

## Billet Manual Rack and Pinion for g-Machine Crossmember or Custom Installation



### Features & Benefits:

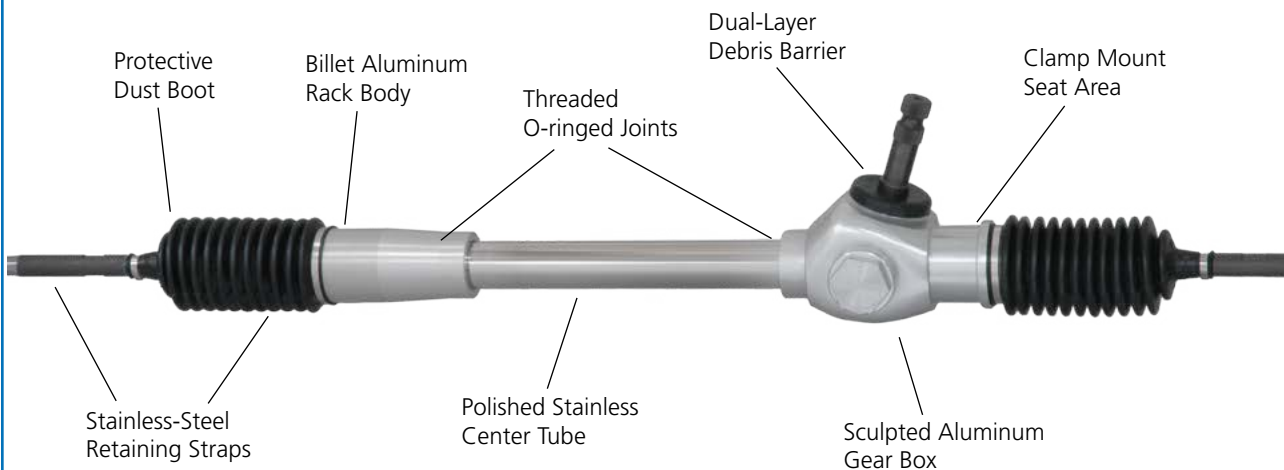
- Front-steer manual rack and pinion
- Manufactured in 15 different lengths (15.5" - 29.5", in one-inch increments)
- Direct bolt-on for g-Machine crossmember system
- Easily integrated into custom projects
- Direct replacement for stock Mustang II
- Rotatable within mounts to aid steering-shaft clearance
- Satin-aluminum or polished finish

## Billet Manual Rack and Pinion

A common issue with many custom steering and suspension conversions is achieving correct steering geometry using the limited selection of OEM and aftermarket rack and pinions. To solve this problem the g-Machine front-steer, manual rack and pinion can be sized from 15.5" to 29.5" (measured from inner tie-rod pivots), in one-inch increments, without affecting rack travel, steering effort, or reliability. This enables correct steering geometry for vehicles ranging from compacts to full-size pickups and allows the assembly to serve as a direct-replacement upgrade for 24.5" Mustang II racks.

## Rack-and-Pinion Body

The rack-and-pinion main body is made up of three components threaded together at O-ring-sealed joints to create a rigid, lightweight structure. A sturdy, polished, stainless-steel center tube connects the gear box to the outer body and features a smaller diameter for additional harmonic-balancer clearance. The gear box and opposite-end rack body are CNC-machined from aluminum to increase wall thickness for added strength directly under the rack mounting clamps without excessive weight.



## Unique Sculpted Gear Box

A sculpted-surface gear box shape was developed through the use of finite element analysis (FEA) software to eliminate fatigue points, minimize gear box deflection, and provide an attractive modernized appearance. Due to the complexity in engineering and machining this component, most manufacturers are limited to inferior cast or simple geometric designs. To attach the protective rubber boots at each end of the rack assembly, external grooves are present for slip-proof installation and easy replacement if ever necessary.



## Internal Components

The helical-cut pinion gear and rack shaft are supported by a combination of low-friction, polymer bushings and roller bearings for smooth gear engagement and extended service life. A spring-loaded gear-lash mechanism enables precise and predictable “zero-play” steering with no need for future adjustment. Tie-rods are screwed directly into the rack gear and locked using crush tabs to prevent loosening. During final assembly all internal components are thoroughly lubricated and the rack completely sealed to prevent contaminants from entering.

When used with Chassisworks sculpted or fabricated spindles, the complete system provides a comfortable balance of responsiveness and steering effort. The rack features four turns lock to lock with 5.25” of travel. To reduce wear, internal stops prevent unnecessarily loading the tie-rod pivots. Connecting the rack and pinion requires a 3/4” 36-spline universal joint and 9/16”-18 female-thread tie-rods or bumpsteer adjusting sleeves. For a high-quality appearance, center tubes are polished stainless steel with billet aluminum rack-body components available in anodized-satin or polished finishes.

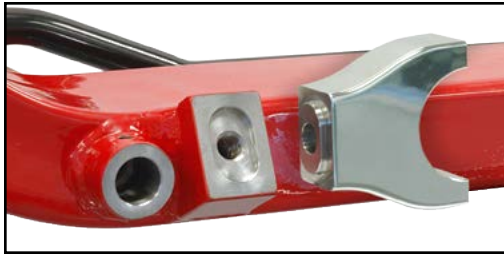
## Manual Rack-and-Pinion Billet Mounts, g-Machine

To aid rack-and-pinion installation into various projects, two styles of billet aluminum mounting brackets are available: the standard Chassisworks solid mount, which uses our slot-tab positioning method for perfect alignment with the factory-welded g-Machine crossmember, and the Mustang II urethane-bushing mount, which when used with our 24.50" rack mimics the OEM Mustang II rack-and-pinion enabling direct replacement, but also greatly simplifies custom installations. Mount bases and outer clamps are 1.20" wide and seat into mating grooves at the widest portion of the rack body, forming a broad, deflection-free mount assembly that completely prevents the rack from shifting. Mount sets include clamp hardware and are available in silver-anodized satin or polished finishes.



## Rack Clamp Mounting System

Installation is a simple bolt-on for Chassisworks g-Machine crossmember systems, with minimal fabrication required for custom installations. Our unique clamping installation method and short pinion shaft move the lower U-joint farther below the exhaust and enable the rack to be rotated within its mounts to adjust steering-shaft clearance and universal-joint angles. Note: Custom installation requires knowledge of steering and suspension geometry.



Slot-Tab Technology, Interlocking Joint



Pinion Rotated **Up**



Pinion Rotated **Down**

## Rack-and-Pinion Specific Dimensions

Feature	Specification/Dimension
Inner-Tie-Rod Thread	9/16"-18 RH Male
Inner-Tie-Rod Length <sup>1</sup>	10.135"
Rack Travel	4 turns lock to lock, 1.31" per turn, 5.25" total travel
Input Shaft	3/4"-36 Spline
Tie-Rod Assembly Length <sup>2</sup>	13.283"
Overall Rack Width (no outer tie-rods)	Rack Size + 20.25" (i.e., 24.5" rack + 20.25" = 44.75")
Overall Rack Width (with outer tie-rods)	Rack Size + 26.50" (i.e., 24.5" rack + 26.50" = 51.00")
Mustang II Mount Width <sup>3</sup>	Rack Size - 8.5" (i.e., 24.5" rack - 8.5" = 16.00")
<b>Notes:</b>	
1	Measured from tie-rod pivot center to end of threaded shaft.
2	Measured from center of inner- and outer-tie-rod pivots.
3	Measured from center of each mounting hole. Mounts are offset 0.75" toward driver's side.

## Satin-Finish Racks

6175-155-1



6175-295-1



## Polished-Finish Racks

6175-155-2



6175-295-2



## g-Machine Mounts

6176-1



6176-2



## Mustang II Mounts

6187-1



6187-2



Part Number <sup>1</sup>	Description
6175-XXX-1	Billet Manual Rack and Pinion, Satin Finish
6175-XXX-2	Billet Manual Rack and Pinion, Polished Finish
6176-1	Billet Rack Clamp Set for g-Machine Crossmember, Satin Finish
6176-2	Billet Rack Clamp Set for g-Machine Crossmember, Polished Finish
6187-1	Billet Rack Clamp Set for Mustang II Crossmember, Satin Finish
6187-2	Billet Rack Clamp Set for Mustang II Crossmember, Polished Finish
<b>Note:</b>	
1	"XXX" in rack-and-pinion part number specifies length (i.e., 155 = 15.5").

All prices subject to change. Current pricing available at [www.cachassisworks.com](http://www.cachassisworks.com).



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