

# INSTALLATION INSTRUCTIONS

## 77 Series Master Cylinders

The TB&C 77-Series master cylinders offer the latest in racing master cylinder technology in very lightweight and compact design. The rear spherical bearing mount and one-piece piston/pushrod eliminate side thrust into the master cylinder bore, providing consistent and repeatable braking. 77-Series master cylinders are designed specifically for use with 900-Series pedal assemblies or balance bar P/N 72-280.



### Master Cylinder Fittings

The inlet port is a  $\frac{1}{8}$ -18 Thread (6AN, designed for a crush washer seal. Use Tilton P/N 77-015 to adapt to a -4AN straight Male tapered seat fitting. Alternately, you may use a banjo bolt and swivel fitting by ordering Goodridge P/N 776-04-M14 (Fitting), 77S-06 (Banjo bolt), and two CW901-6 (crush washers). If you choose alternate fittings, the maximum thread engagement into the master cylinder is .375".

*-4 inlet hose should be used to ensure adequate fluid flow.*

*The outlet port is -3AN Female tapered seat.*

### Altering Cutoff Port Travel

As delivered, the Tilton 77-Series master cylinder has been blueprinted for a cutoff port travel within the range of .030" to .050". The cutoff port travel is set by the thickness of the large copper crush washer between the master cylinder body and the hex end cap (visible from the outside). The actual cutoff port travel and the thickness of the crush washer is noted on a label on the bottom of each individual master cylinder.

You may alter the master cylinder cutoff port travel by changing the thickness of the crush washer. Increasing crush washer thickness increases the cutoff port travel an equal amount. Reducing the crush washer thickness reduces cutoff port travel an equal amount. Five different thickness crush washers in .010" increments are available from Tilton. Use the table to choose the appropriate shim for the master cylinder bore diameter.

Shim Thickness	SHIM P/N FOR MASTER CYLINDER SIZE		
	5/8", 7/10", 3/4" Bore	13/16", 7/8" Bore	15/16", 1" Bore
.020 in	77-412-20	77-414-20	77-416-20
.030 in	77-412-30	77-414-30	77-416-30
.040 in	77-412-40	77-414-40	77-416-40
.050 in	77-412-50	77-414-50	77-416-50
.060 in	77-412-60	77-414-60	77-416-60

## How to Change the Crush Washer

NOTE: During this procedure, it is EXTREMELY important to keep the piston shaft installed in the hex end cap. If you remove the piston shaft from the hex end cap, the threads of the shaft will damage the factory installed external seal and you will have to send the assembly to Tilton for rebuilding .

1. In a vice with aluminum soft jaws, firmly clamp the parallel flat sides of the master cylinder body around the spherical bearing. 2. Use an appropriate sized deep socket, and loosen the hex end cap.
3. By hand, completely unscrew the cap. Be careful near the last thread, as an internal spring will push the assembly apart. Leave the return spring and it's guide pin in the master cylinder body.
4. Remove the existing crush washer, and replace it with the desired thickness crush washer. It is recommended not to reuse the crush washers since they may not seal properly after they have been previously installed.
5. Make sure the pressure cup seal on the piston is lubed with rubber grease (Tilton P/N RG-17). This grease is proven to provide proper initial lubrication, yet dissolves into DOT 3 & DOT 4 Brake fluid. Do not be tempted to use any other grease that may not dissolve, or may chemically damage the seal.
8. Hold the pushrod perfectly in line with the master cylinder body and push **very gently**. The piston's seal should very easily compress into the smooth bore of the master cylinder body. If the seal does not easily compress into the smooth bore of the master cylinder body, tip the piston so that the shaft forms a slight "V" with the master cylinder body (see fig. 2). This will draw the top of the seal into the bore. Then, straighten the piston so that it is axially aligned again and the bottom part of the seal will be drawn into the bore.  
**NEVER** tip the piston so that the shaft forms a "Λ" with the master cylinder body as viewed from the side (see fig. 3). This will draw the bottom of the seal into the bore first and will cause the top of the seal to bulge and possibly get cut on the drilled ports.  
**NEVER use excess force to assemble the master cylinder, as you will risk damage to the seal.**
9. Use a torque wrench and torque the hex end cap to the specified rate for your bore size. (Figure 4).

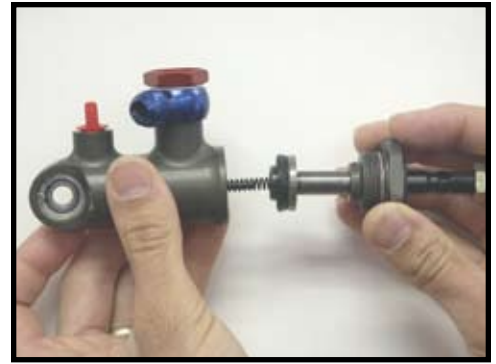


Figure 1



Figure 2

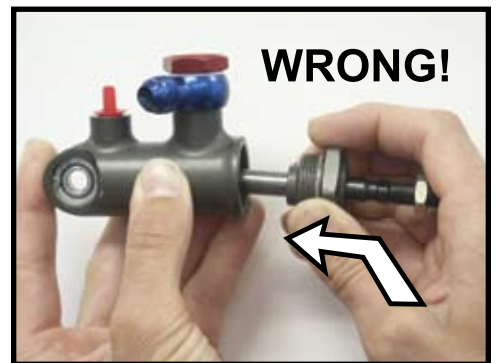


Figure 3

Bore		Torque (lb-ft)
5/8	.625	40
7/10	.700	40
3/4	.750	40
13/16	.812	60
7/8	.875	60
15/16	.937	60
1.0	1.000	60

Figure 4