Rotary Car Club (*http://rotarycarclub.com/rotary_forum/index.php*)
- **RX-7 2nd Gen Specific (1986-92)** (*http://rotarycarclub.com/rotary_forum/forumdisplay.php?f=37*)
- - **AC Failure & Restoration questions** (*http://rotarycarclub.com/rotary_forum/showthread.php?t=19182*)

Pete_89T2 04-17-2017 10:36 AM

AC Failure & Restoration questions

Well the AC compressor on my FC finally crapped out in spectacular fashion this weekend - compressor seized up solid while cruising on the highway! This resulted in a mangled AC belt, which when it snapped, managed to frag the PS belt before I could pull off the road. As I was pulling over onto the shoulder, the engine died and refused to restart - that was due to all the rubber bits of belt that were now covering the new FFE crank angle sensor. After a quick roadside clean up of the sensor, the car started & got me home, minus power steering.

So since I want to restore my AC, it looks like I'll need to rebuild most of the system and switch over to R134 refrigerant. On to the questions:

1. Confirm the parts list below that I'll need to tackle this job, and share any good recommendations for AC parts sources?

- I know I'll need a new/rebuilt compressor, a new receiver/dryer, all new O-rings/seals for the entire system, and I probably should get all new hoses and a new condenser to support the switch to R134.

- I'm thinking the evaporator core and the all the hard lines can be reused, after they are properly flushed & cleaned of all the old R12 compressor lube.

- I'm thinking a new condenser is needed because: (a) It's very difficult to flush/clean 100% of the old R12 lube out of a condenser (tiny passages), and (b) A larger and/or more efficient condenser would benefit an R134 switch, as the FC's AC system was marginal running with R12. I'm thinking new rubber lines are needed because R134 needs the newer "barrier" lines, and my old R12 lines are now almost 28 years old

- Most of the "complete AC repair kits" I've seen online include a new expansion valve/orifice - assume I'll need that as well?

- The stock FC system has a refrigerant pressure switch on the high side plumbing, and a temperature switch on the evaporator core. Both switches are normally closed (NC), and are intended to disengage the compressor clutch when the respective pressure or temperature condition is met. IIRC, the temp switch opens at temps below 35*F or so, just before the evap core would freeze up. Not sure what pressure the pressure switch opens at, but since it was designed for an R12 system, I'm guessing I'll need a different pressure switch to work with an R134 system? If so, what should the switch pressure spec be?

2. After doing a little compressor shopping, I'm finding that the original Denso compressor my FC has (AC installed in Japan during assembly) is NLA or just very hard to find, but the Sanden compressor (port/dealer installed unit) is readily available. Would switching to the Sanden matter, assuming all the fittings/plumbing are new?

Thanks!

JL1RX7

04-17-2017 11:53 AM

Only thing you need to change the compressor and the dryer. Look for jack child's write up on duster, R152A. I did get it to work till my junkyard compressor died. The sanden compressor works just fine. Should be able to get them 200 to 300 from flea bay or advance. If you want I have set of gages and a pump if you want an excuse to head down my way.

Pete_89T2

04-17-2017 12:47 PM

Quote:

> Originally Posted by **JL1RX7** (Post 341165)
> *Only thing you need to change the compressor and the dryer. Look for jack child's write up on duster, R152A. I did get it to work till my junkyard compressor died. The sanden compressor works just fine. Should be able to get them 200 to 300 from flea bay or advance. If you want I have set of gages and a pump if you want an excuse to head down my way.*

Thanks Jack, I have a Horror Freight manifold/gauge set, but I think I'll take you up on the offer to head south for the vacuum pump so I can evacuate/test everything out before charging it up once it's all back together.

Had no luck finding the R152A duster thread you referenced on RCC; is that guy on the other forum? He only posted in about 4~5 threads here, none of them on R152A.

So I gather it is possible to fully flush & clean out a circa 1989 condenser well enough to switch to R134 and the different lube they use? Seems to be lots of conflicting info on the interwebz on that one; some say yes, others no. Supposedly every last molecule of the old R12 lube needs to be flushed, or bad juju results when mixed with the new R134 lubes. That, plus the fact that my compressor probably spewed a bunch of metal shavings into the system make me concerned about making sure all the reused bits are cleaned out properly before reusing.

t_g_farrell

04-17-2017 02:02 PM

Pete, we should talk at DGGR unless you are fixing it before.

You need a new dryer, expansion valve, green orings (forget the name for the compound, compressor and hoses. The old hoses will leak anything with smaller molecules than R12 (which is 134A and R152A).

I was going to mention the R152A, its almost the same temp curves as R12, so no need for a larger condensor. Its cheap, just go to Staples and and get a 3 pack of the Dustoff spray, just make sure it says it has R152A. You can buy a vampire tapping tool to use when feed the duster into the system. HF carries them and you can get them on ebay. I use the HF vacuum device thats driven by my compressor to evacuate and it works just fine and its cheap.

You want to use ester oil for the new oil too (I think, I'll have to verify).

The link to the 152 post on the other forum is:https://www.rx7club.com/1st-gen-arch...gerant-

997918/

If you want blow by blow instructions let me know and I can post em up here.
I've done this to 3 vehicles so far and all 3 have been working well for years.

Pete_89T2

04-17-2017 03:20 PM

Quote:

> Originally Posted by **t_g_farrell** (Post 341177)
> *Pete, we should talk at DGGR unless you are fixing it before.*

Oh, we'll be talking about this at DGRR, since there's no way in hell I'm going to find the time to get this job done before DGRR :rofl:

Quote:

> Originally Posted by **t_g_farrell** (Post 341177)
> *You need a new dryer, expansion valve, green orings (forget the name for the compound, compressor and hoses. The old hoses will leak anything with smaller molecules than R12 (which is 134A and R152A).*

Tracking on all of the above.

Quote:

> Originally Posted by **t_g_farrell** (Post 341177)
> *I was going to mention the R152A, its almost the same temp curves as R12, so no need for a larger condensor. Its cheap, just go to Staples and and get a 3 pack of the Dustoff spray, just make sure it says it has R152A. You can buy a vampire tapping tool to use when feed the duster into the system. HF carries them and you can get them on ebay. I use the HF vacuum device thats driven by my compressor to evacuate and it works just fine and its cheap.*
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> *You want to use ester oil for the new oil too (I think, I'll have to verify).*
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> *The link to the 152 post on the other forum is:https://www.rx7club.com/1st-gen-arch...gerant-997918/*
>
> *If you want blow by blow instructions let me know and I can post em up here.*
> *I've done this to 3 vehicles so far and all 3 have been working well for years.*

That R152A link was very informative; presuming all my reused parts (especially the condenser) can be flushed/cleaned out adequately, switching to R152A gets me the performance of R12 without having to get a new condenser. :cheers2:

t_g_farrell

04-17-2017 05:09 PM

I have been working to get AC back into my SA. Hardest part was finding someone to make

the hoses correctly (damn SA has weird metric fittings unlike any other rx7). I found a local place that can do them via a mechanic at a C&C meet. So I'll probably be getting the AC going after DGRR as well.

GySgtFrank

04-17-2017 07:36 PM

The other thing to be aware of, if switching to R134a, is that it is not as efficient as R12. To get the same temperature drop you need a larger evaporator and condenser. Most people just put up with the slight drop in efficiency rather than trying to upsize all that.

RETed

04-18-2017 11:35 PM

The condenser core is woefully inadequate for the system.
This was confirmed by an AC tech guy that I knew.
If you're going to drop serious money to fix the system, try and get a custom / bigger condenser core.
At the same time, you're probably need a stronger / larger fan.
Most of us go electric fans anyways, so this might be a moot point.

When I had my stock AC working, I think the FC was the ONLY car that actually got HOTTER when you turned on the AC... :(

-Ted

Pete_89T2

04-19-2017 07:27 AM

Quote:

> Originally Posted by **t_g_farrell** (Post 341184)
> *I have been working to get AC back into my SA.* ***Hardest part was finding someone to make***
> ***the hoses correctly*** *(damn SA has weird metric fittings unlike any other rx7). I found a local place that can do them via a mechanic at a C&C meet. So I'll probably be getting the AC going after DGRR as well.*

^I suspect the same will be true for the FC. My car has the Nippon Denso compressor, but they also built S5 FCs with the Sanden compressor. Each has a different hose fitting configuration. I can go with either compressor at this point (FWIW, the Sanden is a bit easier to source than the ND, but both can be had), but switching to the Sanden means I'll HAVE to scrap my hoses. Hard lines are common to both on the FC, according to the parts fiche. Hopefully someone at DGRR will have an FC with the Sanden AC so I can take a gander and figure out which compressor configuration I like better - maybe the Sanden setup gets in the way less when changing plugs out :rofl:

Quote:

> Originally Posted by **GySgtFrank** (Post 341185)
> *The other thing to be aware of, if switching to R134a, is that it is not as efficient as R12. To get the same temperature drop you need a larger evaporator and condenser. Most people just put up with the slight drop in efficiency rather than trying to upsize all that.*

^Tracking, that's why the conversion to R152A (aka - keyboard duster gas) is looking very appealing. From what I've read, R152A refrigeration properties are about the same as R12, so if your condenser & evaporator core worked well enough with R12, they should work fine with a proper charge of R152A. The amount of R152A you need to charge the system will be different than R12, but the info is out there and others have done it successfully, so I'll give it a shot.

Quote:

> Originally Posted by **RETed** (Post 341211)
> *The condenser core is woefully inadequate for the system.*
> *This was confirmed by an AC tech guy that I knew.*
> *If you're going to drop serious money to fix the system, try and get a custom / bigger condenser core.*
> *At the same time, you're probably need a stronger / larger fan.*
> *Most of us go electric fans anyways, so this might be a moot point.*
>
> *When I had my stock AC working, I think the FC was the ONLY car that actually got HOTTER when you turned on the AC... :(*
>
> *-Ted*

When my AC was working (with R12), it worked great - that thing could freeze your nuts off! With the stock radiator & fan though, it's true that running the AC jacked up the coolant temps. The stock radiator I think is inadequate as-is. That problem went away though when I dropped in a Koyo dual pass AL radiator, even with the stock fan. After that, I was hard pressed to see coolant temps ever go above 195*F while flogging the car with the AC on, high 170's - low 180's otherwise. I'm running an E-fan now, and there's no difference in that respect.

I'm figuring if the stock condenser cooled well enough with R12, it will do the same with R152A. The real question then is can the stock condenser be flushed/cleaned out adequately, given my compressor took a dump?

t_g_farrell

04-19-2017 08:05 AM

You should be able to take the condensor and the evaporator (part by the heater core) to a radiator repair place and have them flush and evaluate both to make sure they are clean. Its a legit concern if the compressor seized up on you.

In my case, I'm lucky, I had stopped using the AC when it leaked down and then removed it so my hard bits are all good still.

djmtsu

04-19-2017 08:43 AM

I might have an AC compressor from my S5 still here somewhere. I'll check before DGRR. If I do, it was from my S5 NA, and worked well before removed. Of course it will have to be flushed, it's been sitting.

Pete_89T2

05-02-2017 01:55 PM

Here's an update on my AC situation...

Removed the compressor from the car, and verified it's a Nippon Denso compressor, part #10P15C to be exact. I also purchased a remanufactured ND compressor, new receiver/dryer, new expansion valve & O-ring kit from these guys:

http://www.acpartshouse.com/

FWIW, price for all of the above shipped to me was $210, compressor was $150 with a 1 year warranty. For an extra $100, they will give you a lifetime warranty on it, but since they told me that they don't do anything different or better in the rebuild process when I asked, I didn't think the lifetime warranty was worth the extra $100. Figured if it's a bad rebuild, it would fail within the 1st year anyway.

My plan going forward is to remove the condenser & evaporator core, hoses & AC hard pipes and give everything a thorough flushing with solvent & drying with compressed air to ensure there are no bits of my old compressor left behind. Then when the compressor & other parts arrive, reassemble the system with all new O-rings/seals, and evacuate & leak test it with a vacuum pump. Charge it up with R152A duster spray and enjoy the cold AC again :cheers2:

FerociousP

05-02-2017 02:18 PM

^sounds good!

They make specific cleaner for clearing out the tubes.

+1 on r152. Those around me that used it had good luck. Just make sure you use the right expansion valve (r12 one?).

Pete_89T2

05-08-2017 11:53 AM

Another update on the A/C project, this weekend I got the following done:

- Pulled the evaporator, flushed & cleaned it out
- Pulled the condenser, flushed & cleaned it out
- Removed all the hard lines & hoses, flushed & cleaned those out.
- Bench lubed the new compressor and installed it on the car
- Installed the new receiver/dryer and new expansion valve, which is within the evaporator box. Amazing how many dead spiders and assorted desiccated bug carcasses I found in there :rofl:
- Reinstalled the now clean & dry condenser, evaporator and all hard/soft lines with all new O-rings.

For flushing everything, I picked up this flush tool that you partially fill with solvent and hook up to your air compressor:

https://www.amazon.com/gp/product/B0...?ie=UTF8&psc=1

Worked like a champ, although the rubber tip on the nozzle was a bit too big to fit some of the smaller hard lines I had to flush. Fortunately, I was able to improvise with other blow gun tips I had in the shop. For solvent, I used this stuff:

https://shop.advanceautoparts.com/p/...s-11/7060432-P

It worked well, and since it's a citrus based solvent, the garage smelled like oranges afterwards :rofl: Only downside is that it took a LOT of shop air to blow the evaporator & condenser completely dry.

Other tidbits:

If you're using the ND compressor, you'll need to salvage the suction/pressure pipe manifolds from your old compressor, as the new/rebuilt one probably won't include those parts (mine didn't). Removing those can also be a PITA - one of the 4 socket head (allen) bolts on mine was seized to the compressor and it had to be drilled out. Fortunately it was a common size (M8-1.25 x 20mm long) socket head bolt that I could get locally. Can't use a hex head because the hex won't clear the recess in the manifolds. I got 4 new stainless bolts, and used some anti-seize lube on the threads in case I ever have to remove them again.

If you're switching from R12 to either R134 or R152A like I am, in addition to flushing the rest of the system, you'll need to make sure your new/rebuilt compressor doesn't have much/any mineral oil left in it, as you'll be switching to Ester lube to be compatible with R134/R152A. Ester lube is compatible with mineral, so it's OK if you don't get 100% of the mineral oil out. Just don't use PAG oil - bad things will happen if PAG mixes with even trace amounts of mineral oil. According to the instructions that came with my compressor, it was shipped "dry" with just some mineral oil assembly lube left in. What you need to do in that case is "bench flush" & lube the compressor. First support it upside down so the open ports drain into a pan. That removes most of the mineral oil assembly lube. Then flip it right side up, and add about 60~100 cc's of new Ester lube into the inlet (suction side) ports. Turn the compressor clockwise by hand about 10x to work the lube thru it, then flip it over to drain it out. Repeat this process about 2~3x until there is nothing but clean Ester lube comes out. Let it drain until dry on the last pass - this will take a long time. Then you'll then add your final 60~100 cc of Ester lube (for ND compressor, per FSM) and rotate it clockwise by hand a few times before putting the manifolds & new O-rings back on it, and mounting the compressor in the engine bay. Cap the compressor ports to prevent any crap from getting in before you close up the system.

Next step will be getting a vacuum pump to evacuate the system & check for leaks. Assuming no leaks to fix, it's on to charging it with R152A.

t_g_farrell

05-08-2017 12:37 PM

Sounds good Pete. I use an instant read meat thermometer stuck in the vents with the AC on high with the fan on high as well. When I fill I watch the temps of the air and fill until

it bottoms out, if goes up a bit after hitting the low, thats ok, you can just bleed off some of the coolant to get it back to the low temps.

Pete_89T2

05-08-2017 03:04 PM

One other thing I forgot to add. While removing the stock aux E-fan to get the condenser out, I found out why it was so damned loud & vibrated a bit much.... Turns out 1 of the 5 plastic fan blades was busted off, and the other 4 blades had various chips & cracks. So it was way out of balance.

Mazda still sells a replacement fan blade for it, at like $50. I'm thinking I can just get a universal 9~10" E-fan off of Ebay for around $20~$35, fab up a quick mounting bracket or reuse the existing stock fan frame and get better performance.

Pete_89T2

08-22-2017 02:53 PM

I just realized I forgot to post up my results after finishing this AC project. Short story is the duster gas (aka. R152A or HFC-152A) works about as well in my restored FC A/C system as the old R12 did.

The 1st reman compressor I got was probably damaged in shipping, in that the mag clutch would sometimes stay engaged even after it was de-energized. The company I bought it from (see previous posts) replaced it under warranty, but that meant I had to R&R the compressor, evacuate/vacuum the system & recharge it again. Good thing R152A is dirt cheap - $11 for a 4 pack of 10oz cans at Walmart.

The step by step procedure I used for evacuating & charging the system with R152A is within in the first 40 or so posts here from the other forum:

https://www.rx7club.com/1st-gen-arch...gerant-997918/

The best result I got was about 7*C (= 44.6*F) temperature from the center vents at max cooling. According to the link, it should take in about 2x full 10oz cans of duster gas, but I couldn't get the system to ingest more than maybe 1-1/2 cans. Not sure why, as I followed all the tips suggested in the link to get the last can in. So perhaps my system is slightly under charged, or perhaps the new expansion valve I got, which *I THINK* is calibrated for R12, being it's an OEM replacement, might not be optimal for using R152A.

For my busted auxiliary E-fan, I found a nice 10" universal fan on Ebay for about $18 that I was able to easily adapt to fit the stock e-fan bracket. No more noise & crazy vibes when the fan kicks in.

Anyway, I'm happy with it!

t_g_farrell

08-22-2017 04:40 PM

Hey, that sounds great. I think I remember it always taking less duster gas than 134a but not sure about how the amount compares to R12.

Pete_89T2

08-23-2017 08:06 AM

1 Attachment(s)
The OP from the other forum says the charge by weight for R152A is 20~22 oz, based on molecular weight. Since it sucks to wade thru 40-ish posts to find relevant info, I packaged the OP's instructions into a single handy PDF file - see attached.

There may be another reason why I couldn't get that full 2nd can in.... In order to retain my AC & PS with the FFE crank trigger kit, Angry Stig came up with a brilliant solution using a backwards mounted spare FC Alt/WP/air pump drive pulley & some AL spacers. Since those pulleys are smaller in diameter than the stock AC drive pulley, I'm now under driving my AC a wee bit. So it is very possible that when I was charging the system at 2000~2500 RPMs per the instructions, maybe I should have been revving it higher to draw that last can in?

All times are GMT -4. The time now is 08:28 AM.