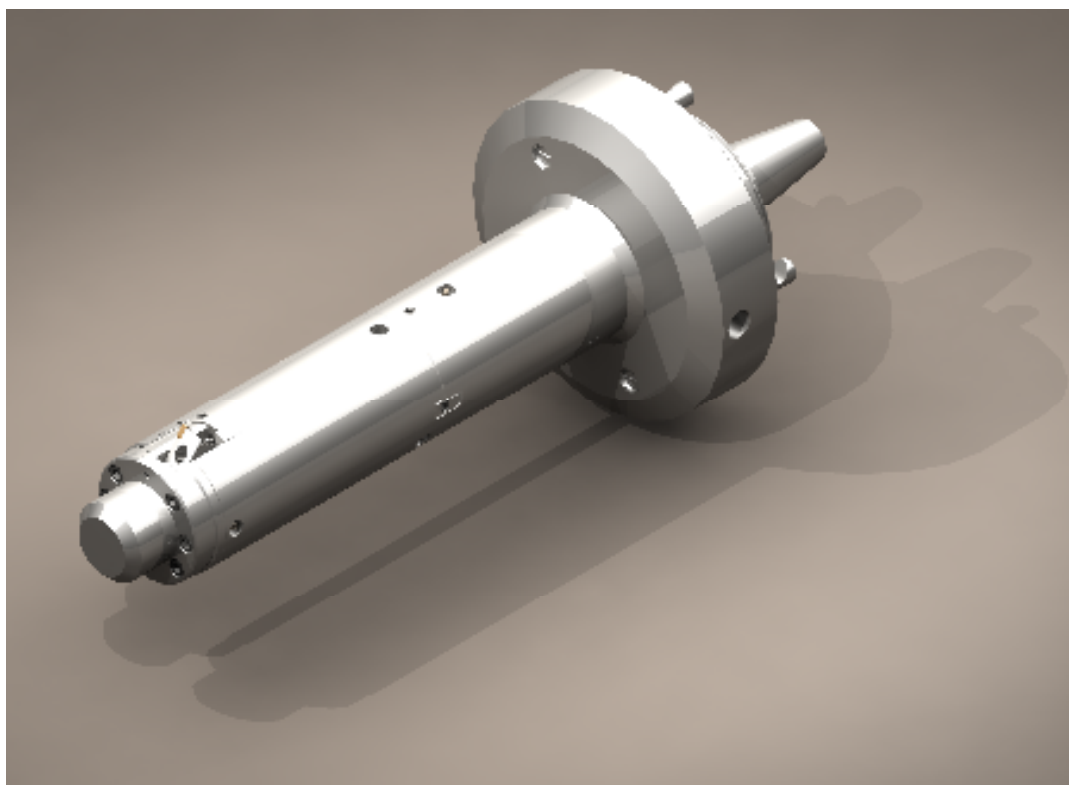




COGSDILL – NUNEATON LTD.

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Precision Engineers



# **ZX Seat Pocket Tool Service Manual**

P R E C I S I O N E N G I N E E R S

# **ZX Seat Pocket Tool**

## **Service Manual**

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# Customer Order Details



**Customer:**

**Quote No:**

**When contacting  
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information  
about your order,  
please have this  
sheet to hand.**

**Works Order No:**

**Sales Order Processing No:**

**Drawing Number:**

**Additional Notes and Related Tooling:**

# Introduction

**Cogsdill-Nuneaton's** Valve Seat Pocket Tools are designed to work on Horizontal boring Machines (H.B.M.) with Live Spindles and C.N.C. controls. This proven rugged design is used to to effectively machine deep bore cavities and contours in large castings or components. With its pilot supported cutting action and modular design, at lengths normally difficult to machine using standard equipment, the 'ZX' Modular Valve Seat Pocket Tool can greatly simplify and improve the machining of deep bore cavities, leading to reduced manufacturing lead times and improved machining characteristics of components.

The combination of the spindle feed (z-axis) and the work piece (w-axis) enables most cavities and contours to be accurately machined. The independent spindle feed (z-axis) is utilised to actuate the toolslide feed out mechanism in the seat pocket tool. For ease of programming the actuation ratio of these valve seat pocket tools is 2:1 (Inner spindle movement: Toolslide feed out movement). Different makes of horizontal Boring machine can have different home positions for their inner spindle (shank gauge line to the spindle nose face). Cogsdill - Nuneaton's seat pocket tools are individually set to suit each customer's machine requirements, if our standard home position will not fit.

The 'ZX' valve seat pocket tool comes in two different styles, a single toolslide design for single point cutting and a twin-toolslide design, which offers the benefit of a balanced cutting action when machining at higher speeds. Standard tool sizes available are -  $1 \frac{13}{16}$ ,  $2 \frac{1}{16}$ ,  $2 \frac{9}{16}$ ,  $3 \frac{1}{16}$ ,  $4 \frac{1}{16}$ ,  $5 \frac{1}{8}$ ,  $6 \frac{3}{8}$  and  $7 \frac{1}{8}$  Inch in both single and twin-slide designs. Machining of components such as Oil Valve Blocks is a complex operation when using conventional cutting tools; problems are encountered with tool rigidity, concentricity and tool chatter when cutting. All of these are eliminated with the 'ZX' Valve Seat Pocket Tool. Rigidity during the cutting operation is maintained by piloting with an expandable collet pilot assembly. This collet pilot assembly is located in a suitable position in the valve body bore and the collet is adjusted out to securely grip the inside of the bore. Concentricity is thus guaranteed by the design of the expandable collet pilot assembly. We also offer a pneumatically operated collet pilot assembly for those wishing to improve tool loading and unloading times. Tool chatter is eliminated by use of a unique damper unit assembly. This damper unit is spring-loaded and automatically adjusts to the bore size. So with the damper unit together with the collet pilot assembly optimum-machining capability is maintained at all times.

Valve seat pocket tools are of a modular construction, allowing extra extensions to be easily fitted or removed from the tool to vary the tool length without the need for a completely new tool. The extensions feature a simple coupling mechanism that allows for quick easy assembly and dismantling. A camloc bonnet is secured to the H.B.M. spindle, to allow for fast and easy tool loading and unloading. With four-camloc pins and a substantial location diameter you can be sure that the tool is securely held to the H.B.M. spindle.

We also offer conversion kits for the toolslide, collet pilot assembly and damper unit assembly that will allow the 'ZX' valve seat pocket tool to accommodate different size bores.

A wide range of inter-changeable cartridges to suit standard ISO inserts is available for all tools. These cartridges cover most machining possibilities from front and back boring, chamfering contouring etc. If necessary we can also supply special cartridges if your needs are not met by our standard range.

It is normally recommended to use a collet pilot assembly, but in some cases it is not possible, due to a bore being blind or the cavity being too close to the outer face. In these cases we can supply a variant of the standard tools called a twin-slide stub tool. These tools require no piloting and have twin-tool slides for a balanced cutting action.

Cogsdill – Nuneaton's development of quality tooling and pursuit of continuous improvement in our product lines has resulted in a proven rugged modular design for its 'ZX' Valve Seat Pocket Tools. All moving parts are precision ground and heat-treated to ensure lasting accuracy. Tool lubrication is through easily accessible grease nipples or oilers on the smallest tools.

## **Cartridge Assembly with Insert Mounted in ZX Seat Pocket Tool**



# Mounting Tool onto Machine

## Chapter

# 1

1. Before the Seat Pocket Tool is installed into the machine spindle, ensure all locating faces are free from swarf chips and foreign matter.
2. Advance the machine spindle forward through the cam loc bonnet.
3. Mount the Seat Pocket Tool into the spindle and actuate the pull stud clamp.
4. Retract the spindle slowly until the Seat Pocket Tool flange is within 1,0mm of bonnet face.
5. Check with the home position on C.N.C. controls
6. Retract the spindle to its home position.
7. Tighten the two camlocs in the camloc bonnet.
8. Before machining commences check tip height (measure the tool block-housing diameter and divide by a factor of 2 for radial dimension from centre).
9. Measure the amount, which the insert edge protrudes from the tool block housing.
10. Add this figure to the tool block housing Radial dimension, to get the tip height (Multiply by 2 for diameter).



# Positioning of Collet Assembly

## Chapter

# 2

### Manual Collet

1. Load the collet onto the Collet Spanner (see Fig. 1)
2. Insert the collet into position in the valve block component, ensuring that sufficient clearance has been allowed to clear the end cap on the Seat Pocket Tool, when machining the seat pocket (see Fig. 2)
3. Holding the Handle on the end of the Collet Spanner stationary tighten the collet by turning the Collet Spanner Tommy Bars clockwise.
4. Remove the Collet Spanner by turning the Handle, in either direction, until the drive dowel can pass through the drive collar.

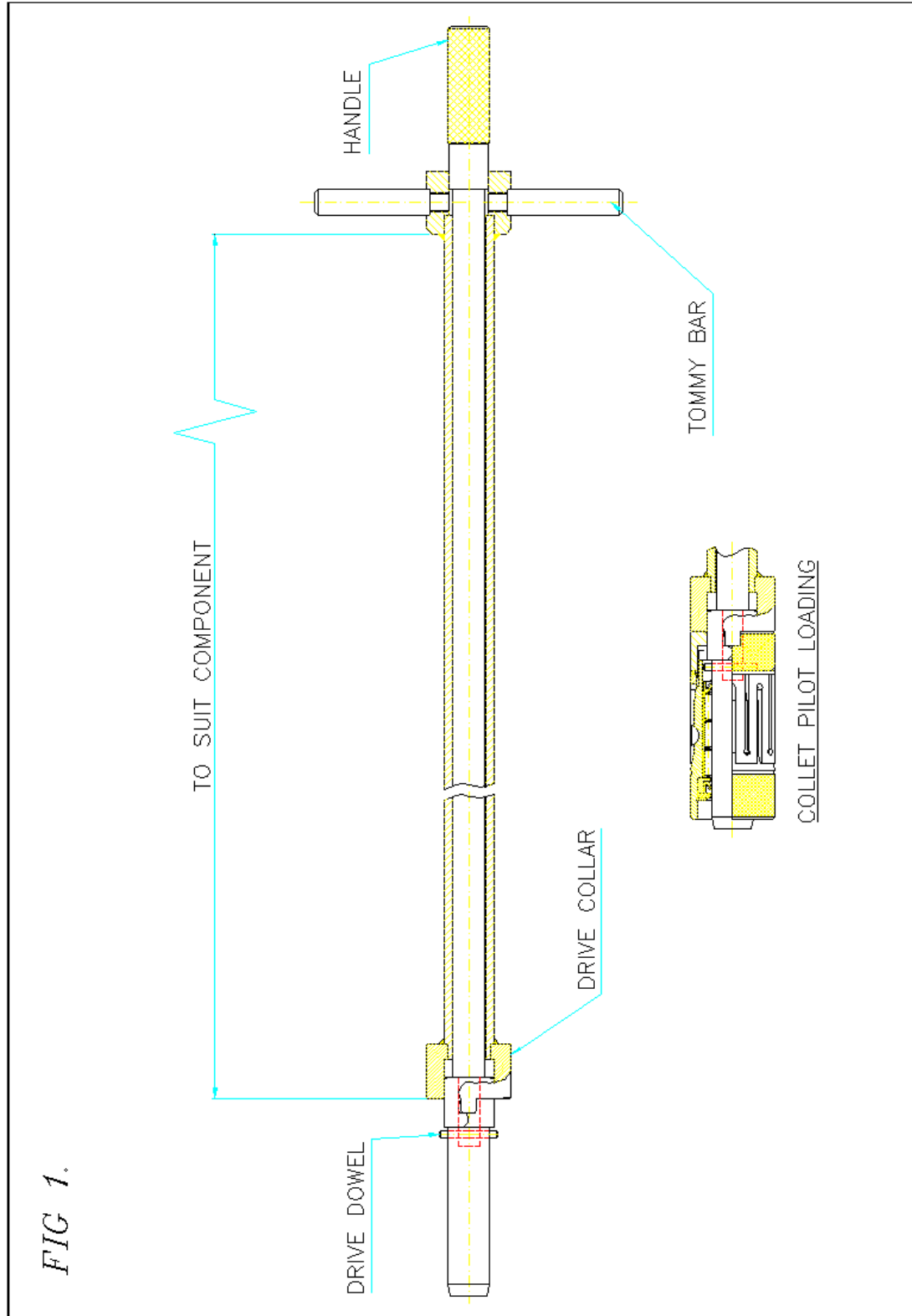
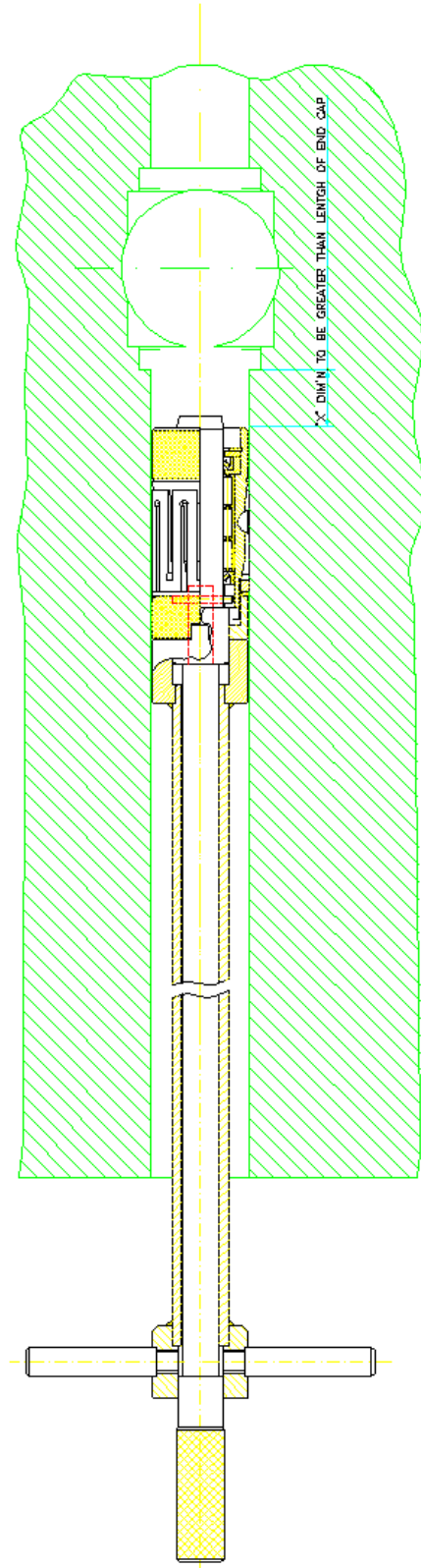


FIG 2.



# Removing Collet Assembly

## Chapter

# 3

### Manual Collet

1. Load the collet spanner down the component bore and into the collet pilot assembly. Turn the collet spanner handle to find the drive dowel slot then turn the collet spanner tommy bars to find the drive collar slot.
2. Hold the collet spanner handle stationary and turn the collet spanner tommy bars anti-clockwise to undo the collet assembly.
3. Lightly tap the end of the collet spanner to release the collet from the component bore.
4. Pull out the collet assembly with the collet spanner.

# Tool block Housing Assembly

## Chapter

# 4

## Assembly & Removal

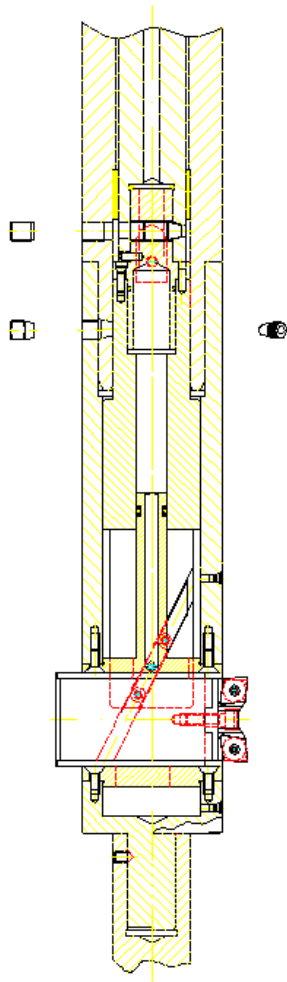
1. Load seat pocket tool into a vice, gripping the extension next to the section to be removed, alternatively load into the machine spindle.
2. Move the shank into the home position. The toolslide should be in the central position in the tool block housing.
3. Remove the 3 taper lock screws (detail 12).
4. Remove the cover screw (detail 109) to gain access to the push rod.
5. Load the Allen Key through the cover screw hole into the taper lock screw (detail 14) and undo until the screw bottoms out. Wind back one-quarter turn to avoid damage to the extension sleeve bore.
6. Pull off the tool block housing assembly.

The tool block housing should be held across the toolslide during removal to restrict actuator movement.

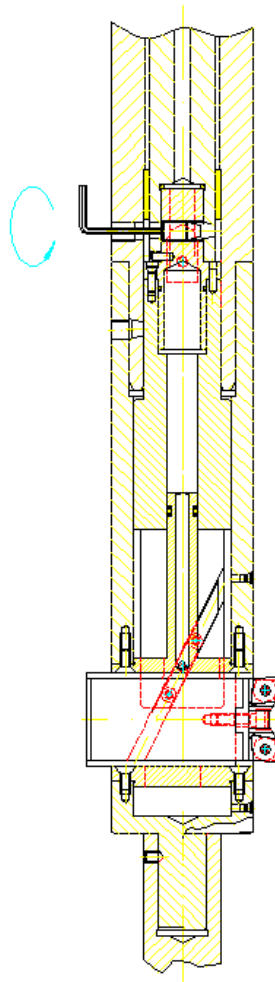
7. Reverse the above procedure for re-assembly. Tighten the taper lock screws with a torque wrench to 28 NM<sup>2</sup>.

FIG 3.

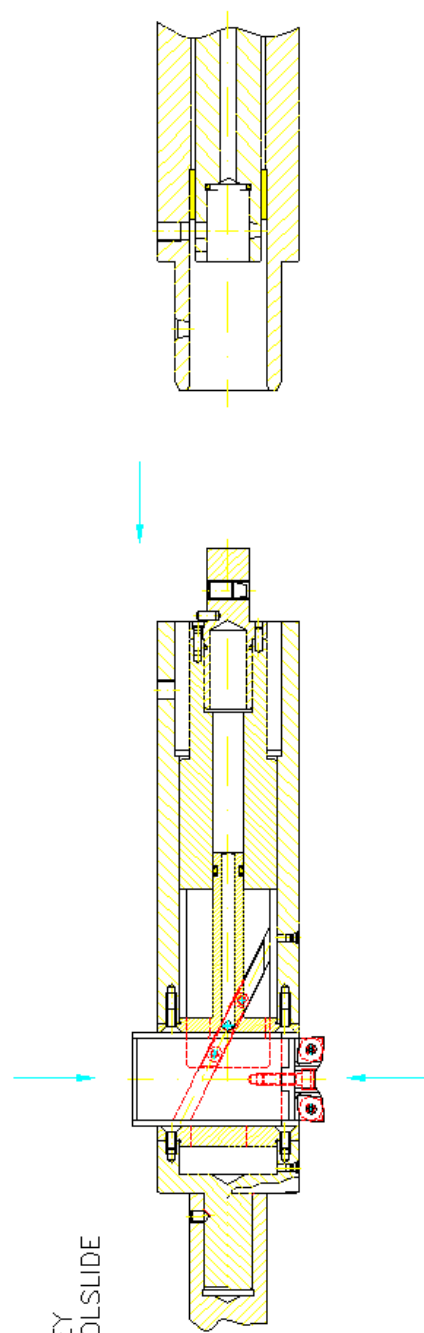
REMOVE TAPER LOCK  
SCREWS & COVER SCREW



UNSCREW PUSH ROD  
TAPER LOCK SCREW



REMOVE ALLEN KEY  
HOLD ACROSS TOOLSLIDE  
& PULL OFF



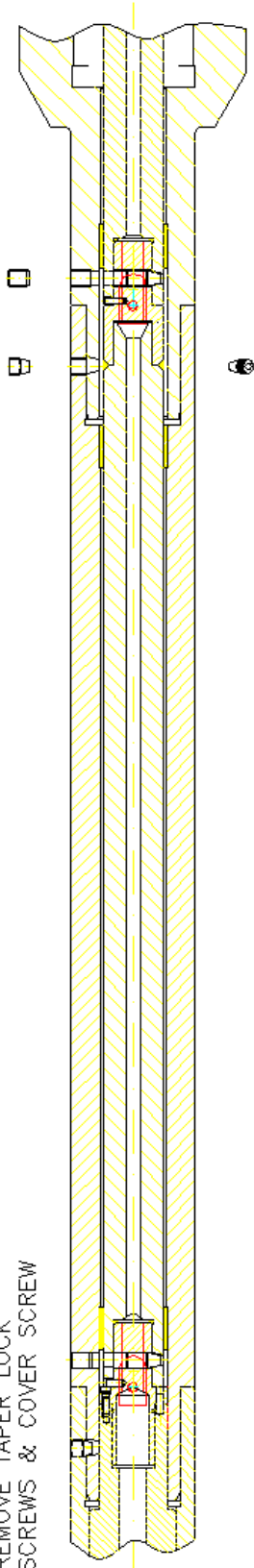
# Extension Sleeve Assembly

## Assembly & Removal

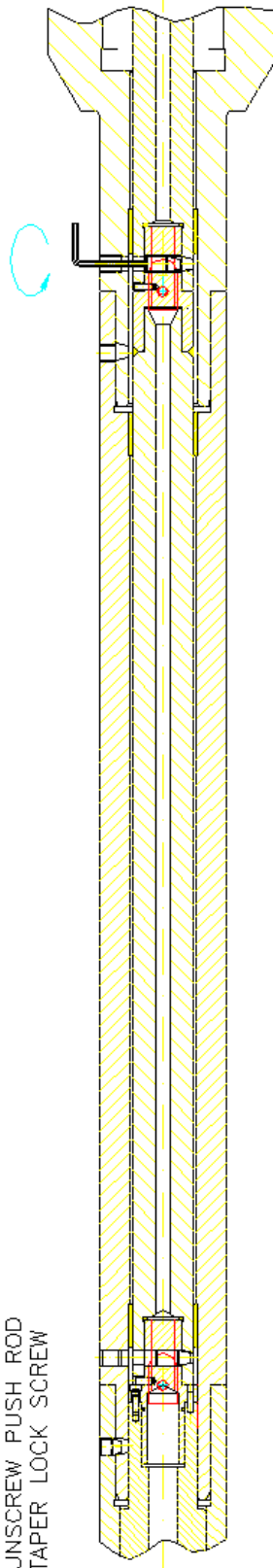
1. Load seat pocket tool into a vice, gripping the stub sleeve next to the section to be removed, alternatively load into the machine spindle.
2. Move the shank into the home position. The toolslide should be in the central position in the tool block housing.
3. Remove the 3 taper lock screws (detail 12).
4. Remove the cover screw (detail 109) to gain access to the push rod.
5. Load the Allen Key through the cover screw hole into the taper lock screw (detail 14) and undo until the screw bottoms out. Wind back one-quarter turn to avoid damage to the extension sleeve bore.
6. Pull off the tool extension assembly.
7. Remove toolblock housing assembly as previously described in chapter 4.
7. Reverse the above procedure for re-assembly. Tighten the taper lock screws with a torque wrench to 28 NM<sup>2</sup>.

FIG 4.

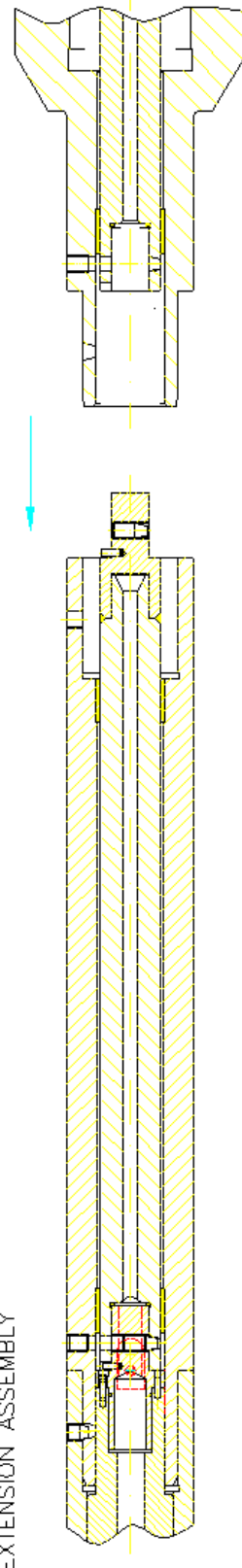
REMOVE TAPER LOCK  
SCREWS & COVER SCREW



UNSCREW PUSH ROD  
TAPER LOCK SCREW



PULL OFF  
EXTENSION ASSEMBLY





# Changing the Toolslide

## Chapter

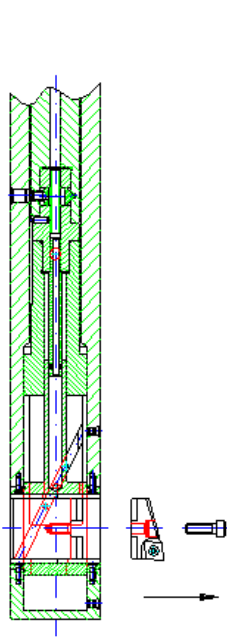
# 6

Mount the Seat Pocket Tool into the machine spindle – See Chapter 1

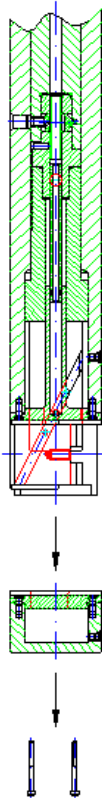
1. Remove the pilot shaft assembly (detail 2) by unscrewing the 3 cone point screws (detail 117) from the pilot shaft (see Fig. 5)
2. Remove the end cap (detail 3) by unscrewing the 5 cap head screws (detail 104).
3. Actuate the machine spindle forward (approximately 1.500”), the toolslide (detail 5) will push forward enabling its removal.
4. Replace with new toolslide ensuring that all items are clean and free from swarf, making sure that the toolslide is the right way round and properly located in the keyway in the actuator (detail 10).
5. Actuate the machine spindle and move to the home position.
6. Replace the end cap (detail 3.) ensuring that the location faces are free from swarf.
7. Tighten up the 5 cap head screws (detail 104).
8. Replace the pilot shaft (detail 2).
9. Tighten up the 3 cone point screws (detail 117).

**Fig 5.**

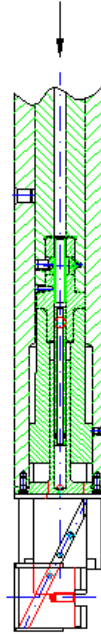
Remove caphead screw  
and pull off cartridge.



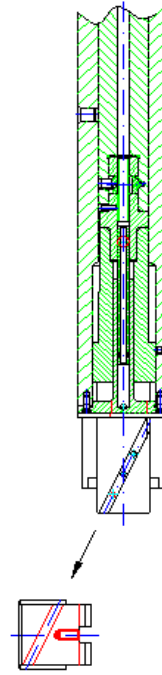
Remove 5 caphead screws  
and pull off endcap.



Actuate machine spindle



Remove toolslide



# Dismantling and assembly of Collet Assemblies.

## Chapter

# 7

## Manual Collet - Dismantling

1. Unscrew the adjusting nut (detail 2) and remove it along with the thrust washer (detail 5).
2. Slide the collet (see detail 6) of the pilot body (detail 1).
3. Mount the pilot body (detail 1) into a bench vice – using soft jaws – with the seal housing (detail 4) facing upwards.
4. Using circlip pliers remove circlip (detail 103) from its groove.
5. Remove the seal housing along with one seal (details 4 & 100).
6. Remove the bearings (detail 101) and seal (detail 9).

## Manual Collet - Assembly

Before assembling ensure that seal surfaces are clean and free from swarf and imperfections.

Replace any worn or damaged seals or bearings.

1. Mount the pilot body (detail 1) in a bench vice – using soft jaws – with the largest diameter upward.
2. Replace the seal (see detail 100), bearings (detail 101) and seal housing (detail 4).
3. Replace circlip (detail 103) using circlip pliers to put circlip into its groove in the pilot body bore (detail 1).
4. Remove from vice.
5. Replace the collet (detail 6).
6. Replace the adjustment nut (detail 2) and thrust washer (detail 5).

# Maintenance

## Chapter

# 8

Cogsdill-Nuneaton Limited's Seat Pocket Tools require regular maintenance whilst being used.

The tools should be cleaned free of swarf or other foreign matter after each machining operation.

To ensure the Seat Pocket Tool remains in good working order it is recommended that the working parts e.g. the actuator (detail 10) and tool slide (detail 5) are well oiled or greased.

This will avoid corrosion from coolants etc. and ensure that the tool is in good working order when next used.

# Recommended Spares

## Chapter

# 9

Below is a list of recommended spares, which could need replacements due to normal wear and tear

1. Collet
2. Tool slides
3. Cartridges
4. End cap
5. Actuator
6. Front & Rear Retaining plates

# Lubrication

## Recommendations

# Chapter 10

Operational reliability and trouble free service of high performance machinery and tooling depends on the correct selection and use of high quality specialised lubricants.

1. It is recommended that a water resistant paste (**Klüber - Altemp Q NB 50**) be used in this type of tool. The paste should be applied to all moving parts or surfaces when the tool is disassembled for cleaning and maintenance or when the tool is stored for extended period of time.
2. To lubricate the heads during use, it is recommended that a water resistant paste (**Klüber – Altemp Q NB 50**) should be applied, as a general guideline, every 200 – 300 operating hours or as deemed necessary in practice. The lubrication frequency can vary depending upon the working environment, working speed, coolant used, machine used, number of head actuations and distance stroked by the tool.
3. A lube gun is available from Cogsdill to make routine maintenance easy. (Ref. Part No. CN-D24)

To attain long term, maintenance free operation of Cogsdill tooling it is recommended that the tools be lubricated with Klüber Lubrication's special lubricating paste.

## Altemp Q NB 50

The benefits of this tribologically developed lubricant are:

Long term lubrication product for Boundary friction conditions

- Enables precise positional accuracy and repeatability
- Prevents fretting corrosion
- Provides unparalleled resistance to water based coolants
- Resists centrifuging at high rotational speeds
- No workplace contamination

Apply Altemp Q NB 50 paste to all sliding surfaces on assembly of the head and thereafter by high-pressure lever type grease gun. Frequent relubrication with Altemp Q NB 50 is not generally required, depending on service conditions. As a guideline we recommend re application every 200 – 300 operating hours, or as deemed necessary in practice.

**Mixing of lubricants should be avoided and could result in operational performance deficit**



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# General Arrangement Drawings

