

OPERATION & ADJUSTMENT OF THE
CITROMATIC TRANSMISSION

by Donald [Red] Dellinger

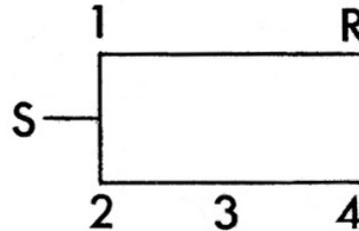
Many people get confused about Citromatic equipped cars especially if they have never had any previous experience with this type of shift. Most owners who have driven them for years do not understand the workings of this hydraulic marvel. When I think of it, it must be as close and effortless as you can get to a fully automatic transmission without the undesirable aspects of the fully automatic transmission such as loss of power, loss of control, flexibility, economy, etc.

The Citromatic is quick, positive, safe, economical, effortless...IF... all units are working and are adjusted properly. No four speed shifts faster or more accurately than a DS, with Citromatic. No declutching manually, no wait for synchronization, no foot slipping from clutch pedal, no clutch slip [riding clutch], no left leg cramps in traffic, quick shift from 4th to 3rd are just a few of this transmission's good points. One of the transmission's great points is ease of shifting even in hard cornering when extra power is needed. In a normal 4-speed equipped car you must remove one hand from the steering wheel; declutch with the left foot, more gear lever with right hand, release accelerator, etc. Valuable time is lost in these motions! The control of the car may be lost by split second timing in an emergency cornering situation. Citromatic is INSTANTANEOUS and when adjusted properly the shifting is precise.

☞ Most people are not patient enough to take time to understand Citromatic. Most mechanics do not understand it, therefore cannot adjust it properly. Most Citromatic clutches are so improperly adjusted that they have overheated and warped which causes clutch chatter and gives erratic operation. Once all of the components of the Citromatic are adjusted properly the only slippage the driver will get is if the car is started off in a gear higher than it should be [2nd or 3rd when it should be in 1st]. Have you ever observed the shift pattern closely?

Typical Citroen engineering! The transmission must be in neutral to start for safety [the shift block can only be in neutral or the starter will not turn]. 1st and reverse are directly across from each other, this is for ease of parking [minimum movement of the lever].

A properly adjusted DS will idle into a parallel spot just by touching the brake pedal- and shifting

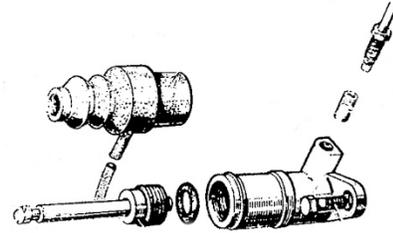


from 1st to reverse to 1st again. By the way, the brake pedal on a DS is to be operated by the right foot only - NO LEFT FOOT ON BRAKE AND RIGHT FOOT ON ACCELERATOR like an American auto - this will DEFEAT ALL ADJUSTMENTS. The champinion or mushroom foot brake rubber sphere is designed for a minimum travel its entire life and is lower than the accelerator pedal for a special reason - quick reaction time from the accelerator to the brake with the right foot, your foot only has to pivot on the heel to depress the brake and pivot to the right for the accelerator. If this is not so in any Citroen D model the accelerator linkage needs adjustment. This is all leading to proper driving of the DS Citromatic.

When all the adjustments are carried out properly to the driver's satisfaction, from this time on, normal maintenance should be a clutch adjustment every 10,000 miles [5,000 miles if the car is used primarily for stop and go

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driving]. EXCEPTION: When any of the components in this circuit are replaced, then adjustment of that component is necessary.

The transmission, differential, clutch pressure plate, clutch, disc, and release bearing are identical to the manual shift cars except for the internal shift rods and forks and the operation of the clutch. Instead of a mechanical clutch cable and rod there is a clutch slave cylinder and fitted to the transmission top covers are five servos or pistons [one each for 1st, 2nd, 3rd, 4th and reverse]. Lines leading from the hydraulic gear selector [shift block] to the transmission connect to these servos and are tied together in one bundle. Like any hydraulic clutch slave cylinder, it has one function - to engage or release pressure on the clutch release fork to operate the clutch mechanism. This lengthy description is necessary because the manually shifted car clutch free travel is also adjusted here by feel of distance or clearance, which can be checked quickly with finger and thumb, but NOT the Citromatic.

The Citromatic clutch is adjusted so that at 750-800 rpm the clutch components are just about ready to contact each other. Disc, pressure plate and flywheel. Putting it more simply, the clutch release or throw-out bearing is depressing the fingers on the pressure plate to the point where the clutch is just about to engage slightly but is still disengaged. For comparison on a manual shift car, the point reached when you are in 1st gear and have eased out on the clutch pedal to where another 1/8 inch would cause the car to start to creep away on the level. MANUAL SHIFT AND CITROMATIC CLUTCHES ARE ADJUSTED DIFFERENTLY. The manual clutch is adjusted without the engine running and the clutch pedal out [clutch engaged position] by pressing with your right thumb against the adjusting bracket [clutch fork] toward the radiator. There should be approximately 6mm clearance or play. Turning the adjusting, screw clockwise reduces the clearance, counter-clockwise increases it. That's it for the manual shift car owners, but for you poor buggers with Citromatic, let me continue as we are going to the meat and potatoes of it.

CITROMATIC CLUTCH ADJUSTMENT

Start engine and bring to normal temperature. If the front of your car has been wrecked and the crank extension will not fit through the air duct without binding you must either remove the duct or make a tool from 1/4 or 5/16 rod [obtained from a hardware store] and weld about 2 inches of 14mm or 9/16 allen key, to the 3 foot long rod. We use an old army surplus rifle cleaning rod that has a "T" handle that revolves. This must take the place of the crank extension piece and is inserted in the front, of the transmission and must be pushed in approximately 1 inch. This makes contact with the transmission main or clutch shaft which passes through the clutch disc and is supported by the pilot bearing in the flywheel. Now, back to the adjustment procedure: engine at normal operating temperature; turn the large air screw [brass] located at the front bottom left of the carburetor clockwise until seated and slightly tight, this should slow engine speed; check and adjust engine idle and mixture screws to obtain a smooth idle of 750-800 rpm [check with tach]; this is the speed the engine will be idling at when you stop for any reason in driving - so. at this speed we want the clutch disengaged [primary idle].

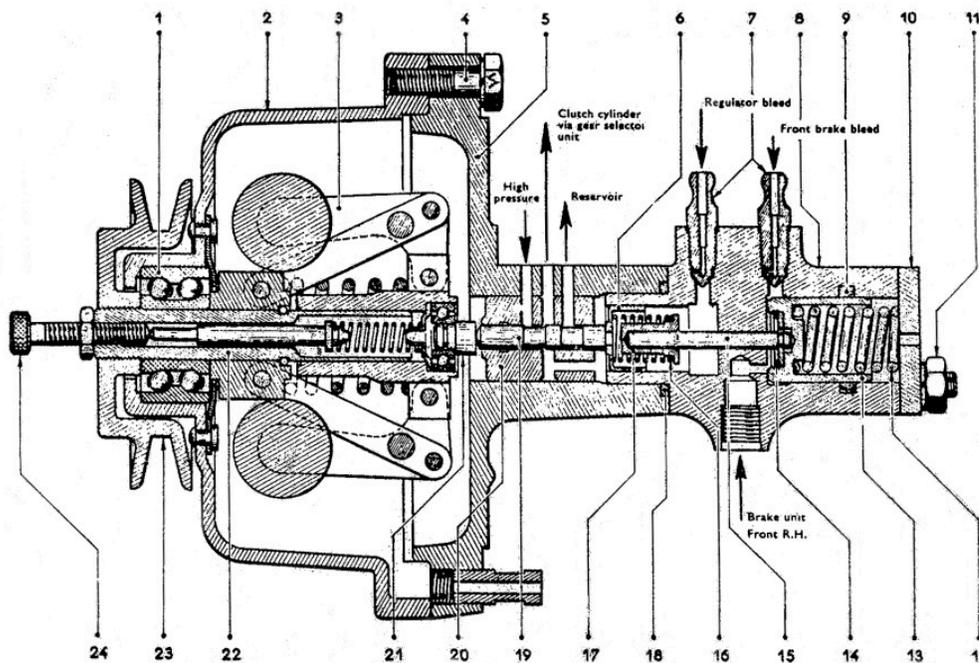
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Since the clutch disc is connected to the transmission main shaft and our crank dog is pushed in with the crank or our home-made tool, by changing the adjustment we can adjust the DS clutch properly. Turn the adjustment bolt counter-clockwise [with the engine running] [**WARNING: watch fingers in moving pieces - belts, fan, etc.**] until the tool [or crank extension] starts the adjustment bolt clockwise until the tool just stops turning [clutch just disengaged] then continue to turn the bolt one [1] full turn clockwise. You are now finished with the clutch adjustment. Note: If the shaft will not stop turning even after turning in the adjustment bolt all the way, then the pressure plate is broken and a new clutch is necessary. This is a fairly common occurrence even with manual shift on high mileage cars. If you try to adjust any other components of the system and you have a faulty pressure plate or clutch you will not be successful at all.

ENGINE IDLE

The next step [providing the clutch adjustment was successful and the Clutch/pressure plate mechanism is working properly] is to adjust the engine idle. I prefer 1000 rpm secondary idle. To adjust unscrew the large brass screw you previously screwed in back out [counter-clockwise] to obtain 1000 rpm. Now, step on the foot brake and the engine speed should drop to 750-800 rpm [primary idle] When you let go of the brake the engine idle should rise to 1000 rpm [secondary idle]. You are now finished adjusting idle. Note: Remember 1000 rpm minus 750 rpm equals 250 rpm [for future reference].

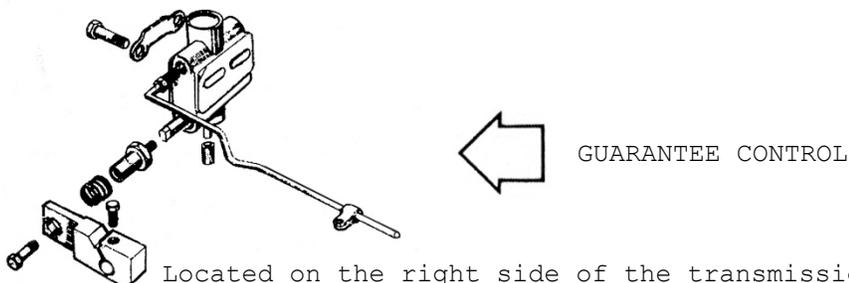


A sectional view of the centrifugal regulator

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|-----|-----------------|---------------------|---------------------------------------|---------------------|------------------|
| Key | 1 Front bearing | 2 Bearing end plate | 3 Governor mechanism | 4 Assembling screws | 5 Regulator body |
| | 6 Dashpot | 7 Bleed screws | 8 Clutch disengagement corrector body | 9 Seal | 10 Rear plate |
| | 11 Nuts | 12 Spring | 13 Piston | 14 Circlips | 15 Rod |
| | 16 Spring | 17 Cup | 18 Seal | 19 Slide valve | 20 Support |
| | 21 Pad | 22 Sleeve | 23 Pulley | 24 Adjusting screw | |

The next unit we will adjust will be the centrifugal regulator, located above the high pressure pump and driven by a small belt from the pump. This belt must not be overtightened or the result will be premature bearing failure in the centrifugal regulator. The centrifugal regulator has, one purpose only. That is to start discharging fluid from the clutch slave cylinder between 800 to 1000 rpm of the engine [a very slight amount]. When the engine speed increases from primary to secondary, idle speed, just enough fluid is released from the clutch slave cylinder to make the clutch start to engage. When the clutch starts to engage just slightly the car starts to "creep" or move slightly in first or in reverse. Therefore the operation of the regulator is as follows. When in first or reverse gear and your foot is on the engaged and the car stays still when you remove your foot from the brake pedal the engine speeds up [approx. 250 rpm] to secondary idle which in turn causes the weights in the regulator to signal the clutch to start to engage and the car begins to creep. It is only normal to have your foot on the brake when stopped at stoplights or signals or for backing up. This is why it is important to use the right foot only for braking - so that the accelerator is released and the primary and secondary idles work properly.

If the car will not creep when the foot brake is released in first gear it will need adjustment. Shut off engine. The adjustment is an 8mm headed bolt which goes through the center of the centrifugal regulator pulley and is locked in place with an 8mm nut. Unlock the nut and turn the bolt out [counter clockwise] one turn. Lock nut up, then start engine and check creep again. Continue this adjustment [counter-clockwise to increase creep/clockwise to decrease creep] until the car is set to creep at a speed you are comfortable with [If the car stalls on selection of first gear - screw in the adjustment screw until you achieve the desired creep.] This is a fine adjustment and should be adjusted in increments of one turn or less at a time. If the car stalls every time on starting out or coming to a stop usually the seals on the piston inside the regulator are swelled and hard, causing the piston to stick in the bore. This is a simple unit and consists of a set of centrifugal weights and springs acting on a sliding piston controlled by the adjusting screw. It's only purpose is to activate between the difference in speed of primary and secondary idle to release a minute amount of fluid from the clutch slave cylinder.



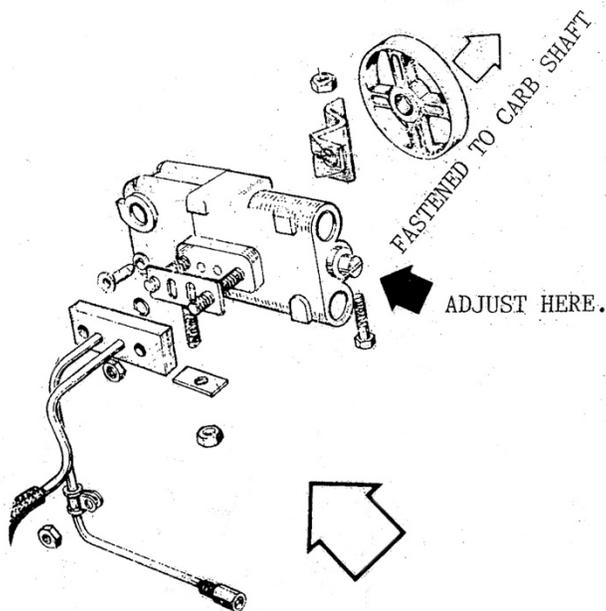
Located on the right side of the transmission, its function is to guarantee that the transmission's gears 1st and 2nd are engaged before the clutch can engage [for safety] by stopping fluid return from the clutch slave cylinder if the gears are not fully engaged. Adjustment procedure. is as follows:

Hydraulic pressure up, engine off, gear selector in neutral; loosen two 11mm headed bolts which hold control to transmission, pull unit toward front of gearbox, stop and push backwards slowly until the unit snaps rearwards [this is the neutral position], retighten the bolts.

Generally, this unit never gives any trouble and almost never gets out of adjustment. Adjust ONLY if it is removed for repairs.

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Changes in components such as the clutch pressure plate, or a change in fluid viscosity, can make the need to adjust this imperative!!

Some adjustments may require that the adjustment screw be turned several turns. This adjuster has a very fine thread, so adjustment is not too sensitive.

CLUTCH RE-ENGAGEMENT CONTROL

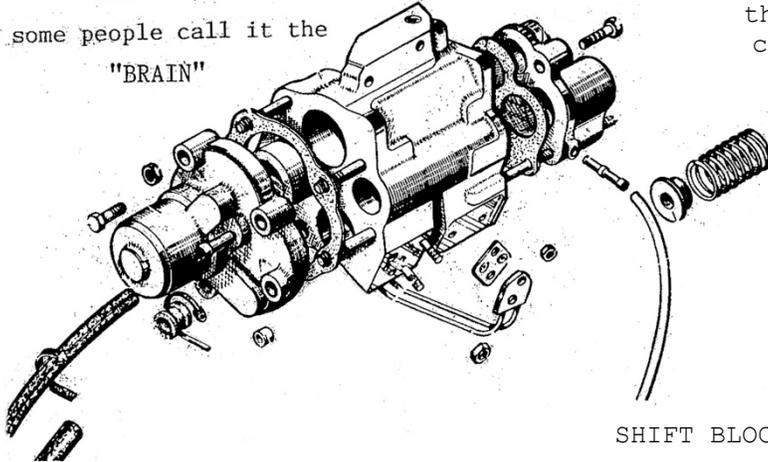
This control is attached to the intake manifold in front of the carburetor: and is activated by the carburetor primary throttle shaft. It's function is to control how quickly fluid is discharged from the clutch slave cylinder between gear changes [how fast the clutch reengages during the shifting from 1st to 2nd, 2nd to 3rd, and 3rd to 4th]. There are two adjustments: 1. On the side of the unit facing toward the driver's side of the car, a straight slotted screw protrudes approximately 8mm, sometimes with a knob fixed by a small screw. The knob has a small raised post allowing it to be turned only 350 degrees, but by unscrewing the small screw it can be turned without stopping on the small peg. If the speed of the clutch reengagement between gears is too slow turn the screw in [clockwise] until you are satisfied with the clutch reengagement speed. If the reengagement of the clutch is too fast unscrew it [counter clockwise] until it suits you. This screw will not unscrew and fall out and sometimes must be adjusted several turns depending on the condition of the clutch [such as when a new clutch is installed]. After getting the adjustment set you can reinstall the small knob with the set screw...install the knob straight up which will give you approx. 175 degrees of fine adjustment in either direction. 2. EXCEPTION: someone may have removed the carburetor and did not fasten the unit on the idle position and the shaft adjustment in relation to the carburetor idle may have been moved. There is a small hole [usually plugged with a plastic plug] just above and to the rear of the shaft centerline [towards front of car]. This is an adjustment/alignment hole. Normally with the throttle closed a 2.5mm [.100"] wire should pass through the hole in the housing and go into the line-up hole in the internal shaft, locking the unit and the throttle shaft tight. If it does it is alright, if not proceed as follows: Grip control unit shaft with thin vice-grip pliers near the body of the control, hold shaft from turning, loosen the 8mm bolt in clamp between the control and the carburetor shaft, push 2.5 mm [.100"] wire in hole in housing and turning shaft against spring tension until the wire falls into the hole in the shaft and locks the unit from turning, release pliers and align shaft coupling and tighten the 8mm bolt. After realignment of the control, readjust the unit as No.1 above. If necessary [it usually is]. Then on your road test after adjusting the unit drive the car at approximately 55 mph in 4th gear on a level road, move the gear change control to 3rd gear without releasing the accelerator pedal. The shift should be smooth and almost unnoticeable...if not stop and fine adjust by the knob [or screw if yours no longer has knob on it]...road test and readjust to suit your driving style. Total time involved is about 1/2 hour.

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SHIFT BLOCK

some people call it the "BRAIN"



SPECIAL NOTE: Before you look for any trouble in this unit, be sure that you check the belt on the centrifugal regulator.

The car will not move if the regulator is not turning. DO NOT OVERTIGHTEN THE BELT!

Should the belt break, the car can be driven by using the manual engagement control that is located under the steering column

SHIFT BLOCK

There is only one adjustment on the shift block itself and it very seldom, If ever, needs readjustment unless the shift block is removed from the car. Adjustment procedure is as follows: With left hand reach under and to the rear of the shift block, there you will find a rubber plug with the largest part about 11mm in diameter. After removing this dust cover you will have access to a 3.94mm hole. When 1st gear is selected with the control lever a pin 3.94mm diameter X 50mm length will slide into the lineup hole approximately 30mm and lock 1st gear position in the shift box. If not, a mirror will allow you to see the hole. The best method to line up the hole [if it is not already] is to have someone move the control lever to the left/right/in/or out slightly in order to line the hole up in the shift block so that the pin can be inserted. Once you have the pin inserted into the shift block properly then you must adjust the shift control lever to the corresponding 1st gear position. To do this you must first remove a dust cover from the metal cowl to the rear of the shift block [under the hood]. This plug is about 3/4" in diameter and is made of rubber. It exposes two 8mm bolts which tighten a clamp between the control lever mechanism and the shift block. To adjust, loosen the lower 8mm bolt and align the shift control lever to the 1st speed detent [pops into place]. Then tighten the lock bolt. Remove the alignment pin and reinstall the dust cover [plugs]. You are finished.

This unit is faithful and almost never gives trouble but is often accused as being the cause of trouble. One exception is when it becomes gummed up and stiff [especially in cold weather]. Then it must be flushed out of removed and cleaned. A hissing noise from the shift block can be caused by misadjustment or a sticking piston which can be remedied by adjustment or removal or cleaning. Seriously, this unit is like all Citroen hydraulic units and is well engineered and needs little attention. Should service be required never take it apart in place, it is easily removed from the car to be repaired on the bench.