TECHNICALLY Speaking

**Article No.:** TCTIP-10-05
**Author:** Ed Lee
**Total Pages:** 3

# A primer on proper parting procedures

**Note: This is the first in a two-part series on proper parting procedures. In Part 1, some basics.**

When the first automatic transmissions were introduced in the late 1930s, the fluid coupling was routinely serviced as part of a transmission overhaul. The fluid coupling was bolted together and servicing it didn't require any skills that a regular mechanic wouldn't have. When the fluid coupling evolved into the torque converter, it was still a bolt-together unit and the only new challenge for the mechanic was to learn about stators.

But then everything changed. The torque converter became a sealed unit and even the best mechanics weren't equipped with the machining and welding skills necessary to rebuild these new units. It's not hard to see why in-house converter rebuilding facilities were so slow to develop.

Most of the early torque converter technicians were self-taught, and passed that knowledge along over the years. Being able to cut a converter apart in a manner that makes reassembly as easy as possible is one of the first skills new technicians learn. Industry veterans will tell you they relied on their senses when cutting a converter apart. A veteran cutter can tell you when the tool bit stops cutting the harder weld material and starts cutting the softer material of the cover or impeller by the feel of his hand on the cross feed. He can also tell you how deep to cut by looking at the weld. The veteran knows that the discoloration of the metal next to the weld is about as deep as the penetration of the weld, and that you will see oil when that line disappears. (See Figure 1.) Unfortunately, it takes years to develop these skills, and new technicians need to know what to do now. So here's a primer on some basic techniques.

*Figure 1*

## The tools

The fixturing for cutting a converter apart needs to be as rigid as possible. An industrial or military-grade lathe has the mass for a good solid base. A CNC lathe is also a good choice because of its mass. How rigid your fixturing is will not only dictate what grade of cutting bit to use, but also the life expectancy of your bits. The experts agree that a roughing grade of carbide is your best choice, and most agree that the tool bit should have a 00 relief and that less radius on the bit will result in less clean-up work. There is little else that anyone in the industry agrees on.

Since the grade of carbide that works best depends on how rigid your fixturing is, here's a good rule of thumb. Start with as hard a grade of carbide as your fixturing can handle with as minimal breakage as you can handle. Work down to as soft of a grade of carbide as necessary for the longevity of your cutting bits. It would be a good idea to make friends with your tool supplier since the price of carbide is a factor! The shops that are cutting their converters apart on CNC lathes report they are cutting between 400 and 500 converters with a single side of an insert.

## How to cut

Where to start your cut? How deep to cut? Which direction to cut? These are your next concerns.

With the possible exception of the BM25 converter, the mating parts of all converters are joined by a single fillet weld and, with the exception of the ring gears or mounting rings, the largest diameter of a converter is usually the overlapping member of the fillet weld. Figure 2 illustrates a converter with a cover that overlaps and Figure 3 illustrates a converter with the

*continued on page 2*

sonnax®
Automatic Drive P.O. Box 440
Bellows Falls, VT 05101-0440 USA
800-843-2600 • fax: 802-463-4059
email: info@sonnax.com •
www.sonnax.com

impeller as the overlapping member.

The point where the overlapping member and the weld meet is where you start your cut, but before you start, you may want to remove any high points that might protrude above the weld. Carbide does not like interrupted cuts, and any high points will only widen as the tool bit is plunged into the weld, causing increased pin point resistance with each revolution.

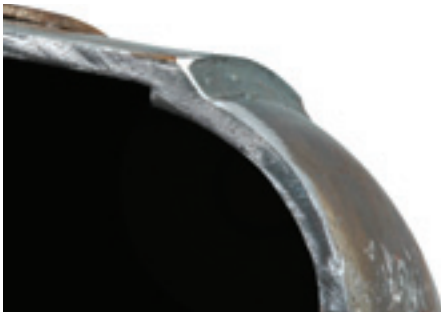

*Figure 2*

After the high points have been removed, zero the cross feed dial and you are ready to start your cut. The depth of your cut is determined by the thickness of the overlapping member. Knowing this thickness is the secret to successfully parting a converter on the first try. Find your converter on the following chart (see Figure 4) and plunge in the corresponding thickness.

Please note that where it says flush on the chart, that means flush with the cover. Touch your tool bit on the cover, zero the dial, back the tool bit away, and cut in until the dial returns to zero.

*Figure 3*

*continued on page 3*

# CUT-OPEN LIST

### GENERAL MOTORS

| TC | Cut (in inches) |
|---|---|
| 125 | 0.170 |
| 440 | 0.130 |
| 4L30-E | 0.130 |
| 4L80-E | 0.200 |
| 200LU | FLUSH |
| 350CH | 0.140 |
| 350LU | FLUSH |
| 400 | 0.190 |
| 700LU | FLUSH |
| BPO | 0.165 |
| JSFM | 0.150 |
| JTFM | 0.150 |
| JXFM | 0.150 |
| JZFM | 0.150 |
| POWERGLIDE | 0.150 |
| NORTHSTAR | 0.150 |

### TOYOTA

| TC | Cut (in inches) |
|---|---|
| TO18 | 0.150 |
| TO19 | 0.110 |
| TO21 | 0.125 |
| TO28 | 0.180 |
| TO39 | 0.150 |
| TO42 | 0.140 |
| TO51 | 0.150 |
| TO64 | 0.150 |
| TO67 | 0.210 |
| TO74 | 0.160 |

### FORD

| TC | Cut (in inches) |
|---|---|
| 5R55W/4/8 | 0.165 |
| AODE | 0.150 |
| A4LD | 0.130 |
| ATX | 0.125 |
| AXOD | 0.200 |
| AXODE | 0.180 |
| AXODE25 | 0.180 |
| AXODESHO | 0.165 |
| AXODE25SHO | 0.165 |
| C4 11” | 0.100 |
| C4 12” | 0.140 |
| C5 | 0.150 |
| C6 EARLY | 0.100 |
| CD4E A | 0.145 |
| CD4E C | 0.175 |
| CD4E H | 0.140 |

### MITSUBISHI

| TC | Cut (in inches) |
|---|---|
| CT10 TP | 0.110 |
| CT11 | 0.110 |
| CT12 | 0.160 |
| CT12-1 | 0.150 |
| CT13 | 0.130 |
| CT15 | 0.135 |
| CT15-1 / CT15-2 | 0.140 |
| CT20 | 0.140 |
| CT27 | 0.170 |
| CT27-9 | 0.170 |
| CT29 | 0.140 |

### CHRYSLER

| TC | Cut (in inches) |
|---|---|
| 470LU | 0.170 |
| 604 24T | 0.170 |
| 604 11” 22T | 0.170 |
| 606 | 0.150 |
| 727 / 727LU | 0.170 |
| 904 / 904LU | 0.170 |
| TC6 / TC6LU | 0.170 |
| TC8 / TC8LU | 0.170 |
| CUMMINGS NL | 0.210 |
| CUMMINGS LU | 0.185 |
| W. GERMAN JEEP | 0.110 |

### NISSAN / DATSUN

| TC | Cut (in inches) |
|---|---|
| DA6 | 0.125 |
| DA7 | 0.125 |
| DA8 | 0.100 |
| DA11 | 0.150 |
| DA13 | 0.125 |
| DA16 T.C. | 0.210 |
| DA16 T.P. | 0.110 |
| DA18 | 0.150 |
| DA24 | 0.190 |
| DA25 | 0.150 |
| DA30 | 0.155 |
| DA34 | 0.120 |
| DA37 | 0.150 |
| DA38 | 0.110 |
| DA39 | 0.150 |
| DA44 | 0.160 |
| DA50 | 0.195 |
| DA53 | 0.190 |
| DA55 | 0.150 |

If your converter is running true, you will then move the cutter perpendicular to the plunge cut, moving away from the weld, until you see oil exiting the converter at the cutting tip. If your converter is not running true, you will want to add an additional .005" to .010" to your plunge cut before moving the cutter to the side.

## Some additional hints

On some Subaru converters (SU15) you will have to remove the ring gear before cutting the converter apart.

On the BM25 converter with 2 welds, cut at the weld closest to the pump.

On late-model Hondas, do not clean off all of the weld. Leave a 450 angle of weld after the halves separate. Due to the close proximity of the ring gear to the weld, it is difficult to get a good angle on the welder head when you are welding the converter back together. The remaining 450 angle will leave a nice area for a bead of weld.

*Next month, the specifics of proper parting procedures.*

*Special thanks to Rich Rossiello from Perfect Shift for his technical assistance in writing this article.*

*Ed Lee is a Sonnax technical specialist with a focus on issues of interest to torque converter builders.*



**HONDA, BMW, JAG, MERC, VW**

| TC | Cut (in inches) |
|---|---|
| HO1 | 0.115 |
| HO7 | 0.115 |
| HO12 | 0.115 |
| HO14 | 0.210 |
| HO16 | 0.115 |
| HO17 | 0.115 |
| HO18 | 0.115 |
| HO21 | 0.115 |
| BM11 | 0.125 |
| BM17 | 0.125 |
| BM25 | 0.181 |
| MC6 | FLUSH |
| MC10 | FLUSH |
| MC18 | 0.160 |
| MC19 | 0.160 |
| JAG E. | 0.131 |
| VW4 | 0.100 |
| RE8 | 0.190 |
| RE9 | |
| RE10 | |
| SU11 | 0.110 |
| SU12 | 0.120 |
| SU13 | 0.120 |
| SU16 | 0.125 |
| SU18 | 0.125 |
| SA4 | 0.075 |
| SA6 | 0.100 |
| SA7 | 0.100 |