



# Middletown Fire Station 82

Pepper Job No. 2301496

Submittal: 82-238126-001-REV1

Type: Product Data

## Variable Refrigerant Volume Heat Recovery System

**FC-4,6,7 PAGE 13**  
**FC-1,2 PAGE 15**

COORDINATE CD-1 AND MAIN  
CONTROLLER POWER REQUIREMENTS  
WITH E.C.  
NZ 5/12/24

REVIEWED

REVIEWED AS NOTED

REVISE & RESUBMIT

REVIEWED FOR GENERAL CONFORMANCE WITH CONTRACT DOCUMENT CONCEPTS ONLY. THE CONTRACTOR IS RESPONSIBLE FOR:

- COORDINATING EQUIPMENT DIMENSIONS WITH ACTUAL FIELD CONDITIONS TO INSURE FIT FOR INSTALLATION, MAINTENANCE AND CODE CLEARANCES
- COORDINATING/VERIFYING SERVICE CONNECTIONS AND CAPACITIES
- PERFORMING INSTALLATION IN ACCORDANCE WITH CONTRACT DOCUMENTS AND EQUIPMENT MANUFACTURERS REQUIREMENTS
- PROVIDING MISCELLANEOUS APPURTENANCES FOR COMPLETE, FUNCTIONAL OPERATION

BY: David Zelinski DATE: 05/12/2024  
NAUMAN & ZELINSKI LLC

<b>Pepper Construction</b> Tomorrow Transformed		
<input checked="" type="checkbox"/>	<b>REVIEWED FOR APPROVAL</b>	<small>Review of this shop drawing does not relieve the Architect, Engineer or Subcontractor of their contractual design responsibilities. Pepper Construction's review is not, nor is it responsible for, an engineering or architectural analysis of design elements, load or dimension calculations, or similar matters. The Subcontractor is responsible to furnish additional material or work as required by the Contract and review of these documents, as well as dimensions to be confirmed and correlated at the job site.</small>
<input type="checkbox"/>	<b>REVIEWED AS NOTED FOR APPROVAL</b>	
<input type="checkbox"/>	<b>FOR RECORD</b>	
<b>JOB:</b> 2301496	<b>BY:</b> clewis	<b>DATE:</b> 5/7/2024
<b>SUBMITTAL#</b> 82-238126-001	<b>Rev #</b> 1	



# Carrier VRF System

Qty. 1 – Heat Recovery Outdoor Unit  
Qty. 9 – Indoor Fan Coil Units

- R-410a Refrigerant; field charging required
- 208/230 Volt-3 Phase
- Branch Boxes
- Hard wired wall mounted thermostats
- Central Touch Screen Controller
- Bacnet Interface

**JOB:** Middletown Fire Station 82

**Mech. Contractor:** Mechanical Optimizers

**DATE:** 4/12/2024

Indoor Units:  
Capacity:

Total Pipe Length:  
Furthest Equiv:  
Furthest Equiv:  
After 1st Branch Actual:  
After 1st Branch Equiv:  
Max Height Between IDU/IDU  
Max Height Between IDU/ODU (Above):  
Max Height Between IDU/ODU (Below):

**Correction Factors**

System Capacity:  
Temperature:  
Piping Length:  
Altitude:  
Defrosting:  
Diversity:  
Additional Derates:

Additional Refrigerant:  
Total Refrigerant Amount:  
Min Allowable Room Volume(cuft):

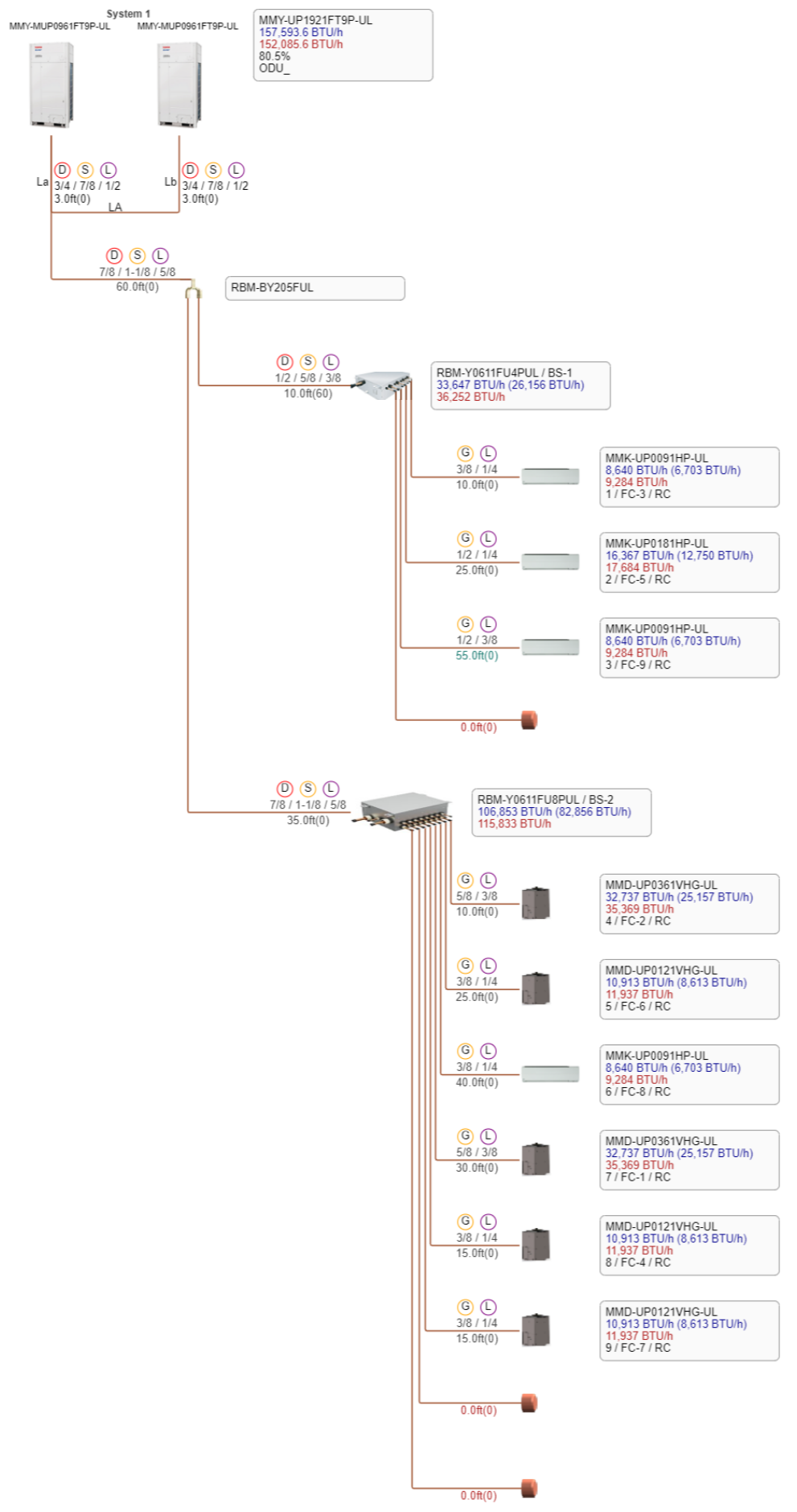
**Design Temperatures**

**Cooling:**

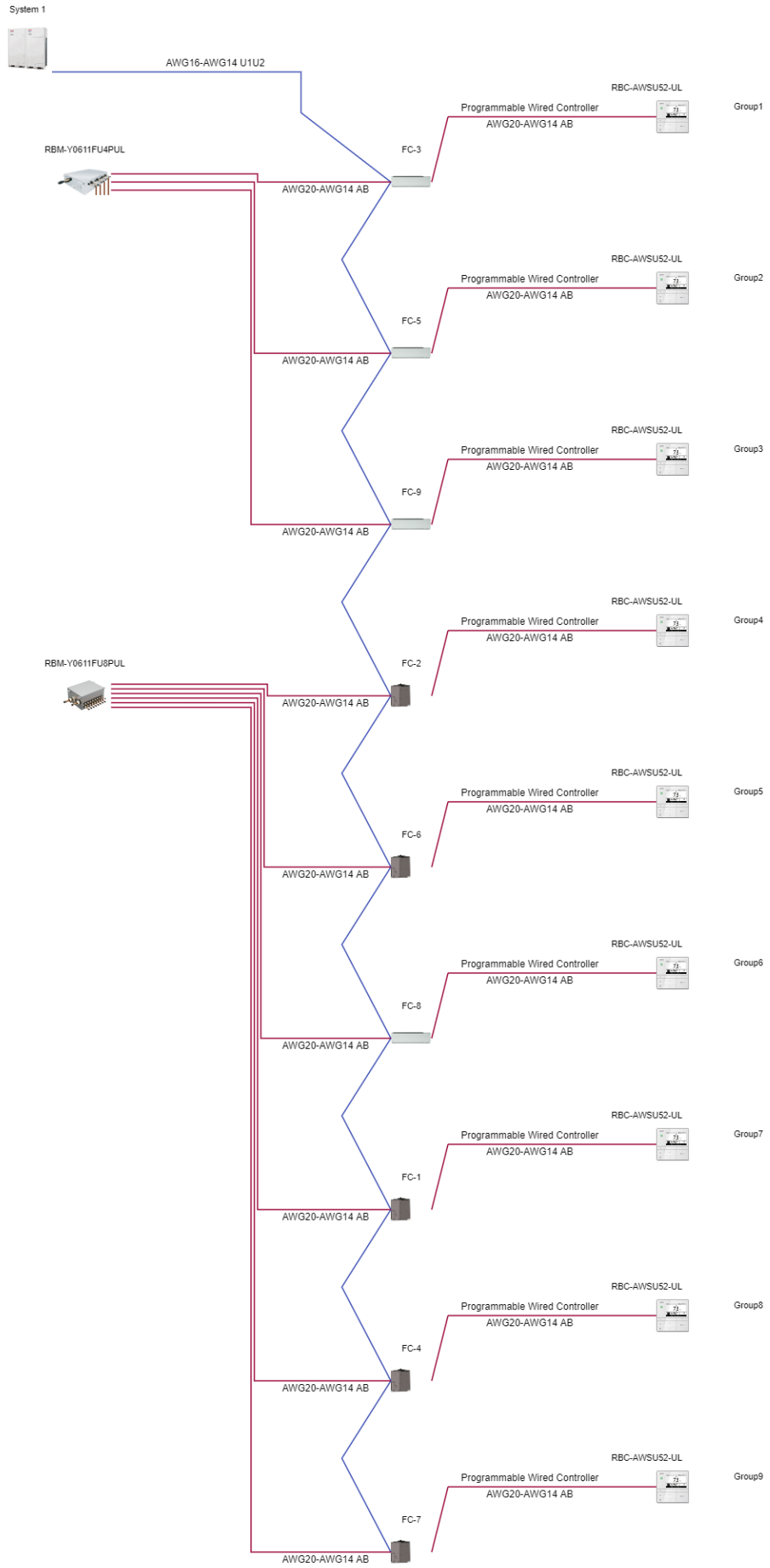
Indoor DB                      Humidity                      Indoor WB  
Outdoor DB

**Heating:**

Indoor DB  
Outdoor DB                      Humidity                      Outdoor WB



ALL WIRE FOR THE SYSTEM MUST BE SHIELDED & STRANDED



Centralized Controller - 1



BMS-CT5120UL

Controller Lines: 1

Total IU Count: 9

Total System Count: 1

RS485

AB

U1U2

BMS-IFLSV4UL



AWG16-AWG14 U3U4

System=1 (IDUs=9)

System 1  
IU Count: 9



Add  
System

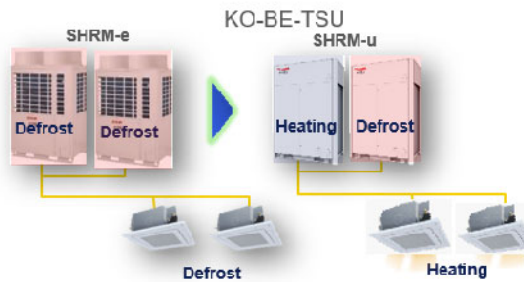


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## Middletown Fire Station 82 VRF System

Below describes the new u-Series VRF defrost cycle with continuous operation heating and defrosting

With using the merit of variable characteristic by rotary compressor, mid temperature control (compression ratio control) secures 73°F of IDU Heat exchanger. This KO-BE-TSU defrost (individual defrost technology) utilized pseudo 2-stage compression cycle to operate the continuous alternate operation with heating and defrosting, which makes reducing defrost time to keep comfort.



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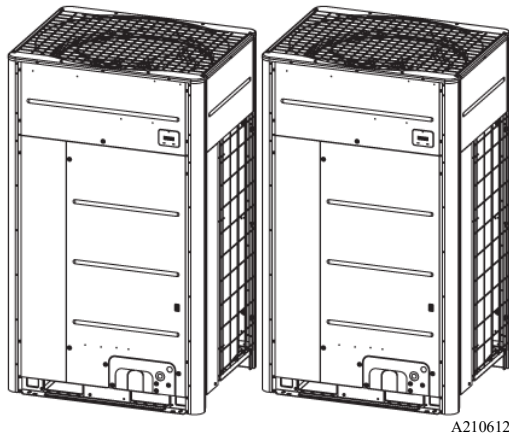


# VRF Outdoor Unit MMY-UP1921FT9P-UL - Heat Recovery



## Submittal Data

Job Name \_\_\_\_\_ Location \_\_\_\_\_  
Tag \_\_\_\_\_



### Heat Recovery Features

- Modules and pairings available from 6 to 42 tons
- Modules have inverter-driven scroll compressors
- Direct-drive, inverter-driven outdoor motor
- Up to 3937 ft actual total system piping (liquid line)
- 656 ft (200 m) actual piping length from outdoor unit to furthest fan coil
- Operating temperature range  
Cooling (db): -10° to 125°F (-15° to 52°C)  
Heating (wb): -22° to 60°F (-25° to 18°C)
- Protection: high pressure sensor and switch, low pressure sensor and switch, process controller board fuse, inverter overload protection
- 7-year compressor limited parts limited warranty

**COORDINATE ELECTRICAL REQUIREMENTS WITH E.C. NZ 5/12/24**

Combination Model		MMY-UP1921FT9P-UL
Header Unit Model		MUP0961FT9P-UL
Follower Unit Model		MUP0961FT9P-UL
<b>PERFORMANCE</b>		
Nominal Cooling Capacity	Btu/h	192,000
Nominal Heating Capacity	Btu/h	216,000
Maximum Number of Indoor Units		34
<b>SIMULTANEOUS COOLING AND HEATING EFFICIENCY†</b>		
SCHE, Ducted FCUs		32.0
SCHE, Ductless FCUs		33.0
<b>COOLING EFFICIENCY†</b>		
EER/IEER, Ducted FCUs	Btu/Wh	11.5/22.0
Power Consumption, Ducted FCUs	kW	14.11
EER/IEER, Ductless FCUs	Btu/Wh	12.1/24.7
Power Consumption, Ductless FCUs	kW	14.79
<b>HEATING EFFICIENCY†</b>		
COP at 47°F, Ducted FCUs		3.81
Power Consumption, Ducted FCUs	kW	13.95
COP at 47°F, Ductless FCUs		4.40
Power Consumption, Ductless FCUs	kW	13.30
Fan Type (Qty)		Propeller (2)
Airflow, Standard Range	CFM	6357 x 2
Sound Pressure	dBA	64.0
External Static Pressure*	in. wg	0.321

### LEGEND

db	— Dry Bulb
COP	— Coefficient of Performance
EER	— Energy Efficiency Ratio
FCU	— Fan Coil Unit
IEER	— Integrated Energy Efficiency Ratio
wb	— Wet Bulb
SCHE	— Simultaneous Cooling and Heating Efficiency

<b>ELEC</b>		
Power Supply	V/Ph/Hz	208-230/3/60
Minimum Circuit Amps (MCA)	A	36.6 x 2
Maximum Overcurrent Protection (MOCP)	A	45 x 2
<b>COMPRESSORS</b>		
Type (Number)		Hermetic Twin Rotary (2)
<b>FAN MOTOR</b>		
Motor Output	kW	0.66 x 2
<b>PHYSICAL DATA</b>		
Pipe Connection Size - Liquid (High Pressure)	in.	1/2 x 2 (Braze)
Pipe Connection Size - Gas (Low Pressure)	in.	7/8 x 2 (Braze)
Discharge - Gas (High/Low Pressure)		3/4 x 2 (Braze)
Refrigerant		R-410A
Factory Charge††	lb	13.2 x 2
Unit Width	in.	39-1/2 x 2
Unit Height	in.	66-1/2 x 2
Unit Depth	in.	31-1/4 x 2
Net Weight	lb	532 x 2

†Rated per AHRI (Air-Conditioning, Heating and Refrigeration Institute) 1230 Standard.

Cooling: Indoor 80°F (27°C) db/67°F (20°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

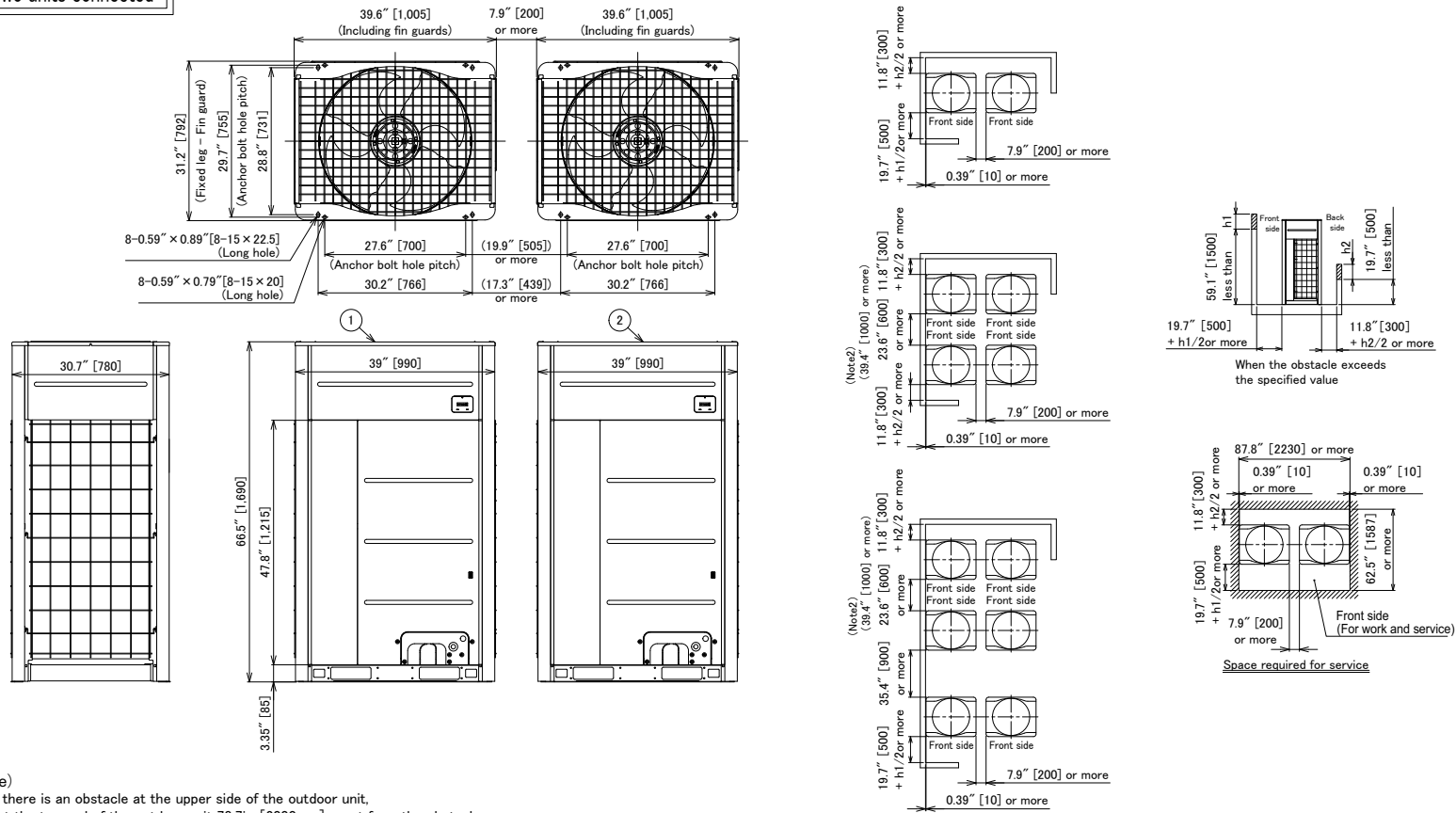
\*Requires setting by menu functions.

††Additional charge required.

NOTE: Unit cabinet and coil slab shall be capable of withstanding 500-hour salt spray test.

# DIMENSIONAL DRAWING OUTDOOR UNIT MMY-UP1921FT9P-UL

Two units connected



- Note)
- If there is an obstacle at the upper side of the outdoor unit, set the top end of the outdoor unit 78.7in [2000mm] apart from the obstacle.
  - Draw out the pipe procured locally to the front of the outdoor unit horizontally, and keep 19.7in [500mm] or more between the outdoor unit and traversing pipe if placing pipe transversely.
  - Arrange each outdoor unit in order of its capacity.  
( Header unit ① ≥ Follower unit ② )

Model name	Outdoor unit	
	① Header unit	② Follower unit
MMY-UP1921FT9P-UL	MMY-MUP0961FT9P-UL	MMY-MUP0961FT9P-UL

( Unit : in [ mm ] )



# SMMSu / SHRMu VRF Indoor Unit MMK-UP0091HP-UL—HIGH WALL



## Submittal Data

Job Name \_\_\_\_\_ Location \_\_\_\_\_  
 Tag \_\_\_\_\_



### SMMSu / SHRMu VRF High Wall Features

- R-410A refrigerant
- Eight sizes from 7,500 to 36,000 Btu/h
- Quiet operation, as low as 27 dBA
- Vertical airflow can be set to swing or fixed position
- Air throw up to 23 feet
- Auto or manually set three fan speeds
- Easy to remove cleanable filter
- Five-year parts limited warranty

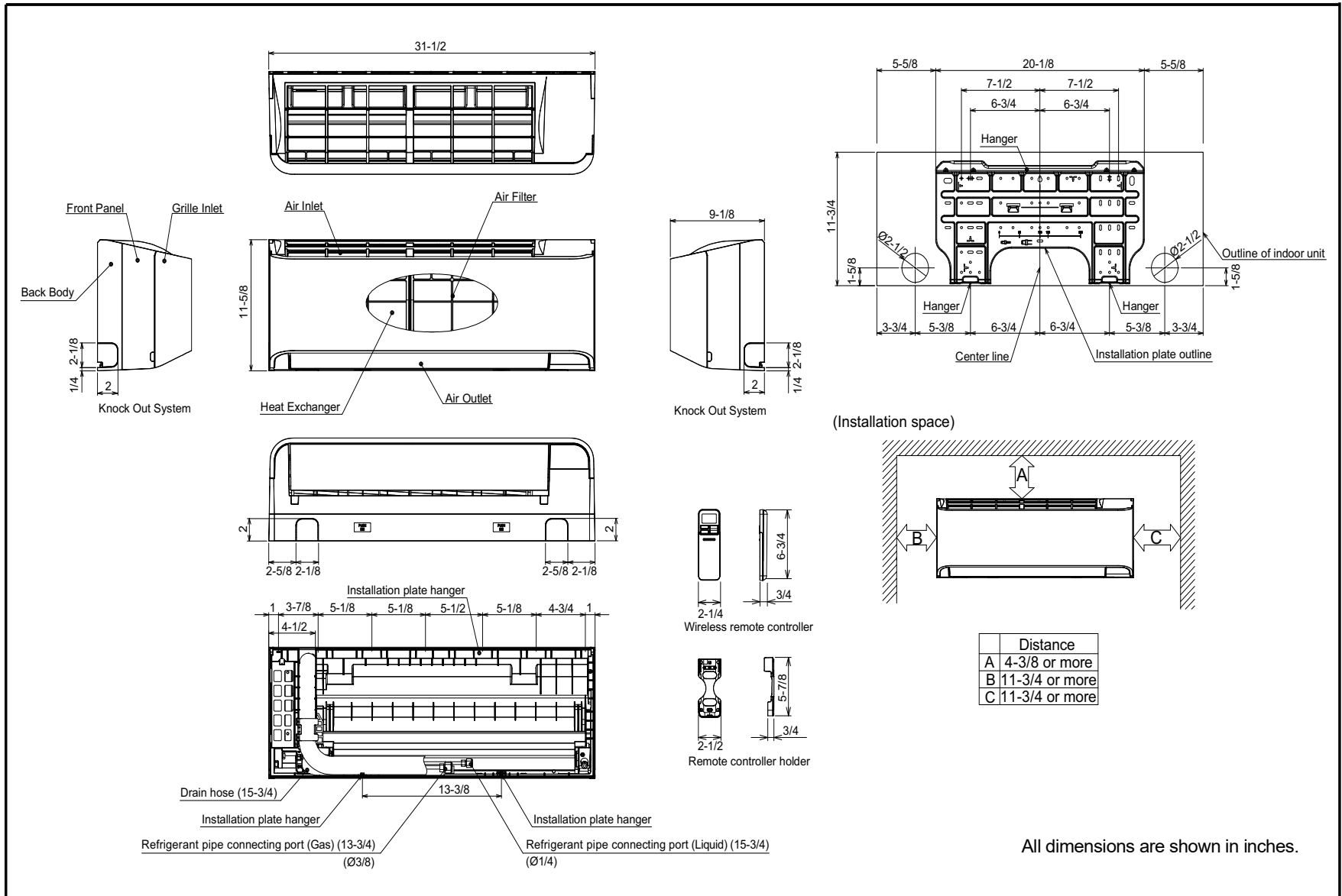
INDOOR UNIT MODEL		MMK-UP0091HP-UL
<b>PERFORMANCE</b>		
Cooling Rated Capacity	Btu/h	9,500
Heating Rated Capacity	Btu/h	10,500
Fan Type (Qty)		Cross-Flow (1)
Airflow (H / M / L)	CFM	300 / 230 / 160
Sound Pressure (H / M / L)	dBA	36 / 31 / 27
<b>FILTER (Standard)</b>		
Type		Washable
Quantity		2
MERV Corresponding Value		5
Dimensions (W x L x D)	in.	11-7/8 x 13-7/8 x 1/16
<b>ELECTRICAL</b>		
Power Supply	V/Ph/Hz	208-230/1/60
Power Consumption (Input)	kW	0.016
Full Load Amps (FLA)	A	0.18
Minimum Circuit Amps (MCA)	A	0.23
Maximum Overcurrent Protection (MOCP)	A	15.0
<b>MOTOR</b>		
Motor Type		DC
Motor Watts	W	30

PHYSICAL DATA		
Pipe Connection Size - Liquid (High Pressure)	in.	1/4 (Flare)
Pipe Connection Size - Gas (Low Pressure)	in.	3/8 (Flare)
Pipe Connection Size - Drain (OD)	in.	7/8
Pipe Connection Size - Drain (ID)	in.	5/8
Refrigerant		R-410A
External Finish		Munsell 2.5GY9.0/0.5
Unit Width	in.	31-1/2
Unit Height	in.	11-5/8
Unit Depth	in.	9-1/8
Net Weight	lb	27
<b>CONTROLS</b>		
Wireless Remote Controller (Standard)		

### ACCESSORIES

- Wired Remote Controller (7-Day Programmable) - RBC-AMS54E-UL / RBC-AWSU52-UL
- Simple Wired Remote Control - RBC-AS41UL
- Remote Sensor TCB-TC41U-UL
- Condensate Drain Pump Kit 53DS-900---118

# DIMENSIONAL DRAWING INDOOR UNIT HIGH WALL MMK-UP0091HP-UL



# SMMSu / SHRMu VRF Indoor Unit MMK-UP0181HP-UL—HIGH WALL



## Submittal Data

Job Name \_\_\_\_\_ Location \_\_\_\_\_  
 Tag \_\_\_\_\_



### SMMSu / SHRMu VRF High Wall Features

- R-410A refrigerant
- Eight sizes from 7,500 to 36,000 Btu/h
- Quiet operation, as low as 27 dBA
- Vertical airflow can be set to swing or fixed position
- Air throw up to 23 feet
- Auto or manually set three fan speeds
- Easy to remove cleanable filter
- Five-year parts limited warranty

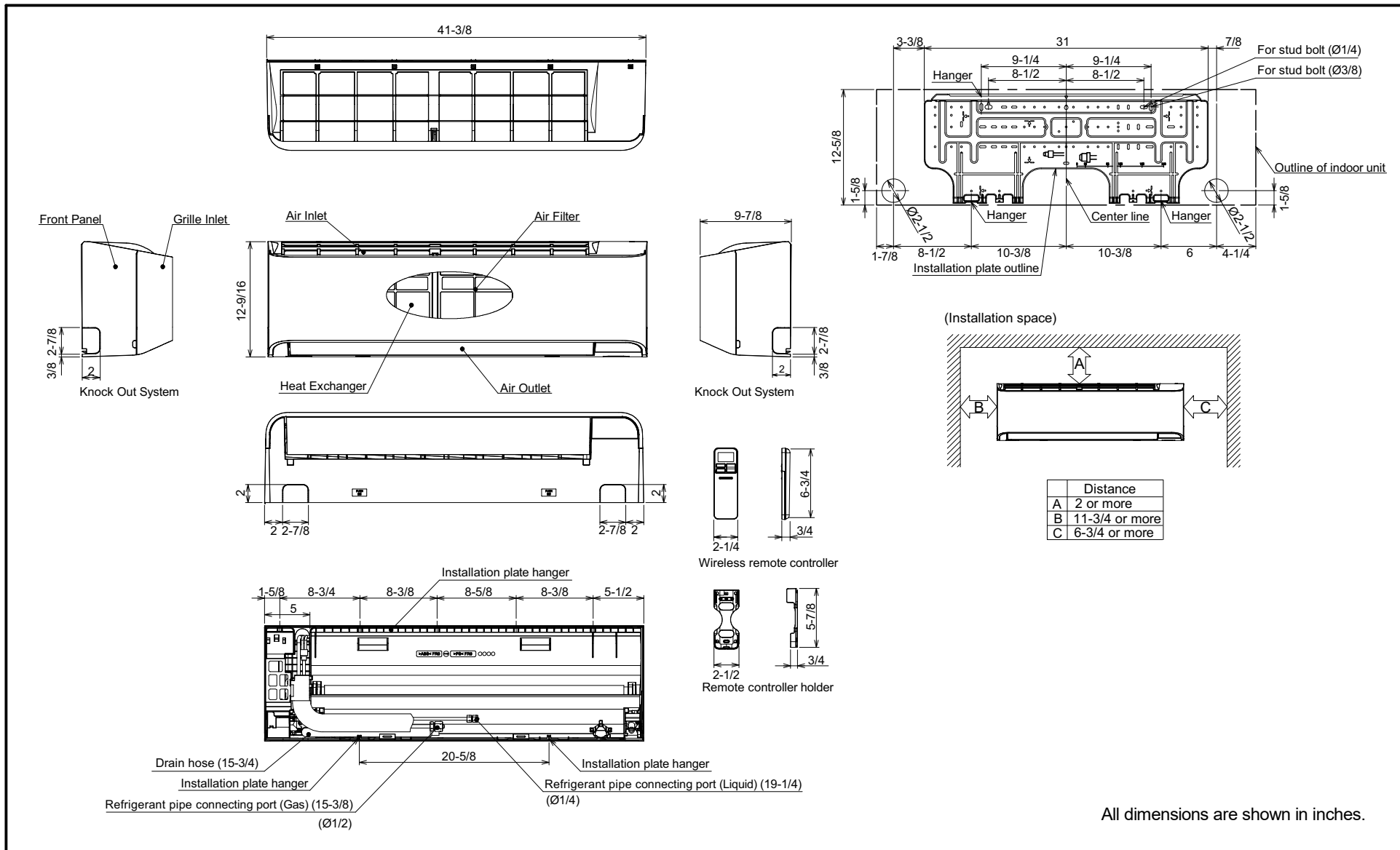
INDOOR UNIT MODEL		MMK-UP0181HP-UL
<b>PERFORMANCE</b>		
Cooling Rated Capacity	Btu/h	18,000
Heating Rated Capacity	Btu/h	20,000
Fan Type (Qty)		Cross-Flow (1)
Airflow (H / M / L)	CFM	530 / 425 / 325
Sound Pressure (H / M / L)	dBA	41 / 37 / 32
<b>FILTER (Standard)</b>		
Type		Washable
Quantity		2
MERV Corresponding Value		5
Dimensions (W x L x D)	in.	15-3/4 x 16-3/8 x 1/16
<b>ELECTRICAL</b>		
Power Supply	V/Ph/Hz	208-230/1/60
Power Consumption (Input)	kW	0.032
Full Load Amps (FLA)	A	0.33
Minimum Circuit Amps (MCA)	A	0.42
Maximum Overcurrent Protection (MOCP)	A	15.0
<b>MOTOR</b>		
Motor Type		DC
Motor Watts	W	30

<b>PHYSICAL DATA</b>		
Pipe Connection Size - Liquid (High Pressure)	in.	1/4 (Flare)
Pipe Connection Size - Gas (Low Pressure)	in.	1/2 (Flare)
Pipe Connection Size - Drain (OD)	in.	7/8
Pipe Connection Size - Drain (ID)	in.	5/8
Refrigerant		R-410A
External Finish		Munsell 2.5GY9.0/0.5
Unit Width	in.	41-3/8
Unit Height	in.	12-9/16
Unit Depth	in.	9-7/8
Net Weight	lb	36
<b>CONTROLS</b>		
Wireless Remote Controller (Standard)		

### ACCESSORIES

- Wired Remote Controller (7-Day Programmable) - RBC-AMS54E-UL / RBC-AWSU52-UL
- Simple Wired Remote Control - RBC-AS41UL
- Remote Sensor TCB-TC41U-UL
- Condensate Drain Pump Kit 53DS-900---118

# DIMENSIONAL DRAWING INDOOR UNIT HIGH WALL MMK-UP0181HP-UL



# SMMSu/SHRMu VRF Indoor Unit MMD-UP0121VHG-UL / Vertical Air Handler

# TOSHIBA Carrier

## Submittal Data

Job Name \_\_\_\_\_ Location \_\_\_\_\_  
Tag \_\_\_\_\_



FC-4 (335 CFM)  
FC-6 (400 CFM)  
FC-7 (400 CFM)

### STANDARD FEATURES

- Dual Drainage Spouts
- Three Fan Speeds - High, Medium and Low
- Unit Can Be Installed Standing Vertical or Laid Horizontally
- Electronically Commutated Fan Motor (ECM)
- Built In Pulse Modulating Valve For Installation Ease
- Removable Front Panel Provides Easy Access
- Filter MERV 3

<b>INDOOR UNIT MODEL</b>	MMD-UP0121VHG-UL	
<b>PERFORMANCE</b>		
Cooling Rated Capacity	Btu/h	12,000
Heating Rated Capacity	Btu/h	13,500
<b>Airflow (H / M / L)</b>	<b>CFM</b>	<b>480/440/340</b>
Sound Data (H, M, L) †	dBA	41.4/38.2/36.8
External Static Pressure (ESP)	in. WG	0.3 (Factory Default)
		0.5 (Max)
<b>ELECTRICAL</b>		
<b>Power Supply</b>	<b>V/Ph/Hz</b>	<b>208-230/1/60</b>
MCA*	A	1.9
MOCP*	A	15
<b>Full Load Amps (FLA)*</b>	<b>A</b>	<b>1.5</b>

<b>PHYSICAL DATA</b>		
Pipe Connection Size - Liquid	inches	1/4 (brazed)
Pipe Connection Size - Suction	inches	3/8 (brazed)
Refrigerant	R410A	
<b>DIMENSIONS (inches)</b>	H (in)	46-7/8
	W (in)	17-3/4
	D (in)	22-1/4
<b>NET WEIGHT</b>	lbs	130

### ACCESSORIES (Optional)

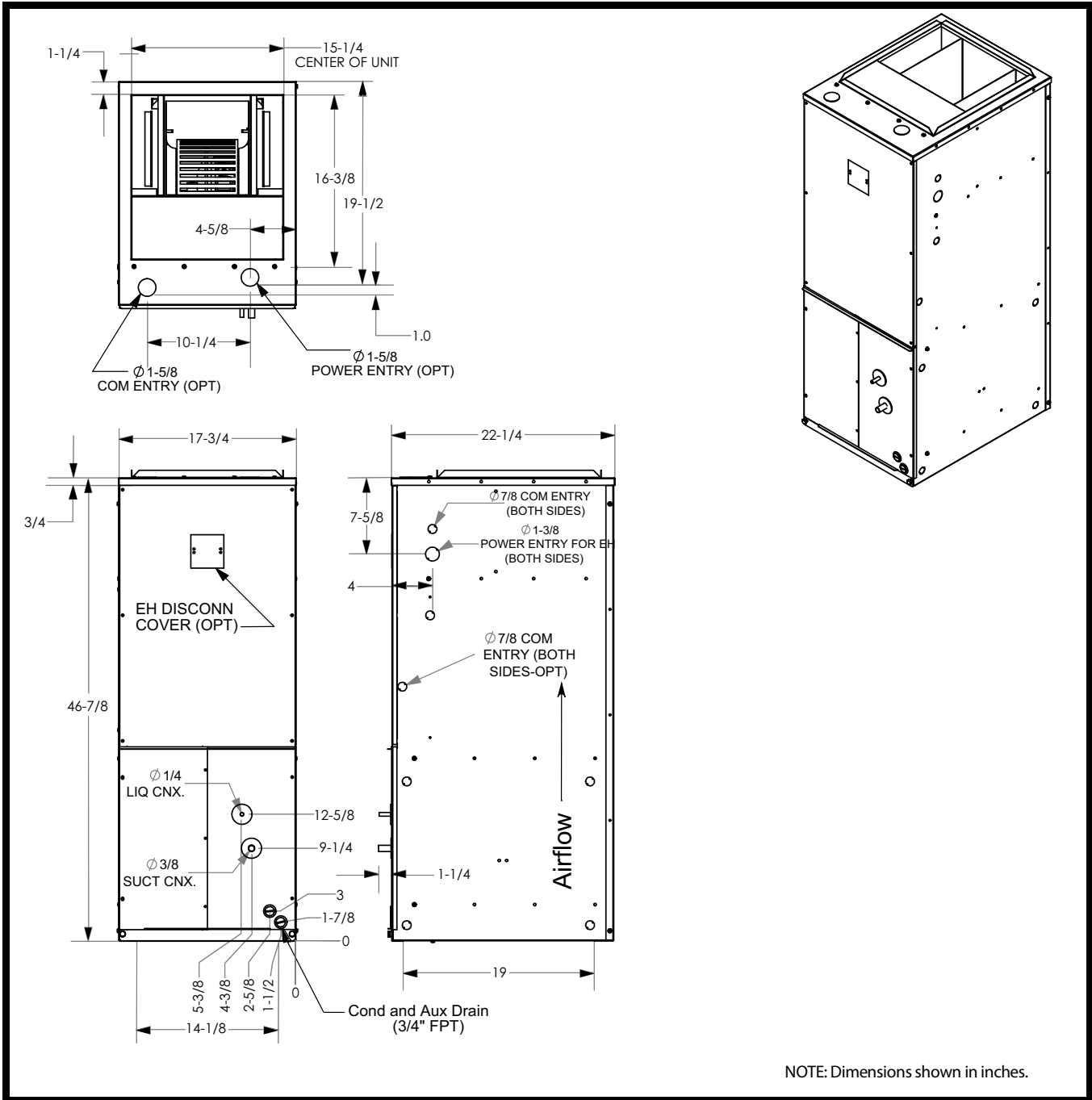
- Wired Remote Controller (7-Day Programmable) - RBC-AMS54E-UL
- Simple Wired Remote Control - RBC-AS41UL
- Wired Remote Controller (Local Controller) - RBC-AWSU52-UL
- Touch Screen Central Controller - BMS-CT2560U-UL
- Stand Alone Receiver with Wireless Remote TCB-AX32UL
- Remote Sensor TCB-TC41LUL
- Wired Remote Controller - RBC-AMT32UL
- Filter Box / 2" MERV8 (TCB-FB2F241VDGUL)
- Plenum TCB-PL2S241VDGUL
- Electrical Heater (240V/208V):

1.0kW/0.8kW	TCB-HT101VDGUL
3.0kW/2.3kW	TCB-HT301VDGUL
5.0kW/3.8kW	TCB-HT501VDGUL

### NOTES:

- \* Does not include electric heater.
- † Average / weighted sound values.

# Dimensional Drawing Indoor Unit Vertical Air Handler MMD-UP0121VHG-UL



# SMMSu/SHRMu VRF Indoor Unit MMD-UP0361VHG-UL / Vertical Air Handler

# TOSHIBA Carrier

## Submittal Data

Job Name \_\_\_\_\_ Location \_\_\_\_\_

Tag \_\_\_\_\_

FC-1 (1095 CFM)  
FC-2 (1095 CFM)



### STANDARD FEATURES

- Dual Drainage Spouts
- Three Fan Speeds - High, Medium and Low
- Unit Can Be Installed Standing Vertical or Laid Horizontally
- Electronically Commutated Fan Motor (ECM)
- Built In Pulse Modulating Valve For Installation Ease
- Removable Front Panel Provides Easy Access
- Filter MERV 3

<b>INDOOR UNIT MODEL</b>	MMD-UP0361VHG-UL	
<b>PERFORMANCE</b>		
Cooling Rated Capacity	Btu/h	36,000
Heating Rated Capacity	Btu/h	40,000
<b>Airflow (H / M / L)</b>	<b>CFM</b>	<b>1200/1150/1050</b>
Sound Data (H, M, L) †	dBA	45.2/44.2/42.0
<b>External Static Pressure (ESP)</b>	in. WG	0.5 (Factory Default)
		0.8 (Max.)
<b>ELECTRICAL</b>		
<b>Power Supply</b>	V/Ph/Hz	208-230/1/60
MCA*	A	4.5
MOCP*	A	15
<b>Full Load Amps (FLA)*</b>	A	3.6

<b>PHYSICAL DATA</b>		
Pipe Connection Size - Liquid	inches	3/8 (brazed)
Pipe Connection Size - Suction	inches	5/8 (brazed)
Refrigerant		R410A
<b>DIMENSIONS (inches)</b>	H (in)	51-7/8
	W (in)	20-1/4
	D (in)	25-1/4
<b>NET WEIGHT</b>	lbs	170

### ACCESSORIES (Optional)

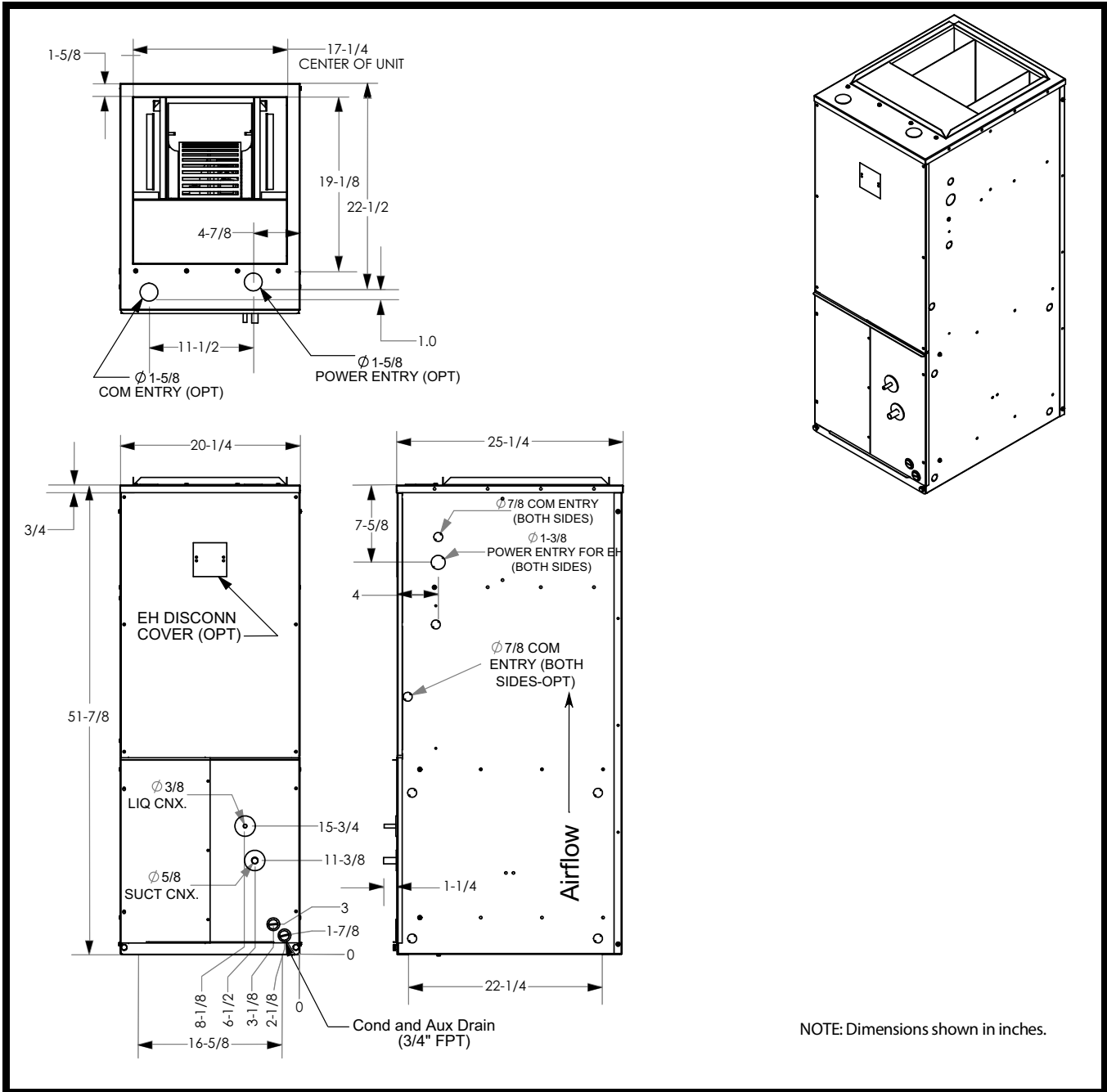
- Wired Remote Controller (7-Day Programmable) - RBC-AMS54E-UL
- Simple Wired Remote Control - RBC-AS41UL
- Wired Remote Controller (Local Controller) - RBC-AWSU52-UL
- Touch Screen Central Controller - BMS-CT2560U-UL
- Stand Alone Receiver with Wireless Remote TCB-AX32UL
- Remote Sensor TCB-TC41LUL
- Wired Remote Controller - RBC-AMT32UL
- Filter Box / 2" MERV8 (TCB-FB2F241VDGUL)
- Plenum TCB-PL2S241VDGUL
- Electrical Heater (240V/208V):

### NOTES:

- \* Does not include electric heater.
- † Average / weighted sound values.

1.0kW/0.8kW	TCB-HT101VDGUL
3.0kW/2.3kW	TCB-HT301VDGUL
5.0kW/3.8kW	TCB-HT501VDGUL
6.0kW/4.5kW	TCB-HT601VDGUL
8.0kW/6.0kW	TCB-HT801VDGUL
9.5kW/7.1kW	TCB-HT951VDGUL

# Dimensional Drawing Indoor Unit Vertical Air Handler MMD-UP0361VHG-UL



NOTE: Dimensions shown in inches.



**SHRMe**  
**RBM-Y0611FU4PUL–Multiport Flow**



## Submittal Data

Job Name \_\_\_\_\_ Location \_\_\_\_\_  
 Tag \_\_\_\_\_



**Multiport Flow Selector Features**

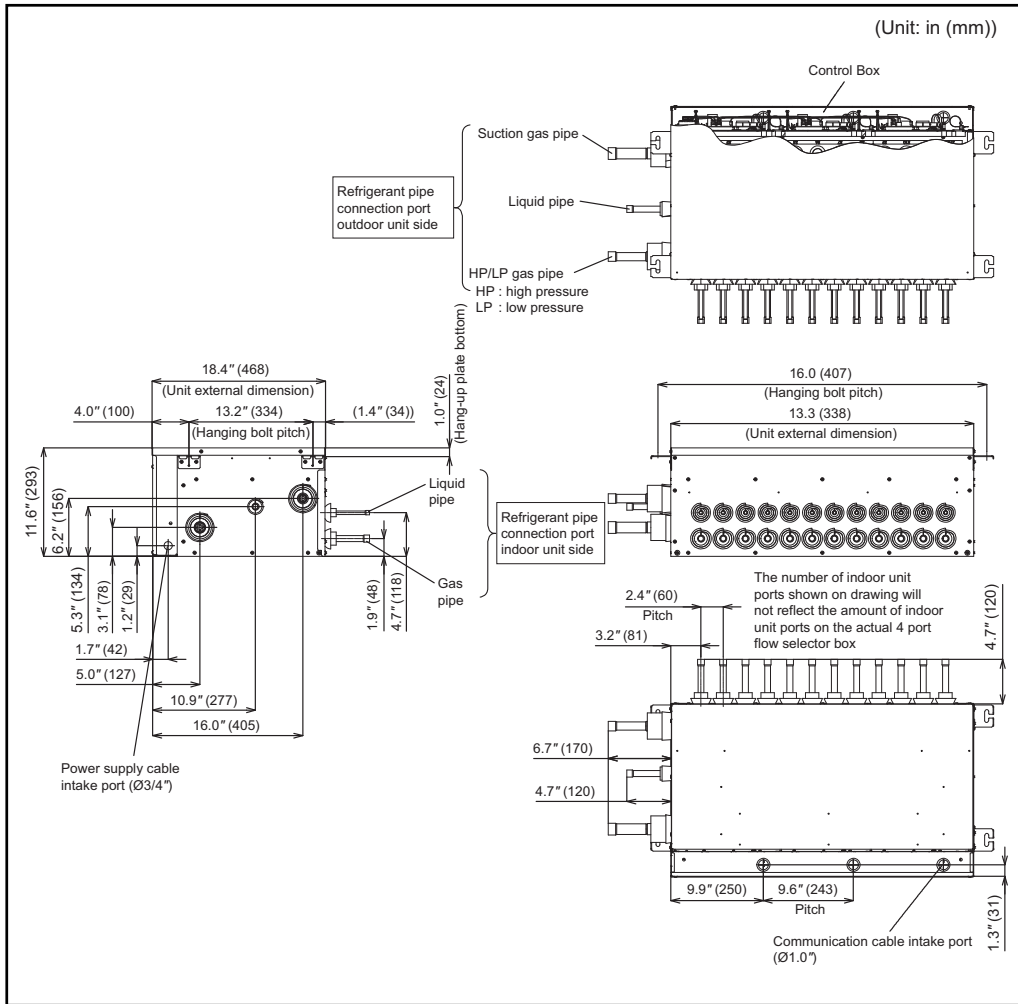
- Maximum piping length between the indoor unit and the FS box is 115 ft.
- Multiple indoor units can be connected to one box.

MODEL NAME	RBM-Y0611FU4PUL	
POWER SUPPLY	208-230/1/60	
MCA	A	0.75
MOCP	A	15
Connectible indoor unit capacity/port	kBtu/h	1 branch: below 61
DIMENSIONS	Height (in)	11.5
	Width (in)	13.3
	Depth (in)	18.4
TOTAL WEIGHT	lbs	46
Connecting Port Diameter (Indoor Unit Side)	Liquid Side (in)	3/8
	Gas Side (in)	5/8
Connecting Port Diameter (Outdoor Unit Side)	Liquid Side (in)	5/8
	Discharge Gas Side (in)	7/8
	Suction Gas Side (in)	1-1/8
Connection	Braze	

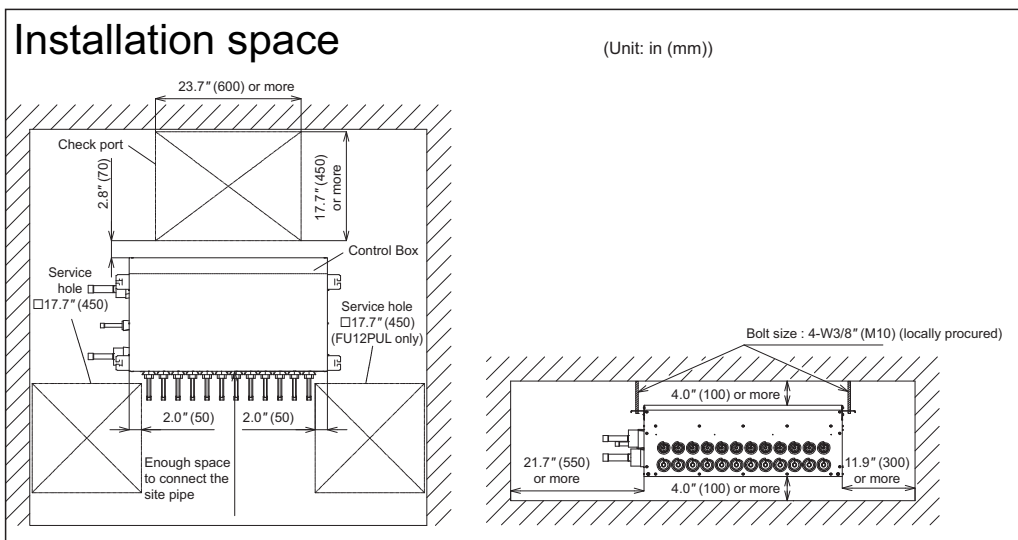
LEGEND

**MCA** — Minimum Circuit Amps  
**MOCP** — Maximum Over Current Protection

# MULTIPOINT FLOW SELECTOR (RBM-Y0611FU4PUL) DIMENSIONS

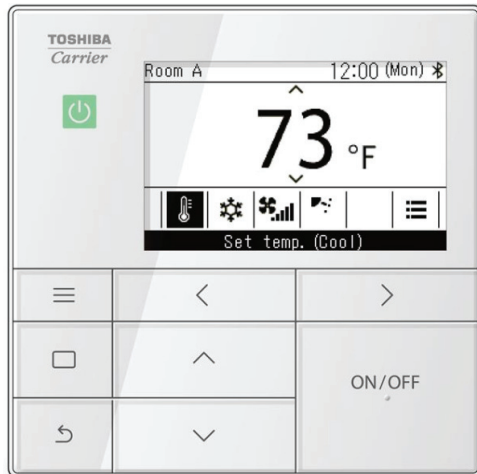


# MULTIPOINT FLOW SELECTOR (RBM-Y0611FU4PUL) CLEARANCES



## Submittal Data

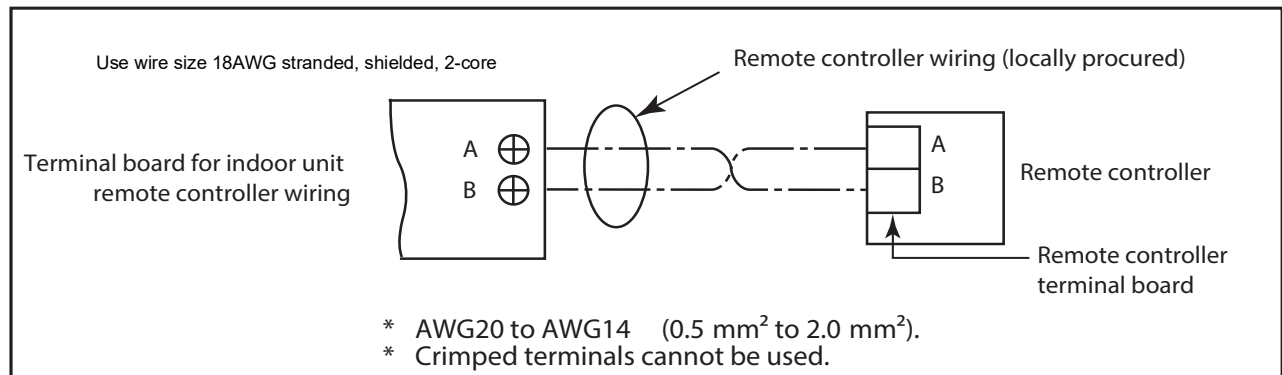
Job Name \_\_\_\_\_ Location \_\_\_\_\_  
 Tag \_\_\_\_\_



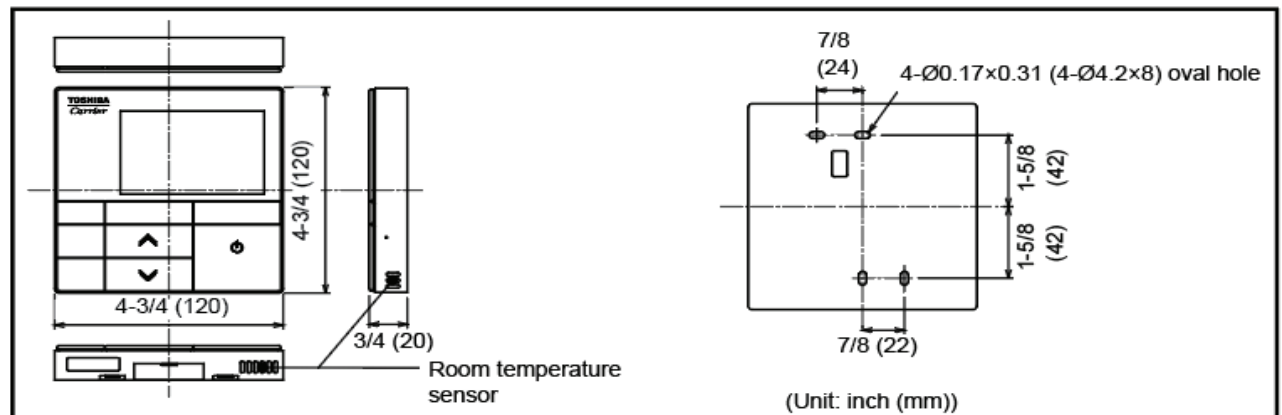
### RBC-AWSU52-UL - Wired Remote Controller Features

- Back lit easy to read
- ON/OFF
- Unit addressing capability
- Mode setting: cool, heat, dry, fan, and auto
- Room temperature display
- Fan speed setting
- Louver swing operation
- Temperature display in 1°F
- Indoor temperature range limiting (62°F to 88°F)
- Dual set-point control
- Error display
- Group Control (Max 16 IDU)
- Touch Buttons
- Three configurable input ports
- Two output ports
- Backwards compatible

### WIRING DIAGRAM



### DIMENSIONAL DRAWING



# SMMSe / SHRMe VRF Controls and Accessories BMS-CT5120UL—Touch Screen Controller



## Submittal Data

Job Data \_\_\_\_\_ Location \_\_\_\_\_  
 Buyer \_\_\_\_\_ Buyer PO # \_\_\_\_\_ Carrier # \_\_\_\_\_  
 Unit Number \_\_\_\_\_ Model Number \_\_\_\_\_  
 Performance Data Certified By \_\_\_\_\_ Date \_\_\_\_\_



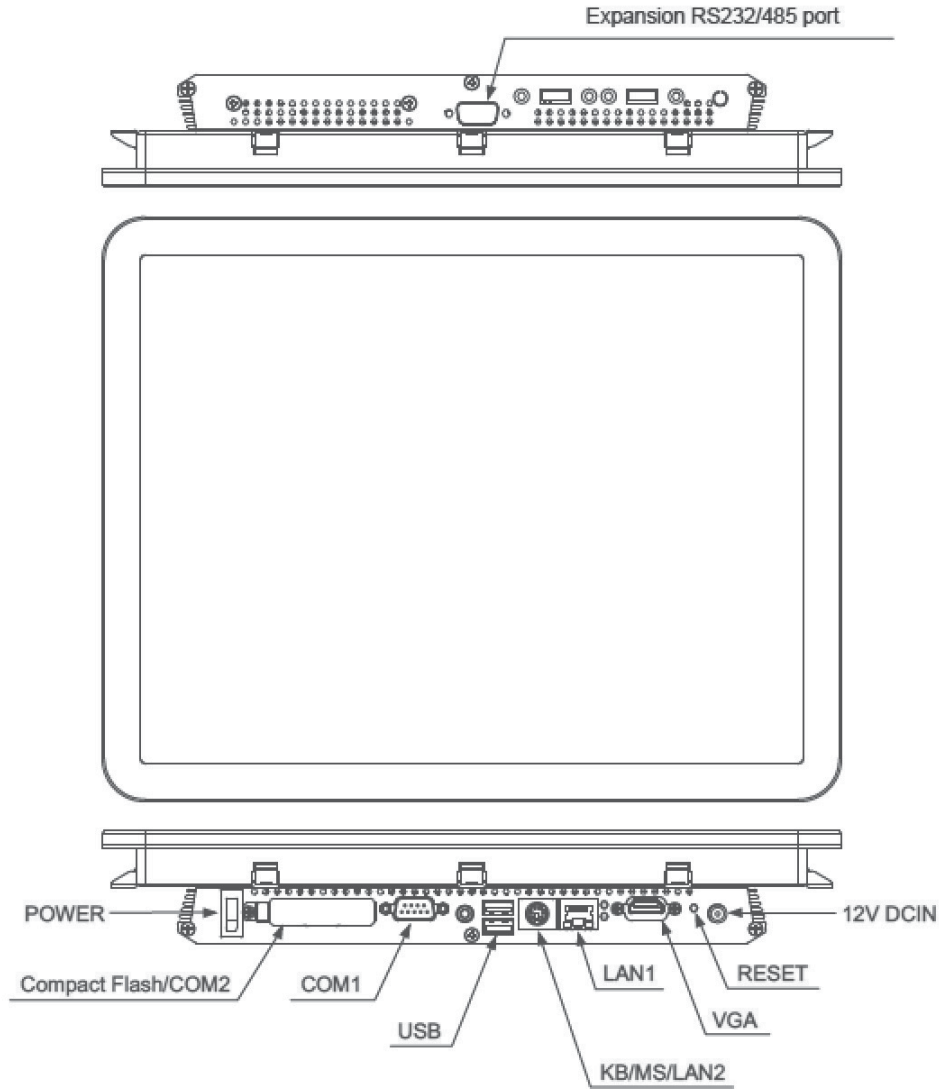
### SMMSe / SHRMe VRF Touch Screen Controller Features

- Grouping based on floor, unit, area, tenant, and level
- Operating mode, turning ON/OFF
- Enable or disable local remote control
- Master scheduler (weekly, 5 special days, monthly)
- Display alarms and provide history for alarms
- Web browser monitoring and control (for intranet PC)
- Up to 2 concurrent users can be connected
- Additional digital I/O device available
- Maximum of 512 indoor units per Touch Screen Controller
- Selectable display language (English, French, Spanish)
- Color Display

PART NAME		TOUCH SCREEN CONTROLLER
Model Number		BMS-CT5120UL
Power Supply	Rated Voltage	120 VAC, 60 Hz
	Energy Consumption	28 W
Operating Temperature Range		32 to 104 F (0 to 40 C), 10 to 90% RH (no condensation)
Storage Temperature Range		14 to 140 F (-10 to 60 C)
Dimensions		12.71 (W) x 10.07 (H) x 1.92 (D) inches (323 (W) x 256 (H) x 49 (D) mm)
Weight lb (kg)	Touch Screen Controller	7.5 (3.4)
	Power Adapter	0.99 (0.45)

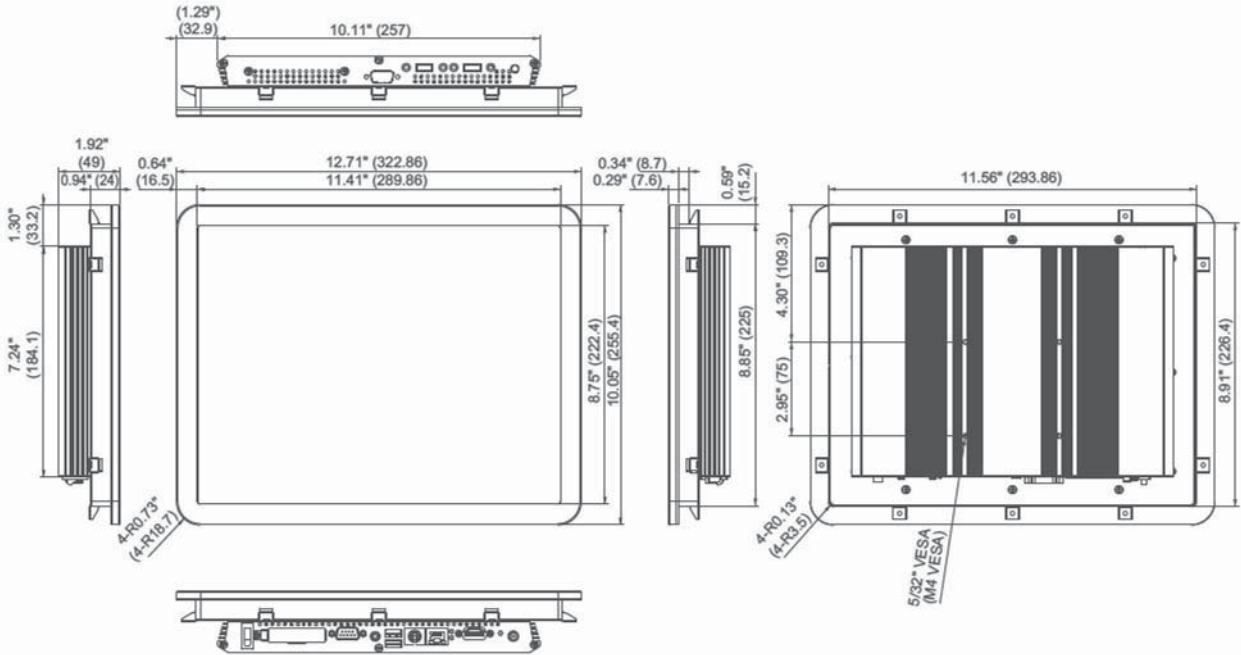
**COORDINATE POWER TO CONTROLLER WITH E.C.  
NZ 5/12/24**

# TOUCH SCREEN CONTROLLER COMPONENTS BMS-CT5120UL

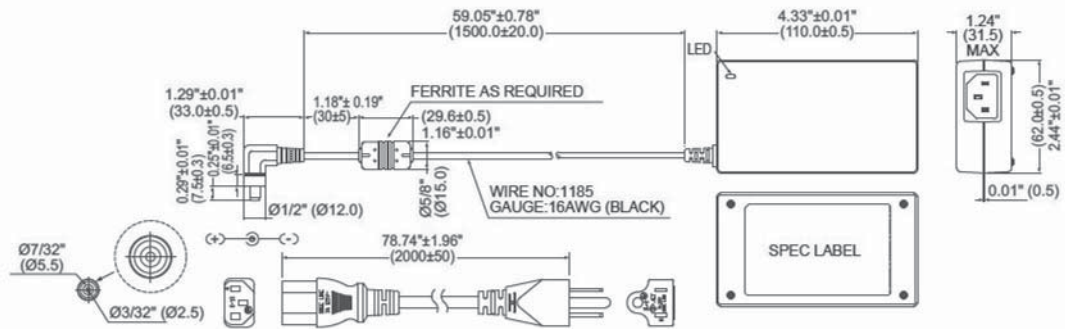


COMPONENT	FUNCTION
Power	Power Switch
Compact Flash/COM2	CF card slot, for inserting compact flash cards
COM1	Connect the supplied RS-485 cable
USB	(for service)
KB/MS/LAN2	(for service)
LAN1	For acquiring daily and monthly report data and controlling air conditioning on a PC
VGA	(for service)
RESET	Reset switch
12V DCIN	Connect the power adapter
Expansion RS232/485 port	(for service)

# DIMENSIONAL DRAWING TOUCH SCREEN CONTROLLER BMS-CT5120UL



## POWER ADAPTER



NOTE: Dimensions are in inches (mm).



**Guide Specifications**  
**Heat Recovery**  
**Variable Refrigerant Flow Outdoor Units**

Size Range:

**Nominal Cooling Capacity Range: 72,000 to 504,000 Btu/h**

**Nominal Heating Capacity Range: 81,000 to 567,000 Btu/h**

Toshiba Carrier Model Number:

**MMY-UP---1FTP—UL**

**MMY-UP---H1FTP--UL**

**Part 1 - General**

**1.01 SYSTEM DESCRIPTION**

- A. The heat recovery variable refrigerant flow system is a three-pipe system consisting of a single or multiple outdoor units, multiple indoor units of various types and capacities, and multiple flow selector boxes, individual or central indoor unit controls with on/off temperature settings, all connected by fully insulated refrigerant lines utilizing factory-supplied, fully insulated branching kits. Indoor units are connected to condensate piping that shall be terminated to the nearest drain point.
- B. The system shall be fully capable of simultaneous heating and cooling operation as requested by the individual indoor zones that can consist of single or multiple indoor units.
- C. The maximum number of connected indoor units shall not exceed 64.
- D. The total connected indoor unit capacity shall range between 50 and 200% of the outdoor unit capacity.

**1.02 QUALITY ASSURANCE**

- A. Units shall be listed by ETL (Engineering Testing Laboratory) and be evaluated in accordance with UL standard 60335-2-40, 3rd. edition.
- B. Units shall be listed in the AHRI directory.
- C. All units shall meet the Federal minimum efficiency standards and be tested per AHRI 1230-2021 Standard

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Units shall be shipped in one piece and shall be stored and handled per unit manufacturer's recommendations.
- B. Units shall be supplied with a base rail that provides openings for moving the unit by fork truck or rigging the unit by crane.

**1.04 WARRANTY (For Inclusion by Specifying Engineer)**

**Part 2 - Products**

**2.01 EQUIPMENT**

- A. General:
  - Factory-assembled, single-piece, air-cooled outdoor unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and the multiple inverter-driven twin rotary compressors.
  - 1. The maximum sound pressure rating for a single module shall not exceed 68.0 dBA sound pressure in cooling and 71.0 dBA in heating. For twinned systems the sound pressure level shall not exceed 69.5 dBA and 70.0 dBA. For 3-module systems the sound pressure level shall not exceed 71.5 dBA and 71.5 dBA. Sound pressure ratings are measured at a distance of 3.28 ft out and 4.92 ft up from the side of the outdoor unit.
  - 2. The outdoor unit shall include an oversized accumulator and a liquid tank for proper heating performance while allowing the indoor unit PMV (pulse modulating valve) metering device to shut off completely when a zone is satisfied.
  - 3. The outdoor unit shall be protected by a high-pressure switch, high-pressure sensor, low-pressure sensor, fusible plug, PC board, and an inverter overload protector.
  - 4. The outdoor unit shall be capable of operating in cooling mode down to -10 F dry bulb ambient air temperature and down to -22 F wet bulb ambient air temperature in heating. For

simultaneous heating and cooling the unit shall be capable of operating between 23 F and 60 F ambient air temperature.

5. The outdoor unit shall include a total oil management system that balances oil between compressors within a module, replenishes compressor oil to the compressors in a module from the oil separator if required.

B. Unit Cabinet:

1. Unit cabinet shall be constructed of pre-coated steel, finished on both inside and outside.
2. Unit access panels shall be removable with minimal screws and shall provide full access to the compressors, fan, and control components.
3. Compressors shall be isolated in a compartment and have an acoustic wrap to assure quiet operation.
4. The outdoor unit control panel shall include a sliding window to access adjustable controls and an LED display for setup and diagnostics.
5. Unit cabinet shall be capable of withstanding 1500-hour salt spray test per ASTM-B117-16.

C. Fans:

1. Outdoor fan shall discharge air vertically and be driven by a DC-inverter variable-speed motor with 64 steps that is capable of running down to 60 rpm.
2. Outdoor fan motor shall be totally-enclosed with permanently-lubricated bearings.
3. Motor shall be protected by internal thermal overload protection.
4. Fan blade shall be non-metallic and shall be statically and dynamically balanced.
5. Outdoor fan shall be protected by a raised non-metallic protective grille.

D. Compressors:

1. Each outdoor unit module fourteen (14) tons and under shall be equipped with an inverter-driven twin- or tri-rotary compressors with full-range control to an accuracy of  $\pm 0.1$  Hz.
2. Modules sixteen (16) tons and above will be equipped with two (2) twin rotary compressors with full-range control to an accuracy of  $\pm 0.1$  Hz.
3. Compressor shall be totally enclosed in the machine compartment.
4. Compressors shall be equipped with factory-mounted crankcase heaters.
5. Internal safety logic shall protect the compressor from over-temperature operation.
6. Motor shall be suitable for operation in an R-410A refrigerant atmosphere.
7. Compressor assembly shall be installed on rubber vibration isolators.
8. To ensure maximum efficiency throughout the system operation range, no compressor is required to run at maximum speed under any condition.

E. Outdoor Coil:

1. Coil shall be constructed of aluminum fins mechanically bonded to seamless copper tubes, which are cleaned, dehydrated, and sealed.
2. The coil configuration shall be 3 sided and fully separated from the machine compartment for more effective heat transfer and sound isolation.
3. The coil fins shall have a factory-applied corrosion resistant blue-fin finish.

F. Controls and Safeties:

Operating controls and safeties shall be factory selected, assembled, and tested. The minimum control functions shall include the following:

1. Controls:
  - a. Compressor speed to match the refrigerant flow and capacity with the system requirements.
  - b. Outdoor fan motor speed for higher efficiency and lower sound.
  - c. Oil control for improved system reliability and comfort
  - d. Pulse modulating valve control for precise control of the refrigerant distribution and accurate capacity management to avoid starving any units.
  - e. Control of compressor staging to maximize reliability and minimum run time on all compressors.
  - f. Module control of compressor operation, compressor speed, and outdoor heat exchanger surface to maximize efficiency and sound level and reliability across the entire operating range of the system.
  - g. Control of the outdoor heat exchanger surface (main vs sub heat exchangers) for maximum efficiency and comfort.

2. Safeties:

The following safety devices shall be part of the condensing unit:

- a. High-pressure switch
- b. Fuses
- c. Crankcase heater
- d. Fusible plug
- e. Over current relay for the compressor
- f. Thermal protectors for compressor and fan motor
- g. Compressor time delay
- h. Oil recovery system
- i. Oil level sensor
- j. Over-current sensor
- k. Compressor suction and discharge temperature sensor
- l. Compressor suction and discharge pressure sensor

G. Electrical Requirements:

1. All sizes shall utilize 208/230-3-60 or 460-3-60 (V-Ph-Hz) field power supply.
2. Modular systems shall have separate field power supply to each module.
3. Two-core, stranded, shielded low voltage cable shall be required for communication between outdoor and indoor unit.
4. All power and control wiring must be installed per NEC and all local electrical codes.

H. Refrigerant Piping and Line Lengths:

1. Piping connections shall be from the front or the bottom of the unit.
2. The unit shall be capable of operating with maximum connected refrigerant line lengths of 3937 ft (actual).
3. The outdoor unit shall have the ability to operate with a maximum height of 230 ft. between the outdoor and the lowest indoor unit.
4. The maximum distance between the outdoor unit and the furthest fan coil shall not exceed 591 ft actual or 656 ft equivalent. No line size changes or oil traps shall be required.
5. The system shall be capable of operating when the height difference between the upper and the lower fan coil is 131 ft.

I. Auxiliary Refrigerant Components:

1. All field supplied copper tubing connecting the outdoor unit to the indoor unit shall use factory-supplied branching kits consisting of either Y joints or headers to ensure even refrigerant flow.
2. To ensure piping flexibility the system shall allow having Y joints or headers downstream of another header.
3. A flow selector box will be required to regulate the flow of high-pressure hot gas or high-pressure liquid to the fan coil requiring heating or cooling.
4. Up to 13 fan coils, all requiring same duty cycle, may be connected to a single flow selector box.
5. A fan coil that runs in cooling only shall not be required to connect to a flow selector box.
6. The single port and multiport flow selector box can be installed up to 115 ft from the indoor unit.
9. The single and multi port flow selector boxes shall be powered by a dedicated 208/230-1-60 field power supply.
10. The single port flow selector box shall not require a drain connection.
11. The multi port flow selector shall not require a drain connection.
12. The single port and multi port flow selector box shall include a galvanized steel enclosure, and shall be tested prior to shipment.
13. The single port flow selector box shall include full interior insulation.