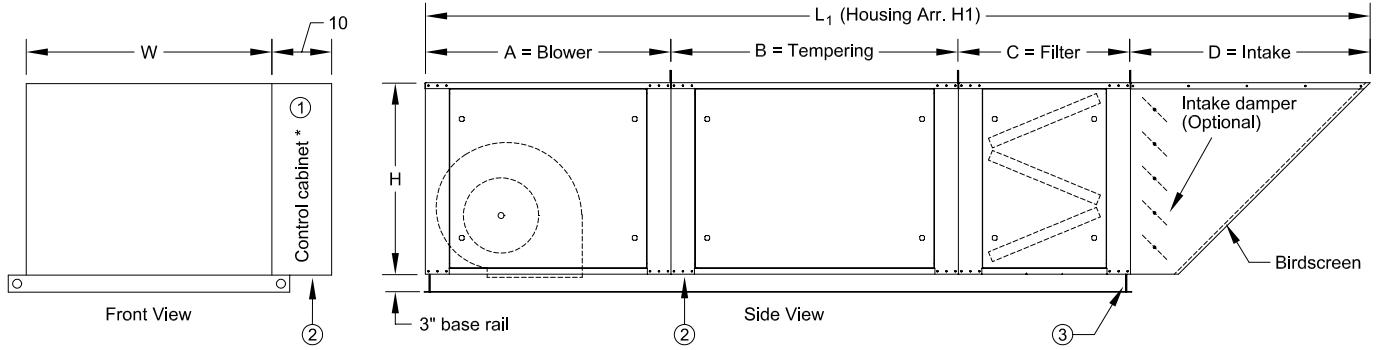


MODEL MUA TEMPERED MAKE-UP AIR UNIT



* See note 10 below

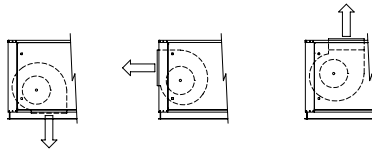
- ① Electrical connection
- ② Heater connection(s)
- ③ Lifting lugs (4)

Select type:

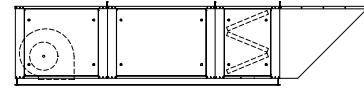
- EC - Electric heater
- HW - Hot Water Coil
- ST - Steam Coil
- CW - Chilled Water Coil
- DX - Dx Cooling Coil

Select one:

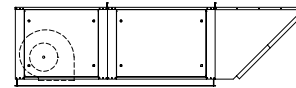
- Down Discharge
- End Discharge
- Top Discharge



H1 Housing
V-bank filters with intake hood



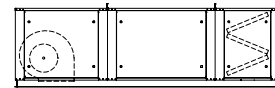
H2 Housing
Flat filters in the intake hood



Select one:

- H1 Housing
- H2 Housing
- H3 Housing

H3 Housing
V-bank filters, no intake hood



* Optional intake damper adds 8" to the L₃ length.

Notes:

1. Intake hood ships loose.
2. Access doors typical on both sides.
3. Refer to SD-MUA-INFO for CFM ranges, filter sizes, weights, curb cap sizes, blower openings, and a bottom view.
4. Consult the factory for drawings of vertical or return air units.
5. Refer to SD-MUA-CURB for curb options and dimensions.
6. Refer to SD-IFG for Indirect Fired Make-up Air Heaters.
7. Refer to SD-DFG for Direct Fired Make-up Air Heaters.
8. Refer to SD-NTS for Non-tempered Supply Units.
9. Refer to SD-EVAP for Evaporative Coolers.
10. The control cabinet is a part of the tempering section. It extends out 10" to one side as shown in the front view. It may contain the electric heater controls or the coil headers. It may also contain any other optional controls included with the unit.

Model	Housing	A	B	C	D	L ₁	L ₂	L ₃ *	H	W
						H1 Hsg.	H2 Hsg.	H3 Hsg.		
MUA-109	#1	33	48	28	34	143	115	109	26	33
MUA-110										
MUA-110	#2	41	48	29	40	158	129	118	32	41
MUA-112										
MUA-115										
MUA-115	#3	57	48	28	54	187	159	133	46	52.5
MUA-118										
MUA-120										
MUA-215	#4	57	48	28	54	187	159	133	46	101
MUA-218										
MUA-220										

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Project				Location			
Engineer						KEES INCORPORATED 400 S. Industrial Dr. • P.O. Box L Elkhart Lake, WI 53020 Phone: (920) 876-3391 Fax: (920) 876-3065 Website: www.kees.com	
Architect				Dwg No.	SD-MUA		
Contractor				Date	08/09		

MODEL MUA TEMPERED MAKE-UP AIR UNIT

Qty.	Model	CFM	S.P.	BHP	RPM	HP	Volts	Ph.	BTU (KW)	Tag

General Construction

Housing

- Galvanized steel
- 1" fiberglass insulation
- Weatherproof construction
- Large access panels

Housing Options

- Painted housing - machinery grey
- Painted housing - special color: _____
- Double wall insulation
- Foil faced insulation
- Hinged access doors

Blower Section

- Forward curved, DWDI blower
- Precision machined steel shaft
- Blower wheels statically and dynamically balanced
- Adjustable V-belt drives
- Pulleys and belts selected for not less than 165% of driven HP
- Fan and motor mounted on vibration isolators
- Self-aligning pre-lubricated bearings
- EPACT rated motor
 - ODP (standard)
 - TEFC
 - Two speed
 - Other _____

Electrical

- Unit is field wired (standard)
- Optional
 - Disconnect switch only (mounted and wired to motor)
 - _____ NEMA1
 - _____ NEMA3R
 - Motor control center with disconnect switch, one motor starter, fuse blocks and control transformer; single point wiring.
 - Extra motor starters:
 - _____ HP
 - _____ HP
 - Other _____

Tempering Section

Electric heater - UL listed, open coil heating elements, non-fused door interlocking disconnect switch, de-energizing contactors, fused control transformer, circuit fusing per NEC, air flow switch. Separate power source is required.

- Step controller with ductstat _____ # of steps
- Other _____

Heating/cooling coil - Factory tested and rated in accordance with ARI 410, copper tubes and aluminum fins. Drain pan on coiling coils.

All controls, valves, compressors, etc. are to be supplied by others.

- Hot water Steam Chilled water Direct expansion
- _____ Rows
- _____ Fins per inch
- Face and bypass dampers for heating coil (controls by others)

Optional Accessories

Damper Options

- Motorized intake damper (mounted)
- Motorized discharge damper (field installed)
- End switch on damper
- Return air (requires drawing from factory)

Curb Options

- _____ Height
- Modular curb and rail (Arrangement A1)
- Roof curb and rail (Arrangement A2)
- Two support rails (Arrangement A3)
- Full perimeter curb (Arrangement A4)

Filter Options

- _____ Thickness
- Aluminum cleanable
- Fiberglass throw-away (V-bank only)
- 30% efficient pleated (V-bank only)
- Other _____

Other Options

- Remote control panel
- Enclosure - surface mounted
 - NEMA12 plastic enclosure (standard)
 - Metal enclosure (NEMA rating: _____)
- 2-Position switches
 - Fan Heat Cool Hood lights
- Indicator lights
 - Fan Heat Cool Hood lights
 - Alarm Filter Other _____
- 3-Position switches
 - Heat-Off-Cool Summer-Off-Winter
 - Fan-Off-Auto Other _____
- Mild weather thermostat (inlet air sensor)
- Low temperature limit (freezestat)
- Clogged filter switch
- Convenience outlet (115V service receptacle)
- Time clock
- Occupied/Unoccupied (Night setback)
- Discharge diffuser (3-way or 4-way)
- Evaporative cooling (refer to SD-EVAP)
- Other _____

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Engineer			KEES INCORPORATED 400 S. Industrial Dr. • P.O. Box L Elkhart Lake, WI 53020 Phone: (920) 876-3391 Fax: (920) 876-3065 Website: www.kees.com			
Architect		Dwg No.				SD-MUA
Contractor		Date				08/09

MODEL MUA GENERAL INFORMATION

CFM Information

Model	Housing Size	Blower CFM Limits		Dx or Chilled Water Coil	Maximum CFM, Size and Area		
		Minimum	Maximum		Steam or Hot Water Coil	Evaporative Cooler	Electric Heater
MUA-109-SM	#1	600	1,600	2,200	3,300	2,700	No Limitations
MUA-109		1,000	2,600	21" x 31"	21" x 31"	24" x 29"	
MUA-110		1,200	3,600	4.4 Sqft.	4.4 Sqft.	4.9 Sqft.	
MUA-110	#2	1,200	3,600	3,700	5,500	4,300	No Limitations
MUA-112		1,800	5,000	27" x 39"	27" x 39"	30" x 37"	
MUA-115		3,000	7,000	7.3 Sqft.	7.3 Sqft.	7.8 Sqft.	
MUA-115	#3	3,000	7,000	7,200	11,000	8,200	No Limitations
MUA-118		4,000	10,000	42" x 50"	42" x 50"	44" x 49"	
MUA-120		5,000	12,000	14.6 Sqft.	14.6 Sqft.	14.9 Sqft.	
MUA-120-HD	#4	5,000	15,000				
MUA-215		6,000	14,000	13,000	20,000	16,500	No Limitations
MUA-218		8,000	20,000	42" x 89"	42" x 89"	44" x 97"	
MUA-220		10,000	30,000	26.0 Sqft.	26.0 Sqft.	30.0 Sqft.	

Filter Information


Model	Housing Size	V-bank Filters		Filters in Intake Hood		Special Filters*	
		Quantity/ Area	CFM @ 500 FPM	Quantity/ Area	CFM @ 500 FPM	Quantity/ Area	CFM @ 500 FPM
MUA-109-SM	#1	(4) 16" x 20"	4,400	(2) 16" x 25"	2,800	(2) 16" x 20"	2,200
MUA-109		8.9 Sqft.		5.6 Sqft.		4.4 Sqft.	
MUA-110							
MUA-110	#2	(6) 20" x 20"	8,300	(4) 20" x 20"	5,600	(2) 20" x 25"	3,500
MUA-112		16.7 Sqft.		11.1 Sqft.		6.9 Sqft.	
MUA-115							
MUA-115	#3	(8) 16" x 20"	14,400	(6) 20" x 25"	10,400	(4) 20" x 25"	6,900
MUA-118		(4) 20" x 20"		20.8 Sqft.		13.9 Sqft.	
MUA-120		28.9 Sqft.					
MUA-120-HD	#4						
MUA-215		(16) 20" x 25"	27,800	(12) 20" x 25"	20,800	(8) 20" x 25"	13,900
MUA-218		55.6 Sqft.		41.7 Sqft.		27.8 Sqft.	
MUA-220							

* Examples of special filters would include 6" and 12" deep high efficiency filters. These would be located in a flat bank in the standard filter section.

Weight Information

Model	Housing Size	Housing Arrangement			Intake Damper	Modular Curb & Rail	Full Perimeter Curb
		H1	H2	H3			
MUA-109-SM	#1	690#	610#	620#	50#	170#	130#
MUA-109		700#	620#	630#			
MUA-110		720#	640#	650#			
MUA-110	#2	980#	890#	880#	60#	190#	140#
MUA-112		1,000#	910#	900#			
MUA-115		1,040#	950#	940#			
MUA-115	#3	1,360#	1,260#	1,180#	70#	220#	160#
MUA-118		1,400#	1,300#	1,220#			
MUA-120		1,500#	1,400#	1,320#			
MUA-120-HD	#4	1,520#	1,420#	1,340#			
MUA-215		2,520#	2,400#	2,230#	100#	280#	200#
MUA-218		2,600#	2,480#	2,310#			
MUA-220		2,700#	2,580#	2,410#			

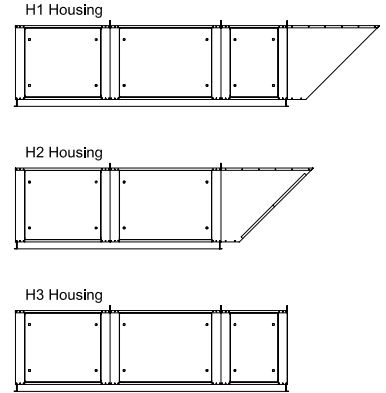
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Engineer		 KEES INCORPORATED 400 S. Industrial Dr. • P.O. Box L Elkhart Lake, WI 53020 Phone: (920) 876-3391 Fax: (920) 876-3065 Website: www.kees.com		
Architect			Drwg.	SD-MUA-INFO
Contractor			Date:	03/07

MODEL MUA GENERAL INFORMATION

Base Rail / Curb Cap Information

Model	Housing Size	A	B	H1, H3 Housing Arrangement		H2 Housing Arrangement
				C		C
MUA-109-SM	#1	32.00	32.00	108.00		80.00
MUA-109						
MUA-110						
MUA-110	#2	40.00	40.00	116.75		88.00
MUA-112						
MUA-115						
MUA-115	#3	51.50	56.25	132.50		104.25
MUA-118						
MUA-120						
MUA-120-HD						
MUA-215	#4	99.50	56.25	132.50		104.25
MUA-218						
MUA-220						



Note: All of the dimensions are measured to the inside of the base rail / curb cap. Undersize the O.D. of the curb by 1".

Dimension B is the curb cap measurement for Curb Arrangements A1 and A2 where the curb is under the blower section only.

Dimension C is the curb cap measurement for Curb Arrangement A4 where the curb is around the full perimeter of the unit.

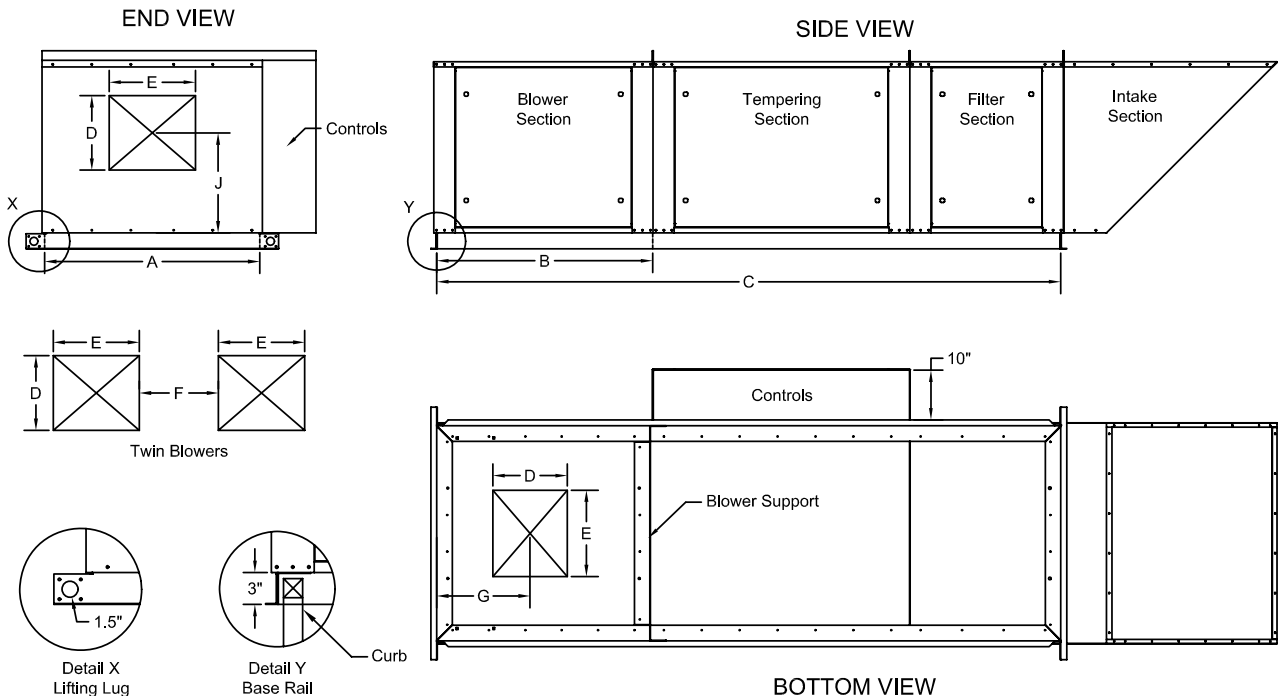
The first dimension C listed is for Housing Arrangements H1 and H3 that have the V-bank filter section.

The second dimension C is for Housing Arrangement H2. It is smaller since the V-bank filter section is replaced by flat filters in the intake section.

Blower Opening Information

Model	Housing Size	D	Blower Opening			Down Discharge	End Discharge
			E	F	G	J	
MUA-109-SM	#1	10.25	7.00	NA	12.50	15.50	
MUA-109		10.25	12.00	NA	12.50	15.50	
MUA-110		11.50	13.25	NA	12.50	15.50	
MUA-110	#2	11.50	13.25	NA	17.50	20.50	
MUA-112		13.50	15.75	NA	17.50	20.50	
MUA-115		16.00	18.75	NA	17.50	20.50	
MUA-115	#3	16.00	18.75	NA	25.00	24.50	
MUA-118		19.00	22.00	NA	25.00	24.50	
MUA-120		24.75	22.75	NA	25.00	24.50	
MUA-120-HD		24.75	24.75	NA	25.00	24.50	
MUA-215	#4	16.00	18.75	15.00	25.00	17.50	
MUA-218		19.00	22.00	18.00	25.00	20.75	
MUA-220		24.75	24.75	20.00	25.00	24.50	

Note: Blower openings are centered on the width of the unit. Dim. G is from the inside of the curb cap. Dim. J is measured from the bottom of the unit.



Note: The Controls Box extends out 10" from the tempering section. It can hold the electrical controls, coil header and/or electric heater controls.

The views shown above are of Housing Arrangement H1.