

RATCO FRAME INFORMATIONAL BOOKLET

CH01 Series - TR250, 5, 6

CH02 Series - TR4A IRS

**CH03 Series - TR2, 3, 3B, 4 and
4A Solid Rear Axle**

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RATCO FRAME INFORMATION PACKAGE SERIES CH01, CH02, CH03

HISTORY

The concept of building and selling new frames for Triumph sport cars grew from a tech project of the Long Island Triumph Association in the early winter of 2002. The club had a 'donor' TR6 and a large inventory of spare parts and pieces. The idea, inspired by the club's Technical Coordinator Anthony Vigliotti, was a ground up complete restoration with an unusual twist: Make the car six inches wider! This would give the TR6 a distinctive look, more interior shoulder room, and a wider wheel base for better stability and handling. It also provided the room to install the aluminum Rover V8 that Tony just happened to have sitting around. The TR6 plus 6 project was born. The first job was to strip down the donor and hoist the body off the frame. Ouch! It was soon obvious that there was a major problem... The thirty year old frame was a mess. The swing arm mounting rails were very badly rusted and many places on the forward rails were rusted through in critical spots. There was no way the frame could be reliably repaired and reinforced much less cut in half and widened six inches.

The decision to build a new frame from scratch was easily made and the TR6 plus 6 project began with the new frame as the first major goal. One year later it was finished and a rolling chassis, complete with the Rover V8, was assembled in time for the Roadster Factory Summer Party. The widened rolling chassis was flat towed to the event and was placed on display in the Roadster Factory's main building and quickly became a favorite among the spectators. The most common questions were "why are you doing this" and the second was "How can I get one for my restoration project". Well if you have to ask 'why' you just wouldn't understand the answer and at that time the building of frames for sale was not even contemplated. Over the next two years Tony found himself building two more frames for other projects. It was obvious that interest in new frames was out there. It looked like a commercial enterprise would fly and he enjoyed the work. That and a real desire to keep the Triumph marquee alive led to the founding of the frame division of RATCO Inc.



TR6 Plus 6 Rolling Chassis

RATCO'S PRODUCTION JIGS AND FIXTURES

The entire project hinges around the ability to build accurate jigs and fixtures upon which to assemble, align and weld the myriad of components necessary to complete the frame. For this purpose a frame that was found to be square and true to the original dimensions and whose history was documented, was used as a model to build the jigs now in use today. Essentially, the model frame was perched upon a rigid steel base made of 5 inch channel and 3X3 box steel uprights and when leveled and secured, it was surrounded by angled steel which was cut or bent to match every detail of the frames shape and welded into place. Next, Jig fitment points of all the models brackets and ancillary components were made, precisely located and added to the Jig. Finally separate Jigs were fabricated to duplicate the details and dimensions of the rear spring towers, differential supports and the front steering rack mount assembly. At this point the Jigging build process was essentially complete and ready for test. New 3X3 box steel pieces were measured, documented, cut and placed in the new Jig perfectly duplicating the model. Once the dimensions, elevations and position of the frame were checked and rechecked against the model, the entire structure was welded together. The now complete base frame underwent a final inspection and for the ultimate test a true and square TR6 body was dropped on it to assure that the frame was complete and that the mounting brackets were in alignment. Perfect!

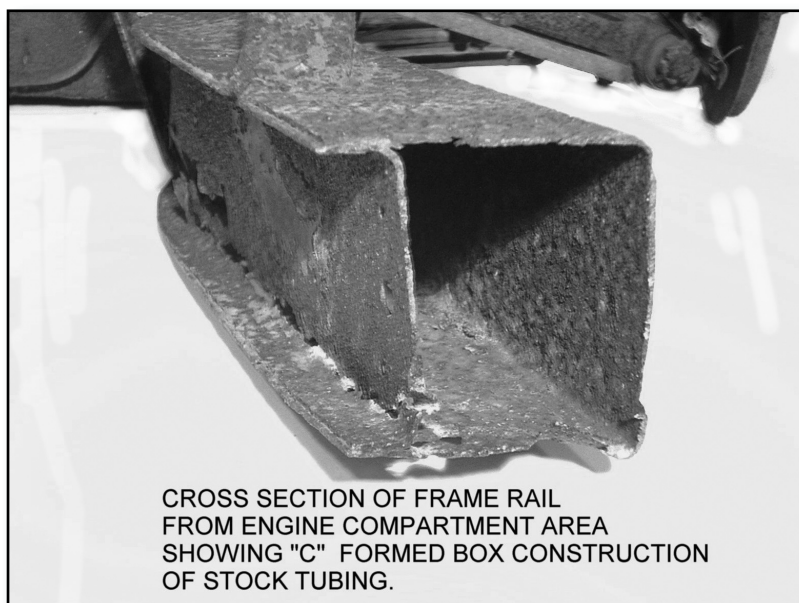
After the body was removed the frame was replaced in the jig and the newly fabricated components (towers, differential supports, steering and suspension mounting points etc.) were welded in place. Once finished a second and third frame were built in this same essential manner but now all dimensional parts are cut from drawings created using sophisticated computer assisted design (CAD) software and the folded steel components are cut with a CNC plasma cutter also using the same CAD package. The results are beautifully precise. The Jigs, fixtures, drawings, processes and procedures are now a proven reality.



SHORT COMING OF THE STOCK FRAME DESIGN

Everyone who owns a Triumph for any length of time soon learns of the failures and shortcomings of the cars design with the frame right at the top of the list. It must be said that these frames have stood up surprisingly well for having been made so long ago with less than quality materials and no attempt at rust proofing. Still many have endured for 40 + years and some will go on for much longer in faithful service to there loving owners. Still others will not make it much longer and many should not be in service at all.

The original frame was made of sheet metal bent into "C" channels. Two sizes were made. One was deep drawn measuring 3 inches tall and 2.75 inches deep (approximately!!) and the other was 2.875 inches tall and .75 inches deep. The smaller channel was placed into the larger and the resulting lip was spot welded every 1/2 inch (or so!) along its length. The resulting box was cut to length and, if necessary the pieces were bent to shape before being welded together to form the final base frame assembly. The towers, brackets and mountings were all stamped from 12 gauge (.090) steel then assembled and mounted on the base frame using electric spot welds or full pass arc welds.



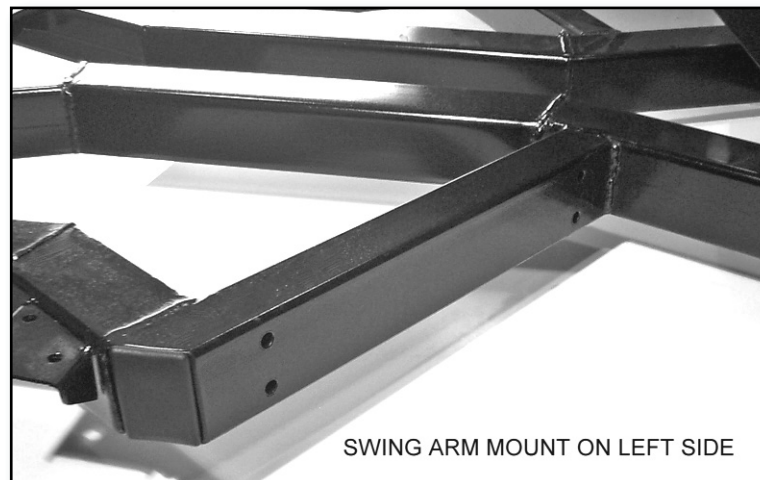
The result was an impressively strong chassis that caused some journalists in that day to say that the car seemed to be machined out of one solid piece of metal and others to say that it was the most rigid sports car available. It was all that, but time has a way of sapping the strength out of most everything.

The assembly technique of using sandwiched steel channels might have been economical and expedient but it made for pockets in the sandwiched metal to fill with water and eventually rust. The Triumph engineers failed to place weep holes in the correct spots on the chassis which would have allowed water to exit. There was no rust-proofing applied other than areas of extreme stress were not properly reinforced, if at all. Add thirty or forty years to these design flaws and eventually serious problems will occur in many critical locations; with the rear swing arm and the lower front wishbone mounts being the most prone to rust and failure. Bodies sag on weakened frames and doors began not to close. Bumper brackets lose their mounting points to rust and A and B posts brake from their mounts due the flex in the chassis. Hang around these cars long enough and you will see all the failures in due time.

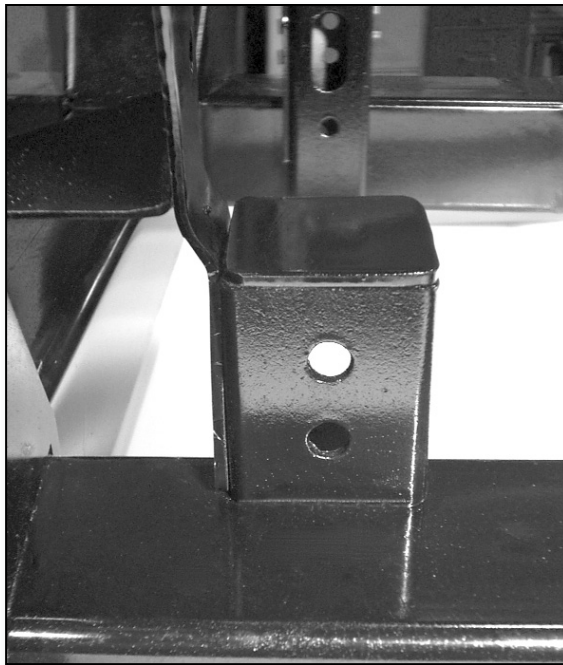
IMPROVEMENTS PROVIDED IN RATCO FRAMES

REAR SWING ARM MOUNTS: First off the rear swing arm mounts are completely redesigned with modern materials. Their size has been made smaller measuring 2X3 rather than the 3X3. Also, they are now made with .119 thick steel (11 GA.).

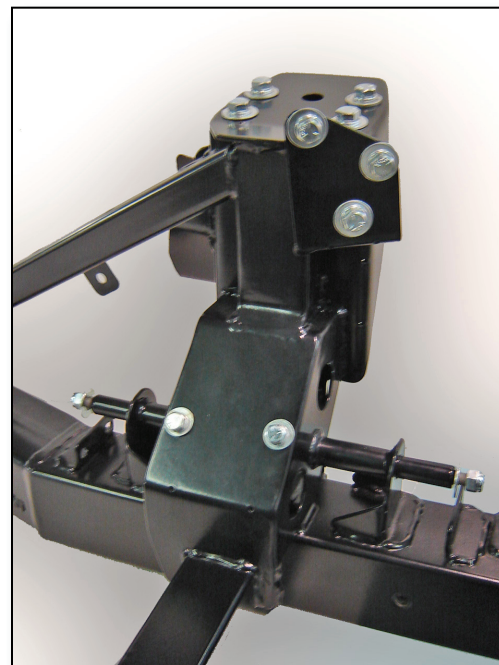
The smaller cross section dimensions and thicker material, increases the structural rigidity tremendously. The tubular sections have blind nuts welded to the inboard outside surface for ease in assembly and the through-bolt holes are reinforced along their length with tubular steel spacers. These spacers insure that the box structure will not collapse over time under the strain of the swing arm movements and over tightened bolts.



FRONT LOWER WISHBONE MOUNTS: The lower wishbone mounts are made of 2X2 11ga. tubing. The rear most mounts are reinforced by the vertical member of the redesigned motor mounts. The forward mounts are reinforced by welding them to the steering rack mount which in turn reinforces both assemblies. The robust material and attention to stress points makes this arrangement extremely strong. The original mounts were not reinforced from the factory on the early cars and required field installed gussets as reinforcements within a short period of time. The later model TR6 cars were gusseted at the factory.



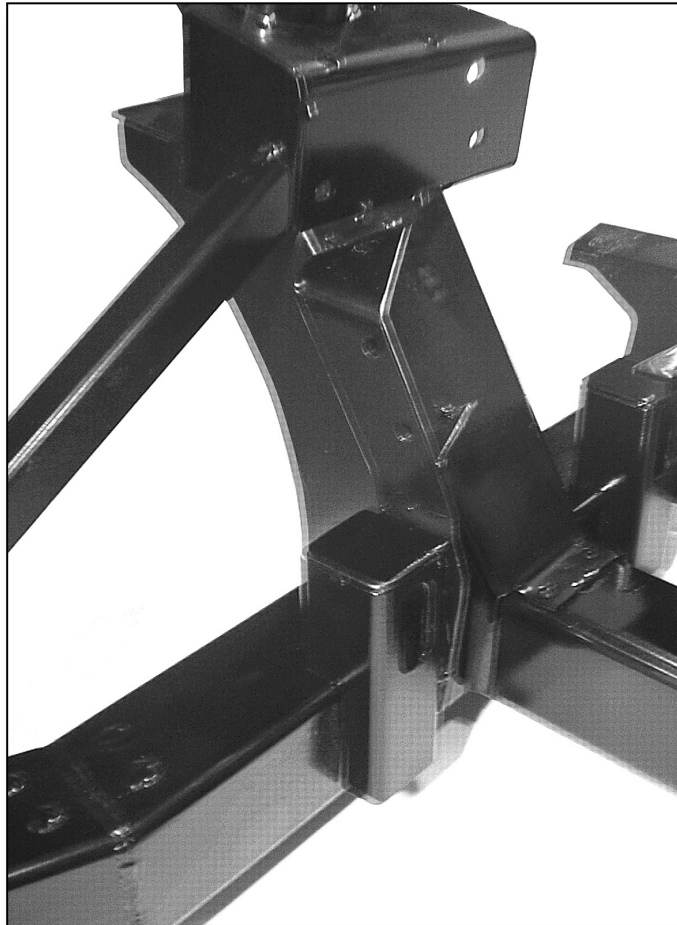
**Lower Wishbone Mounts
CH01 and CH02 Series**



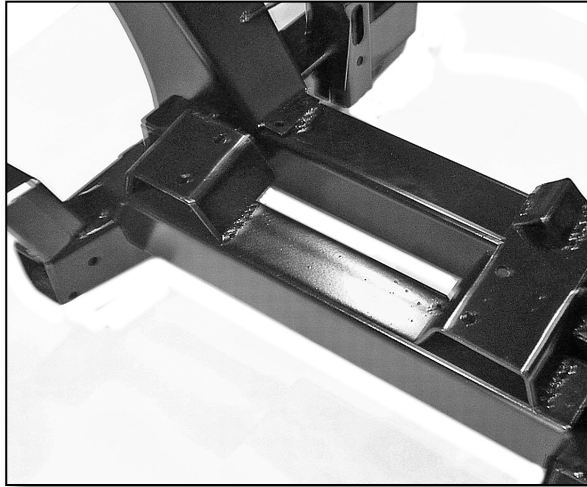
**Lower Wishbone Mounts &
Motor Mounts for
CH03 Series**

NOTE: The superior structure for lower wishbone mounts

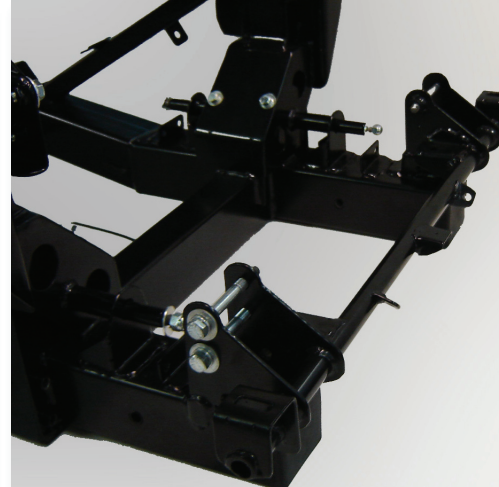
IMPROVED MOTOR MOUNTS: Original motor mounts have a tendency to crack at the upper weld line on the shock tower. The failure is rarely catastrophic but it is unnerving to find cracks in the bracket holding your engine in place. The RATCO design for the engine mounts incorporate support legs that extend down from the mount and are welded to the frame rail adjacent to the rear lower wishbone mounts. In this way the weight of the engine is supported by the frame rails, the shock towers and the lower wishbone mounts and all support one another. The mounts are made of 10ga. (.131 inch) steel plate.



STEERING RACK MOUNT ASSEMBLY: The steering rack mount is made of 12ga. steel and is formed to provide superior strength as compared to the original. It is now attached to the front lower wishbone mount as well and has cutouts for application of the steering rack mounting brackets.

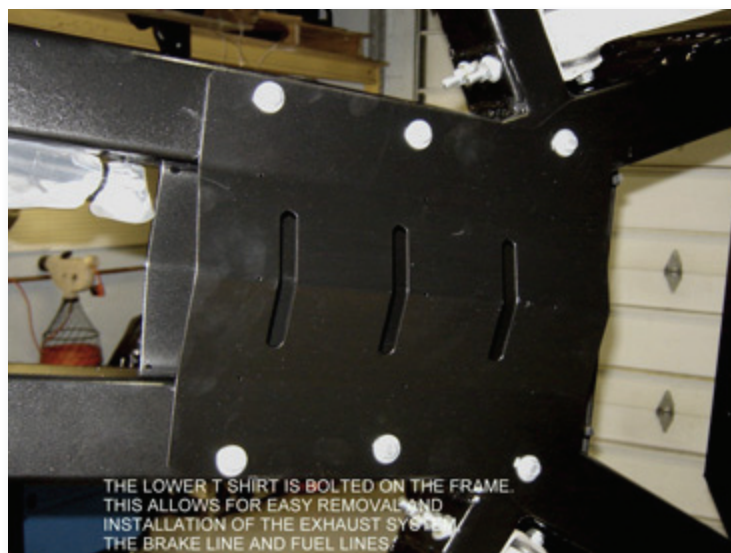


STEERING RACK CH01 SERIES



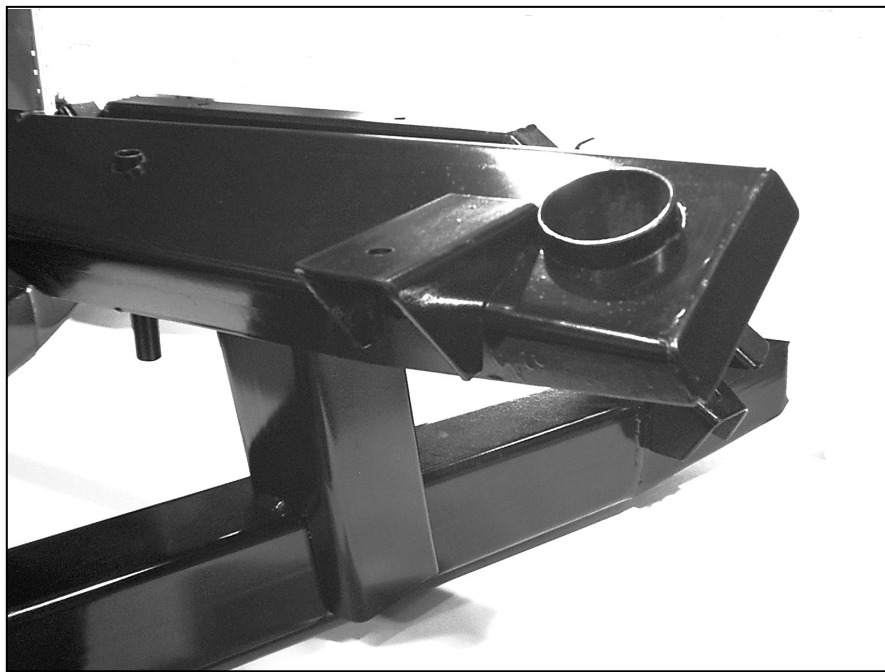
STEERING RACK CH03 SERIES

T-SHIRT MID FRAME SUPPORT: The mid frame “T-shirt”, as it is sometimes called because of its shape, has been redesigned and made more functional than the original. The upper t-shirt is welded to the frame and the swing arm rails. The added material at the swing arm rails reinforces the mounting points at the inboard frame rail. The lower T-shirt is bolted to the frame rails and is removable. This was done to make installation of muffler systems easy as compared to threading bent muffler pipes through the small opening. Structural integrity is maintained by using 14ga. steel (.076 inch) instead of sheet metal as in the original. The t-shirts are formed in such a way as not to allow water to accumulate in low spots.



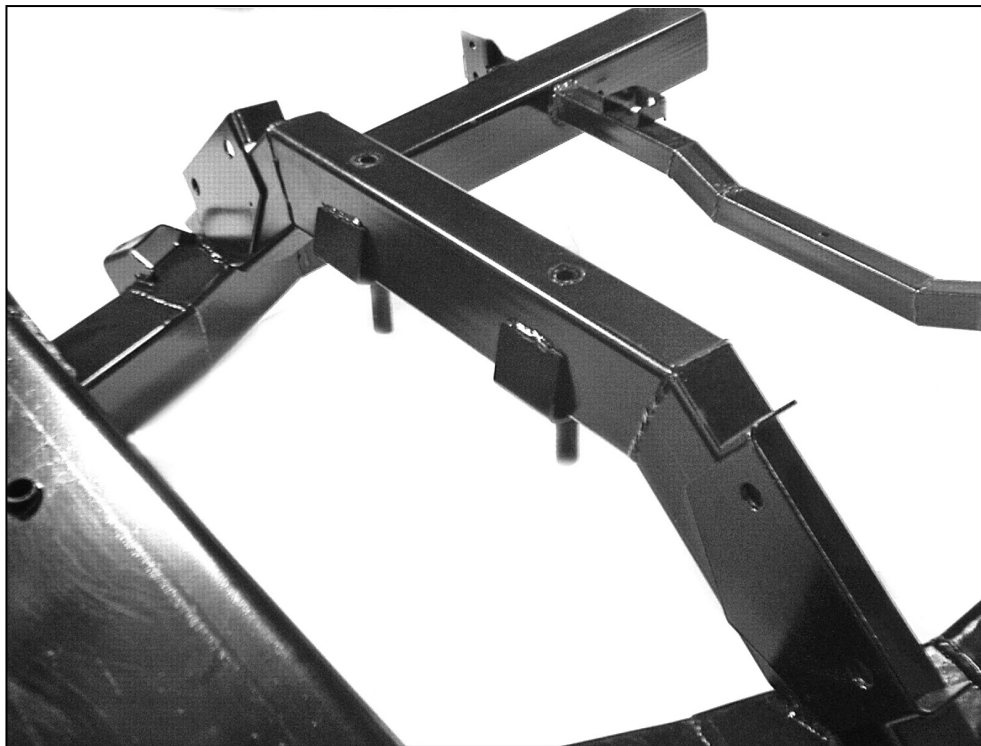
REAR SPRING TOWER / DIFFERENTIAL MOUNTS: This entire structure has been redesigned as the original was plagued with many problems. The original mounting pin arrangement has been maintained but has been made incredibly strong with the use of heavier gauge materials. The mounting pins are full .625 inch thick solid bars with threaded ends to accommodate the differential mounting bushings. They are welded at four locations along their travel through the top surface of the tower and lower mounting plate. The surfaces cannot hold water at any location which solves major problem of the original design which allowed water to accumulate and prematurely rust the mounting points.

The towers shape is unique and comes predrilled for the installation of the optional upper mounted sway bar for shock in coil conversions. They are made of 10ga. steel (.131 inches) and are cold formed and welded for rigidity. The vertical supports pass through the tower's cross-member slots with 2 inch tabs as extensions on the uprights. These tabs are welded across the top for added structural support. Strength and versatility are the keynotes of the spring towers design.



REAR DIFFERENTIAL SUPPORT: The last vertical member of the frame

assembly is the tower which secures the rear of the differential and is the mounting point of the lever shock brackets. As with the spring tower/differential mount, the securing pins on the stock frames often broke free of the cross-member. Also the material used in its construction was too weak to maintain its integrity and prematurely succumbed to torque, vibration and rust. RATCO's rear differential mounts are 2X3, 11ga. tubular steel and the mounting pins are the same .625 steel rods used in the forward spring tower. These towers supporting the rear of the differential are more than capable of sustaining increased torque created by engine modifications and are certainly a major improvement over the original folded sheet metal design.



CH02 SERIES FRAME FOR TR4A IRS **CH03 SERIES FRAMES FOR TR2, TR3, TR3A, TR4, TR4A** **(SRA)**

After the introduction of the series CH01 frames for the TR250/6 IRS cars, work began on the balance of the TR lines for TR2 thru TR4. The CH02 series frames are specifically for the TR4A IRS cars and are almost identical to the CH01 (TR250/6) except for the front steering rack mounts. These racks came in different forms over the cars production life and with these changes in mind, we had to give it its own series to distinguish them from the other IRS cars. The CH03 series encompasses everything from TR2 thru TR4 solid rear axle (SRA). Essentially the differences between the TR2 to TR4 cars are differences in the type, placement and location of the different brackets used on each model number and year. Our production models are all made on the same jigs and fixtures and at a point in the production the correct brackets are added to make the model type correct.

SHORT COMINGS OF THE ORIGINAL DESIGN

The early TR series cars before the introduction of the IRS models had some design deficiencies that have become apparent over the years. We must say however that these frames were less prone to rust than the TR250/6 design. The reason is possibly because the TR2-4 frames were continuous tubes with no blind ends and therefore allowed water and air to pass right through. TR250/6 frames had two blind ends and allowed water to accumulate and air could not pass through to dry the interiors. That being a positive they still had design flaws which became apparent over the years.

The main rails are the same design later used in the IRS cars and in that are structurally inadequate in high stress areas. The mounting around the steering rack assembly, the rear lever shock mounts and the rear spring shackles are frequent points of failure. Also the x-box center section at the intersection of the rails accumulated water and debris and rotted out long before the other components. Another bone of contention was the forward spring mount pins became rusted in place and the pins could not be removed without destroying the surrounding material. These are the major complaints aside from lack of structural stiffness and all items and more were addressed in our frame redesign.

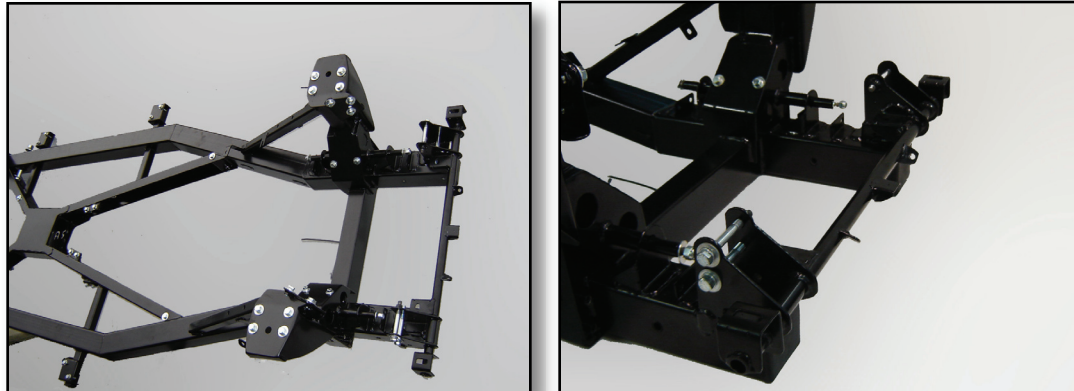
IMPROVEMENTS IN DESIGN FOR THE TR2 TO TR4 CHASSIS

MAIN RAILS

The main frame rails are the same 3X3, 11ga. box section welded steel tubing used successfully in the earlier TR250/6 design. To give you some measure of rigidity, when the 3X3 box steel was tested in compression, it withstood 6 tons of pressure at the weld seams before deflection of the material was detected. The best original frame material we could find withstood only 1.25 tons before deflection. We can interpolate that a new section out of the factory might have endured 2.2 tons of pressure at a weld seam. With this in mind it is not hard to imagine that the critical components such as steering racks, shock mounts and spring mounting points are better secured with this modern material.

STEERING RACK

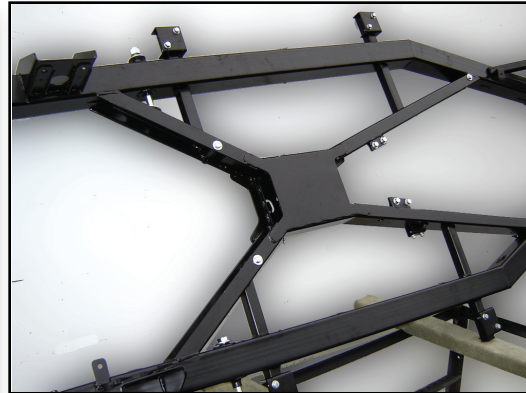
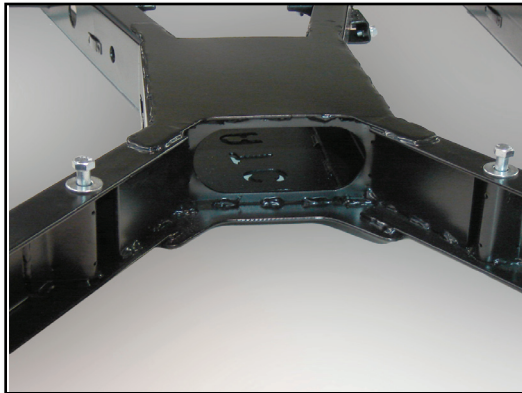
The steering racks are made of 10 gage cold rolled steel sheet cut and formed to meet the original dimensional requirements. They are gusseted and reinforced with steel plate and a steel tube with a .100 wall thickness. The tube connects the rack mounts together and also acts as the body and radiator mounts. The mounting holes are oveled for easy alignment with the steering shaft and the firewall pass through.



STEERING RACK ASSEMBLY CH03 SERIES FRAMES.

X- BOX SECTION

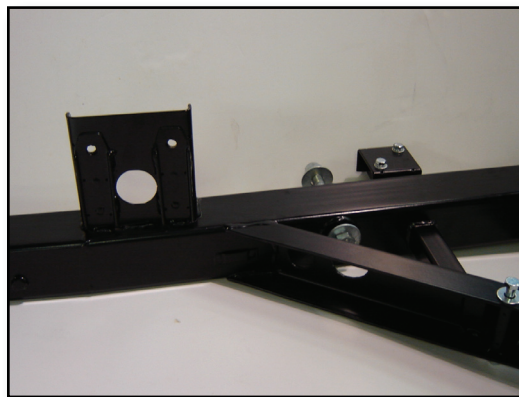
The x- box section at the intersection of the inner frame rails is responsible as the exhaust system to pass through and anti twist reinforcing structure. As mentioned, this structure accumulated water and debris and rotted before it time. Our design allows for easy water ingress and egress and is built of substantially thicker material than the original. The openings that allow the exhaust system to pass through are as large as the area will allow and is comprised of one large oval opening, in and out, instead of two small openings to facilitate the exhaust pipes easily.



X-BOX SECTION OF CH03 SERIES FRAMES NOTE LARGE OVAL OPENING

REAR LEVER SHOCK MOUNTS

Notorious for cracking at the mating lines with the rails, these brackets have been replaced with substantial steel bracketry and are welded securely to the 3X3 box steel rails. Robust gussets are placed on the rear of the units to stop twisting and eventual breaking of the bracket. The material is 10ga. (.140 thick) folded steel plate.

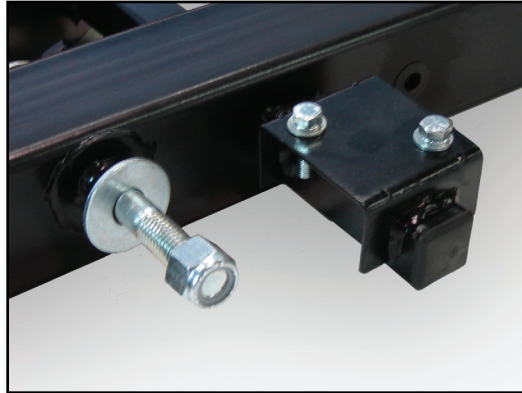


LEVER SHOCK MOUNT AND FRONT SPRING MOUNT FOR SERIES CH03 FRAMES

FRONT SPRING MOUNTS

The front spring mounts and the spring shackle pin are replaced with a simpler design using a 7 inch long 5/8dia. bolt as the main character. It slips through a steel tube which is gusseted to the frame inside and outside for strength. This should be installed with anti-seize compound so that it can be easily removed for service when needed.

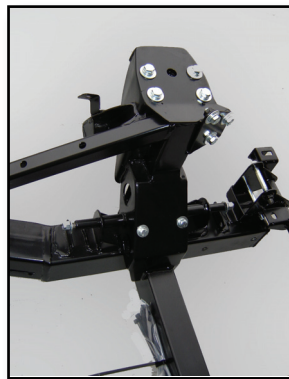
The bolt head can be secured with a box wrench while securing the retaining nut for the spring in place. See photo above and below.



FORWARD REAR SPRING MOUNTING PIN AND REAR BODY MOUNT PIN FOR CH03 SERIES FRAMES

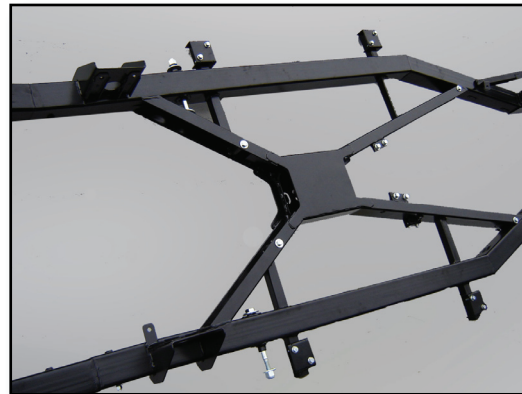
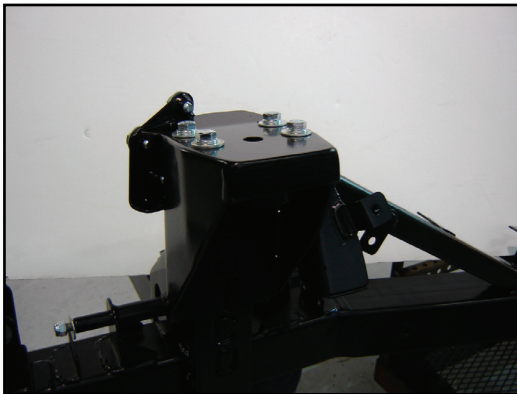
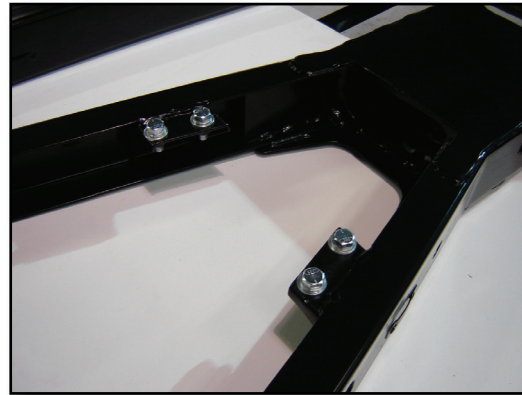
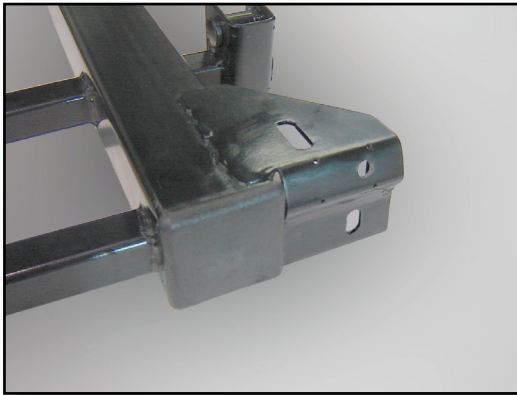
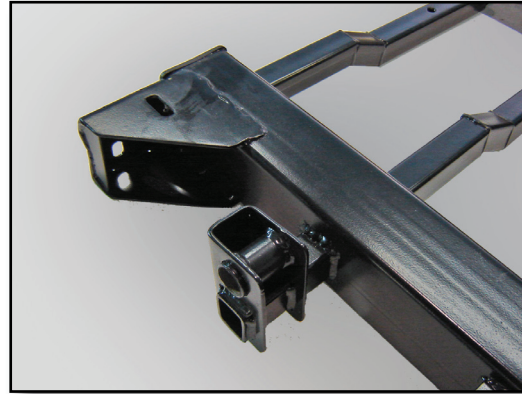
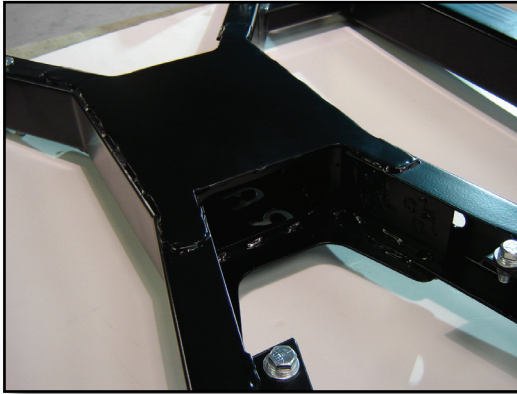
FRONT SPRING TOWER

Our front spring towers are made of 10ga. folded steel plate with completed encased fulcrum pins. The vertical column of the tower is really a 2/3 box section steel tube that is cut to shape and surrounded by the material that makes up the engine mounts, the upper fulcrum mounts and the engine cross-member mounts. The fulcrum pins are .625 thick and are reinforced with an .875dia steel tube which passes through the tower structure and is welded and gusseted in place. This entire arrangement is nothing like the original in terms of rigidity. This assembly will not twist under the most ardent conditions.



**FRONT TOWER
ASSEMBLY CH03
SERIES FRAME**

MISC. PHOTOS CH03 SERIES



FINE DETAILS AND SPECIFICATIONS **FOR ALL SERIES FRAMES**

STRESS POINT GUSSETING: Those areas of the frame which are under the most stress are gusseted either internally or externally with additional steel support. An example of internal gusseting is the joint just behind the engine mounts and rear lower wishbone mounts. This rail joint is internally gusseted with steel plates top and bottom. The lower plate is in tension and the upper plate is in compression complementing one another structurally.



PASS THROUGH REINFORCEMENTS: Whenever a bolt passes through a frame rail, the rail is internally reinforced with a tube running its length and welded to the outside surfaces of the frame rail. This prevents the tubing from collapsing and strengthens the mounting points.

BLIND NUTS: Blind nuts are places in all locations requiring them by design. Most are full thickness fine threaded hex nuts and are welded to the frame members or brackets. In places where blind nuts cannot be welded, compression type blind nuts are used.

INSTALLATION INSTRUCTION MANUAL: An installation manual is provided with each frame addressing all the issues of reassembly with the new frame. There have been some changes made in the original factory design in order to facilitate ease of reassembly and future maintenance. For instance, the front tower cross strut which passes

between the front towers across the engine bay has been moved forward 1/2 inch. This is to facilitate easy removal and replacement of the pulley belts without having to remove the cross strut to do so. The note here would be that the brace that mounts to the strut and secures the radiator will have to be modified by drilling a new hole in order to accommodate the new strut location. All issues of this type will be discussed in detail in the instructions.

BRAKE LINE SUPPORT BRACKETS: The brake and fuel lines run along the inside frame rails. We have added attachment points in strategic locations along the path which allow the use of nylon wire ties in order to secure the lines to the frame. This allows a convenient and readily available method of securing the lines and is easily maintained in the future.

CH01 & CH02 SERIES MATERIALS LIST

All frame rails except for the swing arm support rails are 3x3 11ga. (.119 inch wall) cold rolled welded steel tubing.

All tower assemblies are 10ga. (.131 thick) cold rolled steel plate.

Engine mounts, steering rack mounts, radiator/body mounts and transmission mounts are 10ga. cold rolled steel.

T-Shirts/mid frame supports are 14ga. (.078 inch thick) cold rolled steel plate.

Body mount brackets are 12ga. (.101 inch thick) cold rolled steel plate

Rear trunk support cross member is 1.25x1.25 11ga. cold rolled welded steel tube.

Front lower wishbone mounts are 2x2 11ga. cold rolled welded steel tube.

CH03 SERIES MATERIAL LIST

All outside frame rails are 11ga. 3X3 inch steel box (.119 wall thickness) cold rolled welded steel tubing

The x-box rails are 11ga. 1.5 X 3 inch C-channel. The x-box center is 12ga. (.100 inch thick) steel plate.

The all body mounting brackets are 12ga. steel

The lever shock mounts, front towers and and shackle supports are 10ga. steel

All cross tubing is 1.25 X 1.25 11ga. steel tubing

Brake and fuel line connection points are 14ga. (.090 thick)

Steering rack mounts are 10ga. steel

CH01 /CH02 SERIES DIMENSIONS AND WEIGHTS

WEIGHT OF FINISHED BARE FRAME235 LBS

FOR REFERENCE OUR 1972 TR6 MODEL FRAME WAS WEIGHED AT 180 LBS AFTER WE REMOVED ALL THE RUST AND DIRT FROM THE INTERIOR. WE REALLY DO NOT KNOW WHAT A NEW FACTORY FRAME ACTUALLY WEIGHED BUT WE CAN ONLY GUESS THAT IT WAS MORE THAN 180 LBS BEFORE RUST REMOVED SOME OF ITS BULK.

FRAME LENGTH10 ft. 10 inches

WIDTH AT FRONT SHOCK TOWERS WIDEST POINT35.5 inches

WIDTH AT REAR SPRING/ DIFFERENTIAL MOUNT39.0inches

HEIGHT (MAX) AT FRONT TOWER14.5 inches

HEIGHT (MAX) AT REAR DIFF. TOWER11.0 inches



CH03 SERIES DIMMENSION AND WEIGHTS

WEIGHT OF FINISHED BARE FRAME IS 190 LBS.

For reference the samples we have of the TR3 frames weigh in at 160lbs after they were cleaned and freed of loss rust and dirt. We don't know exactly how heavy the originals were but we can say that our frames are approximately 30 lbs. heavier than the existing frames according to there condition.

FRAME LENGTH.....10.66 FEET (128 INCHES)

**FRAME WIDTH AT THE BODY OUTRIGGERSTR3 – 43 INCHES
TR4(SRA)-47 INCHES**

HEIGHT AT FRONT TOWER.....13 INCHES

DESCRIPTION OF OPTIONAL ITEMS

FRAME FINISH: The frames are normally delivered with no finish applied to allow the owner to choose the appropriate finish for there needs or select from the options that RATCO provides.

Electrostatic powder coating is our sugested choice and is popular for its durable surface which looks like plastic coating and provides a distinctive finished look.

We have found this surface finish to be superior to the painted finish we had suggested in the past. Contrary to earlier statements, this polyester powder coating material can be repaired easily and will not pull back significantly if welding is necessary. We have found that it can be spread with a trowel when it is hot and blended easily. To make the repair look natural, feather the area when cool with sandpaper and paint with any quality enamel. Our new awareness of the qualities of this powder coat and the fact that paint and powder coat now cost about the same, has led us to drop paint from our options list. Powder coating includes sandblasting, sanding, powder primer coat and a powder finish coat in a variety of colors. Black is the most popular, but you can select anything you want.

Frames that our customers would rather finish themselves are sprayed with a metal prep solution to keep the frame from surface rusting until it is sandblasted and finished. Many people like to use the POR-15 system

RUST PROOFING: There are two types of rust proofing that can be applied to the interior surfaces of the frames tubing. First there is the traditional paraffin based coating which coats the interior surface of the tube with a waxy substance that seals the metal from exposure to oxygen and moisture. This material is applied through holes drilled in the frame members at strategic locations and then sprayed in to the openings to coat the interior surfaces. All the holes drilled are then closed with plastic plugs that are then part of the frame and can be painted over to seal the mating line.

The second choice is relatively new to the market and that

is the application of expanding foam to all the interior areas of the frame. This foam is water proof and sticks like glue to all surfaces. The application is once again through holes drilled in the tubing. The expanding foam is forced into one end of the tube length and allowed to ooze out of the other end to assure a complete fill. Once dry the over fill is cut away and the holes are filled with plastic plugs. This foam application does two things to the structure. First it makes for an impenetrable water seal and secondly sound dampens the frame. You may think this a minor point but in fact the frame does resonate and amplify the

vibrations caused by road conditions and those passed along by the drive train. Foam filling quiets the ride appreciably.

Both methods of rust proofing assure a rust free interior surface for the life of the frame.



SHOCK IN COIL CONVERSION:(Not available on CH03 Series)
In our opinion the best thing you can do for you restorations suspension is to get rid of those lever shocks and go to tubular shocks or ultimately a shock in coil system. We offer brackets as do other after market suppliers which allow you to use tubular shocks. But the ultimate system is to convert to a shock in coil. To do this you must send us your swing arms and rear springs. We will modify the swing arms with the application of a machined brackets which bolt to the bottom of the spring mount. The bracket is designed in such a way that removal of the shock absorber in future maintenance is very easy The spring now goes over the shock and the entire assembly is rotated to meet the upper spring tower mount point. The upper pin of the shock

is then inserted through the hole on the tower and secured with the bushings and nuts. The shock is now contained in the spring and both now rotate on the same axis.

The benefits of this are many, but simply put it is the best system for performance suspensions today. The spring flexes around the shock axis and forces exerted by either are directly applied to the same surface in line with one another. There is no loss of energy due to different locations of geometrical centers. In short it is efficient and the most efficient relationship of each component to one another.

You get the following items with this conversion.

- Two modified swing arm assemblies (your parts modified)
- Two shock absorbers (Sorry, performance shocks will not fit.)
- Two sets of new swing arm bushings
- 8 hex bolts and washers
- Two sets of rubber spring seats
- Assembly of the system on your frame



TUBE SHOCK BRACKETS: (Not available on CH03 Series)

If you would like to use the traditional coil/shock relationship but would like to switch to tube shocks, then these brackets are what you need. They are specially designed welded steel plates which are bolted to the frame in the rear wheel wells and allow the use of tubular shocks. You can choose in this case, the use of performance shocks like Koni or KYB and Monroe or Gabriel brands. They mount to the standard shock brackets on the rear differential support. Assembly of this system is very easy and can be done at any time during or after the restoration is complete.

REAR SWAY BARS: (Not available on CH03 Series)

If you are converting to the shock in coil system, then you might want to look into fitting a rear sway bar to your new frame. This sway bar is custom made for us by a premier sway bar manufacturer and is fabricated to fit our frames only if a shock in coil system is used. The system frees the mounting hole normally used by the lever shock on the swing arm. That mounting point is now used for the end link attachment of the sway bar. The bar rides up and over the differential along the spring tower cross member and is held in place by brackets and bushings at two locations. These mounting points are unique on the RATCO cross member design and provide the ultimate location for the sway bar.

The bars are 4140 chrome molly steel and are mandrel bent to our specifications. They come with all the hardware and end links sets and are mounted to the frame here at the factory. These 3/4 inch diameter bars and all the hardware are powder coated for lasting durability.



FRONT SWAY BARS SET: (Not available on CH03 Series)

Front sway bars are also available and ours can be used alone without the rear bar or can be used in conjunction with the rear bar. Our front bars are reproductions of the stock bar in 4140 chrome molly steel, mandrel bent in 3/4 inch diameter. They match the rear bar and when used together are designed to provide neutral steering without inducing under steer or over steer. These are powder coated and come with all the necessary mounting hardware. Front sway bars are normally installed after the front end suspension build, so they are not factory assembled on the frame but are packaged separately.



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