MODINE

AIR 2-501.1
5H1041900001

November, 2013

AIREDALE

INSTALLATION AND SERVICE MANUAL
Classmate®
Single Package Vertical Unit
Models CMD and CMP

C ETL CM US LISTED
Intertek

⚠ WARNING

This unit contains R-410A high pressure refrigerant. Hazards exist that could result in personal injury or death. Installation, maintenance, and service must only be performed by an HVAC technician qualified in R-410A refrigerant and using proper tools and equipment. Due to much higher pressure of R-410A refrigerant, DO NOT USE service equipment or tools designed for refrigerants other than R410A.

IMPORTANT

1. The use of this manual is specifically intended for a qualified installation and service agency. A qualified installation and service agency must perform all installation and service of these appliances.
2. CMD/P units contain the refrigerant R-410A. Review the R-410A Material Safety Data Sheet (MSDS) for hazards and first aid measures.
3. Refrigerant charging should only be carried out by an EPA-certified air conditioning contractor.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death, and could cause exposure to substances which have been determined by various state agencies to cause cancer, birth defects or other reproductive harm. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

Inspection On Arrival

1. Inspect unit upon arrival. In case of damage, report it immediately to transportation company and your local factory sales representative.
2. Check rating plate on unit to verify that power supply meets available electric power at point of installation.
3. Inspect unit received for conformance with description of product ordered (including specifications where applicable).

THIS MANUAL IS THE PROPERTY OF THE OWNER.
PLEASE BE SURE TO LEAVE IT WITH THE OWNER WHEN YOU LEAVE THE JOB.

SPECIAL PRECAUTIONS

SPECIAL PRECAUTIONS

THE INSTALLATION AND MAINTENANCE INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED TO PROVIDE SAFE, EFFICIENT, AND TROUBLE-FREE OPERATION. IN ADDITION, PARTICULAR CARE MUST BE EXERCISED REGARDING THE SPECIAL PRECAUTIONS LISTED BELOW. FAILURE TO PROPERLY ADDRESS THESE CRITICAL AREAS COULD RESULT IN PROPERTY DAMAGE OR LOSS, PERSONAL INJURY, OR DEATH. THESE INSTRUCTIONS ARE SUBJECT TO ANY MORE RESTRICTIVE LOCAL OR NATIONAL CODES.

HAZARD INTENSITY LEVELS

1. **DANGER:** Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.
2. **WARNING:** Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.
3. **CAUTION:** Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.
4. **IMPORTANT:** Indicates a situation which, if not avoided, MAY result in a potential safety concern.

⚠ DANGER

Appliances must not be installed where they may be exposed to potentially explosive or flammable atmosphere.

⚠ WARNING

1. Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage.
2. All appliances must be wired strictly in accordance with the wiring diagram furnished with the appliance. Any wiring different from the wiring diagram could result in a hazard to persons and property.
3. Any original factory wiring that requires replacement must be replaced with wiring material having a temperature rating of at least 105°C.
4. Ensure that the supply voltage to the appliance, as indicated on the serial plate, is not 5% greater than rated voltage.
5. This unit contains R-410A high pressure refrigerant. Hazards exist that could result in personal injury or death. Installation, maintenance, and service must only be performed by an HVAC technician qualified in R-410A refrigerant and using proper tools and equipment. Due to much higher pressure of R-410A refrigerant, DO NOT USE service equipment or tools designed for refrigerants other than R410A.
6. When servicing or repairing this equipment, use only factory-approved service replacement parts. A complete replacement parts list may be obtained by contacting Modine Manufacturing Company. Refer to the rating plate on the appliance for complete appliance model number, serial number, and company address. Any substitution of parts or controls not approved by the factory will be at the owner's risk.

⚠ CAUTION

1. Ensure that the supply voltage to the appliance, as indicated on the serial plate, is not 5% less than the rated voltage.
2. Units not approved for use in potable water systems.
3. Hot water supplied to the hot water heating option must not exceed 200°F temperature or 125 PSIG pressure.
4. Do not overcharge the refrigeration system. This can lead to elevated compressor discharge pressure and possibly flooding the compressor with liquid.
5. Do not attempt to reuse any mechanical or electrical component which has been wet. Such component must be replaced.

IMPORTANT

1. Start-up and adjustment procedures should be performed by a qualified service agency.
2. All refrigeration checks must be made by a qualified R-410A refrigeration technician.
3. Do not release refrigerant to the atmosphere. When adding or removing refrigerant, all national, state/province, and local laws must be followed.
4. To check most of the Possible Remedies in the troubleshooting guide listed in Tables 22.1 and 23.1, refer to the applicable sections of the manual.

Table of Contents

UNIT LOCATION / INSTALLATION

Table 3.1 - SI (Metric) Conversion Factors

To Convert	Multiply By	To Obtain
"W.C.	0.24	kPa
psig	6.893	kPa
°F	(°F-32) x 0.555	°C
inches	25.4	mm
feet	0.305	meters
CFM	0.028	m^3/min

To Convert	Multiply By	To Obtain
CFH	1.699	m^3/min
Btu/ft^3	0.0374	mJ/m^3
pound	0.453	kg
Btu/hr	0.000293	kW/hr
gallons	3.785	liters
psig	27.7	"W.C.

UNIT LOCATION

⚠ DANGER

Appliances must not be installed where they may be exposed to potentially explosive or flammable atmosphere.

Handling

Each unit will be shipped to the site on a wood skid. Whenever possible, all lifting and handling of the unit should be done with the packing and skid in position.

When slinging or using a forklift to lift the unit, the support points should be sufficiently apart to give stability when lifting. Unless otherwise noted, the lifting points should be equidistant from the centerline. Extreme care should be taken not to drop the unit

Considerable damage can occur to the unit during positioning, in particular, to the paneling and exterior paint. Use an adequate number of personnel and the correct tools when moving the unit. The unit is designed to remain upright so care should be taken when lifting the unit up steps.

The use of torque screwdrivers on panel, cover or component mounting screws is not recommended. Hand-start all screws. If electric drills are used – set at the lowest possible torque.

Preparation

1. Before installation, ensure that the correct electrical power supply is available for the unit.
2. Each unit requires an independently fused and isolated power supply.
3. If the installation has multiple units, check that unit identifications correspond with the network diagrams. Advise Modine immediately if discrepancies are noted.
4. Check to make sure that the units will have adequate installation clearance around them.
5. Note that each unit has a condensate connection at the rear and suitable provisions should be made for draining. If multiple units tee into a common drain manifold, the drain line must be sized to ensure free draining with all the units in operation.
6. Inspect the wall sleeve installation for gaps that would allow leakage of outdoor air into the space. All joints and abutments should be sealed with waterproof sealant.

Drainage

Each unit has an internal condensate drain, terminating internally to the unit. A 1-3/8" condensate drain hole is available on the back side of the unit (see Figure 9.1 for the location). This must be connected to the main drain system in accordance with any local codes and general good piping practice.

Electrical

Electrical wiring should be done in accordance with all applicable national and local codes. It is the responsibility of the electrical contractor to adhere to such codes. The warranty will be voided if wiring is not in accordance with the specifications of the unit. Modine recommends using copper conductors only.

All power supply wiring must be capable of carrying the maximum current load under no fault conditions at the stipulated voltages. Care should be taken to avoid significant voltage drops.

A 1.5" diameter knockout for power connection is provided at the top of the unit. Each unit is supplied with a 3 ft. power lead extension for field connection to the customer supplied junction box. This lead is connected directly into the unit's electrical panel.

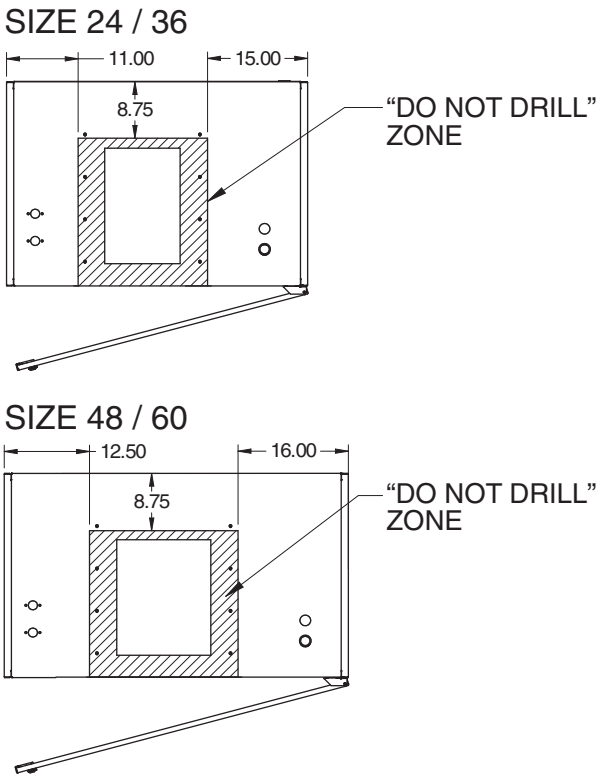
INSTALLATION

The instructions detailed below are for the Installation of a "Standard" unit. Accommodations and adjustments will be required for the usage of additional unit accessories. Should assistance be required for the installation of these additional items, consult Modine at the phone number listed on the back cover of this manual.

1. Check the floor for levelness and check to ensure the wall is at a right angle to the floor. Should there be any irregularity, the placement of foam tape on the outside edges of the unit will fill the gaps between the unit and the wall, allowing for the use of a sealant, to create a smooth transition from the unit to the wall.
2. After adjusting for any irregularity in the location site, locate the position for the floor mounting bolts (see figure 8.1). Drill the appropriate sized holes, for the fasteners that are to be utilized, and insert the anchors that are to be used.
3. Remove the backing strip from the gasket on the wall sleeve. Place the unit in the correct location, ensuring a tight seal with the wall sleeve and the wall.
4. Check to ensure that the unit is plumb and level in both directions. If adjustment is necessary, Modine recommends the placement of metal shims in the outer most corners of the base.
5. The cabinet must be secured to either the back wall or the floor. The floor of the cabinet has four pre-punched holes and the back of the cabinet has a hole on each side. The type of materials used for the floor and the walls will determine the type of fastener to use. Modine recommends the use of 1/2" diameter fasteners with 1-1/2" diameter washers. Securing the cabinet to the floor or wall helps to reduce movement and noise due to vibration.
6. Make the condensate drain connection and the necessary electrical connections to the unit.
7. When connecting a duct flange or ductwork directly to the top of the unit, do not drill or put screws into the area immediately surrounding the supply air opening(s). See Figure 4.1 (dimensions in inches). Holes in the top of the cabinet indicate recommended mounting locations.

INSTALLATION

Figure 4.1 - Do Not Drill Zone



Wiring

⚠ WARNING

1. Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage.
2. All appliances must be wired strictly in accordance with the wiring diagram furnished with the appliance. Any wiring different from the wiring diagram could result in a hazard to persons and property.
3. Any original factory wiring that requires replacement must be replaced with wiring material having a temperature rating of at least 105°C.
4. Ensure that the supply voltage to the appliance, as indicated on the serial plate, is not 5% greater than rated voltage.

⚠ CAUTION

Ensure that the supply voltage to the appliance, as indicated on the serial plate, is not 5% less than the rated voltage.

Installation of wiring must conform with local building codes, or in the absence of local codes, with the National Electric Code ANSI/NFPA 70 - Latest Edition. Unit must be electrically grounded in conformance to this code. In Canada, wiring must comply with CSA C22.1, Part 1, Electrical Code.

Electric wiring must be sized to carry the full load amp draw of the motor, starter and any controls that are used with the unit. See Tables 11.1-14.1 for electrical data.

Any damage to or failure of units caused by incorrect wiring of the units is not covered by warranty.

The electrical supply can be connected to the unit power lead extension at a customer supplied junction box.

When installing any wiring into the electrical panel, extra cable must be left outside the panel to allow the panel to open fully. Failure to follow these instructions may cause damage to the wiring and/or the unit.

Terminal Strip Connections

The terminal strip connections are designed to clamp down on the wires. To properly connect the wires to the terminal strip:

1. Push a small flat-head screwdriver into the square hole on the terminal. Press firmly until the screwdriver hits the back stop and opens the terminal (see Figure 4.2).
2. Remove approximately 3/8" of insulation from the end of the wire and push the stripped wire into the oval hole in the terminal.
3. Remove the screwdriver. Pull on the wire to make sure that it is securely clamped in the terminal.
4. Make sure that the terminal clamp is in contact with bare wire (insulation removed).

Figure 4.2 - Terminal Strip

START-UP PROCEDURE

START-UP PROCEDURE

IMPORTANT

Start-up and adjustment procedures should be performed by a qualified service agency.

The unit has been factory tested and set for proper operation, but a full unit start-up is recommended.

See start-up sheet examples - Figures 6.1 and 7.1

Pre-Start Checks

1. Check that the supply voltage matches the unit supply voltage listed on the Unit Serial Plate. Verify that all wiring is secure and properly protected. Trace circuits to insure that the unit has been wired according to the wiring diagram.
2. Check that the unit has no visible damage and that all the components are secure.
3. Check that all field electrical and mechanical work has been performed according to all applicable Federal, State, and Local codes.
4. Check the supply voltage to the unit is within +/- 5% of the voltage on the unit serial plate.

Unit Start-Up Procedure

1. Disconnect and cap the wires to the CP1 contactor coil. This will allow the compressor crankcase heater to operate without the compressor operating. It is necessary to allow at least 4 hours of compressor crankcase heater operation before energizing the compressor.
2. Turn the disconnect switch to the “ON” position.
3. After the 4 hour compressor crankcase heater operation time, reconnect the CP1 contactor coil wires.
4. Follow the instructions in the Modine microprocessor book. The control parameters and setpoints have all been factory set to the default values.
5. During the unit operation, measure and record all the information that is required to complete the Start-Up Sheets that are supplied with the unit. Copy the information onto the Start-Up Sheets (Figures 6.1 and 7.1) in this manual for your records.

Sequence of Operation

Microprocessor: A Carel microprocessor will control the unit and allow for networking and remote monitoring. The microprocessor will monitor the room temperature (either via an optional wall thermostat or return air sensor), supply air and outdoor air. With this information the unit is able to operate at maximum efficiency. The occupied/unoccupied control can be via time clock or from a signal from a building central time clock.

If a wall or unit mounted thermostat is selected, the setpoint can be either fully adjustable or +/- three degrees. This allows some control of the room temperature while limiting its adjustment. The thermostat will also have an occupied override button to allow a temporary override until the next scheduled occupancy change.

Please reference Modine Controls System Manual (AIR 2-525) and Quickstart (AIR 2-526) literature pieces for assistance in starting up units configured with Modine Control Systems.

Fan: The fan will run continuously during occupied mode and will be intermittent on a call for cooling or heating during unoccupied mode. A built in fan purge time allows for maximum heating and cooling efficiency.

Cool: When the temperature increases above the cooling setpoint, the compressor and reversing valve will be energized. The compressor will be limited to the number of starts per hour by anti-cycle protection.

Heat: When the temperature falls below the heating setpoint, the compressor will be energized and the reversing valve de-energized. The compressor will be limited to the number of starts per hour by anti-cycle protection.

Supplemental Heat (Optional): If the temperature falls below the second stage heat setpoint, supplementary heat (if installed: electric heaters, hot water or steam coil) will be energized. If two stages of electric heat are fitted, the second stage will only be enabled if the compressor is locked out on its safety devices. If the unit is fitted with a hot water coil the valve will be a normally open type.

Dehumidification (Optional): The unit can be fitted with a humidity sensor to control the humidity level in the room. When the humidity increases above an adjustable setpoint, the compressor and reversing valves are energized. A hot gas reheat coil is turned on using the hot gas from the compressor to re-heat the supply air.

Energy Recovery Ventilator (Optional): During operation when the unit is cooling the room (summer), cool room return air is drawn across the enthalpy wheel. This air is then exhausted external to the room. Warm, humid ambient air is drawn across the other side of the ERV and as the enthalpy wheel turns, the air is cooled and dehumidified. This air is then mixed with the room air and recirculated through the indoor section.

During operation when the unit is heating the room (winter) the warm, moist air from the room is used to temper the cold, dry external ambient air.

Table 5.1 - Refrigerant Charge

Nominal Capacity	Charge (lbs of R-410A)	
	CMD	CMP
24	9.38	9.00
36	9.75	11.00
48	11.50	12.00
60	11.00	11.75

START-UP SHEET - EXAMPLE

Figure 6.1 - Start-Up Sheet - EXAMPLE Page 1

AIREDALE

Modine Manufacturing Company – ClassMate Start-up Sheet

This document should be returned to Airedale within 30 days of start-up to validate warranty

Date		Job Reference		TAG ID	
Serial #		Unit Type		Room ID	
SPO #		Drawing #			
Installer		Sales Rep			

Installation Checks

Unit Mounted Level	
Unit Bolted to Floor or Wall	
Condensate Drain Installed Correctly	
Transition / Wall Sleeve Installed Correctly	
Transition / Wall Sleeve Insulated	
Splitter Plate Fitted Correctly	
Electrical and Mechanical Connections all Tight	
Any Visual Damage to the Unit	

Indoor Fan (ECM)

Motor Size	(hp)		FLA		Make		
Amps	High		Med		Low		
Taps @ Hi	+15%		-15%		Program		

Outdoor Fan (ECM)

Motor Size	(hp)		FLA		Make		
Amps	High		Low				

Compressor

Compressor Model			RLA		Make			
Cool Stage 3	100%		L1 Amps		L2 Amps		L3 Amps	
Cool Stage 1	67%		L1 Amps		L2 Amps		L3 Amps	
Heat Stage 3	100%		L1 Amps		L2 Amps		L3 Amps	
Heat Stage 1	67%		L1 Amps		L2 Amps		L3 Amps	

Mains Incoming Voltage

L1+L2		**L2**+L3		**L3**+L1	

Transformer Voltage

Primary		**Secondary**	

Refrigeration	***Cooling 100%***	***Cooling 67%***	***Heat pump 100%***	***Heat pump 67%***
Suction Pressure				
Discharge Pressure				
Superheat				
Hot Gas Valve Setting				

Operational Temperatures	***Cooling***		***Heat pump***	
Return Air Temperature		ºF		ºF
Supply Air Temperature		ºF		ºF
Outside Air Temperature		ºF		ºF
Indoor Coil Temperature		ºF		ºF
Outdoor Coil Temperature		ºF		ºF

START-UP SHEET - EXAMPLE

Figure 7.1 - Start-Up Sheet - EXAMPLE Page 2

AIREDALE

Modine Manufacturing Company – ClassMate Start-up Sheet

This document should be returned to Airedale within 30 days of start-up to validate warranty

Control Transformer Voltages

Primary		**Secondary**	

Controller information

Make		Model	
Address / Outstation		Network Card	
Program Revision		SPID	
Occupied Set points		Neuron ID	
Unoccupied Set points		Stat Model	

Economizer Assembly

Build and Operation Correct

Heat Recovery Wheel Section

Heat Recovery Wheel Motor	FLA		RLA	
Heat Wheel Fan Motor 1	FLA		RLA	
Heat Wheel Fan Motor 2	FLA		RLA	

Hot Water / Steam Valve

Build and Operation Correct

Electric Heating

Stage 1 Amps	L1		L2		L3	
Stage 2 Amps	L1		L2		L3	

Freeze Protection Stat

Manual or Auto Reset		
Stat setting		ºF
Stat operation correct		

Technicians Notes:

Customer Feed Back: Please relay any comments about Quality or Service

Service Technician	
Service Company	
Service Company Telephone	

DIMENSIONS

Figure 8.1 - Dimensions - Base Unit CMD & CMP

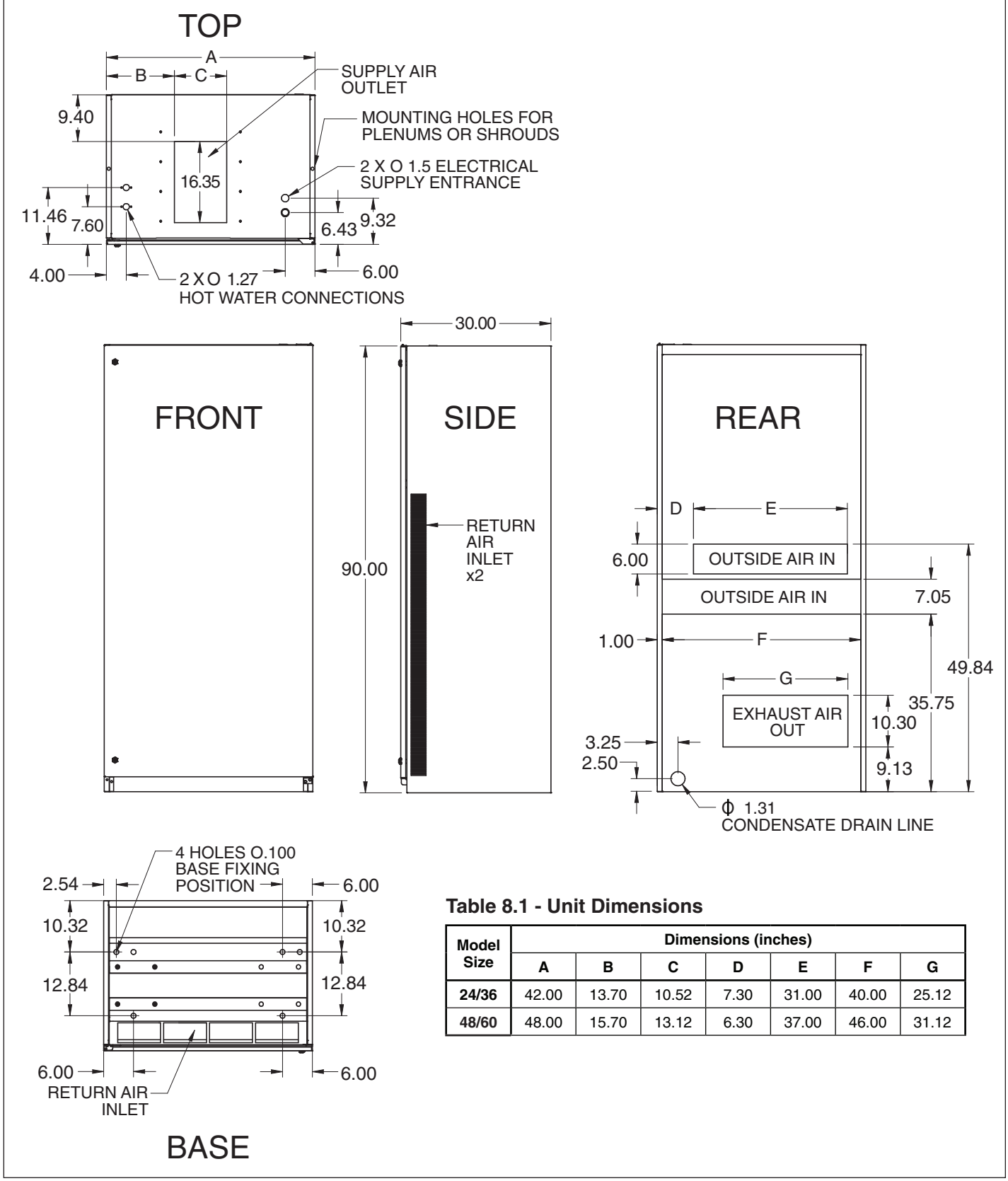


Table 8.1 - Unit Dimensions

Model Size	Dimensions (inches)						
	A	B	C	D	E	F	G
24/36	42.00	13.70	10.52	7.30	31.00	40.00	25.12
48/60	48.00	15.70	13.12	6.30	37.00	46.00	31.12

PERFORMANCE DATA

Table 9.1 - Performance Data - CMD

CMD (Rated in accordance with AHRI 390)	Units	24	36	48	60
Full Load Cooling (80/67˚F Air On, 95/75˚F Outdoor)					
Total Cooling	MBH	24.4	34.0	46.8	56.0
Sensible Cooling	MBH	17.5	24.3	31.5	37.0
EER	MBH/KW	12.1	11.0	11.6	9.7
Rated Airflow	CFM	900	1100	1500	1800
Part Load Cooling (80/67˚F Air On, 80/67˚F Outdoor)					
Total Cooling	MBH	17.1	27.3	37.1	43.4
Sensible Cooling	MBH	11.1	19.3	24.9	29.8
IPLV	MBH/KW	14.1	14.4	16.1	11.6
Rated Airflow	CFM	700	800	1100	1500

Table 11.2 - Performance Data - CMP

CMP (Rated in accordance with AHRI 390)	Units	24	36	48	60
Full Load Cooling (80/67˚F Air On, 95/75˚F Outdoor)					
Total Cooling	MBH	22.0	33.5	45.2	52.7
Sensible Cooling	MBH	17.0	24.0	32.2	37.6
EER	MBH/KW	11.2	10.5	11.0	9.0
Rated Airflow	CFM	900	1100	1500	1800
Full Load Heating (70/60˚F Air On, 47/43˚F Outdoor)					
Total Heating	MBH	20.9	32.8	47.2	58.8
COP	W/W	3.4	3.7	4.0	3.6
Rated Airflow	CFM	900	1100	1500	1800
Part Load Cooling (80/67˚F Air On, 80/67˚F Outdoor)					
Total Cooling	MBH	18.0	26.7	36.8	43.8
Sensible Cooling	MBH	14.6	19.1	26.0	33.4
IPLV	MBH/KW	15.6	14.3	15.4	11.6
Rated Airflow	CFM	700	800	1100	1500
Part Load Heating (70/60˚F Air On, 62/56.5˚F Outdoor)					
Total Heating	MBH	19.0	28.5	42.7	52.1
COP	W/W	4.6	4.2	4.4	4.3
Rated Airflow	CFM	700	800	1100	1500

Table 11.3 - Performance Data - ENERGY RECOVERY WHEEL (OPTIONAL)

ENERGY RECOVERY WHEEL (optional)		DATA SHOWN FOR ALL UNITS			
Outdoor Air Volume	CFM	200	300	400	500
Total Capacity Recovered (Cooling) ①	MBH	8.6	11.7	13.9	15.3
Measured Cooling Effectiveness	%	78.4	71.3	64.3	57.5
Total Capacity Recovered (Heating) ②	MBH	9.1	12.5	15.1	16.9
Measured Heating Effectiveness	%	79.8	73.1	66.7	60.2

① Cooling capacity based on: Room 75/63˚F Dry/Wet Bulb, Ambient 95/78˚F Dry/Wet Bulb.

② Heating capacity based on: Room 70/58.5˚F Dry/Wet Bulb, Ambient 35/33˚F Dry/Wet Bulb.

TECHNICAL DATA

Table 10.1 - Technical Data - CMD & CMP

DIMENSIONS – (H x W x D)		IN	90 X 42 X 30		90 X 48 X 30	
INDOOR (Evaporator) COIL - Face Area		IN^2	720	720	863	863
OUTDOOR (Condenser) COIL - Face Area		IN^2	952	952	1156	1156
SUPPLY FAN			Direct Drive Centrifugal			
Fan Quantity			1	1	1	1
Motor Size (Qty 1)		HP	1/2	1/2	1	1
Motor Type			Electronically Commutated Motor (ECM)			
Indoor Coil Airflow		CFM	900	1,100	1,500	1,800
Rated/Max External Static Pressure		IN.Wg	0.10/0.50	0.15/0.50	0.20/0.50	0.20/0.50
EXHAUST FAN			Backward Curved Motorized Impellor			
Fan Quantity			1	1	1	1
OutdoorCoil Airflow		CFM	2100	2100	2800	3000
Motor Type			Electronically Commutated Motor (ECM)			
Max Room Exhaust Airflow		CFM	900	1,100	1,500	1,800
Rated/Max External Static Pressure		IN.Wg	0.10/0.50	0.15/0.50	0.20/0.50	0.20/0.50
COMPRESSOR			Copeland Scroll ULTRATECH			
Stages			0, 67%, 100%			
Refrigerant Type			HFC-R410A			
UNIT WEIGHT						
Operating Weight		LBS.	685	735	765	830
FILTER			MERV 8,11,13,16			
Quantity			2	2	2	2
Dimensions		IN	16 x 25	16 x 25	20 x 25	20 x 25
ELECTRIC HEATING (optional)						
Electric Heating Capacity		KW	20	20	20	20
Stages			2	2	2	2
HOT WATER HEATING (optional)						
Factory Installed - 1 row	Heating Capacity - 3/6 GPM ①	MBH	70/82	74/88	82/101	87/111
	Water Pressure Drop - 3/6 GPM	PSI	0.37/1.23	0.37/1.23	0.37/1.23	0.37/1.23
Factory Installed - 2 row	Heating Capacity - 3/6 GPM ①	MBH	94/106	101/118	113/139	122/158
	Water Pressure Drop - 3/6 GPM	PSI	0.75/2.50	0.75/2.5	0.88/2.94	0.88/2.94
Plenum Mounted - 1 row	Heating Capacity - 3/6 GPM ①	MBH	71/83	78/94	82/102	84/106
	Water Pressure Drop - 3/6 GPM	PSI	0.45/1.50	0.45/1.50	0.45/1.50	0.45/1.50
Plenum Mounted - 2 row	Heating Capacity - 3/6 GPM ①	MBH	93/107	104/126	109/139	111/146
	Water Pressure Drop - 3/6 GPM	PSI	0.13/0.44	0.13/0.44	0.13/.44	0.13/0.44
STEAM HEATING (optional)						
Plenum Mount	1 Row Heating Capacity - 2/5 psig ①	MBH	93/97	103/108	116/122	124/131

① Hot water/steam heating capacity based on an Air On 33˚F (24MBH), 38˚F (36MBH), 47˚F (4Ton), and 51˚F (5 Ton). The Air On based on 450 CFM outside air at 0˚F and 70˚F room ambient for 24 MBH unit, and 500 CFM outside air at 0˚F and 70˚F room ambient for 36, 48, and 60 MBH unit. For Hot Water: Entering water temperature 180˚F, and water flow rate of 3 and 6 GPM. For Steam: Steam pressure of 2 and 5 psig.

ELECTRICAL DATA

Table 11.1 - Electrical Data

Model	Voltage	BASE UNIT			2kW			3kW			5kW			6kW			7.5kW		
		MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP
CMD 24	208V/1Ph	24.1	21.2	35	24.1	21.2	35	28.6	22.9	35	39.8	31.9	40	45.4	36.3	50	53.8	43.0	60
	230V/1Ph	23.0	20.1	30	23.0	20.1	30	29.0	23.2	30	41.4	33.1	45	47.6	38.1	50	56.8	45.5	60
	208V/3Ph	17.6	16.0	20	18.3	16.0	20	21.6	17.2	25	28.0	22.4	30	31.2	25.0	35	36.1	28.9	40
	230V/3Ph	16.5	14.9	20	17.6	14.9	20	21.2	17.0	25	28.3	22.7	30	31.9	25.5	35	37.3	29.8	40
	460V/3Ph	8.5	7.6	15	8.7	7.6	15	10.5	8.4	15	15.8	12.6	20	15.9	12.7	20	18.5	14.8	20
	575V/3Ph																		
	277V/1Ph	18.6	16.3	25	20.2	16.3	25	25.8	20.7	30	37.0	29.6	40	42.6	34.1	45	51.1	40.8	60
CMD 36	208V/1Ph	28.6	24.8	40	28.6	24.8	40	28.6	24.8	40	39.8	31.9	40	45.4	36.3	50	53.8	43.0	60
	230V/1Ph	27.5	23.7	40	27.5	23.7	40	29.0	23.7	40	41.4	33.1	45	47.6	38.1	50	56.8	45.5	60
	208V/3Ph	24.0	21.1	35	24.0	21.1	35	24.0	21.1	35	28.0	22.4	35	31.2	25.0	35	36.1	28.9	40
	230V/3Ph	22.9	20.0	30	22.9	20.0	30	22.9	20.0	30	28.3	22.7	30	31.9	25.5	35	37.3	29.8	40
	460V/3Ph	11.2	9.8	15	11.2	9.8	15	11.2	9.8	15	15.8	12.6	20	15.9	12.7	20	18.5	14.8	20
	575V/3Ph	8.4	7.4	15	8.4	7.4	15	8.5	7.4	15	11.3	9.1	15	12.8	10.2	15	14.9	11.9	15
	277V/1Ph	23.5	20.2	35	23.5	20.2	35	25.8	20.7	35	37.0	29.6	40	42.6	34.1	45	51.1	40.8	60
CMD 48	208V/1Ph	39.3	34.0	60	39.3	34.0	60	39.3	34.0	60	43.9	35.2	60	49.5	39.6	60	57.9	46.3	60
	230V/1Ph	37.9	32.6	50	37.9	32.6	50	37.9	32.6	50	45.2	36.1	50	51.3	41.1	60	60.6	48.5	70
	208V/3Ph	30.3	26.8	40	30.3	26.8	40	30.3	26.8	40	32.1	26.8	40	35.4	28.3	40	40.2	32.2	45
	230V/3Ph	28.9	25.4	40	28.9	25.4	40	28.9	25.4	40	32.1	25.7	40	35.7	28.5	40	41.0	32.8	45
	460V/3Ph	13.6	12.0	20	13.6	12.0	20	13.6	12.0	20	17.7	14.1	20	17.7	14.2	20	20.4	16.3	25
	575V/3Ph	10.3	9.2	15	10.3	9.2	15	10.3	9.2	15	12.8	10.3	15	14.3	11.4	15	16.4	13.1	20
	277V/1Ph	29.7	25.7	45	29.7	25.7	45	29.7	25.7	45	40.2	32.1	45	45.8	36.6	50	54.2	43.3	60
CMD 60	208V/1Ph	46.7	39.9	70	46.7	39.9	70	46.7	39.9	70	46.7	39.9	70	49.5	39.9	70	57.9	46.3	70
	230V/1Ph	45.3	38.5	70	45.3	38.5	70	45.3	38.5	70	45.3	38.5	70	51.3	41.1	70	60.6	48.5	70
	208V/3Ph	33.4	29.3	45	33.4	29.3	45	33.4	29.3	45	33.4	29.3	45	35.4	29.3	45	40.2	32.2	45
	230V/3Ph	32.0	27.9	45	32.0	27.9	45	32.0	27.9	45	32.1	27.9	45	35.7	28.5	45	41.0	32.8	45
	460V/3Ph	14.6	12.8	20	14.6	12.8	20	14.6	12.8	20	17.7	14.1	20	17.7	14.2	20	20.4	16.3	25
	575V/3Ph	11.5	10.1	15	11.5	10.1	15	11.5	10.1	15	12.8	10.3	15	14.3	11.4	15	16.4	13.1	20
	277V/1Ph	37.7	32.1	60	37.7	32.1	60	37.7	32.1	60	40.2	32.1	60	45.8	36.6	60	54.2	43.3	60

Model	Voltage	9kW			10kW			12kW			15kW			18kW			20kW		
		MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP
CMD 24	208V/1Ph	62.2	49.7	70	67.8	54.2	70	78.9	63.2	80	95.7	76.6	100						
	230V/1Ph	66.1	52.9	70	72.3	57.8	80	84.7	67.7	90	103.2	82.6	110						
	208V/3Ph	40.9	32.7	45	44.1	35.3	45	50.6	40.5	60	60.3	48.2	70	69.9	56.0	70	74.5	59.6	80
	230V/3Ph	42.6	34.1	45	46.2	36.9	50	53.3	42.7	60	64.0	51.2	70	74.7	59.8	80	79.8	63.8	80
	460V/3Ph	21.2	17.0	25	26.5	21.2	30	26.6	21.3	30	31.9	25.6	35	37.3	29.8	40	40.9	32.7	45
	575V/3Ph																		
	277V/1Ph	59.4	47.6	60	65.1	52.1	70	76.3	61.0	80	93.1	74.5	100						
CMD 36	208V/1Ph	62.2	49.7	70	67.8	54.2	70	78.9	63.2	80	95.7	76.6	100						
	230V/1Ph	66.1	52.9	70	72.3	57.8	80	84.7	67.7	90	103.2	82.6	110						
	208V/3Ph	40.9	32.7	45	44.1	35.3	45	50.6	40.5	60	60.3	48.2	70	69.9	56.0	70	74.5	59.6	80
	230V/3Ph	42.6	34.1	45	46.2	36.9	50	53.3	42.7	60	64.0	51.2	70	74.7	59.8	80	79.8	63.8	80
	460V/3Ph	21.2	17.0	25	26.5	21.2	30	26.6	21.3	30	31.9	25.6	35	37.3	29.8	40	40.9	32.7	45
	575V/3Ph	17.0	13.6	20	18.4	14.7	20	21.3	17.0	25	25.5	20.4	30	29.8	23.8	30	32.6	26.1	35
	277V/1Ph	59.4	47.6	60	65.1	52.1	70	76.3	61.0	80	93.1	74.5	100						
CMD 48	208V/1Ph	66.3	53.0	70	71.9	57.5	80	83.1	66.5	90	99.8	79.9	100						
	230V/1Ph	69.9	55.9	70	76.1	60.8	80	88.4	70.7	90	106.9	85.6	110						
	208V/3Ph	45.0	36.0	50	48.3	38.6	50	54.7	43.8	60	64.4	51.5	70	74.1	59.3	80	78.6	62.9	80
	230V/3Ph	46.4	37.1	50	49.9	39.9	50	57.1	45.7	60	67.8	54.2	70	78.5	62.8	80	83.5	66.8	90
	460V/3Ph	23.1	18.5	25	28.3	22.7	30	28.5	22.8	30	33.8	27.1	35	39.2	31.3	40	42.8	34.2	45
	575V/3Ph	18.5	14.8	20	19.9	15.9	20	22.8	18.2	25	27.0	21.6	30	31.3	25.0	35	34.1	27.3	35
	277V/1Ph	62.6	50.1	70	68.2	54.6	70	79.4	63.5	80	96.2	77.0	100						
CMD 60	208V/1Ph	66.3	53.0	70	71.9	57.5	80	83.1	66.5	90	99.8	79.9	100						
	230V/1Ph	69.9	55.9	70	76.1	60.8	80	88.4	70.7	90	106.9	85.6	110						
	208V/3Ph	45.0	36.0	50	48.3	38.6	50	54.7	43.8	60	64.4	51.5	70	74.1	59.3	80	78.6	62.9	80
	230V/3Ph	46.4	37.1	50	49.9	39.9	50	57.1	45.7	60	67.8	54.2	70	78.5	62.8	80	83.5	66.8	90
	460V/3Ph	23.1	18.5	25	28.3	22.7	30	28.5	22.8	30	33.8	27.1	35	39.2	31.3	40	42.8	34.2	45
	575V/3Ph	18.5	14.8	20	19.9	15.9	20	22.8	18.2	25	27.0	21.6	30	31.3	25.0	35	34.1	27.3	35
	277V/1Ph	62.6	50.1	70	68.2	54.6	70	79.4	63.5	80	96.2	77.0	100						

MOP = Maximum Overcurrent Protection MCA = Minimum Circuit Ampacity FLA = Full Load Amps

ELECTRICAL DATA

Table 12.1 - Electrical Data

Model	Voltage	BASE UNIT			2kW			3kW			5kW			6kW			7.5kW		
		MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP
CMD 24 with ERV	208V/1Ph	27.3	24.4	35	27.3	24.4	35	32.6	26.1	35	43.8	35.1	45	49.4	39.5	50	57.8	46.2	60
	230V/1Ph	25.8	22.9	35	26.4	22.9	35	32.5	26.0	35	44.9	35.9	45	51.1	40.9	60	60.3	48.3	70
	208V/3Ph	20.8	19.2	25	22.3	19.2	25	25.6	20.4	30	32.0	25.6	35	35.2	28.2	40	40.1	32.1	45
	230V/3Ph	19.3	17.7	25	21.1	17.7	25	24.7	19.8	25	31.8	25.5	35	35.4	28.3	40	40.8	32.6	45
	460V/3Ph	9.9	9.0	15	10.5	9.0	15	12.2	9.8	15	17.5	14.0	20	17.6	14.1	20	20.3	16.2	25
	575V/3Ph																		
	277V/1Ph	18.6	16.3	25	20.2	16.3	25	25.8	20.7	30	37.0	29.6	40	42.6	34.1	45	51.1	40.8	60
CMD 36 with ERV	208V/1Ph	31.8	28.0	45	31.8	28.0	45	32.6	28.0	45	43.8	35.1	45	49.4	39.5	50	57.8	46.2	60
	230V/1Ph	30.3	26.5	45	30.3	26.5	45	32.5	26.5	45	44.9	35.9	45	51.1	40.9	60	60.3	48.3	70
	208V/3Ph	27.2	24.3	35	27.2	24.3	35	27.2	24.3	35	32.0	25.6	35	35.2	28.2	40	40.1	32.1	45
	230V/3Ph	25.7	22.8	35	25.7	22.8	35	25.7	22.8	35	31.8	25.5	35	35.4	28.3	40	40.8	32.6	45
	460V/3Ph	12.6	11.2	15	12.6	11.2	15	12.6	11.2	15	17.5	14.0	20	17.6	14.1	20	20.3	16.2	25
	575V/3Ph	8.4	7.4	15	8.4	7.4	15	8.5	7.4	15	11.3	9.1	15	12.8	10.2	15	14.9	11.9	15
	277V/1Ph	23.5	20.2	35	23.5	20.2	35	25.8	20.7	35	37.0	29.6	40	42.6	34.1	45	51.1	40.8	60
CMD 48 with ERV	208V/1Ph	42.5	37.2	60	42.5	37.2	60	42.5	37.2	60	47.9	38.4	60	53.5	42.8	60	61.9	49.5	70
	230V/1Ph	40.7	35.4	60	40.7	35.4	60	40.7	35.4	60	48.7	38.9	60	54.8	43.9	60	64.1	51.3	70
	208V/3Ph	33.5	30.0	45	33.5	30.0	45	33.5	30.0	45	36.1	30.0	45	39.4	31.5	45	44.2	35.4	45
	230V/3Ph	31.7	28.2	45	31.7	28.2	45	31.7	28.2	45	35.6	28.5	45	39.2	31.3	45	44.5	35.6	45
	460V/3Ph	15.0	13.4	20	15.0	13.4	20	15.0	13.4	20	19.4	15.5	20	19.5	15.6	20	22.2	17.7	25
	575V/3Ph	10.3	9.2	15	10.3	9.2	15	10.3	9.2	15	12.8	10.3	15	14.3	11.4	15	16.4	13.1	20
	277V/1Ph	29.7	25.7	45	29.7	25.7	45	29.7	25.7	45	40.2	32.1	45	45.8	36.6	50	54.2	43.3	60
CMD 60 with ERV	208V/1Ph	49.9	43.1	70	49.9	43.1	70	49.9	43.1	70	49.9	43.1	70	53.5	43.1	70	61.9	49.5	70
	230V/1Ph	48.1	41.3	70	48.1	41.3	70	48.1	41.3	70	48.7	41.3	70	54.8	43.9	70	64.1	51.3	70
	208V/3Ph	36.6	32.5	50	36.6	32.5	50	36.6	32.5	50	36.6	32.5	50	39.4	32.5	50	44.2	35.4	50
	230V/3Ph	34.8	30.7	50	34.8	30.7	50	34.8	30.7	50	35.6	30.7	50	39.2	31.3	50	44.5	35.6	50
	460V/3Ph	16.0	14.2	20	16.0	14.2	20	16.0	14.2	20	19.4	15.5	20	19.5	15.6	20	22.2	17.7	25
	575V/3Ph	11.5	10.1	15	11.5	10.1	15	11.5	10.1	15	12.8	10.3	15	14.3	11.4	15	16.4	13.1	20
	277V/1Ph	37.7	32.1	60	37.7	32.1	60	37.7	32.1	60	40.2	32.1	60	45.8	36.6	60	54.2	43.3	60

Model	Voltage	9kW			10kW			12kW			15kW			18kW			20kW		
		MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP
CMD 24 with ERV	208V/1Ph	66.2	52.9	70	71.8	57.4	80	82.9	66.4	90	99.7	79.8	100						
	230V/1Ph	69.6	55.7	70	75.8	60.6	80	88.2	70.5	90	106.7	85.4	110						
	208V/3Ph	44.9	35.9	45	48.1	38.5	50	54.6	43.7	60	64.3	51.4	70	73.9	59.2	80	78.5	62.8	80
	230V/3Ph	46.1	36.9	50	49.7	39.7	50	56.8	45.5	60	67.5	54.0	70	78.2	62.6	80	83.3	66.6	90
	460V/3Ph	23.0	18.4	25	28.2	22.6	30	28.3	22.7	30	33.7	27.0	35	39.1	31.2	40	42.6	34.1	45
	575V/3Ph																		
	277V/1Ph	59.4	47.6	60	65.1	52.1	70	76.3	61.0	80	93.1	74.5	100						
CMD 36 with ERV	208V/1Ph	66.2	52.9	70	71.8	57.4	80	82.9	66.4	90	99.7	79.8	100						
	230V/1Ph	69.6	55.7	70	75.8	60.6	80	88.2	70.5	90	106.7	85.4	110						
	208V/3Ph	44.9	35.9	45	48.1	38.5	50	54.6	43.7	60	64.3	51.4	70	73.9	59.2	80	78.5	62.8	80
	230V/3Ph	46.1	36.9	50	49.7	39.7	50	56.8	45.5	60	67.5	54.0	70	78.2	62.6	80	83.3	66.6	90
	460V/3Ph	23.0	18.4	25	28.2	22.6	30	28.3	22.7	30	33.7	27.0	35	39.1	31.2	40	42.6	34.1	45
	575V/3Ph	17.0	13.6	20	18.4	14.7	20	21.3	17.0	25	25.5	20.4	30	29.8	23.8	30	32.6	26.1	35
	277V/1Ph	59.4	47.6	60	65.1	52.1	70	76.3	61.0	80	93.1	74.5	100						
CMD 48 with ERV	208V/1Ph	70.3	56.2	80	75.9	60.7	80	87.1	69.7	90	103.8	83.1	110						
	230V/1Ph	73.4	58.7	80	79.6	63.6	80	91.9	73.5	100									
	208V/3Ph	49.0	39.2	50	52.3	41.8	60	58.7	47.0	60	68.4	54.7	70	78.1	62.5	80	82.6	66.1	90
	230V/3Ph	49.9	39.9	50	53.4	42.7	60	60.6	48.5	70	71.3	57.0	80	82.0	65.6	90	87.0	69.6	90
	460V/3Ph	24.8	19.9	25	30.1	24.1	35	30.2	24.2	35	35.6	28.5	40	40.9	32.7	45	44.5	35.6	45
	575V/3Ph	18.5	14.8	20	19.9	15.9	20	22.8	18.2	25	27.0	21.6	30	31.3	25.0	35	34.1	27.3	35
	277V/1Ph	62.6	50.1	70	68.2	54.6	70	79.4	63.5	80	96.2	77.0	100						
CMD 60 with ERV	208V/1Ph	70.3	56.2	80	75.9	60.7	80	87.1	69.7	90	103.8	83.1	110						
	230V/1Ph	73.4	58.7	80	79.6	63.6	80	91.9	73.5	100									
	208V/3Ph	49.0	39.2	50	52.3	41.8	60	58.7	47.0	60	68.4	54.7	70	78.1	62.5	80	82.6	66.1	90
	230V/3Ph	49.9	39.9	50	53.4	42.7	60	60.6	48.5	70	71.3	57.0	80	82.0	65.6	90	87.0	69.6	90
	460V/3Ph	24.8	19.9	25	30.1	24.1	35	30.2	24.2	35	35.6	28.5	40	40.9	32.7	45	44.5	35.6	45
	575V/3Ph	18.5	14.8	20	19.9	15.9	20	22.8	18.2	25	27.0	21.6	30	31.3	25.0	35	34.1	27.3	35
	277V/1Ph	62.6	50.1	70	68.2	54.6	70	79.4	63.5	80	96.2	77.0	100						

MOP = Maximum Overcurrent Protection MCA = Minimum Circuit Ampacity FLA = Full Load Amps

ELECTRICAL DATA

Table 13.1 - Electrical Data

Model	Voltage	BASE UNIT			2kW			3kW			5kW			6kW			7.5kW		
		MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP
CMP 24	208V/1Ph	24.1	21.2	35	35.3	30.1	40	40.9	34.6	45	52.1	43.6	60	57.7	48.0	60	66.0	54.7	70
	230V/1Ph	23.0	20.1	30	35.4	30.0	40	41.6	34.9	45	53.9	44.8	60	60.1	49.8	70	69.4	57.2	70
	208V/3Ph	17.6	16.0	20	24.1	21.2	25	27.3	23.7	30	33.8	28.9	35	37.0	31.5	40	41.8	35.4	45
	230V/3Ph	16.5	14.9	20	23.7	20.6	25	27.2	23.5	30	34.4	29.2	35	37.9	32.0	40	43.3	36.3	45
	460V/3Ph	8.5	7.6	15	12.1	10.5	15	13.8	11.9	15	19.1	16.1	20	19.2	16.2	20	21.9	18.3	25
	575V/3Ph																		
	277V/1Ph	18.6	16.3	25	29.8	25.3	35	35.4	29.8	40	46.6	38.7	50	52.2	43.2	60	60.6	49.9	70
CMP 36	208V/1Ph	28.6	24.8	40	39.8	33.7	50	45.4	38.2	50	56.6	47.2	60	62.2	51.6	70	70.5	58.3	80
	230V/1Ph	27.5	23.7	40	39.9	33.6	50	46.1	38.5	50	58.4	48.4	60	64.6	53.4	70	73.9	60.8	80
	208V/3Ph	24.0	21.1	35	30.5	26.3	40	33.7	28.8	40	40.1	34.0	45	43.4	36.6	50	48.2	40.5	50
	230V/3Ph	22.9	20.0	30	30.0	25.7	40	33.6	28.6	40	40.7	34.3	45	44.3	37.1	50	49.7	41.4	50
	460V/3Ph	11.2	9.8	15	14.8	12.7	15	16.6	14.1	20	21.9	18.3	25	22.0	18.4	25	24.6	20.5	25
	575V/3Ph	8.4	7.4	15	8.4	7.4	15	12.7	10.8	15	15.5	13.1	20	16.9	14.2	20	19.0	15.9	20
	277V/1Ph	23.5	20.2	35	34.7	29.2	45	40.3	33.7	45	51.5	42.6	60	57.1	47.1	60	65.5	53.8	70
CMP 48	208V/1Ph	39.3	34.0	60	50.5	42.9	60	56.1	47.4	70	67.2	56.4	80	72.8	60.8	80	81.2	67.5	90
	230V/1Ph	37.9	32.6	50	50.3	42.5	60	56.4	47.4	70	68.8	57.3	80	75.0	62.3	80	84.2	69.7	90
	208V/3Ph	30.3	26.8	40	36.8	32.0	45	40.0	34.5	50	46.4	39.7	50	49.7	42.3	50	54.5	46.2	60
	230V/3Ph	28.9	25.4	40	36.0	31.1	45	39.6	34.0	50	46.7	39.7	50	50.3	42.5	60	55.7	46.8	60
	460V/3Ph	13.6	12.0	20	17.2	14.9	20	19.0	16.3	20	24.3	20.5	25	24.3	20.6	25	27.0	22.7	30
	575V/3Ph	10.3	9.2	15	10.3	9.2	15	14.6	12.6	15	17.4	14.9	20	18.9	16.0	20	21.0	17.7	25
	277V/1Ph	29.7	25.7	45	40.9	34.7	50	46.5	39.2	50	57.7	48.1	60	63.3	52.6	70	71.8	59.3	80
CMP 60	208V/1Ph	46.7	39.9	70	57.9	48.8	80	63.4	53.3	80	74.6	62.3	90	80.2	66.7	100	88.6	73.4	100
	230V/1Ph	45.3	38.5	70	57.6	48.4	80	63.8	53.3	80	76.2	63.2	90	82.4	68.2	100	91.6	75.6	100
	208V/3Ph	33.4	29.3	45	39.9	34.5	50	43.1	37.0	50	49.6	42.2	60	52.8	44.8	60	57.6	48.7	60
	230V/3Ph	32.0	27.9	45	39.2	33.6	50	42.7	36.5	50	49.9	42.2	60	53.4	45.0	60	58.8	49.3	60
	460V/3Ph	14.6	12.8	20	18.2	15.7	20	20.0	17.1	25	25.3	21.3	30	25.3	21.4	30	28.0	23.5	30
	575V/3Ph	11.5	10.1	15	11.5	10.1	15	15.7	13.5	20	18.6	15.8	20	20.0	16.9	20	22.1	18.6	25
	277V/1Ph	37.7	32.1	60	48.9	41.1	60	54.5	45.6	70	65.7	54.5	80	71.3	59.0	80	79.8	65.7	90

Model	Voltage	9kW			10kW			12kW			15kW			18kW			20kW		
		MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP
CMP 24	208V/1Ph	74.4	61.4	80	67.8	54.2	70	78.9	63.2	80	95.7	76.6	100						
	230V/1Ph	78.6	64.6	80	72.3	57.8	80	84.7	67.7	90	103.2	82.6	110						
	208V/3Ph	46.7	39.2	50	44.1	35.3	45	50.6	40.5	60	60.3	48.2	70	69.9	56.0	70	74.5	59.6	80
	230V/3Ph	48.6	40.6	50	46.2	36.9	50	53.3	42.7	60	64.0	51.2	70	74.7	59.8	80	79.8	63.8	80
	460V/3Ph	24.6	20.5	25	26.5	21.2	30	26.6	21.3	30	31.9	25.6	35	37.3	29.8	40	40.9	32.7	45
	575V/3Ph																		
	277V/1Ph	69.0	56.7	70	65.1	52.1	70	76.3	61.0	80	93.1	74.5	100						
CMP 36	208V/1Ph	78.9	65.0	80	67.8	54.2	70	78.9	63.2	80	95.7	76.6	100						
	230V/1Ph	83.1	68.2	90	72.3	57.8	80	84.7	67.7	90	103.2	82.6	110						
	208V/3Ph	53.0	44.3	60	44.1	35.3	45	50.6	40.5	60	60.3	48.2	70	69.9	56.0	70	74.5	59.6	80
	230V/3Ph	55.0	45.7	60	46.2	36.9	50	53.3	42.7	60	64.0	51.2	70	74.7	59.8	80	79.8	63.8	80
	460V/3Ph	27.3	22.7	30	26.5	21.2	30	26.6	21.3	30	31.9	25.6	35	37.3	29.8	40	40.9	32.7	45
	575V/3Ph	21.2	17.6	25	18.4	14.7	20	21.3	17.0	25	25.5	20.4	30	29.8	23.8	30	32.6	26.1	35
	277V/1Ph	73.9	60.6	80	65.1	52.1	70	76.3	61.0	80	93.1	74.5	100						
CMP 48	208V/1Ph	89.6	74.2	100	71.9	57.5	80	83.1	66.5	90	99.8	79.9	100						
	230V/1Ph	93.5	77.1	100	76.1	60.8	80	88.4	70.7	90	106.9	85.6	110						
	208V/3Ph	59.3	50.0	60	48.3	39.7	50	54.7	43.8	60	64.4	51.5	70	74.1	59.3	80	78.6	62.9	80
	230V/3Ph	61.0	51.1	70	49.9	39.9	50	57.1	45.7	60	67.8	54.2	70	78.5	62.8	80	83.5	66.8	90
	460V/3Ph	29.7	24.9	30	28.3	22.7	30	28.5	22.8	30	33.8	27.1	35	39.2	31.3	40	42.8	34.2	45
	575V/3Ph	23.1	19.4	25	19.9	15.9	20	22.8	18.2	25	27.0	21.6	30	31.3	25.0	35	34.1	27.3	35
	277V/1Ph	80.1	66.1	90	68.2	54.6	70	79.4	63.5	80	96.2	77.0	100						
CMP 60	208V/1Ph	97.0	80.1	110	74.6	62.3	90	83.1	66.7	100	99.8	79.9	100						
	230V/1Ph	100.9	83.0	110	76.2	63.2	90	88.4	70.7	100	106.9	85.6	110						
	208V/3Ph	62.5	52.5	70	49.6	42.2	60	54.7	44.8	60	64.4	51.5	70	74.1	59.3	80	78.6	62.9	80
	230V/3Ph	64.1	53.6	70	49.9	42.2	60	57.1	45.7	60	67.8	54.2	70	78.5	62.8	80	83.5	66.8	90
	460V/3Ph	30.7	25.7	35	28.3	22.7	30	28.5	22.8	30	33.8	27.1	35	39.2	31.3	40	42.8	34.2	45
	575V/3Ph	24.2	20.3	25	19.9	15.9	20	22.8	18.2	25	27.0	21.6	30	31.3	25.0	35	34.1	27.3	35
	277V/1Ph	88.1	72.5	100	68.2	54.6	80	79.4	63.5	80	96.2	77.0	100						

MOP = Maximum Overcurrent Protection MCA = Minimum Circuit Ampacity FLA = Full Load Amps

ELECTRICAL DATA

Table 14.1 - Electrical Data

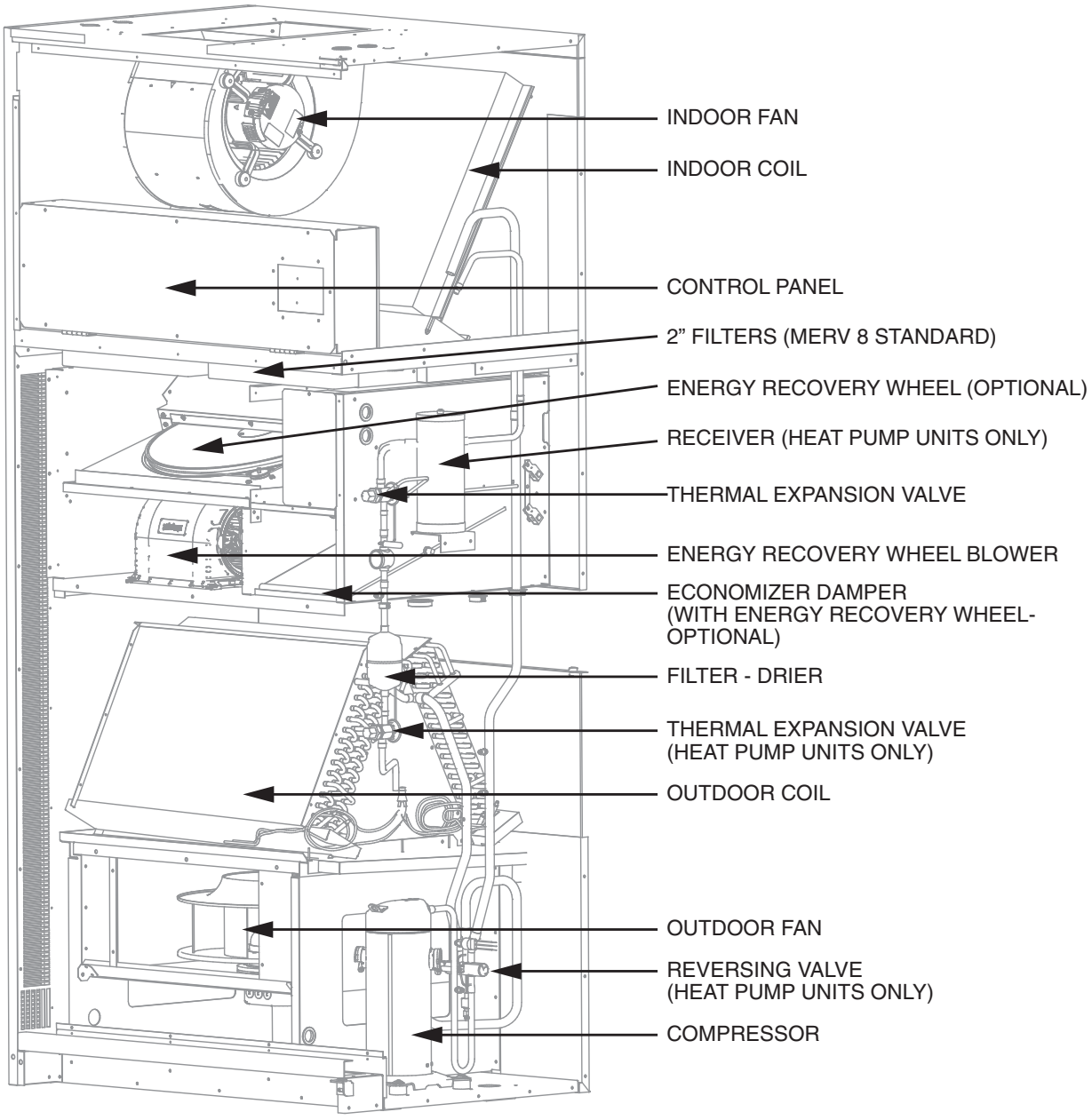
Model	Voltage	BASE UNIT			2kW			3kW			5kW			6kW			7.5kW		
		MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP
CMP 24 with ERV	208V/1Ph	27.3	24.4	35	38.5	33.3	45	44.1	37.8	50	55.3	46.8	60	60.9	51.2	70	69.2	57.9	70
	230V/1Ph	25.8	22.9	35	38.2	32.8	45	44.4	37.7	50	56.7	47.6	60	62.9	52.6	70	72.2	60.0	80
	208V/3Ph	20.8	19.2	25	27.3	24.4	30	30.5	26.9	35	37.0	32.1	40	40.2	34.7	45	45.0	38.6	50
	230V/3Ph	19.3	17.7	25	26.5	23.4	30	30.0	26.3	35	37.2	32.0	40	40.7	34.8	45	46.1	39.1	50
	460V/3Ph	9.9	9.0	15	13.5	11.9	15	15.2	13.3	20	20.5	17.5	25	20.6	17.6	25	23.3	19.7	25
	575V/3Ph																		
	277V/1Ph	18.6	16.3	25	29.8	25.3	35	35.4	29.8	40	46.6	38.7	50	52.2	43.2	60	60.6	49.9	70
CMP 36 with ERV	208V/1Ph	31.8	28.0	45	43.0	36.9	50	48.6	41.4	60	59.8	50.4	60	65.4	54.8	70	73.7	61.5	80
	230V/1Ph	30.3	26.5	45	42.7	36.4	50	48.9	41.3	60	61.2	51.2	70	67.4	56.2	70	76.7	63.6	80
	208V/3Ph	27.2	24.3	35	33.7	29.5	40	36.9	32.0	45	43.3	37.2	50	46.6	39.8	50	51.4	43.7	60
	230V/3Ph	25.7	22.8	35	32.8	28.5	40	36.4	31.4	45	43.5	37.1	50	47.1	39.9	50	52.5	44.2	60
	460V/3Ph	12.6	11.2	15	16.2	14.1	20	18.0	15.5	20	23.3	19.7	25	23.4	19.8	25	26.0	21.9	30
	575V/3Ph	8.4	7.4	15	8.4	7.4	15	12.7	10.8	15	15.5	13.1	20	16.9	14.2	20	19.0	15.9	20
	277V/1Ph	23.5	20.2	35	34.7	29.2	45	40.3	33.7	45	51.5	42.6	60	57.1	47.1	60	65.5	53.8	70
CMP 48 with ERV	208V/1Ph	42.5	37.2	60	53.7	46.1	70	59.3	50.6	70	70.4	59.6	80	76.0	64.0	90	84.4	70.7	90
	230V/1Ph	40.7	35.4	60	53.1	45.3	70	59.2	50.2	70	71.6	60.1	80	77.8	65.1	90	87.0	72.5	90
	208V/3Ph	33.5	30.0	45	40.0	35.2	50	43.2	37.7	50	49.6	42.9	60	52.9	45.5	60	57.7	49.4	60
	230V/3Ph	31.7	28.2	45	38.8	33.9	50	42.4	36.8	50	49.5	42.5	50	53.1	45.3	60	58.5	49.6	60
	460V/3Ph	15.0	13.4	20	18.6	16.3	20	20.4	17.7	25	25.7	21.9	30	25.7	22.0	30	28.4	24.1	30
	575V/3Ph	10.3	9.2	15	10.3	9.2	15	14.6	12.6	15	17.4	14.9	20	18.9	16.0	20	21.0	17.7	25
	277V/1Ph	29.7	25.7	45	40.9	34.7	50	46.5	39.2	50	57.7	48.1	60	63.3	52.6	70	71.8	59.3	80
CMP 60 with ERV	208V/1Ph	49.9	43.1	70	61.1	52.0	80	66.6	56.5	90	77.8	65.5	90	83.4	69.9	100	91.8	76.6	110
	230V/1Ph	48.1	41.3	70	60.4	51.2	80	66.6	56.1	90	79.0	66.0	90	85.2	71.0	100	94.4	78.4	110
	208V/3Ph	36.6	32.5	50	43.1	37.7	50	46.3	40.2	60	52.8	45.4	60	56.0	48.0	60	60.8	51.9	70
	230V/3Ph	34.8	30.7	50	42.0	36.4	50	45.5	39.3	50	52.7	45.0	60	56.2	47.8	60	61.6	52.1	70
	460V/3Ph	16.0	14.2	20	19.6	17.1	25	21.4	18.5	25	26.7	22.7	30	26.7	22.8	30	29.4	24.9	30
	575V/3Ph	11.5	10.1	15	11.5	10.1	15	15.7	13.5	20	18.6	15.8	20	20.0	16.9	20	22.1	18.6	25
	277V/1Ph	37.7	32.1	60	48.9	41.1	60	54.5	45.6	70	65.7	54.5	80	71.3	59.0	80	79.8	65.7	90

Model	Voltage	9kW			10kW			12kW			15kW			18kW			20kW		
		MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP	MCA	FLA	MOP
CMP 24 with ERV	208V/1Ph	77.6	64.6	80	71.8	57.4	80	82.9	66.4	90	99.7	79.8	100						
	230V/1Ph	81.4	67.4	90	75.8	60.6	80	88.2	70.5	90	106.7	85.4	110						
	208V/3Ph	49.9	42.4	50	48.1	38.5	50	54.6	43.7	60	64.3	51.4	70	73.9	59.2	80	78.5	62.8	80
	230V/3Ph	51.4	43.4	60	49.7	39.7	50	56.8	45.5	60	67.5	54.0	70	78.2	62.6	80	83.3	66.6	90
	460V/3Ph	26.0	21.9	30	28.2	22.6	30	28.3	22.7	30	33.7	27.0	35	39.1	31.2	40	42.6	34.1	45
	575V/3Ph																		
	277V/1Ph	69.0	56.7	70	65.1	52.1	70	76.3	61.0	80	93.1	74.5	100						
CMP 36 with ERV	208V/1Ph	82.1	68.2	90	71.8	57.4	80	82.9	66.4	90	99.7	79.8	100						
	230V/1Ph	85.9	71.0	90	75.8	60.6	80	88.2	70.5	90	106.7	85.4	110						
	208V/3Ph	56.2	47.5	60	48.1	38.5	50	54.6	43.7	60	64.3	51.4	70	73.9	59.2	80	78.5	62.8	80
	230V/3Ph	57.8	48.5	60	49.7	39.7	50	56.8	45.5	60	67.5	54.0	70	78.2	62.6	80	83.3	66.6	90
	460V/3Ph	28.7	24.1	30	28.2	22.6	30	28.3	22.7	30	33.7	27.0	35	39.1	31.2	40	42.6	34.1	45
	575V/3Ph	21.2	17.6	25	18.4	14.7	20	21.3	17.0	25	25.5	20.4	30	29.8	23.8	30	32.6	26.1	35
	277V/1Ph	73.9	60.6	80	65.1	52.1	70	76.3	61.0	80	93.1	74.5	100						
CMP 48 with ERV	208V/1Ph	92.8	77.4	100	75.9	60.7	80	87.1	69.7	90	103.8	83.1	110						
	230V/1Ph	96.3	79.9	100	79.6	63.6	80	91.9	73.5	100									
	208V/3Ph	62.5	53.2	70	52.3	42.9	60	58.7	47.0	60	68.4	54.7	70	78.1	62.5	80	82.6	66.1	90
	230V/3Ph	63.8	53.9	70	53.4	42.7	60	60.6	48.5	70	71.3	57.0	80	82.0	65.6	90	87.0	69.6	90
	460V/3Ph	31.1	26.3	35	30.1	24.1	35	30.2	24.2	35	35.6	28.5	40	40.9	32.7	45	44.5	35.6	45
	575V/3Ph	23.1	19.4	25	19.9	15.9	20	22.8	18.2	25	27.0	21.6	30	31.3	25.0	35	34.1	27.3	35
	277V/1Ph	80.1	66.1	90	68.2	54.6	70	79.4	63.5	80	96.2	77.0	100						
CMP 60 with ERV	208V/1Ph	100.2	83.3	110	77.8	65.5	90	87.1	69.9	100	103.8	83.1	110						
	230V/1Ph	103.7	85.8	110	79.6	66.0	90	91.9	73.5	100									
	208V/3Ph	65.7	55.7	70	52.8	45.4	60	58.7	48.0	60	68.4	54.7	70	78.1	62.5	80	82.6	66.1	90
	230V/3Ph	66.9	56.4	70	53.4	45.0	60	60.6	48.5	70	71.3	57.0	80	82.0	65.6	90	87.0	69.6	90
	460V/3Ph	32.1	27.1	35	30.1	24.1	35	30.2	24.2	35	35.6	28.5	40	40.9	32.7	45	44.5	35.6	45
	575V/3Ph	24.2	20.3	25	19.9	15.9	20	22.8	18.2	25	27.0	21.6	30	31.3	25.0	35	34.1	27.3	35
	277V/1Ph	88.1	72.5	100	68.2	54.6	80	79.4	63.5	80	96.2	77.0	100						

MOP = Maximum Overcurrent Protection MCA = Minimum Circuit Ampacity FLA = Full Load Amps

COMPONENT LAYOUT

Figure 15.1 - Component Layout



ACCESSORY INSTALLATION

ACCESSORY INSTALLATION

IMPORTANT

The use of this manual is specifically intended for a qualified installation and service agency. A qualified installation and service agency must perform all installation and service of these appliances.

Wall Sleeve and Louver (Optional)

Instructions only applicable to accessories sold by Modine. If not provided by Modine, consult manufacturer's recommendations.

The wall sleeve is designed to provide a sealed plenum from the fresh air intake and exhaust air outlet on the back of the classroom unit to the outside of the building. When a single wall sleeve is used, the intake and exhaust airstreams are separated with a splitter plate. Units may use a single wall sleeve with horizontal splitter plate or double wall sleeves depending on the unit configuration.

Wall Sleeve Kit Includes:

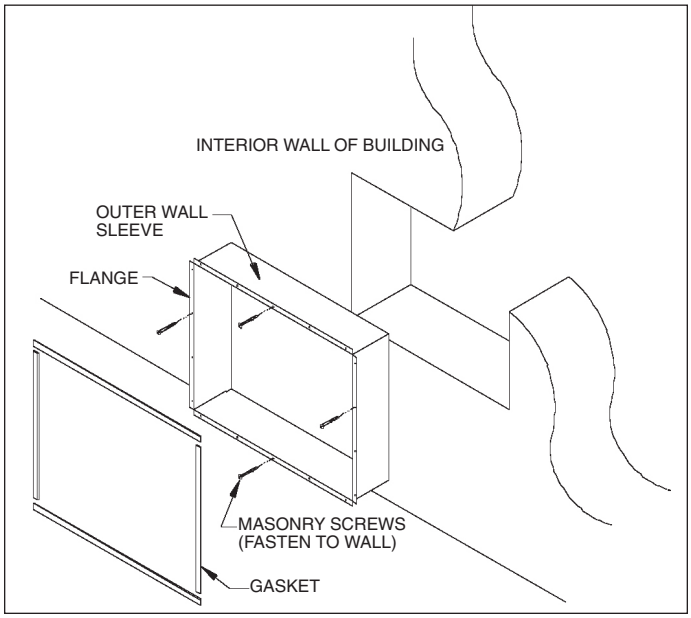
- Outer wall sleeve
- Inner splitter plate (if applicable)
- Outer splitter plate (if applicable)
- Inner wall sleeve
- Masonry screws
- One roll of gasket material

Assembly/Installation

The recommended procedure for assembly and installation is described as follows:

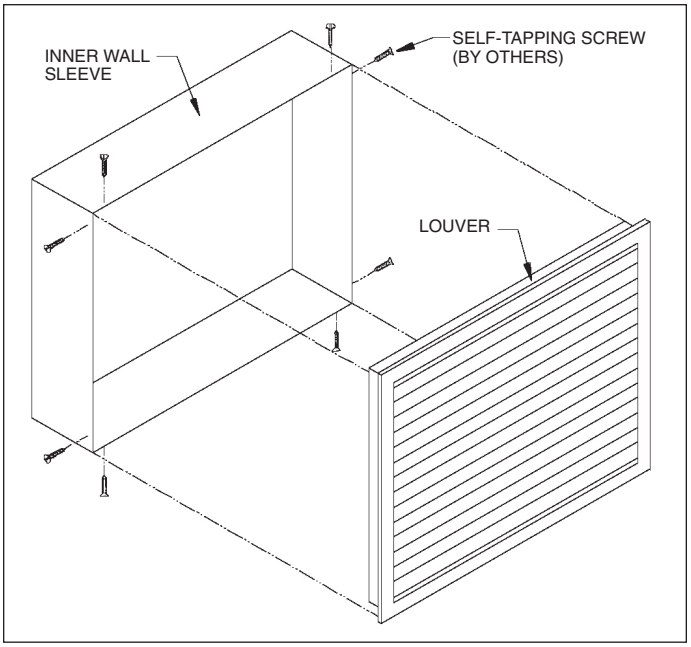
1. Check to insure that the opening in the wall is at the correct height from the floor and that the size of the opening is correct. This information is contained in the Modine Engineering Manual or submittal.
2. From inside the building, slide the outer wall sleeve into the wall opening until the flange is in tight contact with the wall. See Figure 16.1.

Figure 16.1 - Outer Wall Sleeve



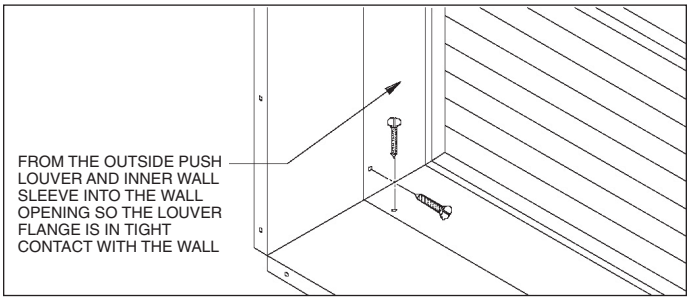
3. Use the masonry screws provided to fasten the wall sleeve flange to the wall. Do not attach the wall sleeve to the classroom unit.
4. Slide the louver (sold separately) into the inner wall sleeve. Use self-tapping screws (by others) to secure the louver to the wall sleeve. See Figure 16.2.

Figure 16.2 - Louver and Inner Wall Sleeve



5. From outside the building, slide the louver and inner wall sleeve into the wall opening and the outer wall sleeve until the louver flange is in tight contact with the wall.
6. Use an exterior grade sealant to seal the louver to the wall.
7. From inside the building, use self-tapping screws (by others) to fasten the two halves of the wall sleeve together. See Figure 16.3.

Figure 16.3 - Wall Installation

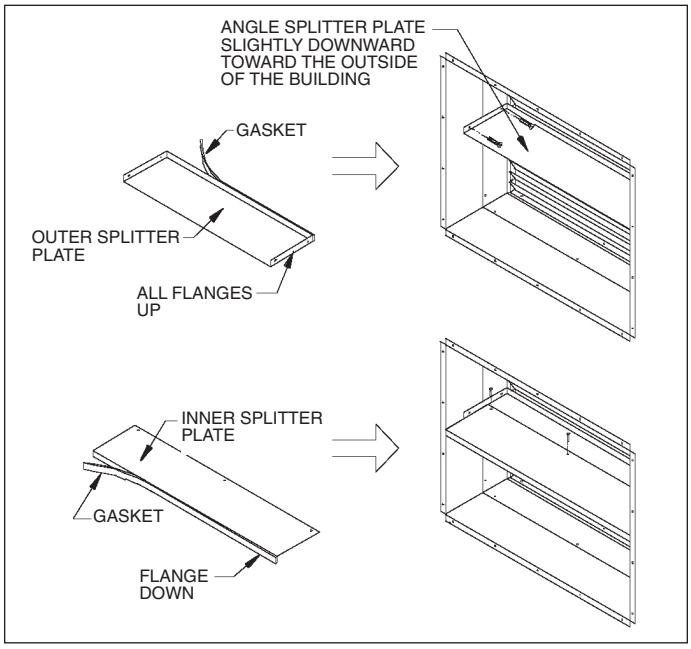


8. Seal the seam between the inner and outer wall sleeve.

ACCESSORY INSTALLATION

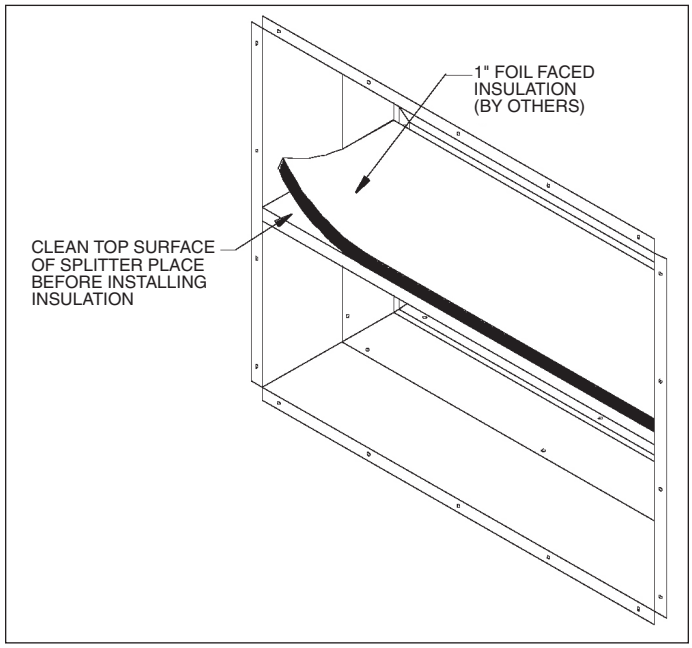
9. Clean the front flange of the outer splitter plate and attach the gasket to the flange. See Figure 17.1.

Figure 17.1 - Splitter Plate Installation



10. Place the outer splitter plate in the proper position inside the wall sleeve. The splitter plate must be positioned between the fresh air intake and the exhaust air outlet on the back of the classroom unit. The splitter plate should be angled slightly downward (approx 1/2" over a distance of 8"), toward the outside of the building, and the gasket should be in tight contact with a blade near the center of the louver.
11. Use self-tapping screws (by others) to fasten the outer splitter plate to the wall sleeve.
12. Place the inner splitter plate over the outer splitter plate, ensuring that the room side flange is flush with the wall sleeve flange. Figure 17.1.
13. Use self-tapping screws (by others) to fasten the inner splitter plate to the outer splitter plate.
14. Seal the inner and outer splitter plates to the wall sleeve, ensuring that no air can pass from one side to the other.
15. Clean the top surface of the two splitter plates and attach 1" thick foil-faced insulation (by others). See Figure 17.2.
16. Clean the wall sleeve flange and inner splitter plate flange and attach the double-sided gasket. **Note:** Do not remove the backing strip from the room side of the gasket until the classroom unit is ready for installation. See Figure 16.1.

Figure 17.2 - Splitter Plate Insulation



ACCESSORY INSTALLATION

REAR EXTENSION (Optional)

Instructions only applicable to accessories sold by Modine. If not provided by Modine, consult manufacturer's recommendations.

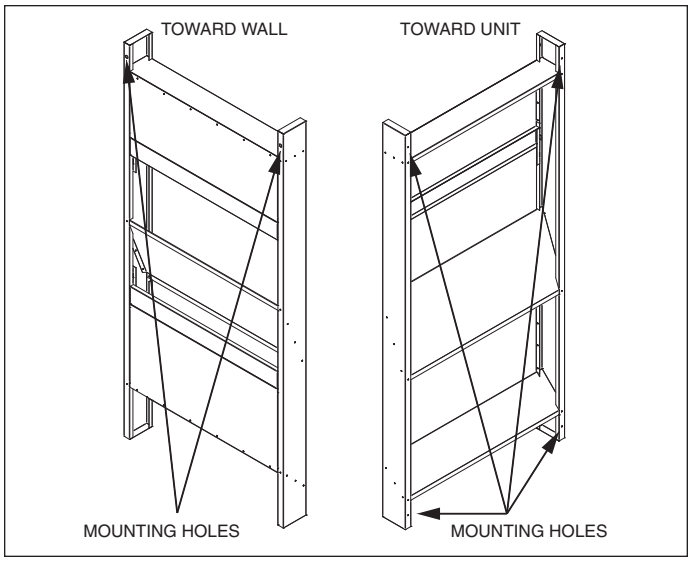
The rear extension is designed to provide a sealed transition from the fresh air intake and exhaust air outlet on the back of the classroom unit to the outside of the building, specifically when the wall openings are not aligned. Units are available with a 15" deep or 6" deep rear extension with adjustable sill heights (consult technical manual AIR 2-104 for available configurations).

Installation

The recommended procedure for installation is described as follows (reference Unit Installation Instructions beginning on page 3 of this manual. Unit must comply with all requirements, regardless if a rear extension is installed or not):

1. Check the floor for levelness and check to ensure the wall is at a right angle to the floor. Should there be any irregularity, the placement of foam tape on the outside edges of the rear extension will fill the gaps between the rear extension and the wall. The tape will act as a sealant, creating a smooth transition from the rear extension to the wall.
2. After adjusting for any irregularity in the location site, locate the position for the unit mounting bolts.
3. Remove the backing strip from the gasket on the rear extension. Place the unit against the rear extension in the correct location, ensuring a tight seal between the two.
4. Using sheetmetal screws (by others) screw above top plate and below bottom plate, totaling 4 connection points from the rear extension, into the unit (see Figure 18.1).
5. Measure the sill height and adjust the movable plates prior to moving cabinet and rear extension to the wall. The movable plates and rear extension openings are designed so there is an overlap of the wall opening, allowing for a sealing surface from the outside.
6. Move the cabinet and rear extension against the wall.
7. Check to ensure that the unit is plumb and level in both directions. If adjustment is necessary, Modine recommends the placement of metal shims in the outer most corners of the base.
8. Remove the backing strip from the gasket on the wall sleeve, and place the unit and rear extension in the correct location (see Figure 18.1).
9. Using screws (by others) screw above top plate and into the wall in each side panel – 2 connection points.
10. Complete installation of unit referencing page 3 of this manual (unit must be secured to the floor).

Figure 18.1 - Rear Extension



PLENUM (Optional)

Instructions only applicable to accessories sold by Modine. If not provided by Modine, consult manufacturer's recommendations.

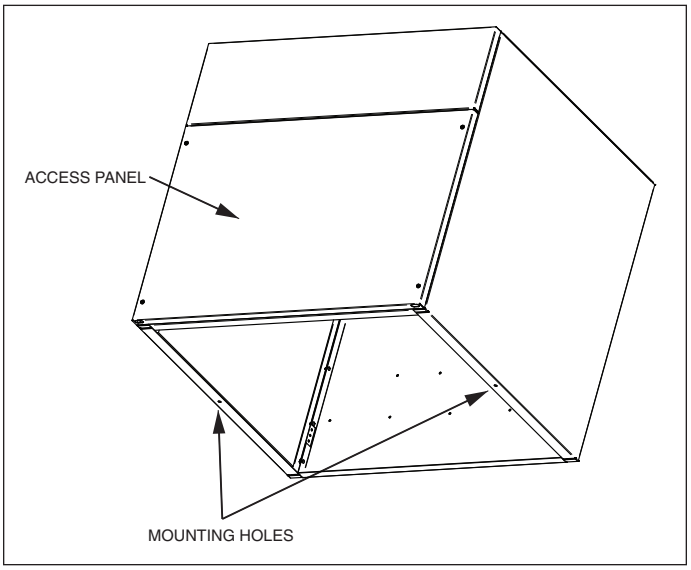
The field installed plenum is designed to discharge air directly into the space without ductwork to distribute air. Plenums are provided in 2" height increments, and multiple discharge configurations (consult technical manual AIR 2-104 for available configurations).

Installation

The recommended procedure for installation is described as follows:

1. Unit must be secured to the floor before plenums are mounted on top to prevent injury.
2. Place plenum centered on the top of the unit.
3. Remove the front access panel, so interior base of plenum is available.
4. Mount the plenum by using sheet metal screws (by others) through mounting holes at bottom center of each side panel (see Figure 18.2). Be sure to use a minimum of one screw for each side panel even if you are not able to use holes provided.

Figure 18.2 - Plenum Installation (Top Discharge Shown)



ACCESSORY INSTALLATION

DUCT SHROUD (Optional)

Instructions only applicable to accessories sold by Modine. If not provided by Modine, consult manufacturer's recommendations.

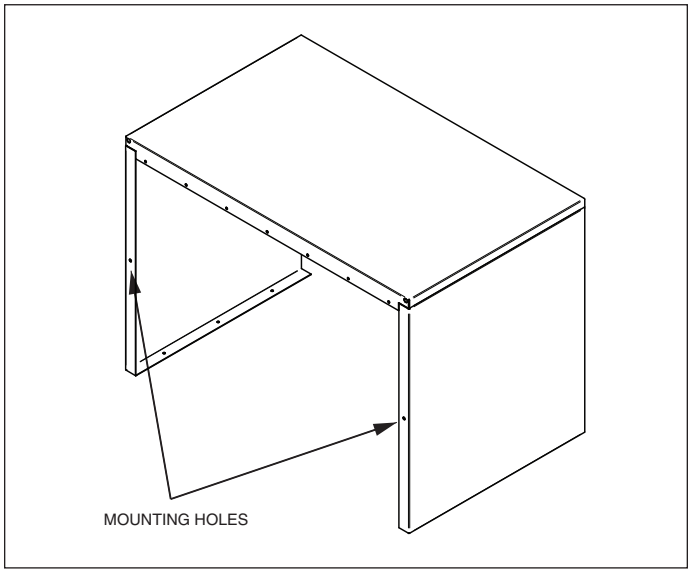
The field installed duct shroud is designed to cover ductwork that is connected to the unit, until it is above a ceiling. Duct shrouds are provided as 26" or 38" high (consult technical manual AIR 2-104 for available configurations).

Installation

The recommended procedure for installation is described as follows:

1. Unit must be secured to the floor before duct shroud can be mounted on top to prevent injury.
2. Place duct shroud centered on the top of the unit.
3. Mount the duct shroud by using sheet metal screws (by others) through mounting holes at bottom center of each side panel (see Figure 19.2). Be sure to use a minimum of one screw for each side panel even if you are not able to use holes provided.

Figure 19.2 - Duct Shroud Installation



FILLER PANEL (Optional)

Instructions only applicable to accessories sold by Modine. If not provided by Modine, consult manufacturer's recommendations.

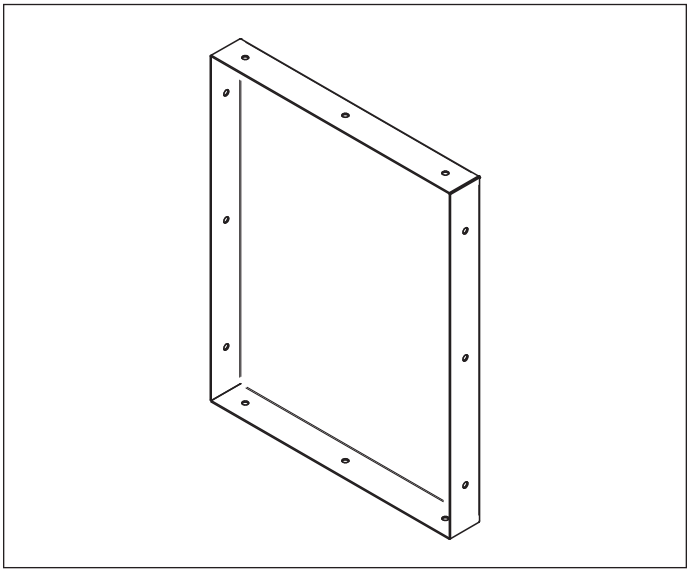
The field installed filler panel is designed to be installed above a rear extension, and behind a plenum or duct shroud so the sheet metal goes all the way to the ceiling, and to the wall (consult technical manual AIR 2-104 for availability).

Installation

The recommended procedure for installation is described as follows:

1. Mount the filler panel by using sheet metal screws (by others) through mounting holes on flanges (see Figure 19.3). Be sure to use a minimum of one screw, on two different sides for proper installation of each panel, even if you are not able to use holes provided.

Figure 19.3 - Filler Panel



MAINTENANCE

MAINTENANCE

⚠ WARNING

When servicing or repairing this equipment, use only factory-approved service replacement parts. A complete replacement parts list may be obtained by contacting Modine Manufacturing Company. Refer to the rating plate on the appliance for complete appliance model number, serial number, and company address. Any substitution of parts or controls not approved by the factory will be at the owner's risk.

⚠ CAUTION

Do not attempt to reuse any mechanical or electrical component which has been wet. Such component must be replaced.

IMPORTANT

To check most of the Possible Remedies in the troubleshooting guide listed in Tables 22.1-23.1, refer to the applicable sections of the manual.

The routine care and maintenance of this unit will increase longevity, provide for the proper operational performance, and reduce the probability of failure.

Once the unit is operational, it will be necessary to perform certain routine maintenance/service checks. Following is a Maintenance Schedule with the recommended checks. If your unit is equipped with special features, there may be additional checks that are required. Consult Modine for assistance.

The use of torque screwdrivers on panel, cover or component mounting screws is not recommended. Hand-start all screws. If electric drills are used – set at the lowest possible torque.

Access

1. Access to the unit is gained by opening the door using the Modine door key that is provided.
2. Access to the compressor, outdoor coil, and condenser fan is gained by removal of the sound trap panel in the bottom section of the unit.
3. Access to the supply fan is gained by carefully lowering the control panel. A blankoff panel in the top section of the unit needs to be removed prior to accessing control panel. Remove screws around perimeter of blankoff panel.

Maintenance Schedule

Every THREE (3) MONTHS

Change the main filters, by sliding the filter out of the track. The filters are positioned under the indoor coil. Never run the unit without filters.

Every SIX (6) MONTHS

(Before the heating and cooling season)

1. Check the refrigeration system performance (Suction and Discharge pressures) and compare with the Start-Up Sheet. If there is any significant variation, then the fault should be found and corrected. Refer to the troubleshooting section.
2. If it is determined that the unit is under-charged, careful inspection of the refrigeration circuit should be carried out to identify the source of the leak. Concentrate on schrader valve fittings and capillary line connections.
3. If the Filter/Drier requires replacing either due to Compressor burn out or collection of non-condensables follow the proper Filter/Drier replacement procedure.
4. Check that the High and Low Pressure Switches are cutting out the Compressor at the correct settings.

	Cut Out	Cut In	Differential
High Pressure Switch	580 PSIG	435 PSIG	145 PSIG
Low Pressure Switch	15 PSIG	44 PSIG	34 PSIG

   The gauges can then be removed from the system. Do not forget to replace the caps on the Schrader valves.
5. With the Disconnect Switch in the "OFF" position, inspect all electrical circuits for loose connections and signs of overheating, arcing, chafing or other physical damage. The electrical control section should also be wiped clean of all dirt that may affect the unit operation.
6. Check for correct fan operation, no excessive noise or vibrations.
7. Wash the condenser coil filters (Optional).
8. Check the electric heat (Optional). See procedure below.
9. Wash down the cabinet using mild detergent and treat any paint damage or rust as necessary.
10. Check the control wiring and sensors. Check the operation and sequencing of controls and ensure that all relevant set points are recorded.

Every EIGHTEEN (18) MONTHS

1. Clean the Energy Recovery Wheel. See procedure below.

Energy Recovery Wheel (Optional)

The Energy Recovery Wheel is mounted in a fully assembled cartridge for easy installation, removal and maintenance. Rotary counterblow heat exchangers (heat wheels) with laminar airflow are "self cleaning" with respect to dry particles. Small particles may pass through, while larger particles that land on the surface are blown clear as the flow direction is reversed. For this reason, the primary need for cleaning is to remove films of oil based aerosols that have condensed on energy transfer surfaces.

1. Remove the bolts holding the ERV assembly to the right hand and left hand side panels and lower sound panel section. Disconnect the ERV plug and socket and slide the entire assembly out of the unit. It is recommended that two people are used for this operation.
2. Remove the top panel of the ERV assembly and disconnect the wheel motor plug and socket. Lift the wheel (attached to plate), top edge first, out of the ERV assembly. After detaching the wheel belt, unscrew the wheel fasteners and crossbar and remove the wheel from the plate.
3. Clean the wheel according to the Cleaning Airxchange Energy Recovery Wheels instructions available on the Airxchange website: **www.airxchange.com**.

MAINTENANCE

Electric Heat (Optional)

1. Check that the electrical connections are secure.
2. Check the operation of the electric heaters.
3. Check the operation of the manual and auto-reset overheat cut-out switches. The auto-reset overheat cut-out switch opens at 130°F and the manual reset overheat cut-out switch opens at 180°F.

REPLACEMENT PARTS

For ease of identification when ordering replacement parts or contacting the factory about your unit, please quote the unit type and unit serial number. This information can be found on the serial plate attached to your unit. See Figure 21.2.

When a component part fails, a replacement part should be obtained through our Parts Department. If the part is considered to be under warranty, the following details are required to process this requirement:

1. Full description of part required, including Unit's part number, if known.
2. The original equipment serial number.
3. An appropriate purchase order number.

Figure 21.1 - Model Number Designations

1,2	3	4,5	6	7	8	9	10	11	12	13	14	15,16
PT	UC	MBH	SV	G	C	VC	F	CC	DS	DO	D	HO

1,2 - Product Type (PT)
CM - Classmate

3 - Unit Configuration (UC)
D - DX Cooling
P - HP Heating & Cooling

4,5 - Nominal Capacity (MBH)
24 - 24,000 Btu/Hr
36 - 36,000 Btu/Hr
48 - 48,000 Btu/Hr
60 - 60,000 Btu/Hr

6 - Supply Voltage (SV)
B - 208/60/1
C - 230/60/1
D - 208/60/3
E - 230/60/3
F - 460/60/3
G - 575/60/3
H - 277/60/1

7 - Generation (G)
A - Current Design

8 - Control (C)
M - Modine Control System
F - Factory Installed Free Issue
B - By Others - Field Installed

9 - Ventilation Configuration (VC)
A - Economizer
B - Economizer with OA Damper
C - ERV with OA Damper
D - ERV with OA Damper & Economizer
E - ERV with OA & RA Damper & Economizer
Z - Return Air Only

10 - Filtration (F)
A - MERV 8
B - MERV 11
C - MERV 13
D - MERV 16

11 - Case Construction (CC)
A - 20Ga (Standard)
B - 16Ga

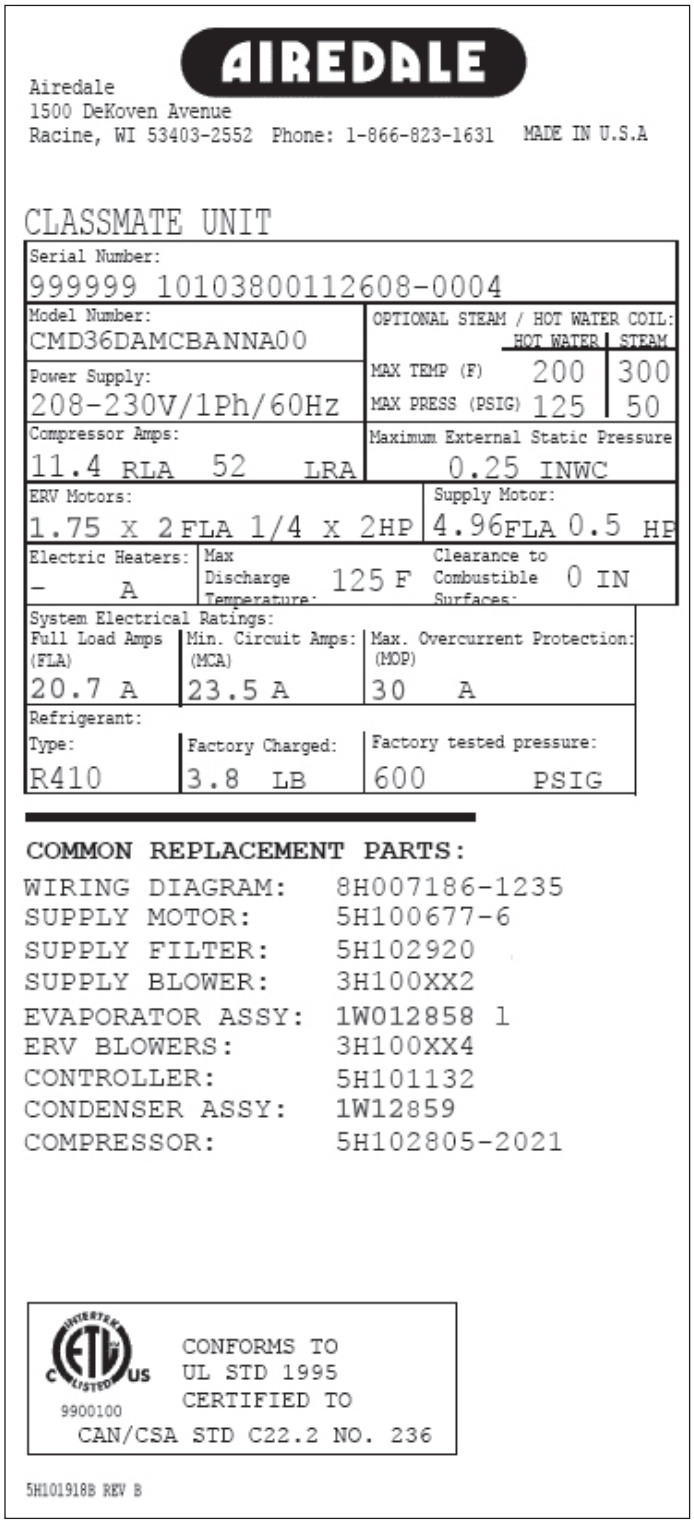
12 - Door Mounted Stat (DS)
N - None
V - Vertical Stat
H - Horizontal Stat

13 - Door Mounted Other (DO)
N - None
K - Key Over-ride
S - Occupancy Sensor
L - Indicator Light
T - Twist Timer

14 - Dehumidification (D)
N - None
A - HGRH Coil

15,16 - Heating Option (HO)
00 - None
02 - 2 kW (1-stage)
03 - 3 kW (1-state)
05 - 5kW (1-stage)
08 - 7.5 kW (1-stage)
09 - 9kW (1-stage)
10 - 10 kW (2-stage)
15 - 15 kW (2-stage)
18 - 18 kW (2-stage)
20 - 20 kW (2-stage)
91 - 1R HW Coil (1/2")
92 - 1R HW Coil (3/4")
93 - 2R HW Coil (1/2")
94 - 2R HW Coil (3/4")

Figure 21.2 - Serial Plate EXAMPLE



TROUBLESHOOTING

Figure 22.1 - Troubleshooting - General

Trouble	Possible Cause	Possible Remedy
A. Unit Not Operating - Power On	1. Unit mounted disconnect in the “OFF” position.	1. Turn the disconnect switch to the “ON” position.
	2. Unit switched OFF in the microprocessor.	2. Consult microprocessor documentation.
	3. Delay on start set incorrectly.	3. Consult microprocessor documentation.
	4. Unit not in occupied mode.	4. Consult microprocessor documentation.
	5. Fire/smoke alarm tripped.	5. De-energize and re-energize unit.
	6. Tripped circuit breakers.	6. Reset the tripped circuit breaker(s).
	7. Loose mains or control wiring.	7. With power OFF inspect the field wiring connections in the connection box.
B. Unit Operating - No Mechanical Heating/Cooling	1. Heating/cooling not required.	1. Verify applicable set point with return air temperature.
	2. No output from microprocessor.	2. Consult microprocessor documentation.
	3. System pressure switch(es) tripped.	3. Inspect high and low system pressures.
	4. Internal overload switch on compressor tripped (open).	4. Wait for compressor motor windings to cool down (This switch is automatic reset).
	5. Loose control wiring connections.	5. Inspect connections beginning with compressor output from the microprocessor.
	6. Tripped circuit breakers.	6. Reset the tripped circuit breaker(s).
	7. Low temperature unit lockout.	7. Consult microprocessor setpoints.
C. Compressor Not Operating	1. Cooling/heating not required.	1. Consult microprocessor documentation.
	2. HP/LP switches tripped (open).	2. Check operation of relay and wiring connections.
	3. Internal overload switch on compressor tripped (open).	3. Wait for compressor motor windings to cool down (This switch is automatic reset).
	4. Compressor faulty.	4. Replace compressor.
	5. Float switch tripped.	5. Check condensate pan and piping for blockage.
D. No Fan	1. Motor tripped on internal overload.	1. Let motor cool down and reset - possible bad motor or blocked filter.
	2. Fan not required	2. Consult microprocessor documentation, or set thermostat to “ON”.
	3. No power to the fan.	3. Check to make sure plugs are locked in place and check for 24V control signal.
E. Electric Heat Not Operation (Optional)	1. Electric heat not required.	1. Consult microprocessor documentation.
	2. Faulty electric heat relay.	2. Check operation of relay and wiring connections.
	3. Overheat cutout switch is tripped (open).	3. This switch requires manual reset. Check current draw of heating elements and compare to nameplate. Check location of sensing probe. To avoid incidental tripping of switch, to not power off unit in electric heating mode.
	4. Faulty heating element(s).	4. Replace elements as necessary.
F. Hot Water Valve Not Operational (Option)	1. Heating not required.	1. Consult microprocessor documentation.
	2. Loose wiring connections.	2. Inspect connections beginning with valve output from the microprocessor.
	3. Faulty heating actuator.	3. Rest and replace actuator if faulty.

TROUBLESHOOTING

Figure 23.1 - Troubleshooting - Refrigeration

Trouble	Possible Cause	Possible Remedy
G. Low Suction Pressure (LP Switch Tripped)	1. Low refrigeration charge.	1. Measure unit operating pressures. Add charge and check for leaks.
	2. Clogged filter(s).	2. Replace filter(s) as necessary.
	3. Clogged liquid line filter drier.	3. Replace drier with a direct replacement. Follow proper procedure.
	4. Improper expansion valve setting or valve malfunctioning.	4. Check operation and check superheat.
H. Low Discharge Pressure	1. Low refrigeration charge.	1. Measure unit operating pressures. Add charge and check for leaks.
	2. Faulty compressor.	2. Replace compressor.
	3. Faulty reversing valve.	3. Evacuate system and replace reversing valve.
I. High Suction Pressure	1. Excessive load.	1. Check occupancy of space.
	2. Expansion valve malfunctioning (overfeeding).	2. Check remote bulb and regulate superheat.
	3. Faulty compressor.	3. Replace compressor.
J. High Discharge Pressure	1. Improper installation of wall sleeve and louver.	1. Ensure separate plate is in contact with the back of the louver blades and no re-circulation of exhaust air takes place.
	2. Dirty condenser coils.	2. Clean condenser coils.
	3. System overcharged.	3. Remove excess refrigerant.
	4. Noncondensables in system.	4. Evacuate refrigerant circuit and recharge.
	5. Condenser fan speed is too slow (cooling mode).	5. Adjust the condenser fan speed controller.
K. Condensate Leaking	1. Condensate drain not piped up.	1. Pipe condensate drain.
	2. Condensate pan/line plugged.	2. Clean drain pan and piping.
	3. Condensate pump (optional) faulty.	3. Check operation of condensate pump. Replace pump if necessary.
L. Defrost Cycle Not Working (Heat Pump)	1. Incorrect settings for defrost cycle.	1. Consult microprocessor documentation.
	2. Coil temperature sensor out of position.	2. Check the position of the sensor. It should be embedded in the condenser coil.
M. Microprocessor Not Working - Faulty Operation	1. Loose sensor wire connectors.	1. Inspect sensor connections at the microprocessor.
	1. Strategy file corrupted.	2. Consult microprocessor documentation.

COMMERCIAL WARRANTY

Seller warrants its products to be free from defects in material and workmanship, EXCLUSIVE, HOWEVER, of failures attributable to the use of materials substituted under emergency conditions for materials normally employed. This warranty covers replacement of any parts furnished from the factory of Seller, but does not cover labor of any kind and materials not furnished by Seller, or any charges for any such labor or materials, whether such labor, materials or charges thereon are due to replacement of parts, adjustments, repairs, or any other work done. This warranty does not apply to any equipment which shall have been repaired or altered outside the factory of Seller in any way so as, in the judgment of Seller, to affect its stability, nor which has been subjected to misuse, negligence, or operating conditions in excess of those for which such equipment was designed. This warranty does not cover the effects of physical or chemical properties of water or steam or other liquids or gases used in the equipment.

BUYER AGREES THAT SELLER'S WARRANTY OF ITS PRODUCTS TO BE FREE FROM DEFECT IN MATERIAL AND WORKMANSHIP, AS LIMITED HEREIN, SHALL BE IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, WHETHER ARISING FROM LAW, COURSE OF DEALING, USAGE OF TRADE, OR OTHERWISE, **THERE ARE NO OTHER WARRANTIES, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE, WHICH EXTEND BEYOND THE PRODUCT DESCRIPTION CONFIRMED BY BUYER AND SELLER AS OF THE DATE OF FINAL AGREEMENT.**

This warranty is void if the input to the product exceeds the rated input as indicated on the product serial plate by more than 5% on gas-fired and oil-fired units, or if the product in the judgment of SELLER has been installed in a corrosive atmosphere, or subjected to corrosive fluids or gases, been subjected to misuse, negligence, accident, excessive thermal shock, excessive humidity, physical damage, impact, abrasion, unauthorized alterations, or operation contrary to SELLER'S printed instructions, or if the serial number has been altered, defaced or removed.

BUYER AGREES THAT IN NO EVENT WILL SELLER BE LIABLE FOR COSTS OF PROCESSING, LOST PROFITS, INJURY TO GOODWILL, OR ANY OTHER CONSEQUENTIAL OR INCIDENTAL DAMAGES OF ANY KIND RESULTING FROM THE ORDER OR USE OF ITS PRODUCT, WHETHER ARISING FROM BREACH OF WARRANTY, NONCONFORMITY TO ORDERED SPECIFICATIONS, DELAY IN DELIVERY, OR ANY LOSS SUSTAINED BY THE BUYER.

BUYER'S REMEDY FOR BREACH OF WARRANTY, EXCLUSIVE OF ALL OTHER REMEDIES PROVIDED BY LAW, IS LIMITED TO REPAIR OR REPLACEMENT AT THE FACTORY OF SELLER, ANY COMPONENT WHICH SHALL, WITHIN THE APPLICABLE WARRANTY PERIOD DEFINED HEREIN AND UPON PRIOR WRITTEN APPROVAL, BE RETURNED TO SELLER WITH TRANSPORTATION CHARGES PREPAID AND WHICH THE EXAMINATION OF SELLER SHALL DISCLOSE TO HAVE BEEN DEFECTIVE; EXCEPT THAT WHEN THE PRODUCT IS TO BE USED BY BUYER AS A COMPONENT PART OF EQUIPMENT MANUFACTURED BY BUYER, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO ONE YEAR FROM DATE OF SHIPMENT FROM SELLER. FOR GAS-FIRED PRODUCTS INSTALLED IN HIGH HUMIDITY APPLICATIONS AND UTILIZING STAINLESS STEEL HEAT EXCHANGERS, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO TEN YEARS FROM DATE OF SHIPMENT FROM SELLER.

These warranties are issued only to the original owner-user and cannot be transferred or assigned. No provision is made in these warranties for any labor allowance or field labor participation. Seller will not honor any expenses incurred in its behalf with regard to repairs to any of Seller's products. No credit shall be issued for any defective part returned without proper written authorization (including, but not limited to, model number, serial number, date of failure, etc.) and freight prepaid.

OPTIONAL SUPPLEMENTAL WARRANTY

Provided a supplemental warranty has been purchased, Seller extends the warranty herein for an additional four (4) years on certain compressors. Provided a supplemental warranty has been purchased, Seller extends the warranty herein for an additional four (4) years or nine (9) years on certain heat exchangers.

EXCLUSION OF CONSUMABLES & CONDITIONS BEYOND SELLER'S CONTROL

This warranty shall not be applicable to any of the following items: refrigerant gas, belts, filters, fuses and other items consumed or worn out by normal wear and tear or conditions beyond Seller's control, including (without limitation as to generality) polluted or contaminated or foreign matter contained in the air or water utilized for heat exchanger (condenser) cooling or if the failure of the part is caused by improper air or water supply, or improper or incorrect sizing of power supply.

Component Applicable Models	**"APPLICABLE WARRANTY PERIOD"**
Heat Exchangers Gas-Fired Units except PSH/BSH	TEN YEARS FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN TEN YEARS FROM DATE OF RESALE BY BUYER OR ANY OTHER USER, WITHIN TEN YEARS FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN ONE HUNDRED TWENTY-SIX MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST
Heat Exchangers Low Intensity Infrared Units **Compressors** Condensing Units for Cassettes	FIVE YEARS FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN FIVE YEARS FROM DATE OF RESALE BY BUYER OR ANY OTHER USER, WITHIN FIVE YEARS FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN SIXTY-SIX MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST
Burners Low Intensity Infrared Units **Other** Components excluding Heat Exchangers, Coils, Condensers, Burners, Sheet Metal	TWO YEARS FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN TWO YEARS FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN THIRTY MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST
Heat Exchangers/Coils Indoor and Outdoor Duct Furnaces and System Units, PSH/BSH, Steam/Hot Water Units, Oil-Fired Units, Electric Units, Cassettes, Vertical Unit Ventilators, Geothermal Units **Compressors** Vertical Unit Ventilators, Geothermal Units **Burners** High Intensity Infrared Units **Sheet Metal Parts** All Products	ONE YEAR FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN ONE YEAR FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN EIGHTEEN MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST

As Modine Manufacturing Company has a continuous product improvement program, it reserves the right to change design and specifications without notice.

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