

APPENDIX 1 PRINCIPLES INVOLVED IN FITTING RACK & PINION STEERING

Figures App 1(a) (Drawing TAC-7) shows the basic suspension geometry of a Holden front end with its unequal A-arms and coil springs acting on the lower A-arms.

A rack and pinion set-up is shown (in broken lines) in its normal position for an unaltered front end. For a Holden front end with its original spindle steering arms, the rack must be positioned as shown with the pivot points of the rack lining up exactly with the pivot points of the front suspension at A and B.

However, if construction requirements deem that the rack be mounted higher or lower for the rack or steering shaft to avoid some obstacle (e.g. sump, engine mount, exhaust manifold etc) this may be done providing geometry is maintained.

Firstly, the pivot points on the rack must stay on the lines A'A' and B'B' respectively. For example, if the rack were to be raised 75mm from its normal position, the rack must be widened so that the pivots remain on the lines A'A' and B'B'.

Secondly, the spindle steering arms must be raised or lowered the appropriate amount to maintain parallelism of all arms. In the case above, the steering arms would need to be raised a corresponding 75mm.

Similarly, if the rack were to be lowered it must be narrowed and the spindle steering arms dropped the correct amount. However, lowering of the rack should be avoided since the rack becomes too narrow to be mounted securely.

While Figures App (1)(a) and (b) (Drawings TAC-7 and TAC-8) illustrate rack and pinion steering on a Holden front end, the same principles apply to the installation of a steering rack to any independent front suspension unit.

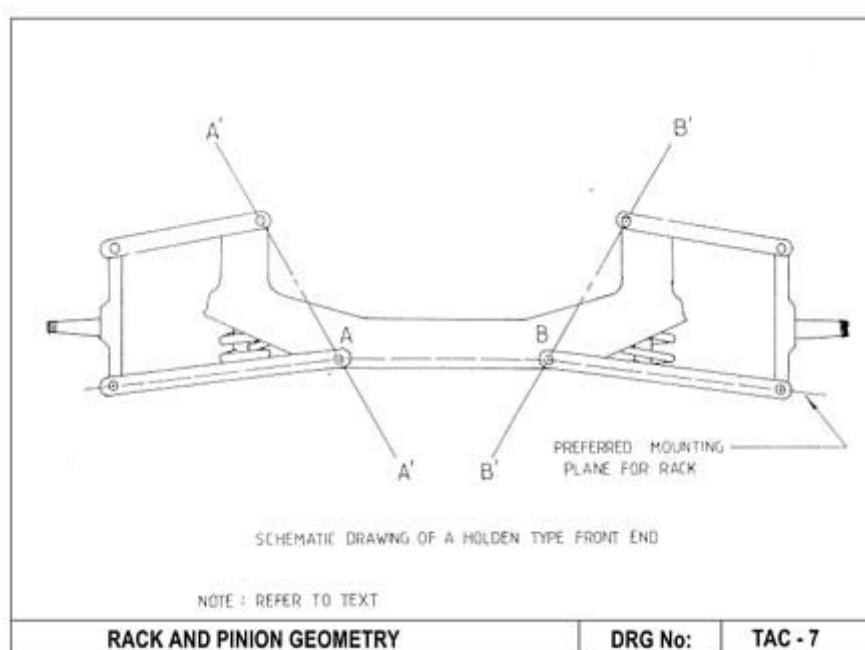


Figure App 1(a) Rack and pinion geometry (Drawing TAC-7)

ADAPTING RACK AND PINION STEERING TO HOLDEN SUSPENSION

Drawing TAC-8 shows the correct installation of a rack and pinion steering to an independent front suspension unit. There are three critical dimensions required to position the rack for correct operation.

Dimension “X”

This dimension is measured from the bottom edge of the cross member to the rack centreline of the rack tube. The parallelism of the front end must be checked once this dimension is obtained.

Dimension “Y”

This dimension is measured from the bottom edge of the front end to the rack centreline, and ensures vertical alignment of the rack pivots and suspension pivots. Any large deviation from “Y” will affect steering geometry and may require the rack to be altered. Parallelism is to be maintained.

Dimension “Z”

This dimension positions the rack housing so that equal lock can be achieved in either direction. This dimension is measured from the centre of the front end to the end of the rack housing.

Note: Dimensions may vary from Street Rod to Street Rod - all measurements should therefore be checked thoroughly.

Two commonly used racks on Holden HK to HG front suspensions are the Austin 1800 and the Holden Commodore. As a guide the following dimensions should be used:

Dimension	Austin 1800	Commodore
X	125mm	125mm
Y	37mm	37mm
Z	200mm	200mm
Shorten rack:	225mm	70mm
Shorten housing:	225mm	95mm

Rack mounts must be made to withstand lateral steering forces and vertical bump loads although their construction is an individual matter. Adapting rack and pinion steering correctly will permit standard wheel alignment settings and reduce toe change. An acceptable turning circle must be provided.

Figure App 1(c) shows a photograph of a Holden front end ready for welding, and Figure App 1(d) a photograph of a Mitsubishi front suspension unit ready for mounting.

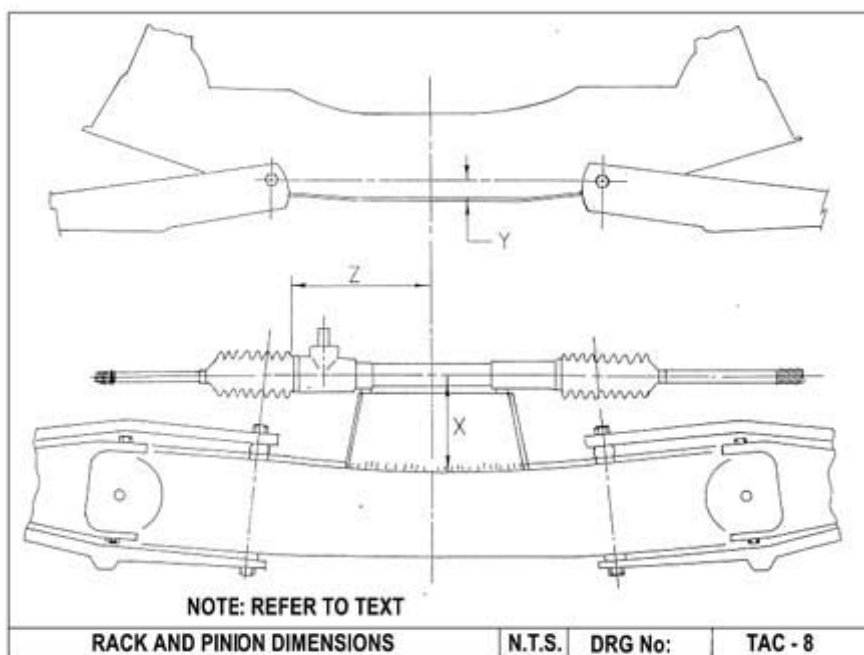


Figure App 1(b) Rack and pinion dimensions (Drawing TAC-8)

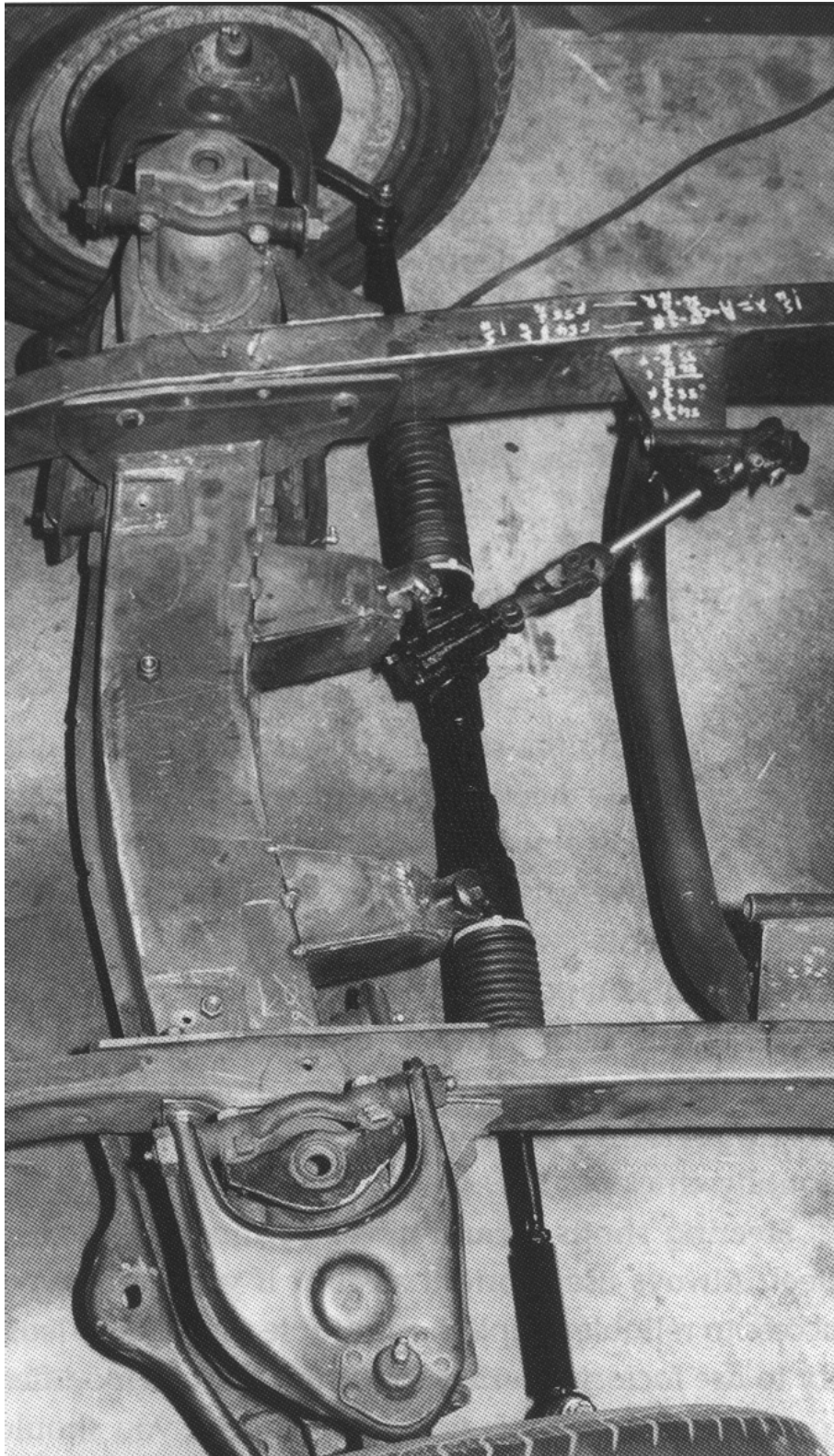


Figure App 1(c) An example of a Holden front end ready for final welding.

The front end has been braced and mounted to the chassis in a manner that will withstand torsional forces well. Rack and pinion mounts are also well-designed and look part of the overall package.

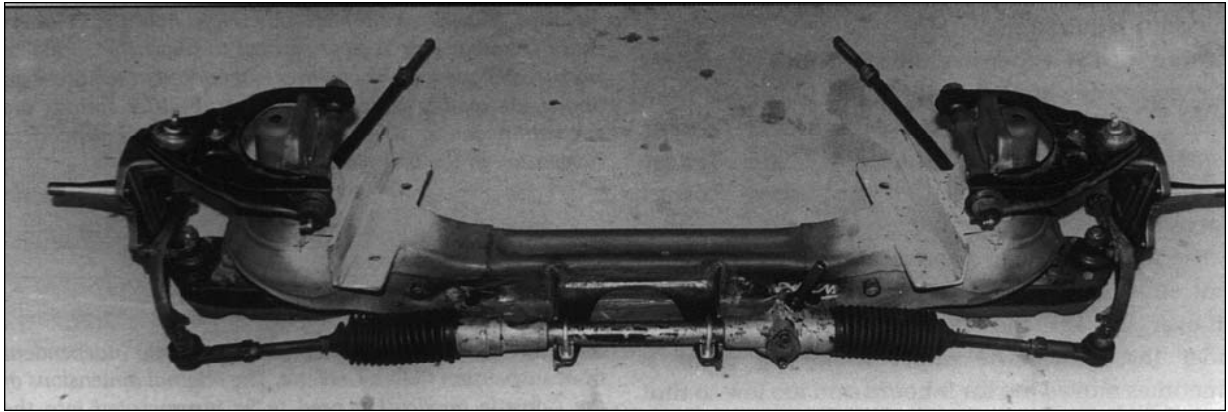


Figure App 1(d) An example of a Mitsubishi L300 Front suspension unit ready for mounting into an early chassis.

Note the simple but strong mounting brackets, and the forward facing radius rods. This unit has been modified to accommodate a rear mounted steering rack (Steering arms have been changed to maintain Ackerman geometry), and has been fitted with lowered Holden stub axles.