Product Guidance Sheet

Keyway Broaching Sets (060-400-00100 & 060-400-00200)

NOTE: The information provided here should be used as general guidance only. The user should make their own assessment of their competence to use these products and suitability for their application. This is the maximum information we can provide. No additional information or guidance is available from Arc Euro Trade Ltd. If the user breaks a component, there are separate replacement components available. We take no responsibility for damage/breakage resulting from the use of these products.

Introduction

Keyway Broaching Sets comprise the following parts:

- High Speed Steel Push Type Broaches - straight, saw blade type cutters where the teeth cut progressively deeper as the broach is pushed through the part.
- Slotted Collared Bushings - these fit in the bore of the part requiring the keyway and act as a guide for the broach.
  The bushing size and "style" are determined by the bore diameter of the workpiece as well as the "style" of broach to be used. "A" style broaches are used with "A" style bushings, "B" style broaches with "B" style bushings, etc.
- Shims - these are used where two or more passes are needed to cut the required depth of keyway.

The smallest size broach (2mm) cut in one pass and requires no shim. Multiple pass keyway broaches are supplied with all necessary shims in the set.

The addition of a shim to the bottom of the bushing's slot serves to move the broach forward towards its standard finished cutting depth. Subsequent passes may require the stacking of shims.
To ensure proper support, the length of cut must never exceed the length of the bushing being used.

In addition to the parts supplied in the broaching set, you will also need the used of:

- An Arbor Press or Hydraulic Press
- Some means of clamping the part to the base of the press.
- The correct lubricant for the material being keyed.

Metric Keyway Broach Sets - Specifications

Set Code	Broach Size	Style	Broach Dimensions	Standard Metric Key Size	Shims Required	Tooth Pitch	No. of Teeth	Length of Cut*	Bushing Diameters (Bore Sizes)†
060-400-00100	2mm	A	3.25x128mm	2x2mm	-	4.8	18	Min: 5.2mm Max: 20-22mm	6mm, 8mm, 10mm
	3mm	A	3.25x128mm	3x3mm	1	4.8	18		
060-400-00200	4mm	B	6.5x170mm	4x4mm	1	7	16	Min: 7.5mm Max: 32-35mm	12mm, 14mm, 15mm, 16mm
	5mm	B	6.5x170mm	5x5mm	1	7	16		
	6mm	C	9.6x300mm	6x6mm	1	9.5	22	Min: 10mm Max: 56mm	18mm, 19mm, 20mm, 22mm, 24mm, 25mm, 26mm, 28mm, 30mm
	8mm	C	9.6x300mm	8x7mm	2	9.5	22		

* Minimum Length of Cut should always be greater than the broach pitch. Maximum Length of Cut is determined by the length of the bushing supplied.
† Other bushing diameters are also available separately - please check our website at www.arceurotrade.co.uk

Length of Cut

Keyway broaches are designed to be used in operations where a minimum of two teeth are engaged at all times. Tooth engagement is always required to prevent the broach moving out of alignment (leading to tool breakage) and maintain a smooth cutting action promoting a clean finish. A sacrificial disc may be used or a number of workpieces may be stacked to establish the ***Minimum Length of Cut***, providing the ***Maximum Length of Cut*** is not exceeded. Proper nesting and clamping of stacked parts is vital when this approach is taken. The workpiece must be solidly fixed or nested perfectly square with the baseplate and ram face.

Set-Up and Alignment

Keyway broaches are designed for fast and accurate broaching using either an Arbor Press or Hydraulic Press.

Successful broaching begins with proper set-up, and alignment of the broach, workpiece and ram. Attention to these details will provide a stable workpiece, and prevent drifting, deflection or even breakage caused by misalignment. The workpiece must be solidly fixed or nested perfectly square with the baseplate and ram face. Make sure all square and parallel surfaces on the face of the ram and baseplate remain true. It is essential to maintain a rigid set-up at all times and caution should be taken when stacking parts to maintain the integrity of the set-up.

At the beginning of a cut, be sure the broach is centered under the ram. Proper alignment is important. After the broach starts to cut, back-off the pressure on the ram allowing the broach to center itself, providing better alignment. If the broach moves out of alignment after starting the cut, back off the pressure on the ram and align the broach again. Repeat this procedure during successive cuts. This will assure a perfectly straight broached hole.

Broaching Procedure

1. Select the correct bushing for the bore (sizes are plainly marked) and insert in the bore of workpiece.
2. Insert the broach (sizes are plainly marked) into the bushing slot and check alignment.
3. Place this assembly in the press and clamp the workpiece to the press base - check to make sure the Broach is centered under the ram.
4. Lubricate.
5. Apply pressure to the broach - back off pressure on the ram allowing the broach to center itself, providing better alignment. If the broach moves out of alignment after starting the cut, back off the pressure on the ram and align the broach again - reapply pressure to push broach through the work.
6. Clean broach using a stiff brush to remove chips from cutting teeth.
7. Insert the correct shim (if required) and repeat steps 3. through 6. as required to obtain the exact keyway depth.

Suggestions for a drifting or "hogging" Keyway Broach:

- Reverse the workpiece or turn Broach so teeth face toward the back of the press.
- Let the bushing protrude above the workpiece to give more support to the back of the broach, thereby helping to keep it aligned. A collared bushing may be placed upside down under the workpiece.

Lubrication and Cutting Fluids Guidance

Broach lubrication is crucial to tool life and the quality of the finish produced. Lubrication enables chips to slide freely and curl in the tooth gullets minimizing frictional heat. This reduces Broach wear and prevents build up on the cutting edge of the teeth. Push-type keyway broaches, *regardless of the material to be broached*, require lubrication on the back side of the broach in order to reduce friction. Various materials require different lubricants:

Mild Steel - A good quality cutting oil or water soluble coolant brushed on the teeth and back side of the Broach. ❶❷❸
Tough Steels such as Nickel Alloys - A good grade of cutting oil or compound. ❶❸
Brass - Typically is broached dry, but requires lubrication for the backside of the Broach. ❶
Bronze - Works well with an oil or soluble oil. ❶❷
Cast Iron - Is almost always broached dry, but requires lubrication for the backside of the Broach. ❶
Aluminum - Straight paraffin may be used, but special lubricants are available. ❶❷

Suggested Lubricants:

❶ 170-150-00100 Rock Oil MAXCUT No.5 Tapping & Cutting Fluid,
❷ 170-150-00200 Rock Oil MAXSYN SLF Semi Synthetic Cutting Fluid (water soluble)
❸ 170-100-10100 Molyslip MCC Molybdenised Metalworking Compound

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