

Heating, Ventilation and Air Conditioning

The following guide gives an overview of heating and cooling electric systems that are widely used in multifamily buildings. The sample of products shown vary from large central heat pumps, mini-split heat pumps and small packaged terminal heat pumps.

Large Application Heat Pumps (240V – 480V)

Larger application heat pumps are most typically used for central air and water systems. In some cases, apartment heating, cooling and ventilation needs are met by individual units (like PTHP's). These larger systems are used for the common space loads.

“Space requirements are much smaller [for all-electric systems], instead of having two to three separate systems for space heating, cooling, and hot water, we can do it with a single heat pump system in half as much space. Maintenance is less because there is only one system - and the technology is just like an air conditioner.” - Hormoz Janssens, Interface

	Mitsubishi City Multi Y-Series (PUHY: P72TKMU, P96TKMU, P120TKMU, P144TKMU) 	Mitsubishi City Multi W-Series (PQRY: P72TLMU, P96TLMU, P120TLMU, P144TLMU) 	Mitsubishi City Multi S-Series (PUMY: P36NHMU, P48NHMU, P60NKMU) 	Spacepak Solstice (Extreme) 
Description	Air source heat pump, variable refrigerant flow	Water source heat pump, variable refrigerant flow, (use w/ air source to reach ideal temps.)	Air source heat pump	Air to water, hydronic heating and cooling
Voltage (V)	208/230	230	460	230
Dimension (ft)	5.4H x 5.7W x 2.4D	3.6H x 2.9W x 1.8D		4.0H x 4.5W x 1.5D
Ref. Type	410A	410A	R410a	R410a
Ambient Temp. Range (H/C) (F)	-13 – 60 / 12 – 115	50 – 113 / 50 - 113	0 - 60	-8 – 105
Power (W)	5,700 - 12,200	3,000 – 8,100	12,000 – 16,100	3,880 – 5,963
Max Amps (A)	23 - 53	12 - 35		23.5 - 31
Heating Cap. (BTUh)	80,000 - 160,000	80,000 – 137,00	42,000 – 66,000	42,240 – 66,480
Cooling Cap. (BTUh)	72,000 - 144,000	72,000 – 144,000	36,000 – 60,000	40,000
Heating (COP)	3.56 - 3.95	4.90 – 5.77	3.30 – 3.90	2.12 – 3.26
Cooling (COP)	3.72 - 4.22	5.50 – 6.05	3.25 – 4.16	2.43

Mini-Splits (240V)

Mini split systems are comprised of a compressor outside the building and a fan inside the building. Mini split systems can also have many fans inside the building, commonly referred to as multi split systems, where one outside unit serves multiple fans or zones inside the building. Having multiple zones in the building allows for a more controlled, versatile arrangement of installations and temperature settings compared to a typical split HVAC system. Zones can be at different temperature settings while still being served by one outside unit. Multi/mini split systems can be ductless (where refrigerant lines move heat around the building) or they can have mini ducts where air is moved around the building. There are pros and cons of ducts versus no ducts - having no ducts prevents duct leakage energy losses but having many refrigerant lines running through the building can cause problems if they leak. In general, mini/multi split systems are more efficient than typical HVAC systems, no ducts also have an advantage because of reduced fan loads.

Larger variable refrigerant flow systems are also a form of a multi split system but on a larger scale (Mitsubishi City Multi Y-Series above).

	Fujitsu Halcyon Series 	Mitsubishi HyperCore FH50 	LG LMU18CHV 	Gree TERRA 09HP230V1A0 
Description	2 – 4 indoor units, XLTH models		2 zones	1 zone
Dimension (ft)	39H x 38W x 14D	36H x 9W x 12D	2.08H x 2.83W x 1.17	2.25H x 2.92W x 1.19D
Ref. Type	R410a	R410a	R410a	R410a
Ambient Temp. Range (H/C) (F)	-15 – 75 / 14 - 115	-15 / 115 F	-4 – 64 / 14 - 118	5 – 75 / 5 - 118
Power (W)	1,330 – 2,700	1,380 – 1,480	1.31 – 2.04	60 - 65
Max Amps (A)	16.4 - 26	13.6	11.09	7.0
Heating Cap. (BTUh)	22,000 – 36,400	10,900 – 30,700	17,000	9,800
Cooling Cap. (BTUh)	18,000 – 35,200	8,500 – 26,600	15,600	9,000
Heating (COP)	3.60 – 4.04	3.07 - 4.85	3.0	3.2 - 3.8
Cooling (COP)	3.52 – 3.60	3.31 – 5.10		3.66 – 4.25

Ducted Heat Pumps (240V)

Ducted air conditioning systems are usually driven by a central compressor that pumps air through ducts to vents in different areas throughout the building. With exception of the Friedrich product below, which is a packaged system that has all components in one box, versus an indoor and outdoor unit. Ducted heat pumps are a good option for retrofits where a central air conditioner can be replaced with a very similar product but is a heat pump and provides heating and cooling to a home.

	Friedrich VRP12K 	Goodman GSZC180481C 	Fujitsu FO2414R 	York YZH02412C 	Carrier Infinity 25VNA036A003 
Description	Variable refrigerant packaged heat pump	Heat Pump	Heat Pump	Heat Pump	Heat Pump
Dimension (in)	26W x 25D x 50H	35W x 35D x 38H	26.25H x 23.63L x 23.63D	34H x 42W x 23D	35W x 44H x 28D
Ref. Type	R410a	R410a	R410a	R410a	R410a
Ambient Temp. Range (H/C) (F)	15 - 70	-5 - 115	55 - 125	-10 – 115	-4 - 68
Power (W)	923 - 991	4,830 – 4,840	7,030	2,500 – 3,412	1,050 – 1,240
Max Amps (A)	4.8	45	20 - 50	25 – 60	16 - 42
Heating Cap. (BTUh)	7,100 – 115,00	22,000 – 59,500	17,060 – 60,053	18,000 - 59,000	25,000
Cooling Cap. (BTUh)	4,000 – 23,524	23,000 – 56,500	17,300 – 60,500	19,000 – 58,000	36,000
Heating (COP)	0.64 - 1	1.47 – 6.77	3.6 – 3.8	2 - 4	2.3 - 4
Cooling (COP)	3.22 – 3.81	3.66 – 4.10	3.37	4 – 4.4	4 – 4.4

Packaged Terminal Heat Pumps (120V)

Packaged Terminal Air Conditioners and Heat Pumps (PTACs and PTHPs), are all in one units that are used to heat and or cool typically a smaller to medium space. These types of units are ductless and usually go either in a window or are put into a cutout in a wall. Although sometimes lower efficiency, packaged units like these deliver heating or cooling directly to the space avoiding duct losses which in turn can be a more effective way of delivering comfort.

	Innova (8,10,10DC,12DC, 12DC Elect) 	Frigidaire FFRH0822Q1 	Friedrich YS10N10C 	Gree 26TTW09HP115V1A 
Description	Twin duct through the wall technology, dehumidification capacity, only one model with ER	Noise 50.2 dB (low) Heat pump with ER	Heat pump model – no back up ER	Heat pump model with ER + dehumidification
Voltage (V)	230	115	115	115
Dimension (in)	1.8H x 3.3W x 0.5D	15H X 22W x 23D	15H x 25W x 29D	15H x 26W x 16D
Ref. Type	R410a	R410a	R410a	R410a
Ambient Temp. Range (H/C) (F)	14 – 64 / 23 - 109	-5 – 75 / 5 – 110	60 – 115 / not below 40 w/o ER	29 - 125
Power (W)	545 – 730	780 – 1,290	917 - 978	830 – 1,150
Max Amps (A)	-	7.4 – 11.6	7.9 – 9.0	15
Heating Cap. (BTUh)	0.7 – 3.05 kw @-7 (0.79 – 1.11) kw	3,500 (ER) 7,000 (HP)	8,000	3,900 (ER) 6,600 (HP)
Cooling Cap. (BTUh)	0.8 – 3.1 kw	8,000	10,000	9,000
Heating (COP)	2.84 – 3.22	2.63	2.6	3
Cooling (COP)	3.12 – 3.28	2.87	3.19	2.87

*ER = electric resistance, HP = heat pump

Packaged Terminal Heat Pumps (240V)

	Amana (AH093E35AX, AH123G35AX, AH183E35AX) 	Friedrich (YS12N33C, YM18N34C, YL2N35C) 	Gree (W07HP230V1A, W09HP230V1A, W12HP230V1A) 	LG (LP073HDUC, LP093HDUC1, LP123HDUC1, LP153HDUC) 
Description	Heat pump model	Heat pump model – no back up ER	Heat pump model with ER + dehumidification	Smaller inverter - cold climate ready for tiny homes
Voltage (V)	208/230	230/208	230	208/230
Dimension (in)	16H x 26W x 27D	20H x 28W x 35D	15H x 26W x 16D	16H x 42W x 21D in
Ref. Type	R410a	R410a	R410a	R410a
Ambient Temp. Range (H/C) (F)	61 - 86	60 - 115	29 - 125	-4 - 75 / 54 - 115
Power (W)	920 – 3,680	1,101 – 2,391	680 – 3,500	2,300 - 4,700
Max Amps (A)	4.2 – 16.0	4.9 – 19.5	20	15,20,30 amp cord
Heating Cap. (BTUh)	10,700 – 9,000 (ER) 8,100 – 16,00 (HP)	11,300 – 22,000	3,900 – 11,000 (ER) 6,600 – 11,400 (HP)	1,250 - 13,400
Cooling Cap. (BTUh)	9,200 – 17,300	12,000 – 24,00	7,200 – 11,700	7,100 – 14,900
Heating (COP)	2.6 - 2.9	2.6 - 2.7	2.9 – 3.1	3.1 – 3.5
Cooling (COP)	2.63 – 2.93	3.02 – 3.19	2.81 – 3.11	3.28 – 3.90

*ER = electric resistance, HP = heat pump