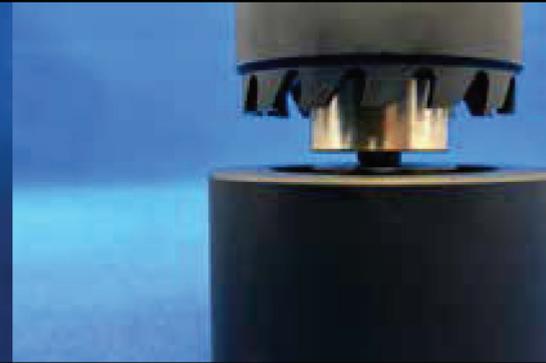




OTAR
COMPONENTI INDUSTRIALI

UNASIS
PRECISION TOOLING



Aerospace Tooling

Product Range





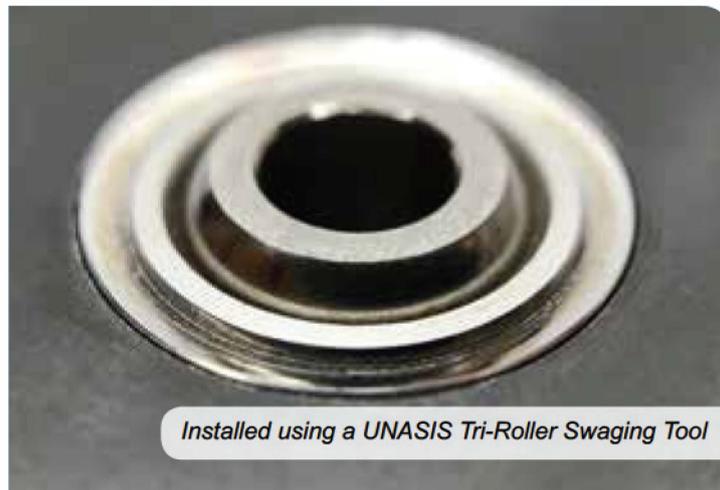
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Introduction

Correct installation of bearings is crucial to exploiting the full potential that the bearing has to offer. The repercussions of a poorly installed bearing can be far reaching regardless of whether you are installing a bearing into an airframe or a suspension system. UNASIS Aerospace tools give you the ability to correctly install your bearing first time, every time. With a range of tools on offer, as well as the ability to work with a customer to design bespoke tools for one-off applications, UNASIS are able to cater to all our customers' bearing tooling needs. Our tools have been proven to improve the installation of bearings leading to a cost and time saving benefit to all our customers.

Benefits of Tri-Roller Swaging Tools



The above images serve as an illustration of the different finishes provided by the traditional anvil staking tools and UNASIS Tri-roller swaging tools.

It is evident in the images that the tri-roller tool has provided an even, smooth and mirror-like surface to the **swaging lip** on the bearing. Virtually no gap is visible between the swaged lip and the housing and thus will provide **superb mating and retention** between the two components. This is in stark contrast to the solution provided by the anvil tool where the surface, whilst even, is not as smooth as the roller tool and the obvious gap between the swaging lip and the housing would suggest an inferior retention and mating between bearing and housing.

What is not obvious in the images but can result from using more basic tools are issues such as **abrading**, sheared edges, gauges and micro cracks. These issues primarily arise because the forces used for anvil **staking tools** are much greater and the magnitude of material stress is much greater when compared with **tri-roller swaging tools** which stress the material much less by causing the material to deform in **small increments** rather than forcing a large change in one movement.

The collective result of these factors is that by using a **tri-roller swaging tool** the bearing is better seated in the housing, better able to perform its function and less likely to be **damaged**.

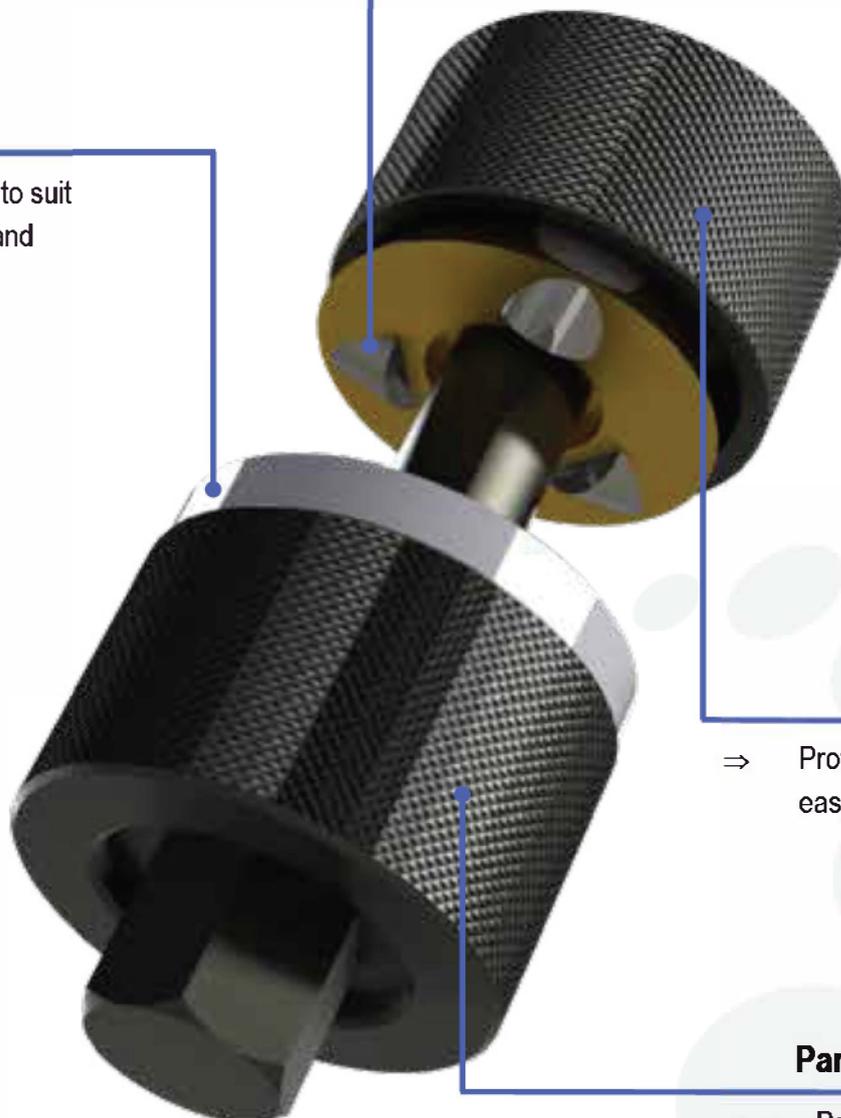
Special Features

Rollers

- ⇒ Rollers rather than staking points create a smooth mirror like finish in swaging grooves with better retention

Flip Ring

- ⇒ A flip ring anvil is used to suit both primary swaging and secondary swaging.



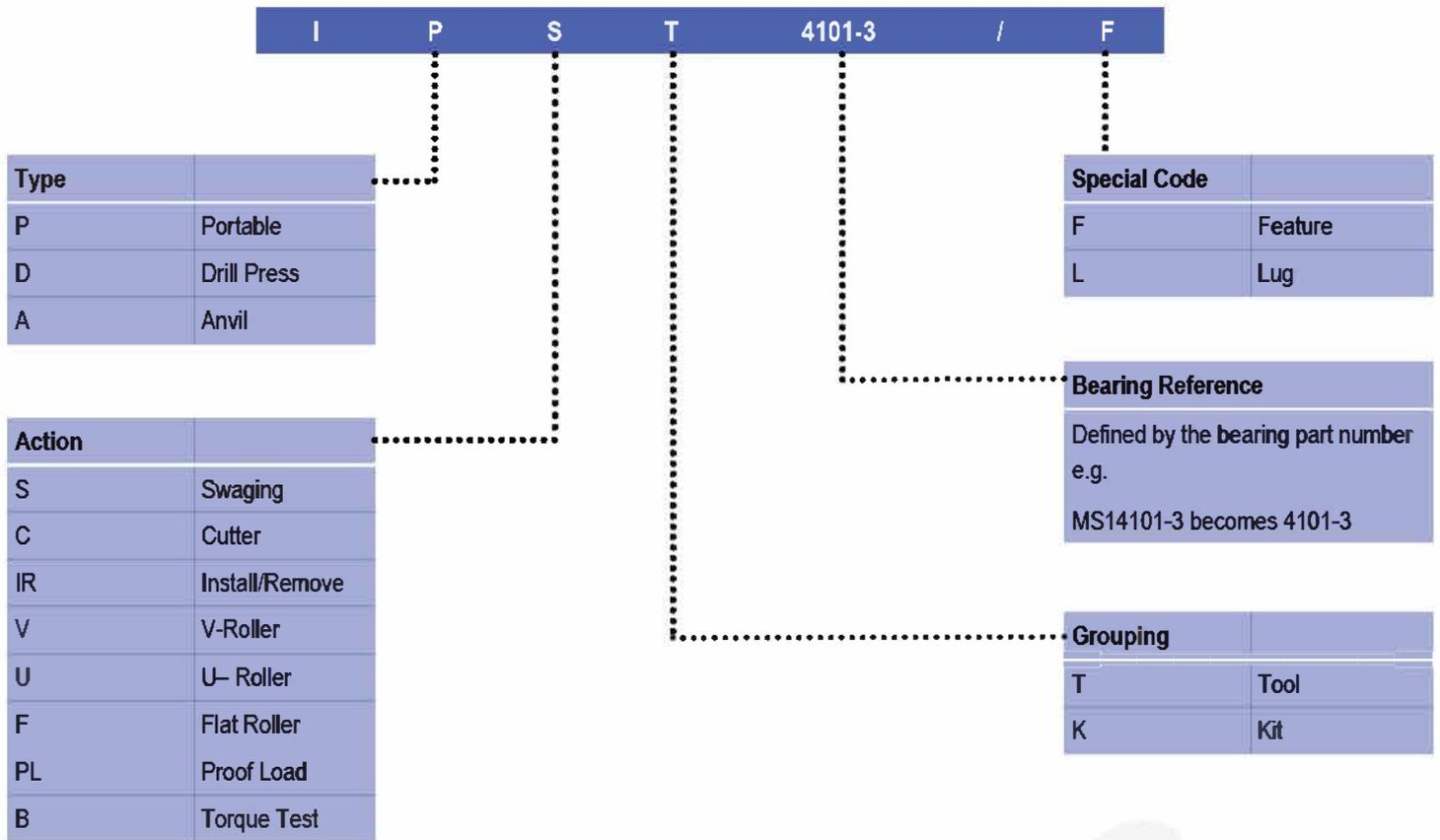
Knurled Surface

- ⇒ Provides a surface that is easy to handle and grip

Part Number Marked

- ⇒ Part numbered to easily identify the correct tool for the correct bearing.

Standard Part Numbering System



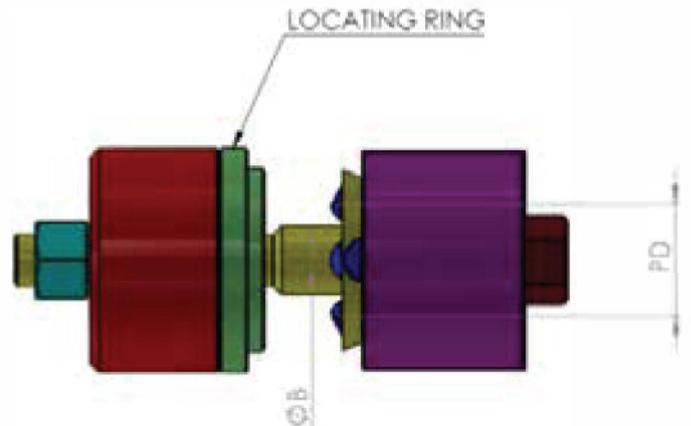
Non-Standard Part Numbering System

Non-standard tools are classed as tools that will swage v-grooved bearings or bearing retaining sleeves that don't conform to the MS14101 or MS14103 specifications. This includes segment and roller staking tools.

Part numbering for non-standard tools can take 2 forms depending on the bearing, housing and specifications outlined in the requirement of the tool. For example a portable swaging tool required for a Boeing aircraft bearing part number (BACB10ES06AG) would maintain the standard prefixes and be hyphenated to the bearing part number and there would be no suffixes. So, in this case the resulting part number would be IPST-BACB10ES06AG.

Alternatively, specialist or custom bearings that require tooling, tooling required to install a bearing in a specific housing or if the tool produced is deemed proprietary to a customer or group of customers then it would be issued an 'AT' number e.g. AT-2369. These part numbers are specific and tied to drawings and do not necessarily give reference to either the housing or bearing being installed.

Portable Swaging Tools



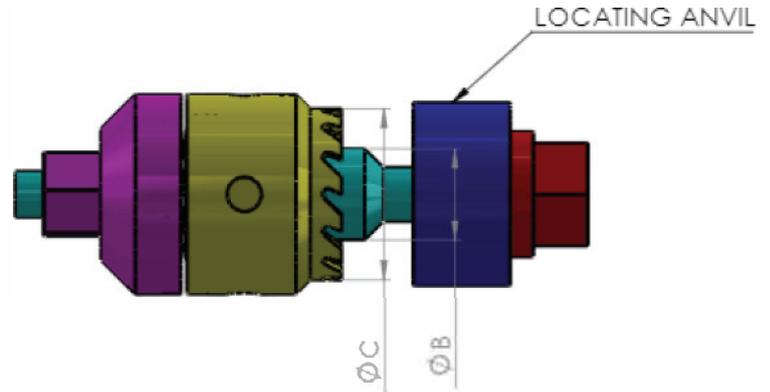
UNASIS Portable Tri-Roller Swaging Tool

UNASIS Part Number	Rexnord Part Number	Bearing Part Number		B	PD
		14101 Series	14103 Series		
IPST4101-3	RST3000	MS14101-3	-	0.19	0.5
IPST4103-3	RST3001	-	MS14103-3	0.19	0.555
IPST4103-4	RST3002	-	MS14103-4	0.25	0.555
IPST4101-4	RST3003	MS14101-4	-	0.25	0.586
IPST4103-5	RST3004	-	MS14103-5	0.3125	0.617
IPST4101-5	RST3005	MS14101-5A	-	0.3125	0.65
IPST4101-6	RST3006	MS14101-6	-	0.375	0.712
IPST4103-6	RST3006	-	MS14103-6	0.375	0.712
IPST4101-7	RST3007	MS14101-7	-	0.4375	0.806
IPST4103-7	RST3008	-	MS14103-7	0.4375	0.837
IPST4101-8	RST3009	MS14101-8	-	0.5	0.875
IPST4103-8	RST3010	-	MS14103-8	0.5	0.9
IPST4101-9	RST3011	MS14101-9	-	0.5625	0.986
IPST4103-9	RST3012	-	MS14103-9	0.5625	1.025
IPST4101-10	RST3013	MS14101-10	-	0.625	1.062
IPST4103-10	RST3014	-	MS14103-10	0.625	1.087
IPST4103-12	RST3015	-	MS14103-12	0.75	1.25
IPST4101-12	RST3016	MS14101-12	-	0.75	1.312
IPST4101-14	RST3017	MS14101-14	-	0.875	1.437
IPST4103-14	RST3018	-	MS14103-14	0.875	1.5
IPST4101-16	RST3019	MS14101-16	-	1	1.625
IPST4103-16	RST3020	-	MS14103-16	1	2

Need a special tool on a short lead time?

UNASIS tools are available for a wide variety of bearing sizes
Please speak to our sales team who will be happy to help.

Portable Cutting Tools



UNASIS Portable Cutter Tool

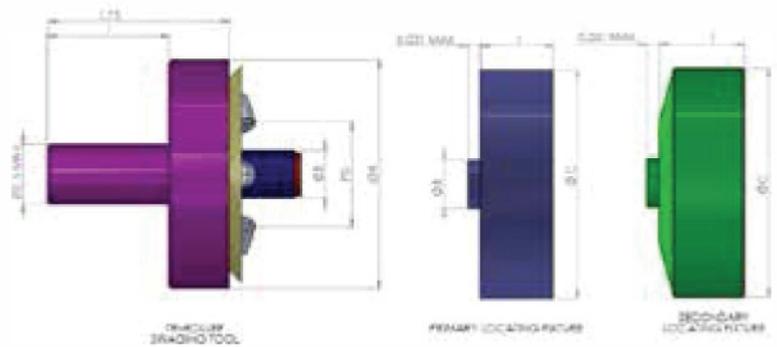
UNASIS Part Number	Rexnord Part Number	Bearing Part Number		B	C
		14101 Series	14103 Series		
IPCT4101-3	RKC4101-3	MS14101-3	-	0.19	0.5625
IPCT4103-3	RKC4103-3	-	MS14103-3	0.19	0.625
IPCT4103-4	RKC4103-4	-	MS14103-4	0.25	0.625
IPCT4101-4	RKC4101-4	MS14101-4	-	0.25	0.6562
IPCT4103-5	RKC4103-5	-	MS14103-5	0.3125	0.6875
IPCT4101-5	RKC4101-5	MS14101-5	-	0.3125	0.75
IPCT4101-6	RKC4101-6	MS14101-6	-	0.375	0.8125
IPCT4103-6	RKC4103-6	-	MS14103-6	0.375	0.8125
IPCT4101-7	RKC4101-7	MS14101-7	-	0.4375	0.9062
IPCT4103-7	RKC4103-7	-	MS14103-7	0.4375	0.9375
IPCT4101-8	RKC4101-8	MS14101-8	-	0.5	1
IPCT4103-8	RKC4103-8	-	MS14103-8	0.5	1
IPCT4101-9	RKC4101-9	MS14101-9	-	0.5623	1.0937
IPCT4103-9	RKC4103-9	-	MS14103-9	0.5625	1.125
IPCT4101-10	RKC4101-10	MS14101-10	-	0.625	1.1875
IPCT4103-10	RKC4103-10	-	MS14103-10	0.625	1.1875
IPCT4103-12	RKC4103-12	-	MS14103-12	0.75	1.375
IPCT4101-12	RKC4101-12	MS14101-12	-	0.75	1.4375
IPCT4101-14	RKC4101-14	MS14101-14	-	0.875	1.5625
IPCT4103-14	RKC4103-14	-	MS14103-14	0.875	1.625
IPCT4101-16	RKC4101-16	MS14101-16	-	1	1.75
IPCT4103-16	RKC4103-16	-	MS14103-16	1	2.125

Need a special tool on a short lead time?

UNASIS tools are available for a wide variety of bearing sizes
Please speak to our sales team who will be happy to help.

Standard tools are equipped to use a C-spanner.
Please ask about our ratchet ring spanner option.

Drill Press Swaging Tool



UNASIS Drill Press Swaging Tool

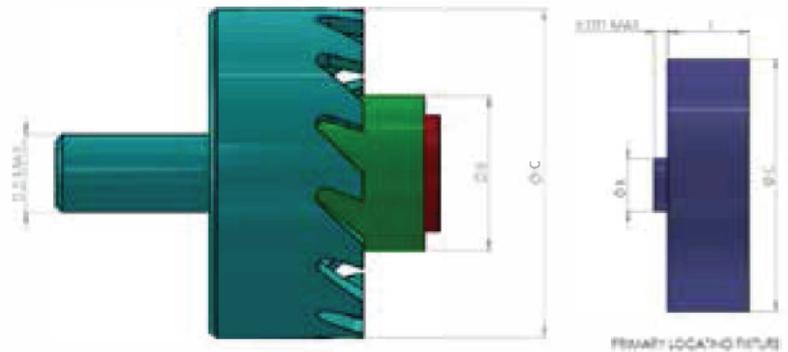
UNASIS Part Number	Rexnord Part Number	Bearing Part Number		A*	B	C*	PD
		14101 Series	14103 Series				
IDST4101-3	RST1000DP	MS14101-3	-	1 1/4	0.19	1 1/4	0.5
IDST4103-3	RST1001DP	-	MS14103-3	1 1/4	0.19	1 1/4	0.555
IDST4103-4	RST1002DP	-	MS14103-4	1 1/4	0.25	1 1/4	0.555
IDST4101-4	RST1003DP	MS14101-4	-	1 1/4	0.25	1 1/4	0.586
IDST4103-5	RST1004DP	-	MS14103-5	1 1/4	0.3125	1 1/4	0.617
IDST4101-5	RST1005DP	MS14101-5	-	1 1/4	0.3125	1 1/4	0.65
IDST4101-6	RST1006DP	MS14101-6	-	1 1/2	0.375	1 1/2	0.712
IDST4103-6	RST1006DP	-	MS14103-6	1 1/2	0.375	1 1/2	0.712
IDST4101-7	RST1007DP	MS14101-7	-	1 1/2	0.4375	1 1/2	0.806
IDST4103-7	RST1008DP	-	MS14103-7	1 1/2	0.4375	1 1/2	0.837
IDST4101-8	RST1009DP	MS14101-8	-	1 1/2	0.5	1 1/2	0.875
IDST4103-8	RST1010DP	-	MS14103-8	1 1/2	0.5	1 1/2	0.9
IDST4101-9	RST1011DP	MS14101-9	-	1 3/4	0.5625	1 3/4	0.986
IDST4103-9	RST1012DP	-	MS14103-9	1 3/4	0.5625	1 3/4	1.025
IDST4101-10	RST1013DP	MS14101-10	-	1 3/4	0.625	1 3/4	1.062
IDST4103-10	RST1014DP	-	MS14103-10	1 3/4	0.625	1 3/4	1.087
IDST4103-12	RST1015DP	-	MS14103-12	2	0.75	2	1.25
IDST4101-12	RST1016DP	MS14101-12	-	2	0.75	2	1.312
IDST4101-14	RST1017DP	MS14101-14	-	2 1/4	0.875	2 1/4	1.437
IDST4103-14	RST1018DP	-	MS14103-14	2 1/4	0.875	2 1/4	1.5
IDST4101-16	RST1019DP	MS14101-16	-	2 1/4	1	2 1/4	1.625
IDST4103-16	RST1020DP	-	MS14103-16	2 3/4	1	2 3/4	2

Primary and Secondary Locating Fixtures are supplied with all UNASIS Drill Press Swaging Tools.

Need a special tool on a short lead time?

UNASIS tools are available for a wide variety of bearing sizes
Please speak to our sales team who will be happy to help.

Drill Press Cutting Tools



UNASIS Drill Press Cutting Tool

UNASIS Part Number	Rexnord Part Number	Bearing Part Number		B	C*	D (ref) *
		14101 Series	14103 Series			
IDCT4101-3	RKC4101-3DP	MS14101-3	-	0.19	1 1/4	0.5625
IDCT4103-3	RKC4103-3DP	-	MS14103-3	0.19	1 1/4	0.625
IDCT4103-4	RKC4103-4DP	-	MS14103-4	0.25	1 1/4	0.625
IDCT4101-4	RKC4101-4DP	MS14101-4	-	0.25	1 1/4	0.6562
IDCT4103-5	RKC4103-5DP	-	MS14103-5	0.3125	1 1/4	0.6875
IDCT4101-5	RKC4101-5DP	MS14101-5	-	0.3125	1 1/4	0.75
IDCT4101-6	RKC4101-6DP	MS14101-6	-	0.375	1 1/2	0.8125
IDCT4103-6	RKC4103-6DP	-	MS14103-6	0.375	1 1/2	0.8125
IDCT4101-7	RKC4101-7DP	MS14101-7	-	0.4375	1 1/2	0.9062
IDCT4103-7	RKC4103-7DP	-	MS14103-7	0.4375	1 1/2	0.9375
IDCT4101-8	RKC4101-8DP	MS14101-8	-	0.5	1 1/2	1
IDCT4103-8	RKC4103-8DP	-	MS14103-8	0.5	1 1/2	1
IDCT4101-9	RKC4101-9DP	MS14101-9	-	0.5623	1 3/4	1.0937
IDCT4103-9	RKC4103-9DP	-	MS14103-9	0.5625	1 3/4	1.125
IDCT4101-10	RKC4101-10DP	MS14101-10	-	0.625	1 3/4	1.1875
IDCT4103-10	RKC4103-10DP	-	MS14103-10	0.625	1 3/4	1.1875
IDCT4103-12	RKC4103-12DP	-	MS14103-12	0.75	2	1.375
IDCT4101-12	RKC4101-12DP	MS14101-12	-	0.75	2	1.4375
IDCT4101-14	RKC4101-14DP	MS14101-14	-	0.875	2 1/4	1.5625
IDCT4103-14	RKC4103-14DP	-	MS14103-14	0.875	2 1/4	1.625
IDCT4101-16	RKC4101-16DP	MS14101-16	-	1	2 1/4	1.75
IDCT4103-16	RKC4103-16DP	-	MS14103-16	1	2 3/4	2.125

Primary Locating Fixtures are supplied with all UNASIS Drill Press Cutting Tools.

Need a special tool on a short lead time?

UNASIS tools are available for a wide variety of bearing sizes
Please speak to our sales team who will be happy to help.

Installation Kits

In addition to supplying individual tools UNASIS is also able to offer installation kits which include the three essential tools required to effectively install and remove the outlined bearing from a housing.

The kit offers a more competitive price compared to buying tools individually.

UNASIS installation kits are available in drill press and portable formats for both standard MS spec bearing and non-standard specifications, please ask us for more details.

Kits can be built to include options for Proof Load and Torque Test options.



UNASIS Portable Installation and Removal Kits

UNASIS Part Number	Bearing Part Number		Included Tools		
	14101 Series	14103 Series	Swaging Tool	Cutting Tool	Install/Remove
IPIK4101-3	MS14101-3	-	IPST4101-3	IPCT4101-3	IPIR4101-3
IPIK4103-3	-	MS14103-3	IPST4103-3	IPCT4103-3	IPIR4103-3
IPIK4103-4	-	MS14103-4	IPST4103-4	IPCT4103-4	IPIR4103-4
IPIK4101-4	MS14101-4	-	IPST4101-4	IPCT4101-4	IPIR4101-4
IPIK4103-5	-	MS14103-5	IPST4103-5	IPCT4103-5	IPIR4103-5
IPIK4101-5	MS14101-5	-	IPST4101-5	IPCT4101-5	IPIR4101-5
IPIK4101-6	MS14101-6	-	IPST4101-6	IPCT4101-6	IPIR4101-6
IPIK4103-6	-	MS14103-6	IPST4103-6	IPCT4103-6	IPIR4103-6
IPIK4101-7	MS14101-7	-	IPST4101-7	IPCT4101-7	IPIR4101-7
IPIK4103-7	-	MS14103-7	IPST4103-7	IPCT4103-7	IPIR4103-7
IPIK4101-8	MS14101-8	-	IPST4101-8	IPCT4101-8	IPIR4101-8
IPIK4103-8	-	MS14103-8	IPST4103-8	IPCT4103-8	IPIR4103-8
IPIK4101-9	MS14101-9	-	IPST4101-9	IPCT4101-9	IPIR4101-9
IPIK4103-9	-	MS14103-9	IPST4103-9	IPCT4103-9	IPIR4103-9
IPIK4101-10	MS14101-10	-	IPST4101-10	IPCT4101-10	IPIR4101-10
IPIK4103-10	-	MS14103-10	IPST4103-10	IPCT4103-10	IPIR4103-10
IPIK4103-12	-	MS14103-12	IPST4103-12	IPCT4103-12	IPIR4103-12
IPIK4101-12	MS14101-12	-	IPST4101-12	IPCT4101-12	IPIR4101-12
IPIK4101-14	MS14101-14	-	IPST4101-14	IPCT4101-14	IPIR4101-14
IPIK4103-14	-	MS14103-14	IPST4103-14	IPCT4103-14	IPIR4103-14
IPIK4101-16	MS14101-16	-	IPST4101-16	IPCT4101-16	IPIR4101-16
IPIK4103-16	-	MS14103-16	IPST4103-16	IPCT4103-16	IPIR4103-16



Need a special tool on a short lead time?

UNASIS tools are available for a wide variety of bearing sizes. Please speak to our sales team who will be happy to help.

Proof Load and Load Testing Tools

In order to compliment the extensive range of installation and removal tools UNASIS is also able to offer a wide range of testing tools. The testing tool range includes both break away torque testing and proof load testing. The type of tooling options supplied are determined by the OEM specification that is being used. In order to react to this, UNASIS tools are manufactured to comply with the respective customer requirement or specification. We are able to offer advice and guidance on what the most suitable operation is in order to achieve effective testing.

Proof Loading Tools

Proof loading tools come in 2 distinct product groups either as a 'press' style or a 'portable' style tool.

The press style tools come in the form of pusher and receiver cups to support the bearing whilst being pressure loaded during tests. This style of tool is designed to work with a press (hydraulic/pneumatic) and customer's own load cell. Press style proof loading tools are ideal for any specification where precise incremental loads need to be applied as they securely hold the bearing and evenly distribute the load to provide accurate testing results. Each size of bearing requires its own pusher and receiver cup in order to accurately match the swaging groove and housing on each bearing.

Portable proof loading tools take the form of an electronic handheld display, receiver cups and load cell. These are highly mobile units that enable, if required, proof loading of newly installed bearings without the need to fully remove the component from its assembly. Each unit is supplied with a load cell specific to the bearing being used and calibrated to the appropriate load value required as per the specification. Electronic handheld displays can be calibrated to work with a number of load cells which reduce cost, as a single display can be returned for recalibration and additional load cells added to its library only requiring the purchase of an additional load cell.

In addition to standard sizes available, all UNASIS proof Loading equipment can be designed to work exclusively with your components. If there is any feature, lug or dimension that may cause a restriction for the standard tool please make us aware so that we can quote accordingly.

Electronic proof loading tools are all supplied with DTI gauges for displacement measurement.



Break Away Torque Testing Tools

Breakaway torque testing tools take the form of a specialised torque wrench which, whilst holding the bearing in place, measures the force required to rotate the ball once the bearing is installed into its housing.

Due to the simple and lightweight design, UNASIS break away torque testing tools can easily be used on components already installed in application. The Torque Testing Tools are simple to use and feature a memory dial indicator which records the peak force value.



Break away torque testers and receiver cups are made to order items that are designed to help measure effectiveness against the requirements of the customers specification. Typical, standard tools work within a range of 0-170in/lbs, but if the requirement falls outside of limits, a tool can be made to suit. Similarly, the hardware which retains the bearing can be adapted and customised to suit complex housings. Multiple retainers and receiver cups can be used with a single Torque Tool which keep the overall cost of a complete set low.



Custom Proof Loading and Testing Jigs and Tools

In addition to standard mechanical and electronic test equipment UNASIS is able to offer bespoke bearing testing solutions to suit requirements.



Testing Tools

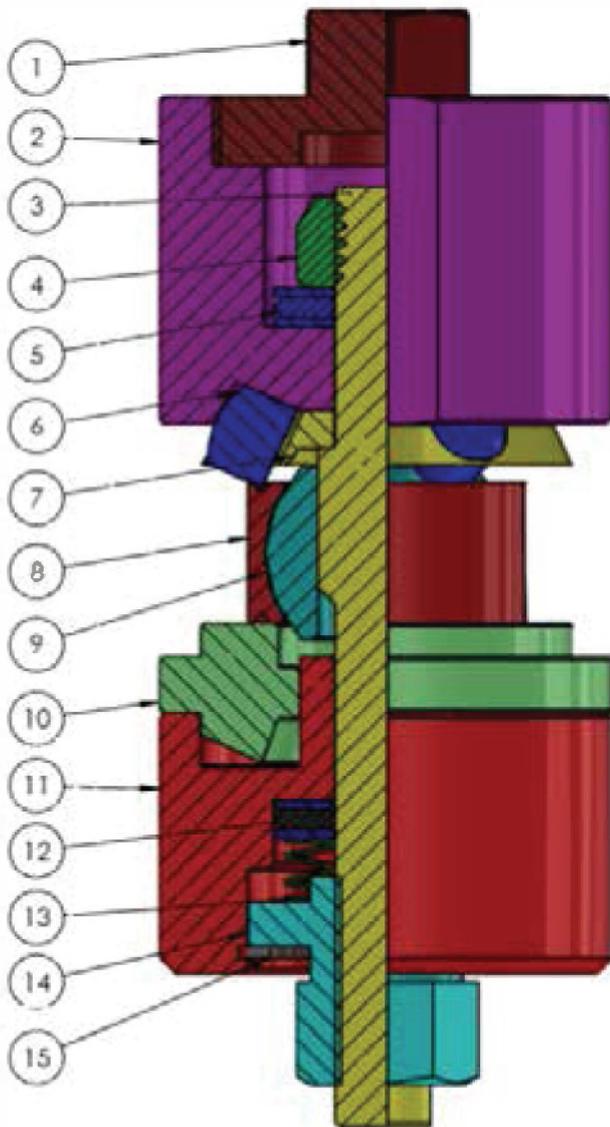
Proof Load Test Tools

UNASIS Portable Style Part Number	UNASIS Anvil Press Style Part Number	Bearing Part Number	
		14101 Series	14103 Series
IPPL4101-3	IAPL4101-3	MS14101-3	-
IPPL4103-3	IAPL4103-3	-	MS14103-3
IPPL4103-4	IAPL4103-4	-	MS14103-4
IPPL4101-4	IAPL4101-4	MS14101-4	-
IPPL4103-5	IAPL4103-5	-	MS14103-5
IPPL4101-5	IAPL4101-5	MS14101-5	-
IPPL4101-6	IAPL4101-6	MS14101-6	-
IPPL4103-6	IAPL4103-6	-	MS14103-6
IPPL4101-7	IAPL4101-7	MS14101-7	-
IPPL4103-7	IAPL4103-7	-	MS14103-7
IPPL4101-8	IAPL4101-8	MS14101-8	-
IPPL4103-8	IAPL4103-8	-	MS14103-8
IPPL4101-9	IAPL4101-9	MS14101-9	-
IPPL4103-9	IAPL4103-9	-	MS14103-9
IPPL4101-10	IAPL4101-10	MS14101-10	-
IPPL4103-10	IAPL4103-10	-	MS14103-10
IPPL4103-12	IAPL4103-12	-	MS14103-12
IPPL4101-12	IAPL4101-12	MS14101-12	-
IPPL4101-14	IAPL4101-14	MS14101-14	-
IPPL4103-14	IAPL4103-14	-	MS14103-14
IPPL4101-16	IAPL4101-16	MS14101-16	-
IPPL4103-16	IAPL4103-16	-	MS14103-16

Breakaway Torque Test Tools

UNASIS Portable Style Part Number	Bearing Part Number	
	14101 Series	14103 Series
IPBT4101-3	MS14101-3	-
IPBT4103-3	-	MS14103-3
IPBT4103-4	-	MS14103-4
IPBT4101-4	MS14101-4	-
IPBT4103-5	-	MS14103-5
IPBT4101-5	MS14101-5	-
IPBT4101-6	MS14101-6	-
IPBT4103-6	-	MS14103-6
IPBT4101-7	MS14101-7	-
IPBT4103-7	-	MS14103-7
IPBT4101-8	MS14101-8	-
IPBT4103-8	-	MS14103-8
IPBT4101-9	MS14101-9	-
IPBT4103-9	-	MS14103-9
IPBT4101-10	MS14101-10	-
IPBT4103-10	-	MS14103-10
IPBT4103-12	-	MS14103-12
IPBT4101-12	MS14101-12	-
IPBT4101-14	MS14101-14	-
IPBT4103-14	-	MS14103-14
IPBT4101-16	MS14101-16	-
IPBT4103-16	-	MS14103-16

Portable Swaging Tool User Instructions



SECTION B-B
SCALE 2 : 1

Item Number	Qty	Description
1	1	Thrust Bearing Retaining Nut
2	1	Roller Body Fixture
3	1	Draw Bolt \ Shaft
4	1	Thrust Bearing Tension Nut
5	1	3 Piece Thrust Bearing
6	3	Rollers
7	1	Tri Roller Cage Retainer
10	1	Primary \ Secondary Anvil
11	1	Tool Bottom Body
12	1	Shaft Location Pin
13	1	Shaft Location Pin Spring
14	1	Bottom Draw Nut Washer
15	1	Bottom Body Retaining Clip

Note: If cleaning of the rollers (6) is necessary; remove snap ring from draw rod, remove sleeve & retainer with rollers, clean race on the roller fixture (2), clean individual rollers (6) and clean the three pockets of the retainer (7). Place rollers (6) back into their pockets in retainer (7) so their round side is facing toward outside of the tool and are in contact with race of the roller fixture (2). Their square side must be facing toward centre of the tool. If rollers are placed in reversed direction, severe damage will occur to roller fixture, rollers and the bearing. Mount sleeve and secure it with snap ring. It is recommended to use a new snap ring every time it is removed.

Portable Swaging Tool User Instructions Cont.

Set-up Instructions

- 1) Disassemble tool by carefully removing draw rod's hex nut in Roller Fixture Assembly (items 1-7 stay together).
- 2) Insert Roller Fixture Assembly into bearing so the sleeve (3) goes through the bore of the bearing (8 & 9) and so that the rollers (6) sit into the bearing's V-groove.
- 3) Prepare Locating Fixture Assembly (items 1 – 15) by placing locating ring (10) onto the bearing base (8) in a way so its flat side (PRIMARY) is opposite to thrust bearing set (11) and retaining snap ring (10).
- 4) Mount Locating Fixture Assembly through draw rod on opposite side of bearing. Hand-tighten the nut until rollers are snug inside the V-groove of the bearing. Ensure the locating fixture ring' primary side is flush with the face of the bearing's outer race and the housing.

Note: Never over tighten causing rollers to dent or make an impression in bearing's groove lip. Ensure that the flat face (primary) of the locating ring is supporting both the bearing and the housing.

Operating Instructions

- 1) Rotate roller fixture by hand to ensure there are no restrictions.
- 2) Tighten bottom hex nut on locating ring side clockwise approximately 30 degrees causing rollers to press against lip. Use wrench but don't over tighten!
- 3) Rotate roller fixture three complete revolutions or until it rotates without resistance. Use spanner wrench on Top Thrust Bearing Retainer Nut to assist with rolling the assembly. Always rotate in a clockwise direction.
- 4) Repeat rotation and tightening until the bottom nut is rotated approximately 180° or until the bearing's lip is completely swaged and there is no gap larger than .002" - .005" between the lip and housing or until it meets the given OEM specification.
- 5) Remove the bottom Locating Fixture Assembly from the Roller Fixture Assembly by first removing the bottom hex nut
- 6) For double sided V-groove bearings, flip the Roller Fixture Assembly around so that rollers are now on the other side of the bearing in order to swage opposite side.
- 7) Prepare Locating Fixture Assembly by placing locating ring (10) onto the base (11) in a way so its angled side (SECONDARY) is opposite to thrust bearing set and bottom nut.
- 8) Mount Locating Fixture Assembly through draw rod on opposite side of bearing. Hand-tighten the bottom nut until rollers are inside the V-groove of the bearing and flip ring secondary side sits against swaged lip of the bearing.

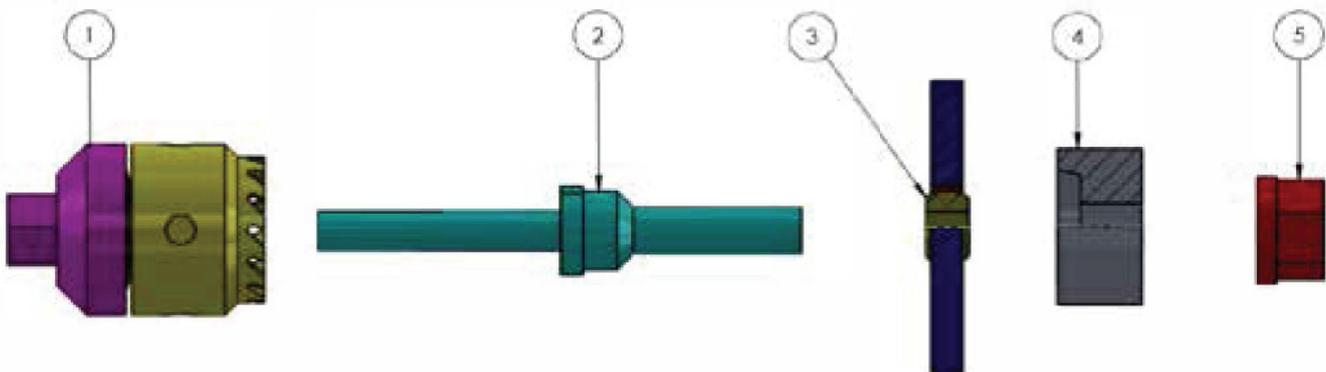
Note: Never over tighten causing rollers to dent or make an impression in bearing's groove lip. Ensure that the angled side (secondary) of the locating ring is supporting only the swaged portion of the bearing

- 1) Repeat steps 5 through 8 to swage the opposite side of the bearing.
- 2) Dismount Locating Fixture Assembly and Roller Fixture Assembly from completely swaged bearing. Examine quality of swaged lip. Re-swaging is allowable if the gap on the lip is excessive.
- 3) Mount Swaging Tool's segments back together, lightly oil and store away.

Portable Cutting Tool User Instructions

Operating Instructions

- 1) Separate cutter by unscrewing flange nut (5).
- 2) Ensure cutter head assembly (1) is connected to threaded shaft (2) but flange on shaft is not bottomed against cutterbore.
- 3) Insert connecting shaft (2) through bearing bore (3) and reassemble by tightening flange nut (5) by hand with locating fixture (4) seated in bearing groove. Finger tighten the top cutter pretension nut so that it exerts only slight pressure from the teeth on the bearing.
- 4) Turn cutter with spanner wrench 5-10 turns. The rotation takes place by inserting the rotation spanner provided into the Cutter head body (Yellow part in the image below). Do not rotate using the top nut as this will over tension the cutter.
- 5) Once the cutter rotates freely, tighten hex nut on cutter head (1) until it tensions the cutter against the bearing again and rotate the spanner wrench 5-10 turns.
- 6) Repeat step 5 until cutter has creased bearing lip .030 - .040. (Note: It is not necessary to cut completely through lip, but as a precaution cutter teeth are dimensioned to not cut into housing).



Item Number	Qty.	Description
1	1	Cutter Head & Pretension Nut
2	1	Draw Bolt
3	1	Bearing \ Housing
4	1	Locating Fixture
5	1	Bottom Flange Nut

Video of UNASIS Swaging and Cutting Tools in operation are available on You Tube and our Website.

Drill Press Swaging Tool User Instructions

Set-up instructions

- 1) Install tri-roller swaging tool (1) into drill press chuck or vertical milling machine.
- 2) Adjust spindle speed approximately 55 rpm for initial pieces (Note: This can later be increased up to 100-200 rpm depending on operator proficiency and experience).
- 3) Install bearing into housing (4) per the drawing specification.

Operating instructions

- 1) Position part (sub-assembly - bearing & housing) on the flat surfaced locating fixture (2), FIG. 1 in bearing bore.
- 2) With part resting on locating fixture slowly lower the spindle - ensuring roller fixture bushing is piloted into the bearing bore (6).
- 3) Before starting the spindle lower the roller head to ensure it will contact with the bearing V-groove.
- 4) Start the spindle and lower the tri roller onto the bearing. Apply light pressure for initial revolutions to allow rollers to centre in bearing groove (5).
- 5) Repeat 1-2 times applying slight pressure and maintain swaging tool engagement for approximately 5 seconds.
- 6) Release pressure and withdraw tool from bearing/housing sub-assembly.
- 7) Inspect swage per the requirements of the drawing or swaging specification.
- 8) Repeat steps 4 through 6 until swage is complete.
- 9) Turn sub-assembly over and repeat steps 1 thru 7 to complete swaging on opposite side, ensuring angled (conical) surface fixture (3) is used, FIG. 2 for this operation.

Notes:

- Do not grease rollers or bearing lip as the friction is needed to rotate the rollers. Using lubricants will cause the cage to become damaged.
- Clean debris from tool rollers frequently using compressed air.
- if application requires installation with sealant or primer, remove excess from bearing groove prior to swaging.

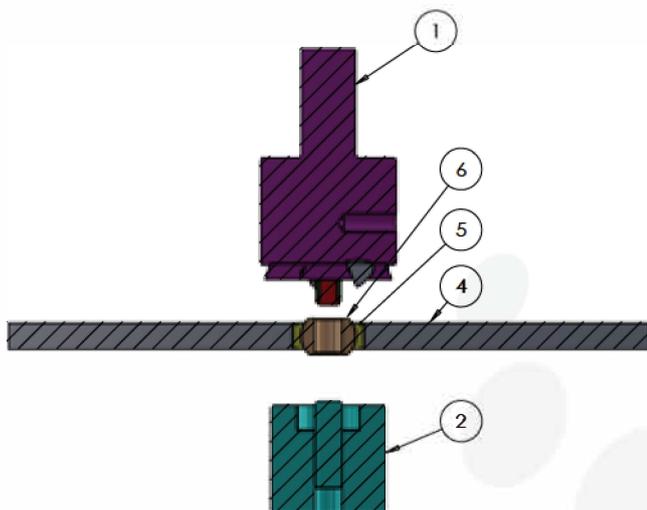


Figure 1

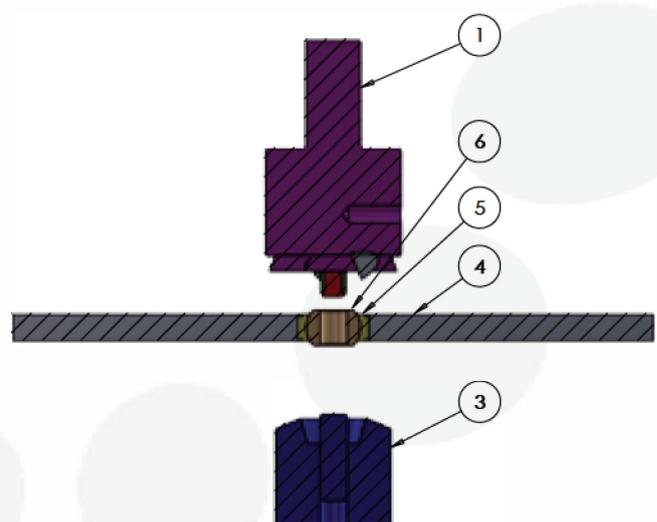


Figure 2

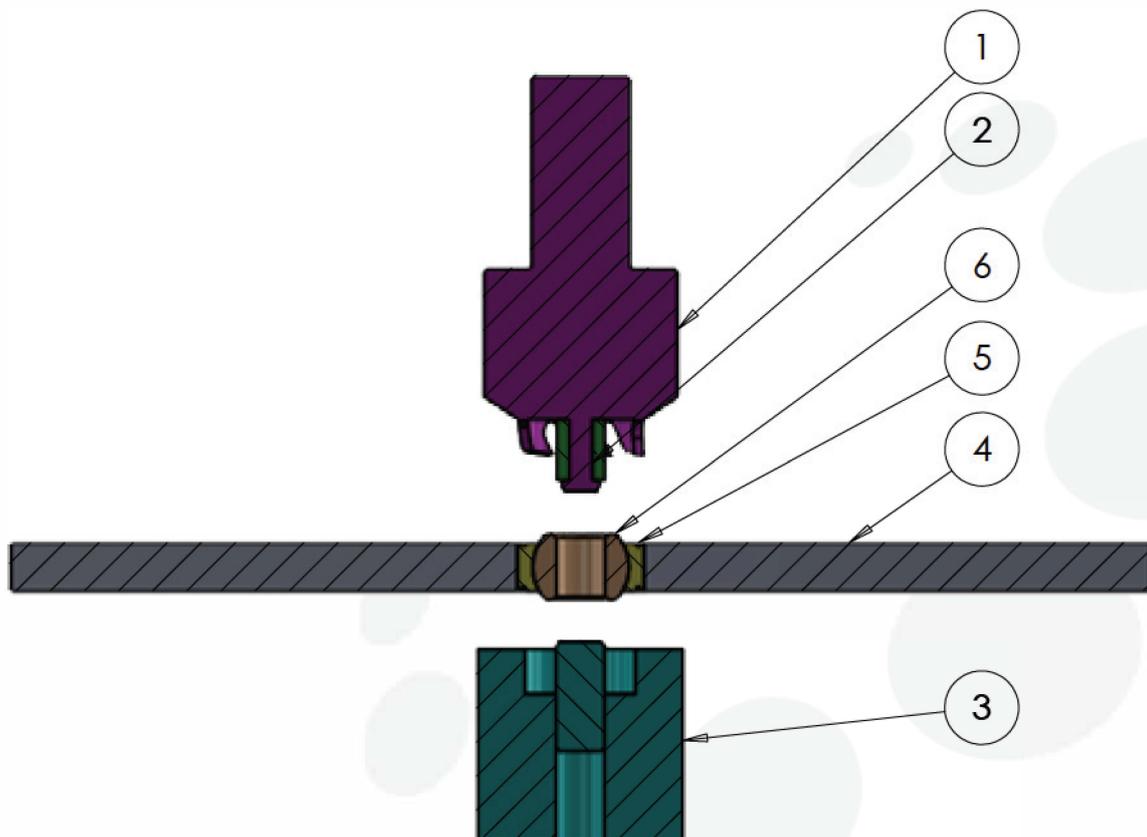
Drill Press Cutting Tool User Instructions

Set-up instructions

- 1) Install cutting tool into drill press chuck or vertical milling machine
- 2) Prior to starting the spindle rotation, bring the cutter down and ensure the workpiece is aligned correctly to cut the V-groove
- 3) Bring the cutter down until it contacts the edge of the bearing, set the spindle stop so it will let the cutter only cut .025-.035 below the initial contact point
- 4) Adjust spindle speed - approximate recommendation = 160 Rpm divided by the Bearing OD.

Operating instructions

- 1) Position part (sub-assembly - bearing & housing) on the flat surfaced locating fixture in bearing bore.
- 2) With part resting securely on locating fixture slowly lower the spindle — ensuring Cutter bushing is piloted into the bearing bore.
- 3) Apply cutting oil to the edge of the bearing.
- 4) Start the spindle and apply gentle pressure at first so the teeth start cutting the bearing, continue to increase pressure and alternate between cut and lift. Frequently check the cut depth. Do not try and force the spindle or try push past the contactstop.
- 5) Release pressure and withdraw tool from bearing/housing sub-assembly.



Specialist, Custom and Non-Standard Tools

Alongside an extensive standard range of aerospace bearing tools, UNASIS is able to produce a large range of non-standard tooling to specifications such as BACB, ABYT, ABWT or EN. Additionally, where normal swaging tools are unsuitable we can produce suitable alternate tooling such as U-roller or flat roller tools. If a non V-Grooved bearing is used we can produce tools to suit a retaining sleeve or bush.

The possibilities are endless. We pride ourselves on our problem solving abilities and produce a number of tools for restricted access assemblies and complex bearing constructions. If you have a swaging, cutting or proof loading requirement get in touch with us.

Speciality tools include, but are not limited to, the following:

- U-roller Swaging Tool
- V-roller Swaging Tool
- Flat-roller Swaging Tool
- Sleeve Swaging Tool
- Two-wheel Swaging Tool
- Anvil Staking Tool
- Ball Staking Tool
- Segment Staking Tool
- Housing Swaging Tool



Express Tool Production and AOG Services.

Do you require a tool in a hurry? Many UNASIS tools are available on an express service subject to additional charges. Typically lead times can be reduced to a matter of days on newly manufactured products. Additionally to express manufacturing UNASIS offers a number of delivery options to suit each case from next day delivery, timed deliveries and same day couriers.

For more details please contact us.

Interchange

<i>MIL-B-81936 PART No.</i>	<i>MIL-B-8976 PART No.</i>	<i>MIL-B-8942 PART No.</i>	<i>MIL-B-81820 PART No.</i>	<i>UNASIS PORTABLE SWAGING TOOL No.</i>	<i>UNASIS DRILL PRESS SWAGING TOOL No.</i>	<i>UNASIS PORTABLE CUTTER TOOL No.</i>	<i>UNASIS DRILL PRESS CUTTER TOOL No.</i>
-	MS211543	-	MS14101-3	IPST4101-3	IDST4101-3	IPCT4101-3	IDCT4101-3
-	-	MS212303	MS14103-3	IPST4103-3	IDST4103-3	IPCT4103-3	IDCT4103-3
-	-	MS212304	MS14103-4	IPST4103-4	IDST4103-4	IPCT4103-4	IDCT4103-4
M81936/1-4	MS211544	MS212324	MS14101-4	IPST4101-4	IDST4101-4	IPCT4101-4	IDCT4101-4
-	-	MS212305	MS14103-5	IPST4103-5	IDST4103-5	IPCT4103-5	IDCT4103-5
M81936/1-5	MS211545	MS212325	MS14101-5A	IPST4101-5A	IDST4101-5A	IPCT4101-5A	IDCT4101-5A
M81936/1-6	MS211546	MS212326	MS14101-6	IPST4101-6	IDST4101-6	IPCT4101-6	IDCT4101-6
-	-	MS212306	MS14103-6	IPST4103-6	IDST4103-6	IPCT4103-6	IDCT4103-6
M81936/1-7	MS211547	MS212327	MS14101-7	IPST4101-7	IDST4101-7	IPCT4101-7	IDCT4101-7
-	-	MS212307A	MS14103-7A	IPST4103-7A	IDST4103-7A	IPCT4103-7A	IDCT4103-7A
-	-	-	MS14103-7	IPST4103-7	IDST4103-7	IPCT4103-7	IDCT4103-7
M81936/1-8	MS211548	-	MS14101-8	IPST4101-8	IDST4101-8	IPCT4101-8	IDCT4101-8
-	-	MS212308	MS14103-8	IPST4103-8	IDST4103-8	IPCT4103-8	IDCT4103-8
M81936/1-9	MS211549	MS212329	MS14101-9	IPST4101-9	IDST4101-9	IPCT4101-9	IDCT4101-9
-	-	MS212309	MS14103-9	IPST4103-9	IDST4103-9	IPCT4103-9	IDCT4103-9
M81936/1-10	MS2115410	MS2123210	MS14101-10	IPST4101-10	IDST4101-10	IPCT4101-10	IDCT4101-10
-	-	MS2123010	MS14103-10	IPST4103-10	IDST4103-10	IPCT4103-10	IDCT4103-10
-	-	MS2123212	MS14103-12	IPST4103-12	IDST4103-12	IPCT4103-12	IDCT4103-12
M81936/1-12	MS2115412	MS2123212	MS14101-12	IPST4101-12	IDST4101-12	IPCT4101-12	IDCT4101-12
-	MS2115414	MS2123214	MS14101-14	IPST4101-14	IDST4101-14	IPCT4101-14	IDCT4101-14
-	-	MS2123216	MS14103-14	IPST4103-14	IDST4103-14	IPCT4103-14	IDCT4103-14
-	MS2115416	MS2123016	MS14101-16	IPST4101-16	IDST4101-16	IPCT4101-16	IDCT4101-16
-	-	-	MS14103-16	IPST4103-16	IDST4103-16	IPCT4103-16	IDCT4103-16

OEM Specification

UNASIS bearing tools are designed and manufactured to enable the operator to correctly install, swage, cut, remove, proof load and load test bearings to meet with the relevant Manufacturer specifications.

OEM	SPEC
Aerospatiale	02-110
Airbus	01-05-10
Airesearch	S8550
Barry Controls	DSW 647
Bell Helicopter	BPS 4162
Boeing	BAC 5435
Bombardier	BAPS 175-004 PSPEC 907 / PSPEC 924
Cessna	CSMP 023
Douglas	DPS 1.33 / DPS 1.33-2
Fairchild	SP 1613
General Dynamics	M 017
Grumman	GB14E
Martin	STP 35008
McDonnell	PS 17031
NAA	LA0101-006 ST0101LA0004
Northrop	FH-19/B-140
NWL	MP-80
Parker	ES2-124
Sikorsky	SS 8743
Vought	CVA 13-180
Other	
NAS 0331	NAVAIR 01-1A-5
MIL-STD-1599	TM-1500-322-24 T.O. 44B-1-122