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2016 WEBINAR DATES | TRANSMISSION
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February 2 | AS68RC Intro
February 16 | Lineartronic Gen 2 Introduction
March 1 | 6T40 Internal
March 15 | Reprogramming 1
March 29 | A5HF1 Introduction
April 12 | Reprogramming 2
April 26 | Nissan CVT Introduction
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June 7 | AS68RC Internal
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July 5 | 6T40 & 6T70 comparison
July 19 | Nissan CVT Internal
August 2 | JF613 Internal
August 16 | Drivability Diagnostics 1
August 30 | Drivability Diagnostics 1
September 13 | A5HF1 Internal
September 27 | Drivability Diagnostics 2
October 11 | Hybrid Diagnostics & Safety

**August 2** | **722.9 Internal**

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Nissan/Jatco CVT Internal

Presented by:
Mike Souza
ATRA Senior Research Technician
Introduction

Jatco/Nissan CVT (Early 1990’s & Up)
CVT for small FWD vehicles F06A (RE0F06A) *(this is the numeral 0 not the letter O on all CVT’s)*
CVT for small FWD vehicles JF009E (RE0F08A/B)
CVT for large FWD vehicles JF010E (RE0F09A/B)
CVT for medium FWD vehicles JF011E (RE0F10A/B / D no ratio control motor)

Jatco/Nissan CVT7 “Xtronic”
CVT with an auxiliary gearbox (2 speed) for mini and small FWD vehicles JF015E (RE0F11A)
CVT with an auxiliary gearbox (2 speed) for small (no mini) FWD vehicles JF020E

Jatco/Nissan CVT8
CVT for medium and large FWD vehicles JF016E/JF017E (RE0F10E/H/J w/chain)
CVT for Hybrid FWD vehicles JF018E/JF019E

Jatco/Nissan CVT RWD
CVT JR006E “Toroidal CVT” also referred to as “Extroid CVT”

![Ratio change mechanism of the EXTROID CVT](image)
# Introduction

## Nissan CVT Changes

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**ROM:** Read Only Memory  
**RCM:** Ratio Control Motor (Stepper Motor)  
**WDR:** With Dropping Resistor in electrical circuit  
**HIR BRAKE:** High & Reverse Brake Clutch Solenoid  
**HIGH CL:** High Clutch Sensor Switch  
**N C SM:** Not connected on some Sentra models  
**N WD:** Not shown in any Factory wire diagram  
**PNP:** Park Neutral Position Sensor (Range Sensor)
# Introduction

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Chain Driven
Introduction

The Jatco/Nissan CVT RE0F09A/B seems to be the most popular on the ATRA tech line, although we are now starting to see more calls on the RE0F10A.

These units are very similar as with most Jatco CVT’s, with some differences in the pulleys that we will cover in this webinar.

Certain differences you will need to be aware of during disassembly of the pulleys and the tools needed to make the job easier.

We will also cover some of the more common failures as well.

This webinar will also cover more of the internal components of the newest model CVT7 platform.

Parts are coming more available as we speak, but in the meantime we need to do what we did in the past for vehicles with transmissions that had hard to find parts.

Buying cores seems to be something the industry hasn’t been doing as much as in the past.

As mentioned before several aftermarket suppliers are working with the manufacturers to obtain more internal hard parts.

More overhaul kits are becoming available as we speak.
The Pulley Assemblies are the most import and often over looked internal component on CVT’s.

These pulleys need to be taken apart to check the seals and to clean any debris from other failed internal or external components such as the Torque Converter.

It’s not uncommon to have the Torque Converter or Belt/Chain fail causing excessive debris without causing any damage to pulleys or other internal components.

The pulleys may be reused in such cases.

Note: The pulley chains can break as well just not seen as often.

At times we have seen the pump chain breaking too.

Here is an example of only one Steel Ring failing.
Pulley Assemblies

The pulleys sustained minimal damage and were reusable.

Secondary Pulley

Primary Pulley
Pulley Assemblies

This belt came completely apart on this Mini Cooper VT1F CVT without any damage to the pulleys.

The belt is basically the same as some Nissan/Jatco CVTs.

Costing less than $400 to repair.
There are not too many tools needed to disassemble the pulleys that we don’t already have in our tool boxes to work on other transmissions.

The only tool necessary that will work on almost all CVT transmissions is a 2 jaw gear puller.

There is also a 3 jaw puller, but the 3rd jaw will not fit in some areas.

This tool can be found on the internet for around $200-$300 in some cases.

This tool will work on all Nissan/Jatco CVT units as well as other CVT’s.
Pulley Assembly Tools

Hand Made
Pulley Assembly Removal

To remove the Pulleys from any Jatco/Nissan CVT simply remove the rear cover. The Pulley assemblies are attached to the rear cover with retainer bolts.

Evenly pry the cover and pulleys out of the case.

Always use at least two Nylon Tie Wraps on the Push Belt before removing the belt from the pulleys.
Pulley Assemblies

All the Nissan/Jatco Secondary and Primary pulleys are very similar with a few differences in components. The Secondary Pulleys will usually have a strong spring and some Primary pulleys also, just not as strong.
Some Secondary Pulleys will have a very strong spring. You must be careful when disassembling.

There are some models where the Primary Pulley also has a spring (larger engines). Usually not as strong as the Secondary Pulley spring.

The pulleys primarily come apart the same but there are some differences you need to be aware of.

**RE0F09A example.**

Remove the Retainer Nut, (left hand thread) with the 2 Jaw Puller and a Gear Puller; remove the Idler & Park Gear.
Be aware that some pulleys may have some Half Moon Retainers just above the Apply Piston not found in all units.

They are hidden underneath a Retainer Piston/Shell with a snap ring just above the Apply Piston.

If left unnoticed you will not be able to remove the Upper Sheath.

Retainer Piston (Shell)

Snap Ring

Half Moon Retainers

Apply Piston (press fit)

Retainer Ring

RE0F09B
After removing the Retainer Piston/Shell, Half Moon Retainers and Snap Ring; place the Park Gear and Retainer Nut (left hand thread) back onto the pulley.

Now with the two jaw puller pull up on the upper sheath until the apply piston pops up and hits the park gear.

It will be quite a pop due to the strong spring.

Now your done, it’s apart that easy.

Just use a press when going back together.
RE0F09B Secondary Pulley

- Retainer Nut (left hand thread)
- Idler Gear
- Snap Ring
- Park Gear
- Retainer Piston (Shell)
- Retainer Ring
- Half Moon Retainers
- Apply Piston (press fit)
- Sealing Ring
- Spring (may have 2 springs)
- Spring Seat
- Upper Sheath (floating)
- Lower Sheath (stationary)
- Retainer Ring
- Check Balls (ball bearings) 3 Sets of 4

Retainer Nut
Idler Gear
Snap Ring
Park Gear
Retainer Piston (Shell)
Retainer Ring
Half Moon Retainers
Apply Piston (press fit)
Sealing Ring
Spring (may have 2 springs)
Spring Seat
Upper Sheath (floating)
Lower Sheath (stationary)
Retainer Ring
Check Balls (ball bearings)
3 Sets of 4

Retainer Ring

Check Balls (ball bearings) 3 Sets of 4
Here is an example of a typical Primary Pulley assembly.

The Primary Pulley shown here is from an RE0F09B with a Return Spring.

After removing the Retainer Nut (right hand thread) use a 3 Jaw Puller to remove the Bearing and Pulley Retainer.
Pulley Disassembly Primary

There is no Retainer Piston or Snap Ring, the Half Moon Retainers are kept in place by the Bearing.

The Apply Piston just like the Secondary Pulley is a press fit.
Pulley Disassembly Primary

The procedure to disassemble the Primary Pulley is the same as the Secondary Pulley.

After removing the Half Moon Retainers, re-install the Retainer Nut and using the 2 Jaw Puller tool pull up until the Apply Piston pops up.

This one will not spring up as abruptly as the Secondary Pulley, the Spring (not found in all units) is weaker.

RE0F09B
Retainer Nut (right hand thread)

Retainer Ring

Half Moon Retainers

“DING”
Pulley Assembly Comparisons

Some models without the half moon retainers have an extended sleeve on one single Apply Piston (no retainer piston/shell).

RE0F09B
Retainer Ring
Half Moon Retainers
Apply Piston (press fit)

RE0F10A
Single Apply Piston (no retainer piston)
Extended Sleeve
Pulley Assembly Comparisons

Other models will use a roller bearing and square retainer instead of check balls with retainer rings.

- **RE0F09B**
  - Retainer Ring (located in upper Piston)
  - Check Balls 3 Sets of 3
  - Retainer Ring

- **RE0F10D**
  - Single Roller Bearing With A Square Retainer
  - There are 3 roller bearings without retainers on the RE0F10D Secondary Pulley

Primary Pulley

Secondary Pulley
Pulley Assembly Comparisons

Some Pulleys may have only 1 set of 3 roller bearings without the square retainers. They will have the same type retainer rings used in earlier models.

Check Balls
3 Sets of 4

Retainer Ring
(located in upper Piston)

RE0F09B
Secondary Pulley

RE0F10D
Secondary Pulley

1 Set Of 3 Roller Bearings Without Retainers
**Pulley Assembly Precaution**

The raised tab (bend) on the check ball retainer ring must be placed into one of the square grooves in the Primary and Secondary Pulley as shown below.

If not placed into one of the square grooves, one of the round grooves will be left open and allow the check balls to fall out of the pulley (shown on next slide).
Pulley Assembly Precaution

As you can see here the bend in the retainer ring was placed at one of the round grooves leaving one of the other round grooves open without retaining the check balls.

Wrong

This is another reason to disassemble the pulleys to check for damage to the check balls and the groove.
Let’s look at the latest JF015E Jatco CVT (RE0F11A) pulleys compared to the earlier models. The pulley assemblies (Variator) are located above the area of the case that holds oil.

This was designed for less frictional drag on smaller engine vehicles and to help prevent aeration of the fluid.
RE0F11A Pulley Assemblies

Unlike the other Jatco CVT’s the Primary Pulley is taller and has the drive gear attached. The Secondary Pulley is shorter with no gear the opposite of what we’ve seen previously.

Keep in mind this CVT has the clutches in front of the Secondary pulley not the Primary, which will be covered later in the presentation.
**RE0F11A Pulley Assemblies Secondary**

- **Secondary**
  - Retainer Nut (right hand thread)
  - Bearing
  - Apply Piston (press fit)
  - Sealing Ring
- **Spring** (may have 2 springs)
- **Apply Piston** (press fit)
- **Speed Sensor Exciter Wheel**
- **Upper Sheath** (floating)
- **Single Roller Bearing With A Square Retainer**
- **Lower Sheath** (stationary)
Alternative Primary Pulley Dis-assembly

Since there is no spring on this Primary Pulley (some have a spring), you can take the pulley apart by simply tapping it on something solid (cement floor) to separate it.

The area just above the nut has no threads to damage doing it this way.

The Secondary Pulley has one or two strong springs, so it’s still best to use the puller tool with or without the re-installing the nut.

**RE0F11A (JF015E)**

![Diagram showing parts of the Primary and Secondary Pulley](image-url)
Pulley Assemblies Installed

Using the 2 jaw puller to compress the Secondary Pulley Spring wrap another nylon tie strap across the entire belt. This will keep the Secondary Pulley Spring compressed.

It is now possible to move either pulley during installation into the rear cover without difficulty.

Install some alignment bolts with the head ground off before installing the pulley assemblies into the rear cover.
Pulley Assemblies Installed

Once installed into the rear cover with the retainer bolts in place.

All the nylon ties can be cut allowing the Secondary Pulley Spring to decompress putting tension back onto the Push Belt.
The RE0F10E/H/J use a chain with plastic guides very similar to the Subaru Lineartronic, so it’s not necessary to use any tie wraps when removing the chain. It won’t come apart like the Push Belt.
Chain Driven Pulleys

A closer look shows there are two aluminum lube chain guide pins/tubes sitting in the chain guides that fit onto two steel feed tubes inside the case.

Installing these pulleys into the cover first will not work.
Chain Driven Pulleys

The flat area on both aluminum chain guide pins/tubes musts face inward to align with the tabs on the feed tubes in the case to prevent them from rotating.

This will keep the lube holes aligned to spray oil onto the chain.
Chain Driven Pulleys

The closed side of the aluminum lube tubes are held down in place by two embossed tabs in the back cover.
Chain Driven Pulleys Installed

The RE0F10E/H/J pulleys with the chain are installed into the case first instead of the cover.

Now the lube chain guide pins/tubes can be installed onto the feed tubes in main case one at a time making sure the flat area aligns with tab.
Now with a couple of alignment bolts on the pulley retainers we can slide the cover onto the pulleys and install the six (6) retainer bolts with seals.

The New Generation units, chain or belt are very easy to assemble.
Pulley Assemblies Installed

Not all Jatco CVT’s will have retainer bolts through the rear cover for both pulleys.

- **RE0F11A**: Only 2 Bolts to the Primary Pulley
- **RE0F10A**: Like the later model RE0F10D, it has 3 Bolts to both the Primary & Secondary Pulley
- **RE0F06A**: Only 3 Bolts to the Secondary Pulley
Clutch Assembly Comparisons

The RE0F11A (JF015/16E) models use a Low Brake and High Forward and Reverse Brake clutch (2 speed). Other models use only a Forward and Reverse Clutch.

Note: that all the clutches are on the Secondary Pulley side of the 11A models.
Clutch Assembly Comparisons

Other Nissan/Jatco CVT’s use only a Forward and Reverse Clutch (RE0F10D example). The clutches are found on the Primary Pulley side on all other models except RE0F11A.

RE0F10D
Common Failures

It is not uncommon to find bearing failure on these CVT transmission. If the bearing does not spin extremely smooth by hand with some pressure; check for ring cut inside the pulley shaft.
Common Failures

Here are a couple examples of pulley bearing failures. Most often the Secondary Pulley bearing begins to fail first with the exception of this RE0F08A shown below.
Common Failures

Not only is there an issue with the bearings on the pulleys going bad completely there are times they will cause noise complaints.

There also times when the check balls on the pulley shafts go bad.
Common Failures

Pressure sensors commonly fail also setting pressure sensor codes. Although there can be leaks in the pulley feed or apply piston sealing rings that will also cause pressure sensor and solenoid codes.
Common Failures

It is not unusual for a later model RE0F11A (JF015E) to arrive at your shop with the section of the case that mounts up to the vehicle to be broken.
Most Common Complaint

P0218 Transmission Overheat is the most common complaint on the tech line. Caused by a restricted High Pressure Filter. Even if the filter looks new change it.

Be aware some new aftermarket filters will also cause this problem.

RE0F10A

External Filter

Located Behind
The Warmer/Cooler

RE0F11A (JF015E)

Warmer/Cooler

Warmer Cooler

External Filter
RE0F10A/B Valve Body

We covered the latest valve body in the RE0F11A in the last webinar so we will cover some information on other Jatco CVTs more common to the tech line calls.

Remove the bolts circled on the left to remove the valve body from the case.

Remove the bolts circled on the right to remove the electronics from the valve body.
RE0F10A/B Valve Body Electronics

- ROM
- Solenoids
- Ratio Control Motor
- Internal Harness
RE0F10A/B Upper Valve Body

- Manual Valve
- Torque Converter Regulator Valve
- Clutch Regulator Valve
- Pressure Regulator Valve
- Secondary Pressure Regulator Valve
RE0F10A/B Lower Valve Body

Select Control Valve
Select Switch Valve
Lock-up Control Valve
Line Pressure Control Valve
Secondary Control Valve
Pilot Valve
Filter
Open End UP
The solenoid identification and function on these two CVT transmissions is basically the same as the RE0F10A-B CVT. Just named differently.

The only major difference between these two valve bodies and solenoids is the Line Pressure Control A and B solenoids. The Flow rate is different on the solenoids and the valve body separator plate is designed for the difference in flow rate.

There are times when an 09 or 08 valve body has to be replaced and not easily found.

The LPCA and B Solenoids if kept with the original separator plate can be swapped as long as the solenoids are matched to the vehicle TCM.

The TCC Select and the 2007 08A TCC the only On/Off type solenoids the others are Pulse Width Modulated.
Although the configuration looks quite different the valve layout is almost the same as the RE0F10A/B series with the exception of one extra plug valve.
Earlier model RE0F06A units were not found in the U.S. market.
RE0F06A Valve Body

As you can see it’s completely different than any of the others.
Valve Body Installation With Ratio Control Motor

Installing a valve body with a ratio control motor onto the transmission. If not done correctly will cause a no ratio change (shifts) it may stay at a 1:1 ratio only. First make sure the control arm is facing the correct way (left photo).

Arm Below The Shaft

Arm Above The Shaft
Valve Body Installation With Ratio Control Motor

Then install a thin punch through the valve body to hold the control arm back against the valve body.

Hold control arm here
Now turn the valve body over and make sure the control arm aligns onto the pivot pin located in the case.

The pulley has to be turned until the pivot pin is moved all the way to the location shown below.

The pulley does not turn very easily.
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