INSTRUCTION & TECH SHEET
F1 TORNADO™ RACING CALIPER

002-0731 /002-0052/ 002-0053 / 002-0054 / 002-0055 / 002-0058

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INSTRUCTION SHEET
F1 TORNADO™ Racing Caliper

This caliper was built and tested on_____by:_____

Caliper torque specifications.

The crossover bolts on this caliper require a specific torque value. It is:

Warning: Do not over torque the crossover bolts. Never assemble this caliper without being sure that the O'rings that seal between the caliper halves are in place in the groove! These are important seals, and

Crossover bolts	**3/8" 12 point, 3/8 x 16 x 2" long**	**torque to 42 foot pounds**

therefore, must be treated with the same respect as any other hydraulic sealing device.

General Information:

This caliper is a major improvement in racing caliper design in 30 years.

Designed by Warren Gilliland, a 31 year brake engineer, it is the strongest caliper for its size on the market today.

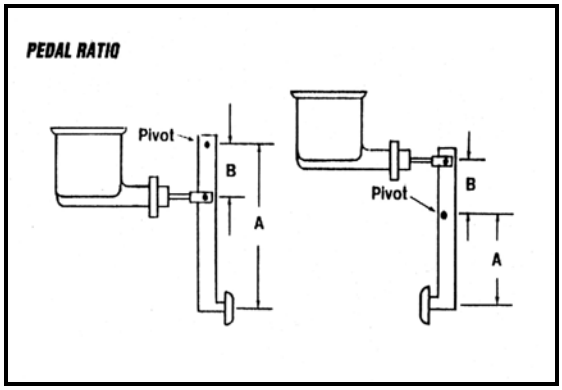
Here are the main advantages:

1. **<u>Forged billet</u> high strength aluminum alloy is far stronger than any cast or machined billet caliper. It is coated with a clear, Type II anodize for corrosion resistance, and to allow you to see the quality you get!**
   The progressive die forging means far less deflection than our competitors, even the expensive European brands!
2. **<u>Dual adaptability</u> allows this caliper to be used as a left or right side caliper by interchanging bleed screw and inlet fit ting. Now you can carry just one spare!**
3. **Dual cotter pin, larger brake pad than other small calipers, increases pad life and provides superior performance.**
4. **<u>Full modular construction</u> allows the owner to purchase any piece separately to easily rebuild, or to convert to differ ent size, such as thicker or thinner rotors, or smaller or larger piston bores. Now you can run the lightest rotors at all tracks without extra calipers, and repair you caliper for a fraction of the cost of a new one!**
5. **<u>Tighter tolerance control</u> creates more consistent pedal height and consequently, far better driver confidence.**
6. **<u>All components highly corrosion protected</u>, creating a caliper that will service the buyer for a great deal longer than the competition. This, combined with our modular construction greatly reduces the brake operating costs over the entire season, as well as greatly reducing upkeep and maintenance.**

MAXIMUM OPERATING PRESSURE IS 1500 PSI. DO NOT USE OVER THIS PRESSURE RATING!

PAD COMPOUND	FRICTION CHARACTRERISTICS	OPTIMUM OPERATING TEMPERATURE	APPLICATION CONDITIONS	FADE AT HIGH TEMPERATURE
#1 ↕ #4	HIGHER ↕ LOWER	LOW ↕ HIGH	LESS ↕ MOST	GREAT ↕ LESSER

PEDAL RATIO CALCULATOR: Pedal ratios should be around 6/1. This means that "A" should be 6 times bigger than "B"



TECH TIP: Billy Joe Brake Puck Says:

"Brake pads are very confusing for the average racer. A simple reminder that may help you avoid some of the confusion is to remember that there is a very definite reason that brake pads have a big variation in price. Wear, coefficient of friction and the rate of abrasiveness varies greatly. Our pads cost a little more, but actually cost less to use because of improved life, less damage to your rotors, and superior performance. If these pads help you win one extra race, then you have paid for your pads for the entire season!"

REPLACEMENT PARTS LIST :

PART #	DESCRIPTION	# OF PISTONS	PISTON DIA	ROTOR WIDTH	WEIGHT	DIM (A)	DIM (B)	SEAL KIT	OVERHAUL KIT	PISTON	HOUSING INBOARD	HOUSING OUTBOARD	COTTER PIN KIT
002-0052	131 F1 Tornado™	2	1.310	.250-.380	1.5	3.59	.75	007-0012	008-0052	006-0730	202-0730	202-0731	009-0078
002-0053	175 F1 Tornado™ Alum	2	1.750	.250-.380	1.4	3.59	.750	007-0015	008-0053	006-0741A	202-0735B	202-0734B	009-0078
002-0054	175 F1 Tornado™	2	1.750	.250-.380	1.5	3.59	.750	007-0015	008-0054	006-0741	202-0735B	202-0734B	009-0078
002-0731	150 F1 Tornado™	2	1.500	.250-.380	1.5	3.59	.750	007-0014	008-0731	006-0343	202-0735A	202-0734A	009-0078
002-0055	175 Harley Tornado	2	1.750	.250-.380	1.5	3.59	.750	007-0015	008-0055	006-0741	202-0736	202-0734B	009-0078
002-0058	163 F1 Tornado™	2	1.630	.250-.380	1.5	3.59	.750	007-0013	008-0058	006-0736	202-0736	202-0737	009-0078

INSTALLATION TIPS

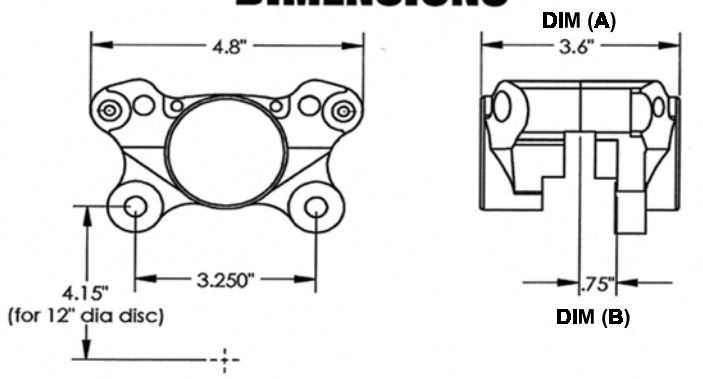
1. For best results, use our brake pads and fluid with this caliper. Although other pads and fluid will work, use of an improper fluid can damage seals or increase pedal travel, substantially altering the "pedal feel". Also, our pads have a very consistent coefficient of friction that will allow the race car to react much more consistently on corner entry. Use the entire package to get the best brake!
2. For improved pedal height, use a 2 pound residual valve, part number 12-1092, available through your dealer. Since the caliper is far more rigid than others, it does not deflect as much, therefore, when the brake is released, you will not see the severe brake drag you have noticed with other calipers.
   If your master cylinder is mounted lower than the caliper, you must run a residual valve.
3. Make sure your brake bracket is perfectly parallel to the rotors. You may use a pair of calipers as a depth gage and measure from the mounting ear to the rotor face. Both ears must be within .010 inches of each other. If they are not, remount the brackets until they are within tolerance.
4. Mount calipers at either 3:00 or 9:00 mounting position. If calipers are mounted other than here, they may need to be rotated into this position for bleeding.
5. Plumb your race car in 3/16" steel line, terminating the lines as closely as possible to the wheels. Use 3/16" steel braid supported hoses. Make sure that hose is long enough on the front wheel to allow for full wheel turn and droop.
6. Make sure you have the right caliper for your application. If you are unsure, contact the brake tech hotline at: 805-604-0339. Use only genuine hardware from "The Brake Man, Inc., to repair this caliper. Although other hardware will fit, these components have been designed to give you the best results. Other hardware could significantly weaken the caliper, or cause failures altogether.
8. Mount this caliper using 3/8" bolts through the mounting ears. We suggest grade 8. This caliper should mount in virtu ally any location where a similar size competitor's caliper will mount. Hole spacing is 3.25"

DO NOT GRIND ON THIS CALIPER!

9. Do not pump the brakes during bleeding. This will aerate the fluid making it impossible to get the air out. Stroke slowly and smoothly. Think of the master cylinder as a hypodermic needle and squeeze the fluid into the lines. This caliper only has one bleed screw. All of the air will evacuate through this hole. Once a steady stream of fluid is noted, you are probably finished. For more tips, see the back of this instruction sheet.

EVERY CALIPER IS PRESSURE TESTED TO 1500 PSI AND SOAK TESTED FOR 24 HOURS PRIOR TO SHIPMENT!

CLEARANCE AND MOUNTING DIMENSIONS



TECH TIP: Billy Joe Brake Puck Says:
Pedal ratios are important for proper pedal feel. If you are unsure if yours are correct, measure the "A" and "B" dimensions shown in the illustration on the right and call "The Brake Man, Inc", technical hotline. We want your brakes to be as good as they can be!

MEET THE BRAKE MAN, INC. CALIPER FAMILY!

The Tornado™ Series!

TROUBLE SHOOTING CHART

TECH TIP: Billy Joe Brake Puck Says:

One of the biggest reasons why a pedal will have excessive travel is because of tremendous flex of some calipers. Remember, the more rigid the caliper housing is, the better, firmer, pedal you will have. Also, modulation and control are greatly influenced by caliper flex. A caliper that has minimal flex causes less drag. Drag robs horsepower!
A race car can never be it's fastest when the brakes are dragging.

TROUBLE SHOOTING CHART

SYMPTOM	*CHECK THE FOLLOWING:*
UNEVEN PAD WEAR	1. CALIPERS NOT MOUNTED SQUARE TO ROTOR 2. STICKING PISTON IN CALIPER 3. BRAKE PAD DIGGING INTO ALUMINUM HOUSING
BRAKE DRAG	1. PRESSURE IN SYSTEM FROM RESIDUAL VALVE 2. LACK OF FREE PLAY IN BRAKE PEDAL LINKAGE 3. CALIPERS NOT MOUNTED SQUARE TO ROTOR 4. EXCESSIVE ROTOR RUN OUT 5. SILICONE BRAKE FLUID PRESENT 6. MOUNTING BRACKETS WEAK OR DEFLECTING 7. MASTER CYLINDER PUSHROD NOT RETURNING
EXCESSIVE PEDAL TRAVEL	1. MASTER CYL. MOUNTED LOWER THAN CALIPER 2. AIR TRAPPED IN FLUID 3. MASTER CYLINDER TOO SMALL 4. PEDAL RATIO TOO HIGH 5. CALIPERS NOT MOUNTED SQUARE TO ROTORS 6. SPINDLE DEFLECTION CAUSING PISTON KNOCK-BACK 7. WARPED ROTORS
PEDAL DROPS DURING RACE	1. FLUID BOILING FROM: A. BRAKE DRAG B. OLD BRAKE FLUID C. INSUFFICIENT ROTOR SIZE OR DUCTING CAUSING OVERHEAT 2. LEAK IN HYDRAULICS 3. MASTER CYL. FLUID BYPASS FAILURE
CAR PULLS	1. FROZEN PISTON IN CALIPER 2. OIL ON BRAKE LININGS 3. CASTER ALIGNMENT OUT 4. MISMATCHED PADS 5. DIFFERENT PISTON SIZES IN CALIPERS
PEDAL OSCILLATES	1. EXCESSIVE ROTOR RUNOUT OR NOT PARALLEL 2. LOOSE WHEEL BEARING 3. LINING TRANSFER TO ROTOR 4. TIRE FLAT SPOTTED 5. CRACKED ROTOR
EXCESSIVE PEDAL EFFORT	1. PEDAL RATIO TOO LOW 2. MASTER CYLINDER TOO LARGE 3. CALIPERS TOO SMALL 4. PAD MATERIAL NOT AGGRESSIVE ENOUGH 5. FROZEN PISTON IN CALIPER 6. BRAKE PAD FADE 7. ROTOR DIA. TOO SMALL

TECH TIP: Billy Joe Brake Puck Says:
" If you have ever lost a race because your brake pedal went to the floor, it was probably because you boiled the fluid. This is because your fluid was old, or of poor quality. Either way, you lost a race that could have been won for under $7.00. Don't let it happen again! Ours is even less expensive when purchased as a case of 12!

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