

# TECHNICAL DOCUMENT

## TTS Rotary Broach

**Product:** TTS Rotary Broach Kit (PN 35195)

**Purpose:** The purpose of this document is to detail installation and use of the Tormach Tooling System (TTS) rotary broach holder and associated rotary broaches.

| Qty. | TTS Rotary Broach Starter Kit (PN 35195) | PN    |
|------|------------------------------------------|-------|
| 1    | Storage Case (not shown)                 | —     |
| 1    | 3 mm Hex Wrench (not shown)              | —     |
| 1    | 3 mm Hexagon Rotary Broach               | 35198 |
| 1    | 4 mm Hexagon Rotary Broach               | 35199 |
| 1    | 5 mm Hexagon Rotary Broach               | 35200 |
| 1    | 6 mm Hexagon Rotary Broach               | 35201 |
| 1    | 8 mm Hexagon Rotary Broach               | 35202 |
| 1    | 10 mm Hexagon Rotary Broach              | 35203 |



**NOTE:** If any of these items are missing, we can help. Create a support ticket with Tormach Technical Support at [tormach.atlassian.net/servicedesk](https://tormach.atlassian.net/servicedesk) for guidance on how to proceed.

## About Rotary Broaching

The rotary broaching process can be used to create polygon-shaped internal holes in a workpiece using either a mill or lathe. Interchangeable rotary broaches are held in a rotary broach holder that angles the axis of the rotary broach at 1° to the spindle axis. Rotary broaches can be programmed in the same manner as a drill, with no special programming required.

Many workpiece materials can be successfully machined with rotary broaching. Softer materials, like aluminum, brass, and free machining steels, are most suitable for rotary broaching. Materials with significant work hardening character, like stainless steel, are not recommended. Any 8 mm shank rotary broach can be used with the *TTS Rotary Broach Holder*. Broaches are available in many sizes and shapes including hexagonal, square, and torx.

## Using the TTS Rotary Broach Holder

### Installing Broaches

1. Using the 3 mm Hex Wrench, loosen Set Screw on the TTS Rotary Broach Holder (see **Figure 1**).

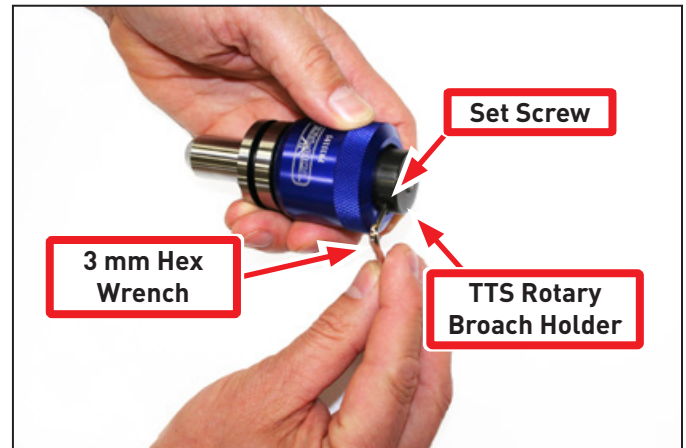


Figure 1

2. Insert a Rotary Broach into the TTS Rotary Broach Holder; align Set Screw with Flat on Rotary Broach (see **Figure 2**).
3. Tighten Set Screw to secure Rotary Broach in place (see **Figure 1**).

**NOTE:** The TTS Rotary Broach Holder has a sealed spindle cartridge and is not serviceable.

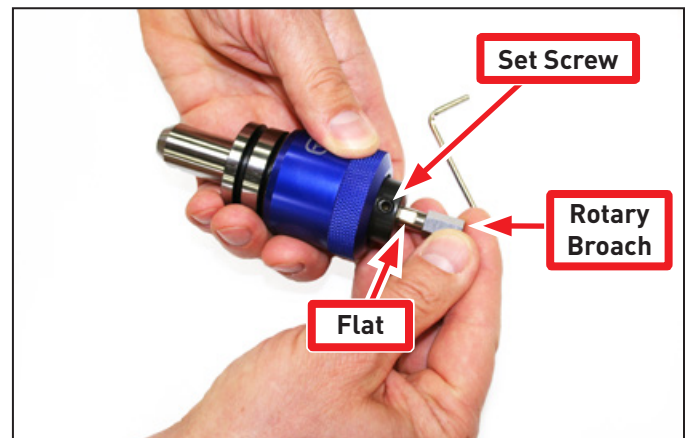


Figure 2

# TECHNICAL DOCUMENT

## Workpiece Preparation

1. Drill a pilot hole in the workpiece using the appropriate drill, as detailed in table below.

**NOTE:** Pilot holes should be drilled to a minimum depth that is equal to two times the broaching depth. This is necessary to allow for chip accumulation in the bottom of the hole.

2. Using a spot drill, chamfer mill, or other suitable method, lead chamfer pilot hole with 45° edge break to the minimum diameter detailed in table below.

**Recommended Pilot Hole and Lead Chamfer Diameters**

| Broach Shape | Broach Size | Recommended Pilot Hole Diameter | Recommended Pilot Drill | Minimum Lead Chamfer Diameter |
|--------------|-------------|---------------------------------|-------------------------|-------------------------------|
| Hexagon      | 3 mm        | .125"                           | 1/8"                    | .140"                         |
|              | 4 mm        | .166"                           | #19                     | .185"                         |
|              | 5 mm        | .206"                           | #5                      | .231"                         |
|              | 6 mm        | .247"                           | D                       | .277"                         |
|              | 8 mm        | .328"                           | 21/64"                  | .366"                         |
|              | 10 mm       | .410"                           | Z                       | .460"                         |

## Speeds and Feed Rates

The minimum and maximum speeds and feed rates for the *TTS Rotary Broach Holder* are detailed in the table below.

|                 | Minimum | Maximum |
|-----------------|---------|---------|
| Speed (RPM)     | 400     | 3500    |
| Feed Rate (IPR) | 0.003   | 0.009   |

When choosing speeds and feed rates, the following recommendations apply:

- As a general starting point, use 700 RPM and 0.003 inches per revolution (IPR)
- Speeds can be increased with smaller broach sizes
- Feed rates can be increased with larger broach sizes

## Programming

For milling applications, use G81 simple drilling cycle to program broaches. For further information, refer to mill *Operator Manual* chapter 7, *Programming*.