



Machine Enhancements & Spindle Optimisation

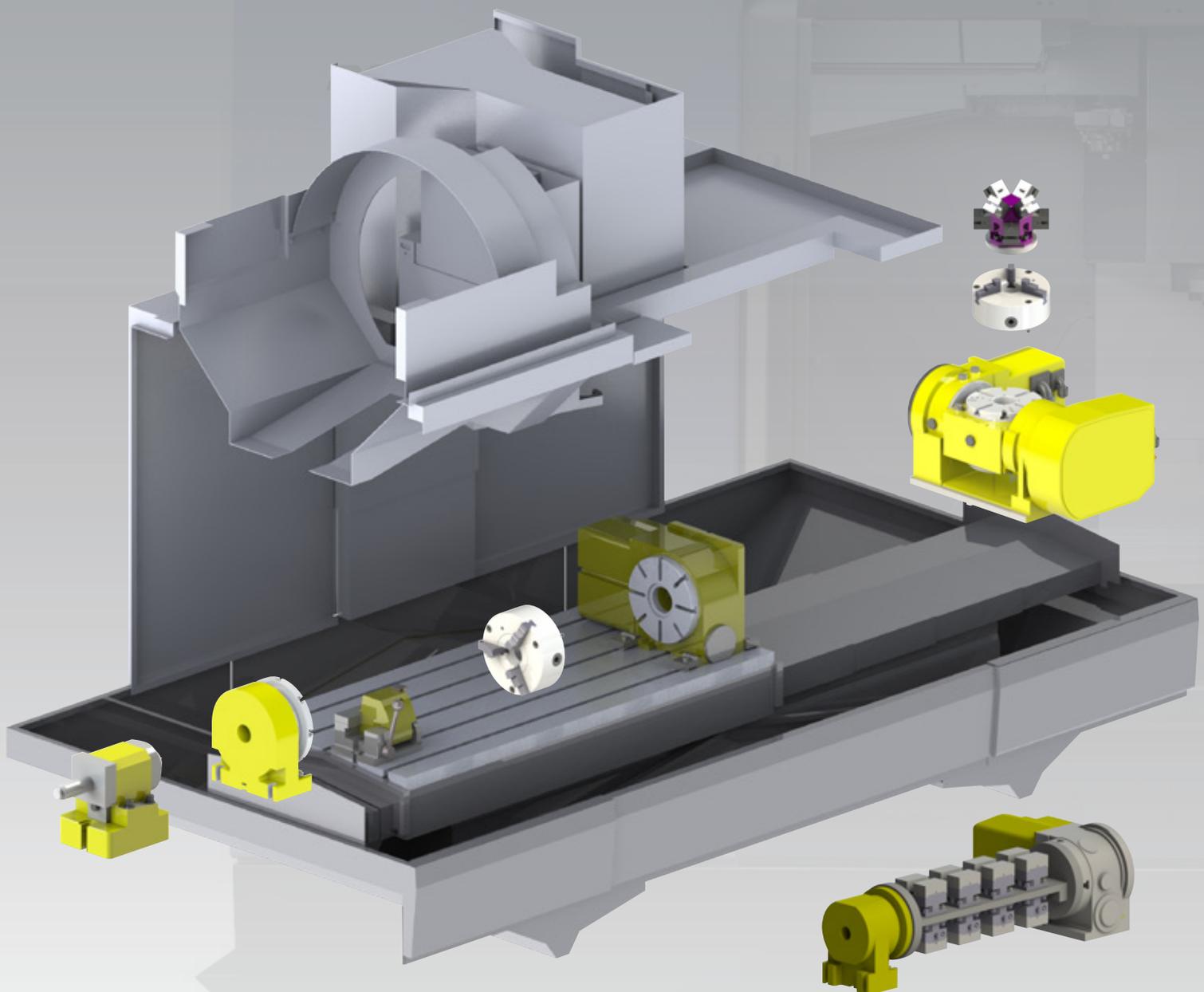


# On Machine Enhancements

## Work Holding

Our range of modular work holding integrates seamlessly with our multi axis platform approach as our zero point location and modular base rail technology are available with the NIKKEN standard table interfaces, this allows rapid change over of component fixtures and work holding set ups.

Standard clamping modules, centring vices and chucks are all interchangeable with machine bed and additional axes, in addition a wide range of standard and bespoke trunnion set ups are available as options.



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elbo controllii  **NIKKEN** Productivity Options

Feature a complete range of Tool Presetting, Tool Inspection and Tool management Systems

# Spindle optimisation

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## Rotary Tables

NIKKEN are able to provide a wide range of on Machine enhancements to create a flexible multi-axis machine platform essential for today's highly competitive market.

Our range of 4th and 5th axis tables open up the possibilities of part manufacture in a single cycle, improving process flow and productivity!

NIKKEN's extensive product range combined with technical expertise, training and after sales service come together with the Doosan range of machine tools to offer a superior end-to-end experience that allows our customers the opportunity to successfully compete in the global market.

## Advanced Tooling System Interface

NIKKEN are able to provide a complete range of advanced spindle tooling to take advantage of the dual 'taper & face contact' spindle interface.

All machining disciplines benefit from the additional rigidity and improved accuracy and repeatability, the 2-lock system will allow cutting strategy and parameters to be optimised.

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## Spindle Attachments

A range of universal and fixed angle heads are available to enhance capabilities further, they facilitate additional detail and features that would normally require additional operations and resources.

The range is complemented by NIKKEN-ALBERTI Turboflex system which can deliver spindle output speeds of up to 60,000rpm offering optimum solutions for small diameter cutters.



# On Machine Enhancements

## Rotary Tables

NIKKEN Kosakusho Works Limited, in Japan annually produces some 3500 rotary tables, it employs a global workforce in excess of 550 and has earned, and maintains, a reputation for producing quality products and demonstrating total commitment to its clients.

Our unique table construction delivers unrivalled performance and reliability, our products are fully supported by our team of factory trained service team and our advanced manufacturing specialists.

Our Tables are the perfect fit for the Doosan range of machines and offer the opportunity to combine operations and multi part load to dramatically improve productivity.



# Rotary Tables

## Industry 4.0

### Unique Table Construction

### Casting

NIKKEN Rotary Tables utilize fine grain high-density Grey Cast Iron castings, these castings are stabilized prior to finishing operations and offer long term stability, low distortion, high strength and rigidity.

NIKKEN are leading the way by utilising the latest, cloud-based technology to access big data during the lifetime of our products. Providing you with full Industry 4.0 compliance.

Being able to sense and predict failure is a major aspiration for optimizing machine uptime, with this goal in mind NIKKEN have created our new **NIKKEN I.O.**

A compact continuous condition monitoring system designed for our NC Tables.

By fitting an array of sensors inside our rotary tables that send real-time data wirelessly while in production, the NIKKEN I.O. offers a comprehensive range of monitoring including: Backlash measurement, collision detection, oil condition monitoring and power consumption.



### Gearing

For gear driven tables NIKKEN use a Patented Solid Carbide Worm Screw held in four point bearing eccentric housing matched with Heat Treated (HV1100) Steel Worm Wheel, this delivers minimal wear compared to traditional Steel/Bronze configurations ensuring accuracy and durability.



### Bearings & Seals

Independent Tubular Thrust and Radial Bearings deliver high rigidity, concentricity and provide enhanced levels of vibration dampening, inner bearing race is produced from hardened steel (HRC58-60) and the faceplate/ bearings are sealed via a special Teflon sealing ring to prevent ingress of moisture.



For details on NIKKEN Rotary Tables contact: [enquiries@nikken-world.com](mailto:enquiries@nikken-world.com)



# On Machine Enhancements

## Rotary Tables

NIKKEN NC Tables offer unrivalled quality and performance, they optimize production and can be configured for all types of Machining centres, Vertical, Horizontal, twin pallet.

NIKKEN can offer a wide range of 4th and 5th Axis Tables that can be easily configured with a variety of work holding solutions such as Trunnion fixtures, built in rotary joints for facilitating hydraulic clamping, chucking and vice systems, the range consists of gear driven and direct drive units and can be controlled by the machine tool direct or via our own Alpha21 control system.



# Rotary Tables

## Servo Specification

### Standard Rotary Tables

NIKKEN offer a comprehensive range of tables for Vertical machines, Face plate diameters range from 105mm to 1600mm and Motor positions can left hand, right hand or back mounted to ensure units are able to be mounted in the most efficient position.

Options Include:

- Built in Rotary Joints
- Direct encoders
- Zero Point Quick change solutions
- Machine Vices
- Trunnion systems
- Modular Work Holding and clamping
- Manual and Power Chuck systems
- Manual, Pneumatic and Hydraulic
- Tailstocks
- TAT end Support Units



NIKKEN Tables are suitable for all Doosan control specifications:

- FANUC
- HEIDENHAIN
- SIEMENS

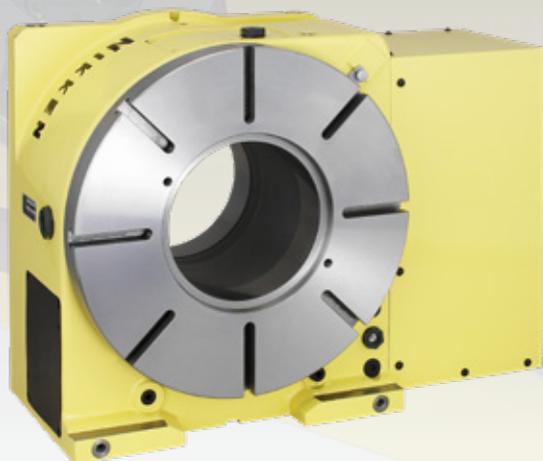
They can also be configured with the NIKKEN A21 control system:  
Control Via

- M-Code



### Big Bore Tables

Our latest generation Ultra Big Bore tables feature the same renowned internal construction, including the usual mono-block spindle design, whilst also providing large through bore access for large shaft components.



### Direct Drive Tables

To complement our range of geared tables we also feature a range of Direct Drive Tables, these offer high Rotational speed and high rates of acceleration/ deceleration- our DD-250F-150 model delivers an impressive 150rpm



For details on NIKKEN Rotary Tables contact:  
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**NIKKEN**

# On Machine Enhancements

## 5 Axis Solutions

NIKKEN are at the forefront in the field of 5 axis tables, we feature a comprehensive range to suit Doosan machining centres, they offer the opportunity to maximise productivity by combining multiple operations, and they are ideally suited for complex multi-faceted parts or components with compound detail to be machined.



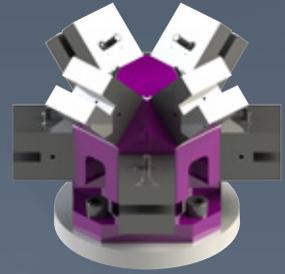
# 5 Axis Solutions

## Accessories

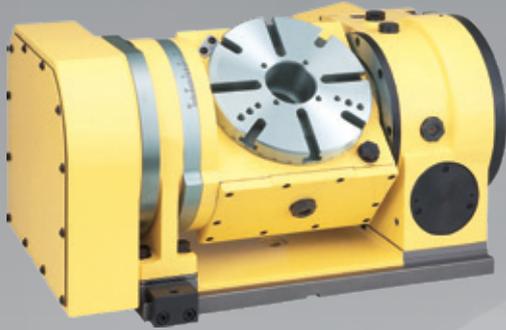
### 5 Axis Tables

5 Axis Solutions are an ideal addition to any Doosan machining centre, they are ideally suited to difficult to hold complex parts and by reducing set ups they optimise quality and productivity, in many instances a part can be manufactured and inspected in a single operation.

A comprehensive range of modular vices and chucking systems are available to compliment NIKKEN 5 Axis solutions.



"Sputnik" multi part clamping system



Compact 5 Axis units can be mounted along the Y Axis of a vertical Machine to facilitate part manufacture in a single set up.

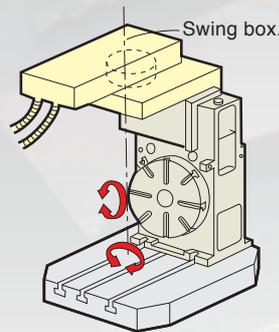
Tables can be mounted along the X axis of the machine to offer Trunnion type 5 Axis solutions, these units have face plates on the centre of tilt axis rotation to maximise working envelope.



### Top Mounted Tables for Horizontal Machining Centres

Another 5 axis solution is by combining a NIKKEN top mounted Rotary Table with the 'B' axis pallet of a horizontal machine, this can be pallet changed by utilising our swing box system, this exciting combination offers 5 Axis capability with all the benefits of a production horizontal machine.

- High Rigidity
- Enhanced Swarf Management
- Larger capacity Tool Carousel



For details on NIKKEN 5 Axis solutions contact:  
[enquiries@nikken-world.com](mailto:enquiries@nikken-world.com)



# Spindle Optimisation

## Advanced Tooling System

For many years NIKKEN have been at the forefront in the field of precision spindle tooling, we can offer a full range of systems to meet all the essential requirements when Milling, Drilling, Reaming, Boring and Threading.

Our standard tapers offer a better than AT3 interface to the machine spindle and this optimises performance whilst helping to protect the machine spindle from the effects of vibration and cutting forces, this can be further enhanced with our NBT connection that offers simultaneous taper and face contact with the spindle for 30, 40 and 50 tapers.



# NC Tooling System

**Pro End Mill**, a unique tool from NIKKEN and the ultimate solution for Indexable Milling up to 32mm, Taper and Face contact as Standard for maximum rigidity, Unique "MD" anti-vibration technology

**Multi-Lock Milling Chuck**, The market leading solution for cylindrical tools shanks up to 42mm, tools are available in a wide range of lengths and diameters and our unique design and manufacturing processes ensure long lasting performance, tested to 2,000 tool loads

**Mini-Mini Advanced**, our ultimate solution for small diameter end mills (up to 12mm), tools are gripped up to the front nose of the chuck minimising overhang and maximising rigidity-the essential requirement for milling with small diameter cutters, our unique Tin bearing design allows high clamping forces without distortion to maximise rigidity and accuracy, balanced to G2.5 for high speed applications.

**Slim Chuck**, the precision standard for collet chucks, the latest slim chuck from NIKKEN incorporates the Tin Bearing Nut that combined with the 8 degree SK collet delivers unrivalled performance in terms of accuracy, repeatability and rigidity. A very wide range of gauge length and nose profiles offers total flexibility to solve any precision application.

**Zero Fit**, The ultimate solution for accuracy- run out is adjusted while in the machine spindle and readings of 0-2u are easily achieved and we strongly recommend this for precision operations such as reaming where tool run out is of critical importance

**RAC Modular Boring (25mm-580mm)**, the new RAC boring system from NIKKEN offers twin cutting edges and rough boring is achieved efficiently by our new generation design that uses ultra-precision ground serrations in the cartridges to counter cutting forces and deliver a smooth cutting action.

**ZMAC Modular Boring (16mm-180mm)**, our latest ZMAC advanced sets new standards in the field of precision boring, the new cartridge design allows for easy micron adjustment while the ZMAC boring head design ensures that the cutting edge is always supported by the boring head body to ensure maximum rigidity, this combination makes it easy to reliably achieve high dimensional precision and superior surface finishes.

**EMAC-Digital Boring**, our new EMAC system utilizes a digital head with a series of accessories and boring bars to deliver precision boring capacity of **6-110mm** in just one standard boring kit, assemblies are easily constructed to achieve the desired bore diameter and perfect adjustment is made via a the digital.



For details on NIKKEN advanced tooling systems contact:  
[enquiries@nikken-world.com](mailto:enquiries@nikken-world.com)

# Spindle Optimisation

## Angle Heads

With 35 years of experience and over 50,000 products installed NIKKEN-ALBERTI are delighted to be able to offer a wide range of Angle Heads and attachments to enhance the functionality of any Vertical Machining Centre, whether that be increasing the output RPM of the spindle or machining internal features otherwise impossible to achieve by other means, NIKKEN have a solution.

All our attachment bodies are manufactured from GS600 stabilized spheroidal Cast Iron to better absorb vibration and deliver higher levels of thermal stability, they are further enhanced by a matt Chrome finish. They are produced using 'lost wax' process moulding technology, this delivers the highest levels of purity and stability allowing ALBERTI to produce lighter compact head designs with the necessary rigidity to meet the demands of the toughest applications.

All units come in a sturdy case and are complete with wrenches, Instruction manual, test Certificate and Doosan stopper Block (Machine Specific).



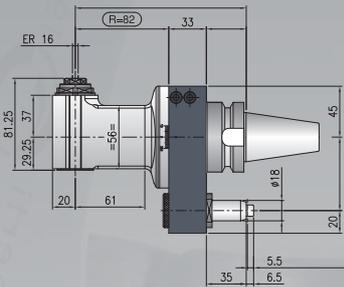
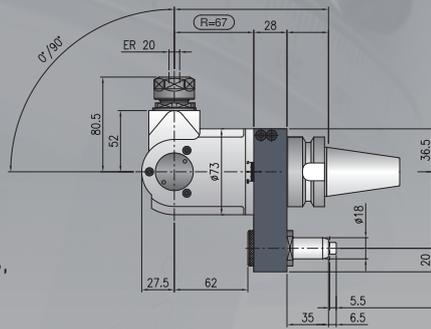
# Angle Heads

## Standard & Universal Angle Heads

NIKKEN offer a wide range of standard and Universal Angle heads, they are designed for integration to the machine tools ATC and to enhance the capability of any standard 3 Axis machine platform.

A comprehensive range of heads are available for selection and integrate via a standard twin location spindle stopper block, heads are now available with NIKKEN SK output.

Optional specifications such as through coolant capability, twin outputs are available – please refer to NIKKEN-ALBERTI standard Angle Head Brochure.



# Integration



Single or twin location stopper blocks are available for the latest Doosan Range of Machines, these locations are suitable for mechanical and Turboflex (air driven) heads.



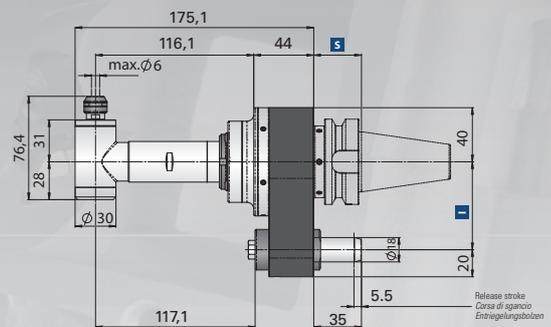
Airline kit for Turboflex system

## Turboflex & Slimline 90° Heads

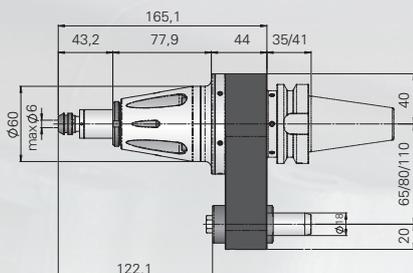
The Turboflex & Slimline range offer the opportunity to increase spindle speed outputs.

Turboflex heads are driven by air delivered through the pin/air location in the stopper block, the machine spindle is static and the output speed is fixed by the air motor type, Turboflex options offer long duty cycles- up to 500 hours constant running.

Slimline heads are spindle driven and output is controlled via the machine spindle speed (subject to output ratio).



## Turboflex Speed Increaser 20/30/60.000 RPM



NIKKEN Turboflex heads utilize an air motor inside the main tool body to drive the tool (machine Spindle remains Static) these heads offer high output speeds and long duty cycles, they are ideally suited to small diameter tools where applications demand high spindle speeds.



For details on NIKKEN spindle optimisation contact:  
[enquiries@nikken-world.com](mailto:enquiries@nikken-world.com)



# Productivity Options

## Tool Presetting

Centralised Tool Setting Solutions from NIKKEN

A single tool presetter can be utilized for multiple machines and spindle types

Tool Inspection - run out and geometry check to minimise non-conformance/scrap caused by tool errors

Non-contact measurement of tools prevents damage to cutting tool and machine spindle

Next Job pre-planning and tool setting done while machines are still producing, significantly reduces down time



# E346i

# E460N



NIKKEN KOSAKUSHO WORKS LIMITED and ELBO CONTROLLI SRL, a major player in the fields of Tool Presetting, Inspection and Tool Management Systems, are delighted to announce that they have now commenced a new global Strategic Alliance.



## Entry level Presetter

**Description:**

E346i Tool presetter complete with ISO spindle and re-setting gauge

**Features:**

- Granite column and base
- Digital camera
- Interchangeable spindle

**Measure Range**

340mm Diameter  
460mm Length

- |                             |   |
|-----------------------------|---|
| Interchangeable Spindle     | ✓ |
| Cutting Edge Inspection     | ✓ |
| Tool Inspection             | ✗ |
| Label Printer Compatible    | ✓ |
| Offset Transfer via Network | ✗ |
| Tool Management             | ✗ |



## Network ready Presetter

**Description:**

E460N Tool presetter complete with ISO spindle and re-setting gauge

**Features:**

- Granite column and base
- Digital camera
- Interchangeable spindle with vacuum clamping
- Tool Management with universal Post Processor generator

**Measure Range**

400mm Diameter  
600mm Length

- |                             |   |
|-----------------------------|---|
| Interchangeable Spindle     | ✓ |
| Cutting Edge Inspection     | ✓ |
| Tool Inspection             | ✓ |
| Label Printer Compatible    | ✓ |
| Offset Transfer via Network | ✓ |
| Tool Management             | ✓ |



For details of how NIKKEN can improve your productivity contact: [enquiries@Nikken-world.com](mailto:enquiries@Nikken-world.com)





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