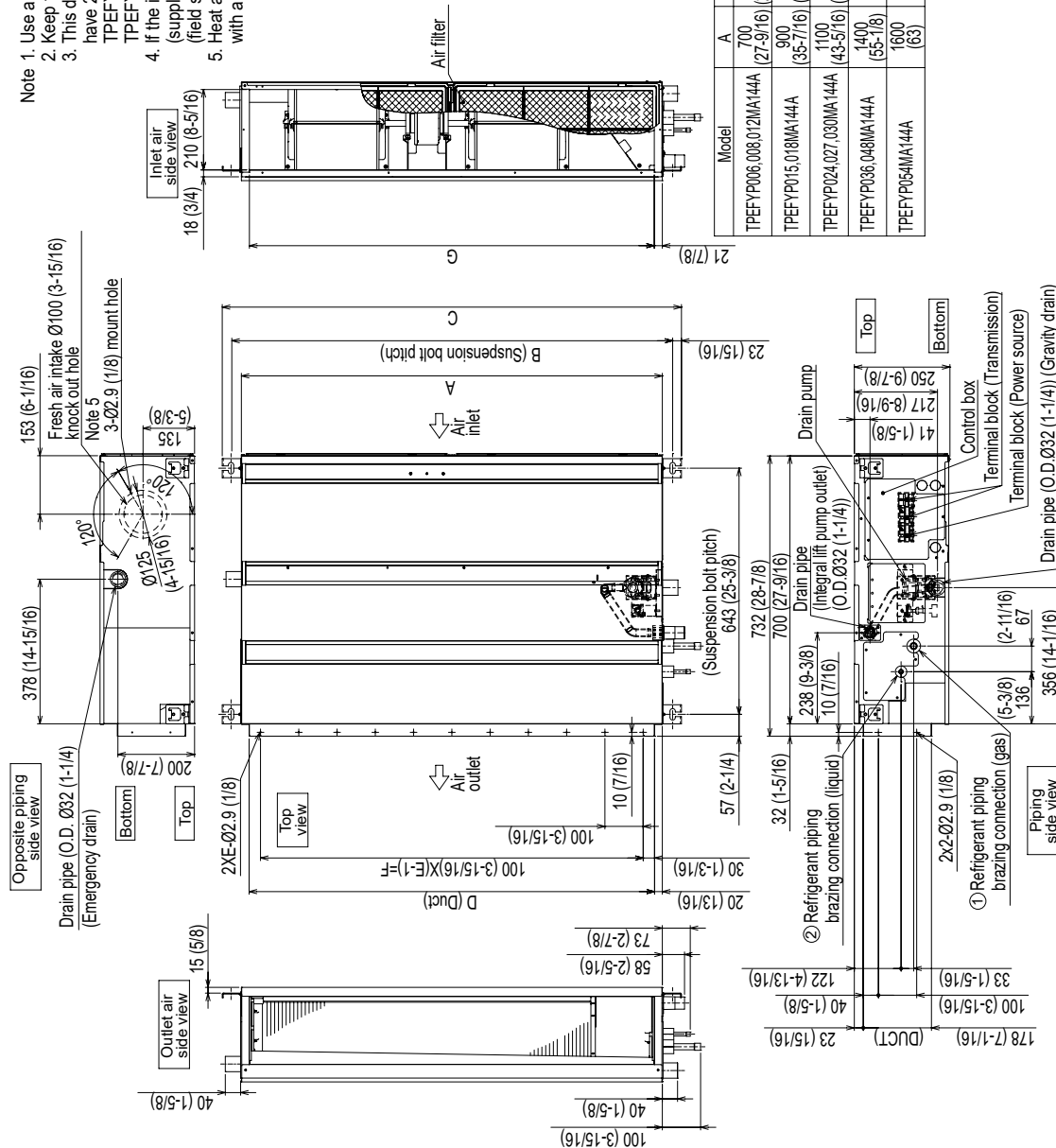
INDOOR UNIT ACCESSORIES: TPEFYP012MA144A

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
	IT Extender	☐ PAC-WHS01IE-E
	kumo station® for kumo cloud®	☐ TAC-WHS01HC-E
	Thermostat Interface	☐ PAC-US444CN-1
	Wireless Interface for kumo cloud®	☐ PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	☐ PAC-USSEN001-FM-1
	Remote Temperature Sensor	☒ PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	☐ PAC-USWHS003-TH-1
Terminal Signal Adapter	Terminal Signal Adapter	☐ PAC-IT51AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	☐ TAR-40MAAU
	Simple MA Remote Controller†	☐ TAC-YT53CRAU-J
	Touch MA Controller†	☐ TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	☐ MHK2
	Wireless MA Remote Controller	☐ TAR-FL32MA-E
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	☐ X85-003
	Blue Diamond MultiTank — collection tank for use with multiple pumps	☐ C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	☐ C13-103
	Sauermann Condensate Pump	☐ SI30-230
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	Filter Box with MERV 13 Filter	☒ FBM2-1-A
Lineset	100' x 1/4" x 100' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-100
	15' x 1/4" x 15' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-15
	30' x 1/4" x 30' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-30
	50' x 1/4" x 50' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-50
	65' x 1/4" x 65' / 1/2" Lineset (Twin-Tube Insulation)	☐ MLS141212T-65

INDOOR UNIT DIMENSIONS: TPEFYP012MA144A

Unit : mm(in.)

- Note 1. Use an M10 screw for the suspension bolt (field supply).
 2. Keep the service space for maintenance at the bottom.
 3. This drawing is for TPEFYP024-027-030MA144A models, which have 2 fans. TPEFYP006-008-012MA144A models have 1 fan. TPEFYP015-018MA144A models have 2 fans. TPEFYP036-048-054MA144A models have 3 fans.
 4. If the inlet duct is used, remove the air filter (supplied with the unit), then install the filter (field supply) at the suction side.
 5. Heat air to 0°C (32°F) or higher when taking fresh air with a fresh air intake.



Model	① Gas pipe	② Liquid pipe
TPEFYP006,008,012MA144A	Ø12.7 (1/2)	Ø6.35 (1/4)
TPEFYP015,018MA144A	Ø15.88 (5/8)	Ø9.52 (3/8)
TPEFYP024,027,030MA144A		
TPEFYP036,048MA144A		
TPEFYP054MA144A		

Model	A	B	C	D	E	F	G
TPEFYP006,008,012MA144A	700 (27-9/16)	754 (29-11/16)	800 (31-1/2)	660 (26)	7	600 (23-5/8)	658 (25-15/16)
TPEFYP015,018MA144A	900 (35-7/16)	954 (37-9/16)	1000 (39-3/8)	860 (33-7/8)	9	800 (31-1/2)	858 (33-13/16)
TPEFYP024,027,030MA144A	1100 (43-5/16)	1154 (45-7/16)	1200 (47-1/4)	1060 (41-3/4)	11	1000 (39-3/8)	1058 (41-11/16)
TPEFYP036,048MA144A	1400 (55-1/8)	1454 (57-1/4)	1500 (59-7/16)	1360 (53-9/16)	14	1300 (51-3/16)	1358 (53-1/2)
TPEFYP054MA144A	1600 (63)	1654 (65-1/8)	1700 (66-15/16)	1560 (61-7/16)	16	1500 (59-1/16)	1558 (61-3/8)

Job Name: **Duluth City Hall**System Reference: 0-109, 0-113, 1-127, 1-128, 1-109b, 2-104, 2-112, 2-116, 2-126, 3-108, 3-116, 3-125, 3-127,
4-111, 4-124Date: **5-18-22**

GENERAL FEATURES

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

Specifications			System
Unit Type			TPEFYP015MA144A
Cooling capacity (Nominal) ¹		BTU/H	15,000
Heating capacity (Nominal) ¹		BTU/H	17,000
Power source	Voltage, Phase, Hertz		208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.062
	Heating	kW	0.06
Current	Cooling	A	0.64/0.58
	Heating	A	0.64/0.58
MCA		A	2.88
Maximum Overcurrent Protection (MOCP)		A	15
External finish			Galvanized steel sheet
External Dimensions		In. [mm]	35-7/16 x 28-7/8 x 9-7/8 [900 x 732 x 250]
Net weight		Lbs [kg]	58 [26]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Sirocco fan x 2
	External Static pressure	in.WG	0.14, 0.2, 0.28, 0.4, 0.6 factory set to 0.2 In. WG
	Airflow rate	CFM	353-424-494
	Motor type		DC Motor
	Motor Output	kW	0.121
	Motor FLA	A	2.3
Sound pressure level (Measured in anechoic room) ³		dB(A)	27-31-34
Air filter			PP Honeycomb fabric
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	1/4 [6.35] Braze
	Gas (Low Pressure)	In. [mm]	1/2 [12.7] Braze
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

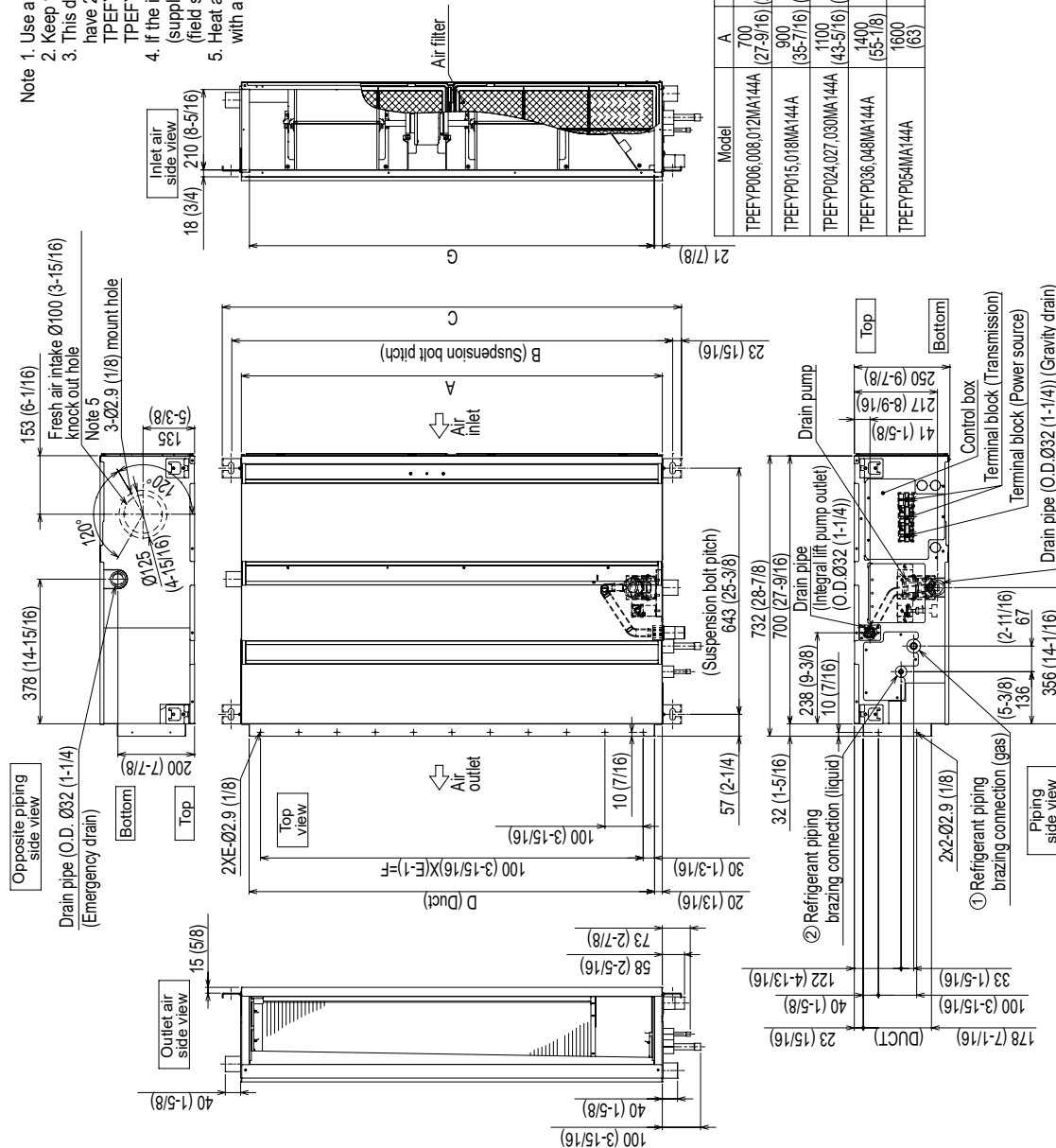
INDOOR UNIT ACCESSORIES: TPEFYP015MA144A

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
	IT Extender	PAC-WHS01IE-E
	kumo station® for kumo cloud®	TAC-WHS01HC-E
	Thermostat Interface	PAC-US444CN-1
	Wireless Interface for kumo cloud®	PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	PAC-USSEN001-FM-1
	Remote Temperature Sensor	✓ PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	PAC-USWHS003-TH-1
Terminal Signal Adapter	Terminal Signal Adapter	PAC-IT51AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	TAR-40MAAU
	Simple MA Remote Controller†	TAC-YT53CRAU-J
	Smart ME Remote Controller - Backlit touchscreen	TAR-U01MEDU-K
	Touch MA Controller†	TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	MHK2
	Wireless MA Controller Receiver	PAR-SR32MA-E
	Wireless MA Remote Controller	TAR-FL32MA-E
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 MultiTank — collection tank for use with multiple pumps	C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	C13-103
	Sauermann Condensate Pump	SI30-230
Filter Box	Filter Box with MERV 13 Filter	✓ FBM2-2-A

INDOOR UNIT DIMENSIONS: TPEFYP015MA144A

Unit : mm(in.)

- Note 1. Use an M10 screw for the suspension bolt (field supply).
 2. Keep the service space for maintenance at the bottom.
 3. This drawing is for TPEFYP024-027-030MA144A models, which have 2 fans. TPEFYP006-008-012MA144A models have 1 fan. TPEFYP015-018MA144A models have 2 fans. TPEFYP036-048-054MA144A models have 3 fans.
 4. If the inlet duct is used, remove the air filter (supplied with the unit), then install the filter (field supply) at the suction side.
 5. Heat air to 0°C (32°F) or higher when taking fresh air with a fresh air intake.



Model	① Gas pipe	② Liquid pipe
TPEFYP006,008,012MA144A	Ø12.7 (1/2)	Ø6.35 (1/4)
TPEFYP015,018MA144A	Ø15.88 (5/8)	Ø9.52 (3/8)
TPEFYP024,027,030MA144A		
TPEFYP036,048MA144A		
TPEFYP054MA144A		

Model	A	B	C	D	E	F	G
TPEFYP006,008,012MA144A	700 (27-9/16)	754 (29-11/16)	800 (31-1/2)	660 (26)	7	600 (23-5/8)	658 (25-15/16)
TPEFYP015,018MA144A	900 (35-7/16)	954 (37-9/16)	1000 (39-3/8)	860 (33-7/8)	9	800 (31-1/2)	858 (33-13/16)
TPEFYP024,027,030MA144A	1100 (43-5/16)	1154 (45-7/16)	1200 (47-1/4)	1060 (41-3/4)	11	1000 (39-3/8)	1058 (41-11/16)
TPEFYP036,048MA144A	1400 (55-1/8)	1454 (57-1/4)	1500 (59-1/16)	1360 (53-9/16)	14	1300 (51-3/16)	1358 (53-1/2)
TPEFYP054MA144A	1600 (63)	1654 (65-1/8)	1700 (66-15/16)	1560 (61-7/16)	16	1500 (59-1/16)	1558 (61-3/8)

Job Name: **Duluth City Hall**System Reference: 1-111, 1-112, 1-115, 1-119, 2-135, 2-129, 3-112, 3-120, 4-103, 4-108, 4-126 Date: **5-18-22**

GENERAL FEATURES

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

Specifications			System
Unit Type			TPEFYP018MA144A
Cooling capacity (Nominal) ¹		BTU/H	18,000
Heating capacity (Nominal) ¹		BTU/H	20,000
Power source	Voltage, Phase, Hertz		208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.082
	Heating	kW	0.08
Current	Cooling	A	0.82/0.74
	Heating	A	0.82/0.74
MCA		A	2.94
Maximum Overcurrent Protection (MOCP)		A	15
External finish			Galvanized steel sheet
External Dimensions		In. [mm]	35-7/16 x 28-7/8 x 9-7/8 [900 x 732 x 250]
Net weight		Lbs [kg]	58 [26]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Sirocco fan x 2
	External Static pressure	in.WG	0.14, 0.2, 0.28, 0.4, 0.6 factory set to 0.2 In. WG
	Airflow rate	CFM	424–512–600
	Motor type		DC Motor
	Motor Output	kW	0.121
	Motor FLA	A	2.35
Sound pressure level (Measured in anechoic room) ³		dB(A)	29–33–37
Air filter			PP Honeycomb fabric
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	1/4 [6.35] Braze
	Gas (Low Pressure)	In. [mm]	1/2 [12.7] Braze
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

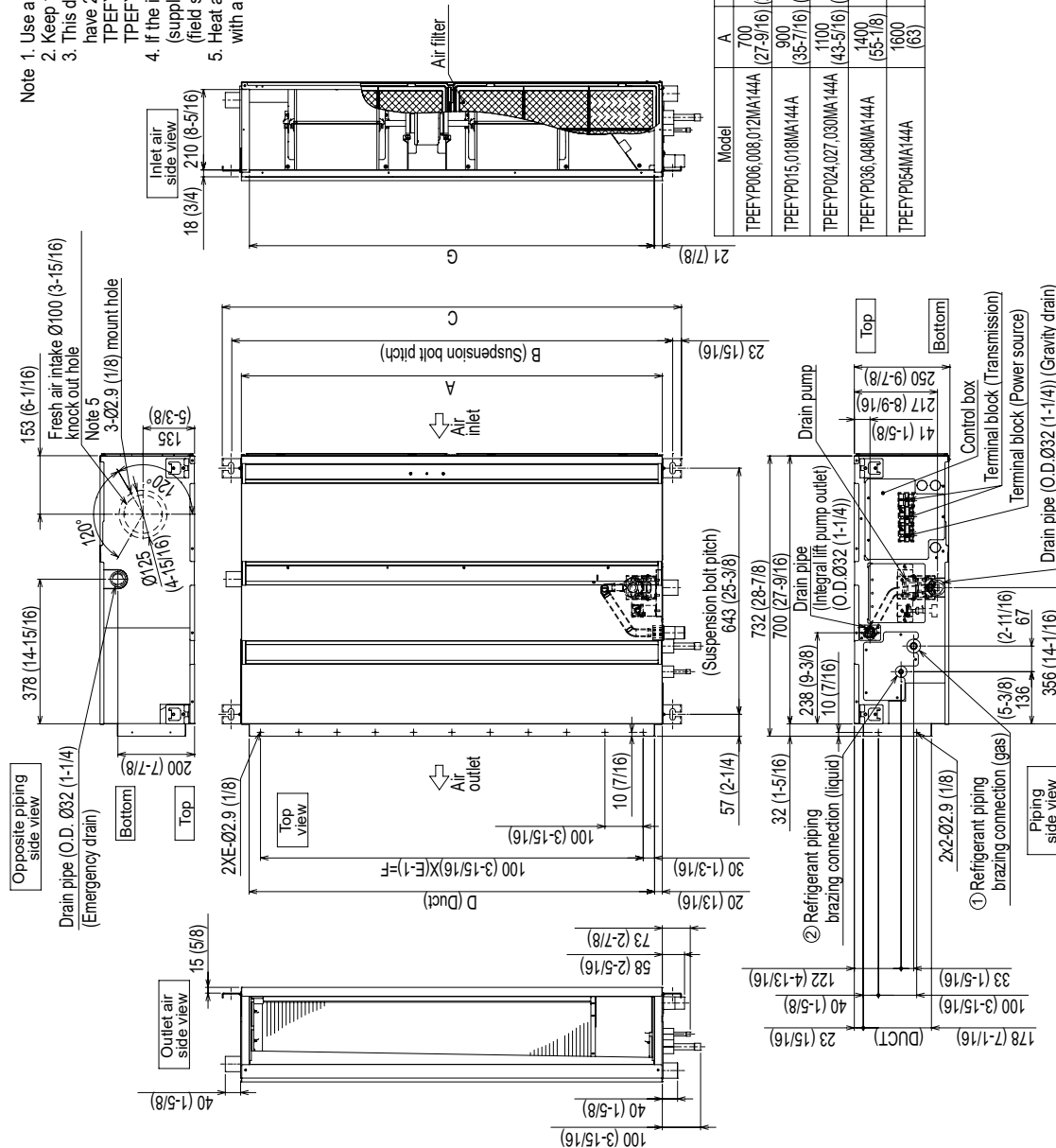
INDOOR UNIT ACCESSORIES: TPEFYP018MA144A

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
	IT Extender	☐ PAC-WHS01IE-E
	kumo station® for kumo cloud®	☐ TAC-WHS01HC-E
	Thermostat Interface	☐ PAC-US444CN-1
	Wireless Interface for kumo cloud®	☐ PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	☐ PAC-USSEN001-FM-1
	Remote Temperature Sensor	☒ PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	☐ PAC-USWHS003-TH-1
Terminal Signal Adapter	Terminal Signal Adapter	☐ PAC-IT51AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	☐ TAR-40MAAU
	Simple MA Remote Controller†	☐ TAC-YT53CRAU-J
	Smart ME Remote Controller - Backlit touchscreen	☐ TAR-U01MEDU-K
	Touch MA Controller†	☐ TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	☐ MHK2
	Wireless MA Controller Receiver	☐ PAR-SR32MA-E
	Wireless MA Remote Controller	☐ TAR-FL32MA-E
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 MultiTank — collection tank for use with multiple pumps	☐ C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	☐ C13-103
	Sauermann Condensate Pump	☐ SI30-230
Filter Box	Filter Box with MERV 13 Filter	☒ FBM2-2-A

INDOOR UNIT DIMENSIONS: TPEFYP018MA144A

Unit : mm(in.)

- Note 1. Use an M10 screw for the suspension bolt (field supply).
 2. Keep the service space for maintenance at the bottom.
 3. This drawing is for TPEFYP024-027-030MA144A models, which have 2 fans. TPEFYP006-008-012MA144A models have 1 fan. TPEFYP015-018MA144A models have 2 fans. TPEFYP036-048-054MA144A models have 3 fans.
 4. If the inlet duct is used, remove the air filter (supplied with the unit), then install the filter (field supply) at the suction side.
 5. Heat air to 0°C (32°F) or higher when taking fresh air with a fresh air intake.



Model	① Gas pipe	② Liquid pipe
TPEFYP006,008,012MA144A	Ø12.7 (1/2)	Ø6.35 (1/4)
TPEFYP015,018MA144A	Ø15.88 (5/8)	Ø9.52 (3/8)
TPEFYP024,027,030MA144A		
TPEFYP036,048MA144A		
TPEFYP054MA144A		

Model	A	B	C	D	E	F	G
TPEFYP006,008,012MA144A	700 (27-9/16)	754 (29-11/16)	800 (31-1/2)	660 (26)	7	600 (23-5/8)	658 (25-15/16)
TPEFYP015,018MA144A	900 (35-7/16)	954 (37-9/16)	1000 (39-3/8)	860 (33-7/8)	9	800 (31-1/2)	858 (33-13/16)
TPEFYP024,027,030MA144A	1100 (43-5/16)	1154 (45-7/16)	1200 (47-1/4)	1060 (41-3/4)	11	1000 (39-3/8)	1058 (41-11/16)
TPEFYP036,048MA144A	1400 (55-1/8)	1454 (57-1/4)	1500 (59-1/16)	1360 (53-9/16)	14	1300 (51-3/16)	1358 (53-1/2)
TPEFYP054MA144A	1600 (63)	1654 (65-1/8)	1700 (66-15/16)	1560 (61-7/16)	16	1500 (59-1/16)	1558 (61-3/8)

Job Name: **Duluth City Hall**System Reference: 0-110, 1-101, 1-108, 1-114, 1-118, 2-101, 2-108, 2-131, 2-115, 3-103, 3-119, 3-123, 4-110,
4-123, 4-130Date: **5-18-22**

GENERAL FEATURES

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

Specifications			System
Unit Type			TPEFYP024MA144A
Cooling capacity (Nominal) ¹		BTU/H	24,000
Heating capacity (Nominal) ¹		BTU/H	27,000
Power source	Voltage, Phase, Hertz		208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.142
	Heating	kW	0.14
Current	Cooling	A	1.24/1.12
	Heating	A	1.24/1.12
MCA		A	2.88
Maximum Overcurrent Protection (MOCP)		A	15
External finish			Galvanized steel sheet
External Dimensions		In. [mm]	43-5/16 x 28-7/8 x 9-7/8 [1100 x 732 x 250]
Net weight		Lbs [kg]	67 [30]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Sirocco fan x 2
	External Static pressure	in.WG	0.14, 0.2, 0.28, 0.4, 0.6 factory set to 0 In. WG
	Airflow rate	CFM	618-742-883
	Motor type		DC Motor
	Motor Output	kW	0.121
	Motor FLA	A	2.3
Sound pressure level (Measured in anechoic room) ²		dB(A)	31-35-39
Air filter			PP Honeycomb fabric
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	3/8 [9.52] Braze
	Gas (Low Pressure)	In. [mm]	5/8 [15.88] Braze
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

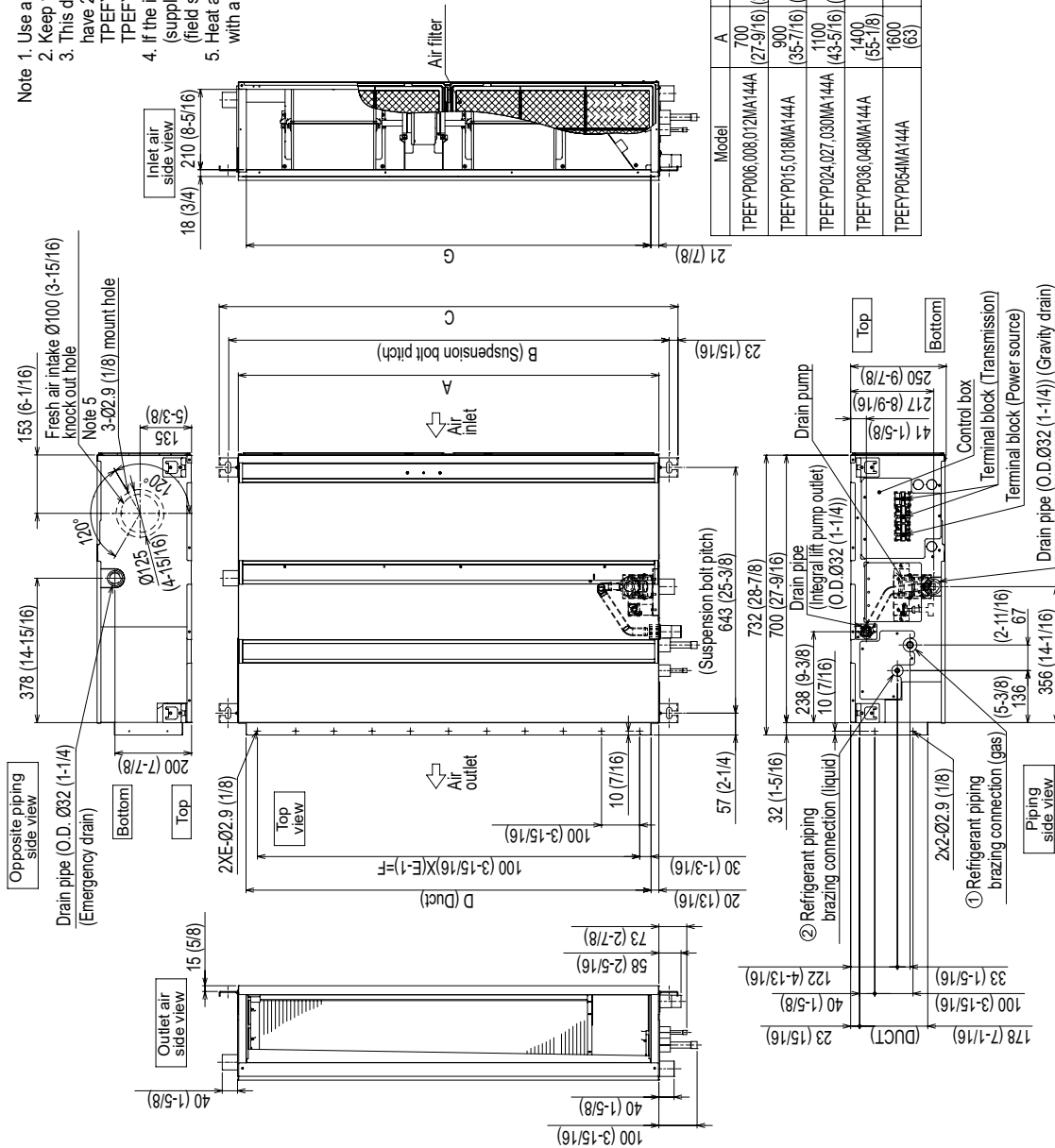
Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

INDOOR UNIT ACCESSORIES: TPEFYP024MA144A

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
	IT Extender	☐ PAC-WHS01IE-E
	kumo station® for kumo cloud®	☐ TAC-WHS01HC-E
	Thermostat Interface	☐ PAC-US444CN-1
	Wireless Interface for kumo cloud®	☐ PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	☐ PAC-USSEN001-FM-1
	Remote Temperature Sensor	☒ PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	☐ PAC-USWHS003-TH-1
Terminal Signal Adapter	Terminal Signal Adapter	☐ PAC-IT51AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	☐ TAR-40MAAU
	Simple MA Remote Controller†	☐ TAC-YT53CRAU-J
	Touch MA Controller†	☐ TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	☐ MHK2
	Wireless MA Remote Controller	☐ TAR-FL32MA-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	☐ X87-721
	Blue Diamond (MegaBlue Advanced) Condensate Pump w/ Reservoir & Sensor	☐ X87-835
	Blue Diamond MultiTank — collection tank for use with multiple pumps	☐ C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	☐ C13-103
	Sauermann Condensate Pump	☐ SI30-230
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 13 Filter	☒ FBM2-3-A
Lineset	10' x 3/8" x 10' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-10
	100' x 3/8" x 100' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-100
	15' x 3/8" x 15' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-15
	30' x 3/8" x 30' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-30
	50' x 3/8" x 50' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-50
	65' x 3/8" x 65' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-65

Unit : mm(in.)

1. Use an M10 screw for the suspension bolt (field supply).
2. Keep the service space for maintenance at the bottom.
3. This drawing is for TPEFYVP024-027-030MA 144A models, which have 2 fans. TPEFYVP006-008-012MA 144A models have 1 fan. TPEFYVP015-018MA 144A models have 2 fans.
4. If the inlet duct is used, remove the air filter (supplied with the unit), then install the filter (field supply) at the suction side.
5. Heat air to 0°C (32°F) or higher when taking fresh air with a fresh air intake.



Unit:mm(in.)	① Gas pipe	② Liquid pipe
	Model	
	TPEFYP006,008,012MA144A	Ø6.35 (1/4)
	TPEFYP015,018MA144A	
	TPEFYP024,027,030MA144A	
	TPEFYP036,048MA144A	Ø9.52 (3/8)
	TPEFYP056MA144A	

Model	A	B	C	D	E	F	G
TPEFY006;008;012MA144A	700 (27-916)	754 (29-1116)	800 (31-172)	660 (26)	7	600 (23-58)	658 (25-1516)
TPEFY015;018MA144A	900 (35-716)	954 (37-916)	1000 (39-38)	860 (33-78)	9	800 (31-12)	858 (33-1316)
TPEFY024;027;030MA144A	1100 (43-5176)	1154 (45-716)	1200 (47-14)	1060 (41-34)	11	1000 (39-38)	1058 (41-1176)
TPEFY036;048MA144A	1400 (55-18)	1454 (57-14)	1500 (59-176)	1360 (53-916)	14	1300 (51-316)	1358 (53-172)
TPEFY054MA144A	1600 (63)	1654 (65-18)	1700 (66-1516)	1560 (61-716)	16	1500 (59-116)	1558 (61-316)



Job Name: **Duluth City Hall**
System Reference: **2-106, 4-128**

Date: **5-18-22**



GENERAL FEATURES

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

Specifications			System
Unit Type			TPEFYP027MA144A
Cooling capacity (Nominal) ¹		BTU/H	27,000
Heating capacity (Nominal) ¹		BTU/H	30,000
Power source	Voltage, Phase, Hertz		208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.142
	Heating	kW	0.14
Current	Cooling	A	1.24/1.12
	Heating	A	1.24/1.12
MCA		A	2.88
Maximum Overcurrent Protection (MOCP)		A	15
External finish			Galvanized steel sheet
External Dimensions		In. [mm]	43-5/16 x 28-7/8 x 9-7/8 [1100 x 732 x 250]
Net weight		Lbs [kg]	67 [30]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Sirocco fan x 2
	External Static pressure	in.WG	0.14, 0.2, 0.28, 0.4, 0.6 factory set to 0 In. WG
	Airflow rate	CFM	618-742-883
	Motor type		DC Motor
	Motor Output	kW	0.121
	Motor FLA	A	2.3
Sound pressure level (Measured in anechoic room) ²		dB(A)	31-35-39
Air filter			PP Honeycomb fabric
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	3/8 [9.52] Braze
	Gas (Low Pressure)	In. [mm]	5/8 [15.88] Braze
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

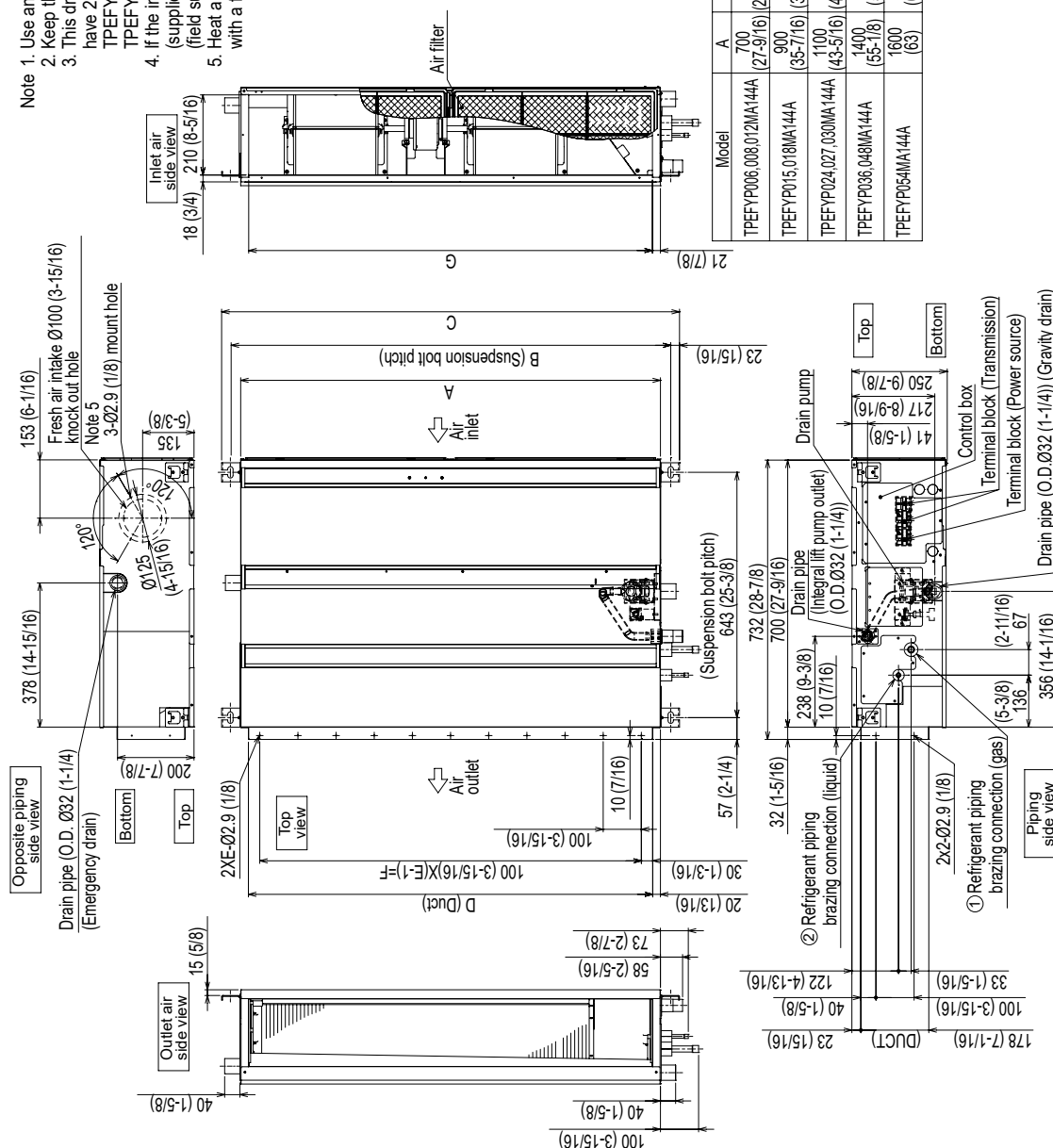
Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

INDOOR UNIT ACCESSORIES: TPEFYP027MA144A

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
	IT Extender	☐ PAC-WHS01IE-E
	kumo station® for kumo cloud®	☐ TAC-WHS01HC-E
	Thermostat Interface	☐ PAC-US444CN-1
	Wireless Interface for kumo cloud®	☐ PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	☐ PAC-USSEN001-FM-1
	Remote Temperature Sensor	☒ PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	☐ PAC-USWHS003-TH-1
Terminal Signal Adapter	Terminal Signal Adapter	☐ PAC-IT51AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	☐ TAR-40MAAU
	Simple MA Remote Controller†	☐ TAC-YT53CRAU-J
	Touch MA Controller†	☐ TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	☐ MHK2
	Wireless MA Remote Controller	☐ TAR-FL32MA-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	☐ X87-721
	Blue Diamond (MegaBlue Advanced) Condensate Pump w/ Reservoir & Sensor	☐ X87-835
	Blue Diamond MultiTank — collection tank for use with multiple pumps	☐ C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	☐ C13-103
	Sauermann Condensate Pump	☐ SI30-230
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 13 Filter	☒ FBM2-3-A
Lineset	10' x 3/8" x 10' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-10
	100' x 3/8" x 100' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-100
	15' x 3/8" x 15' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-15
	30' x 3/8" x 30' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-30
	50' x 3/8" x 50' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-50
	65' x 3/8" x 65' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-65

Unit : mm(in.)

1. Use an M10 screw for the suspension bolt (field supply).
2. Keep the service space for maintenance at the bottom.
3. This drawing is for TPEFY024-027-030MA144A models, which have 2 fans. TPEFY006-008-012MA144A models have 1 fan. TPEFY015-018MA144A models have 2 fans. TPEFY036-048-054MA144A models have 3 fans.
4. If the inlet duct is used, remove the air filter (supplied with the unit), then install the filter (field supply) at the suction side.
5. Heat air to 0°C (32°F) or higher when taking fresh air with a fresh air intake.



Unit:mm(in.)	① Gas pipe	② Liquid pipe
Model		
TPEFYP06.008.012MA14A	Ø12.7 (1/2)	Ø6.35 (1/4)
TPEFYP015.018MA14A		
TPEFYP024.027.030MA14A		
TPEFYP036.048MA14A	Ø15.88 (5/8)	Ø9.52 (3/8)
TPEFYP056MA14A		

Model	A	B	C	D	E	F	G
TPEFYP006,008,012MA14A	700 (27-9/16)	754 (29-11/16)	800 (31-1/2)	860 (26)	860 (26)	600 (23-5/8)	658 (25-15/16)
TPEFYP015,018MA14A	900 (35-7/16)	954 (37-9/16)	1000 (39-3/8)	860 (33-7/8)	9	800 (31-1/2)	858 (33-3/16)
TPEFYP024,027,030MA14A	1100 (43-5/16)	1154 (45-7/16)	1200 (47-1/4)	1060 (41-3/4)	11	1000 (39-3/8)	1058 (41-1/16)
TPEFYP036,048MA14A	1400 (55-1/8)	1454 (57-1/4)	1500 (59-1/4)	1360 (53-9/16)	14	1300 (51-3/16)	1358 (53-1/2)
TPEFYP050MA14A	1800 (63)	1854 (65-1/8)	1900 (66-5/16)	1560 (61-2/16)	16	1500 (50-1/16)	1558 (61-3/8)

Job Name: **Duluth City Hall**
System Reference: **3-106, 4-118**

Date: **5-18-22**



GENERAL FEATURES

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

Specifications			System
Unit Type			TPEFYP030MA144A
Cooling capacity (Nominal) ¹		BTU/H	30,000
Heating capacity (Nominal) ¹		BTU/H	34,000
Power source	Voltage, Phase, Hertz		208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.142
	Heating	kW	0.14
Current	Cooling	A	1.24/1.12
	Heating	A	1.24/1.12
MCA		A	2.88
Maximum Overcurrent Protection (MOCP)		A	15
External finish			Galvanized steel sheet
External Dimensions		In. [mm]	43-5/16 x 28-7/8 x 9-7/8 [1100 x 732 x 250]
Net weight		Lbs [kg]	67 [30]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Sirocco fan x 2
	External Static pressure	in.WG	0.14, 0.2, 0.28, 0.4, 0.6 factory set to 0.2 In. WG
	Airflow rate	CFM	618-742-883
	Motor type		DC Motor
	Motor Output	kW	0.121
	Motor FLA	A	2.3
Sound pressure level (Measured in anechoic room) ³		dB(A)	31-35-39
Air filter			PP Honeycomb fabric
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	3/8 [9.52] Braze
	Gas (Low Pressure)	In. [mm]	5/8 [15.88] Braze
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

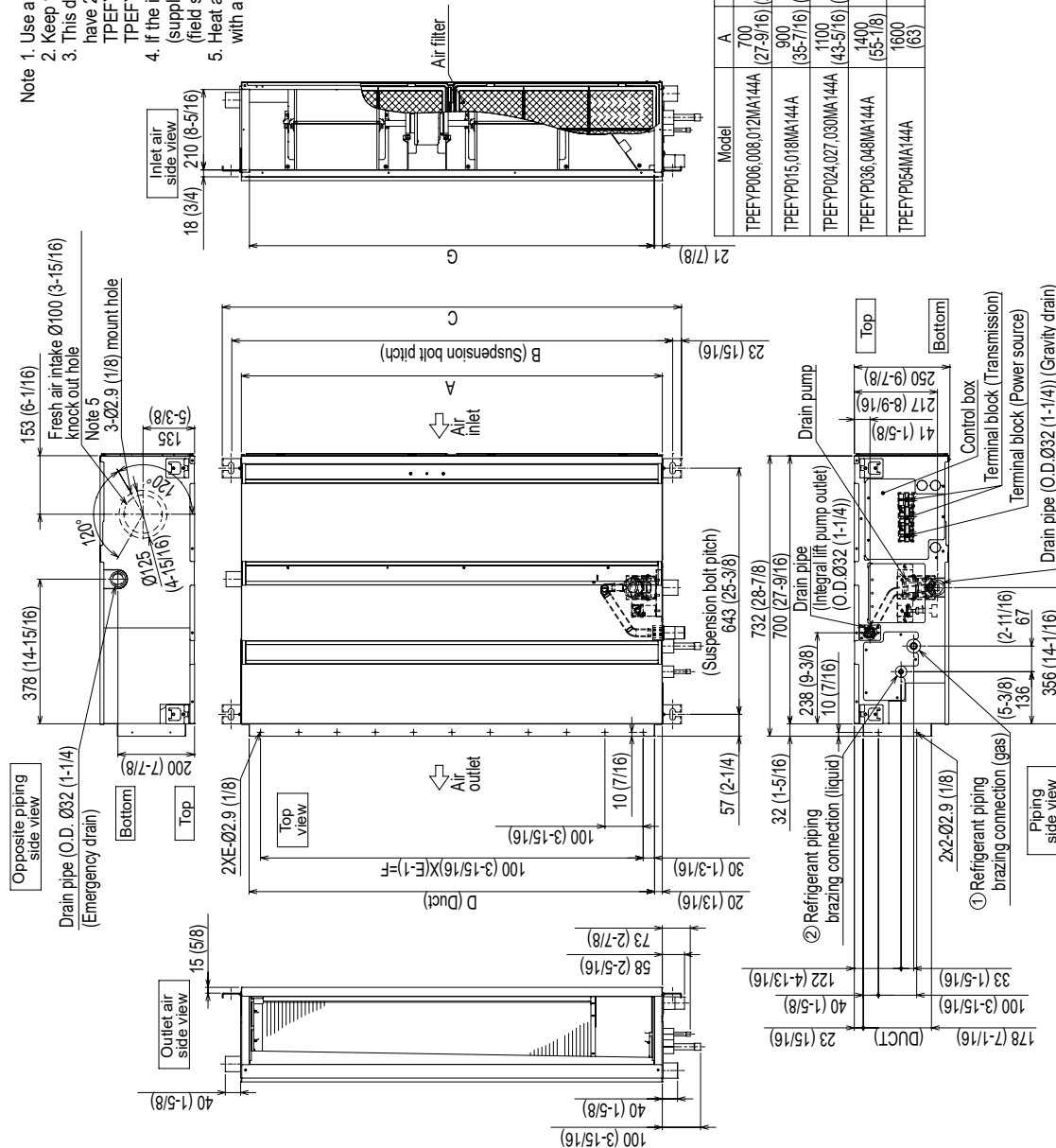
INDOOR UNIT ACCESSORIES: TPEFYP030MA144A

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
	IT Extender	☐ PAC-WHS01IE-E
	kumo station® for kumo cloud®	☐ TAC-WHS01HC-E
	Thermostat Interface	☐ PAC-US444CN-1
	Wireless Interface for kumo cloud®	☐ PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	☐ PAC-USSEN001-FM-1
	Remote Temperature Sensor	☒ PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	☐ PAC-USWHS003-TH-1
Terminal Signal Adapter	Terminal Signal Adapter	☐ PAC-IT51AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	☐ TAR-40MAAU
	Simple MA Remote Controller†	☐ TAC-YT53CRAU-J
	Touch MA Controller†	☐ TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	☐ MHK2
	Wireless MA Remote Controller	☐ TAR-FL32MA-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	☐ X87-721
	Blue Diamond (MegaBlue Advanced) Condensate Pump w/ Reservoir & Sensor	☐ X87-835
	Blue Diamond MultiTank — collection tank for use with multiple pumps	☐ C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	☐ C13-103
	Sauermann Condensate Pump	☐ SI30-230
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 13 Filter	☒ FBM2-3-A
Lineset	10' x 3/8" x 10' x 5/8" Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-10
	100' x 3/8" x 100' x 5/8" Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-100
	15' x 3/8" x 15' x 5/8" Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-15
	30' x 3/8" x 30' x 5/8" Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-30
	50' x 3/8" x 50' x 5/8" Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-50
	65' x 3/8" x 65' x 5/8" Lineset (Twin-Tube Insulation)††	☐ MPLS385812T-65

INDOOR UNIT DIMENSIONS: TPEFYP030MA144A

Unit : mm(in.)

- Note 1. Use an M10 screw for the suspension bolt (field supply).
 2. Keep the service space for maintenance at the bottom.
 3. This drawing is for TPEFYP024-027-030MA144A models, which have 2 fans. TPEFYP006-008-012MA144A models have 1 fan. TPEFYP015-018MA144A models have 2 fans. TPEFYP036-048-054MA144A models have 3 fans.
 4. If the inlet duct is used, remove the air filter (supplied with the unit), then install the filter (field supply) at the suction side.
 5. Heat air to 0°C (32°F) or higher when taking fresh air with a fresh air intake.



Model	① Gas pipe	② Liquid pipe
TPEFYP006,008,012MA144A	Ø12.7 (1/2)	Ø6.35 (1/4)
TPEFYP015,018MA144A	Ø15.88 (5/8)	Ø9.52 (3/8)
TPEFYP024,027,030MA144A		
TPEFYP036,048MA144A		
TPEFYP054MA144A		

Model	A	B	C	D	E	F	G
TPEFYP006,008,012MA144A	700 (27-9/16)	754 (29-11/16)	800 (31-1/2)	660 (26)	7	600 (23-5/8)	658 (25-15/16)
TPEFYP015,018MA144A	900 (35-7/16)	954 (37-9/16)	1000 (39-3/8)	860 (33-7/8)	9	800 (31-1/2)	858 (33-13/16)
TPEFYP024,027,030MA144A	1100 (43-5/16)	1154 (45-7/16)	1200 (47-1/4)	1060 (41-3/4)	11	1000 (39-3/8)	1058 (41-11/16)
TPEFYP036,048MA144A	1400 (55-1/8)	1454 (57-1/4)	1500 (59-7/16)	1360 (53-9/16)	14	1300 (51-3/16)	1358 (53-1/2)
TPEFYP054MA144A	1600 (63)	1654 (65-1/8)	1700 (66-15/16)	1560 (61-7/16)	16	1500 (59-1/16)	1558 (61-3/8)

Job Name: **Duluth City Hall**System Reference: **0-124, 1-129, 1-116, 3-101, 4-101, 4-116, 4-133**Date: **5-18-22**

GENERAL FEATURES

- Dual set point functionality
- Multiple fan speed settings
- Auto fan mode
- 9-7/8" (250mm) high for low ceiling heights
- Built-in condensate lift; lifts to 27-9/16" (700 mm)
- Ducted fan coil supporting multiple configurations for flexible installation

Specifications			System
Unit Type			TPEFYP036MA144A
Cooling capacity (Nominal) ¹		BTU/H	36,000
Heating capacity (Nominal) ¹		BTU/H	40,000
Power source	Voltage, Phase, Hertz		208/230V, 1-phase, 60 Hz
Power Consumption	Cooling	kW	0.222
	Heating	kW	0.22
Current	Cooling	A	2.01/1.82
	Heating	A	2.01/1.82
MCA		A	4.25
Maximum Overcurrent Protection (MOCP)		A	15
External finish			Galvanized steel sheet
External Dimensions		In. [mm]	55-1/8 x 28-7/8 x 9-7/8 [1400 x 732 x 250]
Net weight		Lbs [kg]	84 [38]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Sirocco fan x 3
	External Static pressure	in.WG	0.14, 0.2, 0.28, 0.4, 0.6 factory set to 0 In. WG
	Airflow rate	CFM	883–1077–1271
	Motor type		DC Motor
	Motor Output	kW	0.3
	Motor FLA	A	3.4
Sound pressure level (Measured in anechoic room) ²		dB(A)	35–39–43
Air filter			PP Honeycomb fabric
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	3/8 [9.52] Braze
	Gas (Low Pressure)	In. [mm]	5/8 [15.88] Braze
Diameter of drain pipe		In. [mm]	O.D. 1-1/4 [32]

NOTES:

¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

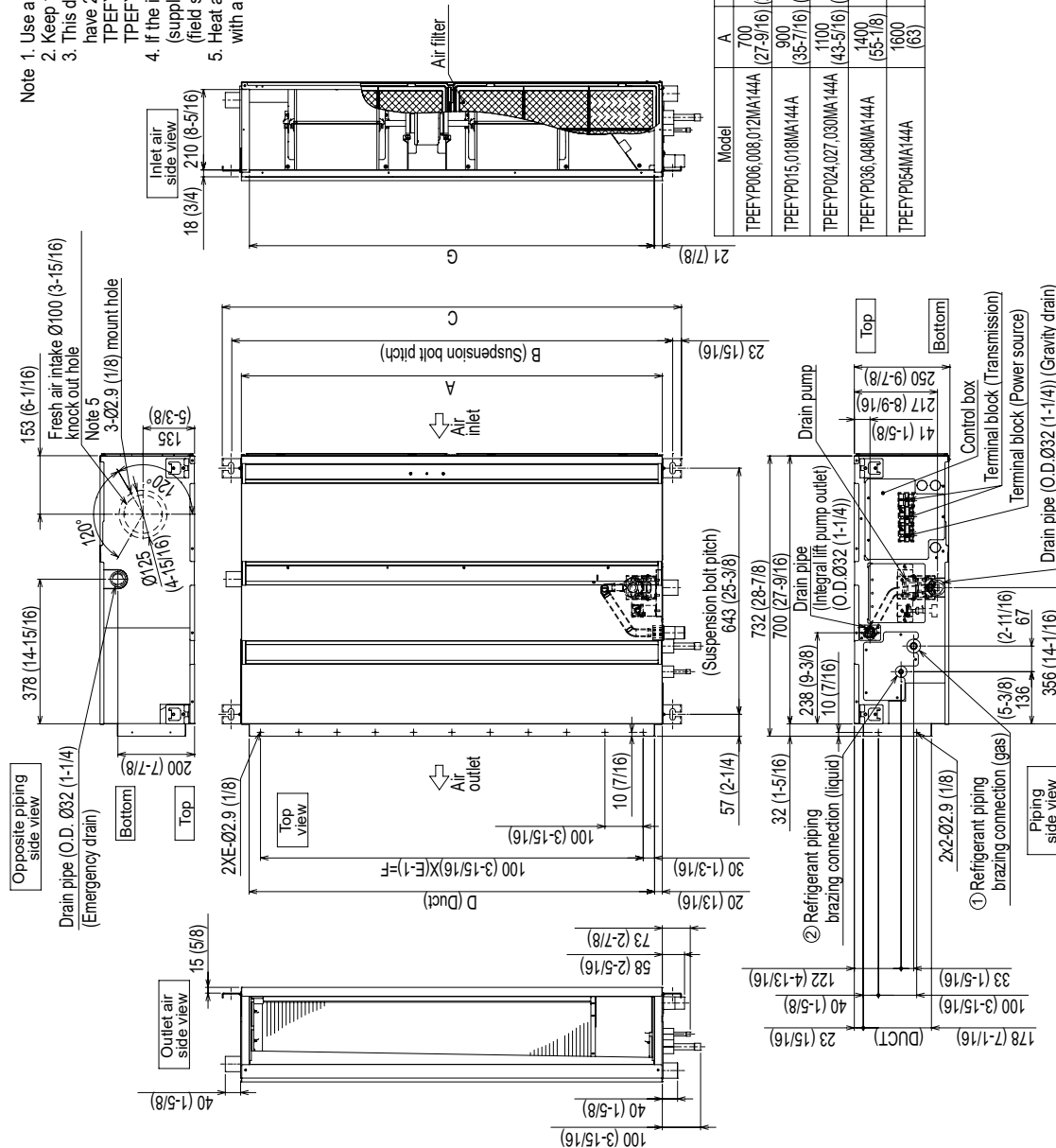
INDOOR UNIT ACCESSORIES: TPEFYP036MA144A

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
	IT Extender	☐ PAC-WHS01IE-E
	kumo station® for kumo cloud®	☐ TAC-WHS01HC-E
	Thermostat Interface	☐ PAC-US444CN-1
	Wireless Interface for kumo cloud®	☐ PAC-USWHS002-WF-2
Remote Sensor	Flush Mount Temperature Sensor	☐ PAC-USSEN001-FM-1
	Remote Temperature Sensor	☒ PAC-SE41TS-E
	Wireless temperature and humidity sensor for kumo cloud®	☐ PAC-USWHS003-TH-1
Terminal Signal Adapter	Terminal Signal Adapter	☐ PAC-IT51AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	☐ TAR-40MAAU
	Simple MA Remote Controller†	☐ TAC-YT53CRAU-J
	Touch MA Controller†	☐ TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	☐ MHK2
	Wireless MA Remote Controller	☐ TAR-FL32MA-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	☐ X87-721
	Blue Diamond (MegaBlue Advanced) Condensate Pump w/ Reservoir & Sensor	☐ X87-835
	Blue Diamond MultiTank — collection tank for use with multiple pumps	☐ C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	☐ C13-103
	Sauermann Condensate Pump	☐ SI30-230
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 13 Filter	☒ FBM2-4-A
Lineset	10' x 3/8" x 10' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-10
	100' x 3/8" x 100' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-100
	15' x 3/8" x 15' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-15
	30' x 3/8" x 30' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-30
	50' x 3/8" x 50' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-50
	65' x 3/8" x 65' x 5/8" Lineset (Twin-Tube Insulation)	☐ MPLS385812T-65

INDOOR UNIT DIMENSIONS: TPEFYP036MA144A

Unit : mm(in.)

- Note 1. Use an M10 screw for the suspension bolt (field supply).
 2. Keep the service space for maintenance at the bottom.
 3. This drawing is for TPEFYP024-027-030MA144A models, which have 2 fans. TPEFYP006-008-012MA144A models have 1 fan. TPEFYP015-018MA144A models have 2 fans. TPEFYP036-048-054MA144A models have 3 fans.
 4. If the inlet duct is used, remove the air filter (supplied with the unit), then install the filter (field supply) at the suction side.
 5. Heat air to 0°C (32°F) or higher when taking fresh air with a fresh air intake.



Model	① Gas pipe	② Liquid pipe
TPEFYP006,008,012MA144A	Ø12.7 (1/2)	Ø6.35 (1/4)
TPEFYP015,018MA144A	Ø15.88 (5/8)	Ø9.52 (3/8)
TPEFYP024,027,030MA144A		
TPEFYP036,048MA144A		
TPEFYP054MA144A		

Model	A	B	C	D	E	F	G
TPEFYP006,008,012MA144A	700 (27-9/16)	754 (29-11/16)	800 (31-1/2)	660 (26)	7	600 (23-5/8)	658 (25-15/16)
TPEFYP015,018MA144A	900 (35-7/16)	954 (37-9/16)	1000 (39-3/8)	860 (33-7/8)	9	800 (31-1/2)	858 (33-13/16)
TPEFYP024,027,030MA144A	1100 (43-5/16)	1154 (45-7/16)	1200 (47-1/4)	1060 (41-3/4)	11	1000 (39-3/8)	1058 (41-11/16)
TPEFYP036,048MA144A	1400 (55-1/8)	1454 (57-1/4)	1500 (59-1/16)	1360 (53-9/16)	14	1300 (51-3/16)	1358 (53-1/2)
TPEFYP054MA144A	1600 (63)	1654 (65-1/8)	1700 (66-15/16)	1560 (61-7/16)	16	1500 (59-1/16)	1558 (61-3/8)

Job Name: **Duluth City Hall**System Reference: **2-137A, 2-137B**Date: **5-18-22****GENERAL FEATURES**

- Multi-position design is suitable for any application requires no additional kits, even for downflow configuration
- Highly efficient DC motor and a forward curved blower ensures quiet, consistent fan operation
- Selectable external static pressure: 0.30, 0.50 and 0.80 in.WG with 3 fan speeds at each static setting
- 1 inch R4.2 fiberglass free insulation reduces condensation and boosts efficiency
- Positive pressure cabinet with air leakage of less than 2.0% at 1.0 In.WG (Tested per ASHRAE Standard 193)
- Unique blow through design allows simple coil cleaning when the blower is removed
- Optional electric heat kit for additional heat capacity
- Optional humidifier control and ERV control

Specifications			System
Unit Type			TPVFYP054AM141A
Cooling capacity (Nominal) ¹		BTU/H	54,000
Heating capacity (Nominal) ¹		BTU/H	60,000
Power source		Voltage, Phase, Hertz	208/230V, 1-phase, 60 Hz
MCA		A	5.6
Maximum Overcurrent Protection (MOCP)		A	15
External finish			High-gloss polyester powder coated
External Dimensions		In. [mm]	25 x 21-5/8 x 59-1/2 [635 x 548 x 1511]
Net weight		Lbs [kg]	172 [78]
Heat exchanger			Cross fin (Aluminum fin and copper tube)
Fan	Type x quantity		Sirocco fan x 1
	External Static pressure	in.WG	0.30, 0.5, 0.8
	Airflow rate	CFM	1040–1262–1485
	Motor type		DC motor
Sound pressure level (Measured in anechoic room)		dB(A)	36–40–44
Air filter			Polypropylene Honeycomb
Diameter of refrigerant pipe (O.D.)	Liquid (High Pressure)	In. [mm]	3/8 [9.52] Braze
	Gas (Low Pressure)	In. [mm]	5/8 [15.88] Braze
Diameter of drain pipe		In. [mm]	FPT 3/4 [19.05]

NOTES:¹Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling | Indoor: 80° F (26.7° C) DB / 67° F (19.4° C) WB; Outdoor 95° F (35° C) DB

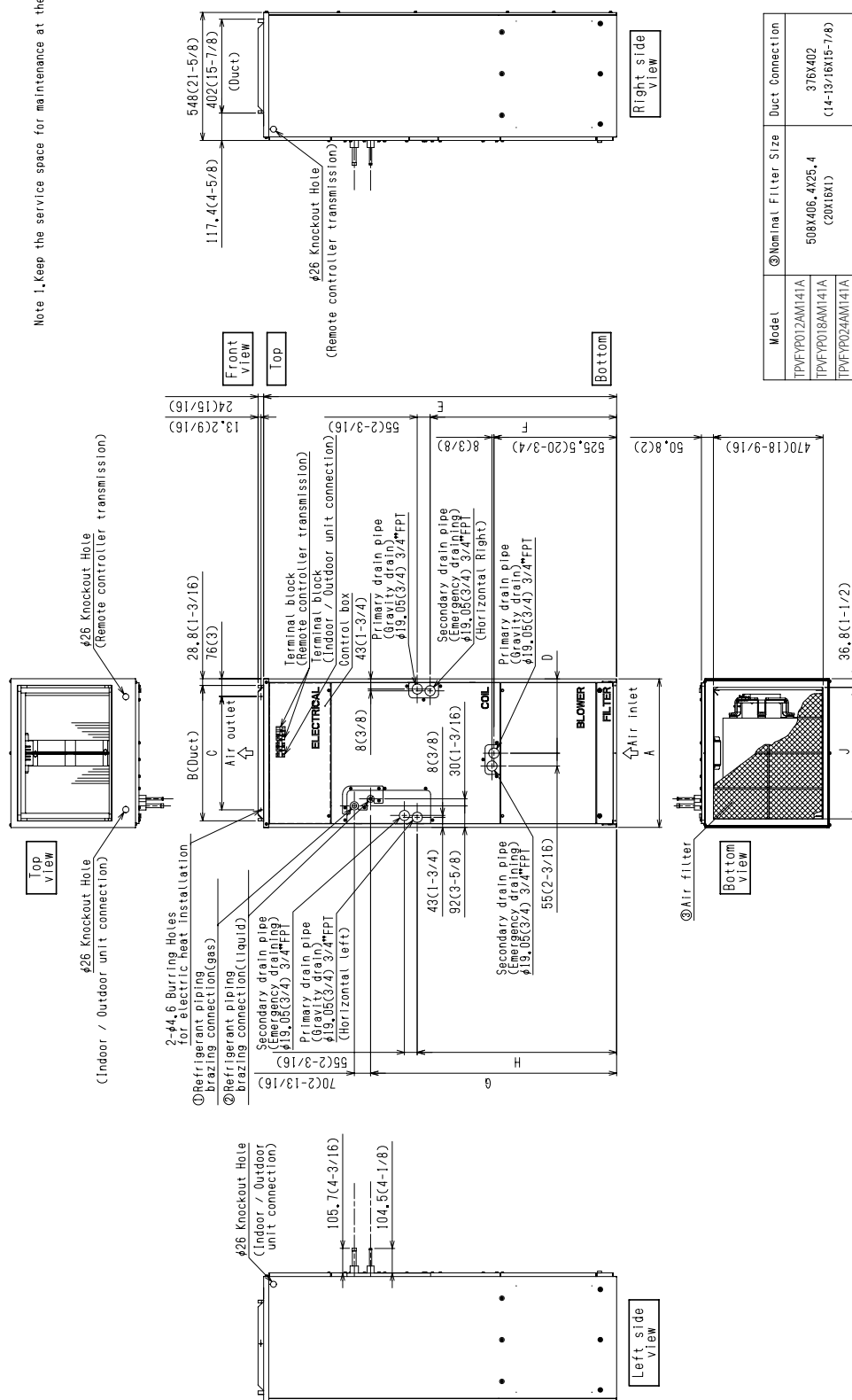
Heating | Indoor: 70° F (21.1° C) DB; Outdoor 47° F (8.3° C) DB / 43° F (6.1° C) WB

INDOOR UNIT ACCESSORIES: TPVFYP054AM141A

Control Interface	BACnet® and Modbus® Interface	☐ PAC-UKPRC001-CN-1
	CN24 Relay Kit	☐ CN24RELAY-KIT-CM3
	IT Extender	☐ PAC-WHS01IE-E
	kumo station® for kumo cloud®	☐ TAC-WHS01HC-E
	Thermostat Interface	☐ PAC-US444CN-1
Remote Sensor	Flush Mount Temperature Sensor	☐ PAC-USSEN001-FM-1
	Remote Temperature Sensor	☒ PAC-SE41TS-E
Terminal Signal Adapter	Terminal Signal Adapter	☐ PAC-IT51AD-E
	Terminal Signal Adapter	☐ PAC-IT52AD-E
Wired Remote Controller	Deluxe Wired MA Remote Controller†	☐ TAR-40MAAU
	Simple MA Remote Controller†	☐ TAC-YT53CRAU-J
	Smart ME Remote Controller - Backlit touchscreen	☐ TAR-U01MEDU-K
	Touch MA Controller†	☐ TAR-CT01MAU-SB
Wireless Remote Controller	kumo touch™ RedLINK™ Wireless Controller	☐ MHK2
	Wireless MA Controller Receiver	☐ PAR-SR32MA-E
	Wireless MA Remote Controller	☐ TAR-FL32MA-E
Condensate	Blue Diamond (Advanced) Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	☐ X87-721
	Blue Diamond (MegaBlue Advanced) Condensate Pump w/ Reservoir & Sensor	☐ X87-835
	Blue Diamond MultiTank — collection tank for use with multiple pumps	☐ C21-014
	Blue Diamond Sensor Extension Cable — 15 Ft.	☐ C13-103
	Sauermann Condensate Pump	☐ SI30-230
Electric Heat Lockout	Electric Heat Lockout	☐ ETC-211000-MIT

Units: mm (in.)

Note 1.Keep the service space for maintenance at the front.



Model	⊙Nominal Filter Size	Duct Connection
PVF/P020AM141A	508x406, 4x25, 4 (20x16x1)	376X402 (14-13x1615-7/8)
PVF/P018AM141A		
PVF/P024AM141A		
PVF/P030AM141A		
PVF/P036AM141A	508x508x25, 4 (20x20x1)	477X402 (18-13x1615-7/8)
PVF/P045AM141A	508x609, 6x25, 4 (20x24x1)	579X402 (22-13x1615-7/8)
PVF/P050AM141A		
PVF/P055AM141A		

Model	A	B	C	D	E	F	G	H	J	Gas pipe	Liquid pipe	Unit:mm(in.)
TPVPFP02AM141A	432	376	281	224	1275	680	823	735.5	360	φ12.7	φ6.35	(1/4)
TPVPFP02AM141A	(17)	(14-13/16)	(11-1/8)	(8-7/8)	(50-1/4)	(26-13/16)	(32-7/16)	(29)	(14-3/16)	(1/2)		
TPVPFP02AM141A	534	477	382.6	266.5	1378	737	953.5	792	461	φ15.88	φ9.52	(3/8)
TPVPFP03AM141A	(21)	(18-13/16)	(15-1/8)	(10-1/2)	(54-1/4)	(29-1/16)	(37-9/16)	(31-3/16)	(18-3/16)	(5/8)		
TPVPFP03AM141A	635	579	484.6	317.5	1511	798.5	1053	853.5	563			(3/8)
TPVPFP04AM141A	(25)	(22-13/16)	(19-1/8)	(12-1/2)	(58-1/2)	(31-7/16)	(41-1/2)	(33-5/8)	(22-3/16)			
TPVPFP05AM141A	635	579	484.6	317.5	1511	798.5	1053	853.5	563			(3/8)
TPVPFP05AM141A	(25)	(22-13/16)	(19-1/8)	(12-1/2)	(58-1/2)	(31-7/16)	(41-1/2)	(33-5/8)	(22-3/16)			

Job Name: Duluth City Hall

System Reference: 3-111

Date: 5-18-22



General Features

- Dual set point functionality
- High external static pressure capabilities
- Ducted fan coil supports multiple configurations for flexible installation
- Built-in condensate pump; lifts to 27-9/16 inches
- Suitable for use in air handling spaces in accordance with Section 18.2 of UL 1995 4th Edition

OPTIONS

- ☐ Condensate Pump.....BlueDiamond X87-711/721; 115/230V
- ☐ Condensate Pump.....Sauermann SI30-115/230; 115/230V
- ☒ Filter Box (Includes 2" MERV 13 filter).....FBH2-3
- ☐ CN24 Relay Kit.....CN24RELAY-KIT-CM3

Specifications

Capacity*

Cooling.....54,000 Btu/h
Heating.....60,000 Btu/h

Power

Power Source.....208 / 230V, 1-phase, 60Hz

Power consumption*

Cooling.....0.63 / 0.62 kW
Heating.....0.61 / 0.60 kW

Current*

Cooling.....3.11 / 2.78 A
Heating.....3.00 / 2.67 A

Minimum circuit ampacity (MCA)

@ 208V.....4.18 A
@ 230V.....3.69 A

Fuse Size.....15 A

external Finish.....Galvanized-steel Sheet

external Dimensions

Inches.....15 H x 47-1/16 W x 35-7/16 D
mm.....380 H x 1,195 W x 900 D

Net Weight.....157 lbs. / 71 kg

coil Type.....Cross Fin
(Aluminum Plate Fin and Copper Tube)

Fan

Type x Quantity.....Sirocco Fan x 2
Airflow Rate (Low - High).....989 - 1,412 CFM
External Static Pressure
@ 208V.....0.40 - 1.00" WG
@ 230V.....0.60 - 1.00" WG
Motor Type.....1-phase induction motor

Refrigerant Piping Dimensions

Liquid (High Pressure).....3/8" / 9.52 mm (Brazed)
Gas (Low Pressure).....5/8" / 15.88 mm (Brazed)

Drainpipe Dimension.....O.D. 1-1/4" / 32 mm

Sound Pressure Levels

Low - High.....41 - 47 dB(A)

* Cooling / Heating capacity indicated at operation under the following conditions:

Cooling | Indoor: 80° F (27° C) DB / 67° F (19° C) WB,
Cooling | Outdoor 95° F (35° C) DB
Heating | Indoor: 70° F (21° C) DB,
Heating | Outdoor 47° F (8° C) DB / 43° F (6° C) WB

Notes:

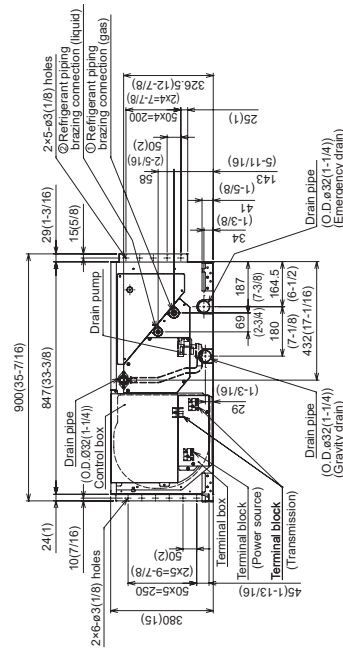
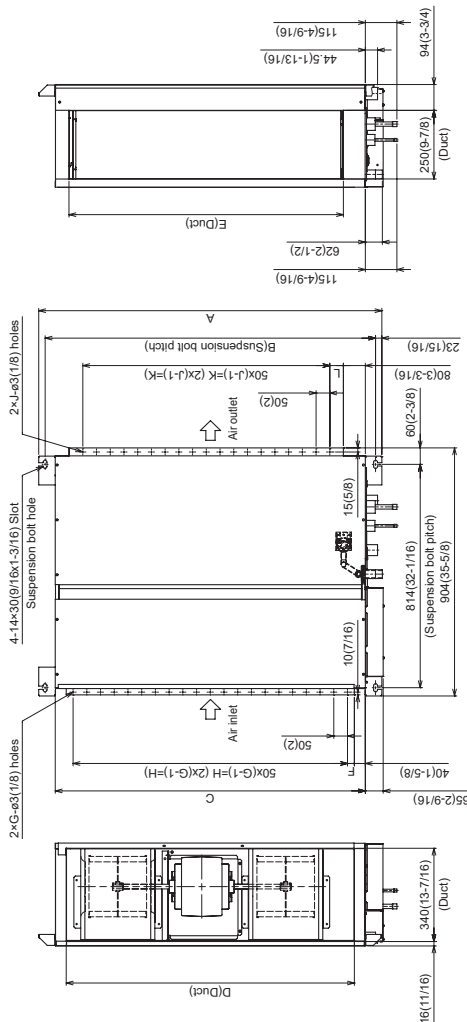
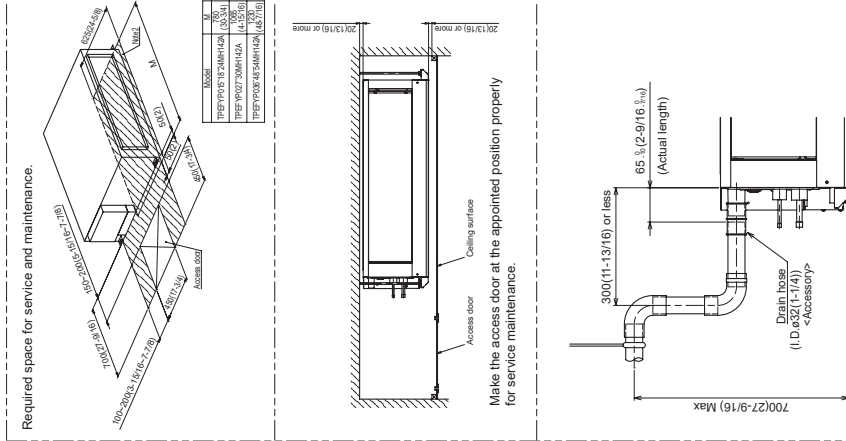


Model: TPEFYP054MH142A – DIMENSIONS

Unit :mm(in.)

1. Use an M10 screw for the suspension bolt (field supply).
2. Keep the service space for the maintenance from the bottom when the heat exchanger is cleaned.
3. This drawing is for TPEFY02738 48"54MH142A, models which have 2 fans. TPEFY02157 36"48MH142A models have 1 fan.
4. Make sure to install the air filter (field supply) on the air intake side.

In case field supplied air filter is used, attach it where the filter service is easily done.



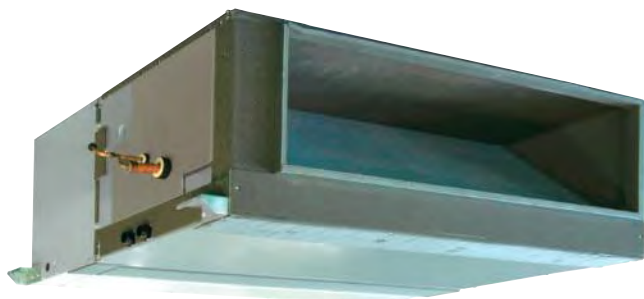
Model	A	B	C	D	E	F	G	H	J	K	L	④ Gas pipe	⑤ Liquid pipe
TFEPF0518MH42A	830 (51-12)	754 (26-11/16)	680 (23-13/16)	600 (21-11/16)	550 (21-11/16)	61	11	630 (19-11/16)	10	1450 (17-3/4)	50	① 27.2 (112)	② 35 (144)
TFEPF0204MH42A	1085 (42-3/4)	1039 (40-15/16)	965 (38)	885 (34-7/8)	835 (32-7/8)	42.5 (1-11/16)	17	800 (31-1/2)	15	700 (27-9/16)	67 (2-11/16)	① 58.8 (56)	② 52 (38)
TFEPF020730MH42A	1240 (49-1/2)	1204 (46-1/4)	1130 (44-1/2)	1050 (41-1/2)	1000 (40)	25	21	1000	900	900	50		
TFEPF020730MH42A	1240 (49-1/2)	1204 (46-1/4)	1130 (44-1/2)	1050 (41-1/2)	1000 (40)	25	21	1000	900	900	50		



Job Name: Duluth City Hall

System Reference: 3-110

Date: 5-18-22



General Features

- Single phase
- Dual set point functionality
- DC Motor
- Static Pressure Features
 - Adjustable up to 1"
 - No change in static pressure with voltage change
- Side access control panel
- Flexibility in duct configuration
- Choice of fan speed

Options

- ☐ Joint Adapter (Port Connector).....CMY-R160C-J
- ☐ Drain pump.....PAC-KE05DM-F
- ☐ External Heater Adapter.....CN24RELAY-KIT-CM3
- ☒ Filter Box (With 4" MERV 13 filter).....FBH4-4

Specifications

Capacity*

Cooling.....72,000 Btu/h
Heating.....80,000 Btu/h

Power

Power Source.....208 / 230V, 1-phase, 60 Hz

Power Consumption

Cooling.....0.63 kW
Heating.....0.63 kW

Current

Cooling.....3.67/3.32A
Heating.....3.67/3.32A
Minimum Circuit Ampacity (MCA)..... 7.7 A
Maximum Overcurrent Protection (MOCP) Fuse..... 15 A

external Finish.....Galvanized-steel Sheet

external Dimensions

Inches.....18-9/16 H x 49-1/4 W x 44-1/8 D
mm.....470 H x 1,250 W x 1,120 D

net Weight

Unit.....214 lbs / 97 kg

coil Type.....Cross Fin
(Aluminum Plate Fin and Copper Tube)

Fan

Type x Quantity.....Sirocco Fan x 2
Airflow Rate (Low-Mid-High).....1,766 - 2,154 - 2,542 CFM
External Static Pressure..... 0.20-0.40-0.60-0.80-1.00 "WG
(External static pressure is factory set to 0.60"WG)

Motor

Type.....DC Brushless Motor

Refrigerant Piping Dimensions

Liquid (High Pressure).....3/8" / 9.52 mm (Brazed)
Gas (Low Pressure).....3/4" / 19.05 mm (Brazed)

Drainpipe Dimension.....O.D. 1-1/4" / 32 mm

Sound pressure Levels (Low-Mid-High)

Low-Mid-High.....36-39-43 dB(A)

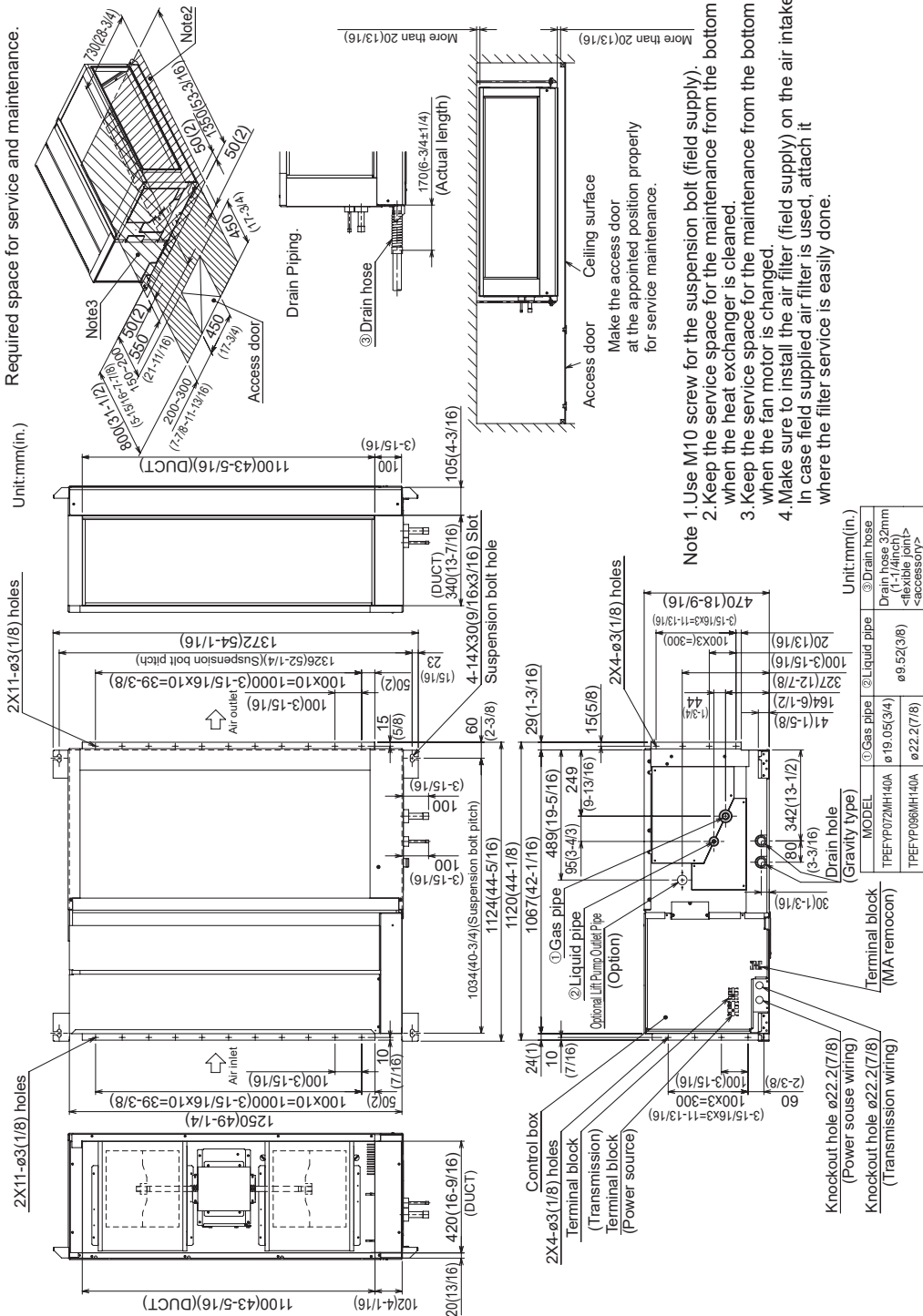
* Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

Cooling: Indoor 80°F (27°C) DB / 67°F (19°C) WB, Outdoor 95°F (35°C) DB
Heating: Indoor 70°F (21°C) DB, Outdoor 47°F (8°C) DB / 43°F (6°C) WB

Notes:



TPEFYP07296MH140A



1. Use M10 screw for the suspension bolt (field supply).
2. Keep the service space for the maintenance from the bottom when the heat exchanger is cleaned.
3. Keep the service space for the maintenance from the bottom when the fan motor is changed.
4. Make sure to install the air filter (field supply) on the air intake side. In case field supplied air filter is used, attach it where the filter service is easily done.



**CITYMULTI®****MODEL: TPKFYP004LM140A**

Job Name: Duluth City Hall

System Reference: 0-114

Date: 5-18-22

**GENERAL FEATURES**

- Dual set point functionality
- Compact, lightweight, flat-white, flat-panel, modern design
- Quiet operation
- Multiple fan speed settings
- Intake grille filter is easily removed for cleaning
- Back and right-side wiring take-out
- Wireless receiver on board

SPECIFICATIONS

Power source		1-phase, 208/230V, 60Hz	
Cooling Capacity ¹ (Nominal)		BTU/H	4,000
Heating Capacity ² (Nominal)		BTU/H	4,500
Power Consumption	Cooling	kW	0.02
	Heating	kW	0.01
Current	Cooling	A	0.20
	Heating	A	0.15
Minimum Circuit Ampacity (MCA)		A	0.24
Maximum Overcurrent Protection (MOCP)		A	15
Recommended Fuse Size		A	15
External finish		Plastic, MUNSELL (0.7PB 9.2/0.4)	
External Dimensions (H x W x D)		In.	11-25/32 x 30-7/16 x 9-11/32
		mm	299 x 733 x 237
Net weight		Lbs (kg)	23.6 (10.7)
Heat exchanger		Cross fin (Aluminum fin and copper tube)	
Fan	Type x quantity		Line flow fan x 1
	External Static pressure	in.WG	0
	Airflow rate	CFM	117-124-134-148
	Motor type		DC Motor
	Motor Output	kW	0.030
	Motor FLA	A	0.19
Sound pressure level (Measured in anechoic room) ³		dB(A)	22-24-26-28
Air filter		PP honeycomb	
Diameter of refrigerant pipe (O.D.)	Liquid (R410A)	in. (mm)	1/4 (6.35) Flare
	Gas (R410A)	in. (mm)	1/2 (12.70) Flare
Diameter of drain pipe		in. (mm)	I.D. 5/8 (16)

Notes

Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:

¹Cooling | Indoor: 81° F (27° C) DB / 66° F (19° C) WB; Outdoor 95° F (35° C) DB²Heating | Indoor: 68° F (20° C) DB; Outdoor 45° F (7° C) DB / 43° F (6° C) WB

ACCESSORIES: TPKFYP004LM140A

Wireless Signal Receiver	□ PAR-SR32MA-W
Wireless Signal Receiver	□ PAR-FA32MA-E
Wireless Remote Controller	□ TAR-FL32MA-E
kumo touch™ RedLINK™ Wireless Controller	□ MHK2
Deluxe MA Remote Controller	□ TAR-40MAAU
Simple MA Controller	□ TAC-YT53CRAU-J
Touch MA Controller	□ TAR-CT01MAU-SB
Wired Remote Sensor	■ PAC-SE41TS-E
Terminal Signal Adapter	□ PAC-IT52AD-E
Terminal Signal Adapter	□ PAC-IT51AD-E
Wireless Temperature and Humidity Sensor	□ PAC-USWHS003-TH-1
Flush Mount Remote Temperature Sensor	□ PAC-USSEN001-FM-1
System Control Interface	□ MAC-334IF-E
Wireless Interface 2	□ PAC-USWHS002-WF-2
Thermostat Interface	□ PAC-US444CN-1
kumo station®	□ TAC-WHS01HC-E
USNAP Interface	□ PAC-WHS01UP-E
IT Extender	□ PAC-WHS01IE-E
BACnet® and MODBUS® Interface	□ PAC-UKPRC001-CN-1
External Fan / Heater Control Relay Adapter	□ CN24RELAY-KIT-CM3
Wire for Remote on/off with CN32 connector	□ PAC-715AD
Connector and wire for Operation status/error using CN51	□ PAC-725AD
Connector cable for remote display	□ PAC-SA88HA-EP
Wire for Remote on/off with CN32 connector	□ PAC-715AD
Remote Operation Adapter ¹	□ PAC-SF40RM-E
3D i-see Sensor® Corner Panel	□ PAC-SF1ME-E
Grille with 3D i-see Sensor®	□ SLP-18FAEU
Installation/Trim Panels	□ PLFY-ITP2
Space Panel	□ PAC-SJ38AS-E
Bottom Return Plate (Converts low-profile ducted indoor unit from rear return to bottom return)	□ BRP-1
Blue Diamond Sensor Extension Cable — 15 Ft.	□ C13-103
Blue Diamond MultiTank — collection tank for use with multiple pumps	□ C21-014
Mini Condensate Pump — 230 volt application	□ SI30-230
Advanced Blue Diamond Mini Condensate Pump w/ Reservoir & Sensor (208/230V) [recommended]	□ X87-721 - 208/230V
(30A/600V/UL) [fits 2" X 4" utility box] - Black	□ TAZ-MS303
(30A/600V/UL) [fits 2" X 4" utility box] - White	□ TAZ-MS303W

¹ Unable to use with wireless remote controller

Unit: in(mm)





MITSUBISHI ELECTRIC TRANE HVAC US

Accessories

Job Name: Duluth City Hall

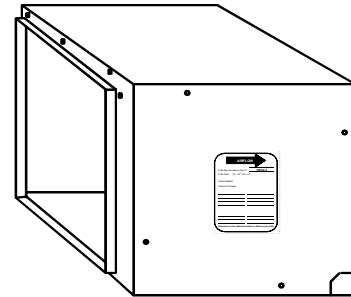
Schedule Reference: High Static MERV 13

Date: 5-18-22

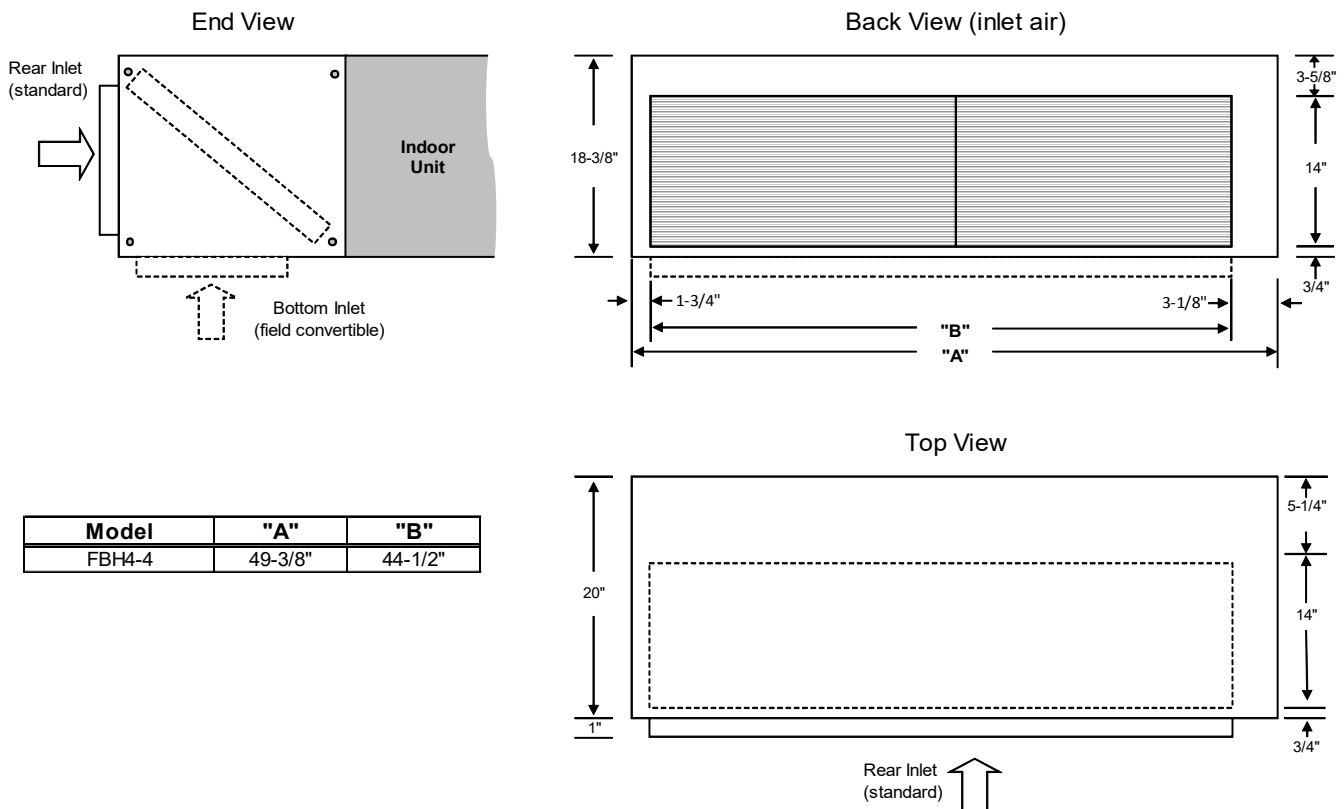
GENERAL FEATURES

- Filter box includes 4" thick pleated MERV 13 filter(s) installed
 Rated MERV 13 when tested in accordance with ANSI/ASHRAE 52.2 Standard
 Rated Class 2 under U.L. Standard 900
- Cabinet is constructed of non-insulated 20 gauge G-60 galvanized steel
- Knurled thumb screws on access door allows easy filter replacement
- Foam gasket provides air-tight connection to indoor unit and access door
- Gasket material complies with UL 723 requirements
- Screw-through cabinet design for secure attachment to indoor unit
- Return connection in rear easily field converted to bottom
- Filter access door includes area to record maintenance schedule

**Meets LEED
 requirement
 of MERV 13**

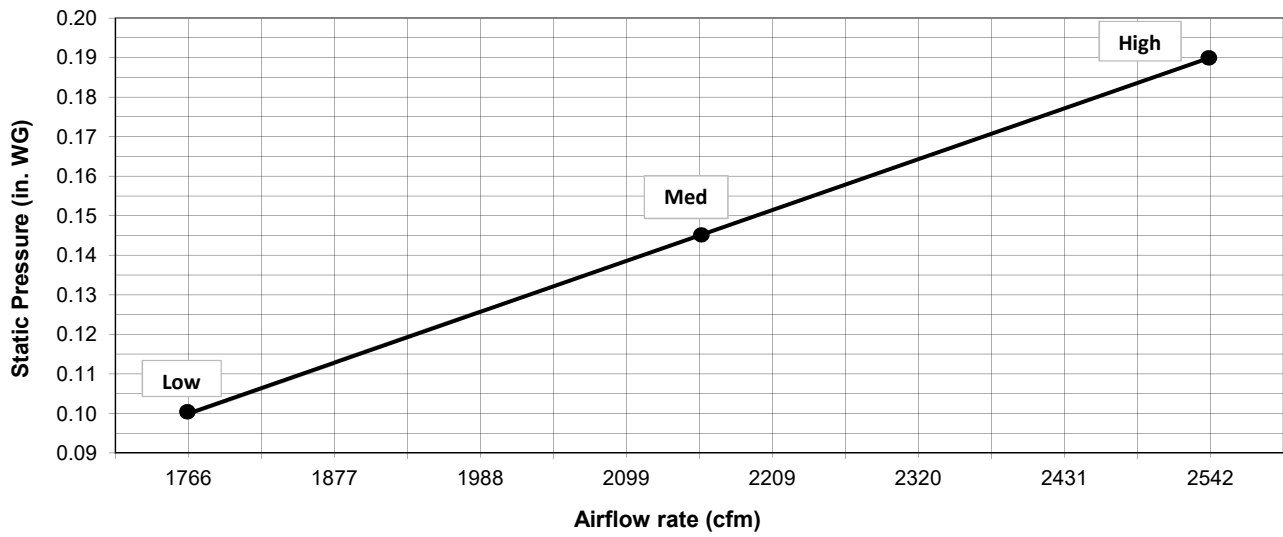
**SPECIFICATIONS**

Part Number	Used on CITY MULTI Models	Filters Included	Ship Weight lbs.	Net Weight lbs.
FBH4-4	PEFY-P72, P96NMHSU-E	(2) - 24" x 24" x 4" MERV 13	44	40

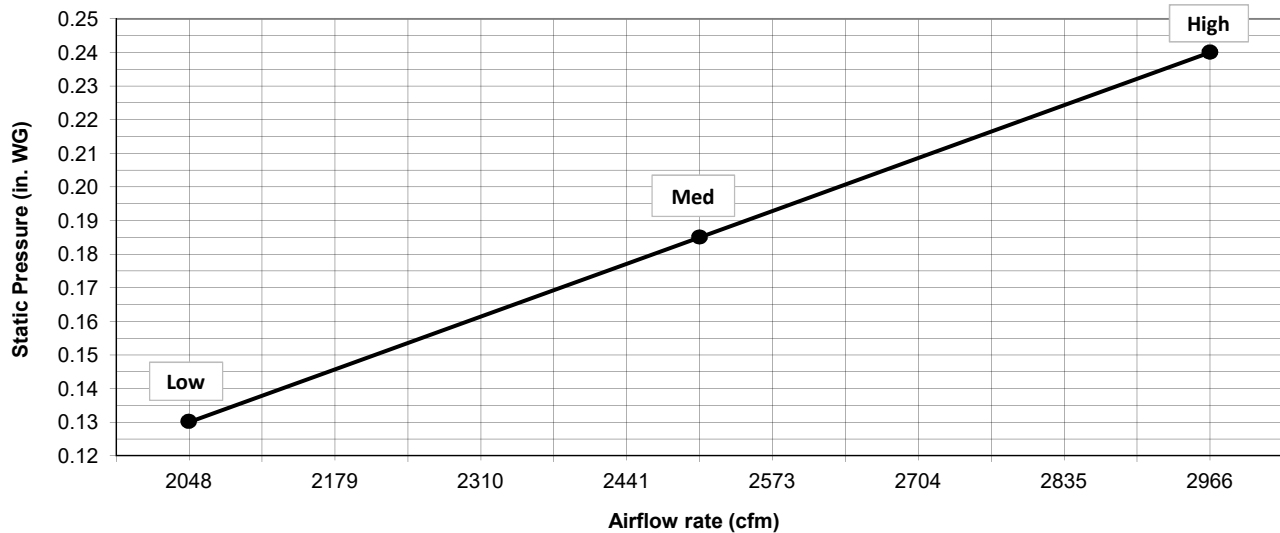
EXTERNAL DIMENSIONS

Initial Filter Pressure Drop with 4" MERV 13 Filter(s) Installed

Indoor Unit PEFY-P72NMHSU-E



Indoor Unit PEFY-P96NMHSU-E



Manufactured for MITSUBISHI ELECTRIC US, INC.
1340 Satellite Boulevard
Suwanee, GA 30024
Tele: 678-376-2900 • Fax: 800-889-9904
Toll Free: 800-433-4822
www.mehvac.com

FBH Series Filter Boxes
 Manufactured for MITSUBISHI ELECTRIC US, INC.
 CITY MULTI® PEFY-P-NMHU-E2 HIGH-STATIC INDOOR UNITS

Job Name: Duluth City Hall

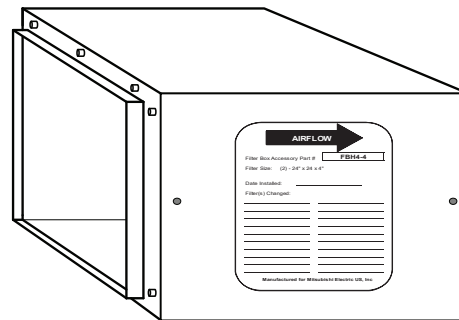
Schedule Reference: High Static MERV 13

Date: 5-18-22

GENERAL FEATURES

- All filter boxes include 2" thick pleated MERV 13 filter(s) installed
 - Rated MERV 13 when tested in accordance with ANSI/ ASHRAE 52.2 Standard
 - Rated Class 2 under U.L. Standard 900
- Cabinet is constructed of non-insulated 20 gauge G-60 galvanized steel
- Knurled thumb screws on access door allow easy filter replacement
- Foam gasket provides air-tight connection to indoor unit and access door
- Gasket material complies with UL 723 requirements
- Screw-through cabinet design for secure attachment to indoor unit
- Return connection in rear easily field converted to bottom
- Filter access door includes area to record maintenance schedule

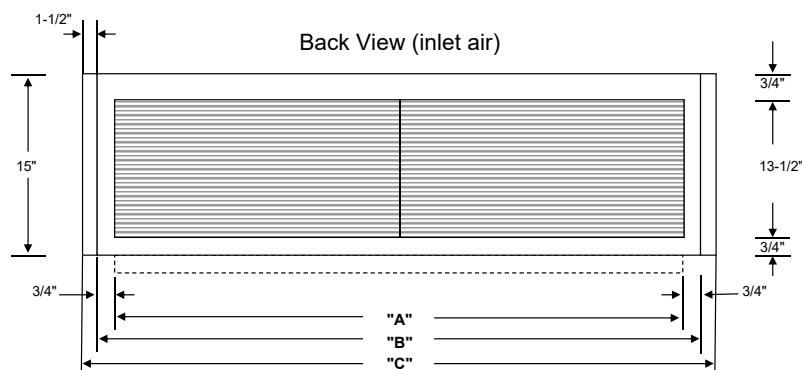
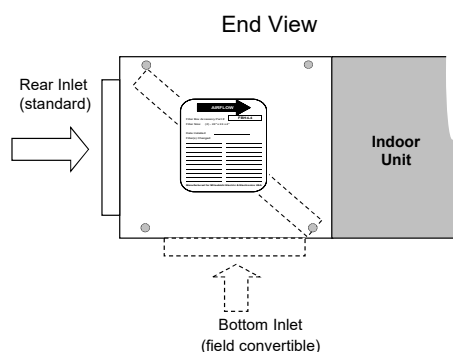
**Meets LEED
requirement
of MERV 13**



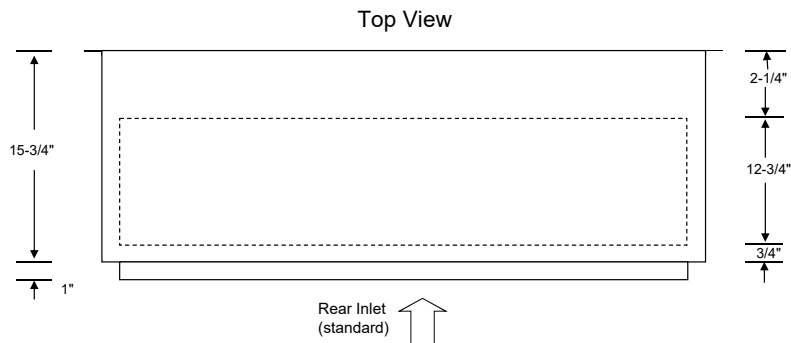
SPECIFICATIONS

Part Number	Use on CITY MULTI Models	Filters Included	Ship Weight (lbs.)	Net Weight (lbs.)
FBH2-1	PEFY-P15, P18, P24-NMHU-E2	(1) - 20" x 24" x 2"	16	14
FBH2-2	PEFY-P27, P30-NMHU-E2	(1) - 20" x 16" x 2", (1) - 20" x 20" x 2"	26	24
FBH2-3	PEFY-P36, P48 P54-NMHU-E2	(2) - 20" x 20" x 2"	29	27

EXTERNAL DIMENSIONS

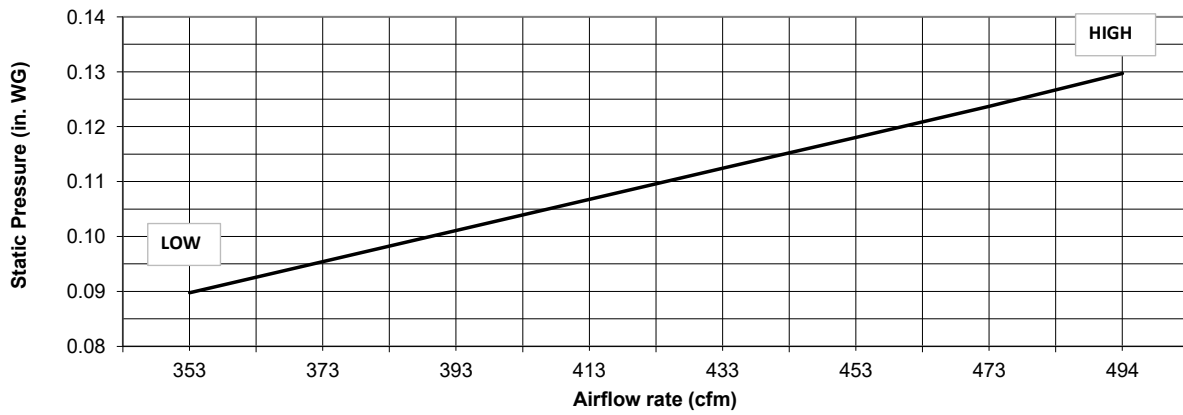


Model	"A"	"B"	"C"
FBH2-1	22-1/4"	23-3/4"	26-3/4"
FBH2-2	33-1/2"	35"	38"
FBH2-3	40"	41-1/2"	44-1/2"

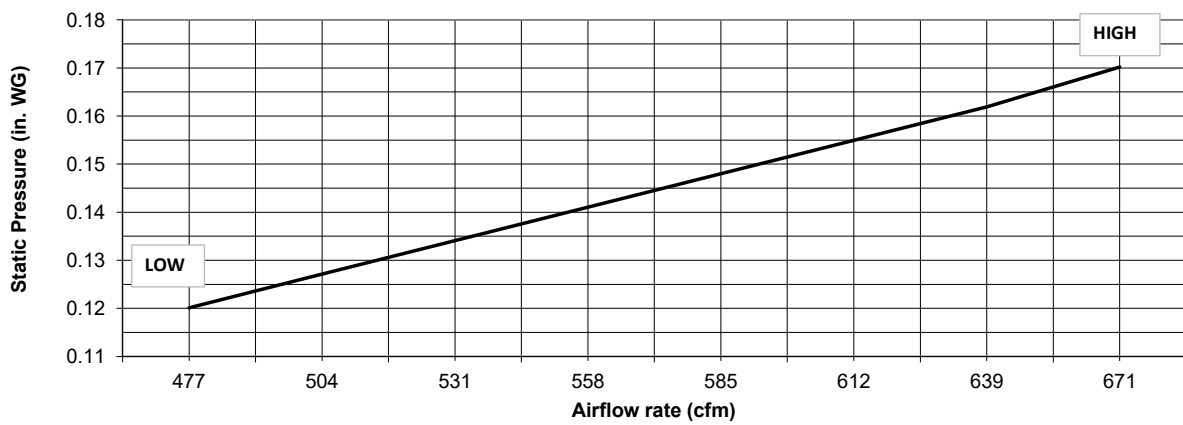


Initial Filter Pressure Drop with 2" MERV 13 Filter(s) Installed

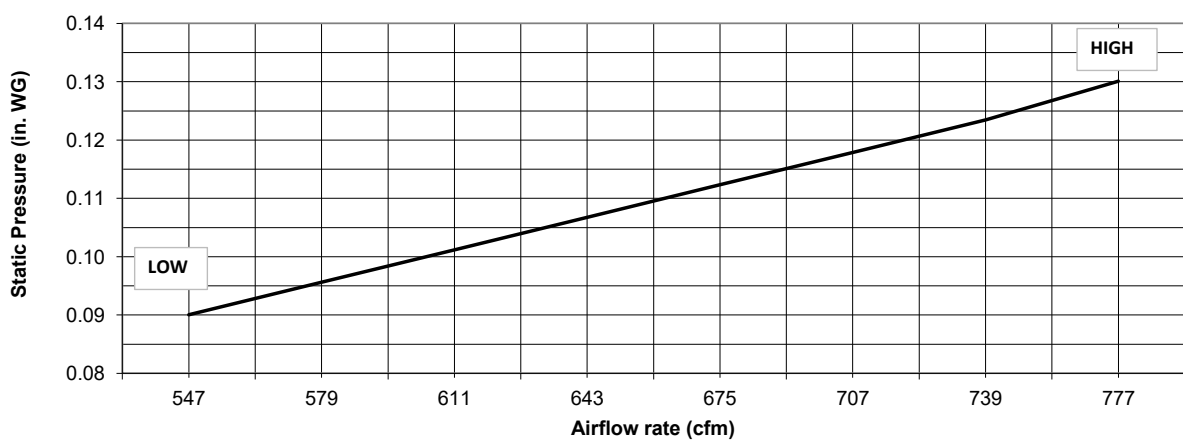
Indoor Unit PEFY-P15-18NMHU-E2



Indoor Unit PEFY-P24NMHU-E2

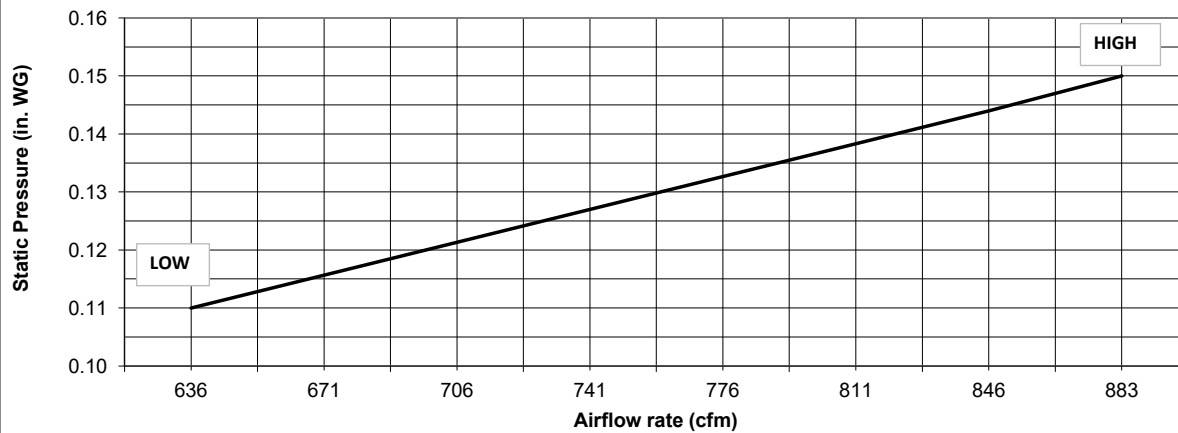


Indoor Unit PEFY-P27NMHU-E2

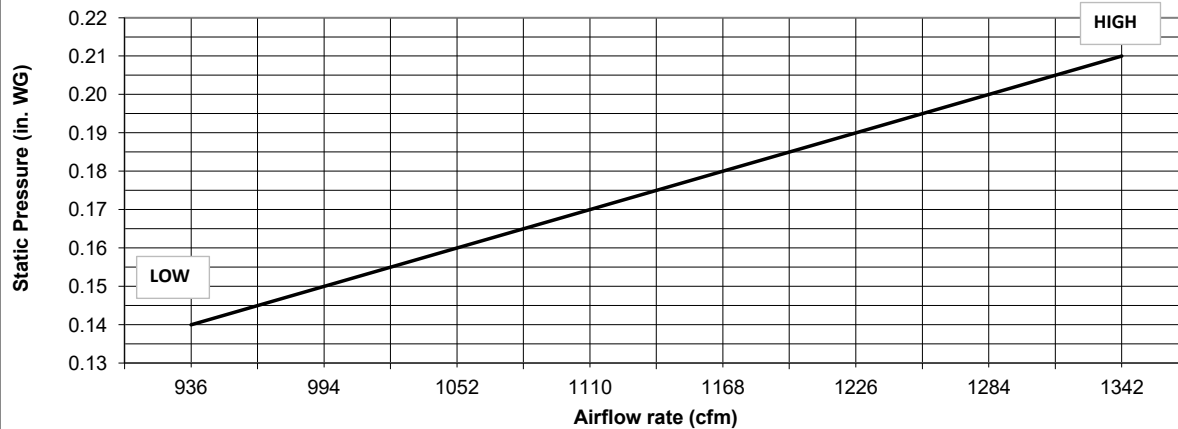


Initial Filter Pressure Drop with 2" MERV 13 Filter(s) Installed

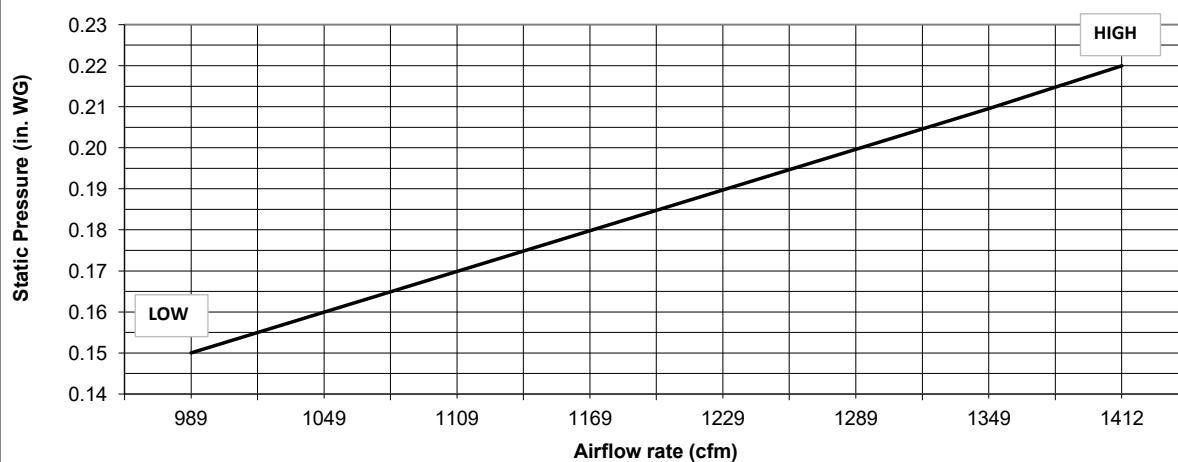
Indoor Unit PEFY-P30NMHU-E2



Indoor Unit PEFY-P36-48NMHU-E2



Indoor Unit PEFY-P54NMHU-E2



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www.mehvac.com

FBM Series Filter Boxes

Manufactured for MITSUBISHI ELECTRIC US, INC.
CITY MULTI® TPEFYP***MA143A and Nv-P PEAD-A*AA7 Medium-Static Indoor Units



Job Name: **Duluth City Hall**

System Reference: **Duluth City Hall**

Date: **Duluth City Hall**



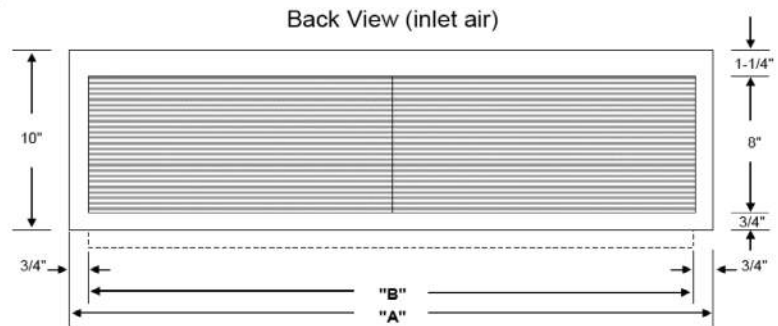
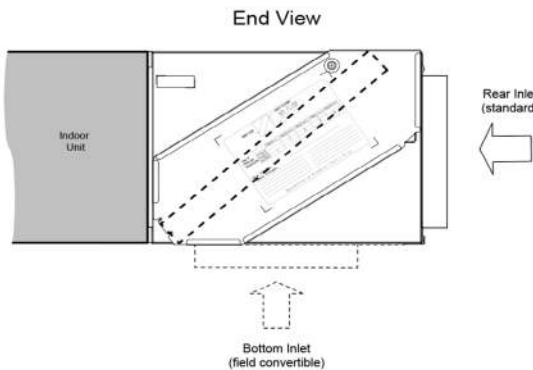
FBM

PRODUCT OVERVIEW

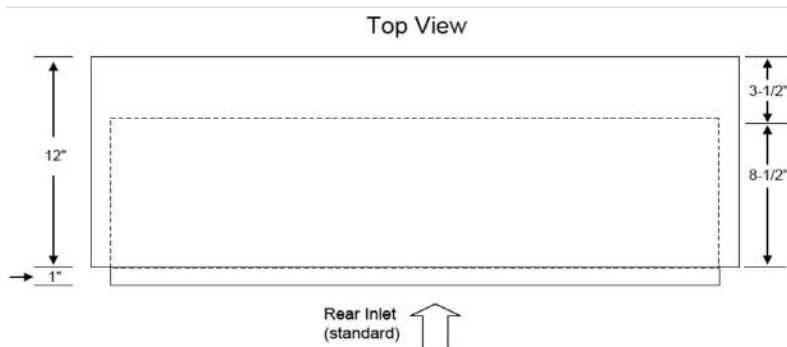
- FBM filter boxes include 2" thick pleated MERV 13 filter(s) installed
 - Rated MERV 13 when tested in accordance with ANSI/ASHRAE 52.2 Standard
 - Rated Class 2 under UL Standard 900
- Low static loss design
- Cabinet is constructed of non-insulated G-60 galvanized steel
- Knurled thumb screws on access door allow easy filter replacement
- Cabinet may be inverted to locate access from other side
- Foam gasket provides airtight connection to indoor unit and access door
- Gasket material complies with UL 723 requirements
- Screw-through cabinet design for secure attachment to indoor unit
- Return connection in rear easily field converted to bottom return
- Filter access door includes area to record maintenance schedule

Part Number	Used on CITY MULTI® Models	Used on Nv- and P-Series Ducted Models	Filters Included	Net Weight lbs.
FBM2-1-A	TPEFYP006, 008, 012MA143A	—	(1) - 14" x 25" x 2"	20
FBM2-2-A	TPEFYP015, 018MA143A	PEAD-A09, A12, A15, 18AA7	(1) - 14" x 20" x 2" (1) - 14" x 14" x 2"	24
FBM2-3-A	TPEFYP024, 027, 030MA143A	PEAD-A24, 30AA7	(2) - 14" x 20" x 2"	29
FBM2-4-A	TPEFYP036, 048MA143A	PEAD-A36, 42AA7	(2) - 14" x 20" x 2" (1) - 14" x 14" x 2"	35
FBM2-5-A	TPEFYP054MA143A	—	(3) - 14" x 20" x 2"	37

FBM DIMENSIONS

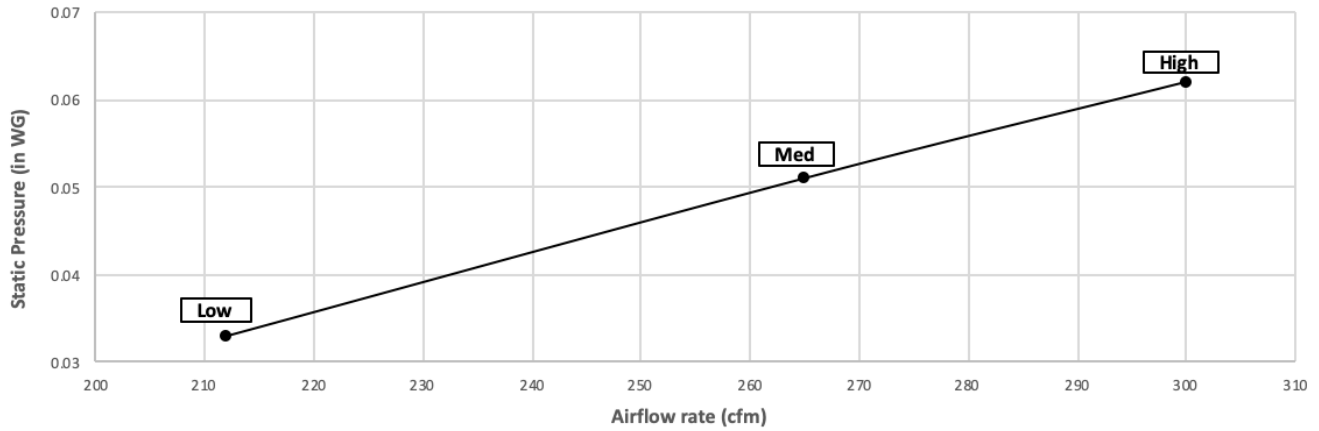


Part Number	"A"	"B"
FBM2-1-A	27 - 5/8"	26"
FBM2-2-A	35 - 1/2"	34"
FBM2-3-A	43 - 3/8"	42"
FBM2-4-A	55 - 1/8"	53 - 5/8"
FBM2-5-A	63"	61 - 1/2"

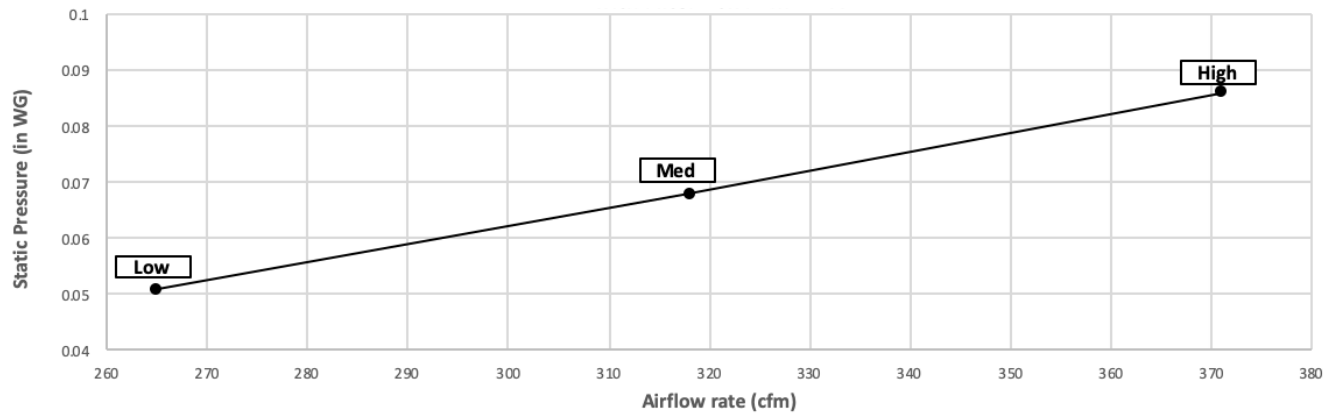


Initial Filter Pressure Drop with 2" MERV 13 Filter(s) Installed

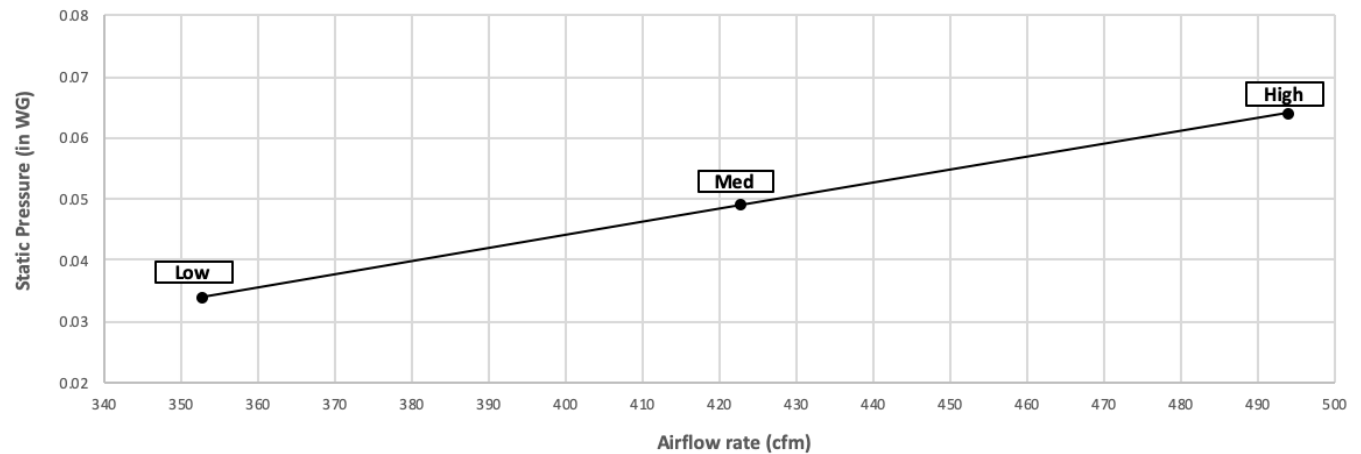
TPEFYP006, 008MA143A
with Filter Box FBM2-1-A



TPEFYP012MA143A
with Filter Box FBM2-1-A

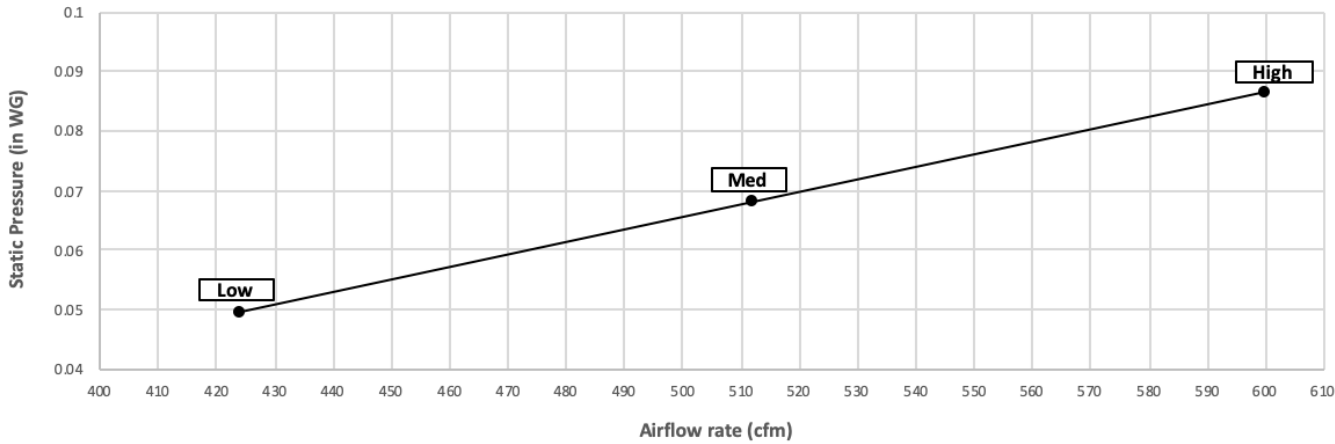


TPEFYP015MA143A
with Filter Box FBM2-2-A

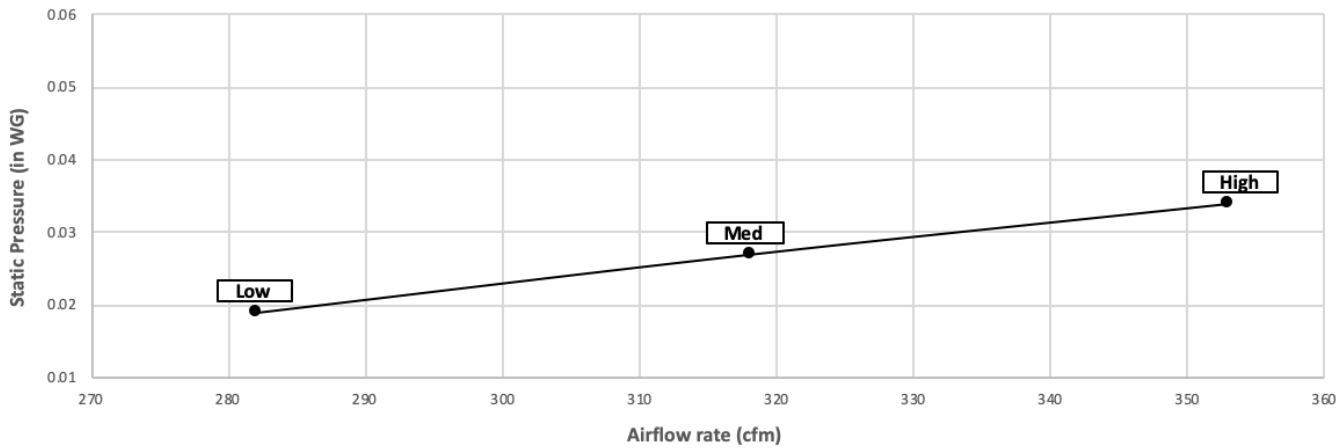


Initial Filter Pressure Drop with 2" MERV 13 Filter(s) Installed, contd.

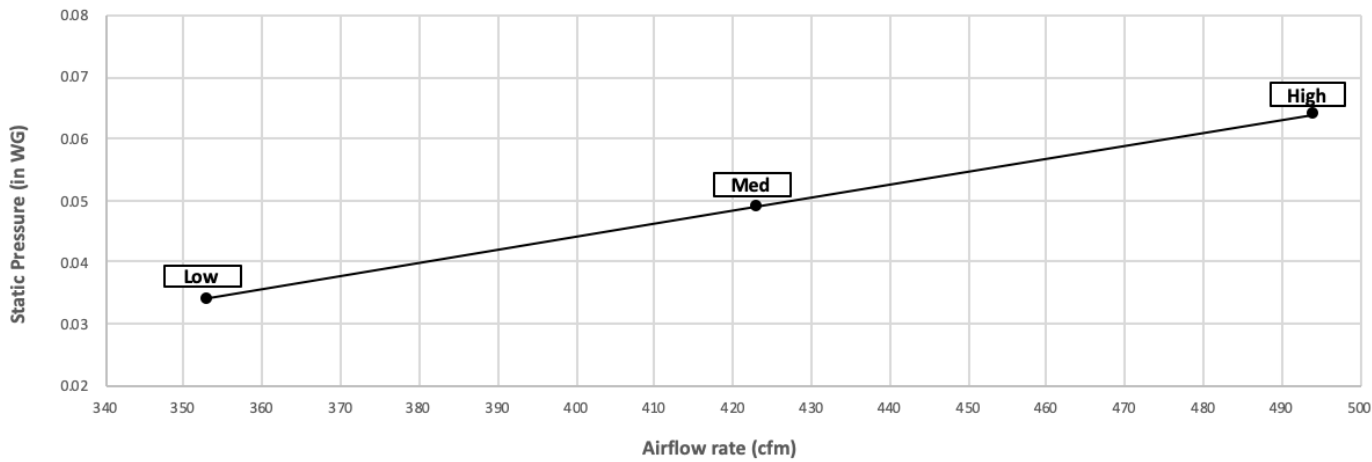
TPEFYP018MA143A
with Filter Box FBM2-2-A



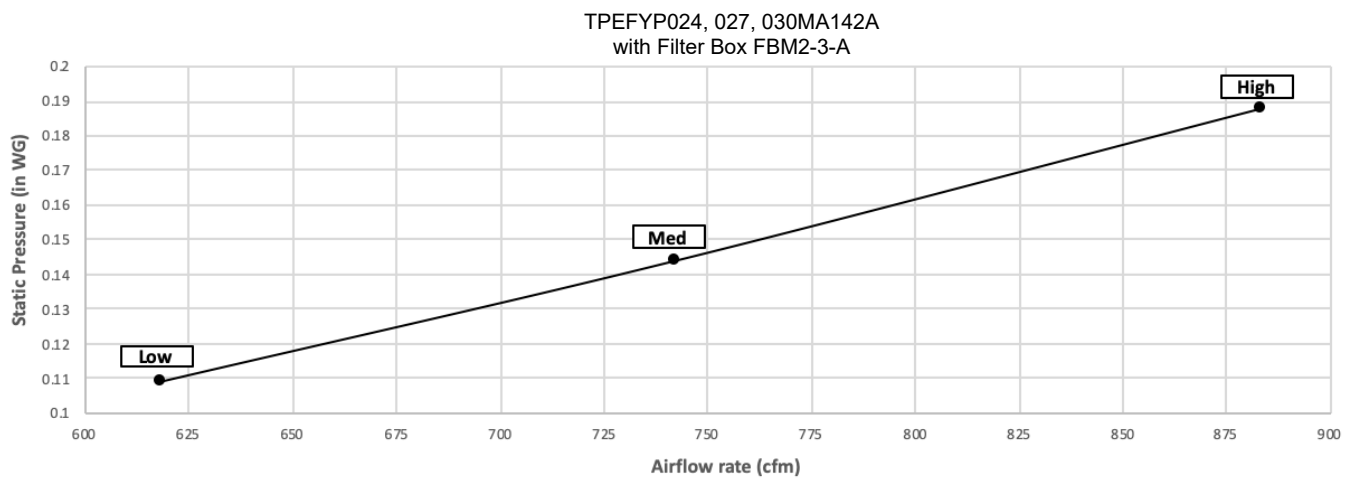
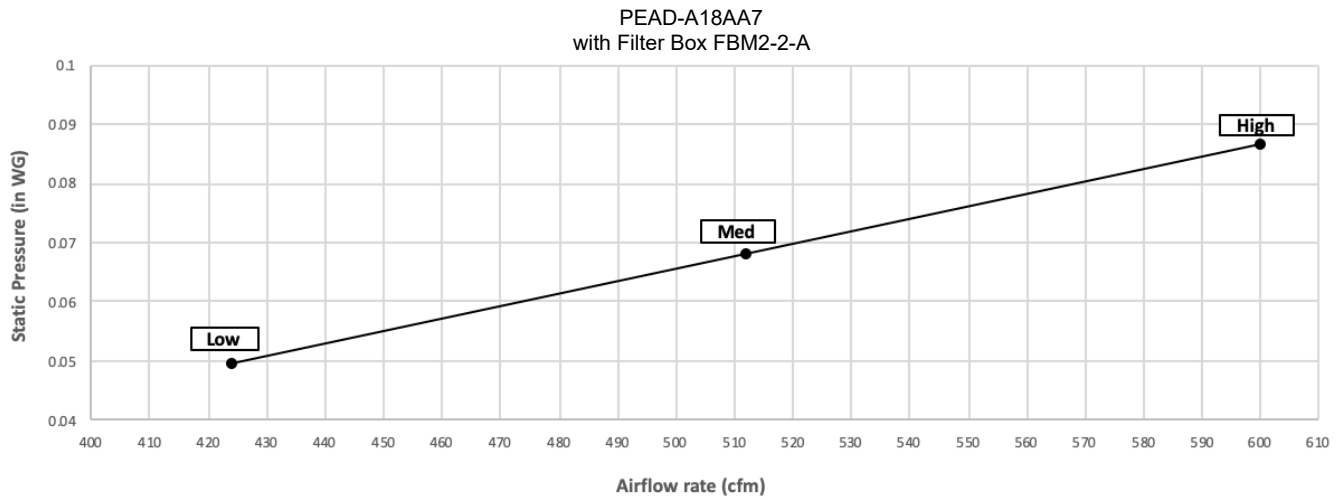
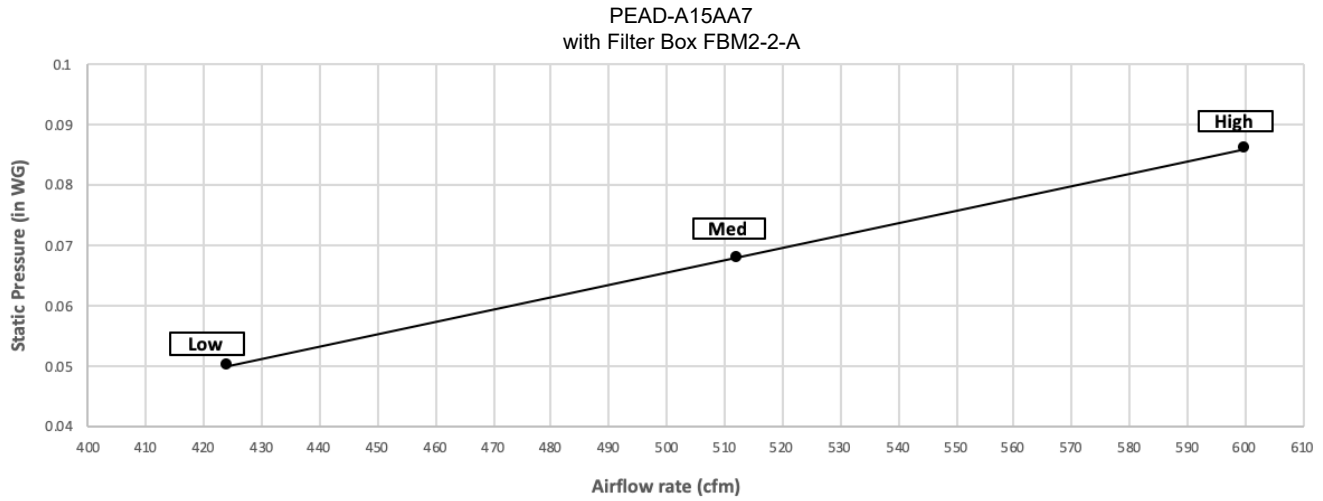
PEAD-A09AA7
with Filter Box FBM2-2-A



PEAD-A12AA7
with Filter Box FBM2-2-A

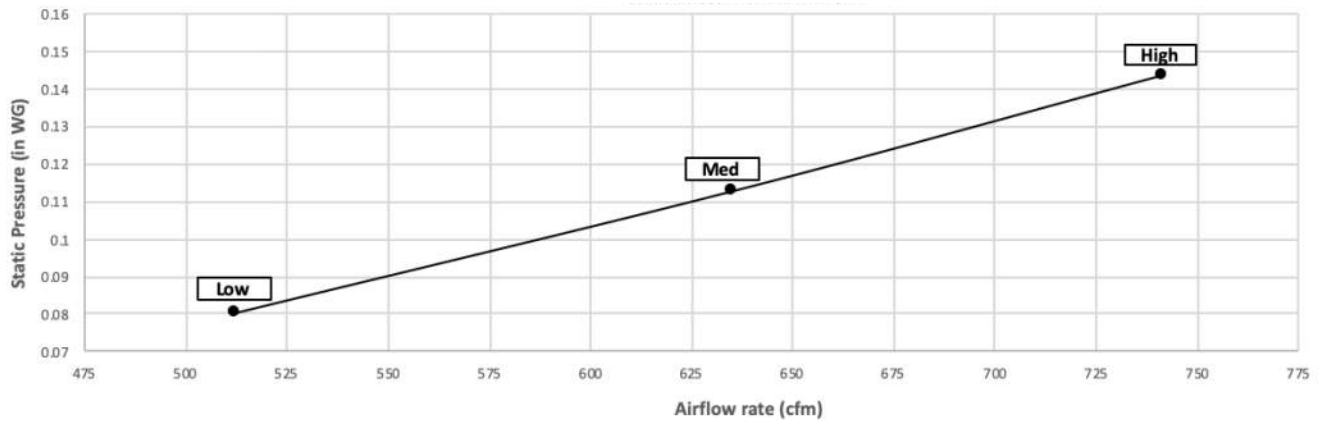


Initial Filter Pressure Drop with 2" MERV 13 Filter(s) Installed, contd.

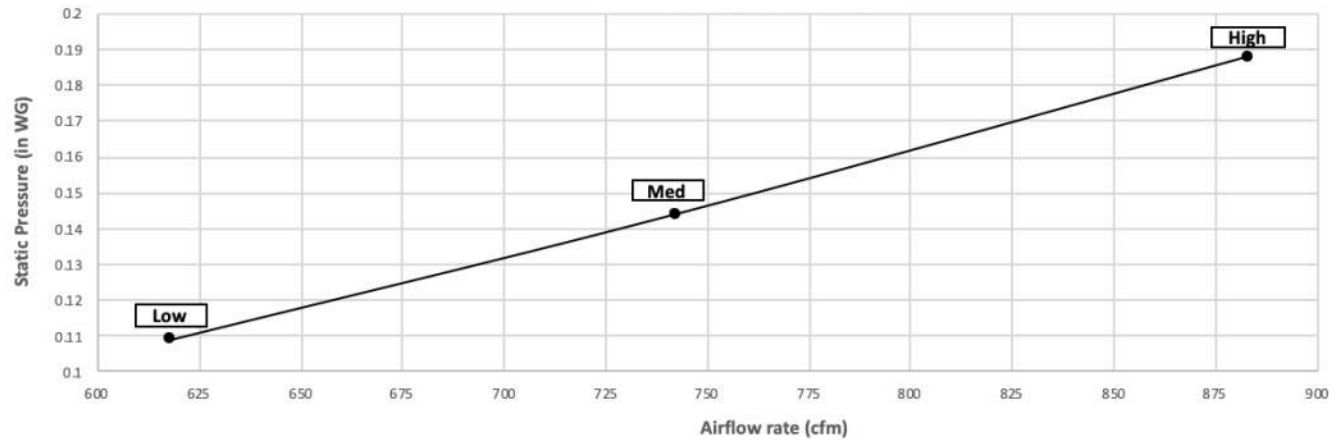


Initial Filter Pressure Drop with 2" MERV 13 Filter(s) Installed, contd.

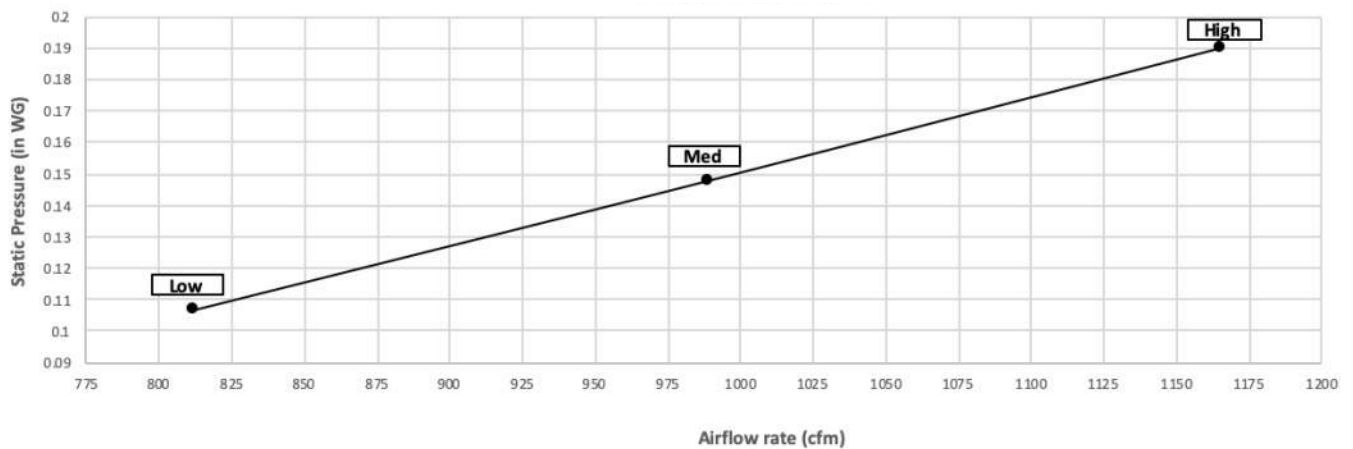
PEAD-A24AA7
with Filter Box FBM2-3-A



PEAD-A30AA7
with Filter Box FBM2-3-A

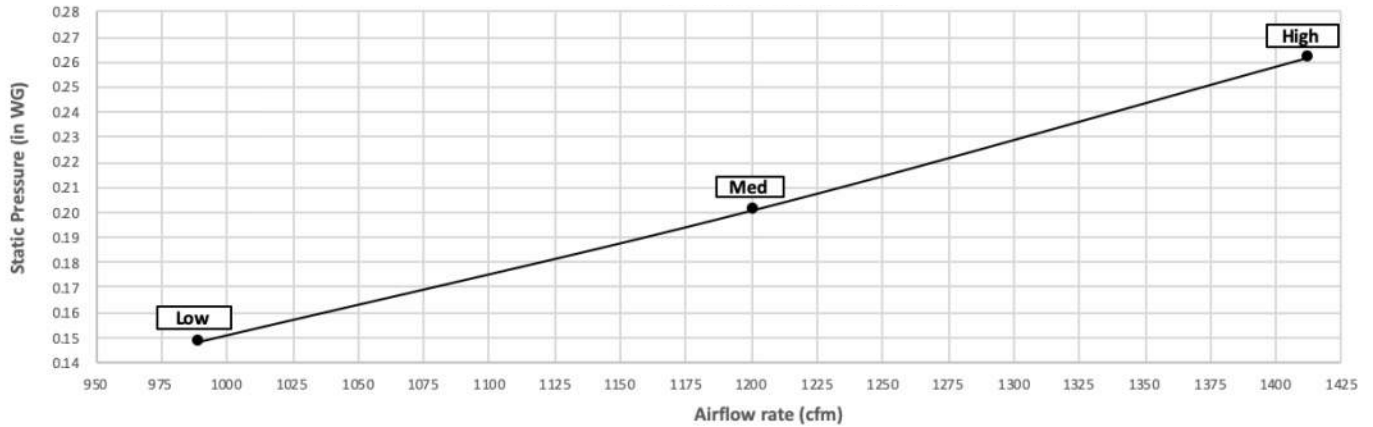


TPEFYP036MA142A
with Filter Box FBM2-4-A

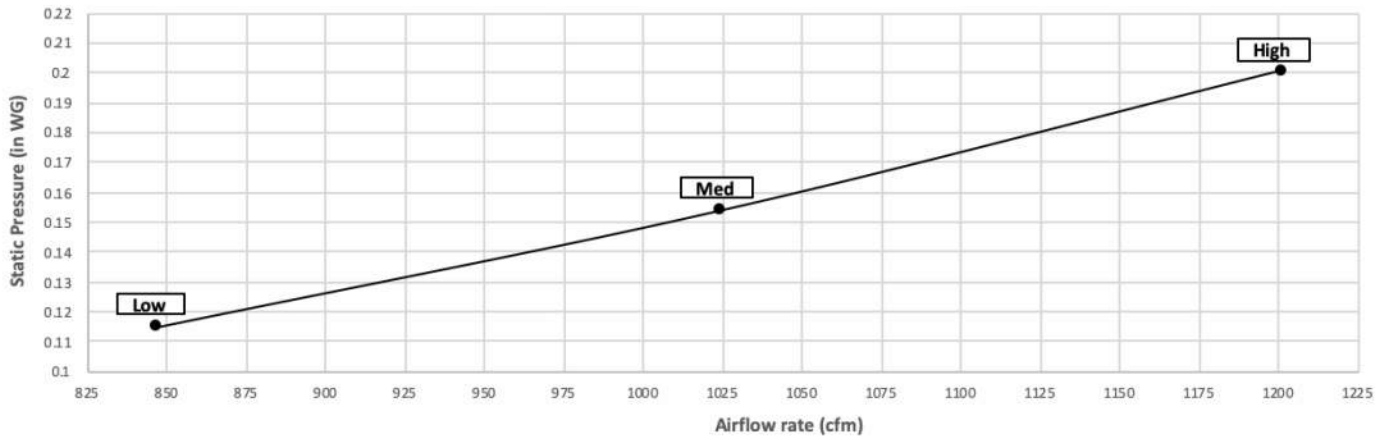


Initial Filter Pressure Drop with 2" MERV 13 Filter(s) Installed, contd.

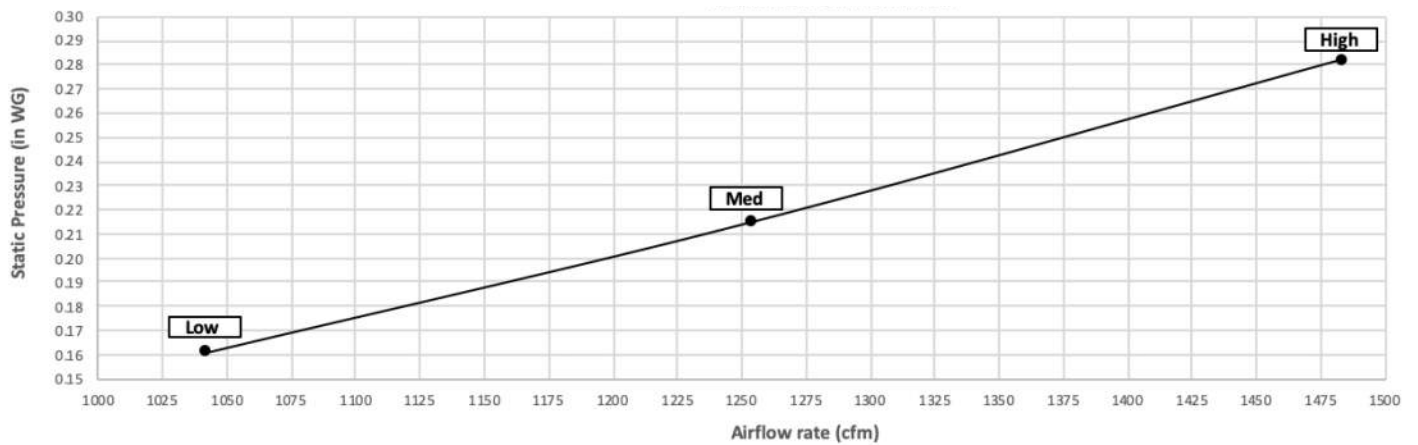
TPEFYP048MA142A
with Filter Box FBM2-4-A



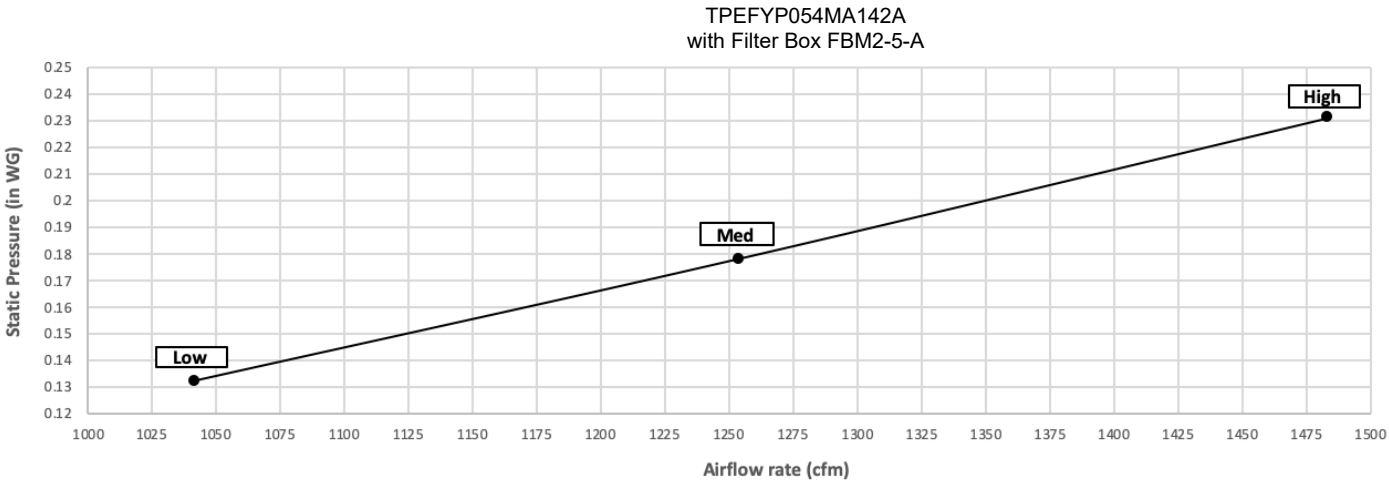
PEAD-A36AA7
with Filter Box FBM2-4-A



PEAD-A42AA7
with Filter Box FBM2-4-A



Initial Filter Pressure Drop with 2" MERV 13 Filter(s) Installed, contd.





MITSUBISHI ELECTRIC TRANE HVAC US

Controls

Job Name: Duluth City Hall

Location: _____

Drawing Reference: _____

Schedule No. _____

System No.: _____

Date: 5-18-22

**REMOTE SENSOR (PAC-SE41TSE)****Capabilities**

- Allows for remote temperature monitoring within an area for the indoor unit.
- Wires back to the indoor unit at CN20 to replace the return air temperature sensor.

General Specifications

- Power supply: Through the indoor unit.
- Dimensions: 2-3/4 W x 4-3/4 H x 5/8" D (70 x 120 x 15 mm).
- Exterior: ABS resin (Munsell No. 4.48Y 7.92 / 0.66)
- Environment Conditions
 - Operating temperature range: -4° to +149° F (-20° to +65° C).
 - Relative humidity: 30 to 90% (no condensation).
 - Install in a single-type switch box or directly on a wall.
- Maximum wiring length: 39' (12 m).
- If combined with environmental measurement controller:
 - Temperature measurement range: -4° to +149° F (-20° to +65° C).
 - Measurement resolution: 0.2° F (0.1° C) for 50° to 95° F (10° to 35° C); 0.9° F (0.5° C) for temperatures outside specified range.

OVERVIEW OF CITY MULTI® CONTROLS NETWORK (CMCN)

- Consists of TG-2000 integrated system software, AG-150/GB-50ADA/GB-24/TC-24 centralized controllers, web browsers, timers, remote controllers, and BMS interfaces.
- TG-2000 integrated system software supports up to 40 AG-150/GB-50ADA centralized controllers (licensed for PC software features) for a maximum of 2,000 indoor units from a single PC.
- AG-150 centralized controller operates up to 50 indoor units with optional control via a field-supplied PC with licensed software.
- GB-50ADA centralized controller operates up to 50 indoor units via a field-supplied PC with licensed software.
- GB-24 central controller operates up to 24 indoor units via a field-supplied PC with licensed software.
- TC-24 standalone centralized controller operates up to 24 indoor units via an integral touch screen interface.
- Remote controllers consist of Deluxe MA, Simple MA, Wireless MA, and ME.
- I/O controllers consist of DIDO (PAC-YG66DCA) and AI (PAC-YG63MCA) for third-party equipment control.
- LonWorks® and BACnet® interfaces also available.
- Interlocking of LOSSNAY® ERV units for control via the AG-150/GB-50ADA/GB-24/TC-24 centralized controllers.



Specifications are subject to change without notice.

Job Name: **Duluth City Hall**System Reference: **Duluth City Hall**Date: **Duluth City Hall****TE-200A**

- TE-200A is the Master Controller
- Master Controller can operate and monitor up to 50 indoor units
- Expansion Controllers can expand an TE-200A to operate and monitor up to 50 additional indoor units through the touchscreen or web browser
- Network up to three TE-50A or TW-50A to one TE-200A to allow the TE-200A to manage up to 200 indoor units

OPTIONAL LICENSES

- **SW-BACnet Master: BACnet Function**
 - Connected air conditioning units can be monitored and operated not only from the existing web browser or the TE-200/TE-50's LCD, but also from the building management system using the BACnet® communication protocol. See SW-BACnet Data Sheet for more information.
- **SW-Charge Master: Energy Allocation**
 - The apportioned electricity billing function is an electric energy
 - apportionment system that apportions electric energy using input from electricity meters with a pulse generator function. The respective amounts of electric energy can be apportioned based on the operating status and capacity of each tenant. See SW-Charge Data Sheet for more information.
- **SW-PWeb Master: Online Personal Browser**
 - Allows tenant managers and general users to control their respective zone conditions via a networked PC, tablet, or mobile phone with or without local remote controllers installed in the space. See SW-PWeb Data Sheet for more information.

SPECIFICATIONS

- Supports dual set point functionality (connected equipment dependent)
- Displays:
 - CITY MULTI® compressor speed and hi/low pressure
 - AdvancedHVAC Controller (DC-A2IO) input/output status
 - Indoor unit free contact input/output status
 - Space temperature and humidity (from Smart ME or AI controller)
 - Error code (Can be emailed automatically to specified recipients)
 - Unoccupied setback up temperature range
- Functions
 - Hold function (temporarily disables schedules indoor unit model dependent)
 - Initial setting
 - Operation data back-up
- Permits or prohibits remote controller functions:
 - On/Off

- Change Operation Mode
- Change Set Point Temperature
- Filter Status
- Change Fan Speed
- Change Air Direction
- External input/output signals can be used for batch operations such as Start/Stop and Emergency Stop (requires PAC-YG10HA)
- Pulse signal input can obtain watt-hour meter, billing data and energy management data based on the cumulative number of pulse signal pulse signals directly input from a metering device
- Temperature set point range limits can be set for local remote controllers
- User defined indoor unit functions:
 - On/Off
 - Monitoring and Operation
 - Operation mode:
 - Auto* (Dual or Single set point)
 - Heat
 - Fan
 - Drying
 - Setback*

Note: *R2 Series only (connected equipment dependent)

- Temperature Setting
- Fan Speed
- Airflow Direction
- **Monitoring and Control:**
 - CITY MULTI® indoor units
 - Nv- & P-Series units (requires M-Net adapter)
 - Lossnay® units
 - TPWFY hydronic heat pump units
 - DIDO controllers
 - CITY MULTI® DOAS
 - Interlock setting enables integration of general equipment inputs/outputs and indoor units
- **Scheduling**
 - Daily
 - Annually
 - Five pattern of weekly seasonal schedule
- **Twenty four scheduled events per day, indoor unit model dependent:**
 - ON/OFF
 - Mode
 - Temperature Setting
 - Vane Direction
 - Fan
 - Speed
 - Operation Prohibits
- **Trend data:**
 - Fan operation time
 - Thermo-on time
 - Set temperature
 - Room temperature
 - AI Controller temperature and humidity (requires PAC-YG63-MCA, 2 inputs total for each controller)
- Memory back up via USB (universal serial bus)
- Memory back up via LAN (local area network) port

TE-200A - SPECIFICATIONS, CONT.

TE-200A CENTRALIZED CONTROLLER

Item	Specifications	
Power Supply	Rated input	100–240 VAC $\pm$ 10%; 0.3–0.2 A 50/60 Hz Single-phase
	Fuse	250 VAC 6.3 A Time-Lag type (IEC 60127-2S.S.5)
M-NET power feeding capability		No specifications**Only an MN converter can be connected.
Ambient conditions	Temperature	Operating Range 0° C to +40° C (+32° F to +104° F)
		Non-operating Range -20° C to +60° C (-4° F to +140° F)
	Humidity	30% to 90% RH (no condensation)
Weight		2.3 kg (5-5/64 lbs)
Dimensions (W x H x D)		11-5/32 x 7-55/64 x 2-17/32 in. (284 x 200 x 65 mm)
Installation conditions		Indoor only **To be used in a business office or similar environment

WEB BROWSER REQUIREMENTS

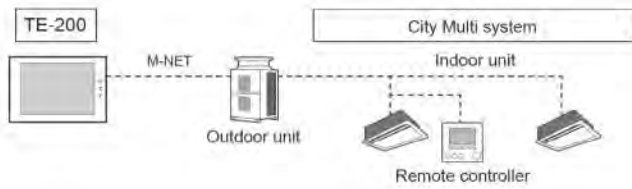
Item	Requirements	
CPU	1 GHz or faster	
Memory	512 MB or more	
Screen Resolution	1024 x 768 or higher recommended	
Compatible Browser	Windows®	Microsoft® Internet Explorer 8.0 Microsoft® Internet Explorer 9.0 Microsoft® Internet Explorer 10.0 Microsoft® Internet Explorer 11.0 **Java execution environment is required. (Oracle® Java Plug-in Ver. 1.8.0_60) **Install Oracle® Java Plug-in that is appropriate for your operating system. When using a 64-bit Internet Explorer, install a 64-bit Java Plug-in. **The version of the Oracle® Java Plug-in can be verified by clicking [Java] in the Control Panel.
Onboard LAN Port or LAN Card		100 BASE-TX
100 BASE-TX		e.g., mouse

NOTES:

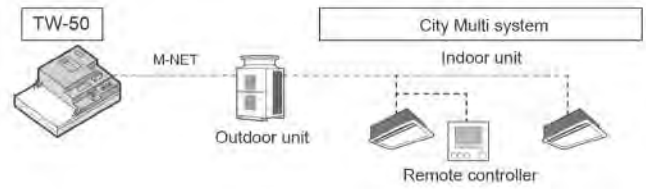
MODEL: TE-200A - SYSTEM CONFIGURATION

CONTROLLING 50 OR FEWER UNITS OF EQUIPMENT

1. TE-200



2. TW-50



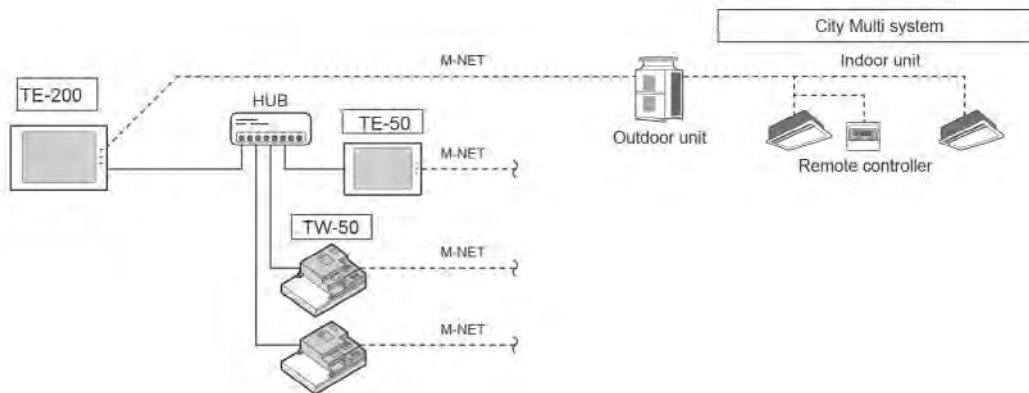
*TE-200A is indicated as TE-200

*TE-50A is indicated as TE-50

CONTROLLING MORE THAN 50 UNITS OF EQUIPMENT (WITH CONNECTION TO A TE-200 CONTROLLER)

Note

TE-200 is required when using TE-50



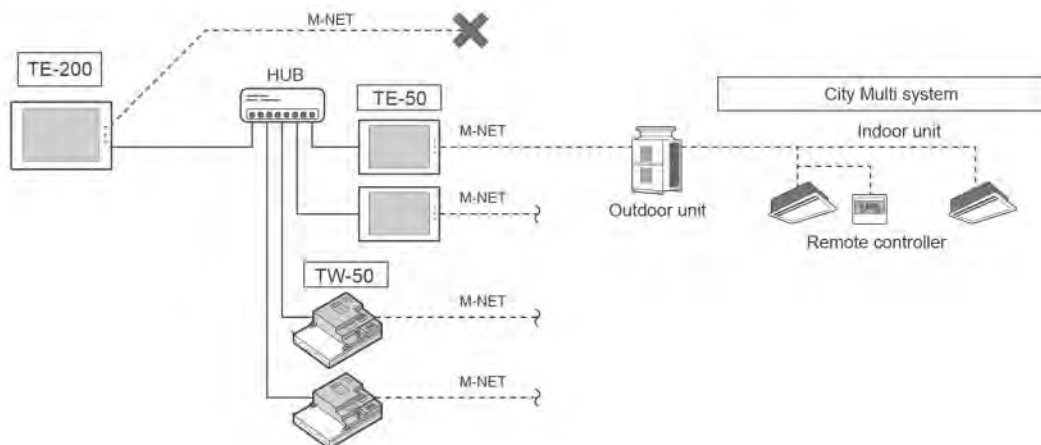
WHEN USING AN APPORTIONED ELECTRICITY BILLING FUNCTION

Notes

TE-200 is required to use a billing function.

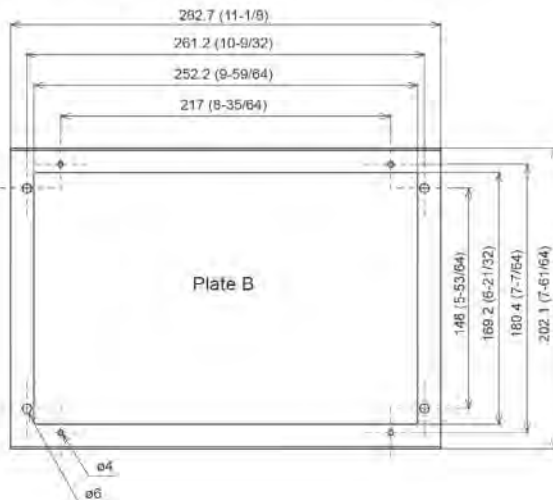
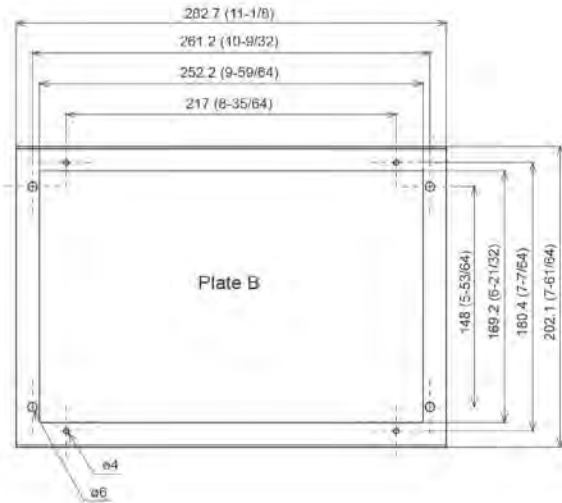
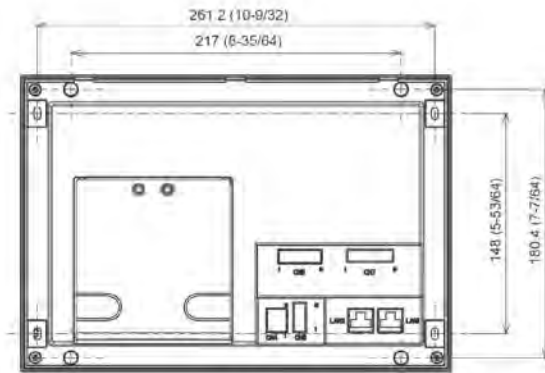
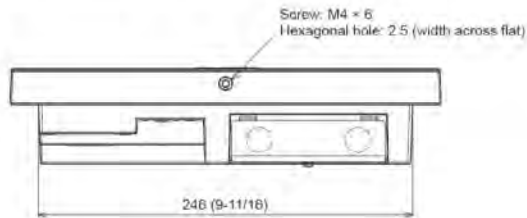
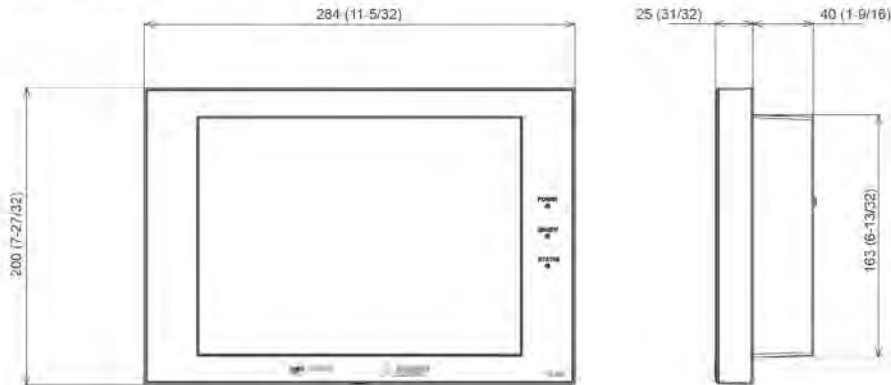
TE-200 M-NET cannot be used when a billing function is used

"Charge" license is required to use a billing function.



TE-200A - DIMENSIONS

Unit: mm (inch)



*TE-200A is indicated as TE-200
*TE-50A is indicated as TE-50



Job Name: **Duluth City Hall**System Reference: **Duluth City Hall**Date: **Duluth City Hall****TE-50A**

- TE-50A is the Expansion Controller
- Expansion Controller can expand TE-200A to operate and monitor up to 50 additional indoor units through the touchscreen or web browser
- Network up to three TE-50A to one TE-200A to allow the TE-200A to manage up to 200 indoor units.

OPTIONAL LICENSES

- **SW-BACnet Expansion: BACnet Function**
 - Connected air conditioning units can be monitored and operated not only from the existing web browser or the TE-200/TE-50's LCD, but also from the building management system using the BACnet® communication protocol. See SW-BACnet Data Sheet for more information.
- **SW-Charge Expansion: Energy Allocation**
 - The apportioned electricity billing function is an electric energy apportionment system that apportions electric energy using input from electricity meters with a pulse generator function. The respective amounts of electric energy can be apportioned based on the operating status and capacity of each tenant. See SW-Charge Data Sheet for more information.
- **SW-PWeb Expansion: Online Personal Browser**
 - Allows tenant managers and general users to control their respective zone conditions via a networked PC, tablet, or mobile phone with or without local remote controllers installed in the space. See SW-PWeb Data Sheet for more information.

SPECIFICATIONS

- Manages up to 50 indoor units individually, in a group or in a collective batch operation
- Networked three TE-50A to one TE-200A to allow the TE-200A to manage up to 200 indoor units.
- Supports dual set point functionality (connected equipment dependent)
- Displays:
 - CITY MULTI® compressor speed and hi/low pressure
 - AdvancedHVAC Controller (DC-A2IO) input/output status
 - Indoor unit free contact input/output status
 - Space temperature and humidity (from Smart ME or AI controller)
 - Error code (Can be emailed automatically to specified recipients)
 - Unoccupied setback up temperature range
- Functions
 - Hold function (temporarily disables schedules indoor unit model dependent)
 - Initial setting
 - Operation data back-up
- Permits or prohibits remote controller functions:
 - On/Off

- Change Operation Mode
 - Change Set Point Temperature
 - Filter Status
 - Change Fan Speed
 - Change Air Direction
 - External input/output signals can be used for batch operations such as Start/Stop and Emergency Stop (requires PAC-YG10HA)
 - Pulse signal input can obtain watt-hour meter, billing data and energy management data based on the cumulative number of pulse signal pulse signals directly input from a metering device
 - Temperature set point range limits can be set for local remote controllers
 - User defined indoor unit functions:
 - On/Off
 - Monitoring and Operation
 - Operation mode:
 - Auto* (Dual or Single set point)
 - Heat
 - Fan
 - Drying
 - Setback*
- Note: *R2 Series only (connected equipment dependent)
- Temperature Setting
 - Fan Speed
 - Airflow Direction
 - Monitoring and Control:
 - CITY MULTI® indoor units
 - Nv & P-Series units (requires M-Net adapter)
 - Lossnay® units
 - TPWFY hydronic heat pump units
 - DIDO controllers
 - CITY MULTI® DOAS
 - Interlock setting enables integration of general equipment inputs/outputs and indoor units
 - Scheduling
 - Daily
 - Annually
 - Five pattern of weekly seasonal schedule
 - Twenty four scheduled events per day, indoor unit model dependent:
 - ON/OFF
 - Mode
 - Temperature Setting
 - Vane Direction
 - Fan
 - Speed
 - Operation Prohibits
 - Trend data:
 - Fan operation time
 - Thermo-on time
 - Set temperature
 - Room temperature
 - AI Controller temperature and humidity (requires PAC-YG63-MCA, 2 inputs total for each controller)
 - Memory back up via USB (universal serial bus)
 - Memory back up via LAN (local area network) port

TE-50A - SPECIFICATIONS, CONT.

TE-50A EXPANSION CONTROLLER

Item	Specifications	
Power Supply	Rated input	100–240 VAC $\pm$ 10%; 0.3–0.2 A 50/60 Hz Single-phase
	Fuse	250 VAC 6.3 A Time-Lag type (IEC 60127-2S.S.5)
M-NET power feeding capability		No specifications**Only an MN converter can be connected.
Ambient conditions	Temperature	Operating Range 0° C to +40° C (+32° F to +104° F)
		Non-operating Range -20° C to +60° C (-4° F to +140° F)
	Humidity	30% to 90% RH (no condensation)
Weight		2.3 kg (5-5/64 lbs)
Dimensions (W x H x D)		11-5/32 x 7-55/64 x 2-17/32 in. (284 x 200 x 65 mm)
Installation conditions		Indoor only **To be used in a business office or similar environment

WEB BROWSER REQUIREMENTS

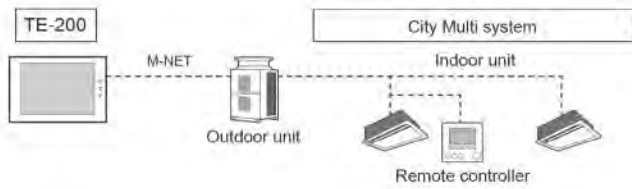
Item	Requirements	
CPU	1 GHz or faster	
Memory	512 MB or more	
Screen Resolution	1024 x 768 or higher recommended	
Compatible Browser	Windows®	Microsoft® Internet Explorer 8.0 Microsoft® Internet Explorer 9.0 Microsoft® Internet Explorer 10.0 Microsoft® Internet Explorer 11.0 **Java execution environment is required. (Oracle® Java Plug-in Ver. 1.8.0_60) **Install Oracle® Java Plug-in that is appropriate for your operating system. When using a 64-bit Internet Explorer, install a 64-bit Java Plug-in. **The version of the Oracle® Java Plug-in can be verified by clicking [Java] in the Control Panel.
Onboard LAN Port or LAN Card		100 BASE-TX
100 BASE-TX		e.g., mouse

NOTES:

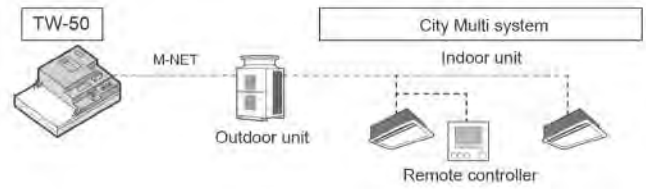
MODEL: TE-50A - SYSTEM CONFIGURATION

CONTROLLING 50 OR FEWER UNITS OF EQUIPMENT

1. TE-200



2. TW-50



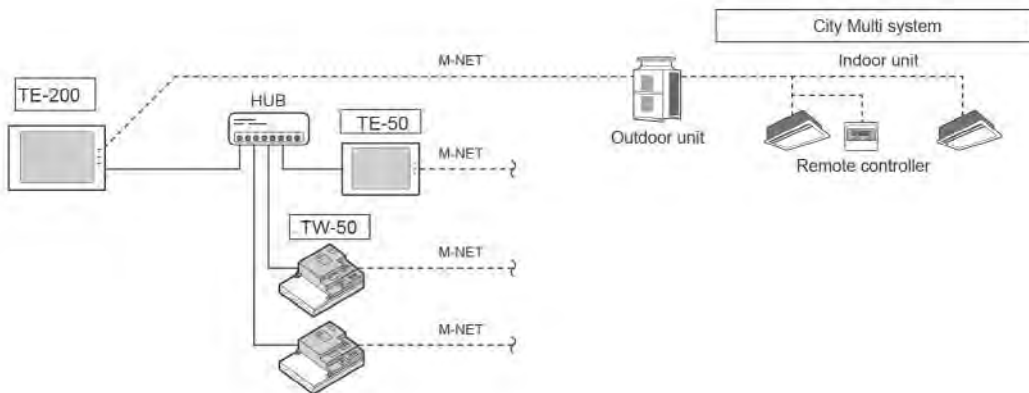
*TE-200A is indicated as TE-200

*TE-50A is indicated as TE-50

CONTROLLING MORE THAN 50 UNITS OF EQUIPMENT (WITH CONNECTION TO A TE-200 CONTROLLER)

Note

TE-200 is required when using TE-50



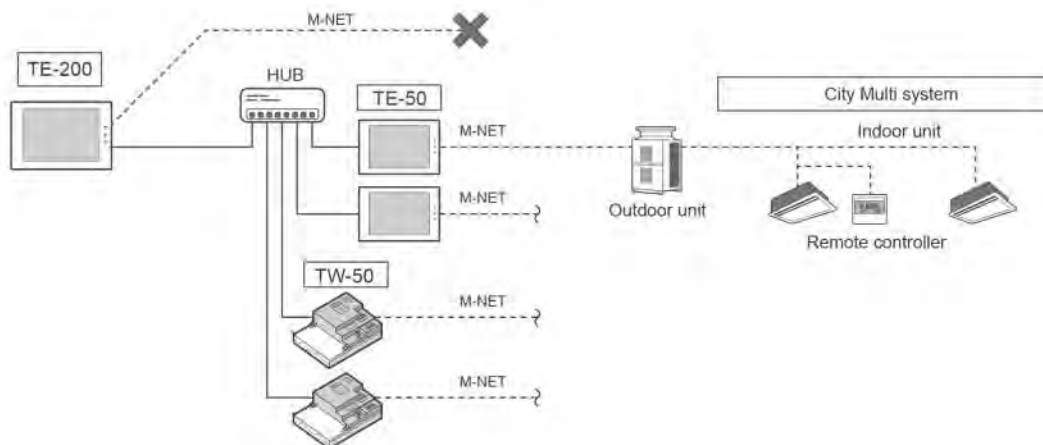
WHEN USING AN APPORTIONED ELECTRICITY BILLING FUNCTION

Notes

TE-200 is required to use a billing function.

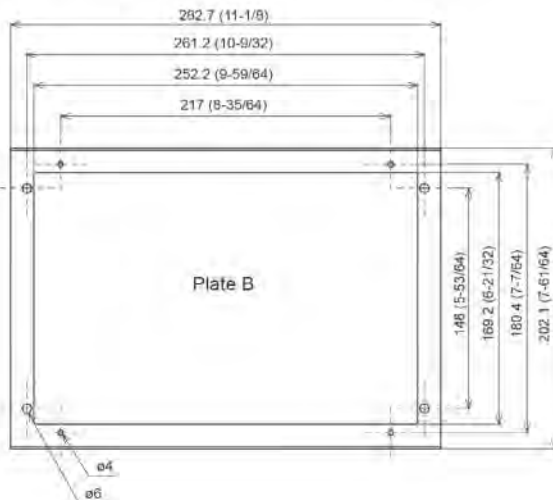
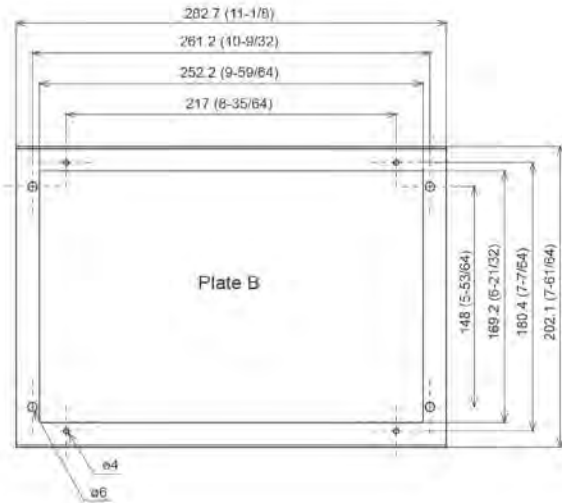
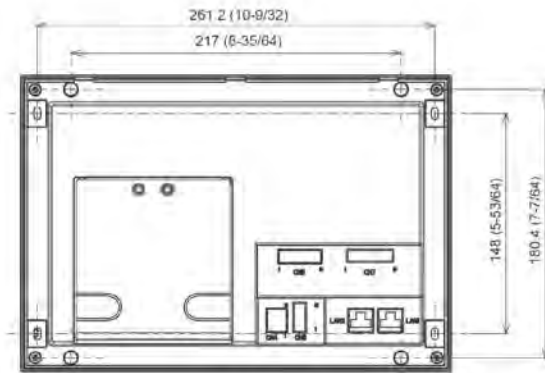
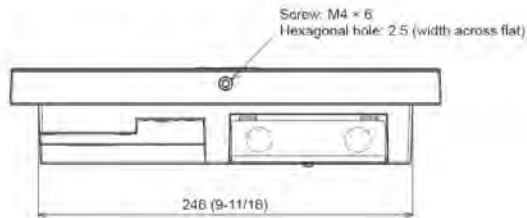
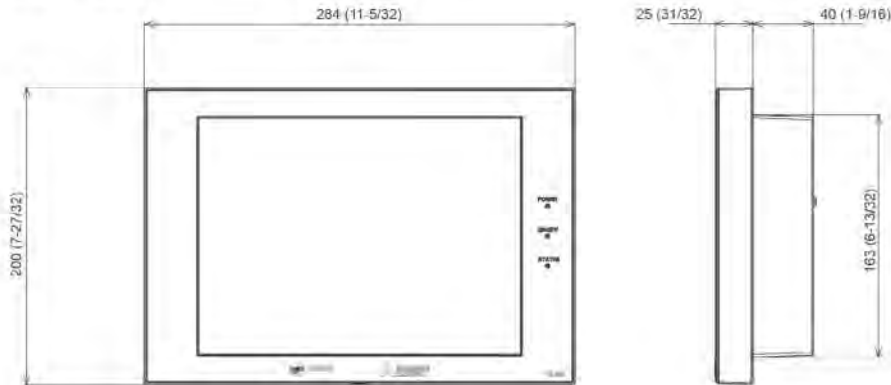
TE-200 M-NET cannot be used when a billing function is used

"Charge" license is required to use a billing function.



TE-50A - DIMENSIONS

Unit: mm (inch)



*TE-200A is indicated as TE-200
*TE-50A is indicated as TE-50



Job Name: **Duluth City Hall**System Reference: **Duluth City Hall**Date: **Duluth City Hall****TW-50A**

- TW-50A can be a Master Controller or Expansion Controller
- Master Controller can operate and monitor up to 50 indoor units
- Expansion Controller can expand an TE-200A to operate and monitor up to 50 additional indoor units through the touch screen or web browser
- Network up to three TW-50A to one TE-200A to allow the TE-200A to manage up to 200 indoor units.

OPTIONAL LICENSES

- **SW-BACnet Master or SW-BACnet Expansion: BACnet Function**
 - Connected air conditioning units can be monitored and operated not only from the existing web browser or the TE-200/TE-50's LCD, but also from the building management system using the BACnet® communication protocol. See SW-BACnet Data Sheet for more information.
- **SW-ChargeExpansion: Energy Allocation**
 - The apportioned electricity billing function is an electric energy apportionment system that apportions electric energy using input from electricity meters with a pulse generator function. The respective amounts of electric energy can be apportioned based on the operating status and capacity of each tenant. See SW-Charge Data Sheet for more information.
- **SW-PWeb Master or SW-PWeb Expansion: Online Personal Browser**
 - Allows tenant managers and general users to control their respective zone conditions via a networked PC, tablet, or mobile phone with or without local remote controllers installed in the space. See SW-PWeb Data Sheet for more information.

SPECIFICATIONS

- Supports dual set point functionality (connected equipment dependent)
- Displays:
 - CITY MULTI® compressor speed and hi/low pressure
 - AdvancedHVAC Controller (DC-A2IO) input/output status
 - Indoor unit free contact input/output status
 - Space temperature and humidity (from Smart ME or AI controller)
 - Error code (Error codes are able to be emailed automatically to specified recipients)
 - Unoccupied setback up temperature range
- Functions
 - Hold function (temporarily disables schedules indoor unit model dependent) - Initial setting
 - Operation data back-up
- Permits or prohibits remote controller functions:
 - On/Off

- Change Operation Mode
- Change Set point Temperature
- Filter Status
- Change Fan Speed
- Change Air Direction
- External input/output signals can be used for batch operations such as Start/Stop and Emergency Stop (requires PAC-YG10HA)
- Pulse signal input can obtain watt-hour meter, billing data and energy management data based on the cumulative number of pulse signal pulse signals directly input from a metering device
- Temperature set point range limits can be set for local remote controllers
- User defined indoor unit functions:
 - On/Off
 - Monitoring and Operation
 - Operation mode:
 - Auto* (Dual or Single set point)
 - Heat
 - Fan
 - Drying
 - Setback*

Note: *R2 Series only (connected equipment dependent)

- Temperature Setting
- Fan Speed
- Airflow Direction
- Monitoring and Control:
 - CITY MULTI® indoor units
 - Nv- and P-Series units (requires M-Net adapter)
 - Lossnay® units
 - PWFY hydronic heat pump units
 - DIDO controllers
 - CITY MULTI® DOAS
 - Interlock setting enables integration of general equipment inputs/outputs and indoor units
- Scheduling
 - Daily
 - Annually
 - Five pattern of weekly seasonal schedule
- Twenty four scheduled events per day, indoor unit model dependent:
 - ON/OFF
 - Mode
 - Temperature Setting
 - Vane Direction
 - Fan
 - Speed
 - Operation Prohibits
- Trend data:
 - Fan operation time
 - Thermo-on time
 - Set temperature
 - Room temperature
 - AI Controller temperature and humidity (requires PAC-YG63-MCA, 2 inputs total for each controller)
- Memory back up via USB (universal serial bus)
- Memory back up via LAN (Local Area Network) port

TW-50A - SPECIFICATIONS, CONT.

TW-50A EXPANSION CONTROLLER

Item	Specifications	
Power Supply	Rated input	100–240 VAC ± 10%; 0.3–0.2 A 50/60 Hz Single-phase
M-NET power feeding capability		1.5
Ambient conditions	Temperature	Operating Range -10°C to +55°C (+14°F to +131°F)
		Non-operating Range -20°C to +60°C (-4°F to +140°F)
	Humidity	30% to 90% RH (no condensation)
Weight		1.7 kg (4 lbs)
Dimensions (W x H x D)		172 × 209 × 92 mm (6-13/16 × 8-4/16 × 3-10/16 in) **253 × 172 × 92 mm (10 × 6-13/16 × 3-10/16 in) when using L-fittings
Installation conditions		Only in a metal control box indoors

WEB BROWSER REQUIREMENTS

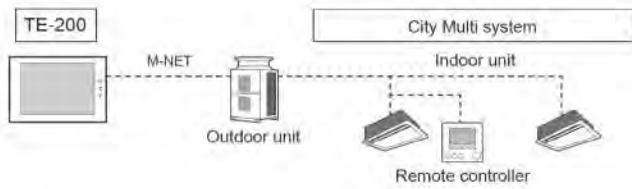
Item	Requirements	
CPU	1 GHz or faster	
Memory	512 MB or more	
Screen Resolution	1024 x 768 or higher recommended	
Compatible Browser	Windows®	Microsoft® Internet Explorer 8.0 Microsoft® Internet Explorer 9.0 Microsoft® Internet Explorer 10.0 Microsoft® Internet Explorer 11.0 **Java execution environment is required. (Oracle® Java Plug-in Ver. 1.8.0_60) ***Install Oracle® Java Plug-in that is appropriate for your operating system. When using a 64-bit Internet Explorer, install a 64-bit Java Plug-in. **The version of the Oracle® Java Plug-in can be verified by clicking [Java] in the Control Panel.
Onboard LAN Port or LAN Card		100 BASE-TX
100 BASE-TX		e.g., mouse

NOTES:

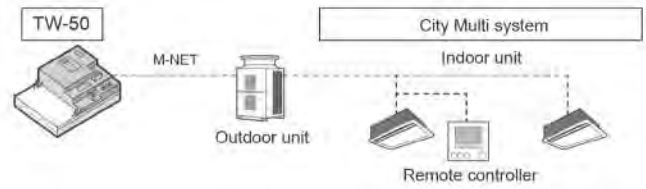
MODEL: TW-50A - SYSTEM CONFIGURATION

CONTROLLING 50 OR FEWER UNITS OF EQUIPMENT

1. TE-200



2. TW-50



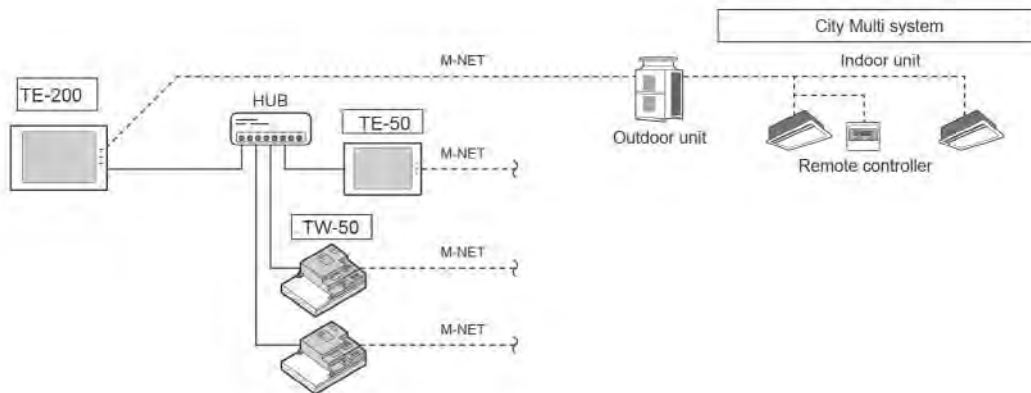
*TE-200A is indicated as TE-200

*TE-50A is indicated as TE-50

CONTROLLING MORE THAN 50 UNITS OF EQUIPMENT (WITH CONNECTION TO AN TE-200 CONTROLLER)

Note

TE-200 is required when using TE-50



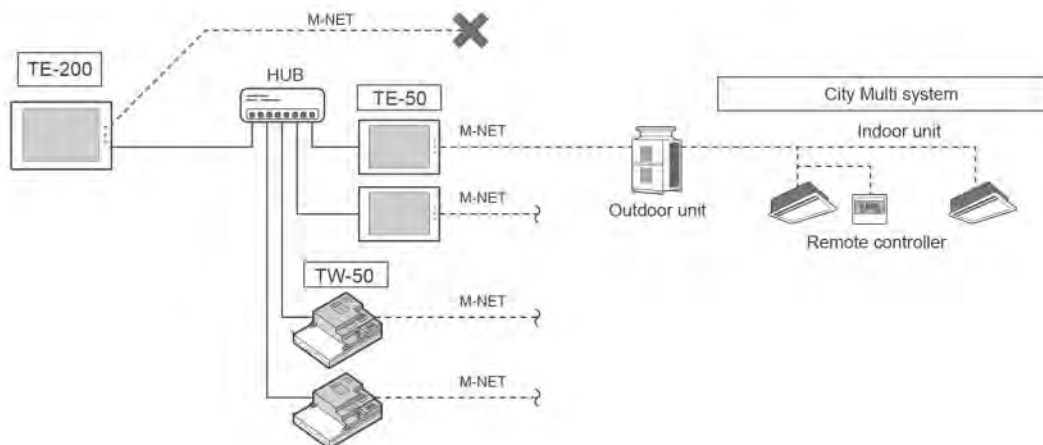
WHEN USING AN APPORTIONED ELECTRICITY BILLING FUNCTION

Notes

TE-200 is required to use a billing function.

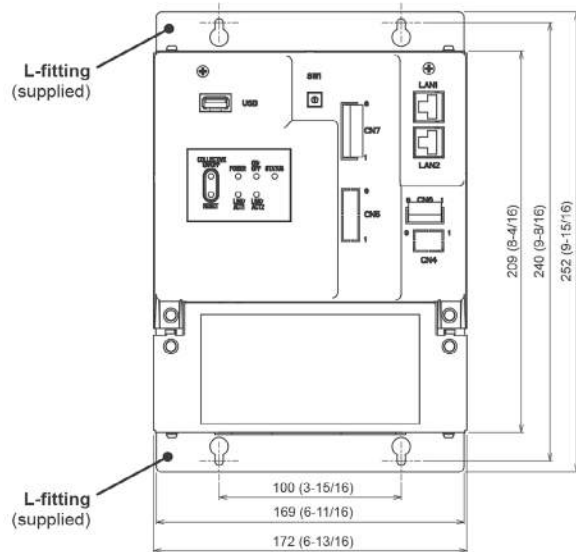
TE-200 M-NET cannot be used when a billing function is used

"Charge" license is required to use a billing function.

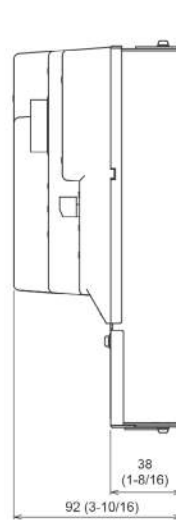


TW-50A - DIMENSIONS

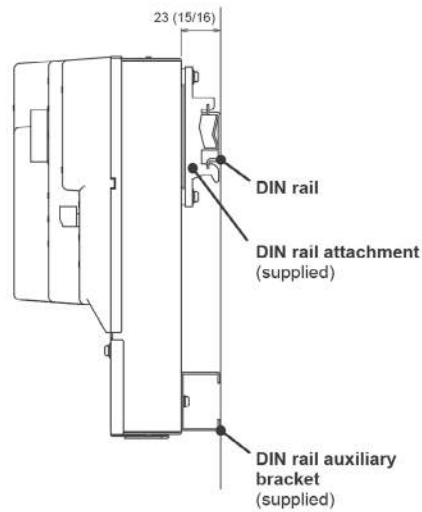
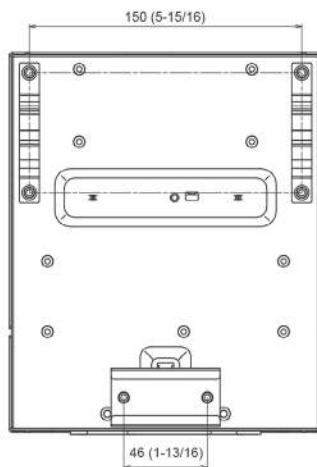
(1) WHEN USING L-FITTINGS



Unit: mm (in)



(2) WHEN USING DIN RAIL



LIGHTING CONTROL MATRIX			
	SYSTEM INPUTS	CONTROLLED BY LOCAL ON/OFF SWITCHE SWITCH	CONTROLLED BY LOCAL PHOTO-CONTROL SWITCHING DEVICE, TO PREVENT OVERHEATING AND REDUCING GLARE
OFFICES WITH EXTERIOR WINDOWS	●	●	
OFFICES WITHOUT EXTERIOR WINDOWS	●	●	
STORAGE ROOMS	●	●	

				I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULUTH LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. PRINT NAME: <u>LUCIA A. ANDERSON</u>  DATE: <u>05-03-2022</u> REG. NO.: <u>27049</u>				 KFI ENGINEERS 670 County Road B West St. Paul, Minnesota 55113 Tel: (651) 771-0880 Fax: (651) 771-0878 Email: kfi@kfi-eng.com Project Title: CITY OF DULUTH CITY HALL MEP RENEWAL DESIGN 411 WEST 1ST STREET DULUTH, MN 55802				Sheet Title: LUMINAIRE SCHEDULE Date: <u>05-03-2022</u> Drawn By: <u>GAA</u> Checked By: <u>LAA</u> Project No: <u>21-0486</u> DWG Scale: <u>AS NOTED</u> Sheet Size: <u>30x42</u>				Revision Number: 1 Sheet Number: E500			
No: <u>1</u> Date: <u>5-17-2022</u> NNA By: <u>ADDENDUM #1</u> Revision:																			

City of Duluth, MN Project Shutdown Plan

In the event that employee illness or a governmental agency requires that the project cease or suspend, prior to suspension the contractor shall provide a written plan to the architect/engineer on the project and to the City for their prior approval and, upon such approval, shall be implemented by the contractor as part of this contract.

The plan shall include the following requirements which shall apply to the status of the work at the time of interruption:

1. Time, if any, between the determination of the necessity of suspension and the actual suspension of work will be allocated in this order of priority; Life Safety Issues, Asset Integrity, Environmental Impacts, & Economic Impacts.
2. Excavations will be completed or temporarily filled.
3. Equipment will be removed from the site or secured by the contractor.
4. Physical barricades shall be installed as necessary to protect the work from damage or destruction and the public from injury in the event of trespass on the site.
5. Warning signs shall be installed where reasonably necessary to warn the public of any hazardous condition on the site.
6. Erosion control necessary to protect the site shall be in place and functioning and vegetation shall be in place and properly protected; all exposed and or erodible soil surfaces shall be fully stabilized per the SWPPP/NPDES permit requirements.
7. Onsite materials shall be removed from the site to safe storage or protected on site from damage or theft.

When work is being performed inside a building, the following additional requirements shall apply:

8. Building/Workspace shall be left in a safe and secure manner. Access to the work area will be accessible with a lockable physical barrier.
9. The building shall be left with a weather tight envelope.
10. Electrical infrastructure shall be left in a safe manner compliant with electrical code.
11. Plumbing infrastructure shall be left in a safe and leak-proof manner compliant with plumbing code.
12. Emergency exit routes shall be open and accessible, unless agreed to by the City of Duluth.
13. Fire suppression systems will be left in an operable manner, unless agreed to by the City of Duluth.
14. Alarm systems will be left in an operable manner, unless agreed to by the City of Duluth.
15. The work area will need to be cleaned/sterilized.
16. If the general contractor is unable to meet these requirements; the work related to these items will need to be contracted out by the general contractor.