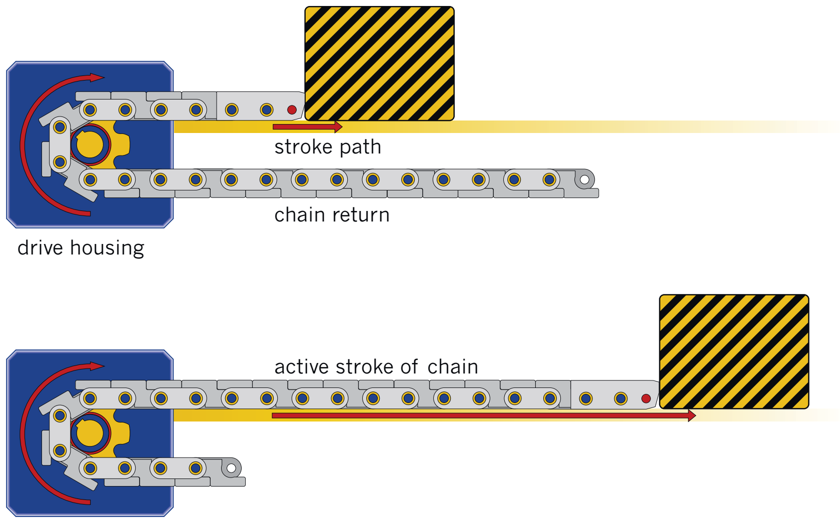
how the chain moves a load

Power is applied to the chain by means of pinions on a drive shaft. The shaft and the pinions are integrated in the chain drive housing. As the shaft rotates the pinions, their teeth engage with rollers on the links' cross-axes, moving the chain forward or backward link by link.

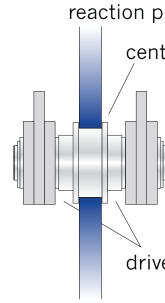
As the chain moves out of the drive housing, it pushes the load forward along the stroke path. When the pinions rotate the other way, the chain does not push but pulls the load back towards the housing.

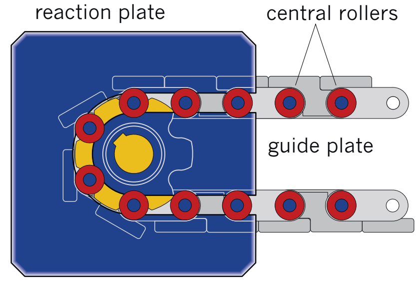
The **length required for the chain** is always the length of the stroke plus only the few additional links that have to remain on the pinions. The retracted chain can be coiled, redirected to free machine space and stored in very efficient ways.



inside the chain drive

The chain's path through the housing is defined by **guide and reaction plates,** which counter the thrust resistance and direct the links precisely onto the stroke path. These plates control the chain's proper course in a simple way. On each of the chain links' cross-axes, between the drive rollers, there is a big central roller. The central rollers run between the edges of the guide and the reaction plates, which serve as rails and thus hold the chain links on the track.

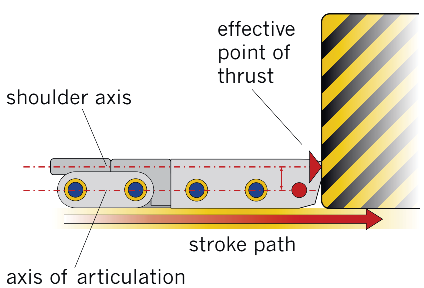




(sectional view of rear portion of chain)

locking and unlocking

As it goes round the pinions, a chain link will eventually exit the curve and reach the point where it is in a straight line with the stroke path. This is where the forward thrust is applied to the link and the subsequent piece of chain. At its end, a special front link shifts the target of the thrust above the axis of articulation. This creates a **moment** which locks the shoulders of the chain links.



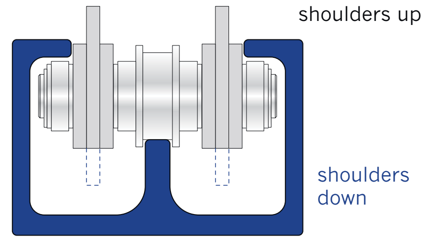
Thus, the shoulder axis of the chain links is used for pushing, while the axis of pulling remains at the height level of the cross-axes, that is, on the axis of articulation. In contrast to a conventional chain or a jack, the rigid chain has two geometrical axes. In both directions of movement, during a pushing or pulling operation, the guide and reaction plates **lock outgoing links** along the upper axis and **unlock incoming links** along the lower axis – stiffening or coiling the chain, respectively.

three basic ways of using the chain

Depending on stability requirements and space availability, the SERAPID chain can be used in three different ways. First, it can be used with guides that secure the proper course of the chain even over very long strokes. Second and third, it can be used unguided, either with shoulders down on the stroke path or with shoulders up.

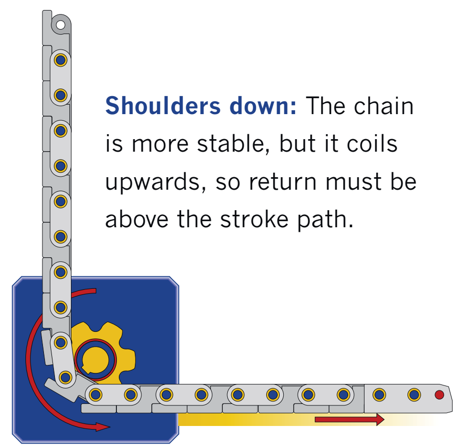
Certainly the best way is to use **guides.** They provide optimum stability, whether shoulders are up or down. They also provide maximum flexibility for storing the chain return. For details on guides, see section *guiding the chain,* **on page 10.**

In some cases, mostly for reasons of space, it may not be possible to use guides. Of the two alternatives of **unguided use,** the one with **shoulders down** provides the better stability. This is because the interlocking shoulders receive additional support through their contact to the work-top. Again, it may not be possible to use the chain in this way. With shoulders down, the chain coils upwards and return has to be above the stroke path. If there is not enough space, the chain has to be used with **shoulders up,** which allows return below the stroke path.

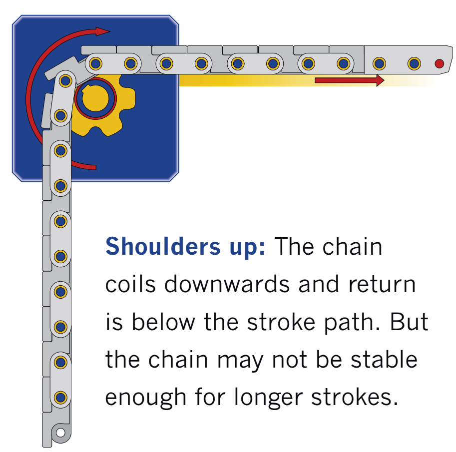


Guided chain: Best stability, shoulders may be up or down, chain return below or above the stroke path. Guides should be used wherever space permits it.

Unguided chain



Shoulders down: The chain is more stable, but it coils upwards, so return must be above the stroke path.



Shoulders up: The chain coils downwards and return is below the stroke path. But the chain may not be stable enough for longer strokes.