



Frostbite

Installation Instructions
2009-2015 CTS-V

PnP Tech Works, LLC



Introduction

Thank you for purchasing the PnP Tech Works interchiller system. Please read these instructions carefully before attempting any work to your vehicle. If your vehicle is experiencing no or poor A/C performance, do not install this product until proper diagnosing is performed.

Required Items (not included)

- PAG46 Oil
- R134A Refrigerant
- Basic Hand Tools
- Toggle Switch
- Fuse Tap

Safety Precautions & Warnings



! DANGER

Personal injury could result in failure to follow this warning. Systems contain oil and refrigerant under high pressure. Proper refrigerant handling techniques should be completed by a qualified technician.



! WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer or service agency.

NOTICE

The Clean Air Act of 1990 bans the intentional venting of (CFC's, HFC's, and CHFC's) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for noncompliance.

Recovery

Prior to any installation of this product, the vehicle must properly have the refrigerant recovered. It is advised to schedule a service with a well trusted facility with the proper equipment to perform this task. During recovery, have the technician note the amount of oil, if any, recovered from the system. The amount of oil lost during recovery must be added back in once installation is complete. If possible, have the technician backfill the system with a small (~5psi) charge of dry nitrogen to decrease the amount of moisture that will be exposed to the system.

Fascia Removal

The front fascia must be removed from your vehicle to gain proper access for mounting the interchiller. Start by removing the plastic beauty cover that is right above the grill. Remove the (6) pins by rotating counterclockwise, and then pull upward. Once they are all removed, you will need to loosen the weatherstripping the runs along the perimeter of the engine bay. Remove the plastic cover and weatherstripping together and set aside. Next, remove the (2) plastic trim retainers on each side, near the front headlight. Use the proper trim tool to remove the center retainer, and then remove the body of the clip. Next you will remove the (2) 10mm bolts holding the front fascia to the core support. These bolts are located on either side of the hood latch assembly. Next, remove the (6) trim retainer pins that are holding the splash shield to the front fascia. Once the splash shield fasteners are removed, there are (3) push pins on the front side of each wheel liner. Turning the wheel to gain clearance is recommended for easier removal. Once the push pins are removed, peel the wheel liner back slightly to gain access to (1) 10mm bolt on each side of the vehicle. The bolt is located at the seam between the front bumper and front fender.

Before going any further, place some painters tape around the headlights and just above the fascia seem on the fender. The tape will help to keep the paint protected when removing the fascia. Pull out on each side of the fascia at the wheel well to unclip the sides from the fender brackets. Next, move to the center of the fascia and pull the fascia outward slightly, placing your hands in the cavity left for the hood latch assembly. Do not try to walk away from the vehicle with the fascia, there are components that still need to be disconnected. Disconnect the connectors from each fog light, (1) on each side. Remove the headlight washer hose by removing the white retaining clip. Tie up hose to minimize the mess of draining washer fluid.

Intake Removal

The intake air assembly will need to be removed to gain access to the AC lines. This includes factory style intakes located on the driver side of the vehicle.

Combination Tap Assembly

The following steps will guide you through the installation process of the combination tap assembly onto the vehicle.

- Locate the 2 clamshell fittings on the driver side firewall of the vehicle.
- Place a rag under this connection as oil may drip out.
- DO NOT PROCEED UNLESS THE VEHICLE REFRIGERANT CHARGE HAS BEEN REMOVED!
- Using an electrical pin removal tool, release the clamshell clamps. Place the tool into the 2 slots on the clamp and push inward. This will allow the clamps to release, then open.



- Once the clamshell clamps are removed, remove the nut retaining the AC line bracket near the strut bar mount. Remove the line bracket from the line assembly with a Phillips screwdriver.



- Gently twist the A/C hoses and pull outward to disconnect them from the cabin evaporator. These can get stuck over the years so take care not to bend the lines too much in the separation process.
- Inspect the O-Rings on the liquid and suction side hoses. New O-rings are provided in the "SPARE PARTS" bag, located in the taps box if needed. Clean the inside of the evaporator tubes, the outside of the liquid and suction hoses, and lube these areas with PAG oil.



- Remove the combination tap assembly from the tap box. Remove the bolt and separate the tap from the front and rear retention plate.
- Unpack the liquid and suction lines, as well as the large diameter foam insulation with reflective sleeve.
- Hold the liquid and suction lines together and form the insulation around them. The liquid hose will need to be on the left side, and the suction on the right. Once the lines are insulated, lay them in the engine bay, along the factory ac lines, down in between the core support and frame, and leave loose for now.
- Screw the liquid and suction lines into the combination tap assembly. Make sure the O-Rings are on the fittings and lubricate with PAG oil. Make them as tight as you can, while still allowing them to rotate for installation.

- With the lines secured into the tap assembly, lubricate the O-Rings on the tap.
- Slide the tap into the factory evaporator assembly. Take care to not damage the O-rings when installing.



- Insulate the factory A/C lines. The smaller diameter foam sleeve will cover the suction hose. The longer piece will go from the tap to the service port, and the shorter piece will go from the service port to the rubber hose. The liquid line will be insulated with the Velcro heat sleeve. The heat sleeve will go from the tap to the service port.
- Place the factory lines into their respective bores in the tap assembly. It will be easier to place the suction line into the tap first. Some minor tweaking of the liquid line will be necessary to install into the tap. Just be careful to not tweak the line so much that it kinks. Only minor adjustment will be necessary.
- Grab the front and rear retention plates, as well as the bolt and keep them handy. The rear plate is threaded and the counterbored side of each plate will face the tap assembly.
- Slide the bolt through the front retention plate and keep handy. Slide the rear retention plate in behind the tap assembly, under the evaporator lines, with the counterbored face facing the tap. Slide the front retention plate in from the bottom of the factory lines and thread the bolt into the rear retention plate. *TAKE CARE TO ENSURE ALL OF THE CONNECTIONS ARE FULLY SEATED BEFORE TIGHTENING THE BOLT.*
- Tighten the retention bolt fully but do not crank down on it unnecessarily.

- Arrange the insulated, rubber liquid and suction lines for best fitment of the hoses and fully tighten. Support the tap assembly when tightening to ensure no damage to the factory aluminum lines into the evaporator.



Chiller Assembly

The following steps will guide you through the installation process of the Chiller assembly onto the vehicle.

- The horn is located near the driver side shock tower near the fender.



- Disconnect the horn electrical connector and remove the horn assembly bracket from the shock tower area. There are (3) 10mm bolts that need to be removed.
- Remove the horns from the horn assembly bracket. These are held with (2) 10mm nut (1) for each horn. It may be necessary to use a penetrant before removing these nuts.
- Install the horns loosely into the chiller bracket provided. The horn with the connector end will be furthest from the bracket mounting point. Use the (2) 10mm jam nuts provided to install the horns to

the bracket. Leave them slightly loose until final adjustment is complete, after installing the bracket.

- Remove the (2) 13mm outer nuts from the studs holding the crash bar to the vehicle. These will be the outside studs on the driver side, top and bottom.



- Slide the chiller bracket onto the studs so that the shelf for the chiller is pointing towards the front wheel. Place the nuts back over the studs and snug up bolts but do not fully tighten.



- Run the AC hoses underneath the vehicle frame and in between the horns. Orient the horns so that they are not stressing the wires or connector, plug them in, and fully tighten the 10mm jam nuts.



- Use the provided insulation tape and wrap it around both the liquid and suction lines on the chiller. These are the stainless formed lines on the chiller body itself.
- Orient the chiller so that the TXV ports are facing up. Remove the shipping cover from the large port on the TXV. Carefully pour 1oz (20mL) of PAG 46 refrigeration oil into the large port opening. Reseal and stand the chiller on end and allow time for the oil to drain into the chiller.
- Place the chiller assembly onto the chiller bracket installed previously, so that the expansion valve on the chiller is pointing away from the engine. The studs on the bottom of the chiller will go through the hole and slot on the bracket.
- Tighten the (2) 13mm nuts holding the chiller bracket. Tighten the (2) 13mm lock nuts securing the chiller body to the bracket.
- Insert the liquid and suction lines into the chiller thermal expansion valve and tighten. Ensure the O-rings on the fittings are lubricated with PAG oil.



- The interchiller kit comes with 2 cushion clamps. Grab the smaller cushion clamp and attach it around the liquid line (smaller line) on the chiller. Remove the nut from the stud on the bottom of the headlight right above the chiller. Slide the mounting hole of the cushion clam over top of the stud, replace the nut, and tighten. *DO NOT OVERTIGHTEN*



- Once the chiller is fully mounted, grab the large cushion clamp from the kit and wrap it around the insulated factory suction line as shown. Attaching the clamp to the factory A/C line mounting bracket location.
- Using the provided stainless steel zip ties, strap all the insulated lines to the suction line previously secured. Clip the zip tie, then roll it under to remove sharp edges and tighten.



- Ensure all lines are routed to avoid the power steering pulley and any other area with moving parts.

Wiring

The race valve solenoid only draws a maximum of 3 amps of power. The race valve is normally open so both the cabin and chiller will be operational when NO voltage is supplied. When 12vdc is supplied, the race valve will inhibit the flow of refrigerant to the cabin. Use the supplied harness to provide power the coil. Provide switched and fused ignition power the coil. A 10a max fuse is recommended to protect the coil. Use the supplied loop and heat sink tubing to protect and secure the harness. A switch can be installed anywhere on the vehicle. It can even be installed under the hood for access at the track.

Water Lines

The chiller assembly is equipped with -12AN male ports. The ports on the chiller are marked with inlet and outlet. Reversing the flow will decrease performance. It is recommended running a 50/50 Antifreeze/Water mixture. The freezing point should be at least -10°F. **RUNNING PURE WATER WILL FREEZE IN THE CHILLER POTENTIALLY DAMAGING IT AND THE PUMP.** Water surface tension modifiers can be used only per manufactures recommendations. Too much can cause air to entrain in the water greatly reducing the pump ability to create flow.

A great resource for plumbing your interchiller system can be found in our KNOWLEDGE BASE section on our website!

<https://pnptechworks.com/knowledge-base/f/coolant-hose-routing>

Reassembly

Look over the entire system one more time to ensure all lines are tight, and routed away from any moving parts. Reinstall the vehicle bumper and air intake system. Bleed the water lines of any air.

Evacuating

The A/C system must be properly evacuated prior to recharging the refrigerant. It is recommended to have a trusted local shop perform this crucial step as well as recharging. Maintaining a 28-29inHg of vacuum over an extended period will ensure the system is properly evacuated and all moisture removed.

Charging

The factory charge of R-134a for the CTS-V is 19.4oz. The chiller assembly will require an additional 3oz of refrigerant for a total of 22.4oz. It is not recommended using any refrigerants with dyes, oils, leak sealers, or conditioners.

Performance

The vehicle's cooling capacity depends on a few factors which are mainly ambient temperature, humidity, and air flow. Air flow over the condenser is critical to performance. The condenser is responsible for rejecting the heat into the ambient air. Insure it is clean of dirt, dust, and bugs as well as fresh ambient air have a path to the condenser.

Chiller performance is factored on complete system design. Heat travels from hot to cold and greater the temperature differential, the more heat will transfer. Ideally, all the heat absorbed would be from the intake air tract of the engine. That is not always the case as heat can be absorb "dirty heat" from the lines, tanks, and pump the water travels through. Insulating lines and tanks from engine bay and exhaust heat will increase performance.

Water volume of the system should be considered as well. Excessive amount of water will put an increased load on the A/C system. Consider your pumps flow rate and time under boost when sizing the amount of coolant. Example: A 6 GPM pump running on a car under boost for 15 seconds (5 seconds staging, 10 seconds racing) will only process 1.5 gallons of water. Excessive water capacity will only increase the amount of "dirty" heat that the chiller must remove.

Cabin A/C performance will be altered in it's time to cool down (not necessarily its temperature). Larger water capacity will slow down the rate the cabin cools. The A/C system must cool down the water and the cabin now. Putting the car on recirculation mode will aid in how fast the cabin cools.

With the cabin and the chiller running, the chilled water temperature will plane off around 38-40°F. This is strictly due to the vehicles HVAC control module. Once the temperature of the evaporator reaches 37°F, the HVAC control module will disengage the compressor. This protection is to keep the cabin evaporator from freezing over. With the race valve engaged, the water temperature will plane off around 15°F. Optimal water temperature will occur driving. This increases the airflow over the condenser as well as ambient air flushing out the "dirty" heat of the engine bay. Intake Air Temperature (IAT) depends on the heat exchange in the air tract to absorb heat. Some intake tracks are better than others at exchanging the heating.