

engineering manual



mini-Might

Precision Ceiling A/C's



- 1, 1-1/2, 2 and 3 Ton Capacities
- T-Bar Ceiling Mounted - Ductless Spot Cooler or Ducted
- DX Air, Water & Glycol Cooled plus Chilled Water Systems



Excellence In Ceiling Mounted AC and Environmental Control Systems
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EPG-EM-MM-1003-2

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Do It Up!



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Model Nomenclature

MAC-036

mini Might - **M** | | |
 Air Cooled - **A**
 Chilled Water - **C**
 Water Cooled - **W**
 Glycol Cooled - **G**
 Computer/Environmental - **C** | | |

012 - Nominal 1.0 Ton
018 - Nominal 1.5 Ton
024 - Nominal 2.0 Ton
036 - Nominal 3.0 Ton

H1/DHP

Horizontal - **H** | | |
 208-230/1/60 - **1**
 208-230/3/60 - **3**
 460/3/60 - **4**
 575/3/60 - **5**
 277/1/60 - **7**

HP - Heat Pump Option
O - Outdoor Air Option

BU - Indoor Centrifugal Blower Air Cooled Remote Condensing Unit

B - Indoor Centrifugal Blower Air Cooled Remote Condenser

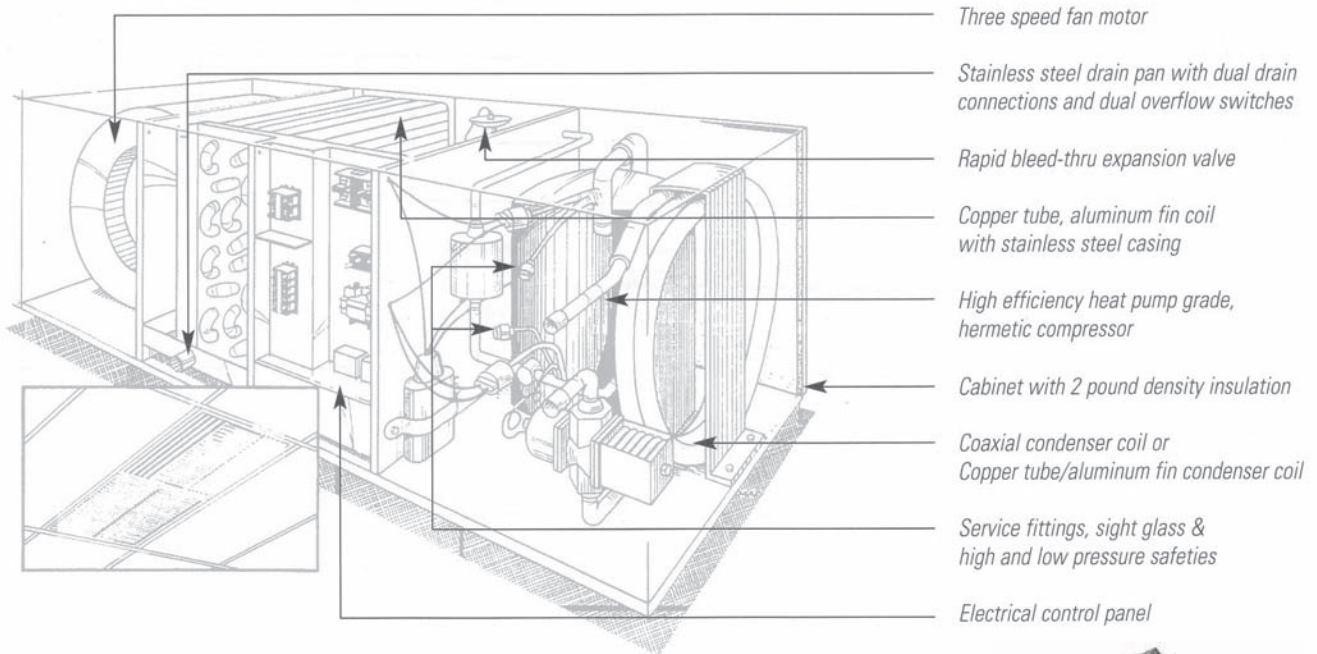
D - Self-Contained Air Cooled Unit

FU - Outdoor Propeller Fan Air Cooled Remote Condensing Unit

F - Outdoor Propeller Fan Air Cooled Remote Condenser

Note: 277/1/60 available via transformers.

mini-Might™ Skil-aire™ Built to Last With Design Features That Assure Superior Performance and Dependability in Any Application.



Invisible Air Conditioning Systems Incorporating Indoor Air Quality Features For Total Comfort:



Microprocessor Controls:

DigiSkil-100/200
Digital T-Stats



MicroSkil-100/200
Micro T/H Controls



Environmental Control:

- Steam Humidifier
- Electric, Hot Gas, Hot Water or Steam Reheat
- High Efficiency Air Filtration



Head Pressure Control:

- Air Cooled - Choose from -17.8°C (0°F), -28.9°C (-20°F) and -34.4°C (-30°F) Low Ambient Options
- Water/Glycol Cooled - 2 and 3-way standard and high pressure regulating valve options



Air Pattern Options:

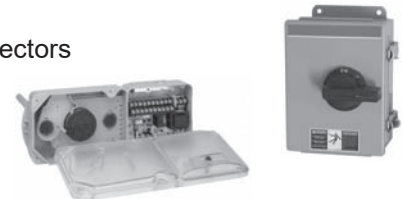
- 2'x4' Ductless Spot Cooler (standard)
- Ducted Evaporator (optional)

Capacity Modulation:

- Hot Gas Bypass

Select Accessories:

- Condensate Pumps
- Non-Fused Disconnects
- Firestats
- Smoke Detectors
- Remote Water Detectors
- and more ...!



MEA-386-90-E NYC Approved
Chicago Code Approved

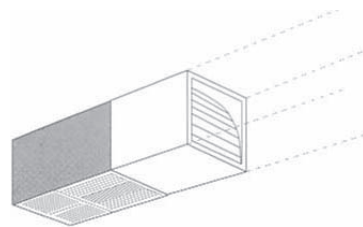
MECHANICAL DATA

Nominal Tons	1.0	1.5	2.0	3.0	
Model Size	012	018	024	036	
AIR COOLED @ 35°C (95°F) Entering Condenser Air					
26.7°C (80°F) DB, 50% RH					
Total / Sensible	KW (MBH)	4.25 / 2.9 (14.5 / 9.9)	6.2 / 4.8 (21.1 / 16.4)	7.5 / 5.8 (25.6 / 19.8)	10.7 / 8.6 (36.6 / 29.3)
23.9°C (75°F) DB, 50% RH					
Total / Sensible	KW (MBH)	3.9 / 2.8 (13.5 / 9.7)	5.8 / 4.8 (19.7 / 16.4)	6.9 / 5.8 (23.6 / 19.7)	9.9 / 8.5 (33.7 / 29.2)
22.2°C (72°F) DB, 50% RH					
Total / Sensible	KW (MBH)	3.2 / 2.7 (10.8 / 9.1)	5.5 / 4.7 (18.8 / 16.1)	6.6 / 5.6 (22.5 / 19.3)	9.4 / 8.0 (32.2 / 27.4)
WATER COOLED @ 29.4°C (85°F) Entering Condenser Water					
26.7°C (80°F) DB, 50% RH					
Total / Sensible	KW (MBH)	4.8 / 3.9 (16.4 / 13.2)	6.0 / 4.7 (20.4 / 16.0)	7.3 / 5.6 (24.8 / 19.3)	11.3 / 8.8 (38.7 / 30.0)
23.9°C (75°F) DB, 50% RH					
Total / Sensible	KW (MBH)	4.4 / 3.8 (15.0 / 12.9)	5.5 / 4.6 (18.7 / 15.6)	6.7 / 5.5 (22.9 / 18.9)	10.5 / 8.6 (35.7 / 29.4)
22.2°C (72°F) DB, 50% RH					
Total / Sensible	KW (MBH)	3.6 / 2.8 (12.3 / 9.8)	4.4 / 4.2 (15.1 / 14.3)	6.3 / 5.4 (21.6 / 18.4)	9.6 / 7.7 (32.8 / 26.2)
GLYCOL COOLED @ 43.3°C (110°F), 40% Entering Ethylene Glycol					
26.7°C (80°F) DB, 50% RH					
Total / Sensible	KW (MBH)	4.1 / 3.3 (14.1 / 11.3)	5.2 / 4.3 (17.8 / 14.8)	6.6 / 5.1 (22.5 / 17.6)	10.0 / 8.3 (34.1 / 28.2)
23.9°C (75°F) DB, 50% RH					
Total / Sensible	KW (MBH)	3.7 / 3.2 (12.6 / 10.8)	4.6 / 4.2 (15.9 / 14.2)	6.1 / 5.1 (20.9 / 17.4)	9.3 / 8.2 (31.7 / 27.9)
22.2°C (72°F) DB, 50% RH					
Total / Sensible	KW (MBH)	3.6 / 2.9 (12.3 / 9.8)	4.4 / 4.0 (15.0 / 13.7)	5.7 / 4.6 (19.4 / 15.7)	8.9 / 7.6 (30.5 / 26.1)
CHILLED WATER SYSTEMS @ 7.2°C (45°F) Entering Water Temp.					
26.7°C (80°F) DB, 50% RH					
Total / Sensible	KW (MBH)	4.2 / 3.2 (14.2 / 11.0)	7.3 / 5.2 (24.8 / 17.9)	7.8 / 6.0 (26.8 / 20.4)	13.1 / 9.1 (44.7 / 31.2)
23.9°C (75°F) DB, 50% RH					
Total / Sensible	KW (MBH)	3.4 / 3.0 (11.5 / 10.2)	5.8 / 4.8 (19.7 / 16.5)	6.3 / 5.6 (21.6 / 19.0)	10.5 / 8.5 (36.0 / 29.1)
22.2°C (72°F) DB, 50% RH					
Total / Sensible	KW (MBH)	3.0 / 2.8 (10.1 / 9.7)	5.0 / 4.5 (17.0 / 15.4)	5.5 / 5.2 (18.9 / 17.9)	8.3 / 7.5 (28.2 / 25.5)
Flow Rate	LPM (GPM)	13.2 (3.5)	18.9 (5.0)	18.9 (5.0)	28.4 (7.5)
Pressure Drop	kPa (FT W.G.)	1.2 (0.4)	14.6 (4.9)	14.6 (4.9)	32.3 (10.8)
Standard Valve	2-way, 150 psig - factory installed				

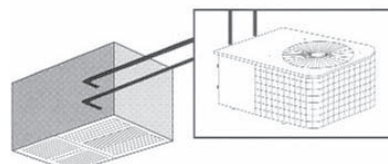
COMMON FEATURES

Evaporator Airflow - @ 0.4" e.s.p., Direct Drive Centrifugal					
Discharge	L/S (CFM)	212.4 (450)	339.8 (720)	415.3 (880)	566.3 (1,200)
Fan Motor	HP	1/2 Hp	1/2 Hp	1/2 Hp	1/2 Hp
Fan Dia x Width	CM (IN)	22.9 x 22.9 (9 x 9)	22.9 x 22.9 (9 x 9)	22.9 x 22.9 (9 x 9)	22.9 x 22.9 (9 x 9)
Evaporator Coil - Aluminum Fin, Copper Tube					
Face Area	M ² (FT ²)	0.1 (1.1)	0.18 (1.9)	0.18 (1.9)	0.23 (2.5)
Rows	NO	4	4	4	4
Face Velocity	MPM (FPM)	125 (410)	115.8 (380)	140.2 (460)	152.4 (500)
Air Filtration - @ 20% Dust Spot					
Nominal Size	CM (IN)	50.8x50.8x2.5 (20x20x1)	50.8x50.8x2.5 (20x20x1)	50.8x50.8x2.5 (20x20x1)	50.8x50.8x2.5 (20x20x1)
Compressor - Heat Pump Duty Hermetic					
Size (Qty.)	HP (NO)	1.0 (1)	1.5 (1)	2.0 (1)	3.0 (1)
Reheat/Heat - includes evaporator motor heat, (Optional)					
Electric Heat	BTUH	17,065	17,065	17,065	17,065
	KW	5.0	5.0	5.0	5.0
Steam Canister Humidifier, (Optional)					
Steam Canister	LBS/HR	3	5	5	5
Max Water Press	PSI	15-85	15-85	15-85	15-85
Connection Sizes					
Humidifier Inlet	FLARE CM (IN)	0.6 (1/4)	0.6 (1/4)	0.6 (1/4)	0.6 (1/4)
Condensate Drain	FPT CM (IN)	1.9 (3/4)	1.9 (3/4)	1.9 (3/4)	1.9 (3/4)

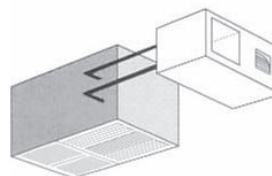
DX - Air Cooled



MAC / D
Self contained Air Cooled System for ducted condenser applications or free discharge of condenser air into open or vented spaces.

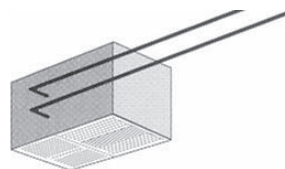


MAC / FU
Air Cooled Split System with outdoor propeller fan remote condensing unit.



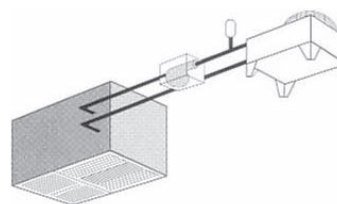
MAC / BU
Air Cooled Split System with indoor centrifugal blower remote condensing unit.

DX - Water Cooled



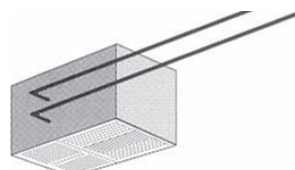
MWC
Self contained Water Cooled System complete with coaxial condenser and water regulating valve.

DX - Glycol Cooled



MGC / FCPP
Self contained Glycol Cooled System complete with coaxial condenser, glycol regulating valve, remote drycooler, pump package and expansion tank.

Chilled Water



MCC
Chilled Water Systems for use with building chilled water systems. Each unit complete with factory installed chilled water valve.

MECHANICAL DATA

Condenser Data

Nominal Tons	1.0	1.5	2.0	3.0
Model Size	012	018	024	036

AIR COOLED CONDENSER DATA

Indoor, Centrifugal Blower Air Cooled Condenser Data - (D and BU models)					
Discharge	L/S (CFM)	354 (750)	566.3 (1,200)	566.3 (1,200)	566.3 (1,200)
	IN ESP	0.4	0.4	0.4	0.4
Fan Motor	HP	1/2	1/2	1/2	1/2
Fan Dia x Width	CM (IN)	22.9 x 22.9 (9 x 9)	22.9 x 22.9 (9 x 9)	22.9 x 22.9 (9 x 9)	22.9 x 22.9 (9 x 9)
Coil Face Area	M ² (FT ²)	0.15 (1.6)	0.18 (1.9)	0.18 (1.9)	0.23 (2.5)
Rows	NO	4	4	4	4
Outdoor, Propeller Fan Remote Air Cooled Condensing Unit - (FU models)					
Discharge	L/S (CFM)	991.1 (2,100)	991.1 (2,100)	1085.5 (2,300)	1368.6 (2,900)
	Fan Motor	HP	1/8	1/8	1/6

WATER COOLED CONDENSER DATA

Water Cooled Condenser Data - (MWC models)					
Flow @ 29.4°C (85°F) EWT	LPM (GPM)	7.6 (2.0)	13.6 (3.6)	22.7 (6.0)	34.1 (9.0)
	Water Press. Drop	kPa (FT WG)	15.5 (5.2)	20.9 (7.0)	18.2 (6.1)
Water Reg. Valve		2-Way, 150 psig - factory installed			

GLYCOL COOLED CONDENSER DATA

Glycol Cooled Condenser Data - @ 40% Ethylene Glycol (MGC models)					
Flow @ 43.3°C (110°F) EGT	LPM (GPM)	15.9 (4.2)	22.7 (6.0)	34.1 (9.0)	45.4 (12.0)
	Glycol Press. Drop	kPa (FT WG)	23.9 (8.0)	31.4 (10.5)	25.4 (8.5)
Glycol Reg. Valve		2-Way, 150 psig - factory installed			

Connection Sizes

Nominal Tons	1.0	1.5	2.0	3.0	
Model Size	012	018	024	036	
AIR COOLED REFRIGERANT (R410A) CONNECTION DATA					
DX Air Handling Units - (MAC models)					
Suction Line	OD CM (IN)	1.3 (1/2)	1.6 (5/8)	1.6 (5/8)	2.2 (7/8)
Liquid Line	OD CM (IN)	1 (3/8)	1 (3/8)	1 (3/8)	1 (3/8)
FU Outdoor, Propeller Fan Remote Air Cooled Condensing Units					
Suction Line	OD CM (IN)	1.9 (3/4)	1.9 (3/4)	1.9 (3/4)	1.9 (3/4)
Liquid Line	OD CM (IN)	1 (3/8)	1 (3/8)	1 (3/8)	1 (3/8)
BU Indoor, Centrifugal Blower Remote Air Cooled Condensing Units					
Suction Line	OD CM (IN)	1.3 (1/2)	1.6 (5/8)	1.6 (5/8)	2.2 (7/8)
Liquid Line	OD CM (IN)	1 (3/8)	1 (3/8)	1 (3/8)	1 (3/8)
WATER COOLED CONDENSER CONNECTION DATA					
Water Cooled Condenser Data - (MWC models)					
Water IN/OUT	OD CM (IN)	1.3 (1/2)	1.3 (1/2)	1.6 (5/8)	1.9 (3/4)
GLYCOL COOLED CONDENSER CONNECTION DATA					
Glycol Cooled Condenser Data - @ 40% Ethylene Glycol (MGC models)					
Glycol IN/OUT	OD CM (IN)	1.3 (1/2)	1.3 (1/2)	1.6 (5/8)	1.9 (3/4)
CHILLED WATER SYSTEMS CONNECTION DATA					
Chilled Water System Data - (MCC models)					
Chilled Water IN/OUT	OD CM (IN)	1.6 (5/8)	1.6 (5/8)	1.6 (5/8)	2.2 (7/8)

Ship Weight (lbs.)

MODEL	EVAP	COND
MAC-012 / D	131.5 (290)	
MAC-018 / D	136.1 (300)	
MAC-024 / D	136.1 (300)	
MAC-036 / D	140.6 (310)	
MAC-012 / FU	63.5 (140)	80.7 (178)
MAC-018 / FU	68 (150)	80.7 (178)
MAC-024 / FU	68 (150)	84.8 (187)
MAC-036 / FU	72.6 (160)	99.3 (219)
MAC-012 / BU	63.5 (140)	56.7 (125)
MAC-018 / BU	68 (150)	56.7 (125)
MAC-024 / BU	68 (150)	61.2 (135)
MAC-036 / BU	72.6 (160)	63.5 (140)
MWC & MGC-012	10.8.9 (240)	
MWC & MGC-018	113.4 (250)	
MWC & MGC-024	113.4 (250)	
MWC & MGC-036	117.9 (260)	
MCC-012	86.2 (190)	
MCC-018	90.7 (200)	
MCC-024	90.7 (200)	
MCC-036	95.3 (210)	

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TYPICAL ELECTRICAL DATA : mini-Might™

Air, Water & Glycol Self-Contained

(FLA = Full Load Amps / MCA = Min Circuit Amps / MFS = Max Fuse Size) * see notes 1-3 below

REHEAT	None, Hot Gas, Hot Water or Steam Reheat				Electric Reheat				None, Hot Gas, Hot Water or Steam Reheat				Electric Reheat			
HUMIDIFICATION	None				None				Steam Canister Humidifier				Steam Canister Humidifier			
Power Supply	208/1/60	277/1/60	208/3/60	460/3/60	208/1/60	277/1/60	208/3/60	460/3/60	208/1/60	277/1/60	208/3/60	460/3/60	208/1/60	277/1/60	208/3/60	460/3/60
AIR COOLED SELF-CONTAINED																
MAC-012 / D*																
FLA	14.5	11.0	N/A	N/A	38.5	29.1	N/A	N/A	22.7	17.8	N/A	N/A	38.5	29.1	N/A	N/A
MCA	16.2	12.3			46.2	34.9			24.4	19.1			46.2	35.1		
MFS	20	15			50	40			30	20			50	40		
MAC-018 / D*																
FLA	16.1	12.2	N/A	N/A	40.1	30.3	N/A	N/A	24.3	19.0	N/A	N/A	40.1	30.3	N/A	N/A
MCA	18.2	13.8			48.2	33.7			26.4	20.6			48.2	36.4		
MFS	25	20			50	35			30	25			50	40		
MAC-024 / D*																
FLA	19.9	15.1	18.5	9.0	43.9	33.1	32.4	15.3	28.1	21.9	31.3	15.4	43.9	33.1	32.4	15.4
MCA	23.0	17.4	21.2	10.3	53.0	33.9	38.5	18.2	31.2	24.2	34.0	16.7	53.0	39.9	38.5	18.5
MFS	35	25	30	15	60	45	45	20	40	30	40	20	60	45	45	20
MAC-036 / D*																
FLA	21.9	16.6	18.5	9.0	45.9	34.6	32.4	15.3	30.1	23.4	31.3	15.4	45.9	34.6	32.4	15.4
MCA	25.9	19.5	21.2	10.3	55.9	42.1	38.5	18.2	34.1	26.3	34.0	16.7	55.9	42.1	38.5	18.5
MFS	40	30	30	15	60	45	45	20	45	35	40	20	60	45	45	20
WATER / GLYCOL COOLED SELF-CONTAINED																
MWC & MGC-012*																
FLA	10.9	8.3	N/A	N/A	34.9	26.4	N/A	N/A	19.1	15.1	N/A	N/A	36.3	28.1	N/A	N/A
MCA	12.6	9.6			42.6	32.1			20.8	16.4			45.4	35.1		
MFS	15	15			45	35			25	20			43.4	32.7		
MWC & MGC-018*																
FLA	12.5	9.5	N/A	N/A	36.5	27.6	N/A	N/A	20.7	16.3	N/A	N/A	36.5	28.1	N/A	N/A
MCA	14.6	11.1			44.6	33.7			22.8	17.9			45.4	35.1		
MFS	20	15			45	35			30	20			50	40		
MWC & MGC-024*																
FLA	16.3	12.4	14.9	7.4	40.3	30.4	28.8	13.7	24.5	19.2	27.7	13.8	40.3	30.4	30.8	14.8
MCA	19.4	14.7	17.6	8.7	49.4	37.2	34.9	16.6	27.6	21.5	30.4	15.1	49.4	37.2	38.5	18.5
MFS	30	20	25	15	50	40	40	20	35	30	40	20	50	40	40	20
MWC & MGC-036*																
FLA	19.1	14.5	14.9	7.4	43.1	32.5	28.8	13.7	27.3	21.3	27.7	13.8	43.1	32.5	30.8	14.8
MCA	23.1	17.4	17.6	8.7	53.1	40.0	34.9	16.6	31.3	24.2	30.4	15.1	53.1	40.0	38.5	18.5
MFS	35	25	25	15	60	45	40	20	45	35	40	20	60	45	40	20

* Note:

- 1) 277V available via field installed step-down transformer.
- 2) The above unit electrical data is reflective of the standard performance data and standard options as shown on pages 4 & 5.
- 3) Due to a policy of continuous improvement, Skil-air reserves the right to change specifications without notice and without incurring any liability. Always consult equipment name plate for exact electrical requirements.

TYPICAL ELECTRICAL DATA : mini-Might™

DX and Chilled Water Air Handling Units

(FLA = Full Load Amps / MCA = Min Circuit Amps / MFS = Max Fuse Size) * see notes 1-3 below

REHEAT	None, Hot Water or Steam Reheat				Electric Reheat				None, Hot Water or Steam Reheat				Electric Reheat			
HUMIDIFICATION	None				None				Steam Canister Humidifier				Steam Canister Humidifier			
Power Supply	208/1/60	277/1/60	208/3/60	460/3/60	208/1/60	277/1/60	208/3/60	460/3/60	208/1/60	277/1/60	208/3/60	460/3/60	208/1/60	277/1/60	208/3/60	460/3/60
DX AND CHILLED WATER AIR HANDLING UNITS																
MAC & MCC-012																
FLA	4.1	3.2	N/A	N/A	28.1	21.3	N/A	N/A	12.3	10.0	N/A	N/A	36.3	28.1	N/A	N/A
MCA	5.1	4.0			35.2	26.6			15.4	12.5			45.4	35.1		
MFS	15	15			40	30			20	15			50	40		
MAC & MCC-018																
FLA	4.1	3.2	N/A	N/A	28.1	21.3	N/A	N/A	12.3	10.0	N/A	N/A	36.3	28.1	N/A	N/A
MCA	5.1	4.0			35.2	26.6			15.4	12.5			45.4	35.1		
MFS	15	15			40	30			20	15			50	40		
MAC & MCC-024																
FLA	4.1	3.2	4.1	2.1	28.1	21.3	18.0	8.4	12.3	10.0	16.9	8.5	36.3	28.1	30.8	14.8
MCA	5.1	4.0	5.1	2.6	35.2	26.6	22.5	10.5	15.4	12.5	21.1	10.6	45.4	35.1	38.5	18.5
MFS	15	15	15	15	40	30	25	15	20	15	25	15	50	40	40	20
MAC & MCC-036																
FLA	4.1	3.2	4.1	2.1	28.1	21.3	18.0	8.4	12.3	10.0	16.9	8.5	36.3	28.1	30.8	14.8
MCA	5.1	4.0	5.1	2.6	35.2	26.6	22.5	10.5	15.4	12.5	21.1	10.6	45.4	35.1	38.5	18.5
MFS	15	15	15	15	40	30	25	15	20	15	25	15	50	40	40	20

Air Cooled, Remote Condensing Units

(FLA = Full Load Amps / MCA = Min Circuit Amps / MFS = Max Fuse Size) * see notes 1-3 below

FU - Outdoor Propeller Fan Air Cooled Remote Condensing Units					
Power Supply	208/1/60	277/1/60	208/3/60	460/3/60	
012-FU					
FLA	7.7	N/A	N/A	N/A	
MCA	9.3				
MFS	15				
018-FU					
FLA	7.7	N/A	N/A	N/A	
MCA	9.3				
MFS	15				
024-FU					
FLA	11.9	N/A	N/A	N/A	
MCA	14.6				
MFS	20				
036-FU					
FLA	12.7	N/A	10.5	5.8	
MCA	15.5		12.7	7.1	
MFS	20		20	15	

BU - Indoor Centrifugal Blower Air Cooled Remote Condensing Units					
Power Supply	208/1/60	277/1/60	208/3/60	460/3/60	
012-FU					
FLA	10.4	7.8	N/A	N/A	
MCA	12.1	9.1			
MFS	15	15			
018-FU					
FLA	12.0	9.0	N/A	N/A	
MCA	14.1	10.6			
MFS	20	15			
024-FU					
FLA	15.8	11.9	14.4	6.9	
MCA	18.9	14.2	17.1	8.2	
MFS	30	20	25	15	
036-FU					
FLA	18.6	14.0	14.4	6.9	
MCA	22.6	16.9	17.1	8.2	
MFS	35	25	25	15	

* Note:

- 1) 277V available via field installed step-down transformer.
- 2) The above unit electrical data is reflective of the standard performance data and standard options as shown on pages 4 & 5.
- 3) Due to a policy of continuous improvement, Skil-air reserves the right to change specifications without notice and without incurring any liability. Always consult equipment name plate for exact electrical requirements.

1.0 GENERAL

1.1 SUMMARY

These specifications describe requirements for an air conditioning system. The system shall be designed to maintain temperature and relative humidity conditions within the room. The manufacturer shall design and furnish all equipment to be fully compatible with heat dissipation requirements of the site.

The system shall be manufactured by Skil-aire in Baltimore, Maryland U.S.A. The system shall be approved and labeled by Underwriters Laboratories, Inc. (UL). The system shall be New York City MEA (MEA-386-90-E) and Chicago Code Approved.

1.2 DESIGN REQUIREMENTS

The control system shall be a Skil-aire factory assembled mini-Might™ model ceiling mounted system. The evaporator section shall be specifically designed for above ceiling installation.

The system shall have a total cooling capacity of _____ BTUH and a sensible cooling capacity of _____ BTUH based on an entering air temperature of _____ °F DB and _____ °F WB. The unit shall be supplied with _____ volt, _____ phase, _____ Hz electrical service. The system model number shall be _____.

2.0 PRODUCTS

2.1 STANDARD FEATURES / ALL SYSTEMS

2.1.1 CABINET

The cabinet and access panels shall be fabricated from heavy gauge galvanized steel. The panels shall be lined with 1/2" 2 lb. density insulation. Removable side doors shall provide ease of installation, service and maintenance. (In most instances, units can be serviced in place, while in operation.) A stainless steel drain pan with dual condensate drain connections shall be provided. Quick adjusting external hanger brackets with vibration isolators shall simplify installation on hanger rods by providing easy leveling, smooth operation, reduced noise and component wear.

2.1.2 AIR DISTRIBUTION

The blower shall be double-inlet, dynamically balanced blower with multiple forward curved blades, self-aligning sleeve bearings, and lifetime lubrication. The blower motor shall be permanent-split capacitor, high efficiency type. Air delivery shall be _____ CFM. System shall be suitable for plenum or ducted air distribution.

2.1.3 EVAPORATOR AIR PATTERN - SPOT COOLER

The system shall be a spot-cooler configuration with factory provided bottom supply and return-filter grille assembly for field installation.

2.1.4 FILTERS

The filters shall be rated not less than 20% dust spot efficiency with MERV of 8, based on ASHRAE 52-76 test method. They shall be removable without shutting down the system.

2.1.5 ELECTRICAL CIRCUITS

The control panel shall be pre-wired to include all contactors, fuses, relays, control transformers and capacitors necessary for complete operation. Terminal blocks shall be provided for power and control connections. Units shall be supplied with on/off control.

2.2 DIRECT EXPANSION SYSTEM COMPONENTS

2.2.1 EVAPORATOR COILS

The evaporator coil shall be quality construction of seamless drawn rifled copper tube, mechanically bonded to tempered aluminum laced fins with galvanized coil end plates. The coil shall have _____ sq. ft. face area, _____ rows deep. The coil shall be factory pressure tested. The refrigeration system shall be sealed prior to shipment. An externally equalized thermostatic expansion valve shall control refrigerant flow. The coil shall be provided with a stainless steel drain pan covering the entire coil area.

2.2.2 COMPRESSORS

The compressor shall be a full hermetic type mounted on vibration isolators and located in a separate compartment out of the evaporator air stream to facilitate servicing while equipment is operating. The compressor shall be complete with reversible positive oil pump, charging and service ports, internal spring isolation, and discharge gas vibration eliminator.

2.2.3 REFRIGERATION CIRCUIT

The refrigeration circuit shall be pre-piped with type "L" refrigerant copper tubing. The refrigeration system shall include but not be limited to: expansion valve with external equalizer and rapid bleed-through capacity, filter dryer, sight glass, pressure fittings and high pressure/low pressure safety cutouts.

2.3 CHILLED WATER SYSTEMS

2.3.1 CHILLED WATER COIL

The chilled water coil shall be of quality construction of seamless drawn rifled copper tube, mechanically bonded

to tempered aluminum laced fins with galvanized coil end plates. The coil shall be factory pressure tested. The coil shall be sized to provide high sensible cooling. The coil shall be sized to provide high sensible cooling. The coil shall be designed with a minimum of _____ sq. ft. face area; _____ rows deep and have a maximum face velocity of _____ FPM at _____ CFM. The coil shall be controlled by a factory installed 2-way chilled water control valve. The coil shall be designed to distribute water into the entire coil face area. The coil shall be supplied with _____ °F entering water temperature with a _____ °F temperature rise. The coil shall require _____ GPM of chilled water and the pressure drop shall not exceed _____ PSI. The entire coil assembly shall be mounted in a stainless steel condensate drain pan.

2.4 STANDARD FEATURES - INDIVIDUAL SYSTEMS

2.4.1 AIR COOLED SYSTEMS

2.4.1.1 SELF-CONTAINED, INTEGRAL AIR COOLED CENTRIFUGAL BLOWER CONDENSING UNIT (D models)

The system shall be self-contained with integral factory installed air cooled condensing unit. The condensing unit shall be a direct driven, centrifugal blower type. The condenser coil shall be constructed of copper tubes and aluminum fins. The condensing unit shall be sized for full heat of rejection at 35°C (95°F) ambient and be capable of operation to _____ °F low ambient air temperature. The system shall be factory tested, charged with refrigerant, sealed and ship from the factory as a one-piece system.

2.4.1.2 INDOOR, REMOTE, AIR COOLED CENTRIFUGAL BLOWER CONDENSING UNIT (BU models)

The system shall be an indoor (*outdoor - optional*) remote air cooled condensing unit designed for field connection to a dx air handling unit. The condensing unit shall be a direct driven, centrifugal blower type. The condensing unit shall be sized for full heat of rejection at 35°C (95°F) ambient and be capable of operation to _____ °F low ambient air temperature. The condensing unit shall be factory tested and shall ship with a dry-nitrogen holding charge and copper sweat connections for field charging.

2.4.1.3 OUTDOOR, REMOTE PROPELLER FAN, AIR COOLED CONDENSING UNIT (FU models)

The remote air cooled condensing unit shall be a direct drive, propeller fan type arranged for vertical air discharge. The condensing unit shall be sized for full heat of rejection at 35°C (95°F) ambient and be capable of operation to _____ °F. The condenser coil constructed of copper tube and aluminum fins. The coil shall be factory tested, and refrigeration system sealed prior to shipment.

The condenser motor shall have permanently lubricated bearings and inherent internal overload protection.

2.4.2 WATER COOLED CONDENSERS (MWC models)

Water cooled systems shall have a coaxial, counter flow liquid condenser with adjustable 2-way water regulating valve to maintain head pressure with condenser water flow. The maximum operating pressure shall not exceed 150 psig. per circuit. The unit shall require _____ GPM of _____ °F water and have a maximum pressure drop of _____ PSI.

2.4.3 GLYCOL COOLED CONDENSER (MGC models)

Glycol cooled systems shall have a coaxial, counter flow liquid condenser with adjustable 2-way glycol regulating valve to maintain head pressure with condenser glycol flow. The maximum glycol operating pressure shall not exceed 150 psig per circuit. The unit shall require _____ GPM of _____ °F, _____ % ethylene glycol and have a maximum pressure drop of _____ PSI.

2.4.4 DRY COOLER & SIMPLEX PUMP PACKAGE (FCPP models)

The drycooler shall be complete with field mounted expansion tank and aquastat to control fan motor operation. The coil shall have seamless copper tubes bonded to aluminum fins for high transfer efficiency. The motor(s) shall have permanently lubricated bearings with inherent overload protection on 1 Phase motors and three coil overloads on 3 Phase motors.

The pump package shall include controls to operate the drycooler and the pump. The pump package shall be enclosed in a weatherproof housing. The pump shall be rated for _____ GPM at _____ Ft. of head, and operate on _____ volt, _____ PH, _____ Hz.

2.5 OPTIONS

2.5.1 DUCTED EVAPORATOR AIR PATTERN

The system shall be designed for ducted evaporator return and supply air. Factory provided duct flanges shall be provided for ease of field duct connection.

2.5.2 AIR COOLED CONDENSER - LOW AMBIENT CONTROL

2.5.2.1 -17.8°C (0°F) AMBIENT - FAN CYCLING (D, FU & BU Models)

Condenser fan cycling controls shall be factory provided for field installation to allow for low ambient condenser operation to -17.8°C (0°F).

2.5.2.2 -17.8°C (0°F) LOW AMBIENT DAMPER

(D, BU Centrifugal Blower Condensers Only)

A low ambient inlet damper shall be provided for the condenser section to allow operation to 0°F. The damper shall include an actuator that is controlled directly by the condensed liquid line pressure. The damper shall be mounted with all control piping furnished by the contractor.

2.5.2.3 -28.9°C (-20°F) VARIABLE SPEED FAN

(FU Propeller Fan Models)

Variable speed head pressure controls shall be factory provided for field installation to allow for low ambient condenser operation to -28.9°C (-20°F) minimum air temperature.

2.5.2.4 -34.4°C (-30°F) FLOODED CONDENSER

(FU & BU Models)

A flooded condenser system shall be provided to allow for low ambient condenser operation to -34.4°C (-30°F). The flooded system shall include a factory installed liquid refrigerant receiver and head pressure control valve.

2.5.3 WATER / GLYCOL COOLED CONDENSER

REGULATING VALVES (MWC & MGC Models)

System head pressure shall be controlled by a factory provided ____-way water / glycol regulating valve rated for ____ psig w.w.p. 2-way valves shall be factory installed, while 3-way valves shall be field installed. (2-way & 3-way valves rated for 150 or 350 psig are optionally available.)

2.5.4 CONTROL OPTIONS

2.5.4.1 DigiSkil-100: Remote Wall Mounted, Heat / Cool Digital Thermostat

A DigiSkil-100 model remote wall mounted single stage heat / cool non-programmable thermostat with digital display shall be factory provided for field installation. The thermostat shall include FAN AUTO-ON and COOL-OFF-HEAT selector switches.

2.5.4.2 DigiSkil-200™: 7-Day Programmable Wall Mounted Digital Heat / Cool Thermostat

A DigiSkil-200™ model remote wall mounted deluxe 7-day programmable heat pump ready thermostat with digital display shall be factory provided for field installation. The thermostat shall include FAN AUTO-ON, COOL-OFF-HEAT-EM (emergency heat), SET and PROG/MAN selector switches.

2.5.4.3 MicroSkil-100™: Microprocessor Temperature Humidity Controller with Alarms

The system shall be provided with a MicroSkil-100™ model microprocessor based temperature and humidity controller with alarms. Centered in the remote wall mounted controller shall be a graphic LCD display with characters to show the operating mode, time, set points and actual readings. The temperature and humidity sensors shall be internal to the remote display. The controller shall be capable of three different set points: normal, temporary and night per day, 7 days per week.

The controller shall include the following visual and audible alarm indications (if applicable):

- High and Low Temperature
- High and Low Humidity
- Dirty Filter
- Sensor Failure
- Common Alarm Failure

The controller shall include the following system operations (if applicable):

- Unit Operational Status Indication - Cooling, Heating, Humidifying, Dehumidifying (if applicable)
- Fan - continuous or on demand
- Auto-restart upon power loss
- Remote stop/start connection
- Short cycle protection
- Cold start time delay
- Heat pump operation with aux. heat

2.5.4.4 MicroSkil™, Advanced Microprocessor Temperature & Humidity Controller with Alarms

The system shall be provided with a MicroSkil-200™ advanced microprocessor based temperature and humidity controller with alarms.

Select Features/Benefits:

- 4x20 Character Liquid Crystal Alpha-numerical Display
- User Configurable
- Run-Time Hours
- Current Unit Mode Status
- Alarm Status
- Digital & Analog Inputs / Outputs
- Temperature Anticipation
- Remote Stop / Start Contact
- Summary Alarm Contact
- Automatic or Manual (selectable) Restart After Power Loss
- Sequential Load After Restart
- Recovery Delay
- Compressor Short Cycle Timers
- Cold Start Time Delay
- Security Password Access
- Self-Diagnostics
- Service Mode

Select Options:

- Multi-Unit Sequencing (Optional)
- BMS Communications (Optional)

Unit Status Display

The control system shall display current unit functions and room status (if applicable):

- Current Dry Bulb Temp Set Point
- Current Relative Humidity Set Point
- System ON/OFF

- Cooling
- Heating
- Humidifying
- Dehumidifying
- Reheating

- Actual Room DB Temperature
- Actual Room Relative Humidity

Alarm Conditions:

Alarm conditions activate an audible and visual indicator plus close a summary alarm dry contact connection. The control system shall alert to the following alarm conditions (if applicable):

- High Temperature
- Low Temperature
- High Humidity
- Low Humidity
- High Head Press
- Loss of Air Flow
- Loss of Power
- Dirty Filter
- Smoke Detection
- Firestat
- Leak Detection
- Sensor Failure
- Summary Failure

Digital & Analog Control Inputs / Outputs:

The control system shall be capable of both digital (ON/OFF) and analog (proportional integral, PI) input and output control.

2.5.5 REHEAT/HEAT OPTIONS

2.5.5.1 ELECTRIC REHEAT/HEAT

The electric reheat/heat shall include factory mounted nichrome open wire elements, contactors and limit controls. The electric element shall be UL approved. The electric heat shall have a capacity of _____ BTU/H and a KW rating of ____ KW.

2.5.5.2 HOT GAS REHEAT

The hot gas reheat coil shall have copper tubes and aluminum fins with capacity of _____ BTU/H with ____ PSIG steam. The system shall be factory pre-piped hot gas regulating control valve.

2.5.5.3 STEAM REHEAT/HEAT

The steam reheat/heat coil shall have copper tubes and aluminum fins with capacity of _____ BTU/H with ____ PSIG steam. The system shall be factory pre-piped with a 2-way control valve.

2.5.5.4 HOT WATER REHEAT/HEAT

The hot water reheat/heat coil shall have copper tubes and aluminum fins with a capacity of _____ BTU/HR when supplied with ____ °F entering water temperature, ____ GPM at ____ PSI pressure drop. The control shall be factory pre-piped with a 2-way control valve.

2.5.6 STEAM GENERATING HUMIDIFIER

The humidification system shall be an electrode canister

type, complete with fill valve, drain valve, adjustable humidity output, and automatic flush cycle. Humidification shall be in the coil bypass to provide maximum humidification efficiency. The humidifier shall be producing _____ lbs/hr.

2.5.7 CONDENSATE PUMP

The condensate pump shall have the capacity of _____ GPH at ____ Ft. of head. It shall be complete with integral float switch, pump and motor assembly, check valve and reservoir.

2.5.8 HOT GAS BYPASS

A hot gas bypass system shall be factory installed to provide capacity modulation.

2.5.9 MAIN POWER NON-FUSED DISCONNECT

A main power non-fused disconnect shall be factory provided for field installation.

2.5.10 FIRESTAT

The firestat shall immediately shut down the environmental control system when activated. The firestat shall be mounted with sensing element in the return air duct, and wired by installing contractor to unit control panel.

2.5.11 SMOKE DETECTOR

The smoke detector shall immediately shut down the environmental control system when activated. The smoke detector shall be mounted in the return air duct by the installing contractor and wired to the unit control panel.

2.5.12 REMOTE WATER-LEAK DETECTOR

A remote water-leak detector shall be factory provided for field installation. The remote water-leak detector shall be wired to shut down all A/C unit water producing functions upon sensing a water leak.

2.5.13 REFRIGERANT LINE-SETS

(MAC-() / FU & BU models)

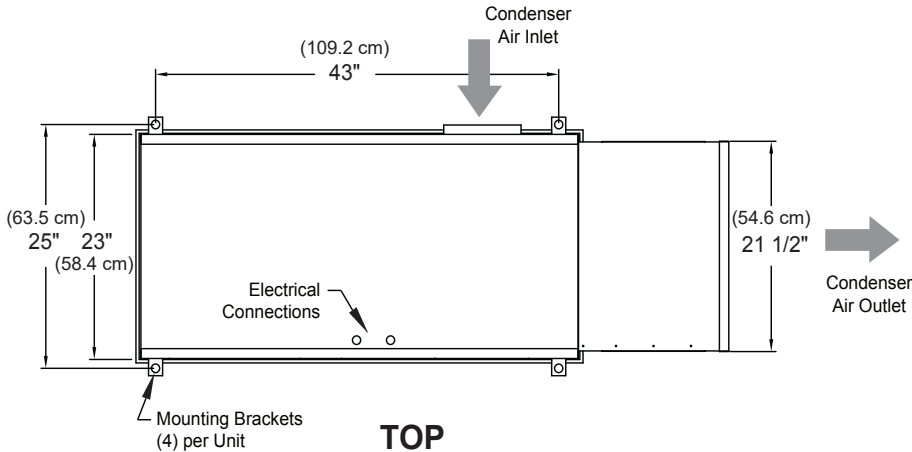
Pre-charged refrigerant (R410a) line sets in a specified length shall be factory provided for field connection of split systems. Factory installed Unit and Line-Set quick refrigerant disconnect couplings shall be provided for ease of field installation.

2.5.14 4 YEAR EXTENDED (5 YR TOTAL) COMPRESSOR WARRANTY (PART ONLY)

The A/C unit shall be provided with a 4 year extended (5 year total) A/C unit manufacturer's limited compressor warranty. The warranty shall be for compressor part only and shall not include labor, transportation or parts other than the compressor.

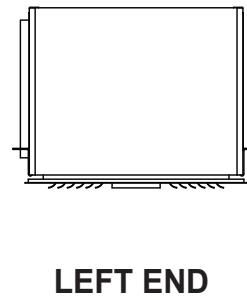
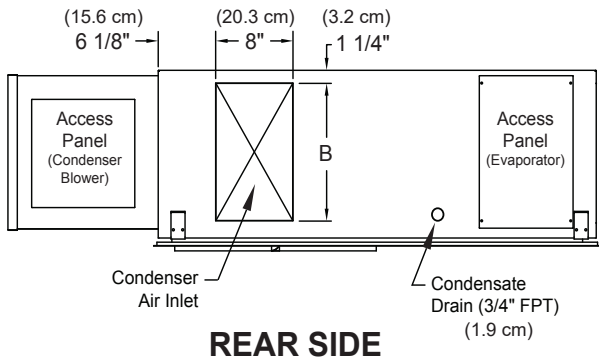
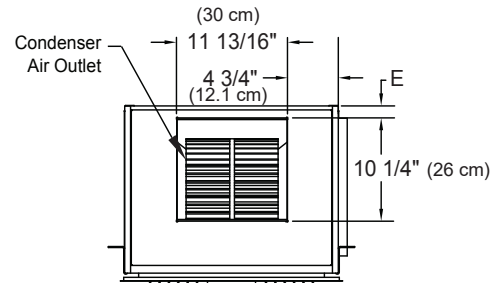
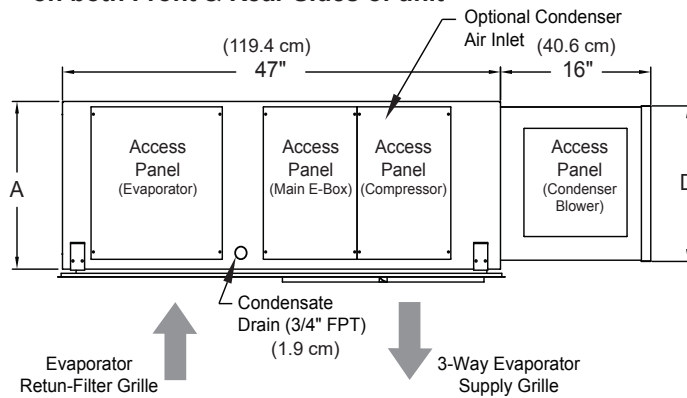
MAC-012/036-H_/D

Air Cooled Self-Contained (1-3 Tons)
(Spot Cooler with Bottom Supply/Return-Filter Grille)



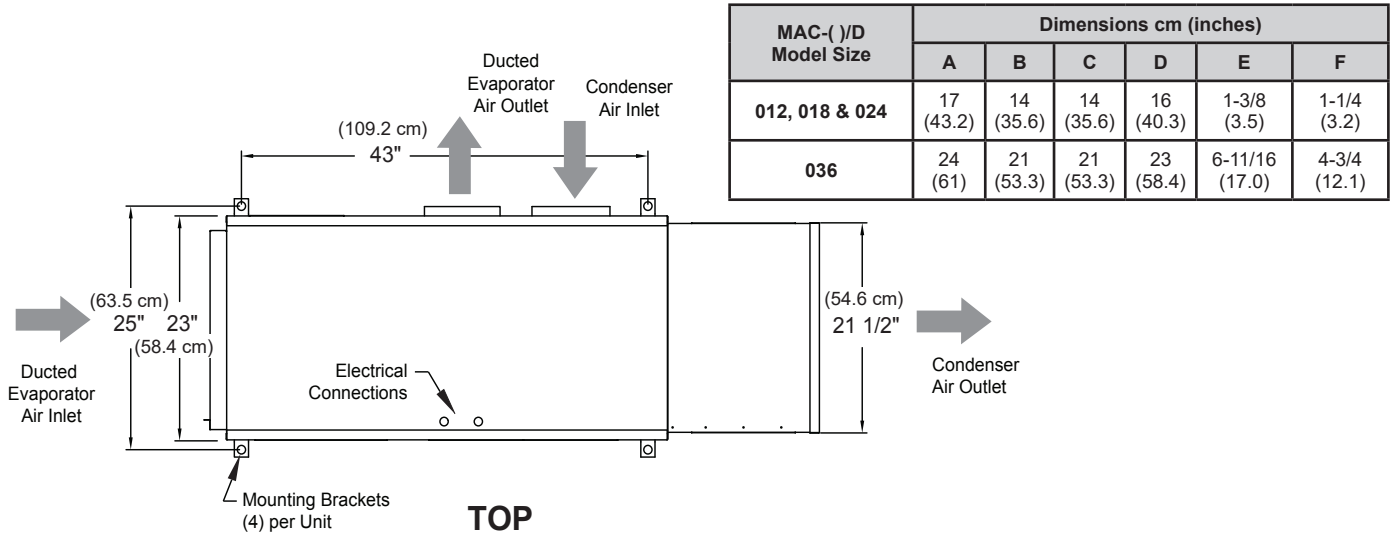
MAC-()/D Model Size	Dimensions inches (cm)			
	A	B	D	E
012, 018 & 024	17 (43.2)	14 (35.6)	16 (40.6)	1-3/8 (3.5)
036	24 (61)	21 (53.3)	23 (58.4)	6-11/16 (17)

Note: 45.7cm (18") service clearance on both Front & Rear Sides of unit

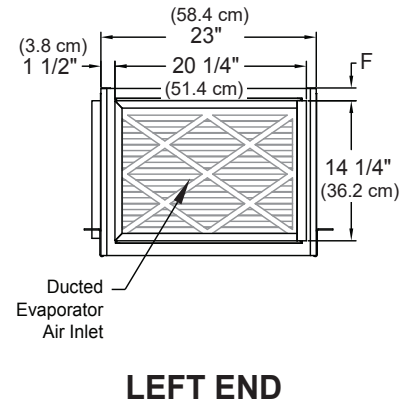
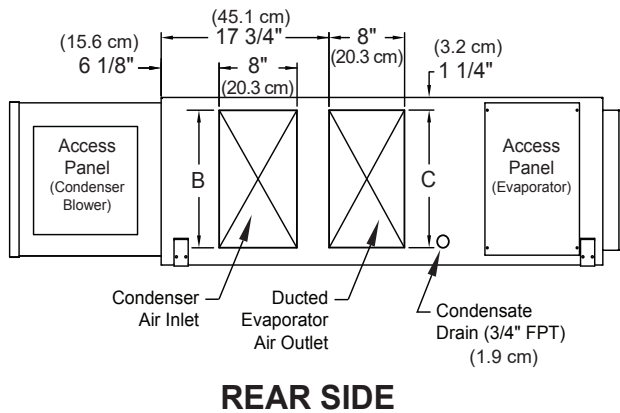
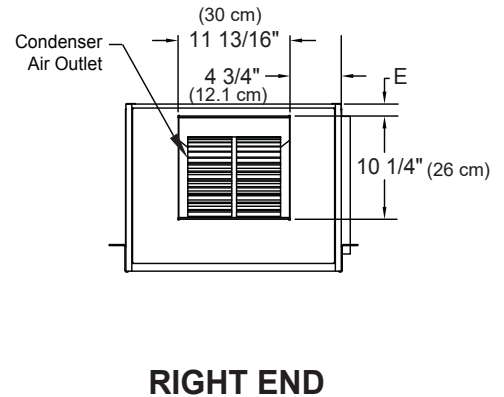
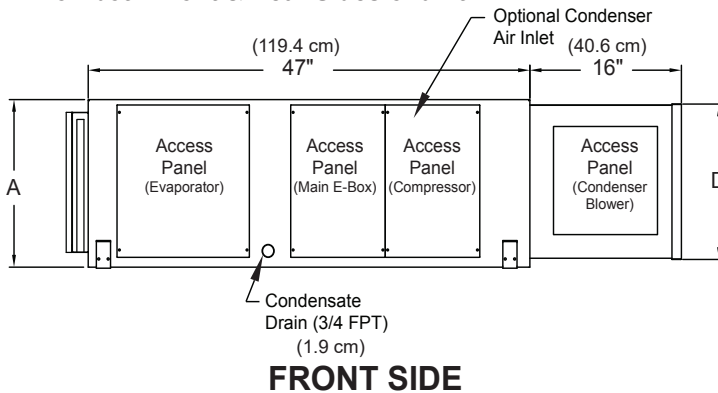


MAC-012/036-H/D

Air Cooled Self-Contained (1-3 Tons)
(Optional Ducted Evaporator)

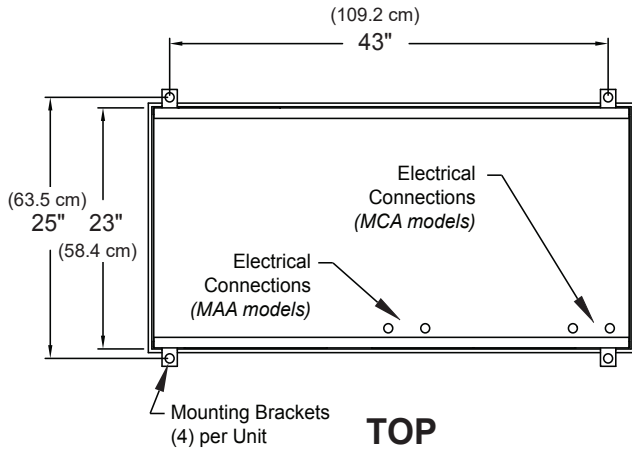


Note: 18" (45.7 cm) service clearance on both Front & Rear Sides of unit



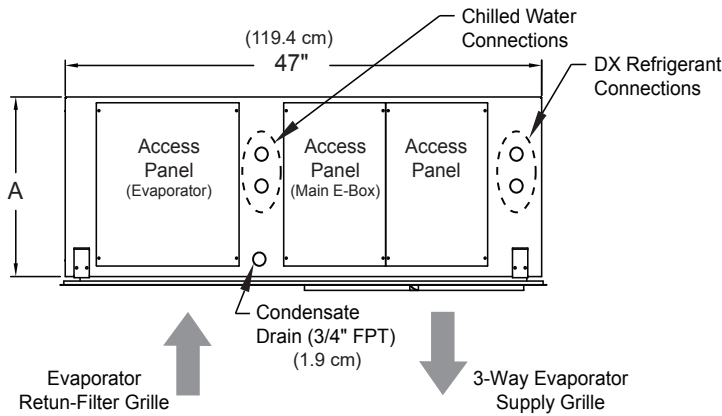
MAC & MCC-012/036-H_

Split DX & Chilled Water Air Handling Units (1-3 Tons) (Spot Cooler with Bottom Supply/Return-Filter Grille)

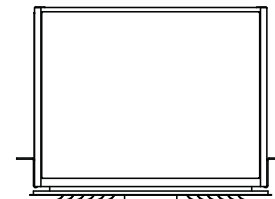


MAA & MCA-() Model Size	Dimensions inches (cm)
	A
012, 018 & 024	17 (43.2)
036	24 (61)

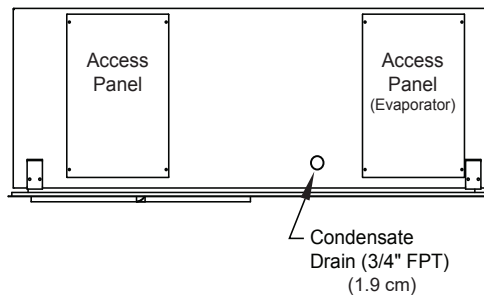
Note: 18" (45.7 cm) service clearance on both Front & Rear Sides of unit



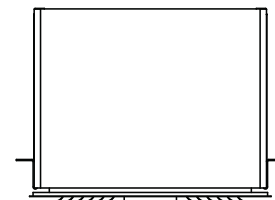
FRONT SIDE



RIGHT END



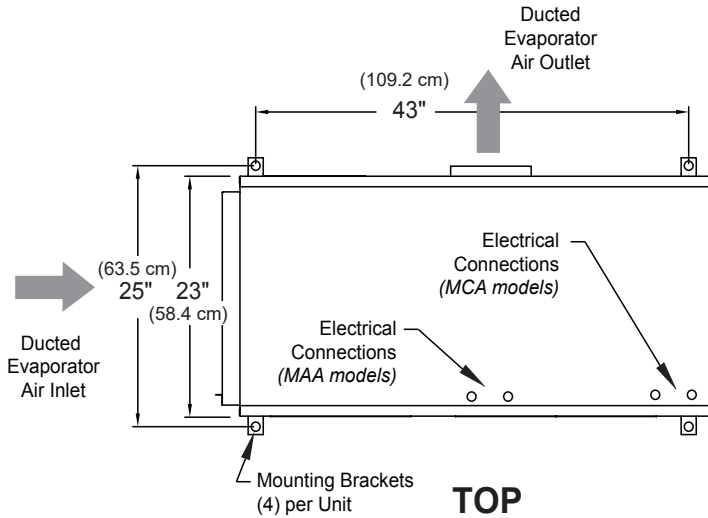
REAR SIDE



LEFT END

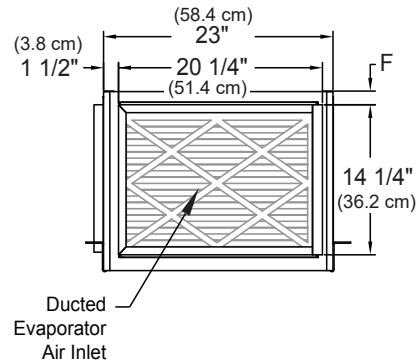
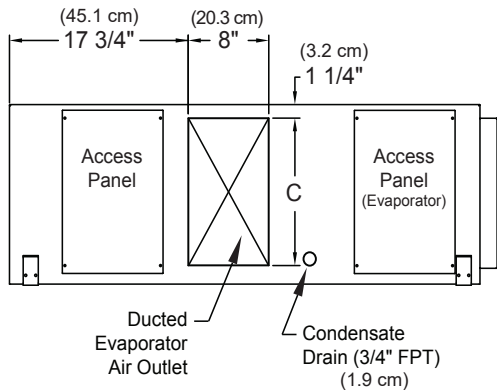
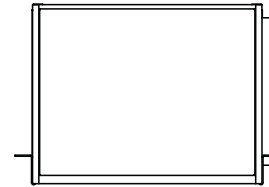
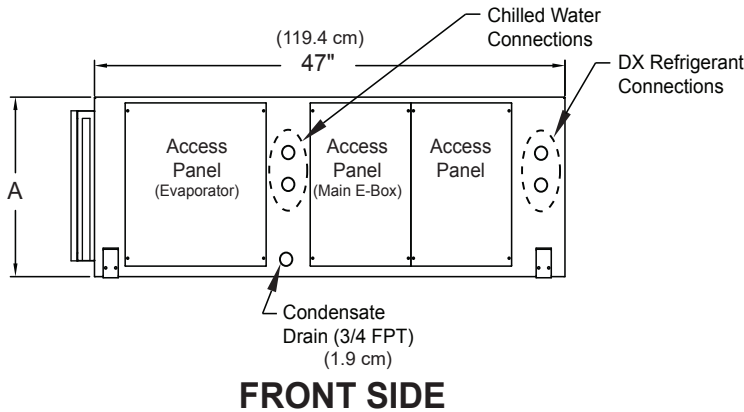
MAC & MCC-012/036-H/D

Split DX & Chilled Water Air Handling Units (1-3 Tons) (Optional Ducted Evaporator)



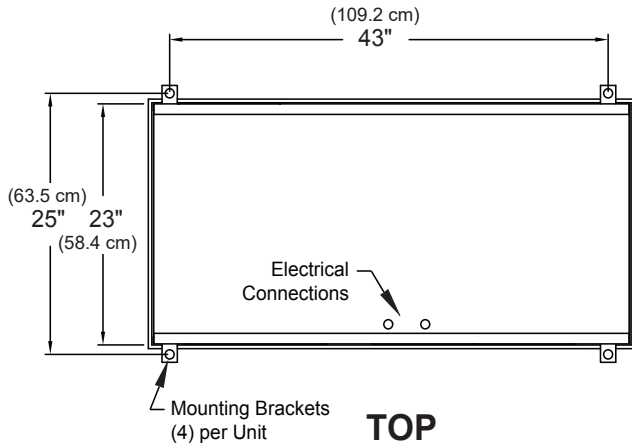
MAC & MCC-() Model Size	Dimensions inches (cm)		
	A	C	F
012, 018 & 024	17 (43.2)	14 (35.6)	1-1/4 (3.2)
036	24 (61)	21 (53.3)	4-3/4 (12.1)

Note: 18" (45.7 cm) service clearance on both Front & Rear Sides of unit



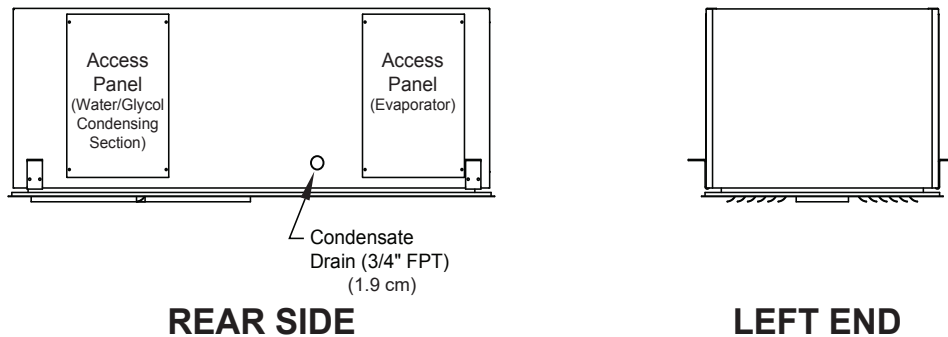
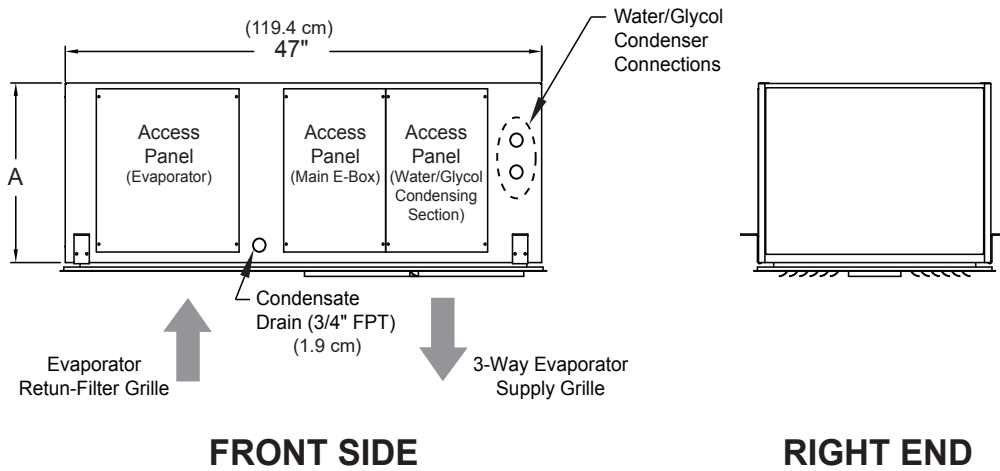
MWC & MGC-012/036-H_

Water/Glycol Cooled Self-Contained (1-3 Tons)
(Spot Cooler with Bottom Supply/Return-Filter Grille)

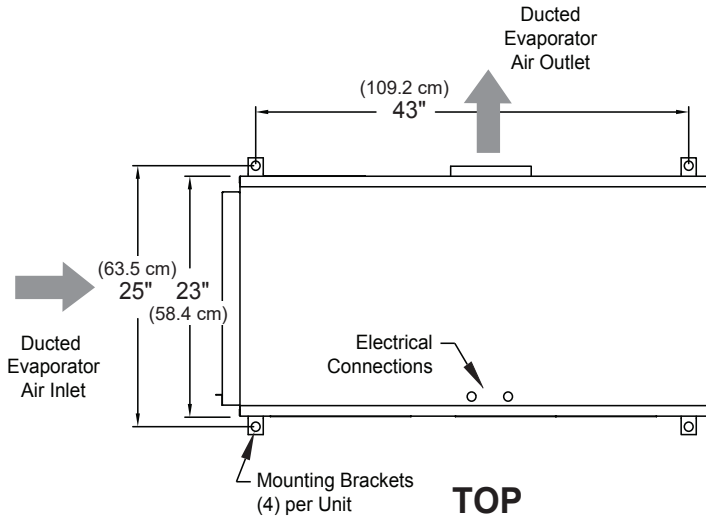


MWC & MGC-() Model Size	Dimensions inches (cm)
	A
012, 018 & 024	17 (43.2)
036	24 (61)

Note: 18" (45.7 cm) service clearance on both Front & Rear Sides of unit

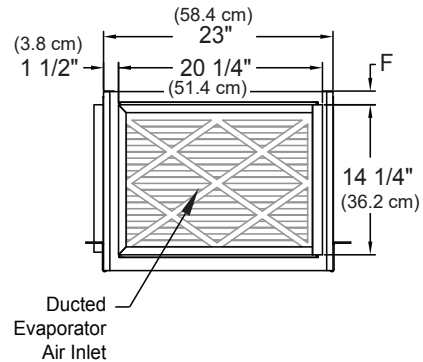
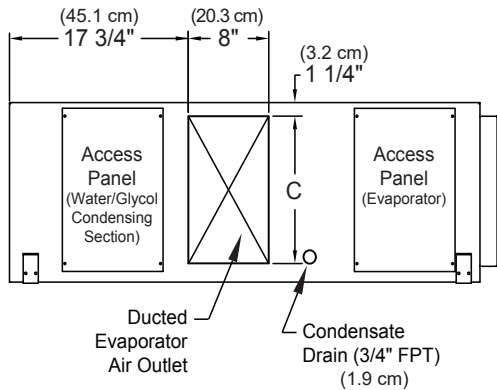
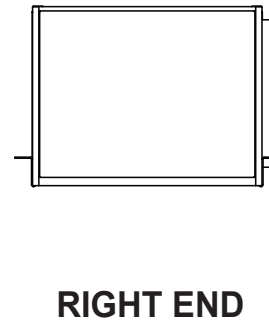
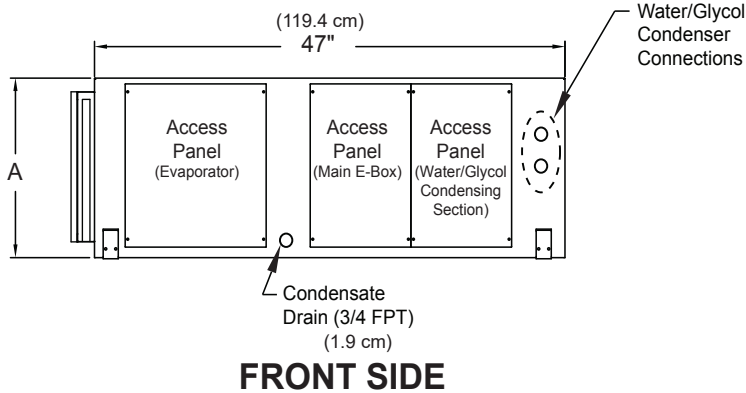


MWC & MGC-012/036-H_ Water/Glycol Cooled Self-Contained (1-3 Tons) (Optional Ducted Evaporator)



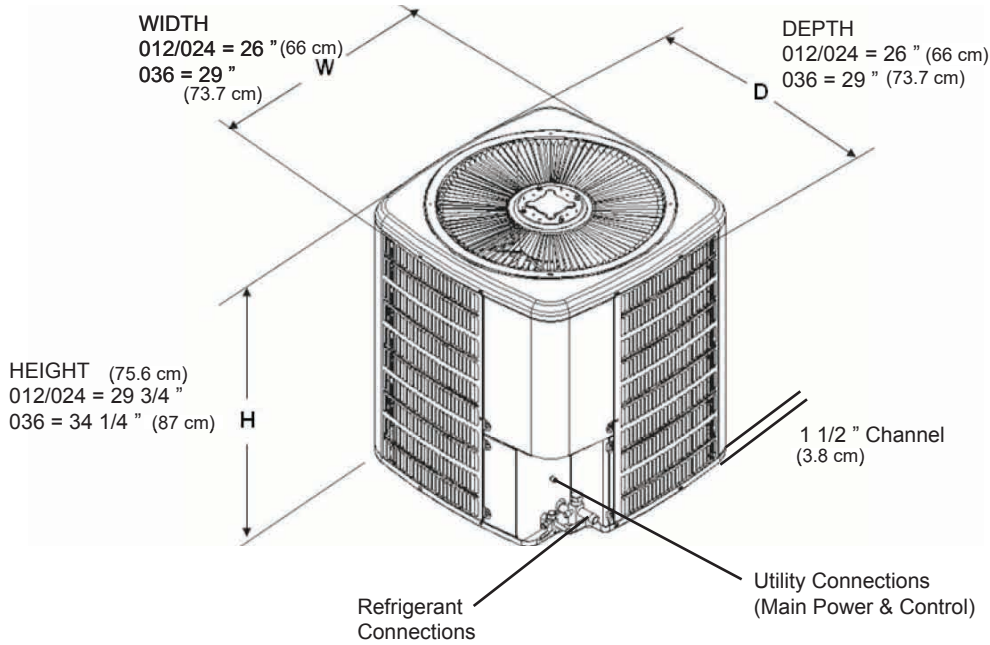
MWC & MGC- () Model Size	Dimensions inches (cm)		
	A	C	F
012, 018 & 024	17 (43.2)	14 (35.6)	1-1/4 (3.2)
036	24 (61)	21 (53.3)	4-3/4 (12.1)

**Note: 18" (45.7 cm) service clearance
on both Front & Rear Sides of unit**



012/036-FU

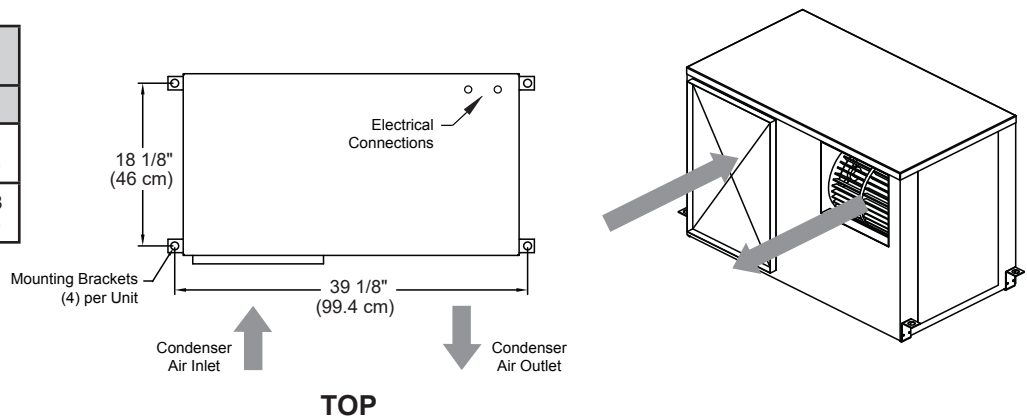
Outdoor, Propeller Fan Remote Air Cooled Condensing Units



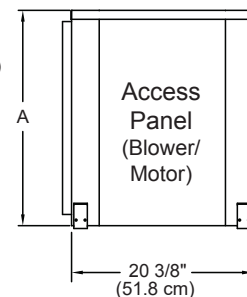
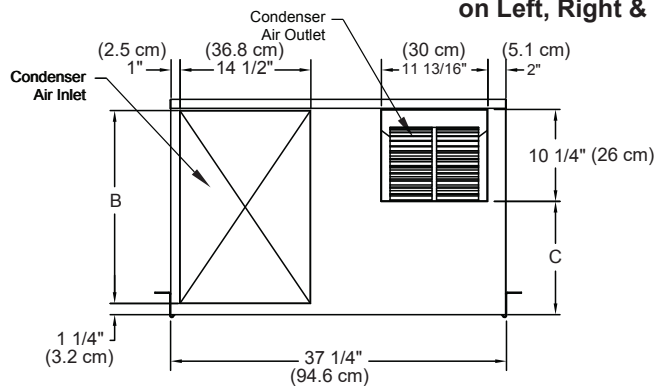
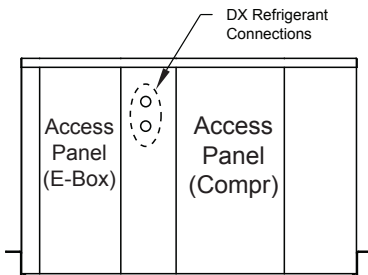
012/036-BU

Indoor Horizontal, Centrifugal Blower Remote Air Cooled Condensing Units

BU Model Size	Dimensions inches (cm)		
	A	B	C
012, 018 & 024	17 (43.2)	14-1/2 (36.8)	6-3/4 (17.1)
036	24 (61)	21-1/2 (54.6)	12-5/8 (32.1)



Note: 18" (45.7 cm) service clearance on Left, Right & Rear Sides of unit

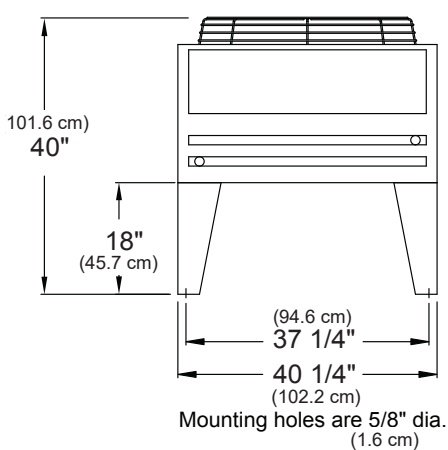


UNIT DIMENSIONS: mini-Might™

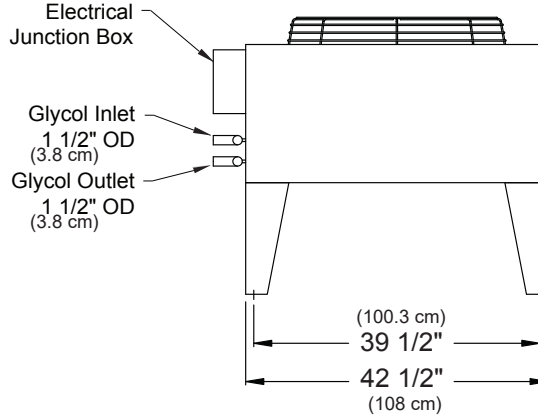
Glycol Drycooler/Fluid Cooler (For MGC-012/036 Glycol Cooled Systems)

Fluid/Drycooler Electrical Data

Drycooler Model	Power Supply (V / PH / Hz)	Drycooler Fan	
		HP	FLA
FC-06	208-230/1/60	1/2	4.0
	208-230/3/60		4.0
	460/3/60	1.2	



END VIEW

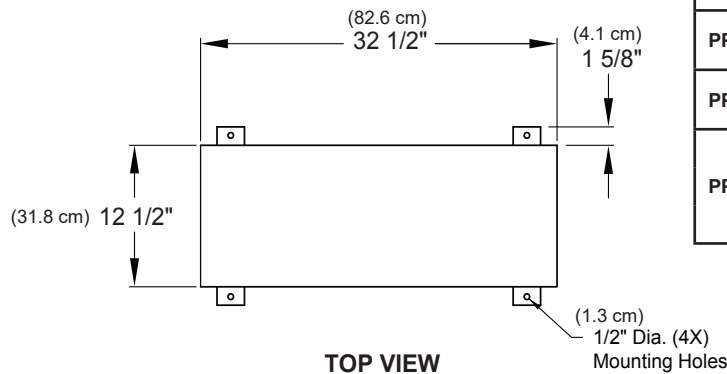


SIDE VIEW

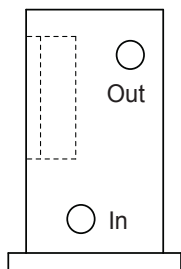
Glycol Pump Packages

Simplex Pump Package Technical Data

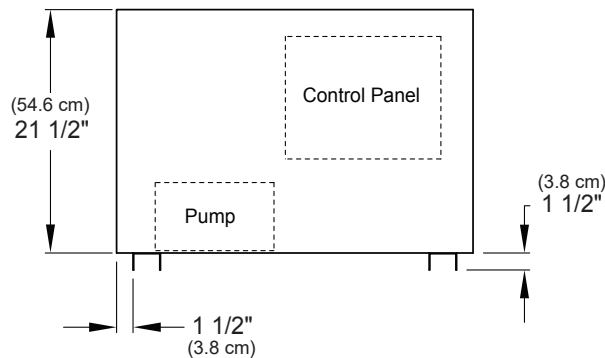
Pump Model	HP	LPM (GPM)	Total Head	Power Supply (V / PH / HZ)	FLA
PP-005	1/2	18.9 (5)	70 Ft.	208-230/1/60	5.3
PP-075	3/4	37.9 (10)	70 Ft.	208-230/1/60	7.4
PP-010	1	75.7 (20)	85 Ft.	208-230/1/60	8.5
PP-015	1 1/2	151.4 (40)	88 Ft.	208-230/1/60	9.9
				208-230/3/60	6.5
				460/3/60	3.0



TOP VIEW



END VIEW



SIDE VIEW