

## Expanding Spline Arbors



Rota lock and key type spline arbors are specially designed and manufactured by Spline Gauges for work holding pieces of all kinds on a variety of machining operations.

Ideal for use in: turning, grinding, hobbing, gear cutting and inspection; their accuracy and precision in performance is unparalleled.

Splined arbors can also be supplied with a master ring to verify principle and accuracy. The majority of components with internal splines have a diameter or face, which has to be concentric or square to the splines. For this reason the spline pitch circle diameter is usually defined as the datum diameter. If you are involved in the turning, grinding or inspection of these features it is extremely important that the arbor locates on the pitch circle diameter so as to maintain the required accuracy. If this is your problem we suggest you try one of the following types of arbors.

### Remember...

- Splined work holding arbors purchased from us are designed and manufactured by a company which has for twenty five years been solely involved in the manufacture of spline gauges and master gears. This dedication to specialization has established us as the leading world manufacturer of these products.
- Splined work holding arbors manufactured by Spline Gauges are manufactured to the same meticulous detail and to the same tolerances of profile, lead and spacing as those applied to spline gauges.
- Splined work holding arbors are manufactured from the finest tool steel or when the arbors are subjected to a high torque load they are manufactured in high quality case-hardened steel to ensure inner core strength. All our arbors are heat treated on our own premises to ensure the correct properties.

## Types of Arbors – Rota lock

This type of arbor (see figs [3](#) & [4](#)) is most suitable for the machining operations already mentioned and inspection operations (it is pitch line clamping).

A 'Rota lock' arbor consists of three portions of splines; the inner and outer portions are themselves keyed perfectly in line by a further set of smaller splines. The center splined ring is a running fit on its shaft and rotates to clamp onto the pitch circle diameter of the component splines.



The rotation is actuated by two offset cams and is arranged such that the direction of rotation is opposite to the direction of rotation of the machine. This ensures that the forces imparted by the machine cutting tools/grinding wheel do not oppose the direction of clamping ([see fig 1](#)).

All arbors are cut with a negative involute profile, which means the profile is minus metal tip and root ([see fig 2](#)) to avoid involute interference.

## Expanding Key Type Arbors

This type of arbor ([see fig 5](#)) is, particularly useful for splines which are major diameter fitting' since with this type of spline the major diameter of the spline is the datum diameter. Therefore it is important when performing machining/ grinding operations that the component is clamped on the major diameter.

Expanding key type arbors consist of a splined section into which are set a number of equal-spaced splined keys. The splined flanks are thinned so that they act as drivers only. The major diameter is ground to size and provided with tip chamfers to avoid interference with any root radii. Expansion of the keys is caused by axial movement of a central drawbar and can be activated manually or hydraulically by the drawbar of the machine to which it is fixed.

## Expanding Splined Collets

This type of arbor ([see fig 6](#)) can be used for grinding or inspection. It consists of a conventional type collet split from either end and has splines on the outside. It is mounted on a plain ground tapered arbor. Actuation is manual.

## Rotalock Arbor - Grinding/Inspection

1. Manually actuated.
2. Arbor is mounted on ground-protected centers.
3. Spline pitch circle diameter is concentric to ground centers.
4. Profile, spacing and lead of teeth to spline gauge tolerances.

This type of arbor is suitable for grinding of journal diameters or faces, which have to be concentric or square to spline pitch circle diameters.

This type of arbor is also suitable for the inspection of the above-mentioned features.

## Expanding Key Type Arbor Turning / Grinding



1. Machine faceplate mounted.
2. Arbor actuated by machine draw bar.
3. All location diameters and faces ground concentric and square to spline pitch circle diameter.
4. Profile, spacing and lead of teeth to spline gauge tolerances.

This type of arbor is recommended for major diameter fitting splines (i.e. it enables journal diameters and faces to be ground concentric or square to the spline major diameter.)

## Expanding Splined Collets - Grinding/ Inspection

1. Manually actuated.
2. Arbor is mounted on ground-protected centers.
3. Spline pitch circle diameter is concentric to ground centers.
4. Profile, spacing and lead of teeth to spline gauge tolerances.

This type of arbor is suitable for grinding or inspection.

This type of mandrel is particularly suitable for mounting on gear testing equipment i.e. for the gear testing of component, which have gear teeth on the outside and splines through the centre.

As every arbor is specifically designed for a particular application, enquiry should be supported by the following information:

- Work piece drawing.
- Schematic layout showing work piece machine operation to be carried out.
- Method by which arbor is to be mounted.
- Direction of rotation.
- Relevant tolerances.