

TapX LINEAR



ANCA
CNC MACHINES

TapX *LINEAR*

Leading the revolution
in single setup tap
manufacture

ANCA was the first machine manufacturer to deliver to market a single setup machine for complete tap manufacture. Continuing this tradition of industry firsts, ANCA now offers the TapX Linear range of machines – the first single setup tap grinding machine with LinX linear motor technology on X, Y and Z axis.

TapX 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 axis 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 tap grinding.

TapX machines are purpose built, with tooling, coolant delivery and automation specifically for production grinding of all types of taps, from M3 up to M50, whether in high speed steel or carbide. Clever tooling design means change over from one tap type to another can be done in minutes, not hours. This delivers greater flexibility in your tap production and results in increased productivity and reduced costs.

A great machine is nothing, without software to drive it. ANCA has always been regarded a market leader with its versatile and easy to use software. Not only does ANCA's dedicated iTap software allow easy programming of any tap type, supporting software makes for easy wheel design and in process dressing. Simulator3D simulation software will also mean your tap design and grinding program can be proven offline, before you lay a hand on the machine – saving you setup time and ensuring you grind the right tool from the first.

Taking the step up to TapXcell, keeps all the capabilities of the TapX Linear and adds automatic tool changing and 9 wheel packs as standard, with the option of up to 24 wheel packs. This means multiple tap types can be produced in the one setup, delivering the ultimate in machine flexibility.





LinX Linear Motors

Performance

The TapX 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 TapX 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.

TapX LINEAR

One machine
for complete tap
manufacture

TapX Linear is a machine purpose built for the needs of a tap manufacturer. The TapX Linear's large working envelope allows you to grind the widest range of tools, from a small M3 tap to a M50. The 37kW grinding spindle, mounted in a rigid machine design, ensures heavy flute grinding can be completed with ease. TapX Linear includes, LinX linear motors on X, Y and also Z axis, ensuring a life time of uncompromised precision. TapX Linear comes ready for production with iTap programming software, two wheel dressing options, and tooling for grinding taps between centres. Automation and a range of machine accessories mean the TapX Linear can be equipped to meet the needs of tomorrow's most stringent tap 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 allows mounting of all required grinding wheels for complete tap manufacture
- CNC tailstock and compensating chuck fitted standard for grinding taps between centres
- Optional auto-adjusting coolant nozzles
- Two independent wheel dressing options. Headstock dresser for flute and chamfer wheel. Secondary dresser for thread wheel
- iTap application software allows you to program any tap type
- Tool loading option with ANCA's RoboMate loader



TapX **CELL** LINEAR

Complete tap grinding without compromise

TapXcell Linear enjoys all the function and features of the TapX Linear, but has a standard robot loader, capable of changing wheel packs up to 300mm diameter and work pieces. With the option of up to 24 wheel packs, multiple wheel sets for different tap sizes or types can be immediately available with zero change over time. Larger wheels also mean longer wheel life and reduced dressing requirements. The result is reduced machine setup and idle time and maximised productive tap grinding time.

OVERVIEW

- TapXcell machine delivers all the same functions and options as TapX 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 shank
- Can have custom engineered solutions to include pre and post grinding operations in the TXcell Linear.

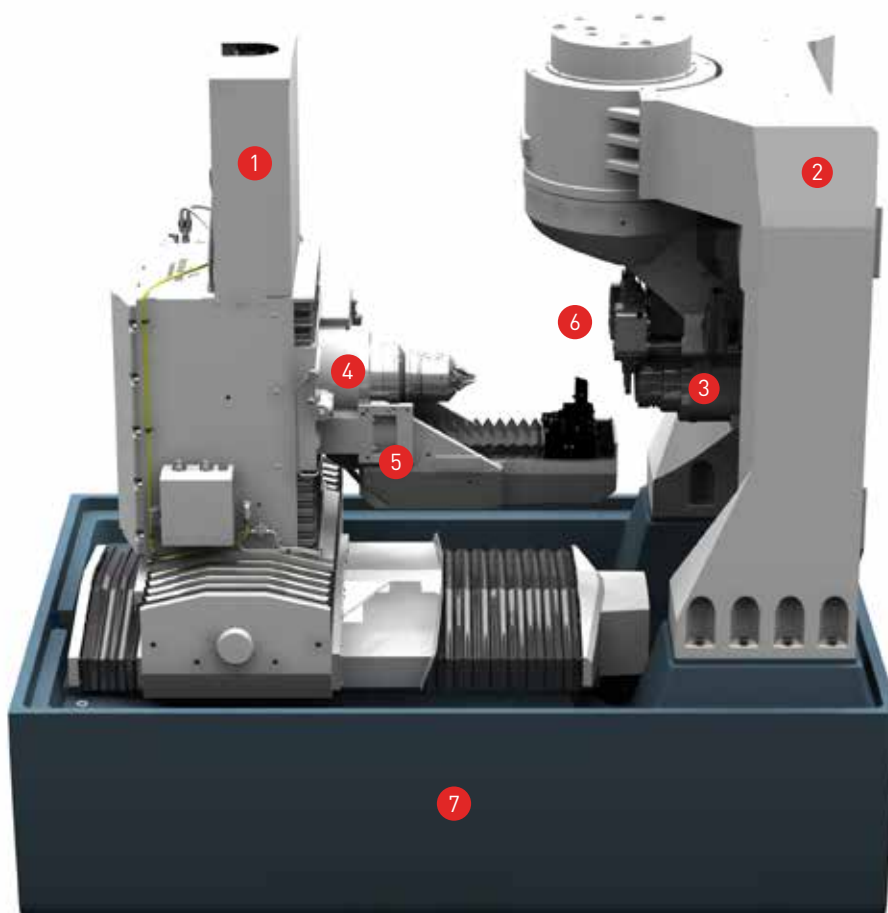


Enhanced Accuracy

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 **Large Working Envelope** – for tool lengths up to 235mm (9.25") long, and up to 50mm (2") diameter gives total flexibility to tackle any job
- ⑤ **Compact Machine Footprint** – one machine for all tap grinding operations saves factory floor space compared to having multiple special purpose machines.
- ⑥ **Loader Options** – Robomate loader for loading tap tools on TX7 Linear, or TXcell for extra capacity of tool and wheel pack loading
- ⑦ **ANCA Motion Control** – 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 BigPlus BT40 taper for outstanding rigidity and repeatability.
- ④ **Rigid Headstock** – fitted with compensating chuck to grind a wide range of taps. Headstock can run up to 3000RPM supporting flute and chamfer wheel dressing and cylindrical grinding operations.
- ⑤ **Tool-Support** – machine is fitted standard with cnc controlled tailstock and dedicated thread wheel dresser.
- ⑥ **Wheel Pack Changer** – TX7 Linear features dual wheel pack changer to cover all tap grinding operations in one setup. Upgrade to TXcell with 9 standard wheel packs, but options for up to 24. 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
- Range of high capacity pallets with tap square orientation
- Optional RoboTeach software allows operators to easily reattach robot positions if required
- The RoboMate can load tool diameters from $\varnothing 3$ mm (1/8") to $\varnothing 32$ mm (1 1/4")
- Maximum standard tool length 350 mm (14"), maximum tap length 235mm (9.25")
- 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"



TapXcell Linear

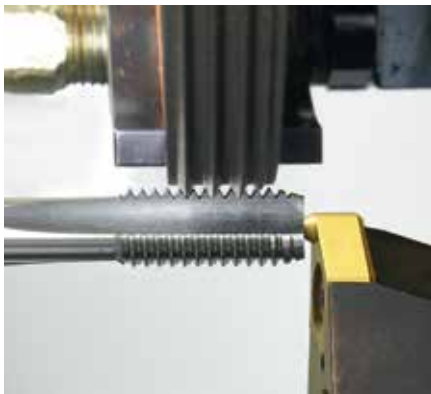
TapXcell greatly extends the capabilities of the TapX Linear machine. The highly flexible robot loader adds wheel pack capacity and tool changing.

- 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.
- TapXcell can load taps with shank diameter 3mm to 32mm, and maximum tap length of 235mm (9.25")



Standard Accessories

Accuracy & Repeatability



CNC Tailstock

The Travelling Steady (P-axis) is fitted with a tailstock for between centre grinding. Tailstock position and engagement force is fully programmable. A range of replacable male and female centres are easily changed for fast setup time.

- Ensures rigid support
- Fully programmable position
- Fully programmable force
- Quick change centres

Wheel Dressers

Two wheel dressing options are included. Able to run at 3000RPM, the machine headstock can run a 200mm dresser roll typically used for the flute or chamfer wheel. Additional secondary motorised dresser is used for thread wheel dressing. Secondary dresser uses quick change HSK arbor for fast change over times.

- Integrated Dressing Software on the machine for complete flexibility of in process dressing
- Seamless integration with ANCA's iFlute wheel/flute 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

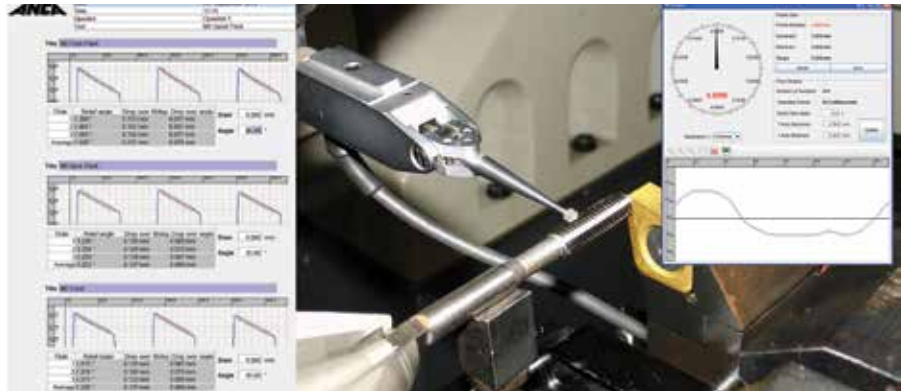
Compensating Chuck

Compensating chuck is used for grinding taps between centres. Interchangeable centres (male or female) and clamp jaws are changed in minutes, minimising setup time. One jaw set will cover a range of tap square sizes.

- High accuracy between centre grinding
- Interchangeable centres and jaws
- Male and female centres
- Change from one tap size to another in minutes

Optional Accessories

Productivity & Profit



Auto Adjusting Coolant Manifolds

As wheels are regularly dressed, their diameter will reduce. Auto-adjusting coolant manifolds will move with the reducing wheel diameter to ensure consistent coolant delivery to the grind point. This is essential to avoid tool burn. Options are available for fluting and threading wheels

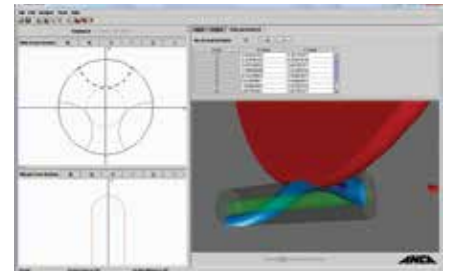
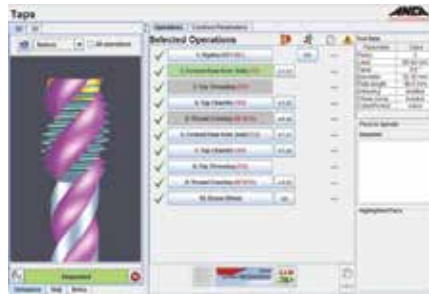
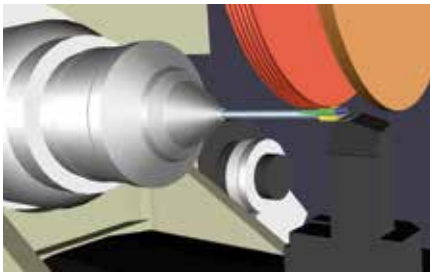
- Consistent coolant delivery to grind point
- Coolant nozzle follows down wheel diameter
- Eliminate tool burning
- Maintain optimal grinding wheel performance

iProbe Thread Measurement

On-machine measurement of thread relief with ANCA's iProbe TRM system. With a measurement probe mounted in the machine, tool thread and OD relief can be accurately measured without removing the tool from the machine. This assists in machine set-up and also allows production of measurement reports for your Quality Assurance systems.

- Semi-automatic thread measurement
- Measure relief profile of thread OD and thread flanks
- Prove out grinding process before commencing a batch run
- Can output tool measurement report

Software



CIM3D

The ability to fully simulate the tap grinding process using ANCA's patented CIMulator3D software means the entire grinding operation, as well as the tap geometry, can be set up and visually verified in 3D. The CIMulator3D software also provides the benefit of performing process optimisation, maximising machine utilisation and further reducing set-up times.

The parts can also be accurately sliced and inspected in any orientation providing fine control of the measurement process. The ability to import DXF overlays allows comparisons to be made between the simulation and the nominal design.

All machine models, work holding and accessories are available in CIMulator3D for the entire grinding sequence to be animated and collisions detected automatically. Coolant holes can be programmed as part of the blank editor and can be simulated and checked for coolant hole breaches. Option is also available to analyse minimum wall thickness and tolerances of coolant holes to the fluting and OD operation.

ToolRoom

The TapX is provided with an impressive suite of software applications which are at the heart of the TapX. The iTap design software allows the complete design of tap tools using an intuitive and logical approach. iTap takes the guesswork out of tap design by allowing the designer to specify tap geometry directly. Standard taps can be completely designed in minutes. iTap has been developed with flexibility in mind.

A vast range of standard and special taps can be designed and manufactured. Custom thread and cresting profiles can be directly designed or imported from DXF format using iTap. All helix, cut types, thread types, and thread relief forms are possible.

Wheel design and dressing is also greatly simplified using ANCA's wheel geometry editor and powerful dressing software. Fluting, single rib and multi-ribbed wheel design is easily accomplished and then dressed automatically on the machine.

i-Flute

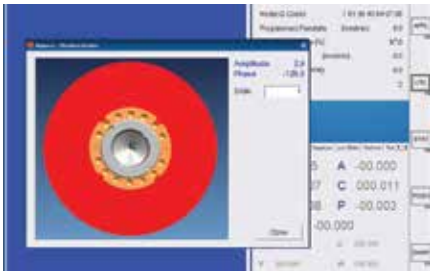
iFlute is a stand-alone Windows based application for designing both grinding wheel and flute profiles. The main benefit of iFlute is its ability to calculate the ideal wheel shape required to produce any possible flute cross-section.

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.

Software



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. Wheel 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



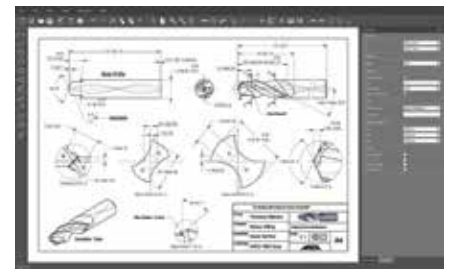
Management Suite

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 up-to-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.



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

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.

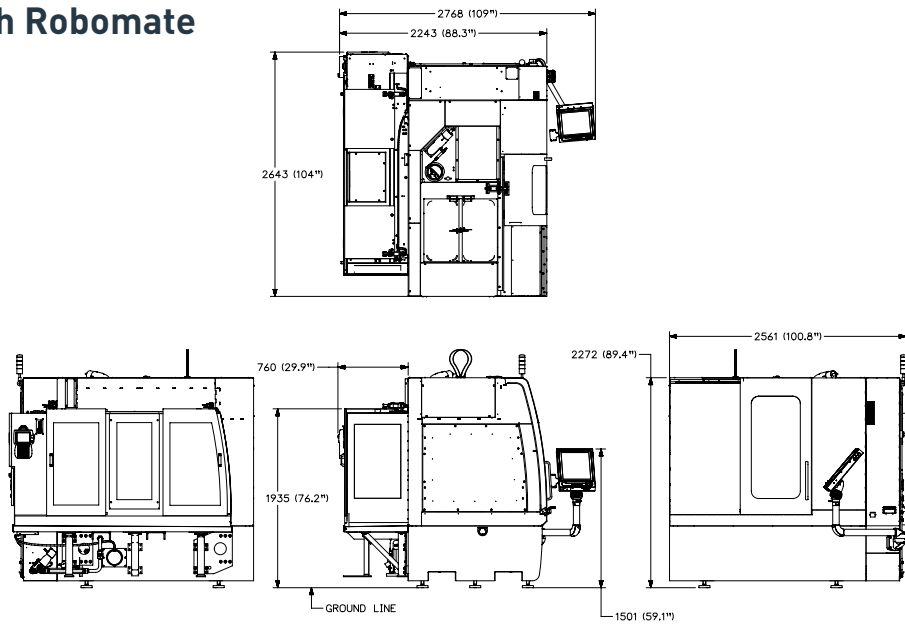
Software & Hardware Upgrade Programs

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.

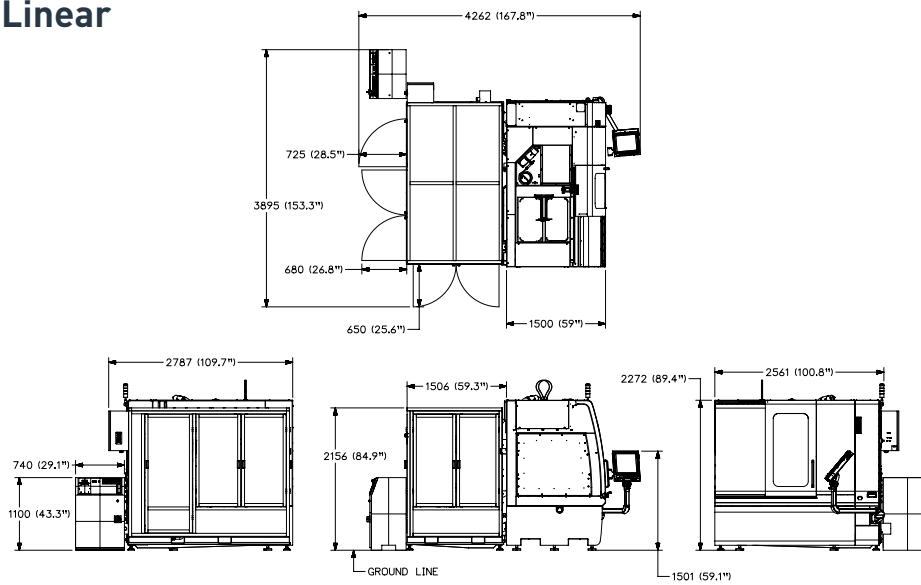


Floor Plans

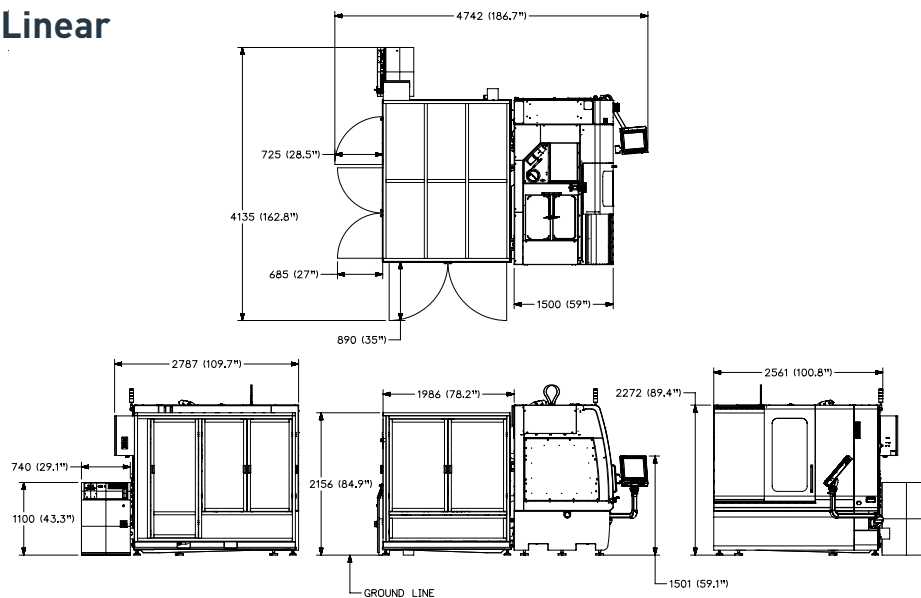
TapX Linear with Robomate



Small TapXcell Linear



Large TapXcell Linear





TapX^{LINEAR}

Leading the revolution in single setup tap manufacture



TapX^{CELL} LINEAR

Complete tap grinding without compromise

Spindle Power	37kW (49hp) (peak power)	37kW (49hp) (peak power)																								
Wheel Packs (one pack can hold up to 4 wheels)	2	Small cell: 9 standard, 14 optional Large cell: 9 standard, 14/19/24 optional																								
Grinding wheel diameter	Max. 203mm (8")	Max. 305mm (12") (on selected wheel packs)																								
Tool Loader	RoboMate (option)	Included																								
Loader Tool Capacity	<table border="1"> <thead> <tr> <th>Tap Shank Diam</th> <th>2 Pallet</th> <th>4 Pallet</th> </tr> </thead> <tbody> <tr> <td>3mm</td> <td>210</td> <td>630</td> </tr> <tr> <td>12mm</td> <td>120</td> <td>360</td> </tr> <tr> <td>20mm</td> <td>40</td> <td>120</td> </tr> </tbody> </table>	Tap Shank Diam	2 Pallet	4 Pallet	3mm	210	630	12mm	120	360	20mm	40	120	<table border="1"> <thead> <tr> <th>Tap Shank Diam</th> <th>Small cell (2 Pallet)</th> <th>Large cell (4 Pallet)</th> </tr> </thead> <tbody> <tr> <td>3mm</td> <td>210</td> <td>630</td> </tr> <tr> <td>12mm</td> <td>120</td> <td>360</td> </tr> <tr> <td>20mm</td> <td>40</td> <td>120</td> </tr> </tbody> </table>	Tap Shank Diam	Small cell (2 Pallet)	Large cell (4 Pallet)	3mm	210	630	12mm	120	360	20mm	40	120
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3mm	210	630																								
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Tool Load Time	15 sec	20 sec																								
Spindle Orientation	Included	Included																								
Linear Scales	Standard on X, Y, Z	Standard on X, Y, Z																								
Tailstock (P-axis)	Standard	Standard																								
Front panel	Standard 19" touch screen with tilt adjust	Standard 19" touch screen with tilt adjust																								
iTap tap programming software	Standard	Standard																								
iBalance software	Standard	Standard																								
iProbe thread relief measurement kit	Option	Option																								
Hand held Remote Pendant with MPG Feed™ function	Standard	Standard																								
Machine Power Requirement	25kVA	Machine: 25kVA + Cell : 3kVA																								
Machine Weight	8500kg (16,500 lbs)	Machine: 8500kg (16,500 lbs) + Cell : 2500kg (5500lbs) max.																								

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 0.0000039"	0.0001 mm 0.0000039"	0.0001 mm 0.0000039"	0.0001 deg	0.0001 deg
Programming Resolution	0.001 mm 0.000039"	0.001 mm 0.000039"	0.001 mm 0.000039"	0.001 deg	0.001 deg
Travel	586mm 23.1"	408mm 16.1"	242 mm 9.5"	264 deg	360 deg

SOFTWARE AXES (PATENTED)

B, V, U, W

WORKPIECE*

Max Tap Diameter: M50

Max. Tap Length: 235mm (9.25) (using compensating chuck)

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

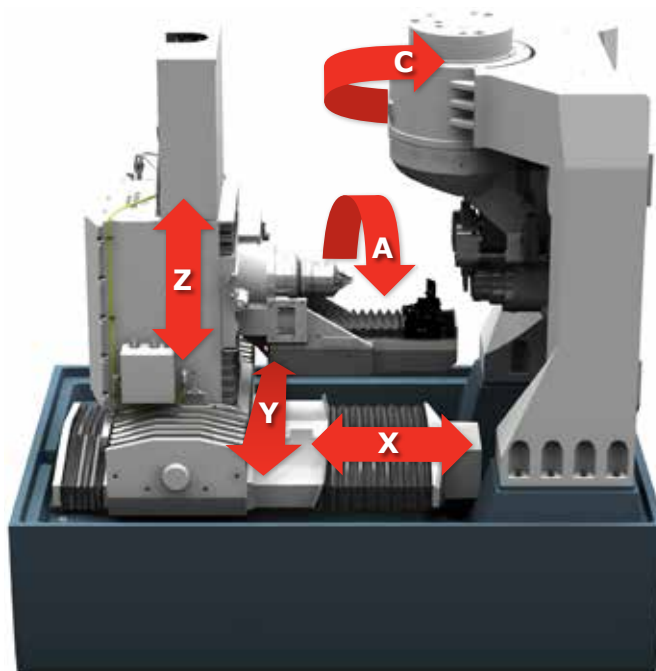
Machine Base: ANCAcrete (polymer concrete)

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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