

# **TX** LINEAR



**ANCA**  
CNC MACHINES

# TX *LINEAR*

The best just got better!

ANCA's new TX Linear range includes TX7 Linear and TXcell Linear.

TX7 Linear is the new industry benchmark for production grinding and machining of cutting tools and components. With its large working envelope and powerful grinding spindle, TX7 Linear will deliver precision and productivity across the widest range of applications.

TX7 Linear finds the perfect balance between proven designs combined with ANCA's newest technologies. The rigid bi-symmetrical column design on the solid polymer concrete base has been the foundation design of ANCA machines over the years. Now, in addition, ANCA's new LinX cylindrical linear motors and linear glass scales are fitted as standard on X, Y and Z for proven and unsurpassed long term reliability and accuracy. The result is a superior machine that ensures customers will meet ever increasing market demands of precision CNC tool grinding, no matter the industry.

Taking the step up to TXcell, keeps all the capabilities of the TX7 Linear and adds automatic tool changing and 9 wheel packs as standard, with the option of up to 24 wheel packs, delivering the ultimate in machine flexibility.

Incorporating over 40 years of software experience, TX7 Linear and TXcell Linear run ANCA's ToolRoom application software. This will ensure you can easily program all the tools you know, while allowing scope for others you haven't yet thought of.





# LinX Linear Motors

## **Performance**

The TX Linear range uses ANCA LinX Linear Motors for axis motion (X, Y and Z axes). In conjunction with linear scales, a high level of machine precision and performance is able to be achieved, resulting in superior tool accuracy and surface finish. With LinX Linear Motors there is no loss of machine accuracy over time due to wear and it is not affected by temperature variations. The LinX Linear Motor has higher axis speed and acceleration leading to reduced cycle times. It achieves this while maintaining a smoother axis motion.

## **Unique Cylindrical design**

Existing flat bed type of linear motors can have some drawbacks when used with tool grinders. A cylindrical design overcomes these drawbacks which is why ANCA developed this particular design of Linear Motor for their new TX Linear range.

## **Reliable**

The cylindrical LinX Linear Motors experience less wear as there are no contacting parts. They have been specially designed for a lifetime of operation in harsh grinding environments. As the magnetic field is cylindrical there is no additional down force on the rails or machine base.

## **Rated to IP67**

With the unique cylindrical design the LinX Linear Motor is sealed to IP67. This sealing keeps out grinding contamination helping to extend the life of the linear motor.

## **Does not need a separate chiller unit**

The LinX uses less energy than an equivalent flat bed style linear motor and has the same power consumption as a ballscrew system but with more efficiency. The design of the motor also naturally isolates any heating effects

from the machine. Because of this reduced heat load the LinX does not need a separate chiller unit and uses the machine's regular coolant system reducing required floor space and power.

# TX<sup>7</sup> LINEAR

The new  
benchmark  
universal grinder

TX7 Linear is ANCA's premium grinding machine, aimed at the most demanding and diverse applications. The TX7 Linear's large working envelope allows you to grind the widest range of tools, from a simple 3mm endmill, to a 400mm long drill or a 300mm diameter face cutter. The 37kW grinding spindle, mounted in a rigid machine design, ensures heavy grinding operations too, can be completed with ease. TX7 Linear includes, LinX linear motors on X, Y and also Z axis, ensuring a life time of uncompromised precision. Automation and a range of machine accessories mean the TX7 Linear can be equipped to meet the specific needs of tomorrows most stringent grinding applications.

## OVERVIEW

- ANCA LinX linear motors and linear scale feedback on X, Y and Z axis
- ANCA Motion AMC5 CNC with touch screen user interface
- 37kW (49HP) peak power direct drive spindle with BigPlus arbor
- 2 wheel pack changer with up to 4 wheels per arbor, maximum wheel diameter 200mm (8")
- On machine tool measurement with standard touch probe and optional LaserPlus and iView
- Variety of tool support options including fixed and travelling steady
- Two independent wheel dressing options
- Tool loading option with ANCA's RoboMate loader



# TX **CELL** LINEAR

## Grinding without compromise

TXcell Linear enjoys all the function and features of the TX7 Linear, but has a standard robot loader, capable of changing wheel packs up to 300mm diameter and work pieces. Wheel packs can be substituted with endmills, polishing or deburring brushes or spindle speeders to further extend the range of applications and operations possible on the TXcell. In addition, using the robot's inherent flexibility, ANCA's Engineering team can develop customised solutions for pre and post grind operations such as part gauging, laser etch marking, cleaning and more.

## OVERVIEW

- TXcell machine delivers all the same functions and options as TX7 Linear machine but additionally includes a robot cell
- TXcell Linear's robot cell is offered in two configurations:
  - Small, with 2 tool loading pallet stations and 9 wheel pack stations with option up to 14
  - Large, with 4 tool loading pallet stations and 9 wheel pack stations with option up to 24
- Loads wheel packs up to 300mm (12") diameter, together with their coolant manifold
- Loads rotary cutting tool from 3mm up to 32mm diameter and up to 350mm long
- Can have custom engineered solutions, to load non-round components, and include pre and post grinding operations in the TXcell Linear



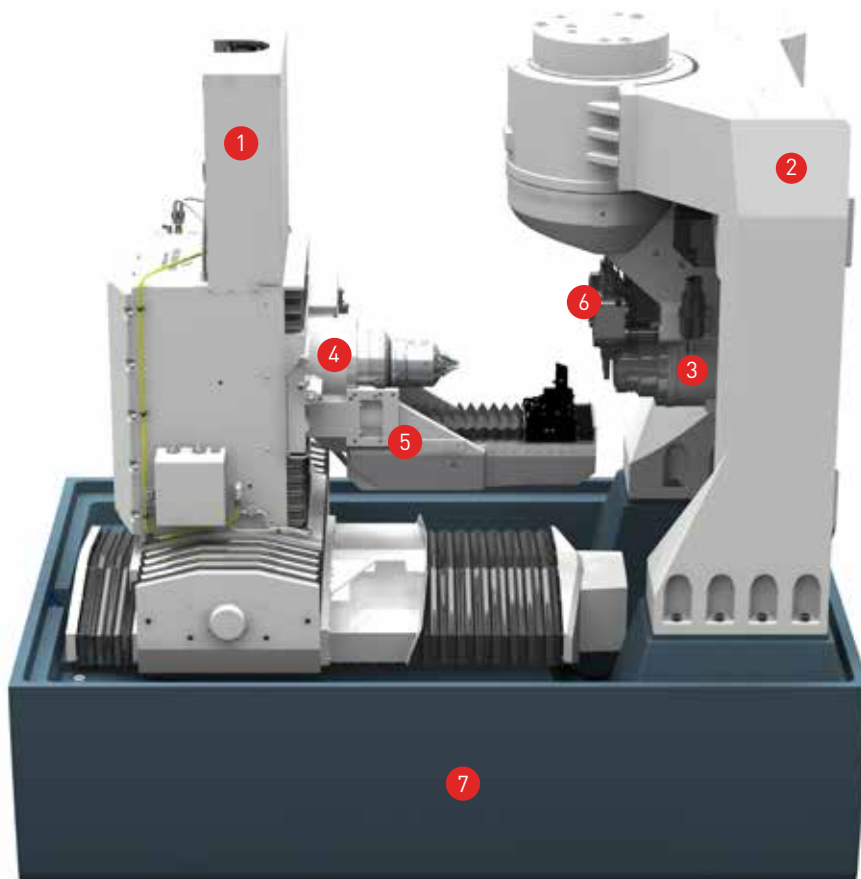
# Enhanced Accuracy

## Upgraded Technology



- 1 Control Panel** – including touch screen, USB ports and space for a standard keyboard. Ergonomic tilt adjust to suit different height operators
- 2 Hand-held Remote Pendant** – includes ANCA's MPG Feed to make machine control and setup easier and safer
- 3 Software** – ANCA's market leading versatile & intuitive tool design software is easy-to-use
- 4 Tool / Wheel Measurement Options** – automated for increased productivity. LaserPlus tool measurement and compensation system. Wheel Probe for automatic wheel qualification. Both are permanently mounted inside the machine for use at any time. iView camera is also offered
- 5 Large Working Envelope** – for tool lengths up to 400mm (16") long, and up to 300mm (12") diameter gives total flexibility to tackle any job
- 6 Loader Options** – Robomate loader for loading rotary cutting tools on TX7 Linear, or TXcell for extra capacity of tool and wheel pack loading
- 7 Machine Control System** – ANCA Motions latest AM5C CNC and AMD5X servo-drives provides all the computing power needed for sub-micron motion control





- ① **ANCA Motion LinX linear motors on X, Y and Z** – and linear scales improve precision and performance for uncompromised accuracy and surface finish over the machine life
- ② **Bi-Symmetrical Gantry** – is a proven design for ultra-high precision grinding. It keeps the grinding spindle centre of rotation (C-axis) on the machine centreline which delivers superior rigidity and minimises effects of thermal growth
- ③ **37kw (49hp) direct drive spindle** – Induction motor spindle runs up to 8000RPM, with options for 10,000RPM and 15,000RPM. Grinding wheel packs mount on a BT40 BigPlus taper for outstanding rigidity and repeatability
- ④ **Rigid headstock** – Will take ANCA's own Premier collet system for holding round cutting tools, but also includes an BT 50 taper workhead to mount customer specific work holding. Headstock can run up to 3000RPM supporting wheel dressing and cylindrical grinding operations
- ⑤ **Tool-Support** – Several tool support options can be mounted from the Z-Axis, ensuring tools are supported accurately. These include fixed position pop up steady, travelling steady (p-axis) and tailstock
- ⑥ **Wheel pack changer** – TX7 Linear features dual wheel pack changer. Upgrade to TXcell with 9 standard, but options for up to 24 wheel packs. Coolant manifolds also change with the wheel packs
- ⑦ **Polymer Base (ANCAcrete)** – provides excellent thermal stability and vibration dampening properties delivering grinding process stability and outstanding tool surface finish

# Automation



## RoboMate Loader

ANCA's RoboMate robot loader is a versatile and flexible automation solution that is equally efficient on a range of ANCA CNC tool and cutter grinders. Using the accuracy and reliability of the Fanuc robot, RoboMate takes the tool directly from the pallet to the collet in a single grip.

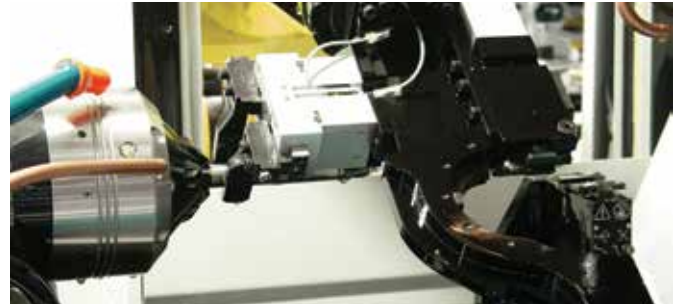
- ANCA's own RoboMate software makes setup and programming simple
- Proven Fanuc reliability
- Designed with high levels of safety and ergonomics
- Available with 2 pallets (standard) or 4 pallets (optional)
- Cost-effective, efficient and fast
- Includes high capacity pallets
- Optional RoboTeach software allows operators to easily reteach robot positions if required

The RoboMate can load tool diameters from Ø3 mm (1/8") to Ø32 mm (1 1/4")

- Maximum tool length 350 mm (14")
- The size of the loader is:

L 2379 mm x W 722 mm x H 1865 mm

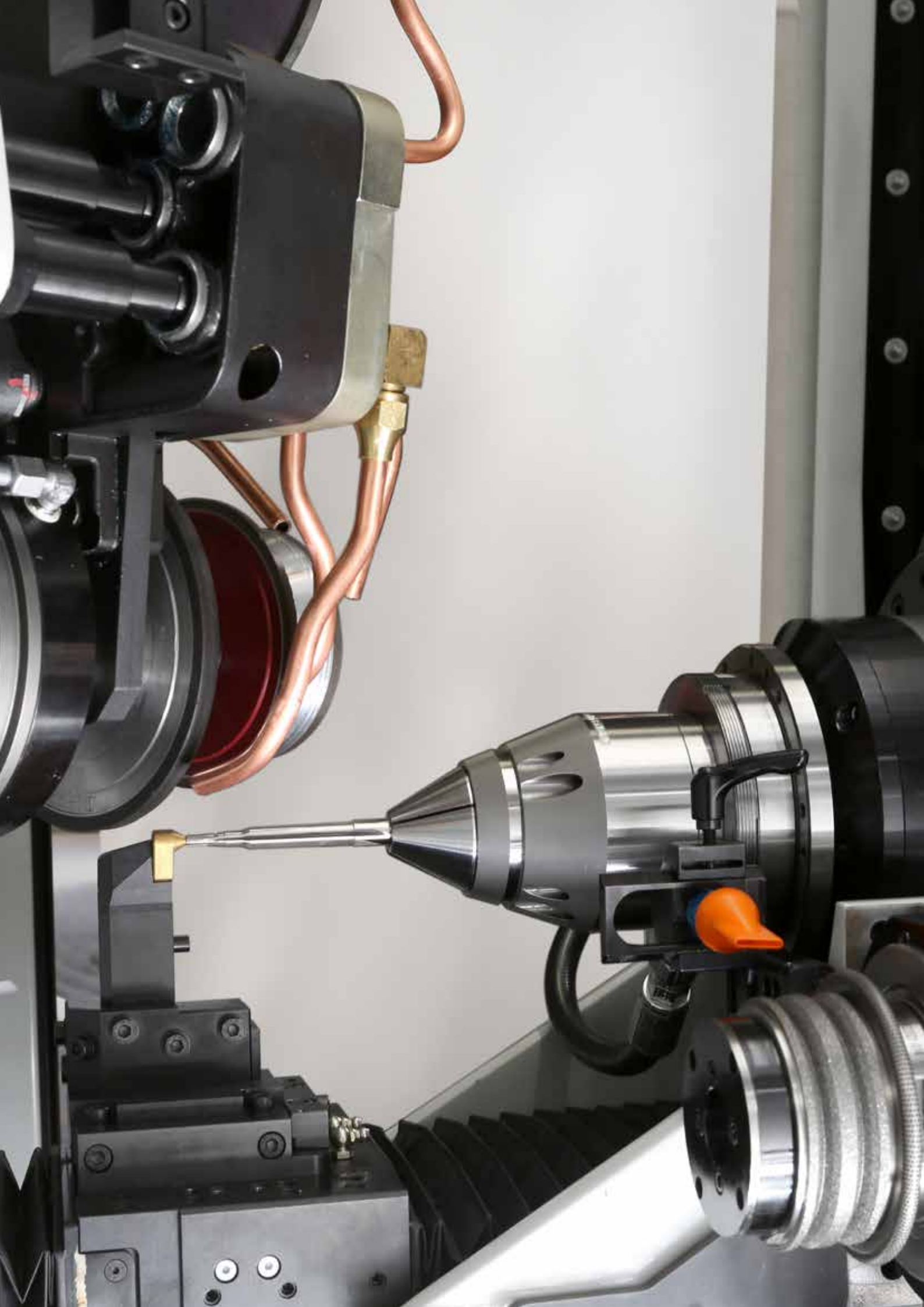
L 94" x W 28" x H 73"



## TXcell Linear

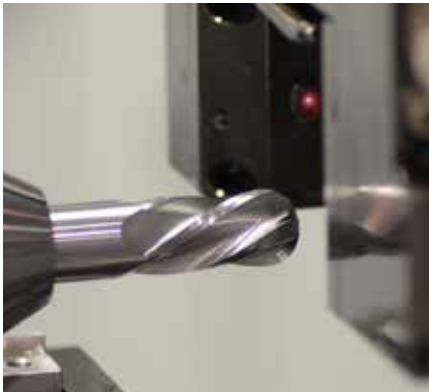
TXcell greatly extends the capabilities of the TX7 Linear machine. The highly flexible robot loader adds wheel pack capacity and tool changing as standard, and opens up options for custom solutions for pre-and post grinding operations.

- ANCA's own RoboMate software makes setup and programming simple
- Proven Fanuc reliability
- Two size cells. Small has 2 tool pallet stations, large has 4 tool pallet stations.
- Small cell has 9 wheel packs with option up to 14. Large cell has 9 wheel packs with option up to 24.
- Maximum wheel diameter 300mm (12") on selected stations.
- Maximum payload (wheel pack or tool) is 8kg.
- TXcell can load tool diameters 3mm to 32mm. Maximum tool length is 350mm (14")



# Accessories

## Accuracy & Repeatability



### LaserPlus

The LaserPlus provides accurate and repeatable measurement of tools. It provides similar capability to iView, but is instead permanently mounted inside the machine and runs automatically and in process. LaserPlus can automatically measure and compensate tool OD, run-out, nominal radius of ball nose and corner radius endmills, and profile of ballnose, corner radius and profile form tools. Typically, the LaserPlus can achieve +/-0.003mm accuracy or better. Air blast unit on the laser ensures coolant or contaminants do not interfere with the measurement process.

- Batch grinding consistency
- Faster set-up times with less scrap
- Measures the tool inside the machine
- Air purge prevents coolant ingress
- Maximum tool diameter 45mm
- Laser OD SPC cycle also available

### Travelling Steady

The Travelling Steady (P-axis) provides the machine with an additional programmable axis for support of tools with long aspect ratio (length : diameter). Different tooling options are offered. Hydraulic Arobotec and standard bush are typically used for grinding of long drills, keeping the support under the grinding wheel at all times. Tailstock will support tools with a centre at the end.

- Ensures rigid support for long tools
- Reduction of vibration and chatter when grinding
- Fully programmable position
- Arobotec supports helical drills with a back taper
- Tailstock has programmable force control
- Increased machine output and high productivity
- Higher feedrates and reduced cycle times are possible

### Wheel Probe

The auto wheel pack qualification probe accurately measures grinding wheels inside the machine. Permanently mounted inside the machine, the wheel probe uses a Renishaw probe arm to qualify the wheel pack. It is possible to measure the front and back surface location, wheel diameter and toroid radius of a grinding wheel. It eliminates the need for operator intervention which ensures consistent measurement results.

- Automatically measures a wide variety of wheel shapes
- Eliminates the need to manually qualify the wheel pack
- Eliminates the need to remove the wheel pack from the grinder
- Increases machine productivity
- Reduces first tool rejections

# Accessories

Productivity & Profit



## Wheel Dressers

Two wheel dressing options are available. Able to run at 3000RPM, the machine headstock can run a 200mm dresser roll. Additionally, a secondary motorised dresser can be added. This features quick change HSK arbor and can hold multiple wheel dressing rolls on one arbor.

- Integrated Dressing Software on the machine for complete flexibility of in process dressing
- Seamless integration with ANCA's iFlute wheel design software
- Automatically update grinding wheel size after dressing
- Mount plated diamond or aluminium oxide dresser rolls
- On machine dressing ensures zero runout on grinding wheels
- Maintain wheel form and grinding performance to maximise machine productivity

## Auto White Stick

Automatic wheel conditioning system improves the life and grinding performance of resin bond grinding wheels. When continually grinding, wheels become glazed, or loaded. The sticking process exposes the wheel grit and removes chips (swarf) embedded in the wheel so the wheel cuts better.

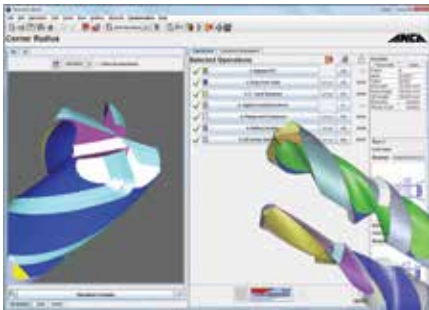
- Reduces tool burn and wheel glazing
- Improves feed rates and reduces cycle times
- Increases life expectancy of grinding wheels
- Saves time and increases operator safety
- Two white sticks available
- Integrated Software on the machine for complete flexibility of in process sticking

## Spindle Speed Increaser

The spindle speed increaser gives you options to run grinding wheels up to 42,000RPM. Driven by the main grinding spindle, the speed increaser will ensure smaller grinding wheels, such as those used for PCD pocket grinding, run at their optimum operating speed.

- Used in place of a regular wheel pack
- Includes BigPlus BT40 taper
- Can be changed out automatically, same as a regular wheel pack in TX7 or TXcell
- Opens up new applications such as PCD pocket grinding and internal grinding where small grinding wheels are required
- Includes a range of collet sizes top to 7mm

# Software



## ToolRoom

ANCA's versatile software is what sets ANCA and its customers ahead of the competition. ANCA has 40 years of tool grinding experience and is well-known for its user-friendly and flexible tool design software.

ANCA's ToolRoom software suite caters for a wide range of tool types and applications with an easy-to-use interface to input tool geometry parameters. ToolRoom ensures that the FX Linear machines will efficiently handle any regrinding or manufacture challenge.

The machine operator is able to easily and quickly set up or modify tool programs, depending upon the required tool type. For more proficient users, advanced software pages exist to access complex tool designs and operations.

ToolRoom supports the grinding of drills, end mills, profile tools, burrs, routers and many other special applications.



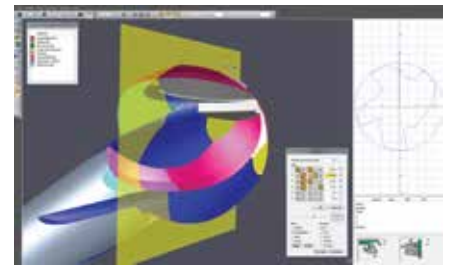
## Management Suite

The management suite provides customers with the ability to manage their tool production, tool files and wheel files. This standalone software comes with three main features

REDAX monitors machine production 24/7 in real-time and delivers upto date information, greatly enhancing the visibility and control of the tool manufacturing operation. This system will enable the customers/ business to improve the productivity of their machines by reducing machine downtime, analysing tool production, and past & present production history.

Wheel management is a server based wheel library which provides a means to easily share wheel packs and qualification data between machines.

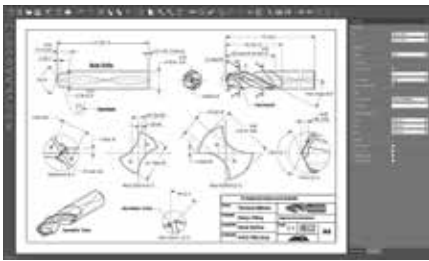
Tool management is also a server based application which makes it easy to transfer between simulators and machines. This also maintains version control and history of all the tool files. This has user permissions for read/write for better control of tool files.



## CIM3D

CIMulator3D simulates the programmed tool path exactly as it would be ground on the machine. New tool programs can be verified for size, shape, machine clearance and even cycle time estimates. CIMulator3D maintains continuous work flow through the machine by reducing development time and trial grinding.

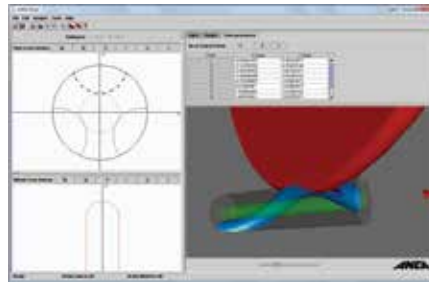
# Software



## ToolDraft

ToolDraft software package is used for creating 2D cutting tool drawings from a simulated tool or direct from ToolRoom. This is built on the foundation of CIM3D engine projecting a 3D model into accurate 2D projection views like end face view, side view, isometric view etc. This will help customers to create drawings of cutting tools manufactured on ANCA machines without relying on third party software. Some of the features and benefits of the package are

- Dimension all tool features with tolerances and surface finish requirements.
- Annotate drawing with text, images, and drafting symbols from the drafting symbols library.
- Load and save customer defined drawing templates with defined text, line and colour styles.
- Export drawing as PDF or DXF with ability to print drawings



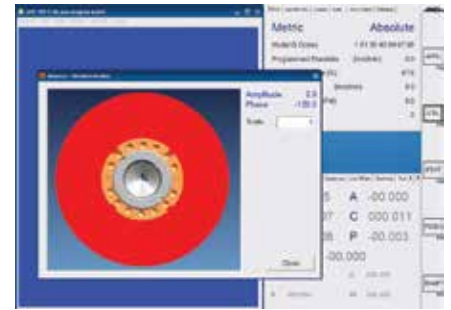
## i-Flute

iFlute is a stand-alone Windows based application for designing both grinding wheel and flute profiles. The main benefit of iFlute is its ability to calculate the ideal wheel shape required to produce any possible flute cross-section.

iFlute takes all the hard work out of tap flute design and manufacture. Using either the DXF import facility or the in-built editor allows the designer to either

- Specify a flute shape in order to calculate the required wheel geometry and fluting parameters.
- Specify a wheel shape and fluting parameters to determine the resulting flute shape.

These results can be directly imported into the iTap and wheel editor software to automatically set up the process parameters and dress the wheel.



## i-Balance

Perfectly balanced wheels are a key to achieving the required surface finish and maintaining the wheel radius for tap grinding. iBalance is an ANCA designed wheel balancing system to achieve both the above. It is a cost-effective system as the iBalance software uses hardware already on the machine.

iBalance enables the balancing of wheel packs in the machine using a semi-automatic process. heel packs are balanced by adding weight to the wheel nut at locations indicated by the iBalance software assistant. The software is also able to monitor the wheel balance while the machine is in operation. Some of the benefits of i-balance are

- Provides improved tool surface finish due to the removal of wheel vibration
- Extends wheel life
- Cost-effective and practical
- User-friendly graphical interface

# Service

## **Comprehensive Global Network of Service Centres**

We have a global network of ANCA service centres and maintain one of the most experienced machine tool field service teams in the world. Our service technicians are OEM factory trained and provide the highest quality level of service to keep your tool grinder up and running.

## **Technical Queries & Application Support**

Our factory trained service technicians are able to provide technical support and advice to keep your machine running at peak performance. ANCA also has an extensive network of applications engineers who can provide tool grinding solutions at a local level.

## **Training**

Machine training can be made available with a machine order or purchased separately at a later date. Training is provided in a wide range of topics, including robotics and machine maintenance.

## **Preventative Maintenance**

Prevent unexpected downtime by regularly maintaining your ANCA tool grinder. The user manual will advise what should be done to keep your machine in premium condition on a day-to-day basis. Maintenance Notification Software (MNS) automatically prompts the operator when certain key maintenance activity should be done. ANCA can help you further ensure you extend the life of your machine with its scheduled maintenances.

## **Service Contracts/Maintenance Agreements**

To keep your machine running in peak condition and to minimise machine downtime an ANCA service contract/maintenance agreement can help you identify potential problems before they occur. This means you have one less thing you need to worry about. Please contact your local ANCA branch for a customised quote.

## **Replacement Parts**

ANCA are able to provide Original Equipment replacement parts to ensure the high quality of your machine is maintained throughout its lifetime.

## **Software & Hardware Upgrade Programs**

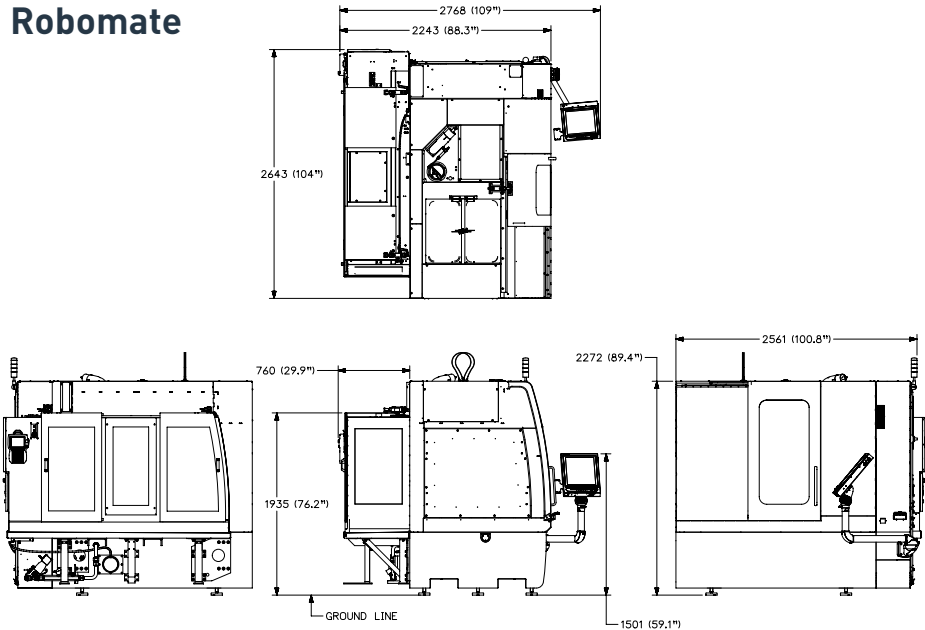
ANCA CNC tool grinders are known to have long service lives and software and hardware is updated frequently. The Service Department can assist you with updates for your machine to take advantage of more recent technology.



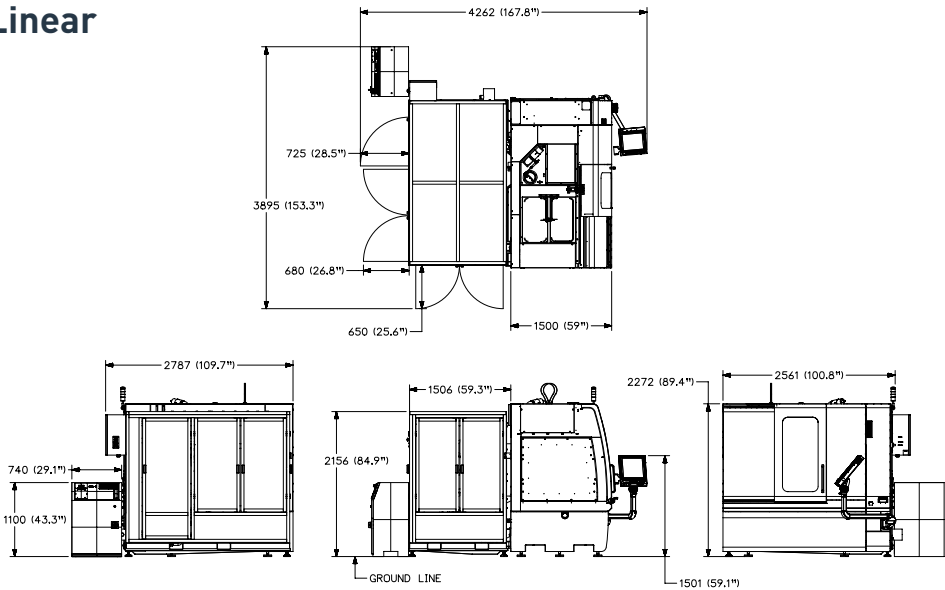


# Floor Plans

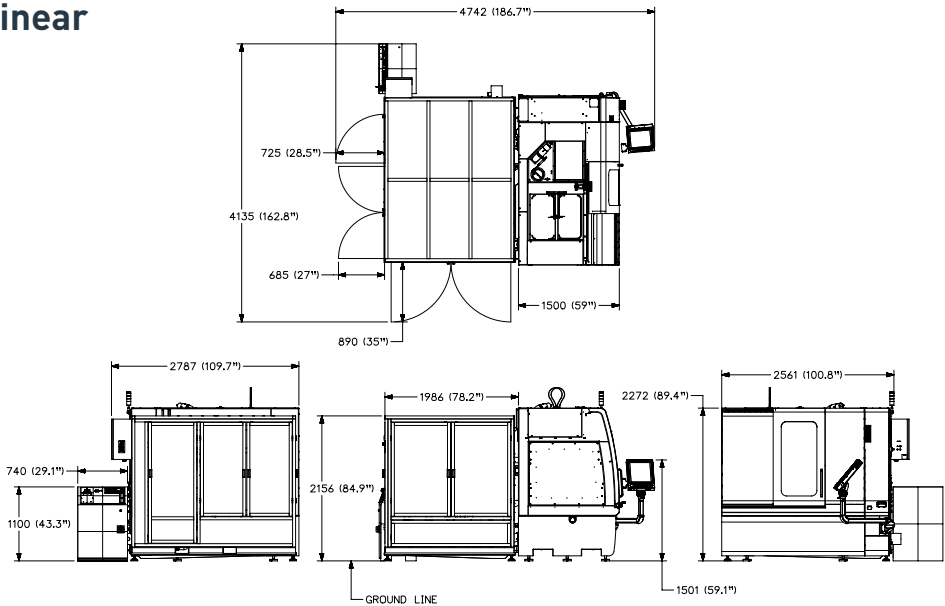
## TX7 Linear with Robomate



## Small TXcell Linear



## Large TXcell Linear





## TX7 LINEAR

TX7 Linear has large working envelope and high spindle power to cover the widest range of grinding applications.



## TX7 CELL LINEAR

With same capabilities as TX7 Linear, a robot loader adds autoloading up to 24 wheel packs as well as tool loading

|   |  |                 |                 |  |                                  |                                  |
|---|--|-----------------|-----------------|--|----------------------------------|----------------------------------|
| <b>Spindle Power</b>                                      | 37kW (49hp) (peak power)                   |                 |                 | 37kW (49hp) (peak power)   |                                  |                                  |
| <b>Wheel Packs<br/>(one pack can hold up to 4 wheels)</b> | 2  |                 |                 | Small cell: 9 standard, 14 optional<br>Large cell: 9 standard, 14/19/24 optional |                                  |                                  |
| <b>Grinding wheel diameter</b>                            | Max. 203mm (8")                            |                 |                 | Max. 305mm (12")*  |                                  |                                  |
| <b>Loader Tool Capacity</b>                               | <b>Tool Diam</b>                           | <b>2 Pallet</b> | <b>4 Pallet</b> | <b>Tool Diam</b>   | <b>Small cell<br/>(2 Pallet)</b> | <b>Large cell<br/>(4 Pallet)</b> |
|   | 3mm  | 840             | 2520            | 3mm  | 840                              | 2520                             |
|   | 16mm                                       | 154             | 462             | 16mm   | 154                              | 462                              |
|   | 25mm                                       | 63              | 189             | 25mm   | 63                               | 189                              |
| <b>Tool Load Time</b>                                     | 15 sec                                     |                 |                 | 20 sec   |                                  |                                  |
| <b>Spindle Orientation</b>                                | Included                                   |                 |                 | Included   |                                  |                                  |
| <b>Linear Scales</b>                                      | Standard on X, Y, Z                        |                 |                 | Standard on X, Y, Z  |                                  |                                  |
| <b>Premier Collet System</b>                              | Option                                     |                 |                 | Option   |                                  |                                  |
| <b>Steady bed with fixed position Pop-up steady</b>       | Option                                     |                 |                 | Option   |                                  |                                  |
| <b>Travelling Steady (P-axis)</b>                         | Option                                     |                 |                 | Option   |                                  |                                  |
| <b>AutoStick</b>  | Option                                     |                 |                 | Option   |                                  |                                  |
| <b>LaserPlus™</b>   | Option                                     |                 |                 | Option   |                                  |                                  |
| <b>iView™</b>   | Option                                     |                 |                 | Option   |                                  |                                  |
| <b>Automatic Wheel Probe</b>                              | Option                                     |                 |                 | Option   |                                  |                                  |
| <b>Front panel</b>  | Standard 19" touch screen with tilt adjust |                 |                 | Standard 19" touch screen with tilt adjust                                       |                                  |                                  |
| <b>Hand held Remote Pendant with MPG Feed™ function</b>   | Standard                                   |                 |                 | Standard   |                                  |                                  |
| <b>Machine Power Requirement</b>                          | 25kVA                                      |                 |                 | Machine: 25kVA +<br>Cell : 3kVA  |                                  |                                  |
| <b>Machine Weight</b>                                     | 8500kg (16,500 lbs)                        |                 |                 | Machine: 8500kg (16,500 lbs) +<br>Cell : 2500kg (5500lbs) max.                   |                                  |                                  |

\* On selected wheel packs

# Technical Specifications

## CNC DATA

ANCA AMC5, EtherCAT, high performance CNC, 8GB RAM, H/D 64GB SSD, Processor i7, Windows 8

## MECHANICAL AXES

|                              | X-axis                  | Y-axis                  | Z-axis                  | C-axis     | A-axis     |
|------------------------------|-------------------------|-------------------------|-------------------------|------------|------------|
| Position Feedback Resolution | 0.0001 mm<br>0.0000039" | 0.0001 mm<br>0.0000039" | 0.0001 mm<br>0.0000039" | 0.0001 deg | 0.0001 deg |
| Programming Resolution       | 0.001 mm<br>0.000039"   | 0.001 mm<br>0.000039"   | 0.001 mm<br>0.000039"   | 0.001 deg  | 0.001 deg  |
| Travel                       | 586mm<br>23.1"          | 408mm<br>16.1"          | 242 mm<br>9.5"          | 264 deg    | 360 deg    |

## SOFTWARE AXES (PATENTED)

B, V, U, W

## WORKPIECE\*

Max Tool Diameter:  $\varnothing$ 300mm (12"), Max. Tool Length (flute & endface grind) : 400mm (15.75"),  
Max Tool Weight: 40kg, optimal size range for solid endmill manufacture 3mm-40mm

## DRIVE SYSTEM

ANCA Digital AMD5X (EtherCat Standard)

Machine Axes:

ANCA LinX Linear Motors (X, Y & Z Axis)

Direct drive rotary axis (A & C axis)

## MACHINE DATA

Grinding spindle:

37kW (49hp) (peak power)

ANCA Bi-directional, with spindle orientation

8000RPM (optional 10,000RPM and 15,000RPM)

Direct drive induction motor

BigPlus BT40 wheel arbors

Wheel bore: 20mm, 31.75mm (1.25"), 32mm, 50.4mm (2"), 76.2mm (3")

## OTHER DATA

Probe System: Renishaw

Coolant System: External

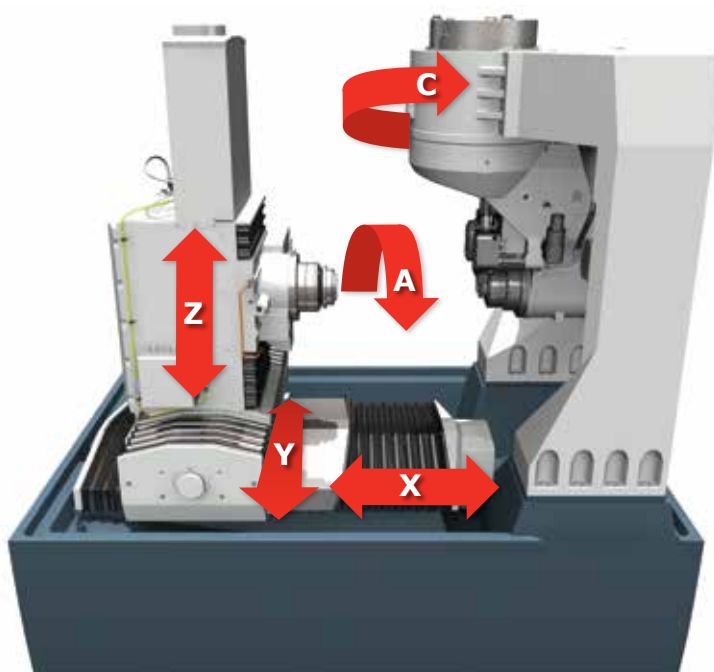
Machine Base: ANCAcrete (polymer concrete)

Colour: RAL 7035 / RAL 5008

Control Panel: 19" touch screen

Machine Structure: Bi-symmetrical column

\* Dependent of on tool geometry and weight, program and tooling layout  
ANCA reserves the right to update or amend specifications without prior notice.



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