

# tbc

TILTON BRAKE  
& CONTROLS



Pedal Assemblies • Master Cylinders • Proportioning Valves • Balance Bars • Remote Brake Bias Adjusters

# Introduction & Table of Contents



**Tilton Brake & Controls...  
Tilton Brake evolved!**

Tilton Brake & Controls (TB&C) represents an evolution of the former Tilton Brake brand. The products found in this new TB&C catalog embody our commitment to being at the forefront of brake controls system development for racing applications. Backed by over 30 years of race winning heritage, TB&C offers a wide range of industry-leading products that enable you to maximize your brake system, including the following new products:



- 900-Series Pedal Assemblies and Balance Bars, incorporating the latest in pivot-mount master cylinder technology (pages 1-8).



- 600-Series Pedal Assemblies, incorporating traditional fixed-mounted master cylinder technology (pages 9-19)



- Billet aluminum reservoirs, including an advanced 3-in-1 billet aluminum reservoir (page 22).



- 77-Series master cylinders, extremely lightweight and compact master cylinders that incorporate pivot-mount technology (page 26).



- 76-Series master cylinders, compact master cylinder designed for use TB&C billet aluminum reservoirs or remote-mount reservoir systems (page 27).



- 73-Series master cylinders, a large volume integral reservoir master cylinder offering many features and exceptional value (page 32).

TB&C products benefit from the highest quality materials, Solid Modeling, Finite Element Analysis (FEA), and multi-axis CNC machining with live tooling. The results are products that offer the highest levels of quality, performance and value.

**Maximize your brake system... Tilton Brake & Controls**

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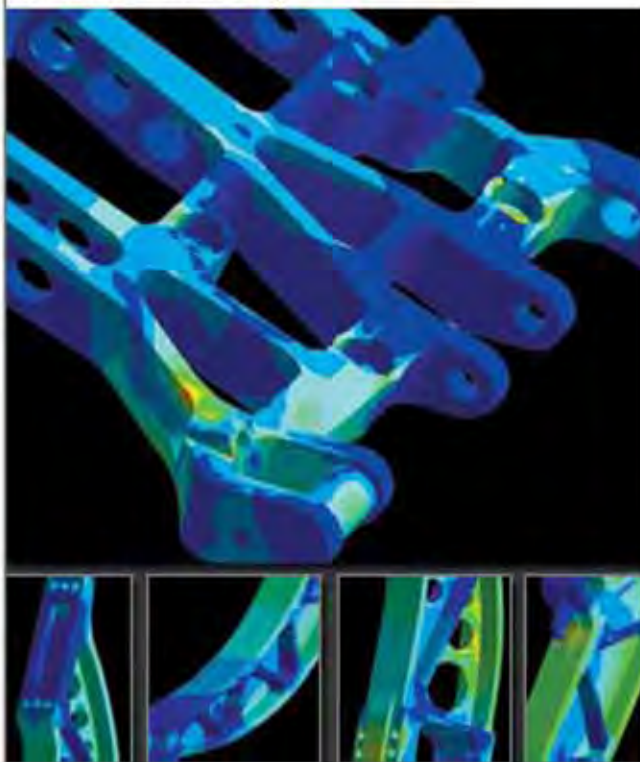
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## Introduction to 900-Series Pedal Assemblies

TB&C's 900-Series pedal assemblies set a new standard in pedal assembly technology for racing applications. Featuring the latest in pivot-mount master cylinder technology, 900-Series pedal assemblies are engineered to enable race teams to fully optimize the braking system. Designed to reduce friction within the balance/master cylinder system and reduce flex of the pedals, 900-Series pedal assemblies provide exceptional feedback and repeatable braking, inspiring driver confidence and producing faster lap times.

900-Series pedal assemblies are produced with the finest materials available. Needle bearings and/or sealed ball bearings are utilized at all pivots for reduced friction and precise action. The pedal frame is machined from billet aluminum for rigidity and weight savings. All pedals are machined from billet aluminum or steel and are fully optimized for strength, stiffness and weight savings using Finite Element Analysis (FEA). The included balance bar features adjustable ratios and needle bearings that ride on hard-ground surfaces at all pivots. In short, 900-Series pedals assemblies have been engineered for race teams that demand the absolute best!

Assemblies are available in **Firewall-Mount**, **Overhung** and **Floor-Mount** configurations, and are designed for use with TB&C's 77-Series pivot-mount master cylinders (see page 26 for further information).



### Firewall-Mount

Page 2



### Overhung

Page 4



### Floor-Mount

Page 6

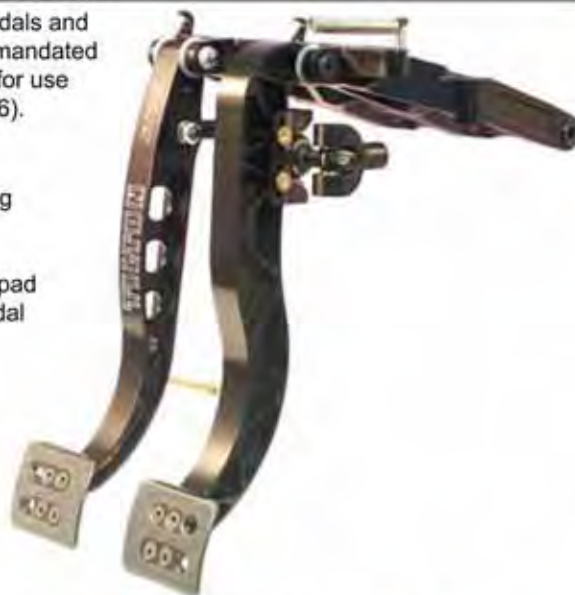


### 900-Series Firewall-Mount Pedal Assemblies

900-Series firewall-mount pedal assemblies feature hanging pedals and locate the master cylinders within the engine compartment, as mandated by the regulations of some race sanctioning bodies. Designed for use with TB&C 77-Series pivot-mount master cylinders (see page 26).

#### Features:

- Fully optimized for strength, stiffness and weight savings using Finite Element Analysis (FEA)
- Billet aluminum pedal frame
- Billet steel brake pedal with return spring and adjustable foot pad
- Billet aluminum clutch pedal with return spring, adjustable pedal stop and adjustable foot pad
- 7/16" diameter needle-bearing balance bar with:
  - Adjustable ratios (6.2:1, 5.3:1 & 4.7:1)
  - Integrated angle limit in case of front or rear brake circuit failure
  - Longer clevis for increased front master cylinder stroke
- Needle bearings utilized at all pivot points
- NASCAR legal
- Weight: 4.6 lbs



#### • Firewall-Mount Pedal Assemblies

##### Description

Pedal assembly, 2-pedal, 3-cylinder

##### Part Number

72-901



Note: Shown with 77-Series pivot-mount master cylinders (sold separately)

#### Optional Components

#### • Remote Brake Bias Adjusters

Allows balance bar adjustments by the driver during competition.

##### Billet Model



P/N: 72-407

##### Standard Model



P/N: 72-507

#### • Master Cylinders

Select the master cylinder bore sizes that meet your requirements.

##### 77-Series Master Cylinder



See page 26

#### • Firewall Plate

Provides a barrier between the engine compartment/master cylinders and the cockpit.

##### Firewall Plate



P/N: 72-799





## 900-Series Overhung Pedal Assemblies

900-Series overhung pedal assemblies feature hanging pedals and locate the master cylinders inside the car's cockpit, keeping master cylinders away from engine heat. Designed for use with TB&C 77-Series pivot-mount master cylinders (see page 26).

### Features:

- Fully optimized for strength, stiffness and weight savings using Finite Element Analysis (FEA)
- Billet aluminum pedal frame
- Billet aluminum brake pedal with return spring and adjustable foot pad
- Billet aluminum clutch pedal with adjustable pedal stop and adjustable foot pad
- 7/16" diameter needle-bearing balance bar with:
  - Adjustable ratios (6.2:1, 5.3:1 & 4.7:1)
  - Integrated angle limit in case of front or rear brake circuit failure
  - Longer clevis for increased front master cylinder stroke
- Needle bearings utilized at all pivot points
- Weight: 4.4 lbs



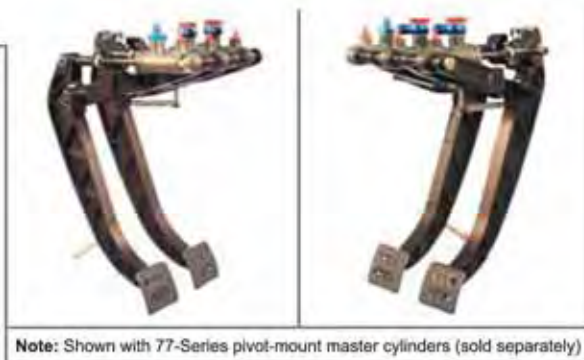
### Overhung Pedal Assemblies

#### Description

Pedal assembly, 2-pedal, 3-cylinder

#### Part Number

72-902



Note: Shown with 77-Series pivot-mount master cylinders (sold separately)

### Optional Components

#### Remote Brake Bias Adjusters

Allows balance bar adjustments by the driver during competition.

##### Billet Model



P/N: 72-407

##### Standard Model



P/N: 72-507

#### Master Cylinders

Select the master cylinder bore sizes that meet your requirements.

##### 77-Series Master Cylinder



See page 26



### 900-Series Floor-Mount Pedal Assemblies

900-Series floor-mount pedal assemblies feature billet aluminum brake, clutch and throttle pedals within one compact package. This assembly offers great flexibility that makes it suitable for most applications that require a floor-mount pedal assembly. In addition, 900-Series floor-mount pedal assemblies feature the same flat-bottom frame design and mounting pattern as TB&C's 600-Series version, allowing for a simple bolt-in upgrade. Designed for use with TB&C 77-Series pivot-mount master cylinders (see page 26).

#### Features:

- Fully optimized for strength, stiffness and weight using Finite Element Analysis (FEA)
- Billet aluminum pedal frame
- Billet aluminum brake pedal with 4 height & 3 side-to-side foot pad adjustment options
- Billet aluminum clutch pedal with a built in pedal stop and 4 height & 3 side-to-side foot pad adjustment options
- Billet aluminum throttle pedal with adjustable foot pad, and adjustable throttle stops that limit pedal movement in both directions
- Ergonomically-designed pedal contour
- 7/16" diameter needle-bearing balance bar with:
  - Adjustable ratios: 8 ratios available (4.52:1, 4.65:1, 4.78:1, 4.91:1, 5.32:1, 5.48:1, 5.63:1, 5.80:1), depending on pedal foot position
  - Integrated angle limit in case of front or rear brake circuit failure
  - Longer clevis for increased front master cylinder stroke
- Sealed ball bearings utilized at all pedal pivot points
- Weight: 5.0 lbs



**Note:** Shown with 77-Series pivot-mount master cylinders and Throttle Linkage System (sold separately).

#### Floor-Mount Pedal Assemblies

##### Description

Pedal assembly, 3-pedal, 3-cylinder

##### Part Number

72-903

#### Optional Components

##### Remote Brake Bias Adjusters

Allows balance bar adjustments by the driver during competition.

##### Billet Model



P/N: 72-407

##### Standard Model



P/N: 72-507

##### Right Angle Coupler

Allows for more remote bias adjuster cable routing options



P/N: 72-561

##### Master Cylinders

Select the master cylinder bore sizes that meet your requirements.

##### 77-Series Master Cylinder



See page 26

##### Throttle Linkage System

Enables tuning of throttle progression for track conditions and driver preferences. Features sealed ball bearings for smooth control of throttle application.



P/N: 72-790







**900-Series Balance Bars**

As used in TB&C 900-Series pedal assemblies, 900-Series balance bars can also be adapted to custom brake pedal applications. Designed for use with 77-Series pivot-mount master cylinders (page 26), this balance bar system is engineered to maximize dual master cylinder braking systems by eliminating friction within the balance bar/master cylinder.

**Features:**

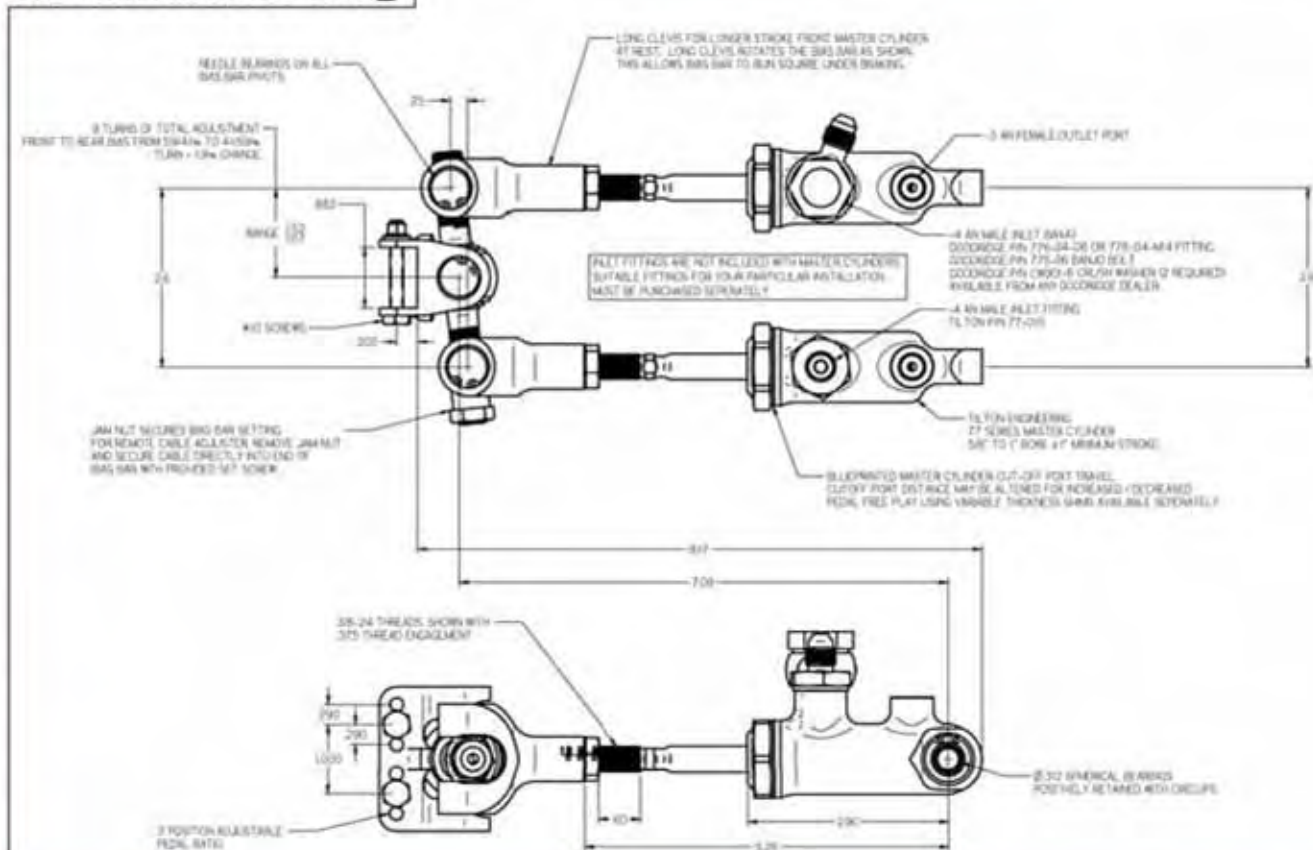
- 7/16" diameter shaft
- 2.6" center-to-center distance
- Integrated angle limit in case of front or rear brake circuit failure; .850" (18") stroke differential
- Front-to-rear bias adjustment from 59/41% to 41/59%
- Designed for use with .875" wide pedal
- All pivots feature serviceable needle bearings
- Billet aluminum clevises and heat treated alloy steel components are optimized using Finite Element Analysis (FEA)
- Longer front clevis allows for increased front master cylinder stroke
- Modular pedal mount designed for 7/8" wide pedals
- Accepts remote bias adjuster cable internally with a set screw, eliminating the coupler typically required with traditional balance bars



**Note:** Shown with 77-Series master cylinders (sold separately).

- 900-Series Balance Bars

Description	Part Number
7/16"-20	72-280

**Installation Drawing**

## **Introduction to 600-Series Pedal Assemblies**

TB&C offers a wide range of pedal assemblies to fit virtually any racing or custom application. TB&C 600-Series pedal assemblies have been designed to provide you with total control of your braking system. 600-Series pedal assemblies benefit from proven designs, the highest quality materials and the latest manufacturing technology. The result is pedal assemblies that offer simplified installation, proven performance, reliability and value.

600-Series pedal assemblies include a traditional balance bar for use with fixed-mounted master cylinders, such as TB&C's 73/74/75/76-Series master cylinders. Pedal assemblies are available in **Firewall-Mount**, **Overhung**, **Floor-Mount** and **Remote-Mount** configurations.



### **Firewall-Mount**

Page 10



### **Overhung**

Page 12



### **Floor-Mount**

Page 14



### **Remote-Mount**

Page 18



### 600-Series Firewall-Mount Pedal Assemblies

600-Series firewall-mount pedal assemblies feature hanging pedals and locate the master cylinders within the engine compartment, as mandated by the regulations of some race sanctioning bodies. Designed for use with TB&C 73/74/75/76-Series master cylinders, or can be used with any master cylinder with a 2.25" center-to-center front flange mounting pattern.

#### Features:

- 6.2:1 ratio fabricated steel clutch and brake pedals with anti-slip foot pads
- Lightweight aluminum alloy pedal frame
- Needle bearings utilized in pedal pivots for smooth, precise action
- 7/16"-20 diameter balance bar featuring billet aluminum clevises
- Adjustable clutch pedal stop
- NASCAR legal (P/N 72-628)
- Weight: 4.9 lbs



#### • Firewall-Mount Pedal Assemblies

##### Description

Pedal assembly, 2-pedal, 3-cylinder,  
Lightened clutch pedal

##### Part Number

72-628

Pedal assembly, 2-pedal, 3-cylinder,  
Lightened clutch & brake pedals

72-629



**Note:** Shown with 75-Series master cylinders (sold separately)

#### Optional Components

#### • Remote Brake Bias Adjusters

Allows balance bar adjustments by the driver during competition.

##### Billet Model



P/N: 72-407

##### Standard Model



P/N: 72-507

#### • Master Cylinders

Select a master cylinder type that best meets your needs.

##### 76-Series



See page 27

##### 75-Series



See page 28

##### 74-Series

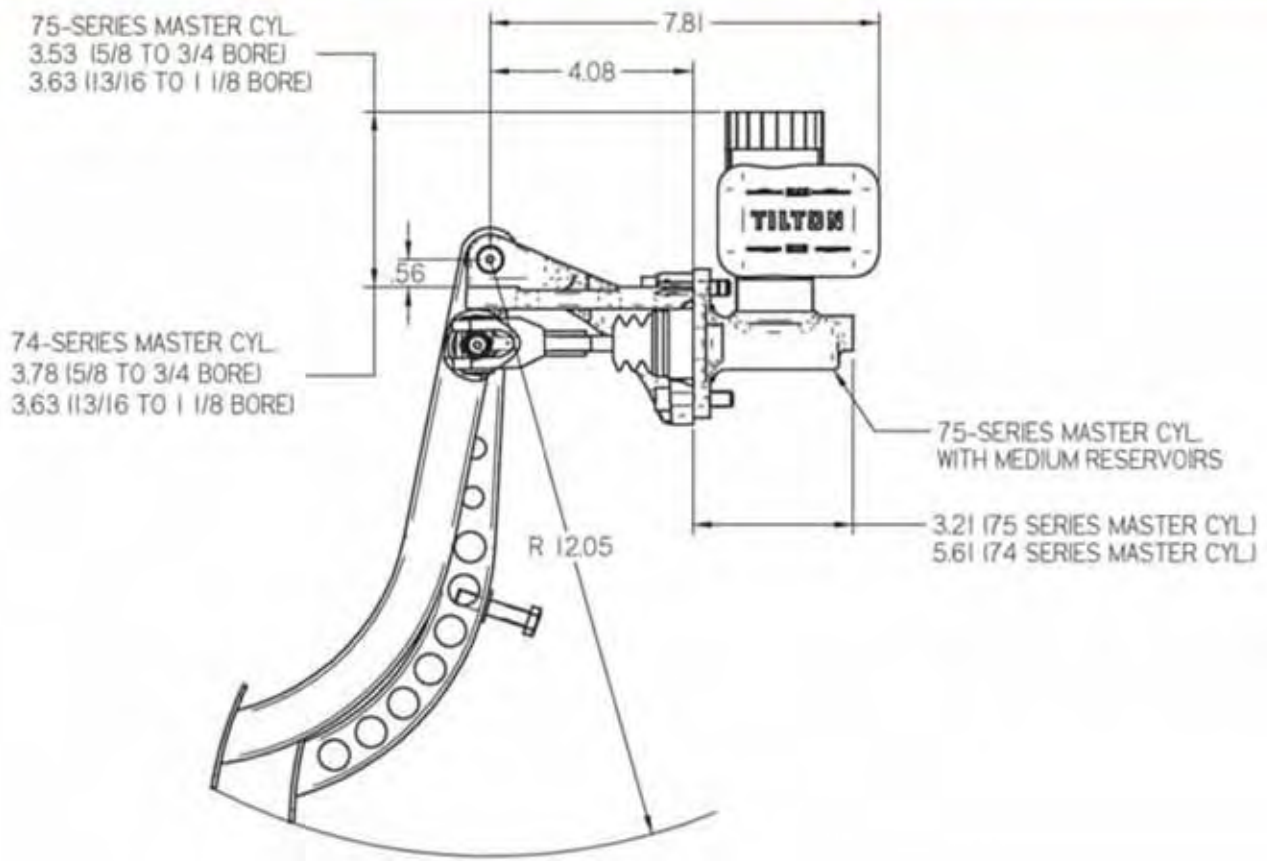


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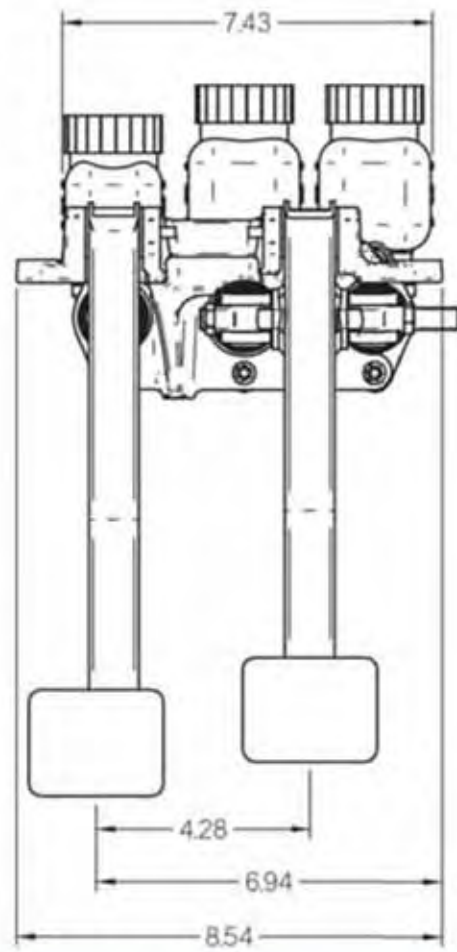
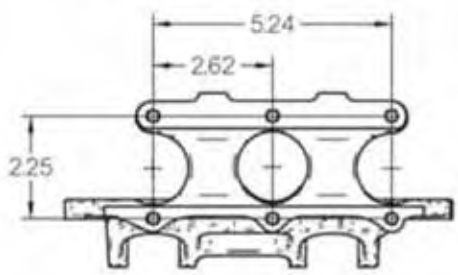
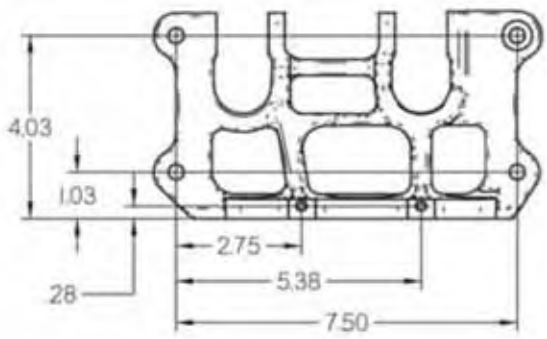
##### 73-Series



See page 32



2 PEDALS, 3 MASTER CYLINDERS  
PEDAL ASSEMBLY  
P/N 72-628 NASCAR  
P/N 72-629 LIGHTENED



## 600-Series Overhung Pedal Assemblies

600-Series overhung pedal assemblies feature hanging pedals and locate the master cylinders inside the car's cockpit, keeping master cylinders away from engine heat. Designed for use with TB&C 73/74/75/76-Series master cylinders, or use with any master cylinder with a 2.25" center-to-center front flange mounting pattern.

### Features:

- 5.5:1 or 6.2:1 ratio clutch and brake pedals
- Aluminum or fabricated steel pedal options
- Lightweight aluminum alloy pedal frame
- 3/8"-24 diameter balance bar
- Weight: 4.2 lbs (P/N: 72-623A)  
4.9 lbs (P/N: 72-620A)  
6.0 lbs (P/N: 72-620)



### Overhung Pedal Assemblies

#### Description

Pedal assembly, 2-pedal, 3-cylinder, aluminum, 5.5:1 ratio  
 Pedal assembly, 2-pedal, 3-cylinder, aluminum, 6.2:1 ratio  
 Pedal assembly, 2-pedal, 3-cylinder, steel, 6.2:1 ratio

#### Part Number

72-623A  
 72-620A  
 72-620



Note: Shown with 76-Series master cylinders (sold separately)

### Optional Components

#### Remote Brake Bias Adjusters

Allows balance bar adjustments by the driver during competition.

#### Billet Model



P/N: 72-401

#### Standard Model



P/N: 72-501

#### Master Cylinders

Select a master cylinder type that best meets your needs.

#### 76-Series



See page 27

#### 75-Series



See page 28

#### 74-Series

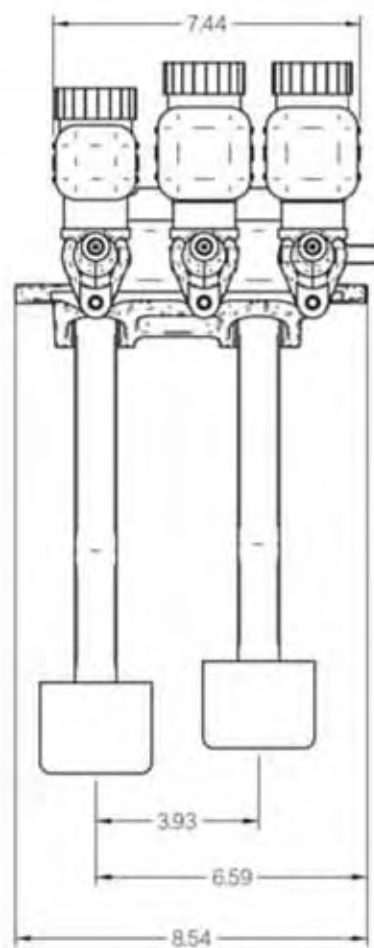
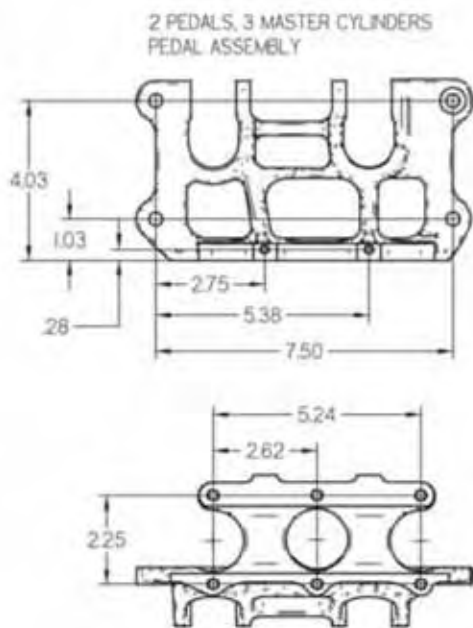
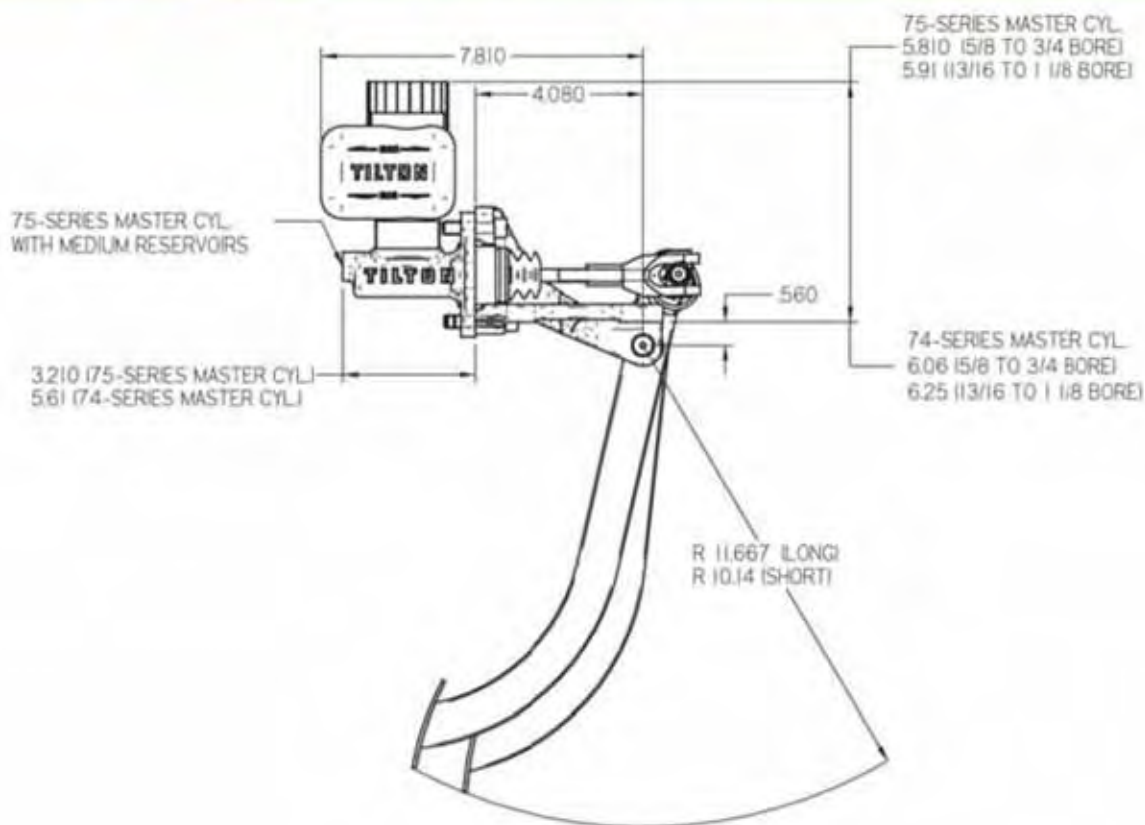


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#### 73-Series



See page 32



## 600-Series Floor-Mount Pedal Assemblies

600-Series floor-mount pedal assemblies have been engineered to provide driver control through an ergonomically-designed pedal contour. In addition, floor-mount pedals (when compared to hanging) lower the vehicle's center-of-gravity by locating the pedals/master cylinders lower in the chassis. Designed for use with TB&C 73/74/75/76-Series master cylinders, or can be used with any master cylinder with a 2.25" center-to-center front flange mounting pattern.

**Features:**

- 5.5:1 pedal ratio
- Aluminum or fabricated steel pedal options
- Lightweight aluminum alloy pedal frame
- 3/8"-24 diameter balance bar
- Adjustable clutch pedal stop
- Weight: 4.9 lbs (P/N: 72-642A)  
5.3 lbs (P/N: 72-642)



Aluminum Pedals



Steel Pedals

• **Floor-Mount Pedal Assemblies**

**Description**

**Part Number**

Pedal assembly, 2-pedal, 3-cylinder, aluminum  
Pedal assembly, 2-pedal, 3-cylinder, steel

72-642A  
72-642



**Note:** Shown with 75-Series master cylinders and Remote Brake Bias Adjuster (sold separately)

### Optional Components

• **Remote Brake Bias Adjusters**

Allows balance bar adjustments by the driver during competition.

**Billet Model**



P/N: 72-401

**Standard Model**



P/N: 72-501

• **Right Angle Coupler**

Allows for more remote bias adjuster cable routing options.



P/N: 72-560

• **Master Cylinders**

Select a master cylinder type that best meets your needs.

**76-Series**



See page 27

**75-Series**



See page 28

**74-Series**



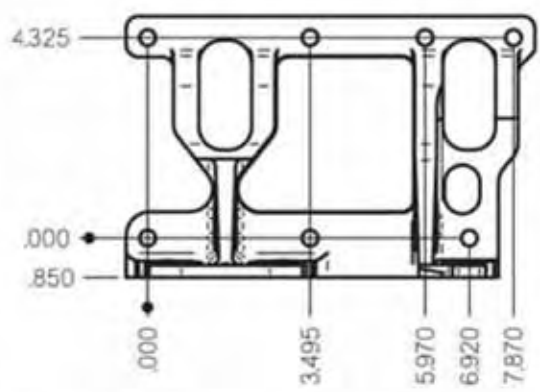
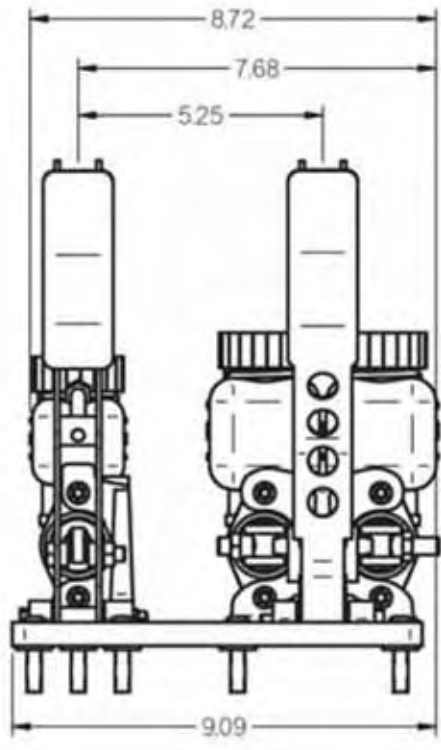
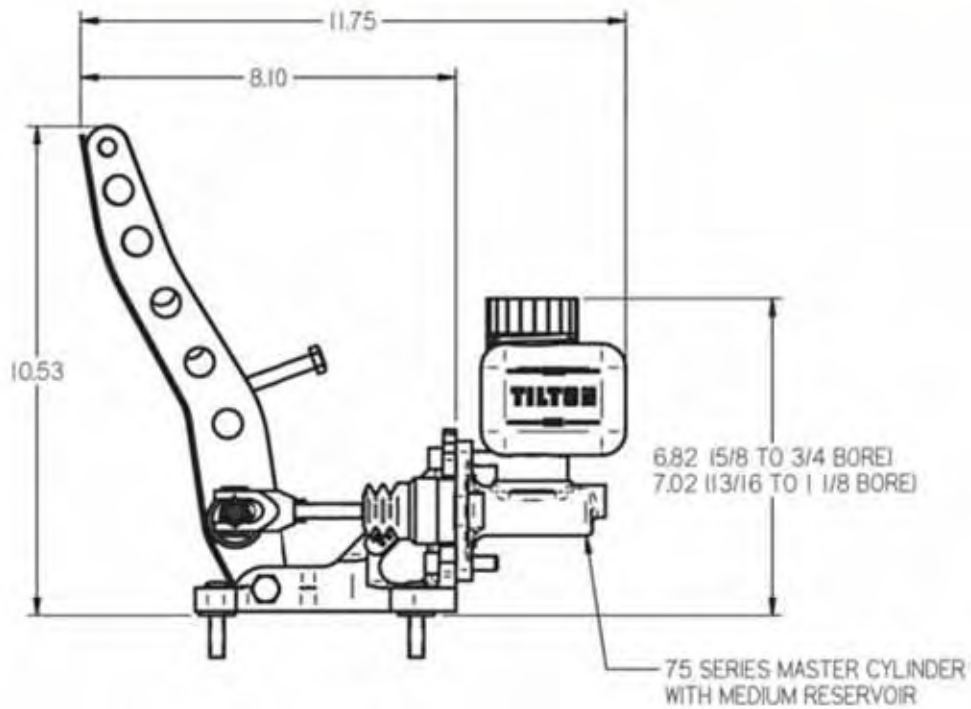
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**73-Series**

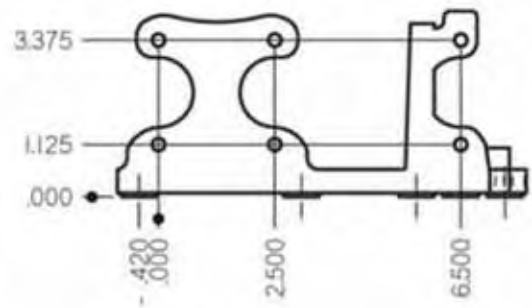


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FLOOR MOUNTING HOLE DIMENSIONS



FIREWALL MOUNTING HOLE DIMENSIONS

**600-Series Floor-Mount Pedal Assembly with Throttle**

600-Series 3-pedal floor-mount assemblies are designed to provide the driver with precise control of the clutch, brake and throttle within one assembly. This assembly offers great flexibility and many unique features that make it ideal for a wide range of applications. All three pedals are fabricated from high-quality steel and feature a 5.5:1 ratio. Designed for use with TB&C 73/74/75/76-Series master cylinders, or use with any master cylinder with a 2.25" center-to-center front flange mounting pattern.

**Features:**

- 5.5:1 ratio fabricated steel clutch, brake and throttle pedals with anti-slip foot pads
- Lightweight aluminum alloy pedal frame features a flat-bottom design and parallel bolt mounting pattern, enabling easy fore/aft adjustments of assembly within the vehicle.
- Adjustable throttle pedal stops limit pedal movement in both directions
- Adjustable ratio throttle cable standoff for connecting cable or solid-type throttle linkage. Bellcrank-type throttle linkage system is available as an option.
- Adjustable toe clip enables the driver to pull back pedal in the event of a stuck throttle
- 3/8"-24 diameter balance bar - Throttle return spring
- Adjustable clutch pedal stop - Weight: 5.8 lbs



Shown with 75-Series Master Cylinders and Throttle Linkage System (sold separately).



Note: Shown with 75-Series master cylinders and Throttle Linkage System (sold separately)

**Floor-Mount 3-Pedal Assemblies**

**Description**

Pedal assembly, 3-pedal, 3-cylinder, steel

**Part Number**

72-680

**Optional Components**

**Throttle Linkage System**

Enables tuning of throttle progression for track conditions and driver preferences. Features sealed ball bearings for smooth control of throttle application.



P/N: 72-790

**Remote Brake Bias Adjusters**

Allows balance bar adjustments by the driver during competition.

**Billet Model**



P/N: 72-401

**Standard Model**



P/N: 72-501

**Right Angle Coupler**

Allows for more remote bias adjuster cable routing options.



P/N: 72-560

**Master Cylinders**

Select a master cylinder type that best meets your needs.

**76-Series**



See page 27

**75-Series**



See page 28

**74-Series**

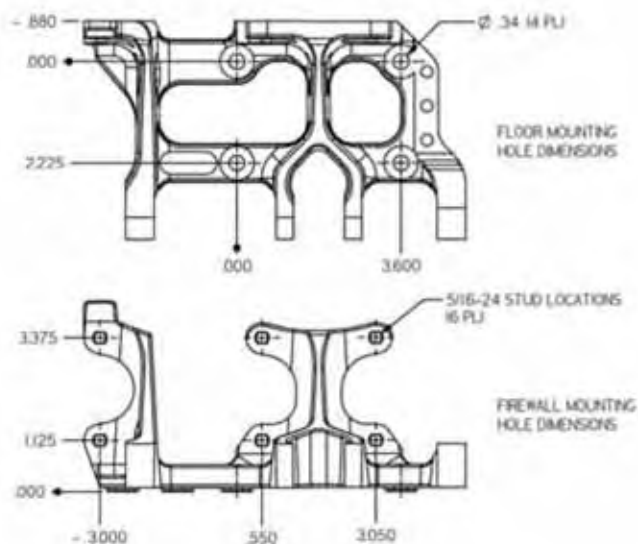
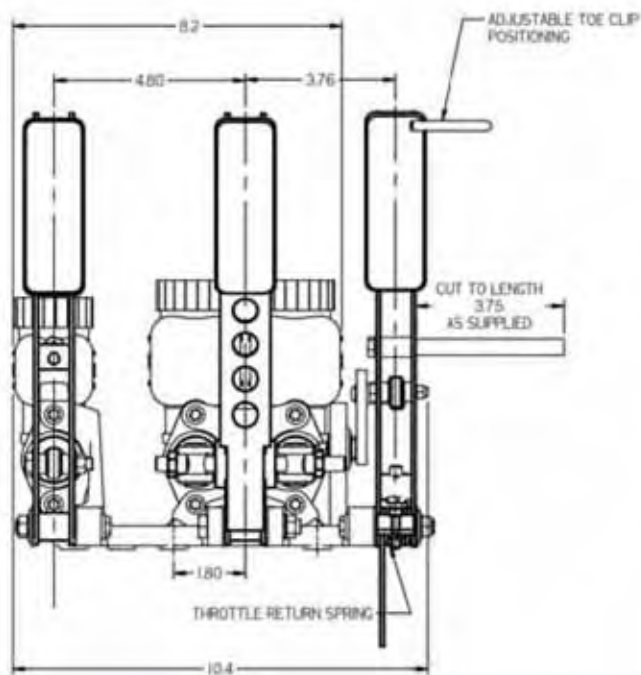
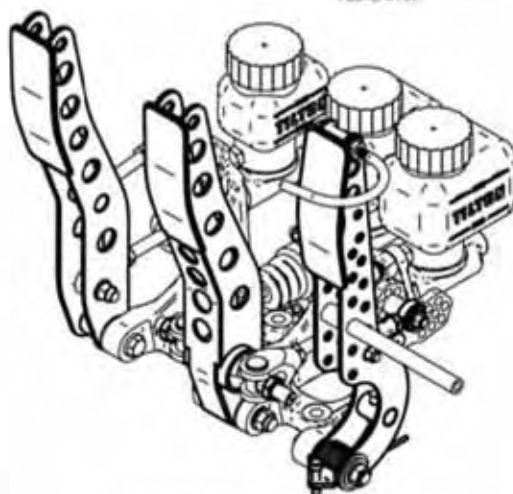
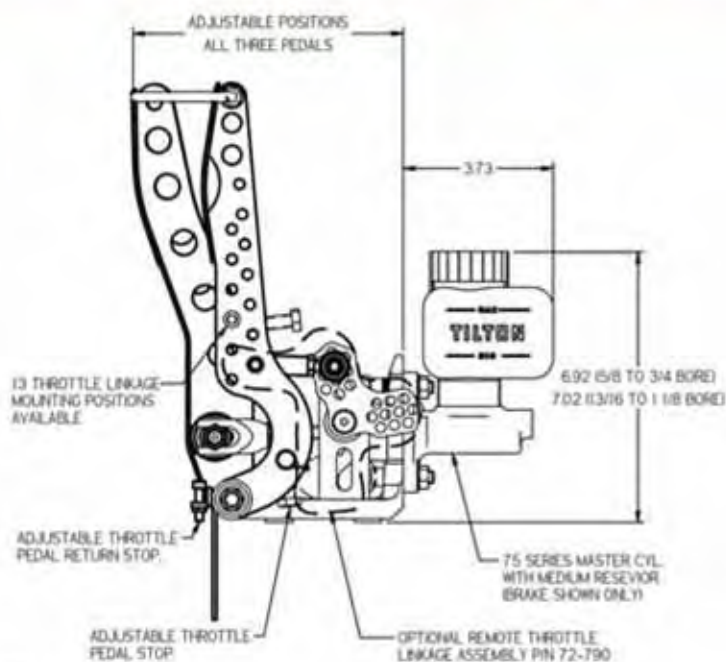
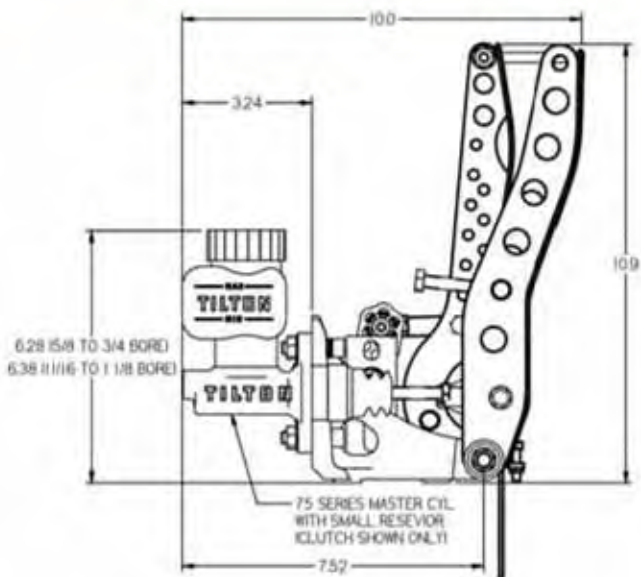


See page 30

**73-Series**



See page 32



## 600-Series Remote-Mount Pedal Assemblies

600-Series remote-mount pedal assemblies are designed for applications where standard pedal assemblies cannot be utilized due to space constraints. These assemblies are also ideal for applications that need to retain "stock" pedals, but require dual master cylinders for the brake system. Designed for use with TB&C 73/74/75/76-Series master cylinders, or can be used with any master cylinder with a 2.25" center-to-center front flange mounting pattern.

### Features:

- Lightweight aluminum alloy pedal frame
- Bell crank assembly features a 3/8"-24 balance bar
- Billet aluminum balance bar adjustment knob
- 90° or 60° master cylinder mount options
- Weight: 2.5 lbs



90° Master Cylinder Mounts

### Remote-Mount Pedal Assemblies

#### Description

Pedal assembly, 1-pedal, 2-cylinder, 90°  
 Pedal assembly, 1-pedal, 2-cylinder, 60°

#### Part Number

72-610  
 72-650



60° Master Cylinder Mounts

60° Master Cylinder Mount Assembly shown with 74-Series Master Cylinders (sold separately)



## Optional Components

### Master Cylinders

Select a master cylinder type that best meets your needs.

#### 76-Series



See page 27

#### 75-Series



See page 28

#### 74-Series

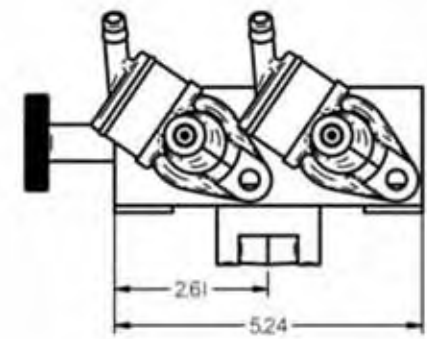
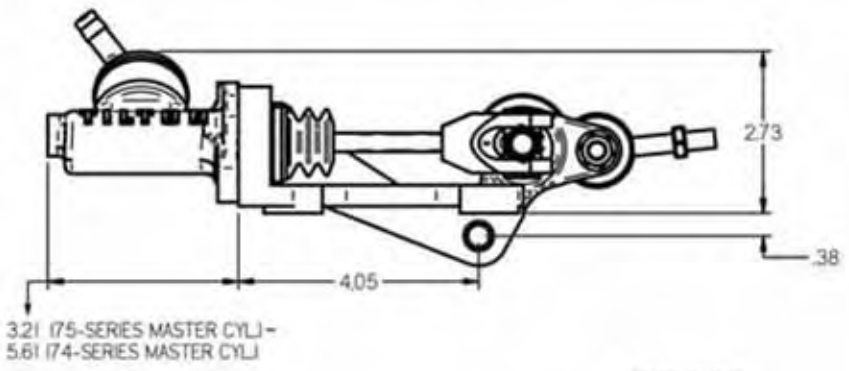
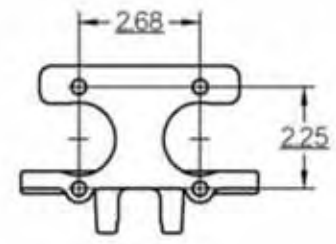
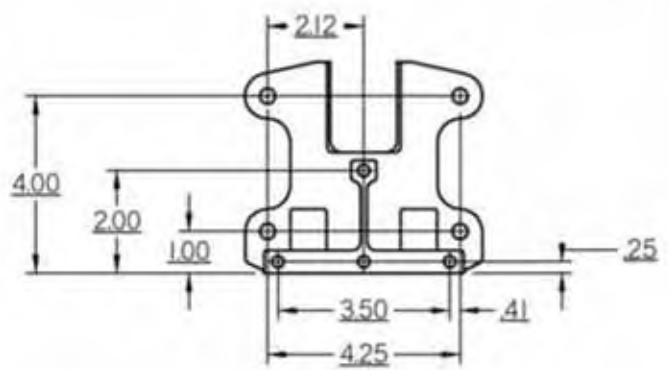
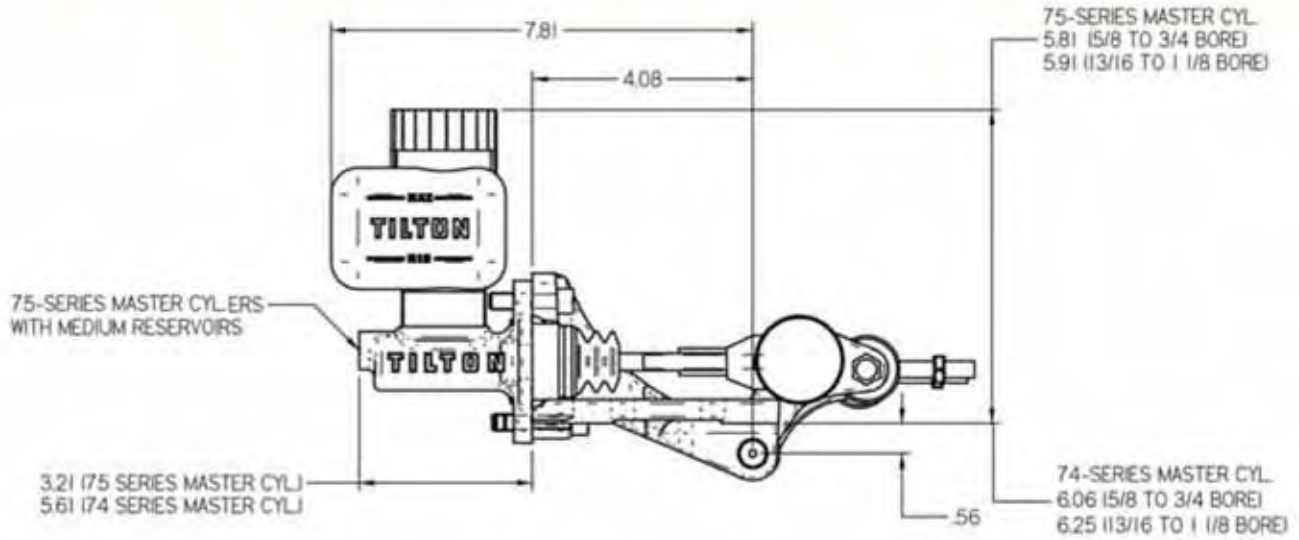


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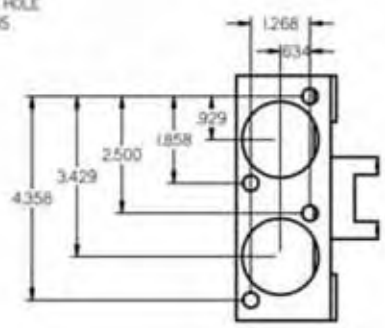
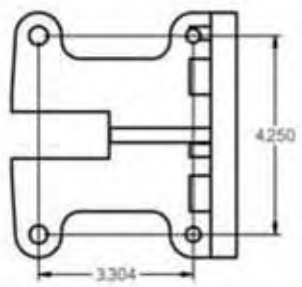
#### 73-Series

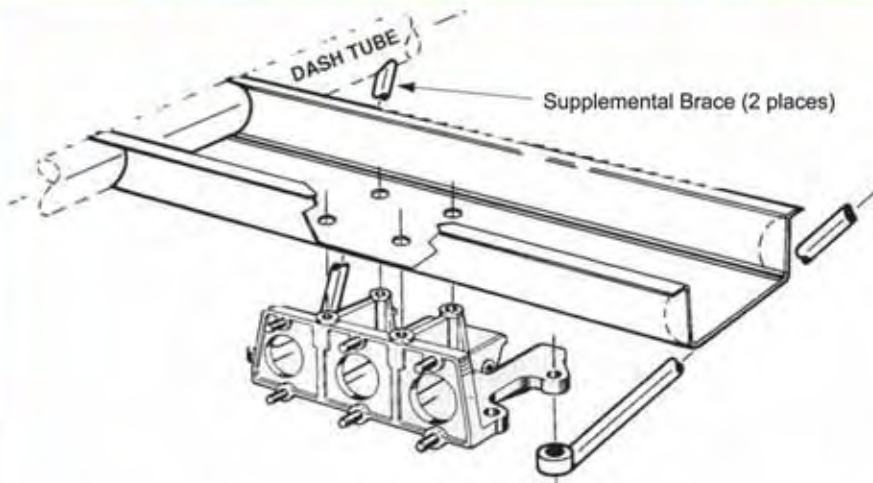


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MOUNTING HOLE  
DIMENSIONS



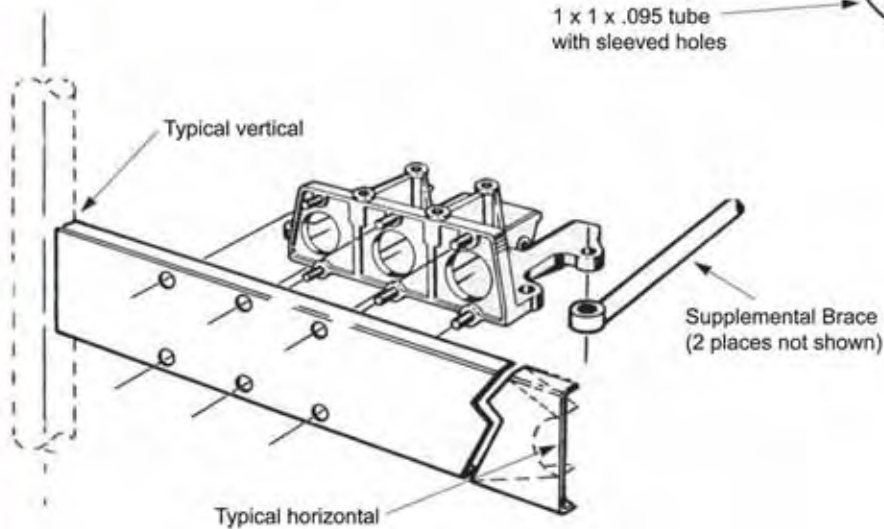
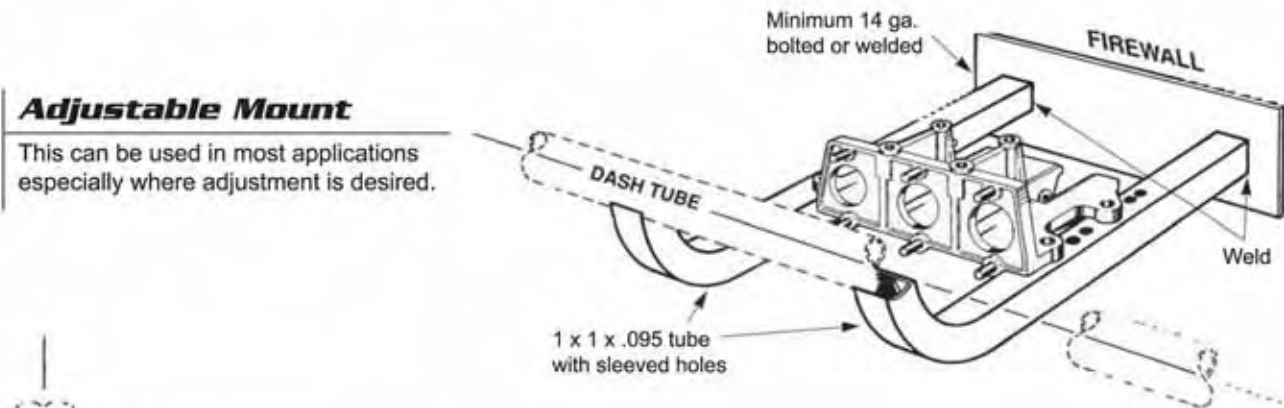


### Top Mount

This can be used to tie into existing structure (roll cage). Length and end shapes may vary. Minimum 14 gauge recommended.

### Adjustable Mount

This can be used in most applications especially where adjustment is desired.

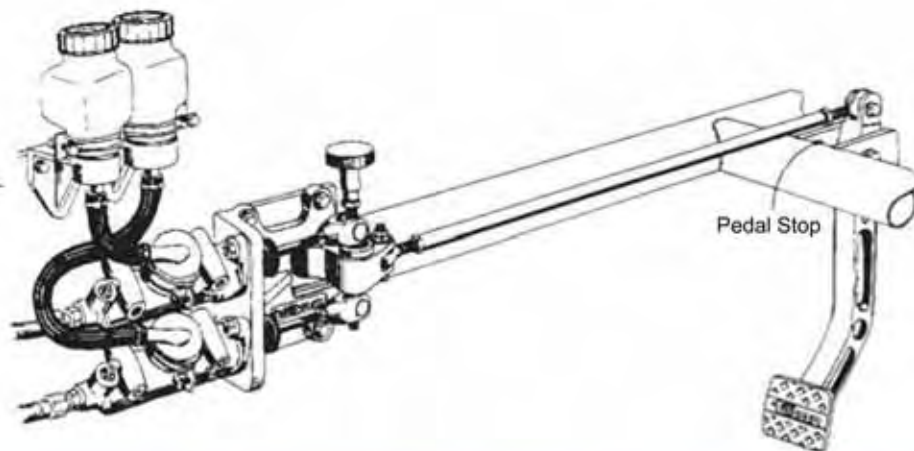


### Front Mount

This can be used to tie into existing structure (roll cage). Length and end shapes may vary. Minimum 14 gauge recommended.

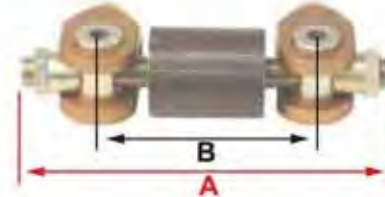
### Remote Mount

This can be used to locate master cylinders in the most convenient location.



**Balance Bars**

Designed for use within a dual master cylinder braking system, TB&C balance bars provide adjustability of front-to-rear brake bias. TB&C balance bars feature high-strength steel bars, low-friction spherical bearings, aluminum (billet or cast) clevises and an outer steel tube. Balance bars are available in a selection of shaft sizes to meet individual needs.



Description	A	B	Part Number
3/8"-24	4.75"	2.50"	72-250
3/8"-24	5.25"	3.00"	72-300
7/16"-20	5.20"	2.625"	72-260
1/2"-20	5.25"	2.75"	72-275

**Remote Brake Bias Adjusters**

Remote brake bias adjusters are designed to attach to balance bars, enabling the driver to adjust brake bias quickly during competition. The **Standard Model** features a finger-grooved plastic adjustment knob and a vibration resistant spring-loaded detent. The **Billet Model** features a billet aluminum adjustment knob with a non-slip rubber grip and dual spring-loaded detents that provide increased vibration resistance and a distinct feel. Both models feature a high-quality 6-foot steel cable protected by a red polyethylene tube. Available for use with 3/8", 7/16" and 1/2" diameter balance bars.



**Billet Model**



**Standard Model**

Description	Part Number
Adjuster, Standard Model, for 3/8"-24 balance bars	72-501
Adjuster, Billet Model, for 3/8"-24 balance bars	72-401
Adjuster, Standard Model, for 7/16"-20 balance bars	72-507
Adjuster, Billet Model, for 7/16"-20 balance bars	72-407
Adjuster, Standard Model, for 1/2"-20 balance bars	72-504
Adjuster, Billet Model, for 1/2"-20 balance bars	72-404

**Right Angle Coupler**

TB&C right angle couplers are designed to connect remote brake bias adjusters to balance bars at right angles. This allows the remote bias adjuster cable to be routed so that it does not interfere with the clutch or throttle pedal. Coupler features high-quality steel bevel gears housed within a compact aluminum case. Available for use with 3/8", 7/16" and 1/2" diameter balance bars.



Description	Part Number
Coupler, for 3/8"-24 balance bars	72-560
Coupler, for 7/16"-20 balance bars	72-561
Coupler, for 1/2"-20 balance bars	72-562





## Proportioning Valves

TB&C brake proportioning valves enable adjustable brake line pressure reduction to a particular wheel or wheels. They can also be used effectively with single or dual master cylinder systems, providing better front-to-rear brake balance under both light and heavy braking. Please see page 24 for further information on proportioning valve operation.

Proportioning valves are available in lever-type and screw-type, with either AN3 or 10mm x 1.0 ports. Lever-type proportioning valves provide a visual reference for seven distinct brake pressure reduction positions. The screw-type proportioning valves provide fine adjustments of brake pressure reduction. TB&C proportioning valves can be bulkhead or panel-mounted.



### Description

Lever-type, AN3 & 3/16" inverted flare (fittings included)  
 Lever-type, 10mm x 1.0 (fittings not included)  
 Screw-type, AN3 & 3/16" inverted flare (fittings included)  
 Screw-type, 10mm x 1.0 (fittings not included)  
 Rebuild kit, all TB&C proportioning valves

### Part Number

90-1000  
 90-1003  
 90-2000  
 90-2003  
 90-1100

## Flow Control Valve

The TB&C flow control valve is designed to reduce shock loads to the driveline by allowing the clutch to slip slightly during engagement. Shock load is a result of an abrupt clutch engagement when the crankshaft and input shaft speeds are not precisely matched. The flow control valve is designed to reduce the chance of losing traction when downshifting (road racing, entering pit lane) and/or reduce the chance of damaging driveline components (broken axles, transmissions, etc). This valve can also be used in drag racing applications to reduce shock load to the driveline when launching.

The valve works by restricting the return flow of the hydraulic fluid by a tunable amount. Fluid flow is not restricted during clutch disengagement. Therefore, shift times are still quick and pedal feel is not altered. The valve will have an effect on quick clutch actuations only. It will not alter fine clutch modulation (small pedal movements).

The TB&C flow control valve includes three orifice sizes (.021", .028" & .040") that enable clutch engagement to be tuned. The valve features AN3 fittings for use with most TB&C master cylinders and -3 hydraulic lines.



### Description

Flow control valve

### Part Number

90-5000

## Brake Bleed Bottle Kits

TB&C brake bleeding kits simplify brake fluid bleeding of dual master cylinder brake systems. The two durable clear plastic bottles included in the kit enable bleeding of a front and rear caliper simultaneously. Brake bleed kits also include complete instructions for proper bleeding of various types of brake systems.

### Description

Brake bleeding kit

### Part Number

72-503



### How the Hydraulic Brake Proportioning Valve Works

Tilton Engineering's patented, adjustable hydraulic brake proportioning valve enables the driver or a crew member to make adjustments of the brake force reduction to a particular wheel or wheels. The light, rugged valve may be bulkhead or panel-mounted. The proportioning valve can also be used effectively with dual master cylinder systems.

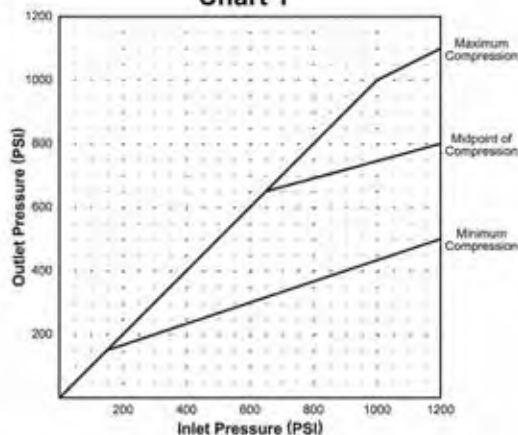
The proportioning valve is often one of the less understood devices bolted onto a racecar. They are often viewed as adjustable restrictor valves. This is not true. In theory, they are fairly easy to understand. Understanding how it works from a functional standpoint will allow the driver and crew chief to take advantage of its properties for a better racecar setup.

At lower pressures, the Tilton proportioning valve acts as a simple hydraulic connector. The pressure going into the proportioning valve is equal to the pressure going out. There is a 1:1 ratio between inlet and outlet pressure. The 45° line shown in **Chart 1 and 2** indicates this pressure range. Once a certain pressure limit is reached, a further increase in line pressure occurs at a reduced rate of 3:1 from inlet to outlet.

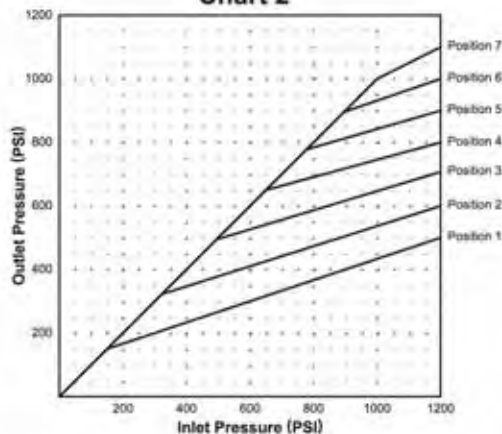
The adjustment control alters the point at which the inlet/outlet pressure ratio changes from 1:1 to 3:1. For example, look at the proportioning valve **Midpoint Position of Chart 1 for Screw-type proportioning valves** and **Position 4 of Chart 2 for Lever-type proportioning valves**. When the master cylinder line (inlet) pressure is above 650 PSI, the caliper line (outlet) pressure is below the pressure in the master cylinder line. The sloping line off to the right (shown in **Chart 1 & 2**) demonstrates this. Below 650 PSI they are equal.

The dual-slope line gives the proportioning valve one advantage over the balance bar system. It can be tuned for a better front-to-rear brake balance under both light and heavy braking. A particular setting of the balance bar gives you a set front-to-rear brake balance, such as 70/30 (70% front/30% rear). Under both light and heavy braking, this balance remains the same. However, the loading on the front and rear axles does not remain the same under different braking conditions. During heavy braking, there is a large load transfer from the rear to the front axle. As the load increases on the front axle you want a higher percentage of the braking force on the front axle. The bend in the graph for the proportioning valve allows this to happen when the proportioning valve is placed in the line for the rear calipers. During heavier braking, a higher percentage of the braking force is distributed to the front calipers.

**Chart 1**

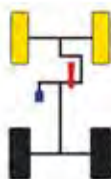


**Chart 2**



- Proportioning valve
- Master cylinder
- Full brake
- Reduced brake
- No brake

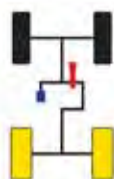
Front  
Rear



**Reduced front**

- Rally
- Dirt
- Off road
- Stadium racing

Used when the front tire needs more adhesion for steering, as well as in loose gravel conditions.



**Reduced rear**

- Road racing
- Street rods
- Trucks
- Oval Track

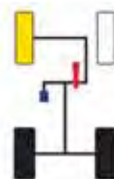
Used to compensate for fuel load or weight changes, deteriorating rear tire adhesion, and brake systems with only one master cylinder



**Reduced right front**

- Dirt
- Asphalt

Used to decrease outside front corner braking, which increases turn in and reduces under steer. Used to compensate for track conditions or deteriorating chassis setup.



**Reduced left, no right front**

- Dirt racing
- Midget
- Sprint

Used to decrease inside front cornering, which decreases turn in and reduces oversteer. Usually used on the inside front with twin calipers on the rear.

## Introduction to Master Cylinders

TB&C offers a wide range of master cylinders for use in most forms of racing and custom applications. Utilizing the highest quality materials and manufacturing processes, every TB&C master cylinder has been engineered to provide the highest levels of reliability and performance. With five series of master cylinders platforms available, most offered with eight different bore sizes, there is no need to look any further than TB&C!



**73-Series Master Cylinder**



**77-Series Master Cylinder**



**76-Series Master Cylinder**



**75-Series Master Cylinder**



**74-Series Master Cylinder**



### 77-Series Master Cylinders

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 (pages 1-7) or balance bar P/N 72-280 (page 8).

#### Features:

- Reliable seal/piston design
- Billet aluminum body profile is optimized for each bore size, providing the highest levels of strength/stiffness while minimizing weight
- Hand-built and blueprinted for cut-off port travel. Cut-off port travel may be tuned for increased or decreased pedal free-play using variable thickness shims (sold separately).
- Spherical bearing (rear pivot) is positively retained with snap rings
- Proprietary low-friction coatings minimize wear and provide smooth operation
- 1.1" of stroke provides the fluid displacement needed for a wide variety of applications
- AN6 crush washer seal, 9/16"-18 thread inlet port
- AN3 (3/8"-24) outlet port
- Cylinder weight (varies by bore size): .30 lbs



Note: Shown with P/N 77-015 fitting (sold separately)

Bore Size	Part Number
5/8" (15.88 mm)	77-625
7/10" (17.78 mm)	77-700
3/4" (19.05 mm)	77-750
13/16" (20.64 mm)	77-812

Bore Size	Part Number
7/8" (22.23 mm)	77-875
15/16" (23.81 mm)	77-937
1" (25.40 mm)	77-1000

### Optional Components

#### • Cut-off Port Shim Kits

Description	Part Number (5/8", 7/10", 3/4" bore)	Part Number (13/16", 7/8" bore)	Part Number (15/16", 1" bore)
.020" thick, 5 pack	77-412-20-5	77-414-20-5	77-416-20-5
.030" thick, 5 pack	77-412-30-5	77-414-30-5	77-416-30-5
.040" thick, 5 pack	77-412-40-5	77-414-40-5	77-416-40-5
.050" thick, 5 pack	77-412-50-5	77-414-50-5	77-416-50-5
.060" thick, 5 pack	77-412-60-5	77-414-60-5	77-416-60-5



#### • Fitting

Description	Part Number
Inlet fitting, 9/16"-18 crush washer seal to AN4 male	77-015



### Service Parts

Bore Size	Pressure Seal	Pressure Seal Shim	Return Spring	Spring Guide Pin	Pivot Bearing
5/8" (15.88 mm)	75-310	75-060	75-010	75-020	COM-5
7/10" (17.78 mm)	75-311	75-061	75-010	75-020	COM-5
3/4" (19.05 mm)	75-312	75-062	75-010	75-020	COM-5
13/16" (20.64 mm)	75-313	75-063	75-010	75-020	COM-5
7/8" (22.23 mm)	75-314	75-064	75-010	75-020	COM-5
15/16" (23.81 mm)	75-315	75-065	75-010	75-020	COM-5
1" (25.40 mm)	75-316	75-066	75-010	75-020	COM-5

## 76-Series Master Cylinders

76-Series master cylinders share the same compact body design of the 75-Series master cylinders, but feature an AN4 (7/16"-20) inlet port adapter. The inlet port adapter is designed to accept AN4 fittings when remote-mounted reservoirs are used, or the adapter can be removed to accept TB&C billet aluminum screw-on reservoirs (page 22).

### Features:

- Reliable seal/piston design
- Aluminum alloy construction
- 1.1" of stroke provides the fluid displacement needed for a wide variety of applications
- AN4 (7/16"-20) inlet port adapter; adapter can be removed to accept screw-on reservoirs with a 1 1/8"-20 thread
- AN3 (3/8"-24) outlet port
- Front-flange mounting
- Black anodized for corrosion resistance
- Cylinder weight (varies by bore size): .69 lbs



Bore Size	Part Number
5/8" (15.88 mm)	76-625
7/10" (17.78 mm)	76-700
3/4" (19.05 mm)	76-750
13/16" (20.64 mm)	76-812

Bore Size	Part Number
7/8" (22.23 mm)	76-875
15/16" (23.81 mm)	76-937
1" (25.40 mm)	76-1000

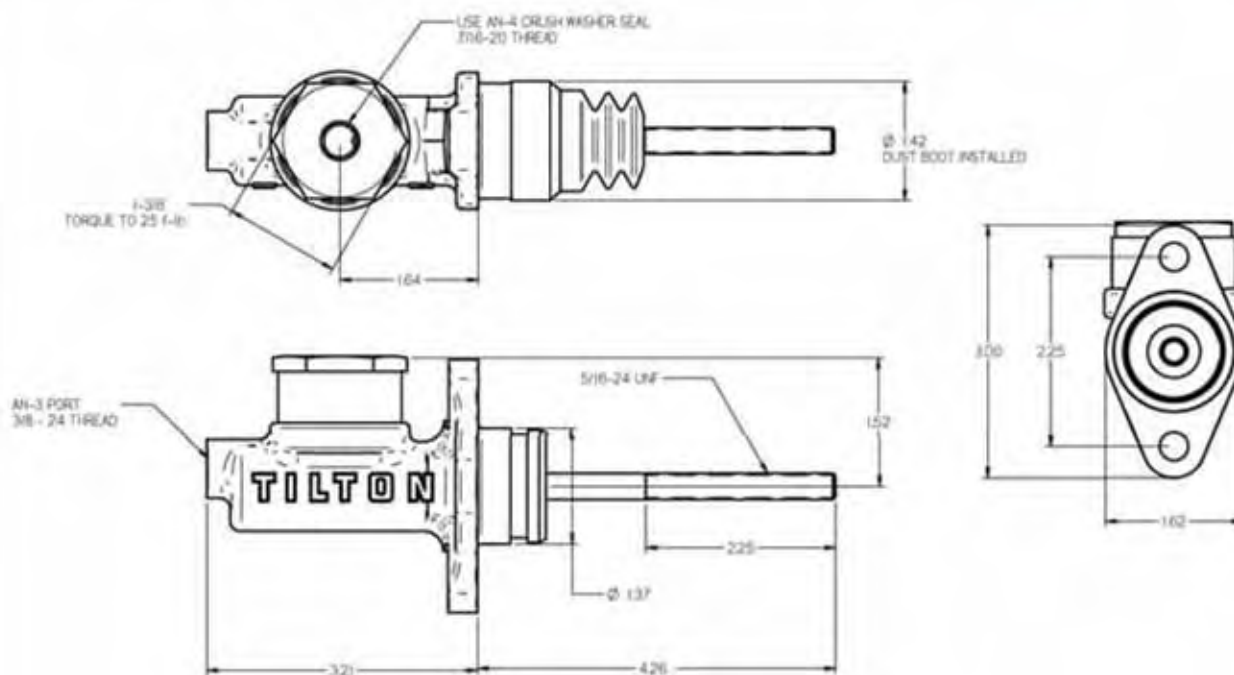
## Service Parts

### • Rebuild Kits

Bore Size	Part Number	Bore Size	Part Number
5/8" (15.88 mm)	76-625RK	7/8" (22.23 mm)	76-875RK
7/10" (17.78 mm)	76-700RK	15/16" (23.81 mm)	76-937RK
3/4" (19.05 mm)	76-750RK	1" (25.40 mm)	76-1000RK
13/16" (20.64 mm)	76-812RK		



## Installation Drawing



### 75-Series Master Cylinders

75-Series master cylinders are designed for applications where space limitations require a compact master cylinder. 75-Series master cylinders are a full 2.4" shorter than 74-Series master cylinder, but maintain a full 1.1" of stroke. 75-Series universal master cylinder kits include a master cylinder, two reservoirs (4.0 oz & 6.8 oz), a remote reservoir mounting kit and fittings.

#### Features:

- Reliable seal/piston design
- Aluminum alloy construction
- 1.1" of stroke provides the fluid displacement needed for a wide variety of applications
- AN3 (3/8"-24) outlet port
- Flange mount
- Black anodized for corrosion resistance
- Includes two reservoirs and a remote-mount kit that provide four different installation configurations
- Cylinder weight (varies by bore size): .63 lbs



#### • Universal Master Cylinder Kits

Bore Size	Part Number	Bore Size	Part Number
5/8" (15.88 mm)	75-625U	7/8" (22.23 mm)	75-875U
7/10" (17.78 mm)	75-700U	15/16" (23.81 mm)	75-937U
3/4" (19.05 mm)	75-750U	1" (25.40 mm)	75-1000U
13/16" (20.64 mm)	75-812U	1 1/8" (28.58 mm)	75-1125U



#### Service Parts

##### • Rebuild Kits

Bore Size	Part Number	Bore Size	Part Number
5/8" (15.88 mm)	75-625RK	7/8" (22.23 mm)	75-875RK
7/10" (17.78 mm)	75-700RK	15/16" (23.81 mm)	75-937RK
3/4" (19.05 mm)	75-750RK	1" (25.40 mm)	75-1000RK
13/16" (20.64 mm)	75-812RK	1 1/8" (28.58 mm)	75-1125RK



##### • Reservoirs & Related Components

Description	Part Number
Reservoir, 4.0 oz	74-202
Reservoir, 6.8 oz	74-203
Filter for 4.0 oz reservoir	74-210
Filter for 6.8 oz reservoir	74-211
Cap, 4.0 and 6.8 oz reservoirs	74-207
Clamp, 4.0 and 6.8 oz reservoirs	7-208
O-ring, master cylinder/reservoir	74-212-A
Push rod	75-030



##### • Remote-Mount Components

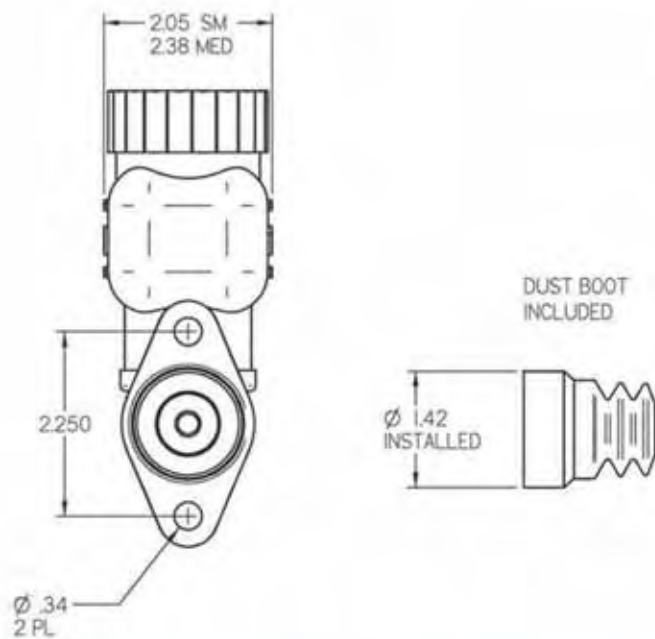
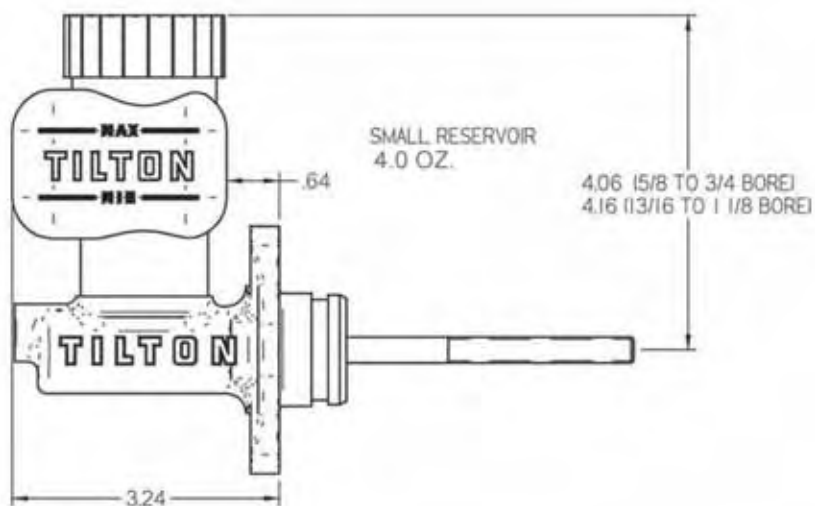
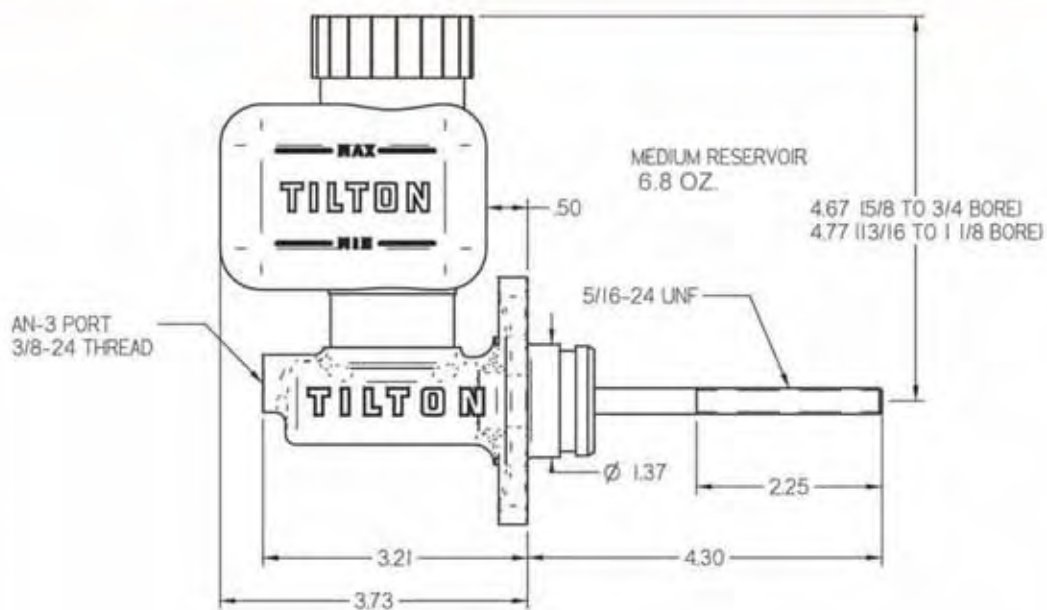
Description	Part Number
Remote inlet fitting	74-200
Remote reservoir mount bracket	74-212
Hose, 24" long	74-214
O-ring, remote mount bracket	74-212-A



##### • Fittings

Description	Part Number
Fitting, union, AN3 male/male	73-815-3L
Fitting, AN3 male, 3/16" female	TE2089-188L





TILTON

### 74-Series Master Cylinders

74-Series master cylinder kits offer great flexibility at an affordable price. Continuously improved since its introduction in 1986, the venerable 74-Series master cylinder has become a trusted favorite of car builders and race teams for its features, reliability and value. 74-Series universal master cylinder kits include a master cylinder, two reservoirs (4.0 & 10.7 oz.) a remote reservoir mounting kit and fittings.

#### Features:

- Reliable seal/piston design
- Aluminum alloy construction
- 1.1" of stroke provides the fluid displacement needed for a wide variety of applications
- Dual AN3 (3/8"-24) outlet ports provide flexibility for brake line routing
- Flange and side-mounting options
- Clear anodized for corrosion resistance
- Includes two reservoirs and a remote-mount kit that provide four different installation configurations
- Cylinder weight (varies by bore size): .94 lbs



#### • Universal Master Cylinder Kits

Bore Size	Part Number	Bore Size	Part Number
5/8" (15.88 mm)	74-625U	7/8" (22.23 mm)	74-875U
7/10" (17.78 mm)	74-700U	15/16" (23.81 mm)	74-937U
3/4" (19.05 mm)	74-750U	1" (25.40 mm)	74-1000U
13/16" (20.64 mm)	74-812U	1 1/8" (28.58 mm)	74-1125U



#### Service Parts

##### • Rebuild Kits

Bore Size	Part Number	Bore Size	Part Number
5/8" (15.88 mm)	74-625RK	7/8" (22.23 mm)	74-875RK
7/10" (17.78 mm)	74-700RK	15/16" (23.81 mm)	74-937RK
3/4" (19.05 mm)	74-750RK	1" (25.40 mm)	74-1000RK
13/16" (20.64 mm)	74-812RK	1 1/8" (28.58 mm)	74-1125RK



##### • Reservoirs & Related Components

Description	Part Number
Reservoir, 4.0 oz	74-202
Reservoir, 10.7 oz	74-204
Filter for 4.0 oz reservoir	74-210
Filter for 10.7 oz reservoir	74-211
Cap, 4.0 and 10.7 oz reservoirs	74-207
Clamp, 4.0 and 10.7 oz reservoirs	74-208
O-ring, master cylinder/reservoir	74-212-B
Push rod	74-400



##### • Remote-Mount Components

Description	Part Number
Remote inlet fitting	74-200
Remote reservoir mount bracket	74-212
Hose, 24" long	74-214
O-ring, remote mount bracket	74-212-A

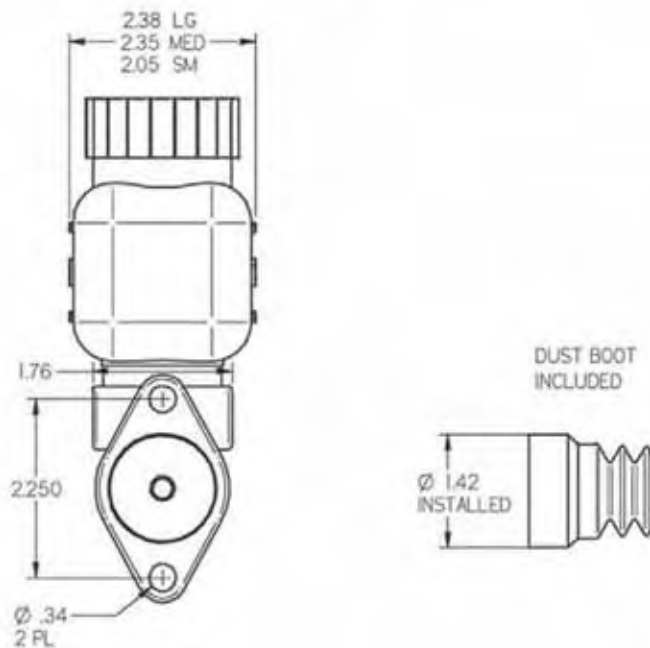
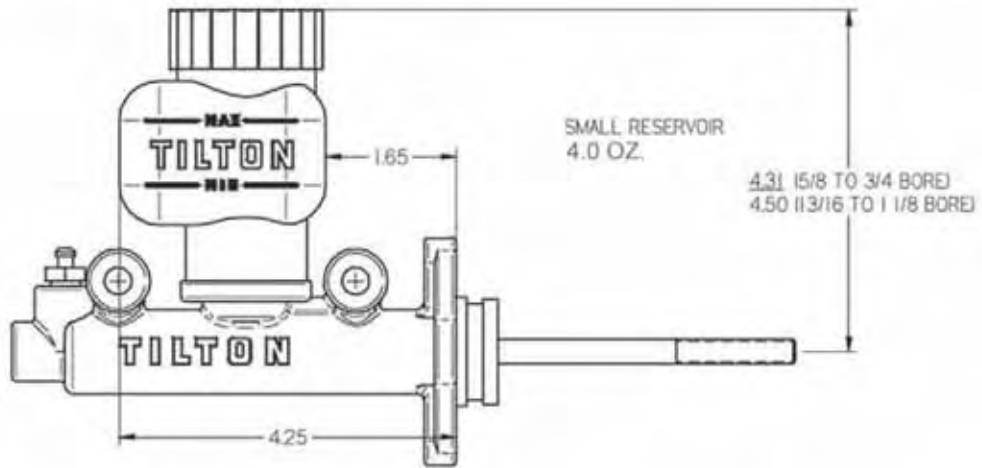
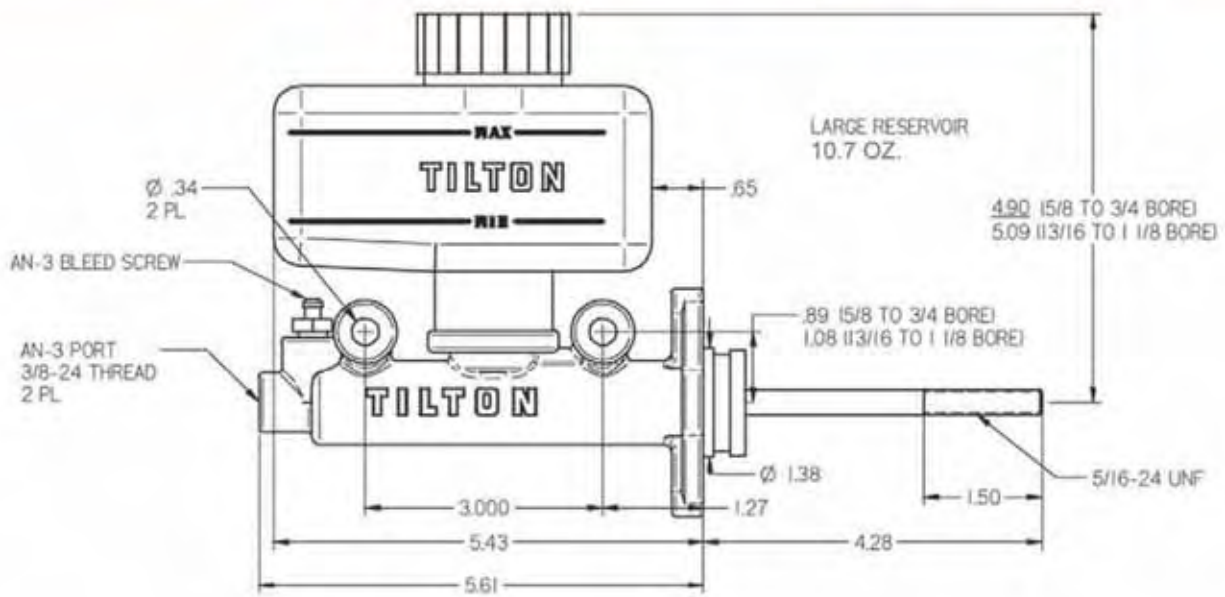


##### • Fittings

Description	Part Number
Fitting, union, AN3 male/male	73-815-3L
Fitting, AN3 male, 3/16" female	TE2089-188L
Bleedscrew, AN3	28696







### 73-Series Master Cylinders

73-Series master cylinders are designed for applications that require large brake fluid capacity in a leak-proof integral reservoir. The 73-Series master cylinders may be inverted temporarily without fluid loss or contamination.

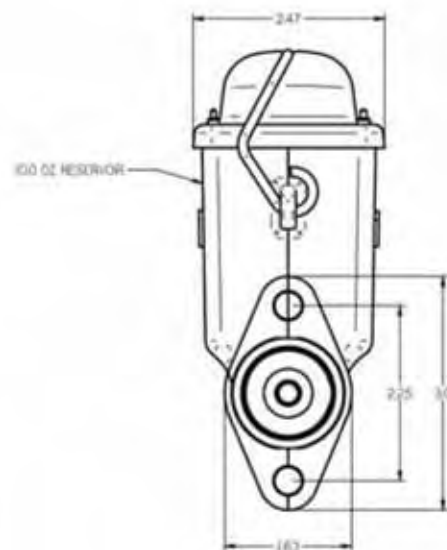
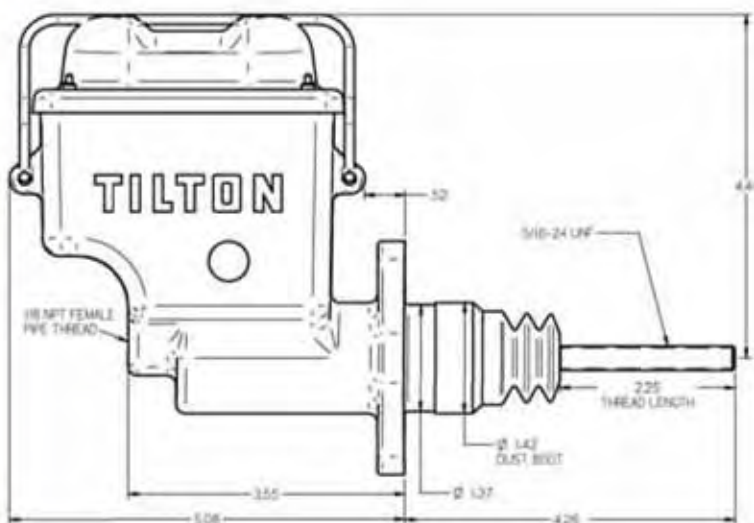
#### Features:

- Reliable seal/piston design
- High pressure die-cast aluminum provides machined-look finish
- 1.1" of stroke provides the fluid displacement needed for a wide variety of applications
- Integral 10 oz. reservoir provides plenty of fluid capacity
- Internal baffle within reservoir keeps port covered with fluid if reservoir runs low
- Bellows form a non-vented seal and keep elements away from brake fluid. Properly engineered, these bellows expand to fully fill reservoir and enable the full volume of fluid to be utilized
- Lid designed for easy removal. Features a bail wire produced from high-tensile spring steel that is designed to provide consistent clamp force
- 1/8" NPT outlet port, shrouded underneath reservoir to minimize the chance of fitting damage
- Front flange mount
- Cylinder weight (varies by bore size): 1.40 lbs



Bore Size	Part Number
5/8" (15.88 mm)	73-625
3/4" (19.05 mm)	73-750
7/8" (22.23 mm)	73-875
1" (25.40 mm)	73-1000

### Installation Drawing



## **Master Cylinder Bore Selection**

In dual master cylinder braking systems, obtaining proper brake balance is highly dependant on selecting the correct master cylinder bore size for the application. Almost every application is different. For example, two different vehicles using the same caliper/rotor/pad combination may require different master cylinder bore sizes.

The following is a list of variables that are needed to most accurately recommend master cylinder bore sizes:

### • **Front Brake Information**

- Number of pistons within each caliper
- Diameter of all the pistons within the caliper
- Piston location. Are the pistons on one or both sides of the caliper?
- Rotor diameter

### • **Rear Brake Information**

- Number of pistons within each caliper
- Diameter of all the pistons within the caliper
- Piston location. Are the pistons on one or both sides of the caliper?
- Rotor diameter

### • **General Information**

- Motion ratio of the brake pedal (5.5:1, 6.2:1, etc)
- Vehicle weight (with driver and fuel)
- Vehicle weight distribution (%)
- Vehicle wheelbase
- Front tire diameter (overall)
- Rear tire diameter (overall)
- Vehicle use (road racing, circle track, drag, street, etc)

If you can provide us with the above-listed information, we can provide you with front and rear master cylinder bore size recommendations. If you would like us to provide recommendations, please visit our website at:

**[www.tiltonracing.com/master\\_cylinder\\_selection.html](http://www.tiltonracing.com/master_cylinder_selection.html)**

and complete the Master Cylinder Bore Selection form. The form will be emailed to our Engineering Department and you will receive a reply with recommendations (usually within 24 hours).

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25 Easy Street / PO Box 1787 / Buellton, California 93427  
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