



EnerSaver™ Packaged Terminal Air Conditioner and Heat Pump with R-410A Refrigerant

Catalog 1303

Model PNES – Air Conditioner with Electric or Hydronic Heat
Model PNHS – Heat Pump with Electric Heat

Design Series 3 & 4



Engineered for flexibility and performance™

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McQuay EnerSaver Legacy Replacement

Description	“A” Design	“B” Design
Current Model	PNES/PNHS “3”	PNES/PNHS “4”
Current Model Replaces	AAF Series 16 ENR/ENH PNES/PNHS “1”	American Standard Type 45 ENR/ENH (SG 45) PNES/PNHS “2”
Room Cabinet/Wall Sleeve	16" x 37½" HP or Electric Heat 16" x 41½" Hydronic Heat Sold as Kit including: • Cabinet/Wall Sleeve • Subbase • Outdoor Louver	Existing Type 45 Cabinet/Sleeve
Power Cord	Short Cord	Short (Hydronic) / Long (Electric)
Plug Type	20 Amp (All “A” Design)	30 Amp (Electric Heat) 20 Amp (Hydronic) Hard Wired (All 265V)
Hydronic Valve	Normally Open (Line Voltage)	Normally Closed (24V)
Retrofit Kit	None Required	Kit Part #063028801
Condensate Drain Kit	Kit Part #105542401 Required for Heat Pumps	Kit Part #105542401 Required for Heat Pumps

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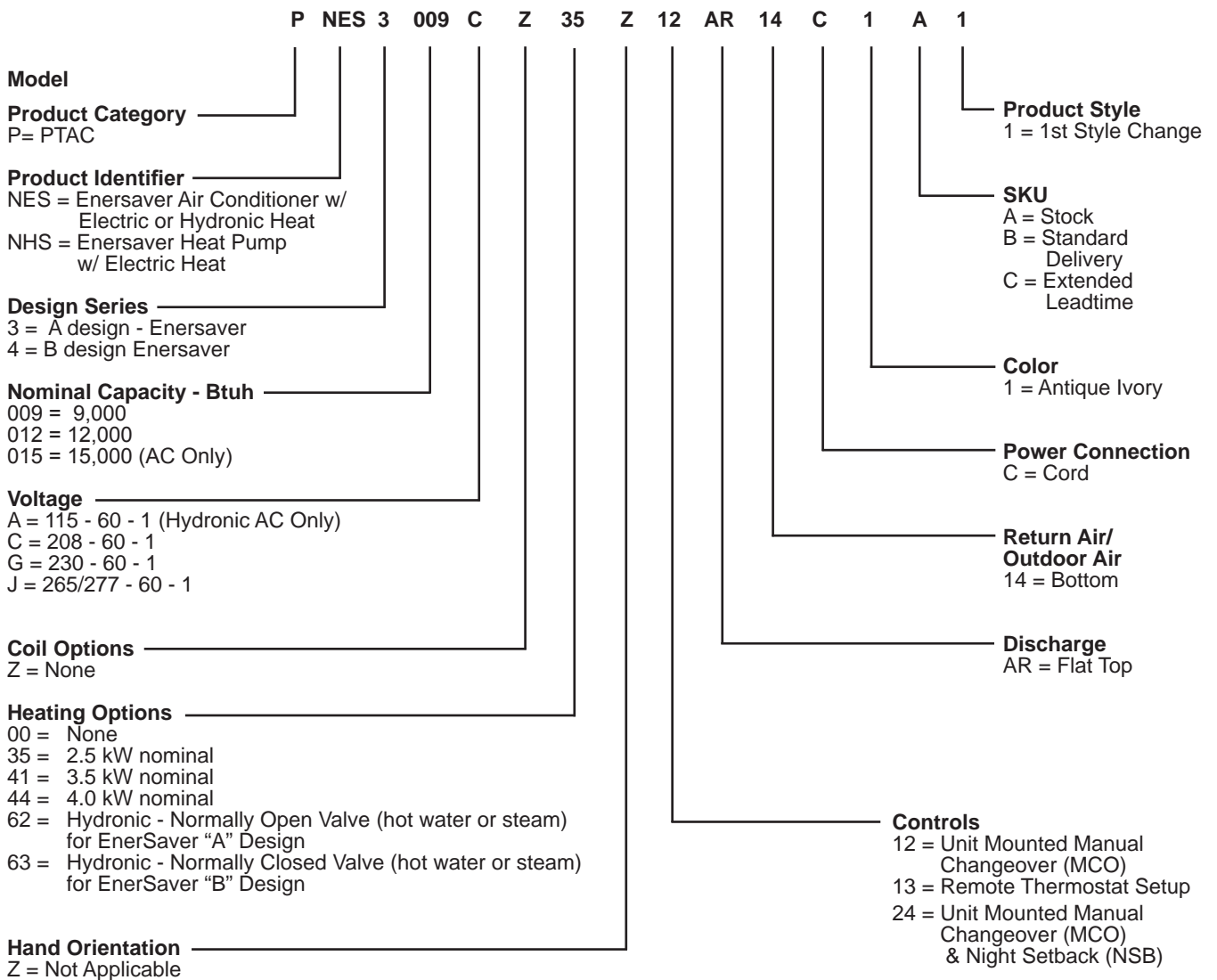
Heavy Duty Construction for Durability and Quiet Operation

Exceptional Quality in Design and Construction

McQuay International has been building quality products for the air conditioning market since 1921. EnerSaver™ Packaged Terminal Air Conditioners and Heat Pump Units were first introduced in 1966. Today EnerSaver Packaged Terminal Air Conditioners and Heat Pumps continue to set the industry standard for quality. Heavy duty construction, premium engineering, carefully selected components and

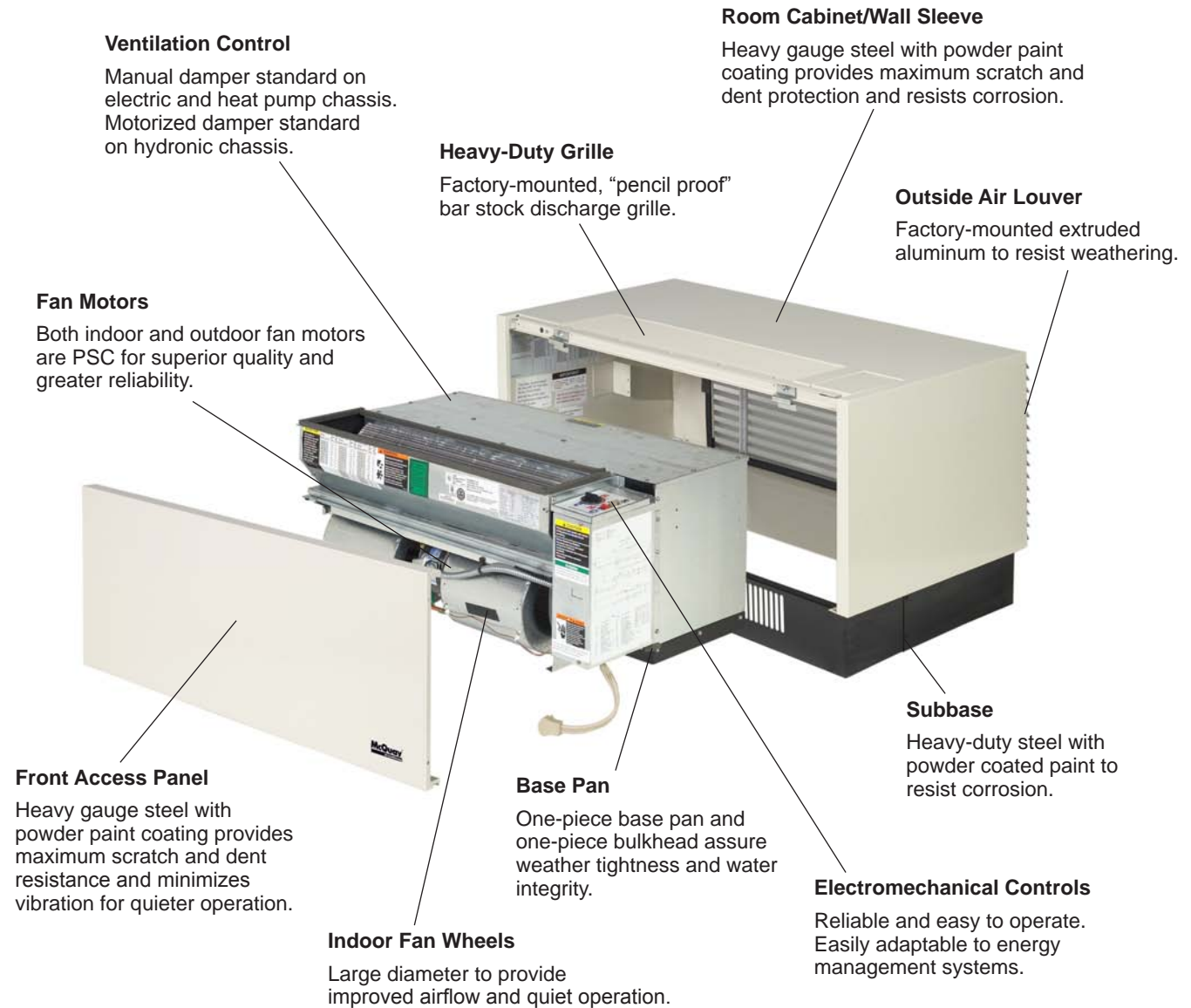
the highest manufacturing standards assure a quality product. McQuay quality offers you a durable yet aesthetic unit that will provide years of quiet trouble-free performance. For exceptional quality in design and construction, turn to EnerSaver Packaged Terminal Air Conditioners and Heat Pumps.

Model Nomenclature



Note: Availability of voltages, heating options, and controls may vary amongst unit sizes. Consult your McQuay representative.

Heavy Construction for Durability and Quiet Operation



Agency Approval

EnerSaver Packaged Terminal Air Conditioners and Heat Pumps are tested and rated in accordance with ARI Standards 310 and 380. They and are listed by Underwriters Laboratories Inc. and the Canadian Standards Association as complying with nationally recognized safety standards for packaged terminal air conditioners and heat pumps.



Units are listed by the
Canadian Standards Association

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System Features

Figure 1: Short Cabinet



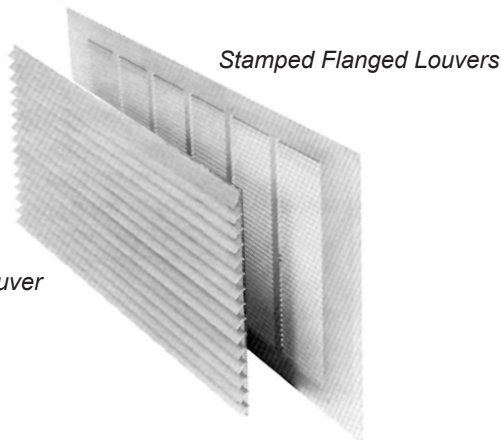
Figure 2: Long Cabinet (hydronic applications)



Figure 3: Discharge Grille, Front Cover & Control Access



Figure 4: Louvers



Room Cabinet/Wall Sleeve

EnerSaver™ room cabinets/wall sleeves are available in short and long cabinet styles.

The 37 $\frac{1}{2}$ " short cabinet is used for applications that utilize electric resistance or reverse cycle/heat pump heating technologies. The EnerSaver chassis power cord is designed to directly plug in to an electrical receptacle that is hard wired and concealed within the subbase of the room cabinet/wall sleeve.

The 41 $\frac{1}{2}$ " long cabinet is used when the hydronic (hot water or steam) heat option is chosen. Included with this room cabinet is a junction box designed to house an electrical receptacle that is hard wired to the facilities respective power circuit.

In all cases, the electric receptacle is supplied by either the factory or by others.

The room cabinet/wall sleeve is constructed of heavy-duty steel that is phosphated and coated with epoxy powder paint to resist scratches, dents and corrosion. The room cabinet/wall sleeve is designed to operate in a dry mode with all condensate and rain collected in the chassis base pan. Water collected in the chassis base pan is evaporated through the condenser coil or discharged into the facilities drain system. This design ensures that no water collects in the room cabinet/wall sleeve and results in prolonged the life. Guide rails position the chassis within the cabinet and insure proper seating of the chassis against the internal weather seal.

Heavy Bar Stock Discharge Grille

The EnerSaver discharge grille is noted both for its strength and appearance. The grille is inclined at a fixed angle of 10° from vertical to provide optimum air circulation. The heavy bar stock design offers an attractive "pencil proof" grille with no moving parts to become damaged or misplaced.

Front Panel and Control Access

The front panel is heavy-gauge steel finished in baked-on corrosion resistant Antique Ivory powdered paint. The panel provides complete access to the removable chassis. The panel can be locked in place by two hidden screws. A steel control access door complements the cabinet's smooth lines by concealing the unit controls. The concealed tamper resistant front panel screws are ideal for institutional applications.

Outdoor Louvers

Outdoor louvers are available in two attractive styles to complement any building. Extruded aluminum louvers offer a pleasing appearance in heavy-gauge anodized aluminum for good strength and long life. Extruded aluminum louvers are factory installed on the wall sleeve cabinet, saving installation time at the job site.

Stamped flanged louvers offer a highly functional alternative where it is desirable to hide a rough wall opening. Heavy-gauge anodized aluminum offers strength and durability. The 1 $\frac{1}{4}$ " wide flange is tapered toward the wall to insure a finished appearance. Stamped flanged louvers always ship separate from the wall sleeve.

Quiet Dependable Performance

Chassis Construction

The unit chassis includes the refrigeration circuit, air moving components, controls and optional electric heaters. A single integrated chassis offers reduced job site labor over the separate heating and cooling chassis of other manufacturers. The chassis drain pan base and panels are galvanized steel for corrosion resistance. A removable cover provides cleaning access to the evaporator coil drain pan, an important consideration for maintaining high indoor air quality.

Compressor

The compressor is the heart of the refrigerant circuit. The compressor's hermetic PSC motor is thermally protected to prevent operation if a system problem should occur. Low ambient lockout to prevent cooling operation below 40°F outside temperature is standard for manual changeover controls. Double vibration isolation assures quiet operation by internally isolating the compressor components with springs and externally isolating the entire compressor with rubber mounts.

Fan Motors

EnerSaver™ units feature separate fan motors for room air and outside air fans. Only the inside fan motor runs when the refrigerant cycle is not operating, unlike single motor units where one large motor operates both indoor and outdoor fans. The two-motor feature offers reduced operating noise and improved energy efficiency. High quality PSC motors are used for both indoor and outdoor fans.

The two indoor fans are double width, double inlet centrifugal design for optimal air distribution over the coil and minimal noise. The outdoor propeller fan incorporates a slinger ring that in the cooling mode picks up condensate water from the base pan and blows it into the condenser coil. The condensate evaporates on the condenser resulting in increased cooling efficiency.

Heat Pump Operation

EnerSaver™ heat pumps are identical to the terminal air conditioning units with the addition of a reversing valve. The valve reverses the traditional functions of the indoor evaporator coil and outdoor condenser coil resulting in heat pump operation. Heat is extracted from the outside air and transferred indoors through the refrigerant circuit. Heat pump operation reduces energy consumption up to 64% over electric resistance heat depending on indoor and outdoor conditions. A special outdoor air sampler system prevents the compressor from starting unless the outside air is above 40°F. The auxiliary electric heat is then activated. Considerable condensate will form during the heating cycle necessitating a condensate removal system.

Fresh Air Damper

The EnerSaver fresh air damper system is designed for maximum outside air ventilation. Many PTAC/PTHP manufacturers' designs allow very little outside air into the room. Both manual and motorized dampers are utilized. Units having hot water/steam heat come standard with motorized dampers. A concealed override switch is standard for the motorized damper. The manual damper is standard for electric heat or heat pump units. A washable insect screen is provided for all dampers.

Figure 5: Top View of Chassis (Top Panel Removed)

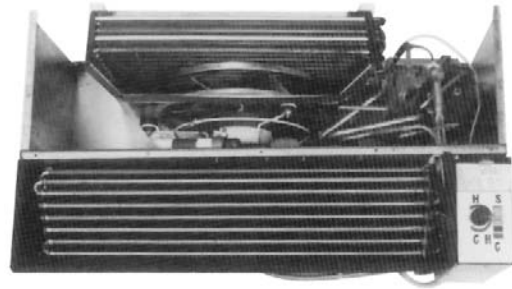


Figure 6: Front View of Chassis



Figure 7: Manual Fresh Air Damper

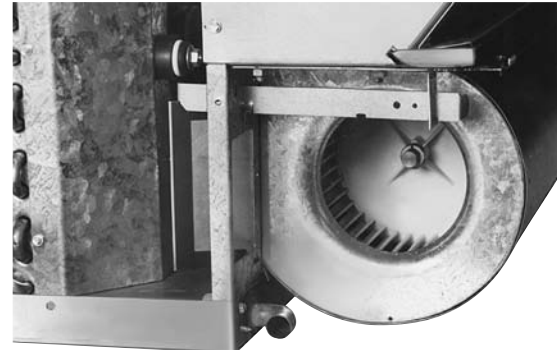


Figure 8: Motorized Fresh Air Damper



System Options

Figure 9: Electric Heat



Electric Heat

Sheathed electric elements provide safe, even heat with long life expectancy.

Hot Water/Steam Heat

EnerSaver™ hot water/steam hydronic heating coils are factory mounted to the wall sleeve cabinet. The complete chassis can be removed without un-piping the coil. Because the hydronic coil is located at the top of the cabinet it is out of the way for chassis removal and there is ample room for valves and piping. The headered coil design offers high capacity with low pressure drop.

Front Panel Grille Options

An optional front panel with an incorporated stamped return air grille is available for floor mounting of EnerSaver units. This allows the wall sleeve to be installed at the floor line to accommodate low windows.

Figure 10: Hydronic Heat



Figure 11: Front Panel Return Air Grille



Accessories

Subbases

The standard subbase is 5" high and adjustable in depth from 7¹/₄" to 20¹/₈" to accommodate almost any wall thickness. Leveling legs at each front corner provide up to a 1" adjustment to compensate for uneven floors. The short cabinet subbase has an electrical box for installation of appropriate receptacle (ordered separately). The long cabinet subbase does not include an electrical box or receptacle since they are provided in the wall sleeve left end compartment. Subbases are shipped with each room cabinet wall sleeve. All subbases are heavy-gauge galvanized steel finished with Oxford Brown powdered paint.

Wall Guard Flanges

A decorative metal picture frame type flange provides a finished look to rough interior wall openings. The wall guard flange is finished in baked-on corrosion resistant Antique Ivory powdered paint to match the wall sleeve.

Outdoor Louver Intake Air Collar

An outdoor picture frame type flange provides a finished look to rough exterior wall openings. The intake air collar is designed for use with the extruded aluminum louver. The louver can be recessed up to 3" (76mm) within the intake air collar. The intake air collar is manufactured of heavy-gauge anodized aluminum.

Air Deflector

A discharge air deflector is available for applications where window drapes interfere with unit airflow. The decorative air deflector is finished in baked-on corrosion resistant Antique Ivory powdered paint to match the wall sleeve.

Figure 12: Subbase



Figure 13: Wall Guard Flange



Figure 14: Intake Collar

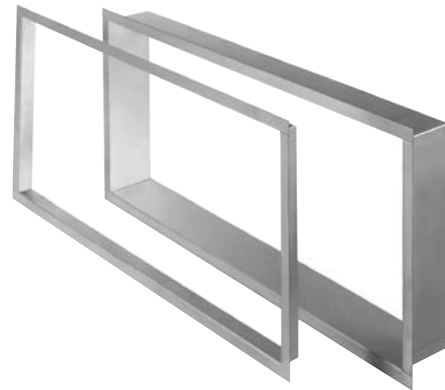


Figure 15: Air Deflector



System Design

A comfort conditioning system based on EnerSaver PTAC and PTHP units offers numerous design advantages over central systems.

Comfort Control

Flexible operation is assured by the independent control of each unit to meet the occupant's comfort requirements. Quiet unit operation contributes significantly to tenant comfort.

Building Design Freedom

Design freedom results from the elimination of extensive ductwork, complex controls, cooling towers, equipment rooms and piping, (electric heat units) and structural load considerations required for central systems.

Installation Ease and Economy

In most cases terminal units offer the lowest installed cost system on the market today. Installation can proceed one or several rooms at a time yielding greater control of job site scheduling for both new construction and renovation. Most options are factory mounted reducing field installation time and offering a more aesthetic unit.

Maintenance Simplicity

EnerSaver units offer the ultimate in maintenance simplicity. The need for a licensed mechanic to operate complex equipment or controls is eliminated. All standard unit chassis are power cord connected to an electrical receptacle in the sub-base or room cabinet wall sleeve. In the unlikely event of unit malfunction a spare chassis can be quickly installed resulting in minimal tenant discomfort. Easy filter access simplifies routine maintenance.

Heating Flexibility

Heat pumps operate down to 40°F outdoor ambient temperature resulting in energy economy. Heating options include electric hot water or steam, offering installation flexibility and the opportunity to select the most economical heat source for the building application.

Energy Economy

EnerSaver™ units are available in two models, packaged terminal air conditioner (PTAC) and packaged terminal heat pump (PTHP). Both models feature high energy efficiency ratios (EER) for economical operation in the cooling mode. Heat pump units feature a high coefficient of performance (COP) providing substantial savings over straight electric heat for operation down to 40°F outdoor ambient temperature.

Cabinet Construction

The one-piece EnerSaver chassis is installed in a rugged institutional quality cabinet that features an aesthetic bar type discharge grille. The pencil proof discharge grille is manufactured of heavy steel bar stock for exceptional durability. Concealed front panel fasteners are ideal for applications requiring tamper resistance.

Control System

The standard control consists of a unit mounted thermostat with manual changeover and low ambient lockout. The fan switch allows high and low airflow selection. Room air fans operate continuously when the unit is on.

Unit Selection

The achievement of an efficient EnerSaver™ terminal air conditioning/heat pump system is dependent on accurate system design and proper equipment selection. Design conditions and design load calculations are not described in detail in this catalog. More detailed information may be found in the ASHRAE Handbook Series. Prior to selecting the individual unit sizes the design engineer must determine the following factors:

- The inside and outside wet and dry bulb temperatures.
- The method of introducing ventilation.
- The total and sensible heat gains/losses of the area to be served by the unit.
- The properties of the heating media (optional steam or hot water heat).
- Any special architectural or design requirements of the building such as outdoor louver type.

Unit size should be selected by calculating the peak load requirements at severe climatic conditions and with the fan operating at high speed. Ordinary day-to-day cooling and heating requirements are then achieved at low fan speed. Unit size is generally selected on the basis of matching the sensible cooling capacity of the unit with the calculated requirements when operating at high fan speed. The unit selection should then be checked for air volume, total cooling load and sensible heating load.

Performance and Electrical Data

EnerSaver™ Packaged Terminal Air Conditioners – PNES

Table 1: Cooling & Heating Capacities

Unit Size	009				012			015		
	115V ^⑤	208V	230V	265V	208V	230V	265V	208V	230V	265V
Voltage ^⑤	115V ^⑤	208V	230V	265V	208V	230V	265V	208V	230V	265V
Full Load Amps - Cooling Only ^{②④}	6.4	5.8	5.2	4.5	6.9	6.3	5.8	8.9	8.0	7.4
Cooling Capacity Btuh ^①	9,200	9,200	9,200	9,200	11,200	11,200	11,200	13,000	13,000	13,000
Sensible Cooling Capacity, Btuh	6,400	6,400	6,400	6,400	7,200	7,200	7,200	8,100	8,100	8,100
Watts	939	939	939	939	1,217	1,217	1,217	1,529	1,529	1,529
EER	9.8	9.8	9.8	9.8	9.2	9.2	9.2	8.5	8.5	8.5
O.A. Ventilation %	20	20	20	20	20	20	20	20	20	20
Aux. Elec. Heat Elements (Total Amps)										
2.2 kW	–	–	9.9	8.8	–	9.9	8.8	–	9.9	8.9
2.3 kW	–	11.4	–	–	11.4	–	–	11.4	–	–
2.9 kW	–	–	12.9	11.4	–	12.9	11.4	–	12.9	11.4
3.2 kW	–	15.7	–	–	15.7	–	–	15.7	–	–
3.7 kW	–	–	–	14.4	–	–	14.4	–	–	14.4
3.9 kW	–	–	17.3	–	–	17.3	–	–	17.3	–
4.2 kW	–	20.5	–	–	20.5	–	–	20.5	–	–

Table 2: Fan Motor Data – PNES

Unit Size	CFM Hi / Lo Speed	Room Air Fan Motor				Outside Fan Motor			
		115V ^⑤	208V	230V	265V	115V	208V	230V	265V
009	320 / 290	0.88	0.34	0.30	0.47	1.40	0.76	0.70	0.66
012	320 / 290	–	0.34	0.30	0.47	–	0.76	0.70	0.66
015	360 / 290	–	0.34	0.30	0.47	–	0.76	0.70	0.66

Notes:

- ① Based on ASHRAE and AHRI standard test conditions of 95°F (35 C) DB / 75°F (24 C) WB outdoor air and 80°F (27 C) DB / 67°F (19 C) WB indoor air.
- ② The complete unit including fan motors.
- ③ Based on ASHRAE and AHRI standard test conditions of 70°F (21 C) DB return air and 47°F (8 C) DB / 43°F (6 C) WB outdoor air.
- ④ Based on high fan speed.
- ⑤ All voltages 60 Hz, single phase.
- ⑥ Air conditioning with hydronic heat only.

Table 3: Auxiliary Hydronic Heat Coil Capacities – PNES^④

Unit Size	Steam Capacity Btuh ^①		Hot Water Capacity				
	Low Speed	High Speed	GPM	Btuh ^②		P.D. ft. H2O (kPa)	
				Low Speed	High Speed	Coil	Valve
009	17,600	19,900	1	11,800	14,900	0.6 (4.1)	0.5 (3.4)
			③	–	16,300	1.8 (12.4)	1.0 (6.9)
			2	14,100	17,000	2.8 (19.3)	1.5 (10.3)
			3	15,000	18,600	5.6 (38.6)	3.0 (20.7)
			4	15,800	19,600	9.0 (62.1)	5.5 (37.9)
012	19,500	21,900	1	13,900	16,200	0.6 (4.1)	0.5 (3.4)
			③	–	17,900	1.8 (12.4)	1.0 (6.9)
			2	15,700	18,100	2.8 (19.3)	1.5 (10.3)
			3	17,000	19,500	5.6 (38.6)	3.0 (20.7)
			4	18,000	20,200	9.0 (62.1)	5.5 (37.9)
015	19,500	21,900	1	13,900	16,200	0.6 (4.1)	0.5 (3.4)
			③	–	17,900	1.8 (12.4)	1.0 (6.9)
			2	15,700	18,100	2.8 (19.3)	1.5 (10.3)
			3	17,000	19,500	5.6 (38.6)	3.0 (20.7)
			4	18,000	20,200	9.0 (62.1)	5.5 (37.9)

Notes:

- ① Based on 70°F (21 C) entering air temperature and 2 psi (3.8 kPa) steam pressure.
- ② Based on 70°F (21 C) entering air temperature and 200°F (93 C) entering water temperature.
- ③ At ASHRAE and AHRI conditions of 70°F (21 C) entering air temperature, 200°F (90 C) entering water temperature and 108°F (82 C) leaving water temperature.
- ④ Maximum hot water temperature = 250°F (121 C), maximum steam pressure = 5 psig (35 kPa), minimum steam pressure = psig (7 kPa).

Performance and Electrical Data

Table 4: Electrical Data, EnerSaver PNES

Voltage	Unit Size	Heating Type	Minimum Circuit Ampacity	Maximum Time Delay Fuse Size	A Design	B Design
					Subbase ^①	Power Cord
115	009	None, Steam or Hot Water	12.3	20	20	20
208	009	None, Steam or Hot Water	6.9	15	20	20
		2.3	14.2	15	20	30
		3.2	19.7	20	20	30
		4.2	25.7	25	20	30
	012	None, Steam or Hot Water	8.4	15	20	20
		2.3	14.2	15	20	30
		3.2	19.7	20	20	30
		4.2	25.7	25	20	30
	015	None, Steam or Hot Water	10.4	15	20	20
		2.3	14.2	15	20	30
		3.2	19.7	20	20	30
		4.2	25.7	25	20	30
230	009	None, Steam or Hot Water	6.3	15	20	20
		2.2	12.3	15	20	30
		2.9	16.1	15	20	30
		3.9	21.6	20	20	30
	012	None, Steam or Hot Water	6.3	15	20	20
		2.2	12.3	15	20	30
		2.9	16.1	15	20	30
		3.9	21.6	20	20	30
	015	None, Steam or Hot Water	5.9	15	20	20
		2.2	10.6	15	20	30
		2.9	16.2	15	20	30
		3.9	21.6	20	20	30
265	009	None, Steam or Hot Water	5.4	15	20	20
		2.2	11.0	15	20	30
		2.9	14.3	15	20	30
		3.7	18.0	20	20	30
	012	None, Steam or Hot Water	7.0	15	20	20
		2.2	11.0	15	20	30
		2.9	14.3	15	20	30
		3.7	18.0	20	20	30
	015	None, Steam or Hot Water	8.6	15	20	20
		2.2	10.7	15	20	30
		2.9	14.3	15	20	30
		3.7	18.0	20	20	30

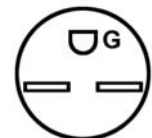
Electrical Receptacles



NEMA #5-20R



NEMA #6-20R



NEMA #6-30R



NEMA #7-20R



NEMA #7-30R

^① Cord plugs into receptacle located in subbase; 20 Amp Plug Set on All Chassis.

Notes:

1. All receptacles indicated are general purpose, non-locking, 2-pole, 3-wire grounding type.

General Electrical Notes:

1. Electrical installation must be in accordance with job wiring diagram and comply with national electrical codes.
2. Permanently connected units may utilize time delay fuses or HACR type circuit breakers (when applicable) for branch circuit protection.
3. Since all chassis have identical dimensions, regardless of heating and cooling capacities, careful attention must be paid to the branch circuit amperage requirement for each unit, to avoid electrical mismatching of chassis and permanently connected branch circuits during field installation.
4. Variations in supply voltage shall not exceed ±10% of rated voltage.

Performance and Electrical Data

EnerSaver™ Packaged Terminal Heat Pumps – PNHS

Table 5: Cooling & Heating Capacities

Unit Size	009			012		
	208V	230V	265V	208V	230V	265V
Voltage ^⑤	208V	230V	265V	208V	230V	265V
Full Load Amps ^{② ④}	5.8	5.2	4.5	6.9	6.3	5.8
Cooling Capacity Btuh ^①	9,000	9,000	9,000	11,200	11,200	11,200
Sensible Cooling Capacity, Btuh	6,200	6,200	6,200	7,200	7,200	7,200
Watts	891	891	891	1,231	1,231	1,231
EER	10.1	10.1	10.1	9.1	9.1	9.1
Reverse Cycle Heat Capacity, Btuh ^②	8,300	8,300	8,300	10,400	10,400	10,400
Watts	811	811	811	1,089	1,089	1,089
COP	3.0	3.0	3.0	2.8	2.8	2.8
O.A. Ventilation %	20	20	20	20	20	20
Aux. Elec. Heat Elements (Total Amps)						
2.2 kW	–	9.9	8.8	–	9.9	8.8
2.3 kW	11.4	–	–	11.4	–	–
2.9 kW	–	12.9	11.4	–	12.9	11.4
3.2 kW	15.7	–	–	15.7	–	–
3.7 kW	–	–	14.4	–	–	14.4
3.9 kW	–	17.3	–	–	17.3	–
4.2 kW	20.5	–	–	20.5	–	–

Notes:

- ① Based on ASHRAE and AHRI standard test conditions of 95°F (35 C) DB / 75°F (24 C) WB outdoor air and 80°F (27 C) DB / 67°F (19 C) WB indoor air.
- ② The complete unit including fan motors.
- ③ Based on ASHRAE and AHRI standard test conditions of 70°F (21 C) DB return air and 47°F (8 C) DB / 43°F (6 C) WB outdoor air.
- ④ Based on high fan speed.
- ⑤ All voltages 60 Hz, single phase.

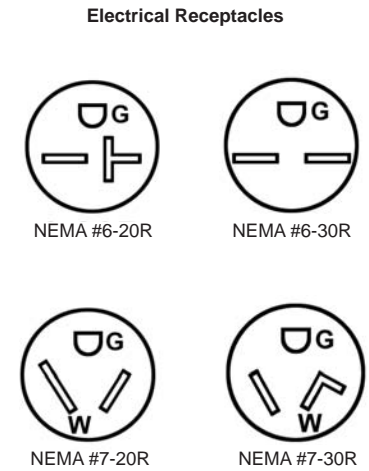
Table 6: Fan Motor Data – PNHS

Unit Size	CFM Hi / Lo Speed	Room Air Fan Motor			Outside Fan Motor		
		208V	230V	265V	208V	230V	265V
009	320 / 290	0.34	0.30	0.47	0.76	0.70	0.66
012	320 / 290	0.34	0.30	0.47	0.76	0.70	0.66

Performance and Electrical Data

Table 7: Electrical Data, EnerSaver PNHS

Voltage	Unit Size	Heating Type	Minimum Circuit Ampacity	Maximum Time Delay Fuse Size	A Design	B Design
					Subbase ^①	Power Cord
208	009	None, Steam or Hot Water	6.9	15	20	20
		2.3	14.2	15	20	30
		3.2	19.7	20	20	30
		4.2	25.7	25	20	30
	012	None, Steam or Hot Water	8.4	15	20	20
		2.3	14.2	15	20	30
		3.2	19.7	20	20	30
		4.2	25.7	25	20	30
230	009	None, Steam or Hot Water	6.3	15	20	20
		2.2	12.3	15	20	30
		2.9	16.1	15	20	30
		3.9	21.6	20	20	30
	012	None, Steam or Hot Water	6.3	15	20	20
		2.2	12.3	15	20	30
		2.9	16.1	15	20	30
		3.9	21.6	20	20	30
265	009	None, Steam or Hot Water	5.4	15	20	20
		2.2	11.0	15	20	30
		2.9	14.3	15	20	30
		3.7	18.0	20	20	30
	012	None, Steam or Hot Water	7.0	15	20	20
		2.2	11.0	15	20	30
		2.9	14.3	15	20	30
		3.7	18.0	20	20	30



^① Cord plugs into receptacle located in subbase; 20 Amp Plug Set on All Chassis.

Notes:

1. All receptacles indicated are general purpose, non-locking, 2-pole, 3-wire grounding type.

General Electrical Notes:

1. Electrical installation must be in accordance with job wiring diagram and comply with national electrical codes.
2. Permanently connected units may utilize time delay fuses or HACR type circuit breakers (when applicable) for branch circuit protection.
3. Since all chassis have identical dimensions, regardless of heating and cooling capacities, careful attention must be paid to the branch circuit amperage requirement for each unit, to avoid electrical mismatching of chassis and permanently connected branch circuits during field installation.
4. Variations in supply voltage shall not exceed ±10% of rated voltage.

Heating Capacity Adjustment Factors

Figure 16: Hot Water Heat

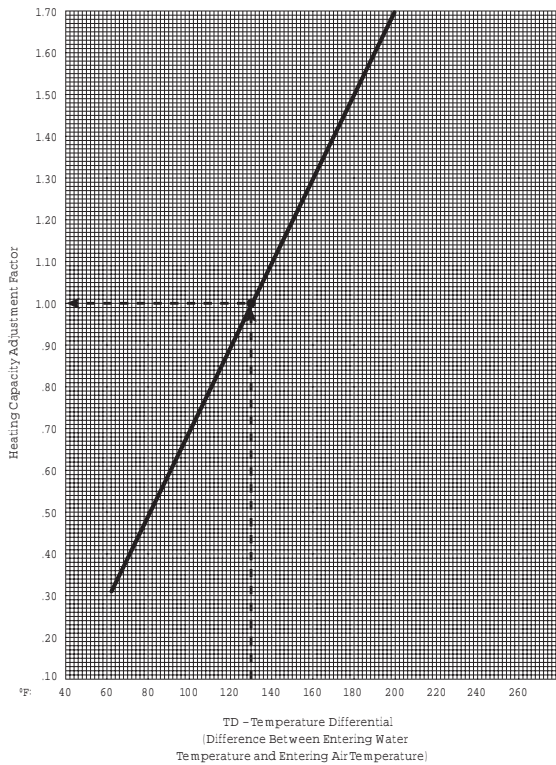
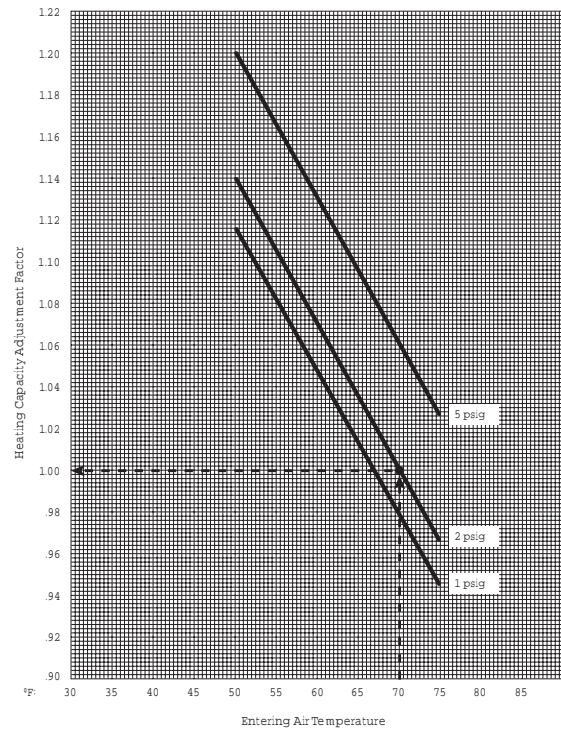
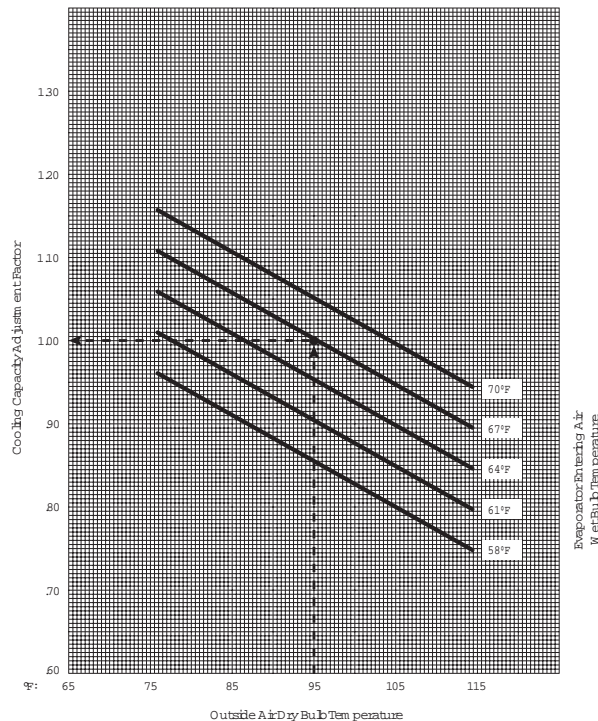


Figure 17: Steam Heat



Note: Convective heating rate, without room fan operation, is approximately 10% of rated capacity.

Figure 18: Cooling Capacity Adjustment Factor



Adjustment Factor Instructions

1. The dashed lines on the charts show how the published ratings were determined.
2. Enter the charts from the bottom.
3. Proceed vertically to the appropriate transfer line. Transfer lines may be interpolated.
4. Move to the left to find the adjustment factor.
5. Apply the adjustment factor to the published rating.

Nonstandard Louver Applications

Approval Procedure

In combining an architecturally compatible louver (furnished and installed by others) with an EnerSaver™ unit, certain minimum criteria must be met to insure satisfactory unit operation. All details of the louver being considered, including the following, must be provided and transmitted through the local McQuay sales representative.

1. Manufacturer's shop drawings detailing louver selected.
2. Architectural plans detailing the following:
 - a. Method of louver installation and mounting to wall sleeve.
 - b. Blockoff provisions for oversized louvers.
 - c. Provision for anti-recirculation baffles on the louver that align with and contact the condenser coil blockoff strips on the rear of the chassis.
 - d. Provision for proper rain water and condensate overflow drainage.
 - e. Sealing details of both louvers to building and louver to wall sleeve.
 - f. Possible air obstructions such as facades, balconies, etc.

Assuming the above prerequisites are furnished approval of the application must be obtained from McQuay and may require testing the louver in our Engineering Lab. Regardless of whether or not a test is deemed necessary, the results of the application review will be transmitted to the representative sales office and installing contractor outlining the various requirements necessary to insure satisfactory unit performance. Until such time as we have received the written assurance of the installing contractor that the parameters as set forth in our correspondence will be adhered to, the application will not be formally approved. **Furthermore, McQuay International reserves the right to the installation for final approval and warranty consideration.**

If our Engineering Department advises a test is necessary, a sample louver is to be forwarded to McQuay. Contact your local sales representative to obtain shipping details. Without exception the sample louver must be at least 16" high by 37 1/2" wide for short cabinet units and 41 1/2" wide for long cabinet units. If the louver application is of a special size, the louver should be of size as shown on the construction drawings so that the McQuay test lab can build the test installation just as the louver will be installed at the job. Sample louvers for testing are not returnable.

Once a specific louver has been tested and approved, it need not be resubmitted for testing again; however, written approval for its reuse must be obtained on each project for warranty purposes.

Areas of Consideration

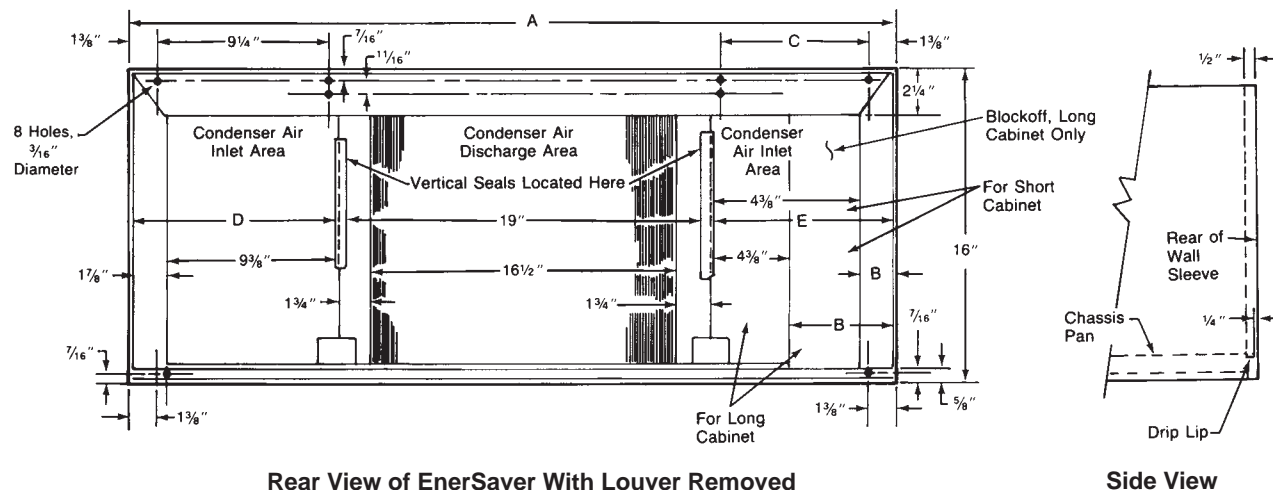
Shown below are the various dimensions pertinent to applying a non-McQuay louver to an EnerSaver unit with either short or long style cabinet. Also shown is a side view of the rear of the cabinet/sleeve. The following are some areas of consideration in applying a louver furnished by others.

Condenser Airflow

An EnerSaver™ louver must handle airflow in two directions simultaneously as shown by the condenser air inlet and discharge areas on the chassis rear view (Figure 19). If condenser airflow is restricted or condenser discharge air is allowed to recirculate or mix with condenser inlet air, condensing temperatures rise above normal, causing possible premature compressor failure as well as a reduction in unit capacity.

To prevent any possibility of recirculation or mix of condenser discharge air with condenser inlet air, the two air-streams must be totally separated. In figure 19, notice the location of the 1 3/4" wide condenser coil block-off strips. Attached to the

Figure 19: Nonstandard Louver Applications



Nonstandard Louver Applications

outermost edge of these strips are the 1" wide, 3/4" thick vertical polyfoam seal strips. Any non-McQuay louver must have anti-recirculation baffles (or blade braces) incorporated into the design and located such that they align with and contact the chassis mounted polyfoam strips. The louver anti-recirculation baffles (or blade braces) must be of the same height as the chassis mounted polyfoam seal strips.

There is yet another area of consideration to prevent recirculation of condenser discharge air with condenser inlet air. Referring to Figure 19, the side view drawing, notice the 1/2" recess flanged area wherein the standard McQuay louver is normally positioned. In most applications, louvers by others include a mounting frame and are not normally positioned within this 1/2" cavity. Therefore, the louver is usually mounted in such a way that the inside edge of the louver butts up against the outer edge of the cabinet/wall sleeve. This mounting procedure results in a 1/2" open area between the chassis rear mounted polyfoam seals and the louver anti-recirculation baffles. To prevent any air recirculation within the confines of this 1/2" open area it will be necessary to either build up the polyfoam seals on the rear of the chassis or add on an extra depth dimension to the louver vertical blade braces. Notching the louver vertical braces at the point of interface with the cabinet/sleeve if the louver is oversized would also be beneficial. It is of the utmost importance that there is not only an alignment but also an abutment of the chassis rear mounted polyfoam strips with the louver anti-recirculation baffles (or blade braces).

To prevent any recirculation of air within the louver blades themselves, the anti-recirculation baffles should be built into the louver design through its front-to-back depth if the blade depth is greater than 1".

To prevent any possible unit performance problems realized from restricted airflow, it is essential that no part of any louver support and/or frame encroach into the areas marked "Condenser Air Inlet" or "Condenser Air Discharge" other than at the location of the chassis mounted polyfoam seal strips.

Louver Size

Without exception, all louvers supplied by others for use with the EnerSaver must be at least 16" high by 37¹/₂" wide for use with short cabinet units and 41¹/₂" wide for use with long cabinets, exclusive of any frame dimension.

If architectural requirements dictate the use of an oversized louver, the wall opening at the wall sleeve should be the same size as specified for the wall sleeve and the excess louver portions should be blanked-off properly to prevent air and water leaks.

Should an oversized louver be intended for use with multiple units, the application must be reviewed not only from the louver standpoint, but also from the unit placement standpoint. In most cases, this type of arrangement must be reviewed and tested in light of the multiple unit arrangement sharing one oversized louver.

Louver Depth and Blade Configuration

The shallower the louver depth, the better. Condenser air has ample opportunity to recirculate within the confines of a deep louver. The preferred louver depth is 1" to 1¹/₂".

A further point of scrutiny is the blade profile, spacing and shape of the louver blades. Caution should be exercised in the selection of louvers with blades employing back returns, vertical front legs or zig-zag patterns. Any louver designed with a blade profile incorporating multiple projections within the blade design or with a minimal blade angle is designed primarily to be "watertight" or "sight-tight". These louver designs should be avoided due to their restricted airflow.

Preferred blade angle is approximately 40°; preferred blade spacing is at least 3/4" open area, exclusive of any dimensions of projections within the blade profile.

Vertical blade louvers are not acceptable for use with a PTAC/PTHP unit. Because the blades are vertical, they direct any discharge airflow severely either to the left or the right depending on the blade design. In view of the fact that our unit has inlet airstreams on the right and left hand sides and a discharge airstream in the middle, the condenser discharge air will be diverted to one of the inlet airstreams. Therefore, hot condenser discharge air will recirculate back into the unit via the affected inlet airstream and high head pressure operating conditions will result.

Louver Mounting

The illustration on page 16 shows the location of the eight louver mounting holes in the rear the cabinet/wall sleeve for mounting the standard McQuay extruded louver. Any screws or bolts inserted through these holes, or any field drilled holes for mounting louvers by others, must not project inside the cabinet/wall sleeve or they will interfere with the insertion of the chassis.

Regardless of the size of the louver, the cabinet/wall sleeve must be field caulked to the wall on top, bottom, and both sides to form an airtight and watertight seal. In addition, especially if the louver is oversized, provisions must be made for caulking the louver to the building and the louver to the wall sleeve to form a watertight louver/wall sleeve interface. Specifications should clearly spell out the materials and methods and specific responsibility for weatherproofing at the time the louvers and PTAC/PTHP wall sleeve are installed.

Nonstandard Louver Applications

Louver Provision for Drainage of Rainwater

There is no such thing as a "rainproof" louver for use with a PTAC/PTHP unit. The vertical blade eliminator type louver is relatively rainproof, but it is not suitable for use with PTAC/PTHP units due to high air friction caused by the louver design.

EnerSaver™ units are designed to contain melted snow or rain that blows through the louver, and prevent this water from entering the building by collecting it in the chassis drain pan. Shown in the side view on page 16 is the 1/2" recess into which the standard McQuay louver fits and the 1/4" wide drip lip projecting into the recess area of the bottom. Water collected in the chassis drain pan overflows to the outside through the louver via the drip lip. If the louver frame of a special louver blocks the drainage path, provision for weep holes must be made in this area.

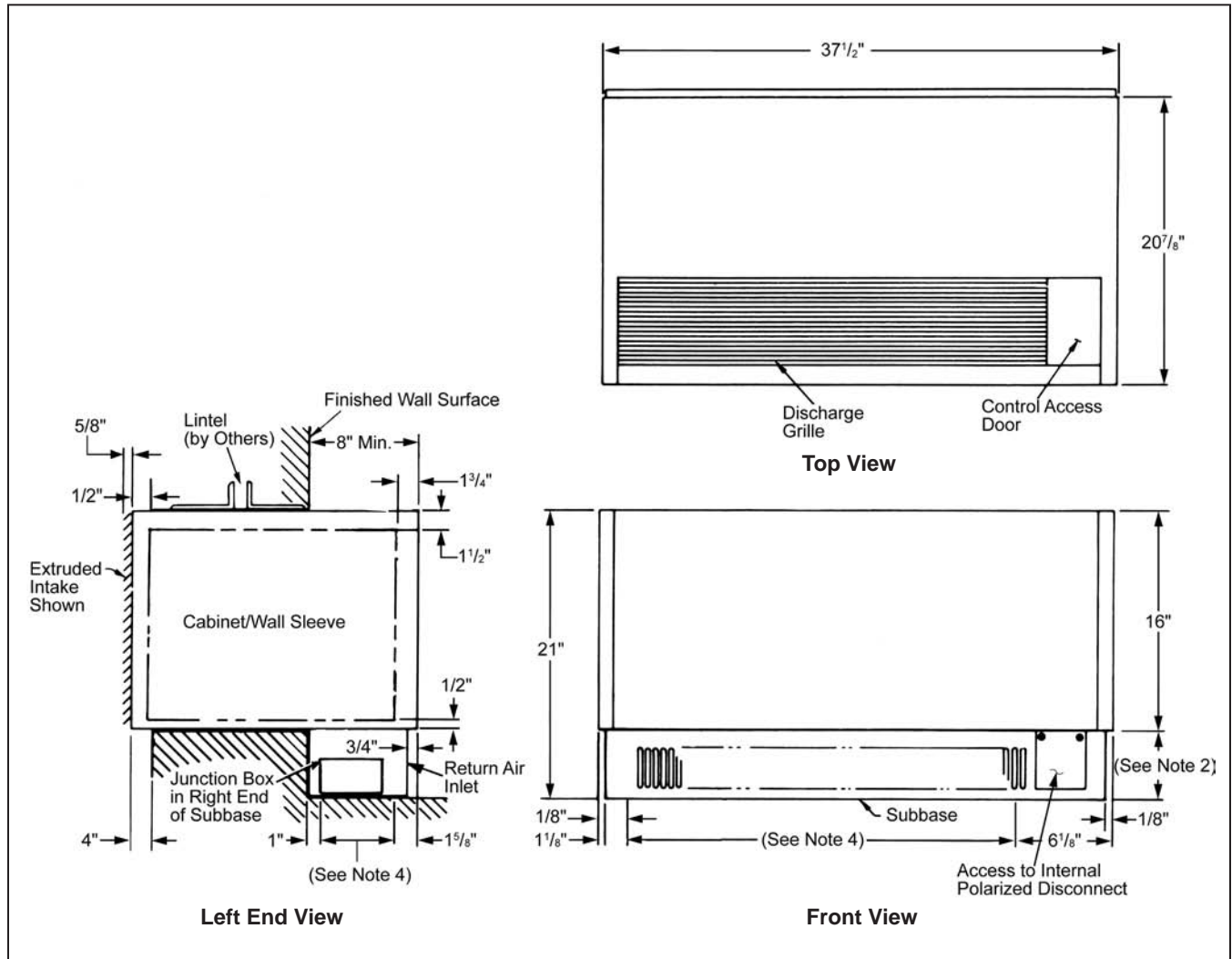
Grilles and Screens

Grilles and screens may be used only if they do not significantly reduce louver free area. We can approve the use of a bird screen providing it is 1/2" x 1/2" square, 0.0625" diameter wire mesh. Insect screens are not acceptable for use with PTAC/PTHP units because these screens are subject to blockage by dirt and other stray material and create the contingent liability of restricting the condenser air circulation through the louver.

Dimensional Data

EnerSaver™ (PNES3 - PNHS3) Dimensional Data

Figure 20: Permanently Connected, Short Cabinet With Subbase



Notes:

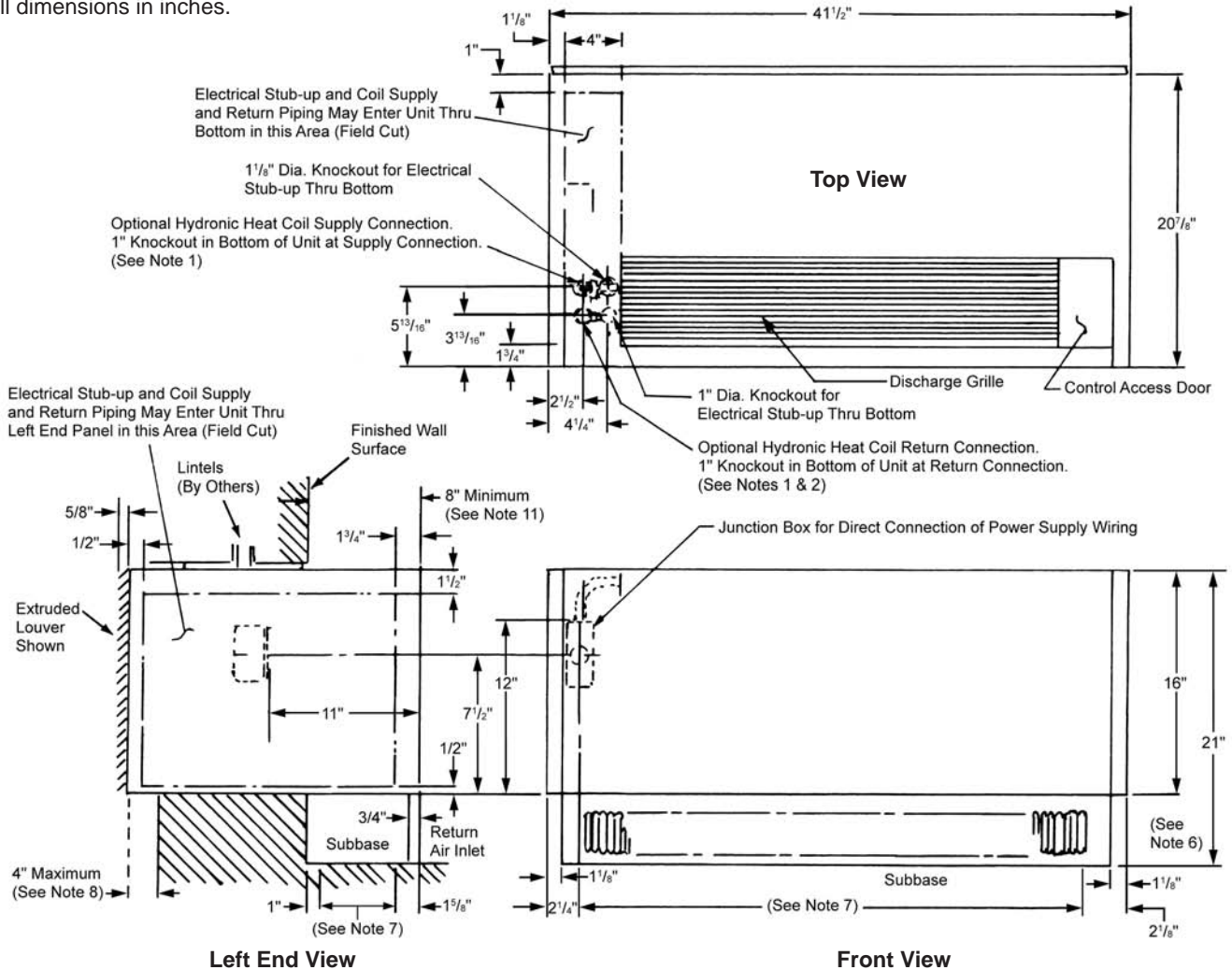
1. All dimensions in inches.
2. When required, 24-volt external control circuit connections are made in the bottom of the control box in right end of unit.
3. Standard subbase is provided with leveling screws which permit height adjustment between 5" minimum and 6" maximum. Subbase depth is adjustable from 7 1/4" minimum to 20 1/8" maximum. Subbase is normally shipped in wall sleeve for field installation.
4. Electric stub-up may enter bottom of subbase through area indicated. Junction box for connection of power supply wiring located in right-hand end of subbase has 1/2" conduit knockouts.
5. The bottom of the wall sleeve must be solidly supported by the wall and the unit subbase. If wall sleeve projects outdoors, maximum unsupported depth is 4". Wall sleeve should be set level for condensate drainage.

Dimensional Data

EnerSaver™ – (PNES3) Dimensional Data

Figure 21: Permanently Connected, Long Cabinet (Hydronic) With Subbase

All dimensions in inches.



Notes:

- Hydronic heat 5/8" O.D. coil connections (male sweat) are always in left end of unit, as shown.
- 1/8" FPT tapping included in hydronic heat return connection for field installation of an air vent furnished by others, if required.
- Hydronic heat motorized valve is line voltage two-way, two-position, normally open, which must be field piped in coil supply. Valve wiring plugs into control circuit wiring furnished with the unit.
- Cabinet/wall sleeve must be installed prior to electrical stub-up. 1/2" knockouts are provided for field wiring in electrical box at left end of unit.
- When required, 24 volt external control circuit connections are made in the left-hand end compartment.
- Standard subbase is provided with leveling screws which permit height adjustment between 5" minimum and 6" maximum. Subbase depth is adjustable from 7 1/4" minimum to 20 1/8" maximum. Subbase is normally shipped cabinet/wall sleeve for field installation.
- Electrical stub-up and coil supply and return piping may enter bottom of subbase through area indicated.
- The bottom of the wall sleeve must be solidly supported by the wall and the unit subbase. If wall sleeve projects outdoors, maximum unsupported depth is 4". Wall sleeve should be set level for condensate drainage.

Dimensional Data

Figure 22: Optional Indoor Guard Flange

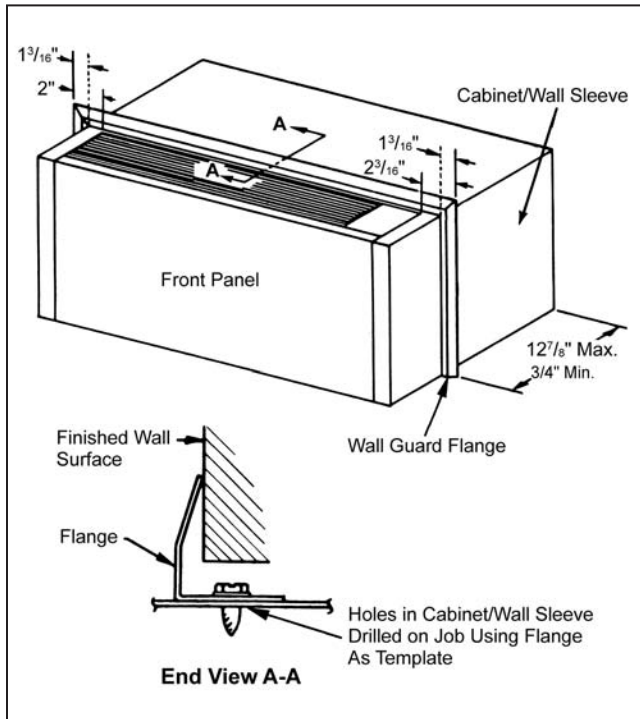


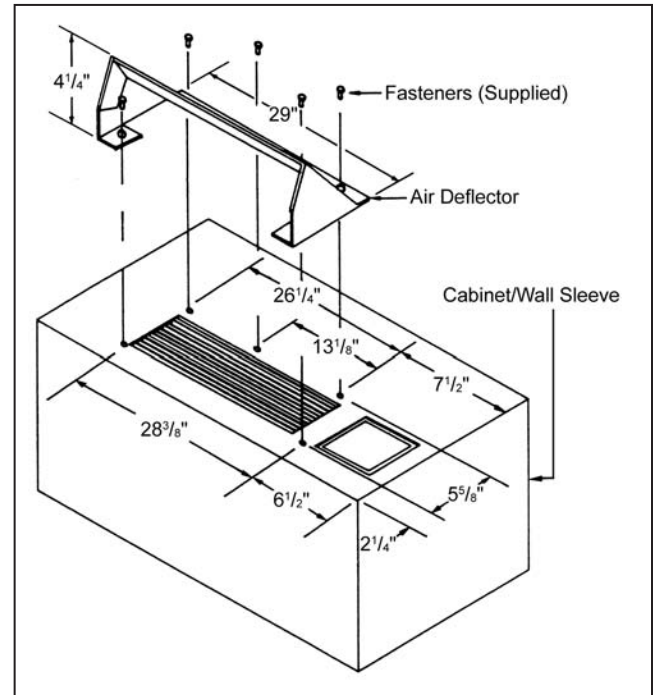
Table 8: Indoor Wall Guard Flange Dimensions

Cabinet Type	X
Short Cabinet	37 1/2"
Long Cabinet	41 1/2"

Notes:

1. All Dimensions in inches.
2. Decorative use only. Not intended to act as weather seal.
3. Color is Antique Ivory to blend with cabinet/sleeve.

Figure 23: Optional Discharge Air Deflector



Notes:

1. All Dimensions in inches.
2. Air deflector is Antique Ivory in color, to blend with room cabinet wall sleeve.

Mounting Instructions:

Using the deflector as a template, drill five (5) .125 diameter holes on top of wall sleeve cabinet as shown. Mount deflector using five (5) fasteners (supplied).

Optional Outdoor Intake Collar

Figure 24: Optional Outdoor Intake Collar

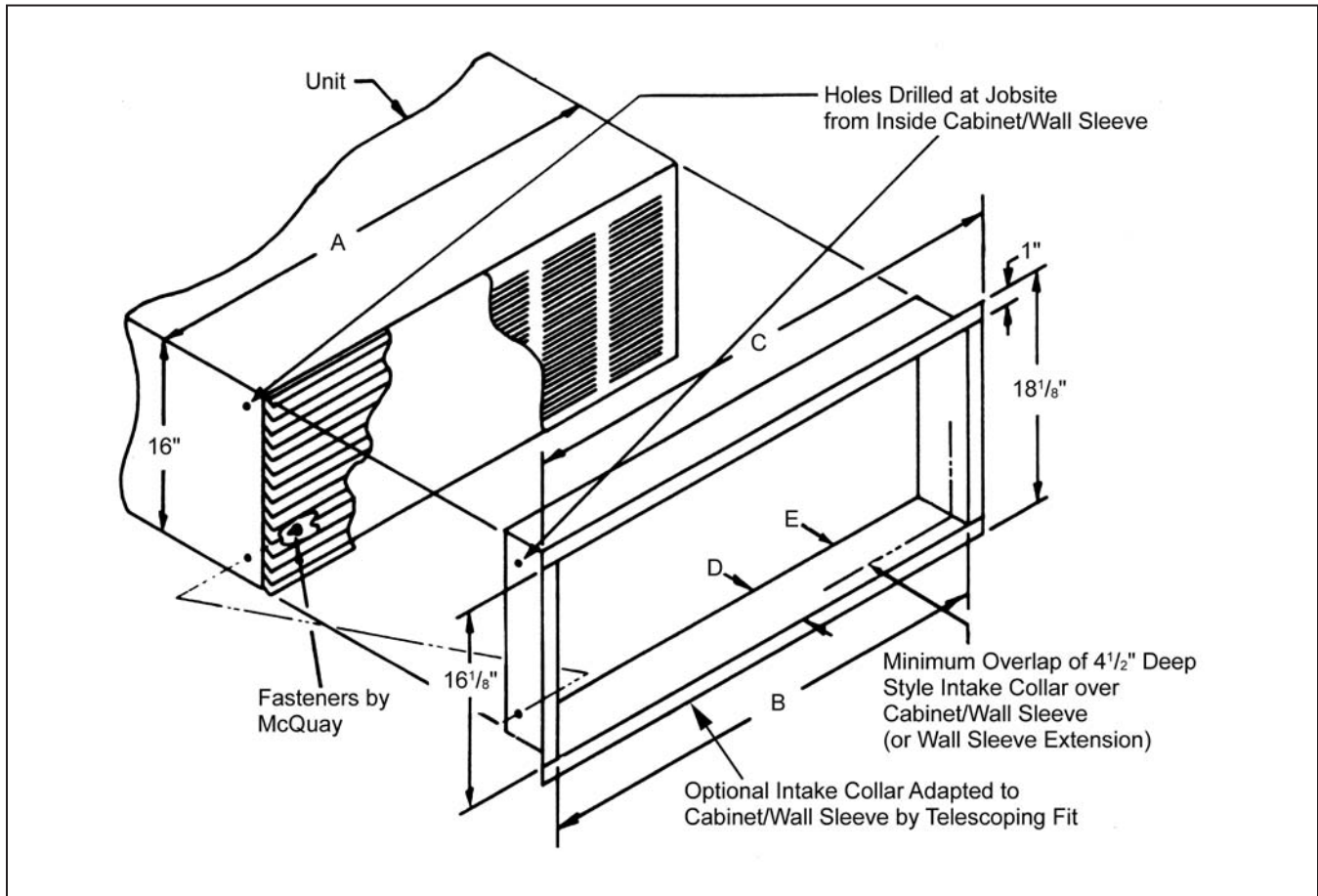


Table 9: Optional Outdoor Intake Collar Dimensions

Collar Size	Dimensions (Inches)									
	A		B		C		D		E	
Cabinet/Wall Sleeve Type	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long
4 1/2 Inch Deep Collar	37 1/2"	41 1/2"	37 5/8"	41 5/8"	39 5/8"	43 5/8"	4 1/2"	4 1/2"	3	3
1 1/2 Inch Deep Collar	37 1/2"	41 1/2"	37 5/8"	41 5/8"	39 5/8"	43 5/8"	1 1/2"	1 1/2"	—	—

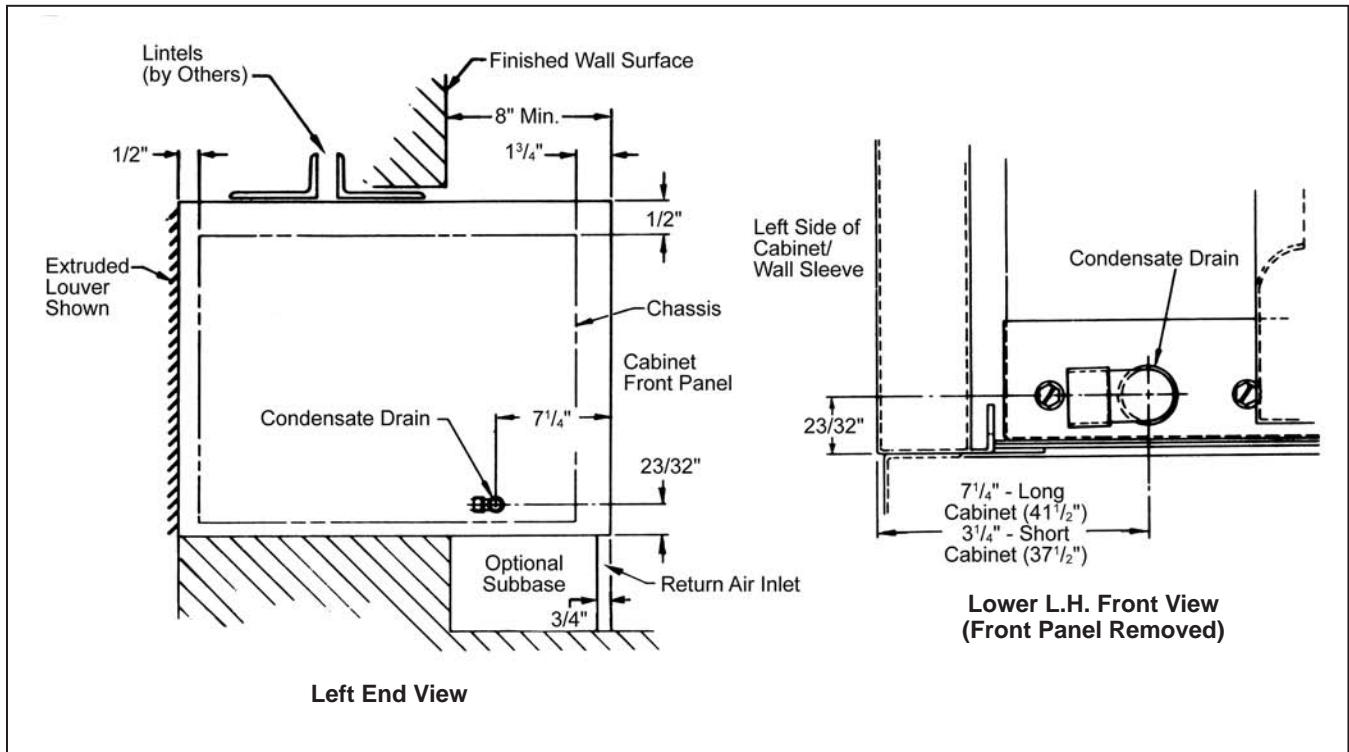
Notes:

1. Intake collars are available in two styles, 1 1/2" deep and 4 1/2" deep. Intake collars are fabricated of clear anodized aluminum to match standard extruded architectural louvers. (Not compatible with stamped flanged louver.)
2. All intake collars are cartoned and shipped separately for field installation.
3. Intake collar must be field caulked to wall and to cabinet/wall sleeve for airtight and watertight weather seal. Installation instructions shipped with intake collar.
4. For walls 12 5/8" to 14 3/8" thick on standard cabinet units the 4 1/2" deep intake collar can be used in lieu of a wall sleeve extension.

Condensate Drain Location (PTHP Units Only)

EnerSaver™ Packaged Terminal Heat Pumps - PNHS

Figure 25: Condensate Drain

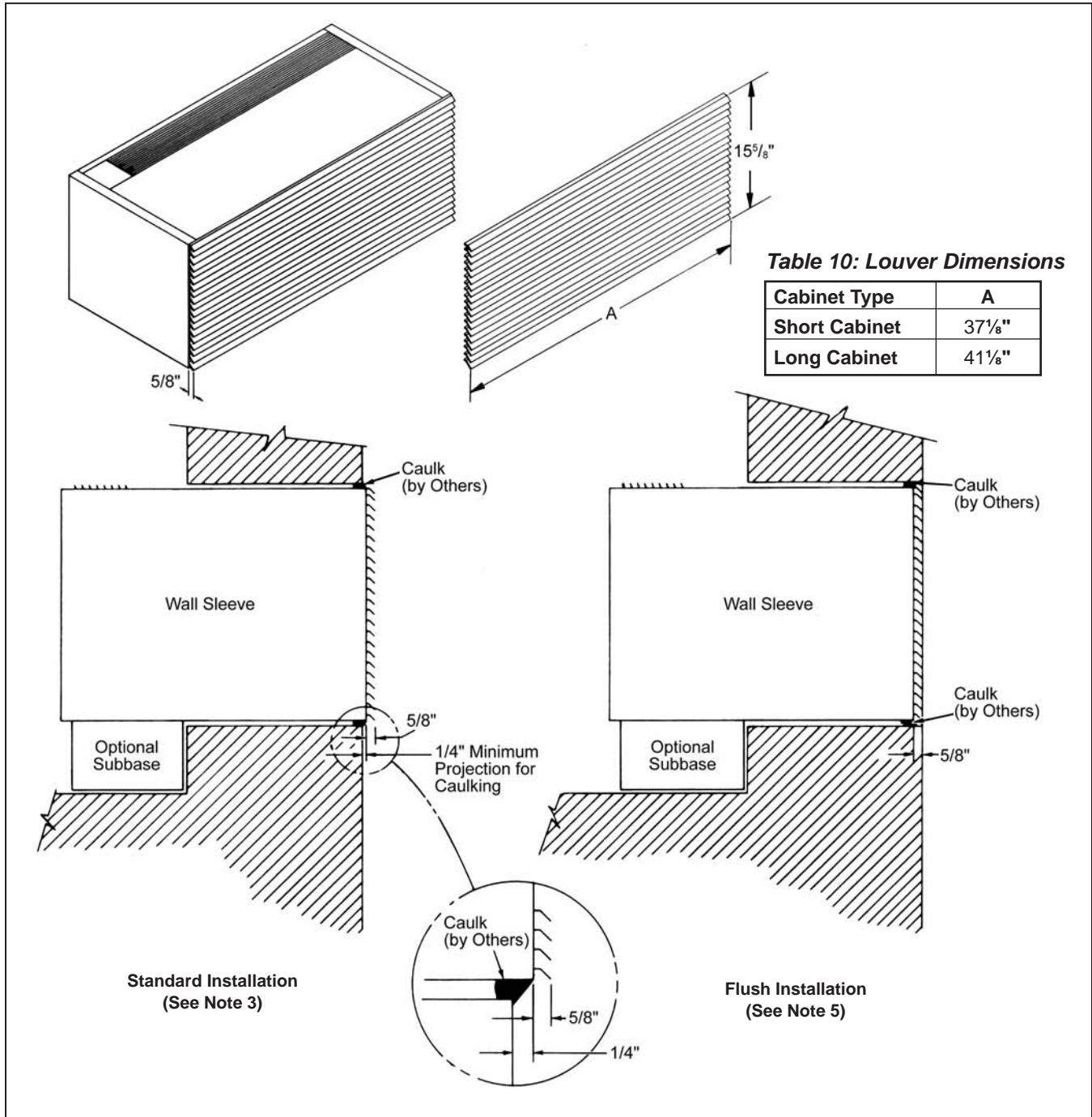


Notes:

1. All Dimensions in inches.
2. Condensate drain piping to be field connected to condensate drain.
3. Condensate piping kit available from McQuay (optional).
4. Condensate piping must be disconnected for removal of chassis.
5. Drain valve is thermostatically controlled. Full open at 60°; full closed at 80°.
6. Condensate line must be slightly pitched below chassis for proper drainage.

Outdoor Louvers

Figure 26: Extruded Architectural Louvers

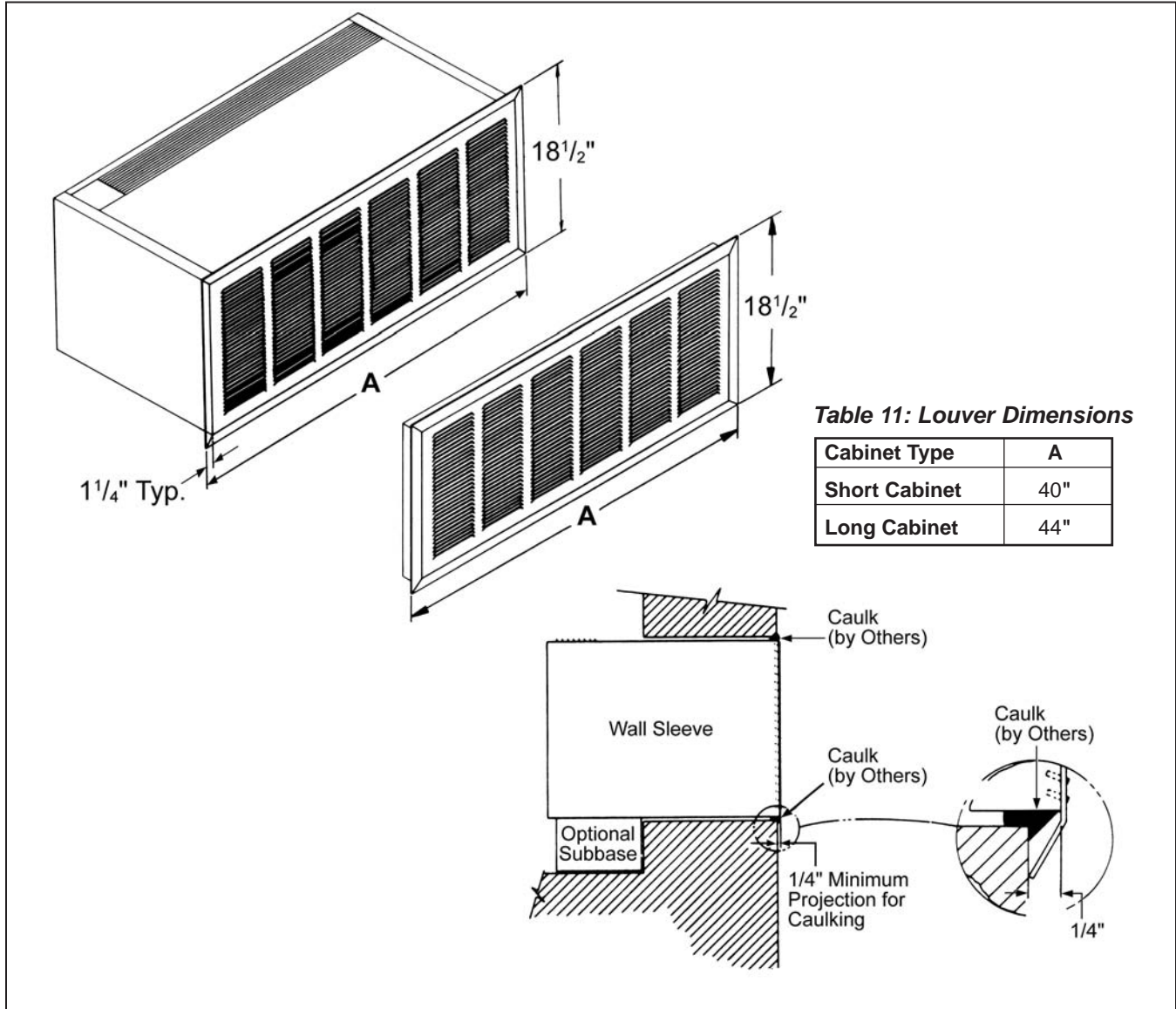


Notes:

1. All dimensions in inches.
2. Louvers are clear anodized aluminum.
3. Extruded louvers are factory mounted on cabinet/wall sleeve prior to shipment and must be removed prior to cabinet/wall sleeve installation. See Note 5.
4. Louvers are designed for installation from interior of building. Fasteners are included.
5. Wall sleeve should be caulked to wall before installation of extruded louver. If wall material at opening is not watertight, framing or flashing must be provided around wall opening (by others) to prevent penetration of water into wall.
6. Regardless of the type of wall construction, the cabinet/wall sleeve must be field caulked to the wall (before installing the louver) top, bottom, and both sides to form an airtight and watertight weather seal. See installation instructions shipped with the wall sleeve.

Outdoor Louvers (continued)

Figure 27: Optional Stamped Flanged Louvers



Filter Size and Approximate Shipping Weights

Cleanable filter.....	7 ³ / ₁₆ " x 30 ¹ / ₂ " x 1/4"
Short Cabinet/Wall Sleeve.....	45 pounds
Long Cabinet/Wall Sleeve	50 pounds
Cabinet Front Panel (included above).....	5 pounds
Outdoor Louver (included above).....	3 pounds
Subbase	5 pounds
Hydronic Valve.....	2 pounds
Chassis, Size, 009, 012.....	155 pounds
Chassis, Size 015.....	160 pound

Notes:

1. All dimensions in inches.
2. Louvers are clear anodized aluminum.
3. Stamped flanged louvers are shipped separately for field mounting on cabinet/wall sleeve.
4. For standard cabinet units, total wall thickness with stamped flanged louver cannot exceed 12⁵/₈", unless a wall sleeve extension is used.
5. Regardless of the type of wall construction, the cabinet/wall sleeve must be field caulked to the wall (before installing the louver) top, bottom, and both sides to form an airtight and watertight weather seal. See installation instructions shipped with the wall sleeve.

Engineering Guide Specifications

General

Furnish packaged terminal (air conditioners) (heat pumps) of the sizes and capacities shown on the schedule and/or specifications. The units shall be located as shown on the drawings and each shall include combination room cabinet/wall sleeve, front panel, subbase, outside air louver and heating/cooling chassis. Models specified with hydronic (i.e. steam or hot water) heat shall require a room cabinet/wall sleeve of sufficient size to conceal hydronic piping, control valve and appropriate controls.

All units shall be UL and CSA listed for safety. Units shall be tested and rated in accordance with ARI Standards 310 and 380. Units shall be McQuay EnerSaver™ Model designated with prefix **(PNES3) (PNHS3)** or equal.

(Overall dimensions for the standard/short room cabinet/wall sleeve, including subbase, shall not exceed 22" high, 37½" wide and 20⅞" deep.) (Overall dimensions for hydronic heat/long room cabinet/wall sleeve, including subbase, shall not exceed 22" high, 41½" wide and 20⅞" deep.) Leveling screws shall be provided with the subbase to allow for height adjustment between 21" and 22". The depth of the subbase shall also be adjustable from 7¼" to 20⅞".

Units shall be designed to operate on **(208) (265)** volts, 60 Hz, single-phase power.

The minimum energy efficiency ratio (EER) in BTU per hour per watt for each packaged **terminal (air conditioner) (heat pump)** unit must be 8.7 for all sizes. (The minimum COP for heat pumps, at 47°F DB outdoor temperature, must be 2.6 for all sizes).

Heating/Cooling Chassis

Chassis shall be slide-in, plug-in type with a self-contained, hermetically sealed refrigerant circuit. All chassis sheet metal parts shall be constructed of either powder-coated A-60 or G-60 galvanized steel for maximum corrosion resistance.

The chassis shall consist of the following components:

Vibration isolated, permanent split capacitor, rotary-type compressor with built in thermal overload; rifled copper tubed evaporator and condenser coils with high efficiency raised lance **(aluminum) (copper)** plate fins mechanically expanded to the tubes for maximum heat transfer; and a capillary restrictor type refrigerant metering device. Coils shall be factory tested at 300 psig. **(Heat pump models shall also include reversing valve.)**

(A positive closing, manual fresh air damper must be located within the chassis to provide fresh air during fan operation.) (A positive closing, automatic, motorized fresh air damper shall be included when hydronic heat is specified or called out on the plans. Motorized damper shall be capable of being controlled by a concealed override switch.)

System airflow shall be accomplished by the use of a two separate, direct drive permanent split capacitor, totally enclosed, permanently lubricated fan motors each with external oilers. The indoor/evaporator fan motor shall be two speed and directly connected to two double inlet, forward curved, centrifugal type fans. These fans shall be constructed of galvanized steel with a steel hub. The outdoor/condenser fan motor shall be single speed and directly connected to the outdoor/condenser fan. The outdoor/condenser fan shall be constructed out of aluminum and consist of multiple propeller-type blades with a slinger ring designed to efficiently remove condensate.

The indoor section of the heating/cooling chassis will include a drain pan to collect condensate from the indoor/evaporator coil. This drain pan shall be cleanable without having to remove the heating/cooling chassis from the wall sleeve.

During the cooling cycle, the compressor and both indoor/evaporator and outdoor/condenser fan motors shall be energized. Condensation accumulated in the indoor/evaporator drain pan shall be drained into the outdoor section of the unit where it is to be picked up by the outdoor/condenser fan and transferred to the outdoor/condenser coil where it shall then be evaporated.

[Electric Resistance Heat Only Models] During the heating cycle, only the indoor/evaporator fan motor and electric resistance heaters are energized. The compressor shall not be energized. Heaters shall be sheathed type with integral high temperature cutout to prevent overheating. Electric resistance heaters shall be sized to meet heating requirements as shown on the schedule and/or specifications. Electric resistance heaters must be placed beneath the indoor/evaporator coil and must not be visible or accessible through the indoor discharge grill. An electrical junction box shall be mounted within the subbase to house a receptacle designed to accept the rated power requirements of the heating/cooling chassis.

Engineering Guide Specifications (continued)

[Hydronic Heat Models] During the heating cycle, only the indoor/evaporator fan motor; the normally open, control valve and automatic fresh air damper shall be energized. The compressor shall not be energized. The hydronic coil shall be suitable for **(steam) (hot water)** and factory mounted to the room cabinet/wall sleeve. The coil shall be constructed of seamless copper tubes with aluminum plate fins and headered for minimum pressure drop. Hydronic heat models shall be designed to allow for the removal of the cooling chassis without disconnecting any piping connections. Additionally, a room cabinet/wall sleeve of sufficient size shall be required to conceal piping and respective control valve. An electrical junction box shall be mounted inside the room cabinet/wall sleeve to house a receptacle designed to accept the rated power requirements of the heating/cooling chassis.

[Reverse Cycle Heat Pump Models] During the heating cycle, the reversing valve, compressor and both the indoor/evaporator and outdoor/condenser fan motors shall be energized. Minimum operating temperature for reverse cycle heating shall be limited to 40°F. Should additional heat be required when the temperature is below 40°F, the supplemental electric resistance heater or hydronic control valve will automatically become energized. Electric resistance heaters shall be sheathed type with integral high temperature cutout to prevent overheating. Electric resistance heaters shall be sized to meet heating requirements as shown on the schedule and/or specifications. Electric resistance heaters must be placed beneath the indoor/evaporator coil and must not be visible or accessible through the indoor discharge grill. An electrical junction box shall be mounted within the subbase to house a receptacle designed to accept the rated power requirements of the heating/cooling chassis. Condensation accumulated during reverse cycle heating must NOT be evaporated against the indoor coil so as to prevent contamination of the indoor air with pollutants and odors. Condensation accumulated during reverse cycle heating shall be disposed of by means of a thermostatically controlled drain valve connected to the facility's central drainage system. Drainage kits are to be supplied by the heating/cooling chassis manufacturer and installed by others. Additionally, an electrical junction box shall be mounted within the subbase to house a receptacle designed to accept the rated power requirements of the heating/cooling chassis.

Control Module

Control module shall consist of push buttons to control high or low fan speed operation when cooling or heating mode is manually selected. Additionally, a rotary dial indicator shall be provided to adjust room temperature levels. Indoor/evaporator fan motor shall be designed to run continuously except when unit is turned off so as to draw room air over the thermostat sensing bulb. The control pad shall be overlaid with a polycarbonate membrane with ADA raised and color-coded lettering.

Room Cabinet/Wall Sleeve

The room cabinet/wall sleeve shall be designed with a flat top. It shall consist of a single piece designed to house the heating/cooling chassis. It shall be manufactured from heavy-duty, 18-gauge steel that is phosphatized and coated with epoxy powder paint to resist scratches, dents and corrosion. The airflow discharge grill shall be an integral part of the room cabinet/wall sleeve and shall be located on the top of the room cabinet/wall sleeve. It shall be made from continuous bar stock. Openings shall be designed to limit the intrusion of foreign objects. As a minimum, a standard pencil shall not be able to pass through the discharge grille. The discharge grill shall be capable of directing airflow a minimum 10° from the vertical. A controls access door shall be incorporated into the design of the room cabinet/wall sleeve. The room cabinet/wall sleeve shall be designed for dry operation only. All condensate and rainwater must be contained in the heating/cooling drain pan.

A separate front panel shall be supplied with the respective room cabinet/wall sleeve. The front panel shall be capable of being attached and/or removed from the room cabinet/wall sleeve without the use of tools. It shall be manufactured from heavy-duty, 18-gauge steel that is phosphatized and coated with epoxy powder paint to resist scratches, dents and corrosion.

(A factory installed architectural extruded aluminum outside air louver shall be included with the respective room cabinet/wall sleeve.) (As specified and called out in the plans, a stamped aluminum louver shall be included with the respective room cabinet/wall sleeve. A 1/4" flange shall surround this louver for attachment to the facility's exterior wall. This louver shall be shipped separately and installed by others.)

Warranty

All McQuay equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local McQuay Representative for warranty details. Refer to Form 933-43285Y. To find your local McQuay Representative, go to www.mcquay.com.

This document contains the most current product information as of this printing. For the most up-to-date product information, please go to www.mcquay.com.

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