



How to

Fit a Concentric Clutch Release Bearing

A hydraulic clutch release is one of the nicest conversions you can do to your Type-9-equipped classic Ford, and it's simple to swap a concentric release bearing in place of a cable clutch — here's how.

Behind virtually every classic Ford engine swap it's been traditional to fit a Type-9 five-speed gearbox. And for that matter, there's been a few non-Ford engines with the same box, too — it's pretty popular. But one of the problems always has been the linkage to the clutch — on plenty of early classic Fords, this is hydraulic while later cars made the switch to cable.

That latter one can be a bit of a head-scratcher — trying to get it all to work easily and with minimal pedal effort. The problem often comes though when you fit a heavy-duty clutch. Some meant for race duty are so hard, it puts a massive strain on both the cable and your left leg. In traffic,

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such situations are nothing short of a nightmare. Hydraulic operation is far more comfortable; not to mention practical too — simply because it self-adjusts. But adaption — by fitting a slave cylinder on the outside of the 'box can be fairly tricky. Thankfully, Retro Ford have a well-thought-out system.

Retro Ford's Dave Colledge reminds us that it's around 18-years since he first came up with the idea of the system. In fact, it was a Classic Ford project car which necessitated the conversion in the first place. We were fitting a Type-9 into our Mk2 Cortina — and as usual, it was around 2 am! We were having lots of problems making it all work when it was suggested, why don't we use a

concentric bearing, like they do in a SAAB? The next day, we bought a suitable candidate from the local motor factors, Dave machined an adapter from billet and the rest is history — as far as we know the Cortina's bearing is still working in its home country that is now Japan!

To this day, Dave gets constant questions on how the system works and how to set it up. So to put it all straight, we thought it was time for a revisit. This then is the ins and outs of the Type-9 concentric release bearing conversion — and for that matter the T5 too — whether you're converting from cable operation or updating your existing hydraulic set-up.



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These are the main components in the kit: an adapter, which replaces the nose of the Type-9 box, made from billet aluminium plus a concentric slave cylinder and all the fixings and gaskets you'll need.



This is what the kit replaces: an original release arm, in this case, meant for cable operation. The kit simplifies the task of converting to hydraulic.



The main part of the kit is this concentric hydraulic slave cylinder, which fits inside the bellhousing via ...



... This adapter, which Retro Ford produces from billet aluminium. This is the slave mounting face.



This is the back, which mounts to the front of the Type-9 'box — once the original front cover's been removed. Note the machined-in grooves to accept the seals...



The new boss has the same outside diameter as the original, which provides the location for the bellhousing to fit onto.



Here you can see the slave cylinder sitting on the boss. There are several ways the slave cylinder can fit — it can be orientated to site the bleed and feed pipes where you need them, according to application.



These are the bleed (left) and feed (right) pipes that come with the release bearing — we will actually remove these later on.



With the bellhousing removed for clarity, the first job is to take off the Type-9's original front cover.



Next we need to prepare the adapter — the oil seal is pushed into the mounting groove using a suitable press tool.



After that, it can be slid onto the input shaft of the Type-9 gearbox and bolted in position using the fixings supplied.



12 Dave prepares the slave cylinder next by removing the bleed and feed fittings — the former is replaced simply because it's not long enough in this application and is replaced.



13 The slave cylinder can be fitted now, but there are four positions it can be orientated to — although you can't see this without the bellhousing in place!



14 Fitted, you can see the pipes need to sit opposite the opening in the bellhousing — this is a special cut-away piece that Dave's prepared so we can see the slave cylinder mounted later on.



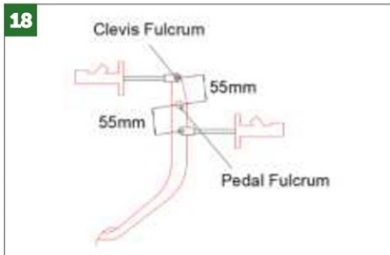
15 Sorting out the bleed and feed pipes is next. These are the components that come in the kit...



16 ...And this is the basics of the system sitting on the bench.



17 The main part is the master cylinder, which needs to be 5/8 inch. This is ideal for use with standard Ford pedal boxes with a fulcrum measurement of 55mm...



18 ...Which can be seen in this drawing. Any more than this nor fitting of a different size master cylinder, you risk blowing the end off the slave cylinder — with the 'box mounted, that means taking the whole lot out again.



19 The system is pretty simple — this is the bleed fitting, which is cut so that the fitting sits outside of the aperture in the bellhousing, so you can get to it to bleed the system!



20 Back inside the bellhousing, you can see the orientation of the braided hoses, connecting with the fittings in the plate.



21 This is a bulkhead fitting, so you can fit the feed either side of the car's bulkhead, feeding into the bellhousing.



22 This system is meant to work with any engine application — Crossflow, Pinto or Zetec using a direct-replacement 215 mm clutch with a 1 inch, 23-spline centre on the Pinto and Zetec, and 190 mm clutch with a 1 inch, 23-spline on a Crossflow.



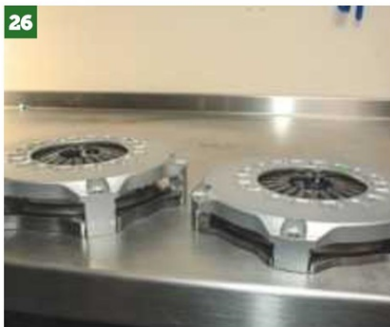
A word about clutch finger operation: in the standard set up, the release bearing is designed to be used with round-nosed fingers — hence the flat face.



If the fingers were flat (and some aftermarket clutches are) then the release bearing would need this round extension fitting on the end.



The release bearing can be used with many different types of clutch — shown is a selection of race clutches with either one or two plates.



But there is a difference in height between the covers, which need setting up.



The benefits of having a cut-away bellhousing: here we can see the essentials of the system fitted. Normally, a standard clutch is set up ready to use and needs no adjustment although it can be a good idea to check before you put it in the car and bolt it all home. You can do the following test with the 'box and engine in component from.



Using a lever, there should about 3-5 mm of free-play on the clutch fingers. This is in contrast to any other type of clutch release where no contact is required — this should have a touch of pre-load. If you have too much, the clutch will slip — in fact you only need about 1 mm of bearing movement to disengage the clutch but it actually travels far more than that to give a smooth feel.



The next measurement is the overall length between engine back face and clutch fingers — which in this application should be around 90 mm.



On the next measurement, the difference between the slave cylinder out and then pushed back in should be about 3 mm (with an absolute maximum of 5 mm), giving an overall measurement of around 93 mm.



If you have less than this, then the slave cylinder can be moved out using these sculpted shims in 3 mm increments. Dave stresses that you can only use a maximum of two before the slave cylinder is moved off its system of location.

SOME DOS, DON'TS AND MYTH BUSTINGS

1. Don't operate the slave cylinder with it disconnected from the clutch — it'll blow the end of the slave cylinder.

2. Some people are put off hydraulic clutch operation believing it's simply not reliable. Dave's answer is, would you go back to cable brake operation? It's reliable enough for that!

3. The bleed nipple is supported by a rubber seal — plenty leave it out but don't because it can vibrate undone and you'll lose your fluid

4. The concentric slave cylinder is supposed to be in contact with the clutch fingers all the time — don't adjust it so it isn't.

5. If you have any free play then clutch will slip — Dave has had instances where a bellhousing has been machined on both faces; meaning it's too short and the clutch will slip when it gets hot.

6. A 1 mm dirt shield can still be used with a concentric slave cylinder — it shouldn't affect the free play.

7. Once set up, this system needs no further adjustment — it's self-adjusting.

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