

FX LINEAR



ANCA
CNC MACHINES



FX LINEAR

The tool grinder you've been waiting for

The FX Linear range consists of 3 new machines

- FX3 Linear
- FX5 Linear
- FX7 Linear

The FX Linear includes a significant number of important new technology releases and a complete body redesign that is both aesthetically pleasing and technologically beneficial.

The range is ideal for everything from light manufacturing, to regrinding and even full production. Its best performance and productivity range is for tools up to a diameter of 12mm (1/2"). It can grind tools up to a diameter of 200mm (7.8").

Many new noteworthy features have been included in the range to make an operator's work easier. These include a new touch screen customisable with Windows, handheld pendant for easier set-up and an easy to access loader door for slide out pallets.

The FX Linear machine is compact but also has a large working envelope. It of course benefits from ANCA's 40 years of experience in designing tool grinders and developing user-friendly, versatile ToolRoom software.

Every part on the machine, from the positioning of the grinding wheel on the C-axis centreline to reduce thermal influence, to the ANCA designed linear motors, have been designed to enhance accuracy, increase productivity and make the operator's day easier.





LinX Linear Motors

Performance

The FX Linear range uses ANCA LinX Linear Motors for axis motion (X & Y 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 FX 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.

FX³ LINEAR

An affordable first step into CNC tool grinding, or an economical, good quality basic machine. Whatever your needs this machine provides the kind of technology and rigid accuracy not usually available at this price. If you don't need automation then the FX3, with its 9.5kW wheel spindle which provides ample power to cover a wide range of applications, is the tool grinder for you. It offers the same software and machine quality that are found in all ANCA machines.

OVERVIEW

- Linear motors (X & Y axes)
- Linear scales (X & Y axes)
- An AM5000 control system for faster processing
- Single wheel spindle (9.5kW peak power)
- Manual headstock
- A touch screen monitor that is customisable with Windows
- Remote pendant (hand held) for easy operator access
- Headstock coolant



FX⁵ LINEAR

If you need automation and the versatility of more options, such as the MicroPlus, then the FX5 Linear will suit your needs. The FX5 Linear has a spindle power of 9.5kW and also has an automatic 2-wheel changer for an increased range of wheels and tool types. Together with the optional automatic headstock clamping and automation solutions it can provide unmanned operation and the flexibility to handle small volumes and mixed batches of tools.

OVERVIEW

- Same standard features as FX3 Linear

Also includes:

- Wheel spindle (9.5kW peak power)
- Includes a standard Automatic 2 Wheel Changer for an increased range of wheels & tool types
- Automatic clamp headstock (optional)
- Available with optional automation solutions



FX⁷ LINEAR

For customers that require the increased flexibility of more spindle power, or the increased automation capacity that a robot can provide, the FX7 Linear is the machine that you are looking for. The FX7 Linear is the premium tool grinder in the FX range and provides exceptional value for money. It offers a wide range of options for those looking to increase productivity and accuracy.

OVERVIEW

- Same standard features as FX5 Linear

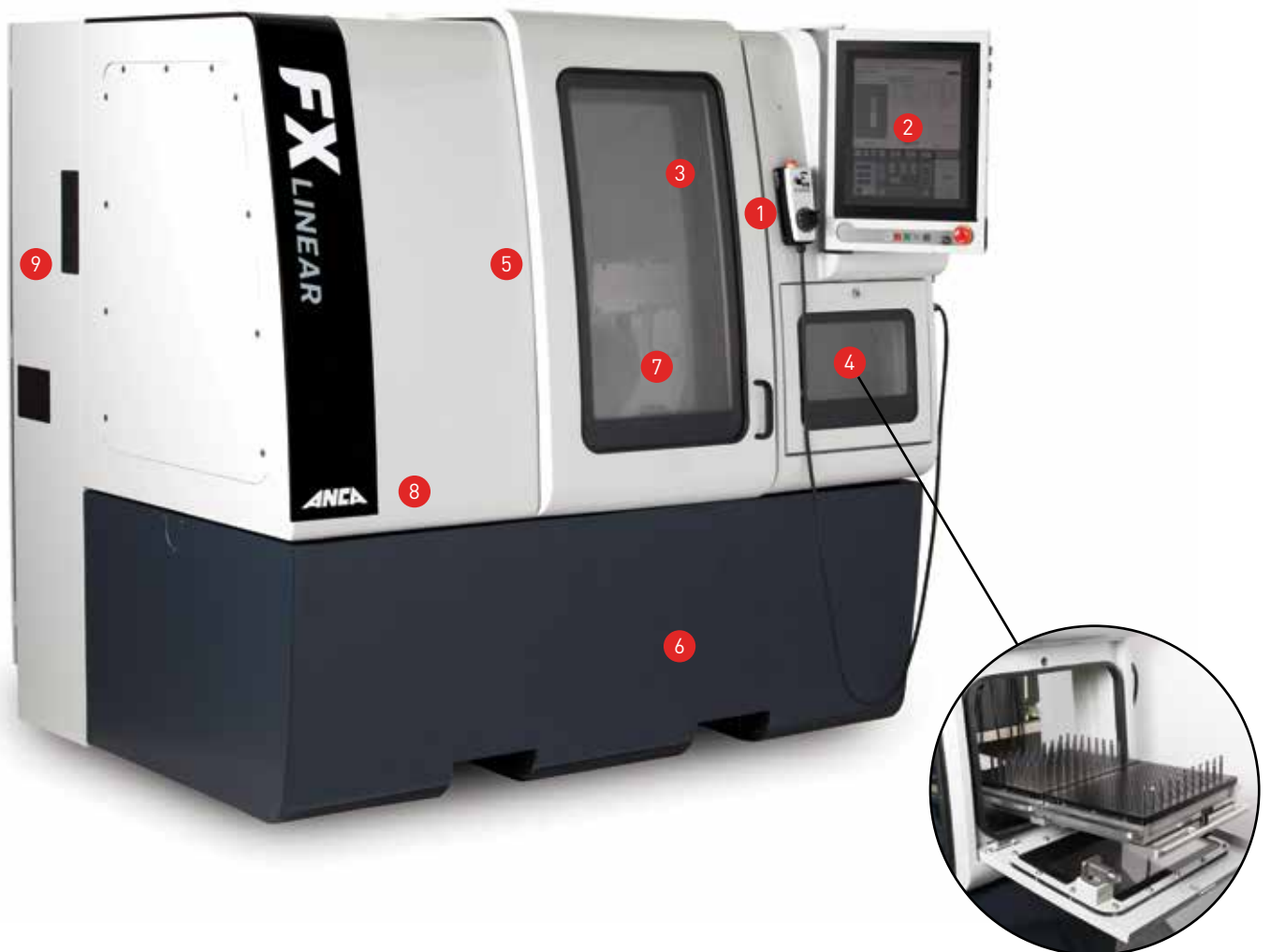
Also includes:

- High power wheel spindle - 19kW (peak power)
- Automatic clamp headstock
- Linear scales on X,Y & Z axes
- Robot loader with capacity to load up to 840 tools (optional)
- Available with an optional 6 station wheel changer for automatic loading of wheel packs & coolant manifolds
- Additional options are available including LaserPlus in-process tool measurement and compensation and Wheel Probe auto wheel measurement



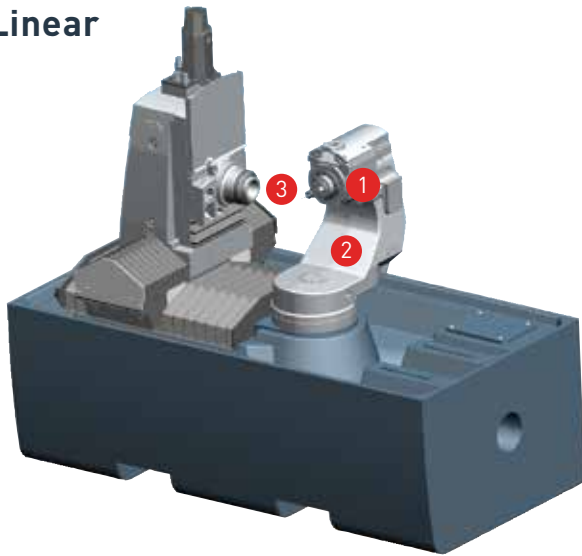
Enhanced Accuracy

Upgraded Technology



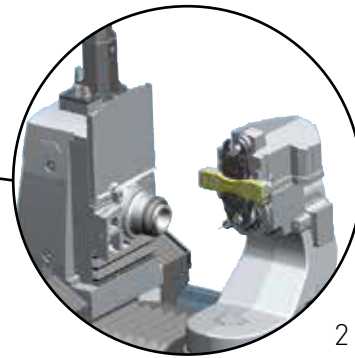
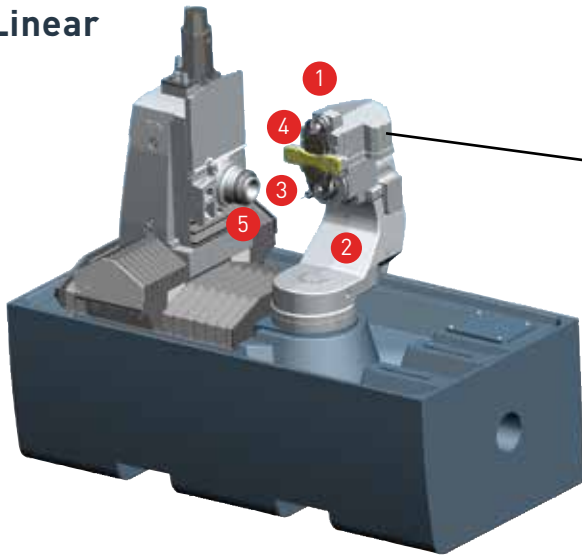
- ① **Hand-held Remote Pendant** – provides operator with easier access to the machine during set-up
- ② **Control Panel** – full touch screen configured to machine options. Has Windows functionality with multi-touch & zoom
- ③ **Automation Options** – Robot loader options for either high-volume or low-volume tool production. Unmanned operation with 6 station wheel changer & Robot
- ④ **Loader Access Door** – pallets slide out for easy operator access to tools for Robot loader
- ⑤ **Tool / Wheel Measurement Options** – automated for increased productivity. LaserPlus auto tool measurement and compensation system. Wheel Probe for auto wheel qualification. iView tool measurement.
- ⑥ **Compact Size** – the machine has a small footprint saving factory space but still has a large working envelope
- ⑦ **Rigid Design** – positioning the grinding wheel on the C-axis centreline reduces thermal effects, as does the more compact machine size
- ⑧ **Linear Motors (LinX)** – and linear scales improve precision and performance for superior tool accuracy and surface finish.
- ⑨ **AM5000 Control System** – provides faster processing for increased productivity

FX3 Linear



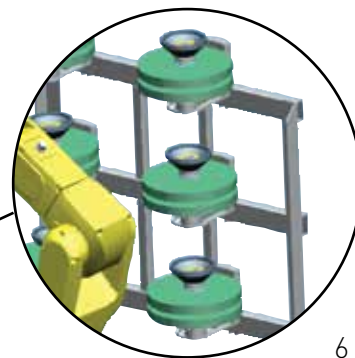
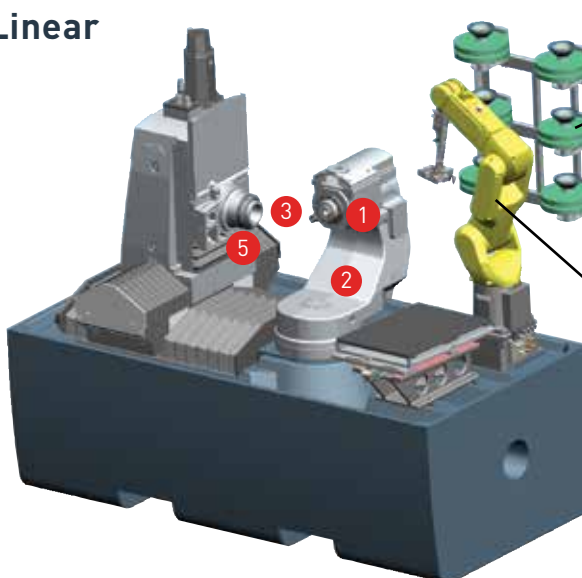
- ① **Spindle Design** – HSK40F taper provides increased rigidity and accuracy for improved tool surface finish results
- ② **C-Axis Pivot Point** – as the grinding wheel is positioned on the C-axis centreline axis motion is reduced which is ideal for ballnose grinding to ensure accuracy is maintained
- ③ **Easy Machine Access** – ergonomically designed for the operator. Easy access to the headstock workholding, wheel pack and spindle for quick set-up and job change-over.
- ④ **Wheel Changer** – Options for 2 and 6 station wheel changer for maximum flexibility and productivity
- ⑤ **Tool-Support** – Options include Steady bed, Pop-Up Steady and MicroPlus systems to increase accuracy (Z-axis mounting)

FX5 Linear

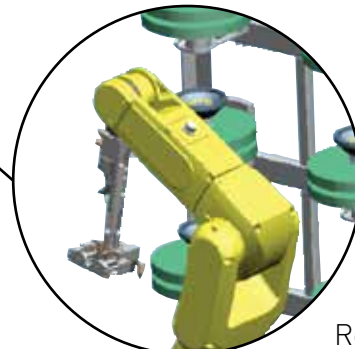


2 Wheel Changer

FX7 Linear



6 Wheel Changer



Robot Loader

Operating Controls



Touch Screen Monitor

- ANCA designed full touch screen front panel (19")
- Latest touch screen technology
- Windows 8 functionality – multi touch, zoom, etc.
- Configured to machine – only machine 'options' are displayed on the screen
- Designed to withstand an industrial environment
- Configured so operator can quickly set up machine
- ANCA menu and other hard buttons are integrated into the soft panel or as soft touch keys



Remote Handheld Pendant

- Allows operator improved access for machine set-up
- Allows operator to remain comfortably standing at machine door during set-up instead of moving to screen or having to lean over
- Includes MPG (Manual Pulse Generator) so operator can safely test program step-by-step
- A feed-rate override control on the pendant allows the axis travel speed to be easily varied
- Also acts as a 'hold to run' to meet CE certification

Automation



AR300 Robot Tool Loader

(FX5/FX7 option)

ANCA's designed and built low cost tool loader is fully contained within the machine canopy. The AR300 loader has 3 axes and is easily set up and controlled via the touchscreen and remote handheld pendant. It provides customers with an affordable automatic tool loading solution and is perfect for low-volume production runs.

- Operator access from front of machine
- Does not increase machine footprint
- One gripper set for the entire diameter range
- Ideal for loading tools $\varnothing 2 - 20$ mm (1/18" - 3/4")
- Tool length range 30 - 150 mm (1 1/4" - 6")
- Double gripper, tool change for load/unload
- Loading time of 15 seconds
- The pallet capacity ranges from 380 tools with $\varnothing 2$ mm (1/8") shank, 200 tools with $\varnothing 6$ mm (1/4") shank and 33 tools for $\varnothing 20$ mm (3/4") shank



Fanuc Robot Loader

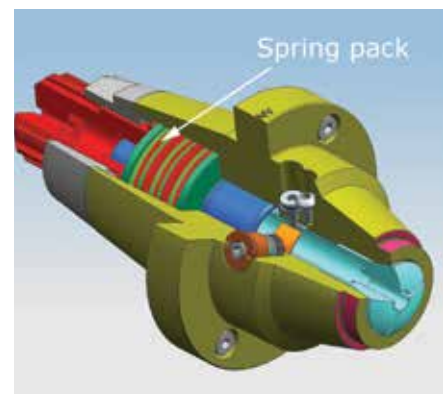
(FX option)

The Fanuc Robot Loader is a versatile automation solution that is located completely within the FX Linear machine. It provides automatic tool loading, enabling extended periods of unmanned operation, for maximised productivity.

- Can be used to auto-load up to 6 wheel packs & their coolant manifolds
- Operator access from front of machine
- Does not increase machine footprint
- One gripper set for the entire diameter range
- Ideal for loading tools $\varnothing 2 - 20$ mm (1/16" - 3/4")
- Tool length range 30 - 250 mm (1 1/4" - 10")
- Double gripper, tool change for load/unload
- Loading time of 9 seconds
- The pallet capacity ranges from 840 tools with $\varnothing 2$ mm (1/8") shank, 520 tools with $\varnothing 6$ mm (1/4") shank and 96 tools for $\varnothing 20$ mm (3/4") shank

Accessories

Accuracy & repeatability



MicroPlus

MicroPlus provides less than 3 micron tool runout. It is ANCA's #1 high accuracy workholding and tool support system. The MicroPlus system consists of the Flexi-Chuck assembly for workholding, and the Overhead Top Clamp Assembly (OTC) for tool support. The Flexi-Chuck clamps and rotates the tool. The patented design allows the tool and the internal components to move independently of each other, minimising any misalignment.

The OTC consists of a V-block that supports the tool and a rigid overhead metal finger that holds the tool in place. The OTC provides alignment accuracy for the tool.

- Less than 3 micron (0.0001") runout
- Available for FX5 Linear and FX7 Linear tool grinders
- Elimination of radial and axial runout

LaserPlus

The LaserPlus system provides accurate and repeatable measurement of tools inside the machine. The LaserPlus can automatically measure OD, run-out, EOT, ball nose and corner radius profile tools. An air blast unit on the laser ensures that coolant or contaminants do not interfere with the measurement process.

- Faster set-up times
- Less scrap
- No need to remove the tool from the machine
- Increased efficiency
- Laser OD SPC cycle also available
- Laser is permanently mounted inside the machine

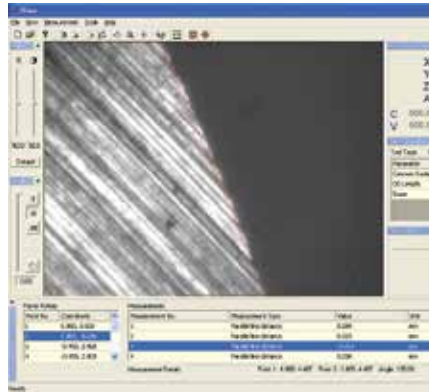
PREMIER Collet Adaptors

ANCA's new PREMIER Collet Adaptors provides operators with a premium workholding range. The PREMIER Collet Adaptors use a new totally internal clamping mechanism. The spring pack in the adaptor provides the tool clamping force and prevents possible runout that was previously added if misalignment occurred between the drawbar and the collet.

- Reduces tool runout for improved tool quality
- Available in W20, W25 and B32/45 versions
- PCA (Precision Collet Adaptor) versions also available
- Available for the FX5 Linear and FX7 Linear tool grinders

Accessories

Performance & profit



Wheel Probe

The auto wheel pack qualification probe is used to accurately measure grinding wheels inside the machine. The Wheel Probe uses a Renishaw probe to qualify the wheel pack. It is possible to measure the front surface location, 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

iView

iView is a measuring system that is able to measure the ground tool while it is still in the work-holding on the machine. The image of the ground tool as taken by the iView camera is compared with an ideal overlay shape generated by the software. The tool size can then be compensated automatically based on the overlay.

- Eliminates the need to remove a tool from the grinder in order to check the dimensions
- Reduces errors caused by relocating tool and manually compensating
- 90x – 360x range of tool magnification
- Provides measuring accuracy to 2 microns
- iView is permanently mounted inside machine

6-Wheel Changer

Used in conjunction with the Robot Loader. 6 wheel packs and coolant manifolds are loaded together, stored on a frame next to the robot. A docking station allows the wheel pack to be located close to the wheel spindle for fast wheel change cycle times. The wheel changer is totally contained within the FX7 canopy.

- Utilises robot for maximised productivity
- Maximum of 6 wheel packs
- Changes wheels plus coolant manifolds
- Cycle time <12 seconds
- Maximum wheel diameter Ø203 mm (8")

Software

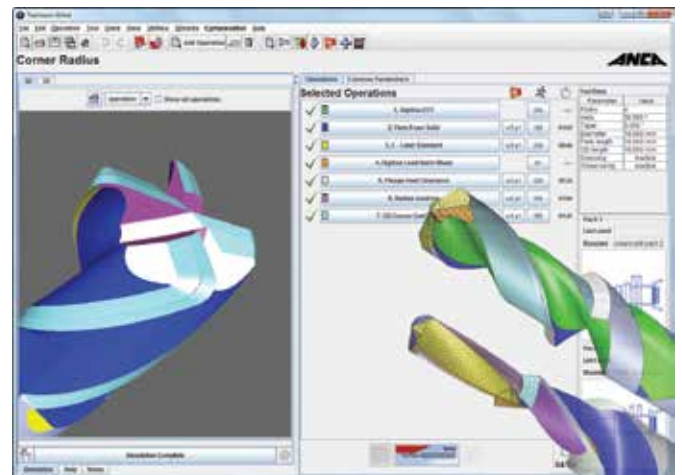


ANCA's versatile software is what sets ANCA and its customers ahead of the competition. ANCA has 40 years of tool grinding experience and is well-known for its user-friendly and flexible tool design software.

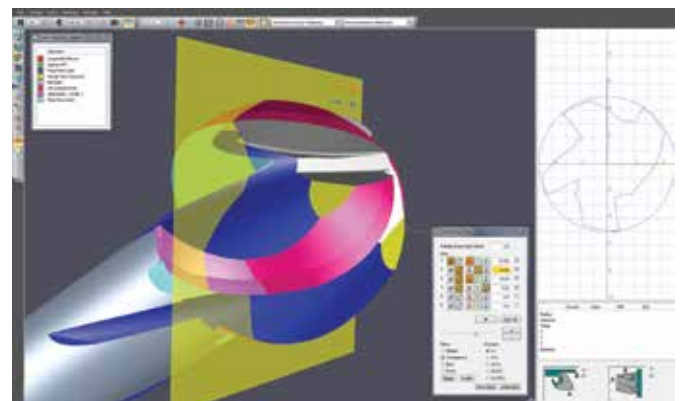
ANCA's ToolRoom software suite caters for a wide range of tool types and applications with an easy-to-use interface to input tool geometry parameters. ToolRoom ensures that the FX Linear machines will efficiently handle any regrinding or manufacture challenge.

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.



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.



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. 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.





FX³ LINEAR

ANCA's entry level machine for light manufacturing & sharpening of small to mid-size tools.



FX⁵ LINEAR

ANCA's economical CNC grinding machine. Same design as FX3 with more options.



FX⁷ LINEAR

Same design as FX5 but with more spindle power & more options.

Machine Structure	Single Column	Single Column	Single Column
Grinding Spindle	9.5 kW (12.7 HP) peak 10,000 RPM & HSK40F Taper	9.5 kW (12.7 HP) peak 10,000 RPM & HSK40F Taper	19 kW (25.4 HP) peak 10,000 RPM & HSK40F Taper
Wheel Packs	1 x Ø203 mm (8") max	2 x Ø203 mm (8") max	2 x Ø203 mm (8") max with wheelchanger: 6 x Ø203 mm (8") max (option)
Tool Length (Max)* *flute length - may vary depending on tooling	200 mm (8")	200 mm (8")	200 mm (8")
Loader Type	n/a	AR300 loader (option)	AR300 loader (option) Fanuc loader (option) loads tools & wheels
Max. Tool Capacity (with loader)	n/a	AR300 loader: 340 x Ø3 mm 200 x Ø6 mm 80 x Ø12 mm	AR300 loader: 340 x Ø3 mm 200 x Ø6 mm 80 x Ø12 mm Fanuc loader: 840 x Ø3 mm 520 x Ø6 mm 221 x Ø12 mm
Spindle Type	Single Ended Induction	Single Ended Induction	Single Ended Induction
Drive System (X & Y Axes)	Linear Motor	Linear Motor	Linear Motor
Linear Scales	Standard on X & Y-axes, optional on the Z-axis	Standard on X & Y-axes, optional on the Z-axis	Standard on X, Y & Z-axes
Touch Screen	Yes (Full Touchscreen)	Yes (Full Touchscreen)	Yes (Full Touchscreen)
Tool Load Time	n/a	AR300 loader 15 sec	AR300 loader 15 sec Fanuc loader 9 sec
Travelling Steady (P-axis)	n/a	n/a	n/a
MicroPlus	n/a	Option	Option
Overhead Top Clamp	n/a	Option	Option
Pop-up Steady	n/a	Option	Option
Auto-Stick	1 Stick (option)	1 Stick (option)	1 Stick (option)
Touch Probe	Yes	Yes	Yes
LaserPlus	n/a	Option	Option
Automatic Wheel Probe	n/a	Option	Option
iView (semi-automatic tool inspection)	Option	Option	Option
iBalance	Option	Option	Option
Dimensions	1930 mm (76") W 1800 mm (70") D 1810 mm (71") H	1930 mm (76") W 1800 mm (70") D 1810 mm (71") H	1930 mm (80") W 1800 mm (70") D 1810 mm (71") H

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	384 mm 15.1"	317 mm 12.5"	217 mm 8.6"	230 deg	360 deg

SOFTWARE AXES (PATENTED)

B, V, U, W

WORKPIECE

Diameter 200 mm (7.8") max., weight 20 kg (44 lb) max., productive up to Ø12 mm

DRIVE SYSTEM

ANCA Digital AMD5x (EtherCAT standard)

Linear axes:

- Direct-drive linear motors (X & Y axes)
- Direct-drive ballscrew (Z-axis)
- Rotary axes direct drive

MACHINE DATA

Grinding spindle:

- ANCA bi-directional
- 10,000 RPM
- Integral direct-drive
- Spindle - Single ended induction

Grinding wheel: Max. diameter 203 mm (8")

Wheel bore: 31.75 mm (1.25"), 32 mm and 20 mm

Wheel packs: Single wheel pack - options of 2 and 6 auto wheel changer (max 4 wheels per pack)

OTHER DATA

Electrical power: 14.5 KVA (16 KVA with robot)

Probe system: Renishaw

Coolant system: External

Machine base: ANCAcrete (polymer concrete)

Floor plan:

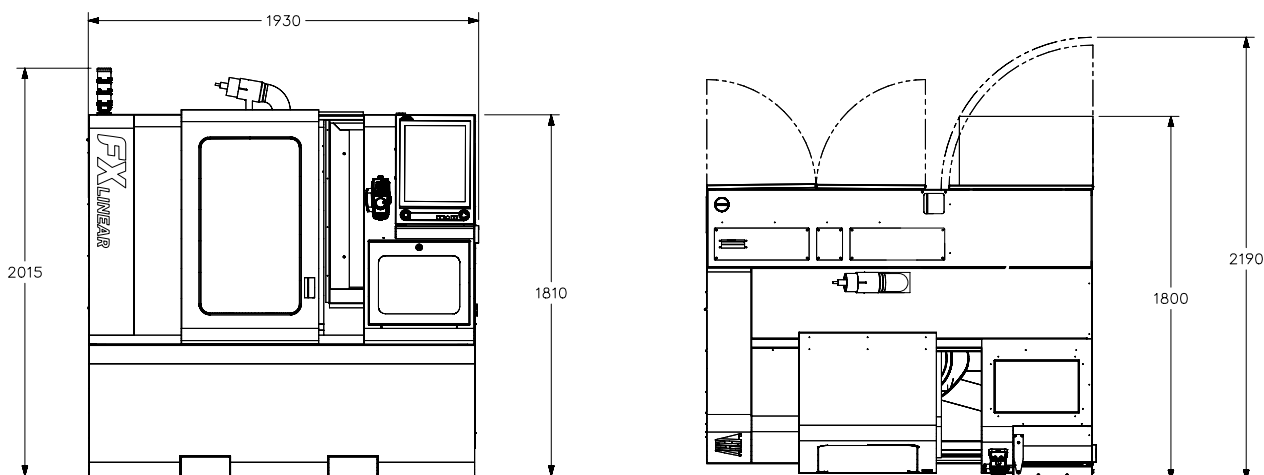
- Width: 1930 mm (76")
- Depth: 1800 mm (70")
- Height: 1810 mm (71")
- Weight: 4500 kg (9920 lb)

Colour: RAL 7035 / RAL 5008

Control panel: Full touch screen (19")

Machine structure - single column

* ANCA reserves the right to update or amend specifications without prior notice.



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