






Consulting, Resource, Education, Training, and Support Services for Home Inspectors
"A candle loses no light when it lights another candle."

AC Compressor/Condenser Unit Data Plates

AIRE – FLO		Dallas, TX 75379			
Model Number:	AFAIR10B42-A	Serial Number:	4603A13621		
SUITABLE FOR OUTDOOR USE					
Unit Electrical:	208-230	Volts	1	Ph	60 Hz
Power Supply:	25.0	Minimum Circuit Ampacity			
	40	Max Fuse			
	40	Max Ckt Breaker (HACR) Type per NEC			
Compressor:	208-230	Volts	1	Ph	60 Hz
	19.0	RLA	105	LRA	
Fan Motor:	208-230	Volts	1	Ph	60 Hz
	1/5	HP	1.1	FLA	
For Use With:	R-22				
Factory Charge:	6	Lbs.	2	Oz.	2.78 Kg.
Use Piston Size:	80	Indoor			n/a Outdoor
Design Test Pressure	300	Psig (High)		2064 kPa	
	150	Psig (Low)		1032 kPa	
	LISTED SECTION OF CENTRAL COOLING AIR CONDITIONER 9700729				
Conforms to UL Std 1995			C Certified to CAN/CSA C22.2 No. 236	Certification applies only when the completed system is listed with ARI	
			Part Number: 20414691		

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Home inspection standards typically do not specifically refer to the information on compressor/condenser unit data plates. However, understanding data plate information is essential for confirming that the overcurrent protection for the unit is of the proper ampere rating and type.

In addition, having a working familiarity with the data plate information provides an inspector with a broader understanding of air conditioner sizing and installation requirements as well as how air conditioning systems work.

- **Model:** *not required*
- **Serial number:** *not required*
- **Age:** *not required*
- **Tonnage:** *not required*
- **Electrical information:** *necessary to determine correct conductor size and overcurrent protection device type and size to conform to the manufacturer's requirements*

On the data plate you will typically see a number of multiple letter abbreviations such as:

- **VAC - Voltage Alternating Current**
- **HZ – 60 Hertz** The term “hertz” refers to the number of cycles per second for the alternating current. The data plate indicates 60 hertz.
- **PH – Phase 1 (single phase)** The generation of AC electric power is commonly three phase, in which the waveforms of three supply conductors are offset from one another by 120°. These three conductors are commonly housed in a single cable assembly or conduit but may also be separately housed or spaced in open-air, such as between utility poles. Standard frequencies are either 50 or 60 Hz. The voltage across a pair of these conductors or between a single conductor and a neutral conductor is single phase electric power.
- **LRA - Locked Rotor Amperes:** This refers to the inrush amperes that are drawn when an AC motor is started with full voltage applied. This inrush current can be many times higher than the full load amperes. It also refers to the amperes the motor would draw if the rotor of the motor were seized and could not turn.
- **FLA - Full Load Ampere** is 1.1 amperes. This amperage is the current that the motor will draw when it is loaded up to its rated horsepower.

As the torque on a motor increases, the amperage required to power the motor also increases. When the full-load torque and horsepower are reached, the corresponding amperage is termed the “full-load amperage. The FLA is used to select the correct wire gauge, motor starter, and overload protection devices necessary to serve and protect the motor. This is also referred to as the Running Load Amperes and should not be confused with the Rated Load Amperes.

- HP - Horsepower
- HACR - Heating, Air-Conditioning, Refrigeration: This abbreviation is used to designate circuit breakers which meet requirements specified by Underwriters Laboratories (UL) for breakers used to protect the circuit components of typical heating, air-conditioning, and refrigeration equipment. These include compressor motors and motors connected in group motor applications.
- Ton: This is a unit of refrigeration capacity corresponding to the removal of 12,000 Btus per hour so named because it is equivalent in cooling effect to melting one ton of ice in twenty-four (24) hours.
- Btu - British thermal unit: This is a standard measurement of the heat energy required to raise one (1) pound of water one degree Fahrenheit (1° F).

The data plate pictured indicates the following about the unit:

- The manufacturer is Aire-Flo.
- The Model Number is AFAIR10B42-A.
- The Serial Number is 4603A13621. In this example, the date of manufacture is coded into the serial number in the third and fourth digits – 03. This indicates that this unit was manufactured in 2003 and is approximately two (2) years old. The method used to indicate the date of manufacture on the data plate varies among manufacturers. Some may clearly indicate all four digits of the year, others, as in the example used here, will code the last two digits of the year into the serial number, and there are still others who choose to use a letter code in the serial number to indicate the year.
- Be careful not to confuse other dates which may appear on the data plate such as those that refer to certain standards like those of UL (Underwriters Laboratories), ANSI (American National Standards Institute), the AGA (American Gas Association), or other independent research, testing, and certification organizations with the manufacturer’s date of manufacture.

- For a nearly comprehensive guide to the age of both heating and cooling equipment manufactured between 1960 and 2000, you can purchase Preston's Guide from the online store at www.ashi.org.
- It is suitable for outdoor use.
- The unit is designed and intended to operate using 208-230 volts, single phase, 60 hertz power. This number is known as the nameplate or data plate voltage. The 22 volt range (208-230 volts) is based on the fact that there may be voltage changes on a given power distribution system due to changing loads conditions within a house and on the utility that provides the power. Motors are designed with a 10% tolerance for voltage above and below the rated nameplate value.
- The power supply to the unit must be capable of carrying a minimum of 25.0 amperes.
- The maximum fuse size for overcurrent protection is 40 amperes.
- The maximum circuit breaker size for overcurrent protection is 40 amperes and the circuit breaker must be a HACR type as per the NEC.
- The RLA - Rated Load Amperes is 19 amperes. This refers to the rated current resulting when the motor-compressor is operated at its rated load, rated voltage, and rated frequency. The RLA provides the installer and service personnel with information necessary to determine whether the unit is operating in accordance with the proper manufacturer's rating for the unit. Air conditioners draw approximately 6.5 amperes per ton of cooling capacity; therefore, if the RLA is known but the tonnage is unknown (not indicated on the data plate), the approximate tonnage of the unit can be obtained by dividing the RLA by 6.5. Conversely, if the tonnage is known but the RLA is unknown, multiplying the number of tons by 6.5 will yield the approximate RLA.
- The condenser fan motor is a single phase 1/5 horsepower unit operating on 208 – 230 volts, 60 hertz with an FLA of 1.1
- The number of tons of cooling of the unit is not specifically listed on the data plate (although it is typically coded into the serial number); however, the RLA is listed. So, we can divide the RLA of 19.0 amperes by 6.5 (approximate amperes per ton) and we obtain 2.92. Rounding up, this gives us approximately 3 tons of cooling for about 1350 square feet of main level living space and 1350 square feet of unfinished basement or one ton of cooling for every 450 square feet of above-ground living space. In this case, given the dry Colorado climate and the design parameters of the house, this unit is probably adequately sized for the home.

- The compressor horsepower is not indicated. However, it typically requires about 1 HP per ton, or for this unit, about 3 HP.
- The LRA is listed as 105 amperes.

Bigger Isn't Always Better

Oversizing a compressor can result rapid/short cycling leading to reduced compressor life due to more frequent compressor start-ups and poor cooling performance since short cycling doesn't allow the removal of as much humidity from the house air.

Cold, damp indoor air when the system is operating and a compressor that short cycles (turns on and off frequently – every five minutes or so) may be an indication of an oversized compressor. An undersized compressor will run constantly attempting to provide enough cooling and will wear out sooner.

The ASHI Training Manual states that, “*Two surveys have shown that one third to one half of all residential air conditioning systems are oversized.*”

However, making any comments or recommendations regarding the adequacy of the air conditioning based solely on the indicated or estimated tonnage exceeds the ASHI Standards and may increase your liability exposure.*

Specific conditions such as rapid or short cycling of the compressor and a noticeably damp indoor environment indicating that the air is not being dehumidified by the air conditioning system or a system that runs constantly in an attempt to cool the house may form the basis to recommend further evaluation of the system by a qualified HVAC contractor.*

*See the *ProSpex* article *Air Conditioner Compressor Sizing* in the HVAC section of the *ProSpex* website at www.prospex.us for additional information on compressor sizing.