



UndermountAC.com

Kit Version 2.0

12V AC Installation Guide

This installation manual is a guideline. If you have any specific questions related to this installation please do not hesitate to contact us sales@undermountac.com for a prompt response.

Manual Version 3.1

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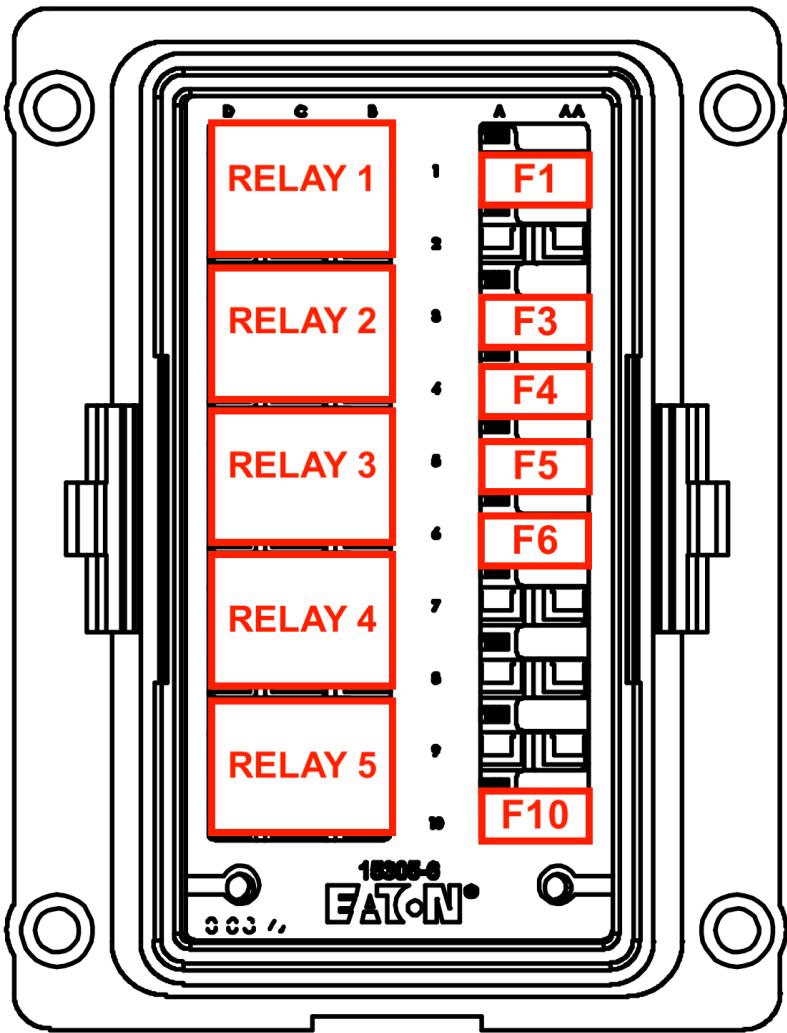
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INCLUDED IN KIT

- ProAir 109 or 105 undermount condenser. 109 is horizontal mount up to 45 degrees from horizontal. Ports facing up. 105 is vertical mount up to 50 degrees from vertical.
- UndermountAC Compressor attached to compressor mount with drier, control/relay board and circuit breaker installed.
- ProAir 916 Brushless Evaporator Cabinet Mount or ProAir 981 Brushless Ducted Evaporator
- ProAir Digital Thermostat with temperature sensor
- ProAir Controller board for condenser, compressor, evaporator and thermostat
- Appropriate wiring harness for all components
- Cut to length A/C lines and hoses with PEX style crimp fittings (Easy DIY)
- Dryer, low/high pressure switch
- Hose Mounting clips

REQUIRED TO COMPLETE KIT

- 6AWG (or larger depending on length of run) wiring to connect compressor and control board to battery or power source.
- Burgaflex, Pex or Knipex Tool to crimp line fittings.
- Brackets to support Evaporator and compressor for under-van mounting. 105 Evaporator may be mounted directly to floorboards.
- 2-2.5LB pure R-134A Refrigerant
- Vacuum Pump and Gauges if shop is not used for installation.



RELAY 1 – COMPRESSOR ON

RELAY 2 – COMPRESSOR SPEED 1-2 CHANGE

RELAY 3 – HEAT ON (IF EQUIPPED, OPTIONAL)

RELAY 4 – COOL ON

RELAY 5 – CONDENSER ON

F1 - FUSE THERMOSTAT ON - 10A

F3 - FUSE EVAPORATOR - 30A IF 12V, 20A IF 24V

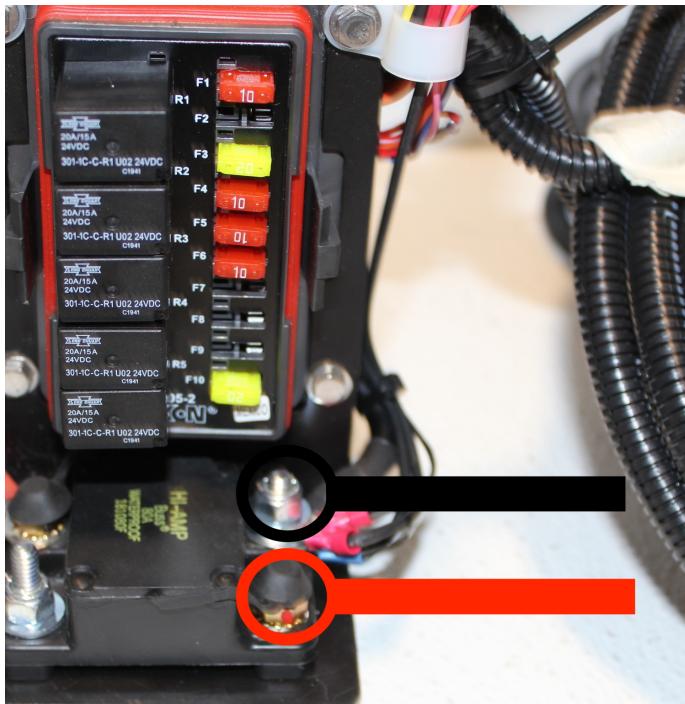
F4 - FUSE RELAY POWER – 10A

F5 - (OPTIONAL) FUSE HEAT POWER – 10A

F6 - (OPTIONAL) FUSE HEAT ON – 10A

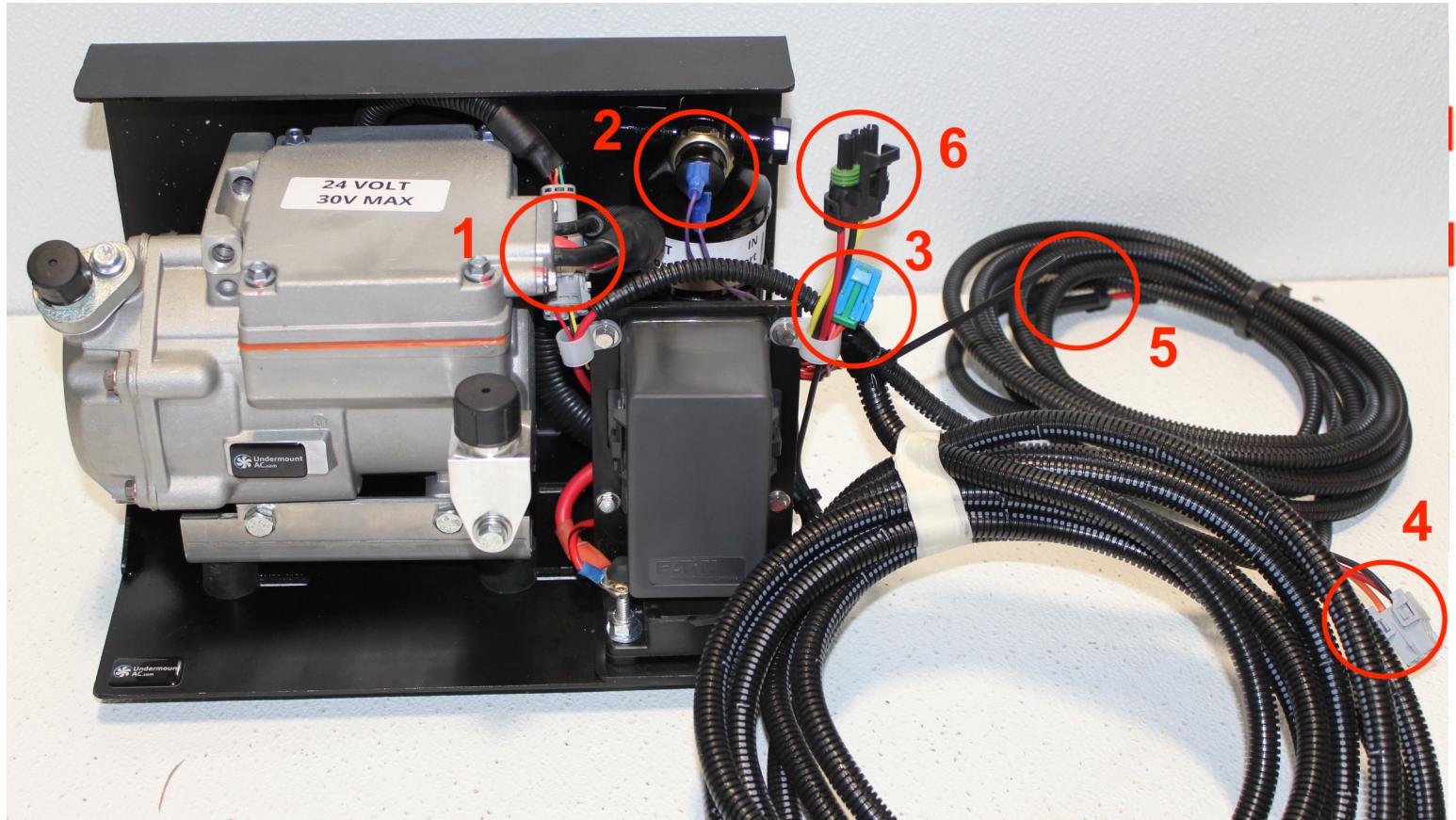
F10 -FUSE 30A IF 12V, 20A IF 24V

REQUIRED CONNECTIONS (Not Included)



Power and Ground leads to the included circuit breaker.

Capable of carrying 150A for 12V systems, and 80A for 24V systems.



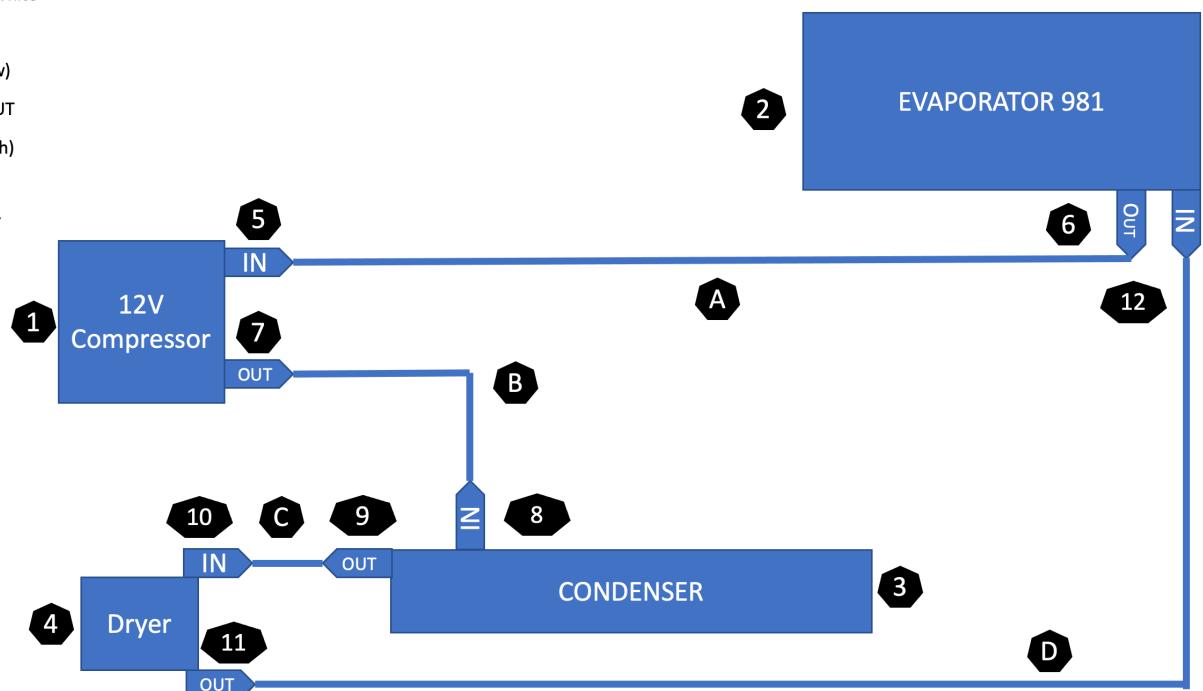
Additional Wiring.

1. Connection between relay board and compressor
2. Refrigerant pressure switch attached to drier.
3. Harness for thermostat (blue connector)
4. Harness for evaporator (gray connector)
5. Harness for condenser (black connector)
6. 3 pin harness for heat addition (**Option**)

ProAir V2 12V 981 Evaporator and 109 Condenser

Main Components

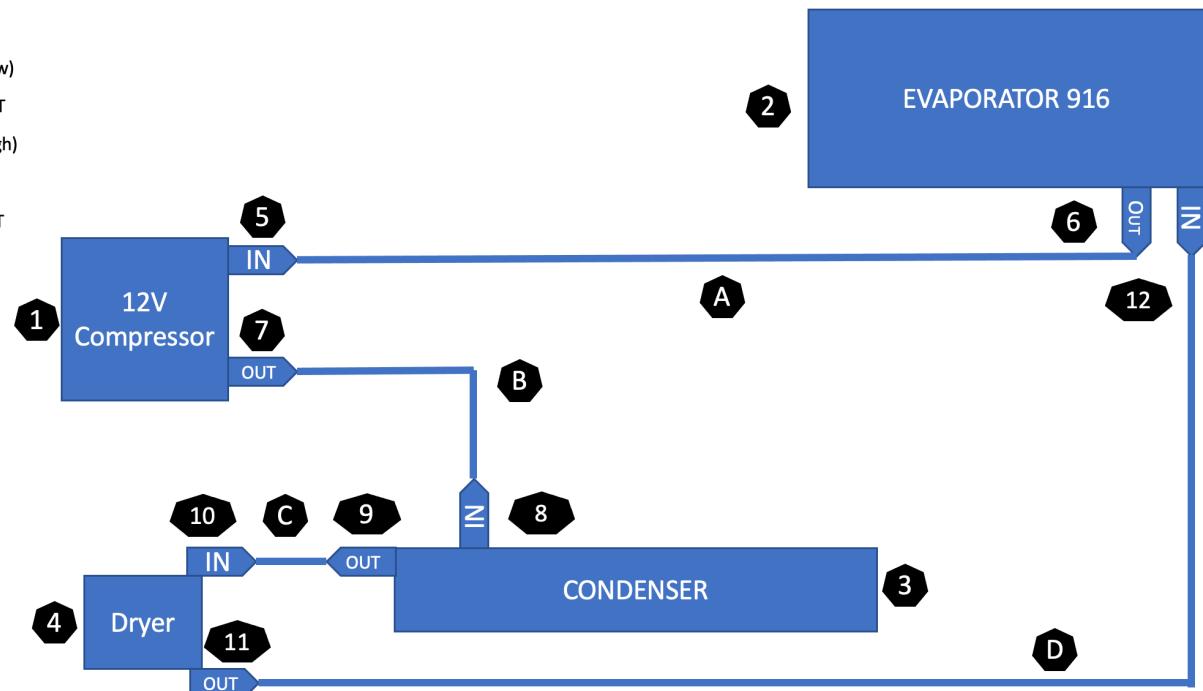
1. Compressor 12V
2. Evaporator 981 Brushless 12V Ducted
3. Condenser 109 Flat Mount 12V White
4. Dryer w/Pressure Switch
5. 05000509 Elbow w/ Fill Port (Low)
6. 05000484 Straight Evaporator OUT
7. 05000506 Elbow w/ Fill Port (High)
8. 05000504 Elbow Condenser IN
9. 05000504 Elbow Condenser OUT
10. 05000515 Elbow Dryer IN
11. 05000502 Elbow Dryer OUT
12. 05000502 Elbow Evaporator IN



ProAir V2 12V 916 Evaporator and 109 Condenser

Main Components

1. Compressor 12V
2. Evaporator 981 Brushless 12V Ducted
3. Condenser 109 Flat Mount 12V White
4. Dryer w/Pressure Switch
5. 05000509 Elbow w/ Fill Port (Low)
6. 05000529 Elbow Evaporator OUT
7. 05000506 Elbow w/ Fill Port (High)
8. 05000504 Elbow Condenser IN
9. 05000504 Elbow Condenser OUT
10. 05000515 Elbow Dryer IN
11. 05000502 Elbow Dryer OUT
12. 05000527 Elbow Evaporator IN



This Pro-Air kit uses a Burgaflex Cinch Style Crimp tool common on automotive fittings and more recently PEX fittings. Please make sure you have this tool available for proper crimps. The proper oil for lubrication is included in your fittings kit.

Do not use any other oils or mineral oils as they do not mix with R-134A or the oil in the Compressor. Do not forget to use the same lubricant on the green o-ring.



Figure 5



Figure 6

ProAir LLC
2900 County Rd 6 W
Elkhart, IN 46514
Ph: (574) 264-5494 Fx: (574) 266-0876



ProAir West LLC
2260-C S. Archibald Ave.
Ontario, California 91761
Ph: (909) 930-6224 Fx: (909) 930-6226

GENERAL BURGACLIP INSTRUCTION

1. Cut the hose to proper length with hose cutters. The cut must be made normal to the hose length.



2. Place the two clips in the clip holder. Install two proper-sized clips into the clipholder. For ease of assembly both clips should have the same orientation.



3. Slip on the clipholder with the clips. Place the clipholder with the two clips on the hose. In such a manner that the side with the smallest hole touches the end of the hose.



4. Oil the Burgaclip fitting with a generous amount of the A/C system's lubricator oil. This is to lower the force of the insertion.



5. Insert the fitting into the hose. Ensure that the fitting is fully inserted by checking the gap between the end of the hose and the shoulder of the fitting.



6. Close the clips with the Burgaflex Clip pliers. The pliers open themselves when the right force has been reached. Start with the clip closest to the end of the hose.



Digital Thermostat Operation

67 000 145

Function/Mode	Action
A/C Off	Push once to turn on and push again to turn off. Display on, reads and displays probe temperature, blower motor operates. A/C compressor runs above set temperature point and shuts off at set temperature point. A/C light will be on.
Blower Speed	Select desired blower speed by pressing the up or down arrows, display will indicate set speed, F1 to F7 for the seven speeds of operation.
Temperature	Temperature can be set by using the up/down buttons to select the desired level between 50°F and 99°F or 10°C and 37°C. Display will show set temperature for two or three seconds then display will show actual temperature. To switch between Fahrenheit and Celsius press both temperature up and down buttons at the same time for three seconds.
Auto Mode	With system on press auto to turn on auto mode temperature control, press once more to shut off. In auto mode temperature is maintained + or - 2° and blower speed is automatic and cannot be changed.
Backlighting	With controller turned off or on with auto mode activated, the fan speed down button toggles the backlight on and off.
Preset Operations	Upon cycling of 12vdc supply, the unit will default to previous settings mode and blower speed. All output signals are negative voltage.



Blower Speeds or Evaporator not working.

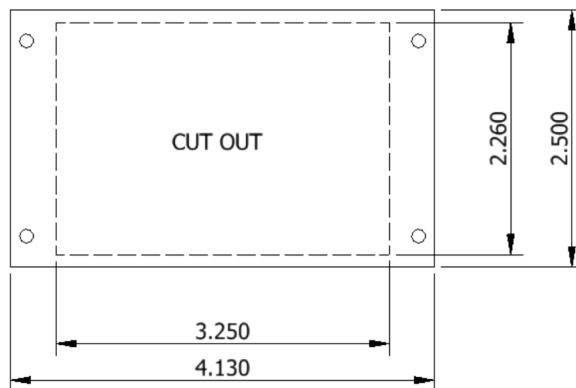
If for whatever reason your evaporator blower is not working the thermostat may have gotten reset and you will need to change the blower type. Please use the instructions below and set the blower to S7 (240hz PWM)

Blower Type & Number of Speeds;

Unit can be configured for standard blowers or PWM (Pulse Width Modulated) blowers. Be sure to set it for the blower you have since unpredictable blower operation can occur if the wrong mode is selected. To view blower/speed mode, press and hold the WARM button and simultaneously press the HIGH button. Unit will display the current blower mode, which will be one of the following; P7, P5, P3, S7, S5, S3, H7, H5, H3. To change the mode, press and hold the WARM button and simultaneously press and hold the HIGH button for three seconds. You can then click the HIGH button repeatedly to quickly step through the nine modes (while still holding WARM). The mode you stop on will be the one selected when you release both buttons. The six modes are as follows;

- P7 Seven speeds for PWM blower (10 kHz).
- P5 Five speeds for PWM blower (10 kHz).
- P3 Three speeds for PWM blower (10 kHz).
- S7 Seven speeds for PWM blower (240 Hz).
- S5 Five speeds for PWM blower (240 Hz).
- S3 Three speeds for PWM blower (240 Hz).
- H7 Seven speeds for Pro Air brush blower (requires Pro Air blower module 01 000 539).
- H5 Five speeds for Pro Air brush blower (requires Pro Air blower module 01 000 539).
- H3 Three speeds for standard brush blower with three speed resistor.

Cut Out Dimensions



ProAir 981 Ducted Evaporator 4x 2.5" Standard Automotive A/C Outlets

PARTS LIST				PART NO. 66 000 180
ITEM	QTY	PART NUMBER	DESCRIPTION	
1	1	01 000 351	T'STAT, NON-ADJ (31-39)	
2	1	01 000 791	HARN, 980 BLOWER	
3	1	02 000 040	SCREW, 8 x 1 1/4 HEX WSHR ZINC TEK	
4	2	02 000 042	BOLT, 1/4-20 x 5/8 HEX ZINC	
5	2	02 000 043	WASHER, 1/4 FLAT ZINC	
6	1	02 000 056	GROMMET, 1/2" ID 5/8" OD	
7	2	02 000 104	NUT, 1/4-20 CAGE	
8	6	02 000 163	SCREW, 10-24 x 5/8 TYPE 23 THDCU	
9	16	02 000 227	SCREW, 10 x 3/8 HEX WSHR TYPE A	
10	2	02 000 418	SCREW, 10x1/2 HEX WSHR TYPE AB	
11	1	03 000 129	COIL, HEAT ONLY	
12	1	03 000 142	COIL, A/C 980 W/90 VLV	
13	1	05 000 458	VALVE, EXPAN FK 1.0 TON O-RING	
14	2	06 000 167	MOUNTING BRACKET	
15	1	06 000 530	HOUSING, BOTTOM 980/981	
16	1	06 000 531	HOUSING, TOP 980	
17	1	06 000 532	DEFLECTOR, 980 DRAIN PAN	
18	1	07 000 005	OUTLET, 4 - 2 1/2" HOLE	
19	1	07 000 482	PAN, 980 DRAIN	
20	1	08 000 008	O-RING, #8 13/32	
21	1	11 000 214	BLOWER ASSY, W/RESIS, 12v UNIM	

MOUNT INFO

Heat Coil Not Included with ProAir 981 (AC Only)

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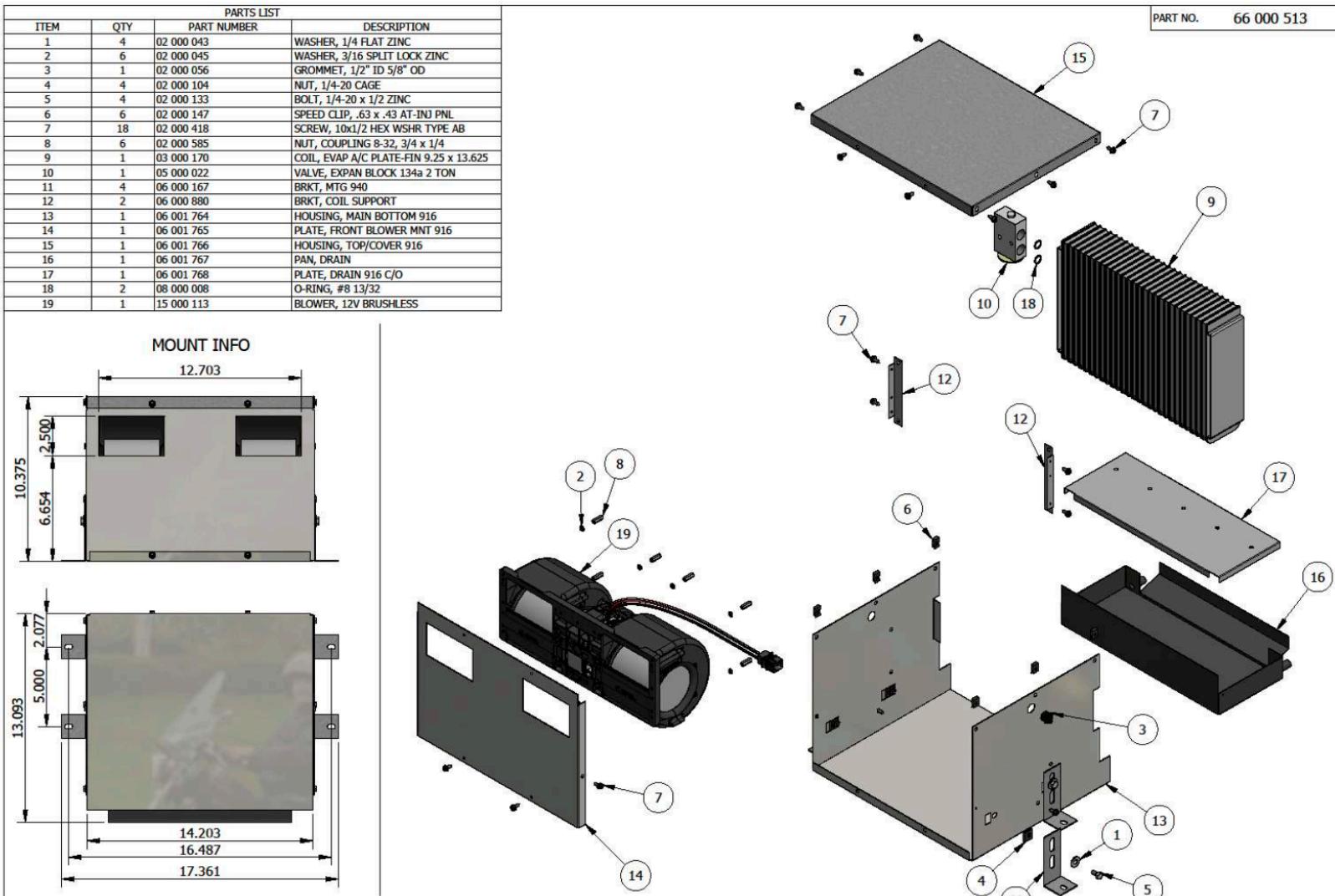
SIGNATURES DATE
DRAWN CEB 11/13/18
CHECKED RAI 11/13/18

PROAIR™
CLIMATE COMFORT IN MOTION

REV. 1

PART NO. 66 000 180
SCALE: .2 : 1 SIZE A
USAGE: ALL
SHEET 1 OF 1

ProAir 916 Cabinet Mount Evaporator



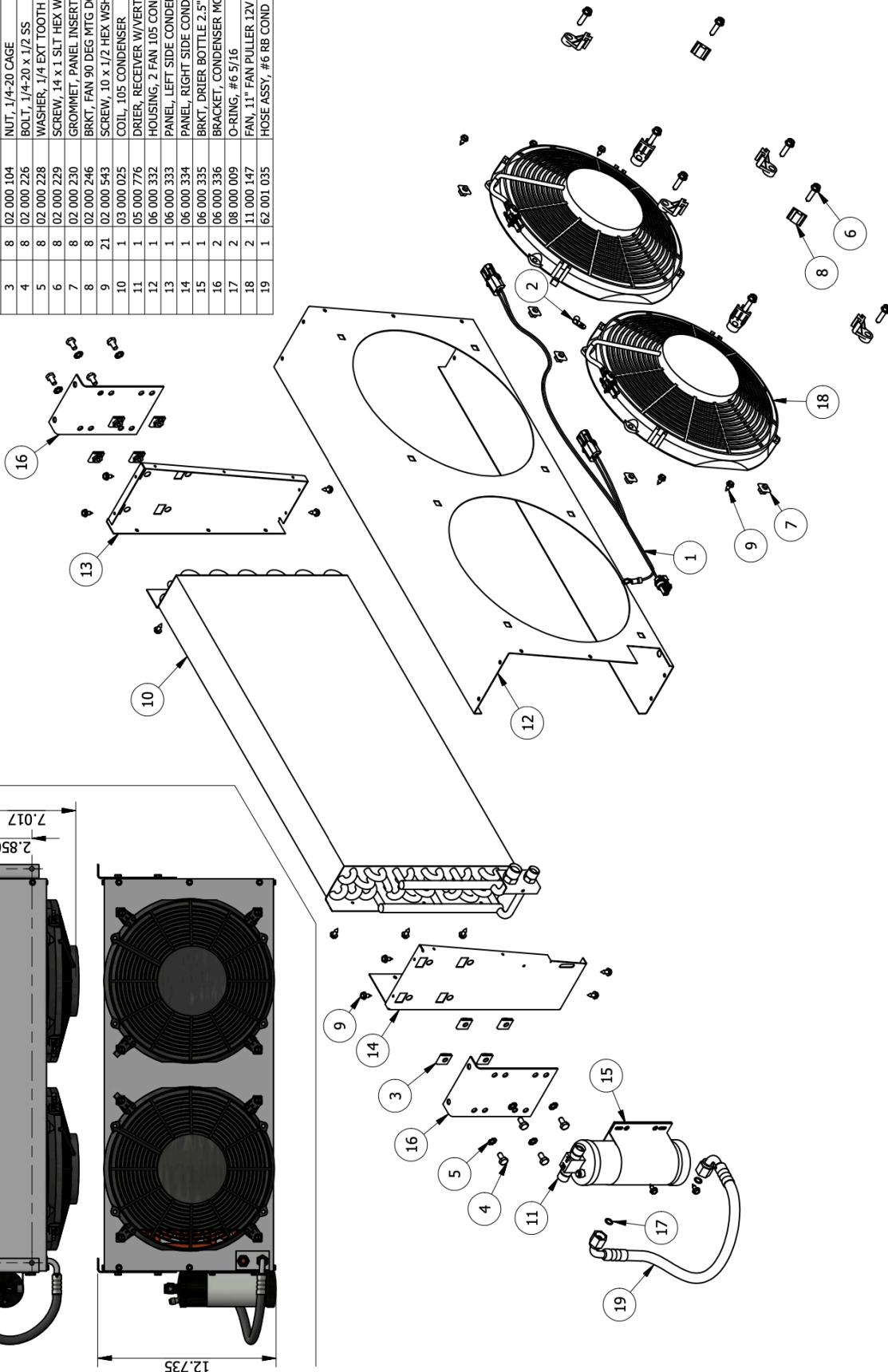
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REV. A

A LET. NO.	17-255	RELEASED TO PRODUCTION REVISION	CEB BY	SIGNATURES		DATE 9/28/17	PROAIR 2900 COUNTY RD 6 W ELKHART, IN 46514	TITLE: FRIGIKING, 916 C/O 12V	PART NO. 66 000 513
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								USAGE: ALL	SHEET 1 OF 1

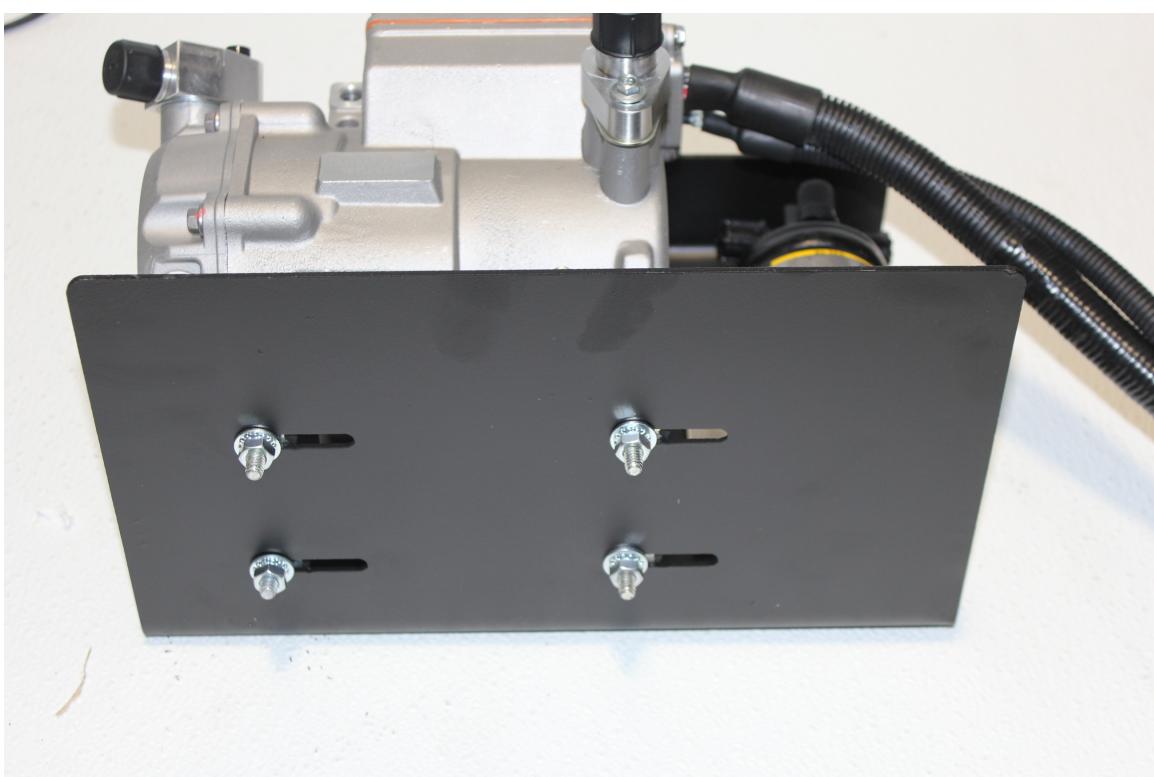
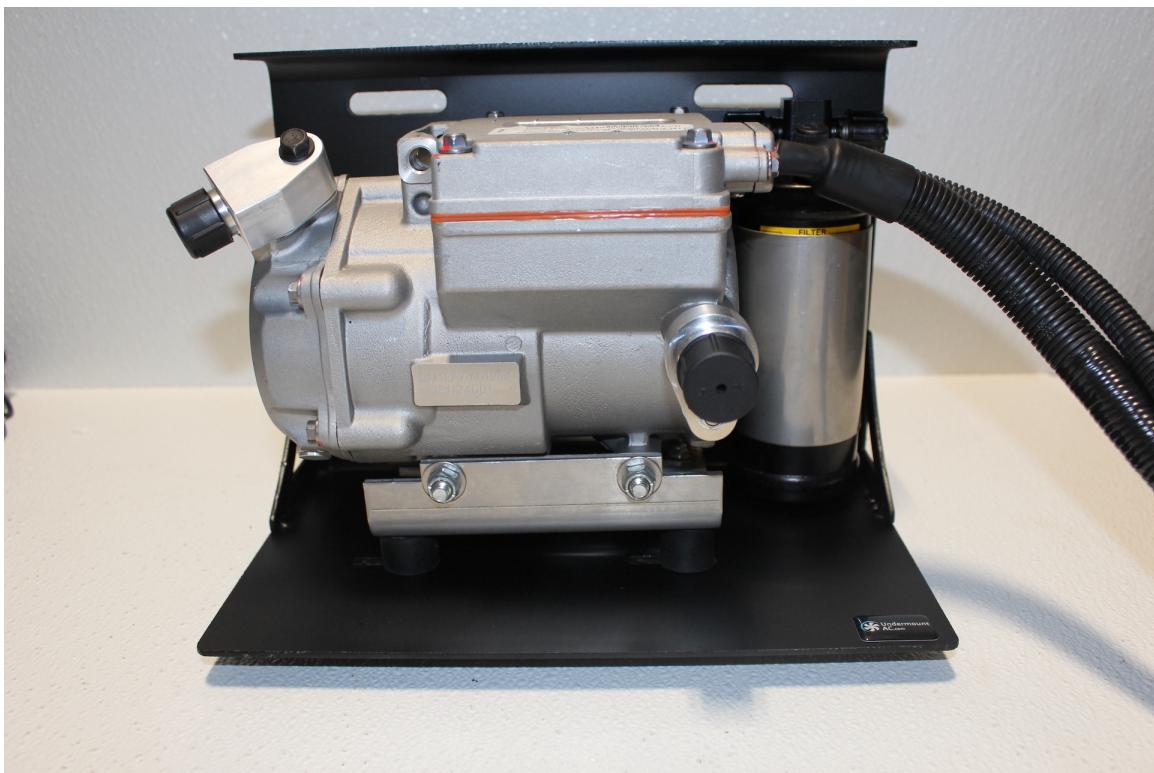
PART NO.				PARTS LIST	
ITEM	QTY	PART NUMBER	DESCRIPTION		
1	1	01 0000 819	HARN, 105 CONDENSER FANS		
2	2	02 0000 100	LINESTAKE, 1/4" I.D. NYLON		
3	8	02 0000 104	NUT, 1/4-20 CAP		
4	8	02 0000 226	BOLT, 1/4-20 X 1/2 SS		
5	8	02 0000 228	WASHER, 1/4 EXT TOOTH SS		
6	8	02 0000 229	SCREW, 14 X 1 SLT HEX WSHR SS		
7	8	02 0000 230	GROMMET, PANEL INSERT NYLON		
8	8	02 0000 246	BRKT, FAN 90 DEG MITG DCM		
9	21	02 0000 543	SCREEN, 10 X 1/2 HEX WSHR TEK SS		
10	1	03 0000 025	COIL, 105 CONDENSER		
11	1	05 0000 0776	DRIER, RECEIVER WAVEVERTICAL SVC		
12	1	06 0000 332	HOUSING, 2 FAN 105 COND		
13	1	06 0000 333	PANEL, LEFT SIDE CONDENSER		
14	1	06 0000 334	PANEL, RIGHT SIDE CONDENSER		
15	1	06 0000 335	BRKT, DRILER BOTTLE 2.5" DIA.		
16	2	06 0000 336	BRACKET, CONDENSER MOUNTING		
17	2	08 0000 009	O-RING, #6 15/16		
18	2	11 0000 147	FAN, 11" FAN FULLER 12V		
19	1	62 001 035	HOSE ASSY, #6 RUB COND		

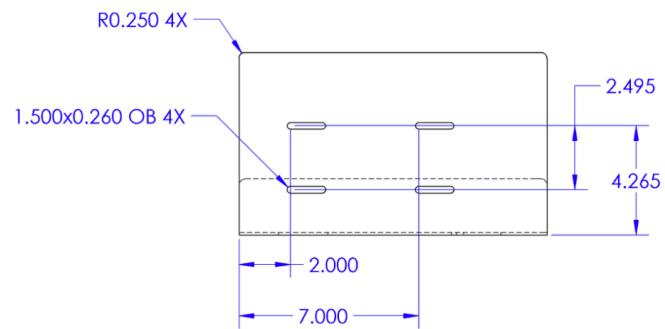
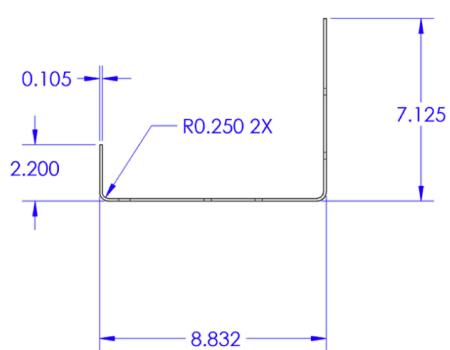
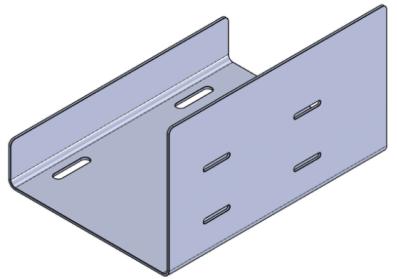
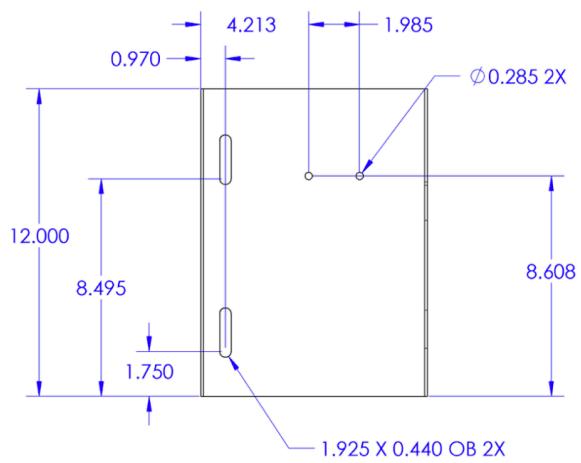
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				TITLE: CONDENSER, 105 w/OUT PS 12V		PART NO. 31 000 103	
						SCALE: .25 : 1 SIZE A	
						SHEET 1 OF 1	
PRO AIR 2900 COUNTY RD 6 W ELKHART, IN 46514		SIGNATURES		DATE			
		DRAWN	CEB	10/5/17	CHECKED	RAI	10/5/17
A LET. NO.	17-262	RELEASED TO PRODUCTION	REVISION	CEB BY DATE	APPROVED		

Compressor and Dryer Mount





Compressor Installation Notes

Please follow the guidelines below for proper compressor installation and warranty:

- **The Compressor Assembly MUST be mounted upright**
- Do not add any additional Lubricating Oil. **100ml of Zerol POE oil comes shipped inside the compressor.** Please keep the caps sealed until ready for A/C lines to prevent factory vacuum and compressor oil from escaping the compressor. Pressure in Drier, compressor and condenser is normal and is inserted to prevent moisture.
- The inverter is internal of the compressor and is mounted inside the compressor housing on the flat spot of the compressor. Inverter electronics do not like excessive heat and rely on the flow of refrigerant through the compressor to properly cool. DO NOT mount the compressor in a location where it will see temperatures in excess of 158 °F (70°C)
- Please use a qualified professional to double check your work if DIY, pressure test and fill your system. HVAC systems are not intended to be DIY, and a professional is always required at the very least to purge and fill the system. No warranty will be provided for improperly filled or damaged systems as a result of improperly purging and pressure testing.
- If you are not confident in the accuracy of your Vacuum/Pressure Gauges. Please Vacuum to 30in Hg, seal the system and hold overnight before fill.
- ***IMPORTANT*** Use only PURE R134a Refrigerant without any additives or equivalents. Do not use any “compatible” refrigerants or any sealants. Use of anything but pure R134A will void all compressor warranty.

Filling with Refrigerant

The system uses standard R134a automotive refrigerant. You may test the system for leaks with nitrogen at pressure and check that it holds for 30 minutes, or pull a vacuum to 30in Hg and hold it there for a period of time. Depending on the accuracy of your gauges, you may need to hold vacuum overnight. The system as shipped does not need compressor oil added. The compressor is pre-filled with Zerol POE Oil. Although this is an electric compressor, it does not need special oil as it is a low voltage system.

The system requires a fill of roughly 2.0lb-2.5lb of PURE R134A Refrigerant. Do not use any "compatible" or refrigerant that has additives or sealants. Only Pure R134A can be used. Vacuum the system and pull close to a 1LB of Refrigerant into the system at a slow pace. Turn on the System and introduce the rest as the compressor is running. Compressor is variable speed and will ramp up, so allow some time for pressures to increase and stabilize.

**Do not introduce more than 25PSI on low side pressure without the compressor running.
With 25PSI in the system start the system and allow the compressor, condenser and evaporator to stabilize before introducing more refrigerant.**

Normal low side pressure should be 30-35 psi. There is no harm in having less pressure in the system so long as it above 25psi. The chart below is a troubleshooting guide for system pressures. As temperature increases the condensers ability to drop the refrigerants temperature decreases, so the ability to return the refrigerant that is in vapor form back down to a liquid, decreases, therefore system pressures increase.

The higher overall system pressure you maintain, the less room there is for this expansion to occur as ambient temperatures increase, so it is highly discouraged.

Normal Pressures are 25-50PSI on the low side and 105-210Psi on the high side depending on ambient temperature and how hard the condenser is working. The low side pressure switch closes at 20PSI (Allowing Operation) and the high pressure switch shuts the system down at 410PSI. The compressor also features an electronic shutdown that will occur and timeout the compressor to prevent damage when the high side system pressures run past 220psi.

R-134a TEMPERATURE PRE (Tabla de Temperaturas y)	
Ambient Temperature °F/°C (Temperatura Ambiental)	Low-Pressure Gauge (Puerto de Servicio del Lado de Baja Presión)
65°F (18°C)	25-35 psi / 172-241 kPa
70°F (21°C)	35-40 psi / 241-276 kPa
75°F (24°C)	35-45 psi / 241-310 kPa
80°F (27°C)	40-50 psi / 276-345 kPa
85°F (29°C)	45-55 psi / 310-379 kPa
90°F (32°C)	45-55 psi / 310-379 kPa
95°F (35°C)	50-55 psi / 345-379 kPa
100°F (38°C)	50-55 psi / 345-379 kPa
105°F (41°C)	50-55 psi / 345-379 kPa
110°F (43°C)	50-55 psi / 345-379 kPa

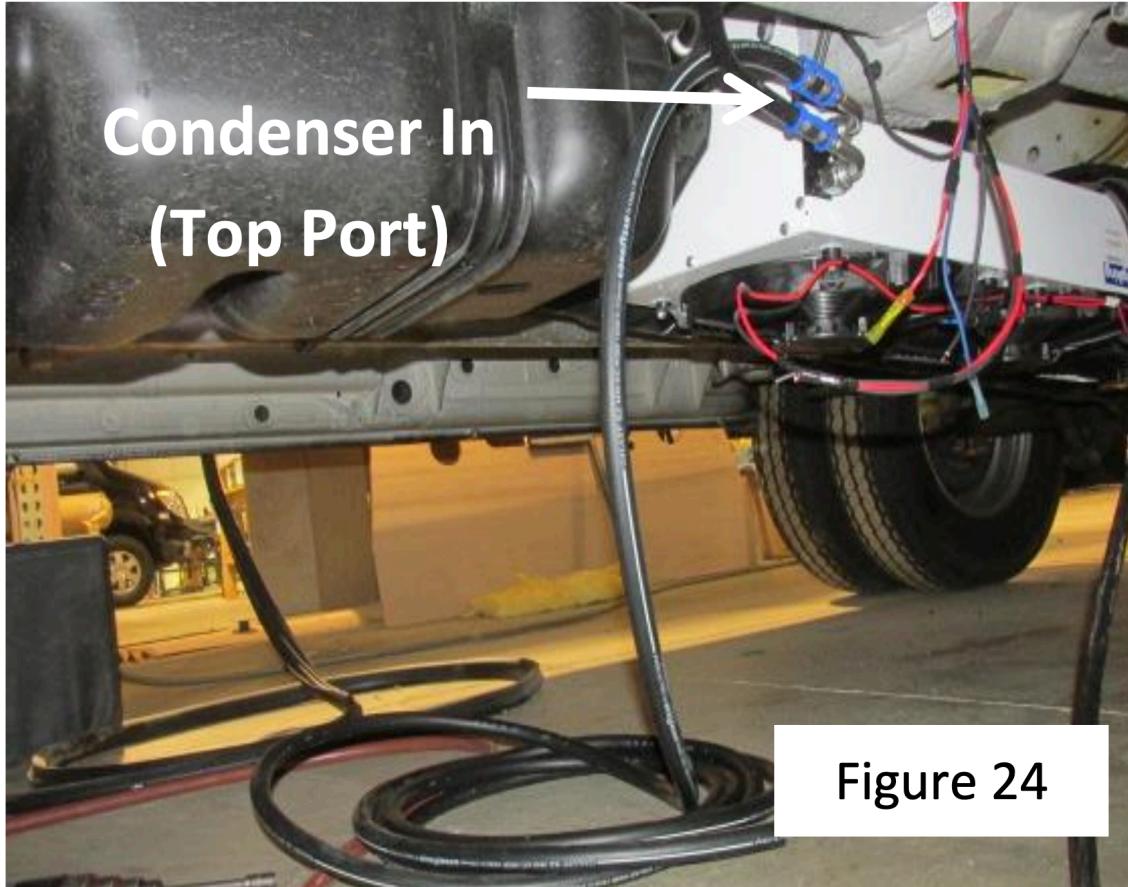
Ambient temp is the outside atmosphere

The high side pressures are removed from this chart as high side pressures on systems with an electric compressor will be lower than normal, and if followed will result in the system being overfilled. **Only fill the LOW side.** Do not use automatic filling systems that fill to standard automotive belt driven compressor pressures.

109 Condenser Flat Mount Installation Notes

When flat mounting it is particularly important to pay attention which port is the IN and which is the out. This could cause premature compressor failure. When mounted with the fans facing down, the top port on the condenser is the IN port which leads to the compressor. The bottom port closer to the fans is the OUT port which leads to the dryer.

Please see diagram:



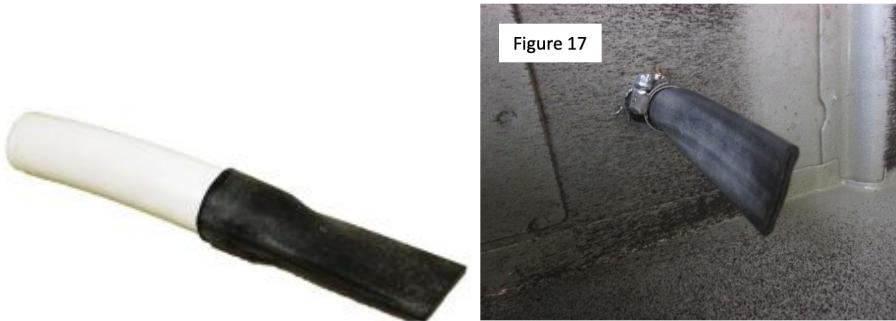
Evaporator Mounting Notes

Both the 916 and 981 evaporators must be mounted horizontal and flat. They cannot be mounted in any other orientation as the built-in condensation tray will be inoperable. During the normal course of operation air conditioners will pull humidity out of the air-conditioned space and the produced condensation will exit via a drain port.

The 916 evaporator has dual rear mounted drain ports which can be T'd together with the provided T. In high humidity environments we recommend using both drain ports individually. The 981 evaporator has a single side mounted drain port and does not require the included T.

The included drain kit includes a duck bill valve. (2.5" black rubber flat) When placed at the end/exit of your drain hose it will act as a one-way valve. The one-way valve is important to prevent the suction from the evaporator blower from interfering with the gravity drain of the one-way valve.

Installation is simple. Simply open one end, install at the end of the hose and clamp. Leave enough length past the hose to make sure the other end of the valve is still completely closed.



Prestite refrigerant tape

Included with your installation kit is Prestite refrigerant tape. Use this tar-style tape to wrap the exposed metal fittings on the evaporator between the currently taped evaporator section to the hose. This will provide a thermal barrier preventing condensation from forming on the fittings causing water to pool outside of the condensation drip tray.

Required maintenance

The system requires period maintenance and inspection in order to ensure proper and long-term operation. Since the system requires the movement of air both by the evaporator and the condenser any obstruction to that movement of air must be cleared for long term operation. This requires periodic cleaning and inspection of the condenser and evaporator coils. A cut to size washable air filter can be installed on the intake side of the evaporator to prevent dust and dirt build up on the evaporator coil. The evaporator coil can be washed under light pressure while installed keeping in mind not to overwhelm the condensation tray and line.

The condenser is exposed to road grime, debris and dirt. A clogged, dirty or not maintained condenser will lower system efficiency and harm the compressor long term as it will work harder than it should. Periodic cleaning of the condenser is necessary. Be careful to not bend the fins on the condenser coil when applying water pressure, to mitigate this apply water pressure parallel to the condenser fins. Degreaser is encouraged, but any harsh detergent or products with wax are discouraged.

Keep electrical connections free of corrosion, electrical dielectric grease is encouraged on connections. Chassis grounds should be checked periodically for corrosion and to make sure they are tight and clean.

If you live in an area with heavy salt use we recommend rinsing the components more often to prevent corrosion and rust, just as you would with the rest of your vehicle and components.

Warranty & Liability

Warranty coverage starts 1 week from the delivered day of your kit. This is the “grace period” to allow you to install your kit. The warranty is a parts-only warranty in which we guarantee any parts from manufacturing defects for the period of 1 year.

The parts-only warranty allows us to replace any defective parts but not customer responsible portion of the installation (labor, refrigerant, etc). Parts replacement are subject to availability and can only be shipped via standard courier shipping.

Any parts under \$200 will be shipped and replaced without a requirement for deposit or return so long as photos and descriptions are provided while diagnosing the issue with our technical support. Any parts over \$200 will require the return of the part for diagnosis and a deposit for the part will be held in trust. If the part is deemed to be a manufacturing defect the entirety of the deposit will be returned to the customer.

It is important to follow the instructions of this installation guide. While this guide is not a step-by-step installation manual, it provides some important steps required for warranty coverage. This includes but not limited to; Making sure the bracket and compressor are mounted in the correct upright position, correct IN/OUT hose positions, correct wiring size, proper grounding and power supply, correct voltage application, correctly following fill instructions and not overfilling or underfilling the system.

The warranty does not cover damage due to:

- Lightning, electrical surges, fires, floods or any other forces or nature.
- Accidents, misuse, abuse or alterations
- Improper or neglected maintenance
- Improper installation by not following installation guide

By purchasing and installing a product from UndermountAC.com, buyer and installer agrees to:

1. Assume ANY and ALL RISKS of Injury, death or damage resulting from use of the product,
2. WAIVE, RELEASE, and NOT SUE, MAKE ANY CLAIMS OR FILE ANY ACTIONS against UndermountAC.com, 1709006 Ontario Ltd, or any other owner or operator of businesses offering products through this website, or any one of the aforementioned entities and each of their insurance carriers, subsidiaries, affiliates, officers, directors, shareholders, members, representatives, assignees, employees, volunteers and agents, as well as any manufacturers and distributors (hereinafter the “Indemnified Parties” collectively, the “Indemnified Party” individually) that are based on, arise or result from, in whole or in part, use of the product, and
3. INDEMNIFY, DEFEND AND HOLD THE INDEMNIFIED PARTIES HARMLESS, from any and all claims, demands, actions, causes of action, losses or liabilities whatsoever arising from or related to participation in any activity and any loss, damage or injury, including death, that may be sustained by buyer or assignee, or caused to others or their property by buyer or assignee. Buyer also agrees to pay all costs, including reasonable attorneys' fees and disbursements, incurred by any Indemnified Party in defending an investigation, claim or suit brought by or on behalf of Buyer or assignee.