



VMC 1300 Pro
CNC Machine
User's Manual

UK
CA | CE
approved



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1 : Notes



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1: Warning Notices

Warranty Disclaimer.

The Warranty on your Mill will be invalidated if any modifications are made to the machine or any additional ancillary equipment fitted, or any adjustments are made to the controlling devices without prior notification from Denford Limited. Please refer to the information held in your separate Warranty pack, for specific details.

Any portable appliance testing (PAT) carried out on this equipment must comply fully with the instructions outlined later in this chapter.

Maintenance Disclaimer.

Always obtain permission from the person responsible for machinery in your establishment, before accessing the electrical control panel or Mill machine casings to carry out any maintenance work. All work must be carried out by personnel suitably qualified for each maintenance task, to avoid damage to the machine systems and injury to the maintenance personnel. Denford Limited cannot accept responsibility for any damage, injury and/or loss that may occur through incorrect maintenance of your Mill.

Use of Machine.

Your Mill is designed for machining a range of resistant materials such as wax, plastic, free cutting alloys, aluminium and steel. In each case, the appropriate tooling, speeds and feeds should be used as recommended by the material supplier. Information should also be sought from suppliers regarding the safety specification of the materials to be cut.

Your Mill is not intended for use with MDF or hard woods which may react with the machine lubricants causing oxidation of the machine surfaces, or with any materials which may contain known carcinogens.

Do not machine any toxic, radio-active or volatile materials.

Use of the machine for any purpose other than those for which it is designed may result in injury, and may also invalidate the warranty.

The machine should only be used under constant supervision, to help guard against, and respond to, any unforeseen hazard such as fire or explosion. First aid and firefighting equipment (CO₂ Extinguisher) should be located nearby in a clearly signed and prominent position.

1: Warning Notices



Sound Level Disclaimer.

The Noise Level test published in this manual is for the machine and any essential equipment such as dust extraction equipment, and complies with the relevant standards. It cannot make provision for noise resulting from the cutting process, since this is a variable, depending on such factors as material, cutting data and tooling.

Any ancillary equipment supplied by Denford will also comply with the relevant standards. However, when used jointly with the machine in a machining environment, the combined sound levels emitted may require that Personal Protection Equipment, such as ear defenders, be used. Other factors, such as high ambient noise levels and nearby machinery and equipment can also increase the sound levels.

It may be possible to reduce the sound levels by changing the machining process and/or repositioning the machine and/or its ancillary equipment.

If, under these circumstances, it is felt that the sound level is still unacceptably high, then independent advice should be sought and complied with.

If you have any doubts and/or questions regarding the use, specification, servicing, or features of your machine, please contact Denford Customer Services.

Denford Limited reserves the right to change the specification and/or operating features regarding this CNC machine without notice or documentation.



Portable Appliance Testing.

In-Service Testing

This is the testing carried out as a routine to determine whether the equipment is in a satisfactory condition.

In-Service testing will involve the following:

- Preliminary inspection
- Earth continuity tests (for Class 1 equipment)
- Insulation testing (for Class 1 equipment)

Electrical testing should be performed by a person who is competent in the safe use of the test equipment and who knows how to interpret the test results obtained. This person must be capable of inspecting the equipment and, where necessary, dismantling it to check the cable connections.

1: Warning Notices

Portable Appliance Testing (continued).

If equipment is permanently connected to the fixed installation, e.g. by a flex outlet or other accessory, the accessory will need to be detached from its box or enclosure so that the connections can be inspected. Such work should only be carried out by a competent person.

Preliminary inspection

Formal visual inspections should only be carried out by persons competent to do so.

- Cables located so as to avoid damage
- Means of disconnection/isolation readily accessible
- Equipment positioned to avoid strain on cord
- Equipment is being operated with the covers in place
- Indiscriminate use of multi-way adaptors and trailing sockets is avoided
- Identify signs of overheating
- Identify signs of damage to insulation
- Check the correct size fuse is fitted (10A)
- Check the flexible cable connections and anchorage.

Before carrying out the following tests ensure the machine is disconnected from any external equipment or supplies.

Ensure Ethernet (RJ45) and USB (if applicable) connections are removed prior to testing.

Earth continuity Test (Class 1 equipment)

The test should be carried out at 25A for a period of 5 – 10 Seconds

The reading should be less than $0.1 + R$ (where R is the resistance of the lead)

Insulation Resistance Test (Class 1 equipment)

The applied test voltage connected between Live/Neutral and Earth should be 500VDC

The insulation Resistance should be greater than 1M Ohms

1: About this Manual

Using this manual	<p>This manual provides information describing how to transport, site, setup and operate the basic functions of your Denford Mill CNC machine, including any operational features of hardware specific to the Denford Mill series.</p> <p>This manual does not provide any information regarding the software packages used. Please refer to the help section within the appropriate software.</p> <p>Please note that the Electrical Diagrams for your Mill are not included in this manual - they are delivered separately in the standard equipment box supplied with your CNC machine.</p> <p>If you have any doubts and/or questions regarding the specification, servicing, or features of your Mill, please contact Denford Customer Services. Denford Limited reserves the right to change the specification and/or operating features regarding this CNC machine without notice or documentation.</p>
Disclaimer	<p>Please note that due to the nature of hardware and software developments, the specifications and features of this product can change without notice. The information contained in this manual is correct at the date of printing only - February 2023. No liability can be accepted by Denford Limited for loss, damage or injury caused by any errors in, or omissions from, the information supplied in this manual.</p>
Screenshots	<p>Please note that any screenshots are used for explanation purposes only. Any numbers, wording, window or button positions may be different for the configuration of the CNC machine control software being used to control your Mill.</p>
Language	<p>This manual is written using European English.</p>
Contact	<p>Any comments regarding this manual should be marked for the attention of our technical authoring team and referred to the following e-mail address: customerservices@denford.co.uk</p>

1: Introducing your VMC 1300 Pro

Congratulations on your purchase of a VMC 1300 Pro CNC machine. In this manual you will learn how to setup and use your Machine correctly and safely.



Your Mill is a full three axes CNC Machine with a large work area. Suitable for all levels of education and training, it is manufactured to meet industrial standards. With rapid traverse rates of up to 5000 mm/min. Your VMC 1300 Pro is designed with you in mind - making the processes involved both safe and easy to use.

Main Features:

- Designed specifically for Education and Training.
- Manufactured to industrial standards.
- Programming via International Standards Organisation format (ISO).
- CE & UKCA approved for safety.
- Capable of cutting common resistant and prototyping materials Aluminium, Steel, Brass, Wax, Plastics and Acrylics.
- Links to various CAD/CAM software packages.
- Totally enclosed high visibility interlocked guard.
- Feedrate and Spindle Speed override controls.

1: Before Beginning to Setup

Before beginning to set up your VMC 1300 Pro, please check your separate order documentation, making sure that all items have been delivered to your establishment. Any missing or damaged items should be reported to Denford Customer Services as soon as possible.

The following equipment is supplied as standard with your Mill CNC machine:

- VMC 1300 Pro CNC machine. Note that the precise specification of your CNC machine will depend on any options selected at the time of ordering (see below).
- 1 x Allen (hex) keys pack.
- 1 x VMC 1300 Pro warranty pack (UK Machines only).
- 1 x CD-ROM containing Denford VR CNC Machine Control Software and manuals, and Machine user's manual.
- 1 x CD-ROM containing VR CNC Machine Control Software Security Key.
- 1 x RJ45 Ethernet cable.
- 1 x USB to RJ45 adaptor.
- 1 x Spare fuse pack.
- 1 x Mains Cable.
- 1 x Datum plate.
- 1 x Mitee bite clamping kit.
- 1 x BT30 side lock holder.
- 1 x Pull stud for toolholders.
- 1 x 6mm dia ball nose cutter.

The following optional equipment may also be supplied with, or ordered for, your machine:

- Additional Software: CAD/CAM, Offline CNC Machine Control.
- CNC Machine Control software security keys.
- Table mounted 6 or 8 Station Automatic tool changer
- Pneumatic Safety Guard Door. (Factory Fitted - requires compressed air).
- Spray mist coolant
- Flood coolant
- Comprehensive Tooling Packages for Auto Turret and Manual Toolpost.
- Computer Support Extension.
- Air Compressor.
- 4th Axis Programmable Rotary Fixture

2: Safety Features and Precautions

Safety Features Overview.

The following safety features are standard on your Machine:-

- Emergency stop button.
- Manually operated, totally enclosed guard door with interlock switch.
- Option to check CNC programs using toolpath graphics, prior to machining.
- Automatic tool retraction and spindle stop for tool changing.

Safety Precautions.

Safety is very important when working with all forms of machinery but particularly when working with CNC equipment, due to the hazardous voltages, speeds and forces that exist in the hardware. Follow the rules below at all times, when using your machine.

General Safety Precautions :

- Wear clothing suitable for machine operation and follow the safe working procedures in place at your establishment. When cleaning down the machine, wear suitable respiratory protective equipment. Other personal protective equipment, such as eye protection, overalls and gloves should also be considered.
- Do not place any objects so that they interfere with the guards or the operation of the machine.
- Never try to clean the machine if any part of it is rotating or in motion.
- Ensure that the correct cable for the power source is used.
- Ensure the mains power is switched off (and unplugged) before starting any maintenance work on the machine. Depending on ancillary equipment supplied with machine there may be more than one power supply to the machine. When isolating the machine always ensure that all power sources have been disconnected. Post a notice informing others not to use the machine whilst undergoing maintenance.
- Hazardous voltages can still exist immediately after switching the machine off. Always wait at least 10 minutes before accessing the CNC machine electronics.
- If power fails turn off the mains power switch immediately and unplug the machine from the mains power socket.
- Correct maintenance is an essential part of the safe use of this machine (see the Maintenance section for further details).
- Observe caution when handling machine tooling, particularly with regard to hot and/or sharp cutters. Consider wearing protective gloves.
- When an emergency stop is required, press the circular red emergency stop button, located on the right side of the CNC machine front panel.
- Visually check door and window for signs of cracks or chips. Any damage should be reported immediately to Denford and a suitable replacement obtained without delay.

2: Safety Features - Emergency Stop



A circular, red emergency stop button is located on the right front panel of your Mill, as shown above. When pressed, it has the effect of stopping all axes movements and bringing the spindle to a controlled stop. The guard interlock switch will also close. When the safety guard door is in its closed position, this will prevent access to the working area of the CNC machine.

To activate an emergency stop, press the button in until it clicks. The emergency stop button will continue to cut all power to the machine drives and keep the interlock switch closed, until the release sequence is performed.

To release a closed emergency stop button, turn the button clockwise until it springs back out.

After releasing an emergency stop, you will need to reset any CNC control software messages and home the CNC machines axes.

Check the emergency stop button is released before attempting to power up the Mill.

2: Safety Features - Interlock Guard

Note

A closed safety guard door cannot be opened when:

- The machine is switched off (ie, not in use). To release the interlock guard switch, supply power to the machine.
- The emergency stop button is fully pressed in. To release the lock, push in and turn the emergency stop button counter-clockwise until it springs back out to its ready position.
- Machining is taking place. The interlock guard switch will release when the machining operations have been completed.

Warning



Danger of serious injury!

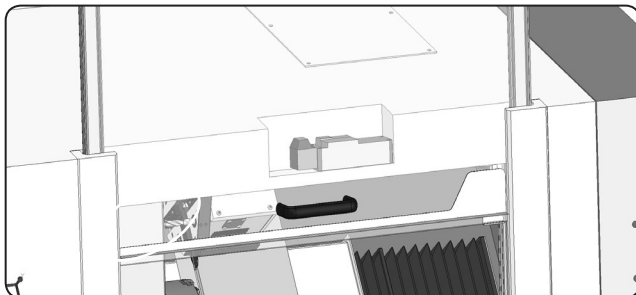
Do not let unauthorised personnel use the machine when the guard lock feature is disabled. Ensure the guard lock feature is switched back on as soon as possible.

Under no circumstances must the safety switch actuator be removed (or a spare or replacement actuator, or other device be used) to defeat the safety interlocking system.

Note

When the guard lock feature is disabled, the machine spindle will not operate. Ensure this is enabled before operation.

An interlock guard switch is fitted to the front machine door. The switch unit itself is attached behind the machine guard panel, accessible from above the front of the machine. The lock must be manually released to enter the working area when the 24 volt circuit has failed and the door is clamped electrically. An override facility is provided on the interlock guard switch, allowing temporary removal of the guard lock feature. For manual interlock release, the power supply must be switched off.

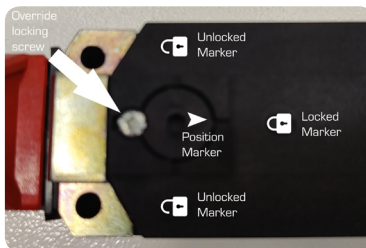


1) Locate the interlock guard switch unit.

2) Using a small flat or crosshead screwdriver, loosen the manual override locking screw until the circular black plastic lock screw can be turned (refer to photograph below).

3) Using a 3mm allen key, turn the circular black plastic lock screw one quarter turn to switch off the guard lock feature. If in doubt refer to the lock/unlock symbols embossed on the casing surface.

4) If necessary, tighten the manual override locking screw slightly. If you need to leave the machine, post a warning note informing users that the safety guard door lock is not operating.



Above: Looking directly at the face of the interlock guard switch

2: General Swarf and Coolant Precautions



General Swarf Safety Precautions.

Obtain "material safety data sheets" from your material suppliers and enforce the recommended precautions. Be aware that certain materials could contain known carcinogens. Please consult your materials supplier for further details.

Swarf particles that remain inside the working area of the Mill after a part has been machined, should be removed using a dust pan and brush or a specifically designed swarf and lubricants vacuum.

Never used a compressed airline for this purpose.

When cleaning down the machine, wear suitable personal protective equipment, such as respiratory protection, eye protection, overalls and gloves should also be considered.

swarf particles on the floor can cause slipping. This should be monitored by the operator and removed before becoming a hazard.



General Coolant Safety Precautions.

Obtain "material safety data sheets" from your coolant suppliers and enforce the recommended precautions. Be aware that certain coolant could contain known carcinogens. Please consult your materials supplier for further details.

ensure coolant is maintained and replaced as advised by the manufacturer. failure to adhere to the manufacturers instructions could lead to the growth of mould, bacteria and/or fungus which will add to the list of possible health problems.

Launder overalls regularly, provide good washing facilities with hot and cold water, soap and towels and encourage a high standard of personal hygiene.

Failure to adhere to the material safety data sheets, could lead to the following health problems, which are among the potential effects associated with exposure to certain coolants and/or corrosion inhibitors applied to materials:

- Skin disorders.
- Cancer.
- Lung Disease.

3: Unpacking and Lifting your CNC Machine

Warning



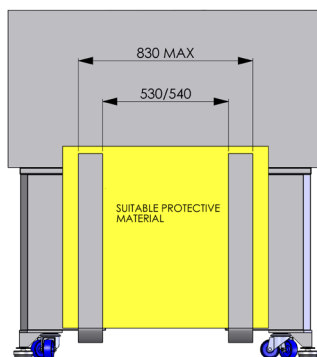
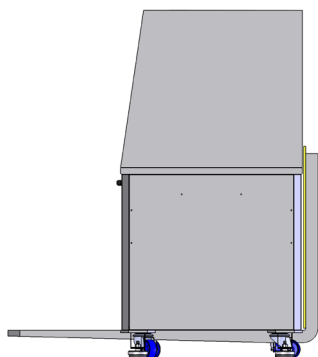
Caution.

Always use sensible lifting precautions in accordance with Health and Safety Regulations in your establishment.

If your CNC machine has been supplied inside a delivery box, cut the top of the box open and remove any packaging carefully. To obtain better access to the machine, remove all the sides from the delivery box. Your VMC 1300 Pro can weigh upto 560 kg depending on options fitted.

If the machine has been supplied on a base then lifting by forklift is recommended.

Denford do **not** advise manual lifting of this machine.



BACK VIEW OF MACHINE

Instructions for fork lifting machine.

1. Machine should be lifted from the back.
2. Outside edges of forks should be approx. 530/540mm apart and should be positioned symmetrically with respect to cabinet door.
3. Forks should be off sufficient length to ensure that they project through beyond the front of the machine.
4. Suitable protective material should be placed between forks and machine.
5. If going up a slope, fork lift should travel forward. If going down a slope, fork lift should travel in reverse.
6. If the machine is supplied on a pallet, any support blocks between the underside of the machine and the pallet must be retained in place when fork lifting the machine while on the pallet.
7. If necessary the supports may be removed prior to fork lifting the machine off the pallet, to allow the forks to be used in the stipulated positions.

3: Unpacking and Lifting your CNC Machine

Warning

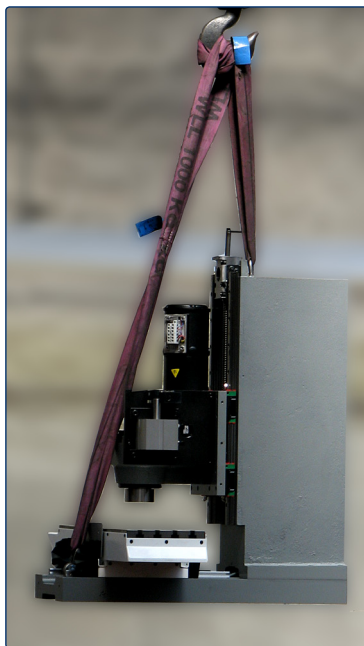
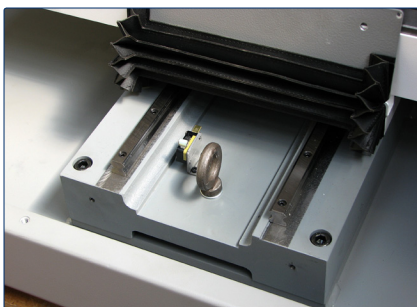
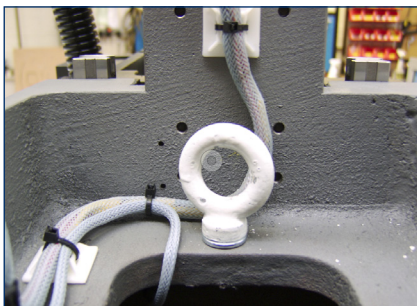


Caution.

Always use sensible lifting precautions in accordance with Health and Safety Regulations in your establishment.

With the bench mounting unit a suitable method of transportation must be used as the unit is not fitted with wheels: for example secure machine on a pallet and transport using a pallet truck.

If lifting by crane, slings must be used attached to suitable certified M10 collared lifting eyes, fitted to the holes provided in the column top and in the machine base, as shown in following illustrations.



Note: to gain access for fitting the lifting eyes it is first necessary to remove cabinet lid and front bellows cover on base.

Note: this method can be used with or without the machine cabinet, but not with the universal machine bench fitted.

Always use sensible lifting precautions in accordance with Health and Safety Regulations in your establishment.

All lifting equipment must be certified as being suitable for the loads involved.

Ensure that your CNC machine is both secure and balanced before lifting. Do not tip the machine whilst lifting.

3: Choosing a Site for your CNC Machine

Site your machine in a well ventilated room.

Ideally, the user will operate the machine when standing at its front, with a clear view of both the machine working area (through the transparent guard window) and the personal computer being used as the controller unit (which should be angled towards the user), as shown in the diagram below.

Sufficient room should also be provided for effective maintenance to be carried out around the machine itself. In particular, leave enough space for removal of the large plate covering the electronics at the right hand side of the cabinet. Positioning the PC on a movable workstation may allow easier access to the various vents, connectors and switches on the machine cabinet, when required.

Position any air compressors used at the rear, or under, the machine table.

Do not place the machine in a position which allows any of the cabinet vents to be covered. Ensure all cables, pipes and flexes are routed to avoid the possibility of users tripping over them.

Dimensional Data.

Machine Width (left to right) 1330mm (52.4").

Machine Width (including optional PC arm) 1965mm (77.4")

Machine height 1000mm (39.4")

Machine height on optional base (top to bottom) 1445mm (56.9").

Machine height on optional base (door open) 1830mm (72").

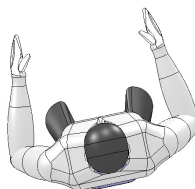
Machine depth (front to back) 750mm (29.5").

Ensure that any inlet/exhaust vents are not covered or blocked.

Allow space to remove the electrical panel cover plate at the side of the cabinet.



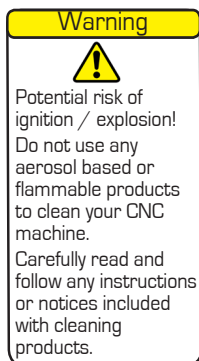
Computer angled towards Operator.



Machine Operator.

Plan View showing Ideal Machine Layout and Operating Positions.

3: Removing Protective Coatings and Packaging

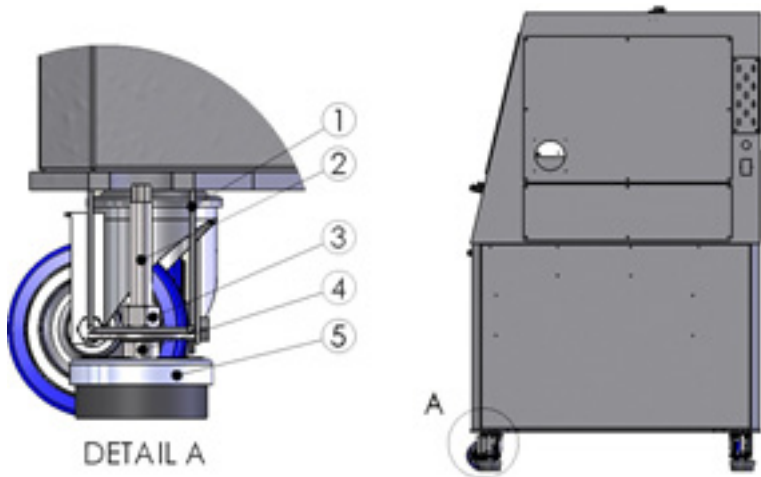


Once your Mill has been sited and connected electrically, the protective coatings and transit packaging must be removed to prepare the machine for running:

- 1) The protective plastic sheeting on the guard door and window must be removed prior to cleaning them with an antistatic cleaner.
- 2) Tie-wraps may be used in the working area of the machine, to prevent movement of components during transit. Additional items from your order may also be supplied packaged inside the working area.
- 3) To gain entry to the working area of the machine, power must be supplied to the machine, in order to release the switch unit that locks the safety guard door. Note that the switch unit will also remain locked when the emergency stop button is fully pressed in.

Warning - Aerosol based or flammable products must not be used to clean your CNC machine. To avoid the potential risk of ignition / explosion, ensure that any trapped solvent vapours can exit fully from any enclosed areas on the CNC machine. Wait at least 1 hour before attempting to operate the CNC machine.

3: Adjusting anti-vibration feet



Note: the anti-vibration feet are intended to be used as steadies and not for jacking the machine/base off its wheels. The wheels must always remain in contact with the floor.

These instructions are for siting the machine and also for when the machine is in transit.

1. Remove the hexagon bolt [2] and lock nut [3] from foot assembly
2. Compress support platform [4] into foot [5] sufficiently to allow the foot assembly to be positioned under the base bracket [1]
3. Re-fit hexagon bolt and locknut to foot assembly.
4. While preventing the foot assembly from rotating, turn the hexagon bolt clockwise with a 9mm a/f spanner until the support platform contacts the underside of the base bracket and the foot contacts the floor. Turn the hexagon bolt another 2 full turns.
5. Using a 9mm a/f spanner to prevent the hexagon bolt from rotating, turn the locknut clockwise with a 19mm a/f spanner to lock the bolt.

4: Switching the Mill On

Note

The safety guard cannot be opened until the Mill is powered up to release the interlock guard switch.

Warning



Do not connect cables between any electrical hardware with the mains power switched on, since this could seriously damage components inside your CNC machine.

Warning



Never attempt to access the electronic hardware systems of the machine with the mains power switched ON.

Note that hazardous voltages can still exist immediately after switching off the power.

If the machine has previously been switched on, wait at least 10 minutes before attempting to open the electrical panel cover plate.

Many electronic components are sensitive to electrostatic damage - ensure components and/or personnel are suitably earthed to minimise this risk.

Follow these instructions to switch on your Mill:

- 1) Check the Ethernet cable is fitted securely between the Mill cabinet (located above or near the power cord) and either the RJ45 socket on your computer or into the supplied RJ45 to USB adaptor which is then fitted to your laptop or computer.
- 2) Check that all access panels are in position and securely fastened.
- 3) Check that all inlet/exhaust vents are clear from obstructions.
- 4) Check that the guard door is fully closed.
- 5) Plug the Mill mains supply cable into an available power socket. Switch the power socket on.
- 6) The on/off power switch is located on the right-hand panel of the Mill cabinet. To switch machine on depress the left-hand side of switch. The switch will illuminate when power is being supplied to the machine.
If the Mill does not begin its power-up routine, switch off the mains power and check all connections and fuses.
- 7) Switch on the machine controller PC and start the CNC machine control software.

Establish a communication link between your machine controller and PC - for help please contact technical support +44 (0) 1484 728000.

4: Switching the Mill Off

Warning



Never attempt to access the electronic hardware systems of the machine with the mains power switched ON.

Note that hazardous voltages can still exist immediately after switching off the power.

If the machine has previously been switched on, wait at least 5 minutes before attempting to open the electrical panel cover plate.

Many electronic components are sensitive to electrostatic damage - ensure components and/or personnel are suitably earthed to minimise this risk.

Warning



Depending on ancillary equipment supplied with machine there may be more than one power supply to the machine.

When isolating machine always ensure that all power sources have been disconnected.

Follow these instructions to switch off your Denford Mill off:

- 1) Wait for the Mill to fully complete any machining or processing of any operational instructions.
- 2) Open the safety guard door and remove any finished parts from the working area.
- 3) Close the safety guard door.
- 4) Close down the communication link between the CNC control software and the Mill, then exit the CNC control software, as described in your separate CNC Control Software User's Manual.
- 5) Power down the Mill by depressing the right-hand side of the red on/off mains power switch. The on/off switch is mounted on the right-hand cabinet panel, Note that cutting the machine power will trigger the closing of the interlock guard switch. This will lock a closed safety guard door in position, preventing access to the machine working area. The interlock guard switch will automatically reopen when power is next supplied to your Mill.
- 6) Switch off the mains power socket.

4: Homing the Machine Axes (Home Mode)

Note

The sequence of events required to home the Mill will depend on the type of CNC machine control software being used - please refer to your separate CNC Machine Control Software User's Manual for specific details.

Immediately after establishing a communication link between the CNC control software and the Mill, all three axes of the CNC machine must be homed. The process is commonly referred to as homing the machine, or datuming each of the machine axes.

When a communication link is first established between the Mill and the CNC machine control software, or when the CNC machine "loses" position, the software will not know the true position of the machine axes in relation to the machine spindle.

Note

The CNC machine control software Jog and Auto Modes will not become available until the machine has been configured by homing all machine axes.

Homing the CNC machine defines:

- The machine datum, by physically driving the machine head to a fixed zero reference point.
- The constraints of the dimensional co-ordinate grid system used for plotting any programmed movements, effectively the working envelope of the CNC machine.

Note

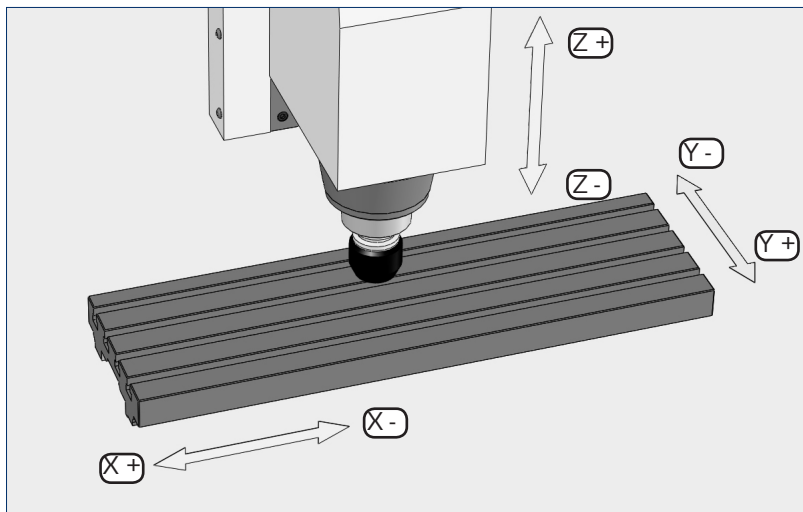
The machine datum position is set by Denford and can never be moved, since it defines the physical movement capability of the CNC.

After homing the machine, the zero position of the dimensional co-ordinate grid system is referred to as the machine datum. You can find the position of the machine datum by switching the co-ordinate display in your CNC control software to read Machine Co-ordinates. The position of the machine datum is achieved when the X, Y and Z panels of the co-ordinate display all read zero.

In addition to homing the CNC machine after it has first been switched on, we also recommend homing the CNC machine after loading or configuring any offsets.

4: Manual Control - Axis Definitions (Jog Mode)

Jog mode is used for manually controlling the CNC machine, moving the machine axes, changing tools, operating optional equipment and configuring any offsets.



Axis Definitions.

X Axis - The X axis slides run at 90 degrees to the Y and Z axes, horizontally right and left, when viewed from the front of the machine.

Minus [-] X movements run the table towards the right end of the machine and positive [+] X movements run towards the left end of the machine.

Jog Keys to move axis - arrow keys right and left.

Y Axis - The Y axis slides run at 90 degrees to the X and Z axes, horizontally backwards and forwards, when viewed from the front of the machine.

Minus [-] Y movements run the table towards the back of the machine and positive [+] Y movements run towards the front of the machine.

Jog Keys to move axis - arrow keys up and down.

Z Axis - The Z axis slides run at 90 degrees to the X and Y axes, vertically up and down, when viewed from the front of the machine.

Positive [+] Z movements run the spindle head up, away from the floor of the machine and minus [-] Z movements run down, towards the floor of the machine.

Jog Keys to move axis - Page up and Page down.

4: Machine Operators Panels

Note

Feedrate override changes will only be registered when an actual spindle speed or feedrate is being applied by the CNC control software.

Spindle Speed and Feedrate Override Controls.

The spindle speed and feedrate of the VMC 1300 Pro can be manually overridden during a machining operation, using the potentiometer controls fitted to the operators panel. The spindle speed can be overridden between 50% and 120%.

The feedrate can be overridden between 0% and 150%.

To increase the spindle speed or feedrate, rotate the appropriate control clockwise.

To decrease the spindle speed or feedrate, rotate the appropriate control counterclockwise.

The degree of adjustment applied to each value is displayed in the CNC control software.

Warning



Depending on ancillary equipment supplied with machine there may be more than one power supply to the machine.

When isolating machine always ensure that all power sources have been disconnected.

Mains Power Switch.

To supply power to the CNC machine, depress left-hand side of the switch immediately above the power inlet socket. To cut power to the CNC machine, depress right-hand side of switch.

Do not cut the mains power when machining or processing of any operational instructions is taking place. Note that cutting the machine power will trigger the closing of the interlock guard switch. This will lock a closed safety guard door in position, preventing access to the machine working area. The interlock guard switch will automatically reopen when power is next supplied to your Mill.

Note

Activating an emergency stop will also trigger the interlock guard switch. This will prevent a closed safety guard door from being opened.

Emergency Stop Button.

The emergency stop button is a circular red push button. Pressing the emergency stop button has the effect of stopping all axes and spindle movements immediately. To activate an emergency stop, press the button in fully until it clicks. The emergency stop button will remain closed (continuing to cut all power to the machine drives) until the release sequence is performed. To release a closed emergency stop button, push and turn the button clockwise until it springs back out, then wait 10 seconds for the machine systems to reset, unlocking the safety guard door.

5: Setting Tools in the Toolholders

Fitting a Tool.

Select the correct collet Size for the tool, according to the shank size for example a 6mm tool would use a 6-7 collet.

Note: The tool holder may not have a pull stud (arrowed) fitted. A pull stud will need to be fitted for use in the VMC.1300 Pro.



Position the collet in the toolholder and fit retaining collar



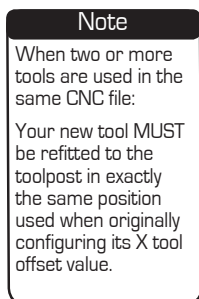
Screw on the retaining collar so collet sits flush with collar face as shown.



Insert the tool into the collet to the length you require and tighten the retaining collar.



6: Performing a Tool Change



Performing a Manually Requested Tool Change.

To ensure that the machine is always aware of which tool is fitted to the spindle at any one time, it is recommended that if you wish to change tool it is carried out via the machine control software. When a tool change is requested the machine will automatically move to the tool change position as it would do in the Automatic tool change detailed in the next chapter.

Performing an Automatically Requested Tool Change during the running of a CNC program.

On reading a tool change operation line in your CNC program, the machine axes will move to their tool change positions, via an intermediate point, if programmed.

At this point, the software will pause the CNC program.

A) If a manual tool change system is fitted a message window will be displayed, prompting you to manually change tools.

Always wait for the spindle and machine axes to stop moving, before attempting to open the safety guard door.

Replace the current tool number with the tool number specified in the software message window (the tool profiles allocated to each tool number may be listed at the beginning of your CNC program).

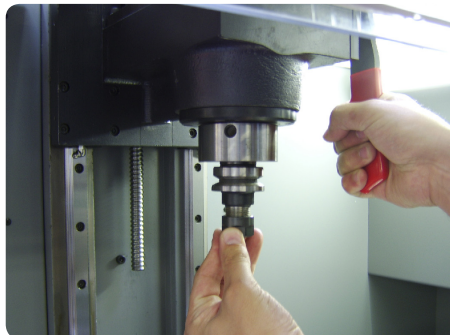
Close the safety guard door and ok the software message window to resume your machining.

B) If an automatic tool change system is fitted the machine will move to the programmed tool change position and carry out a tool change automatically.

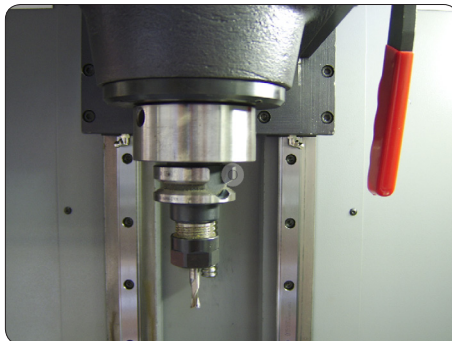
6: Performing a Tool Change - Manual

At this point it is assumed that all the tools have been setup as outlined in section 5. if you have either requested to change tools within the software or you are currently running a program and have a manual tool change system fitted, you must follow the steps below in order to change the tool. In either case the machine will move to the tool change position and a message on screen will prompt to change to the requested tool.

- 1) Pull the lever towards you and hold the tool in the spindle.



- 2) Release the lever to clamp the tool.



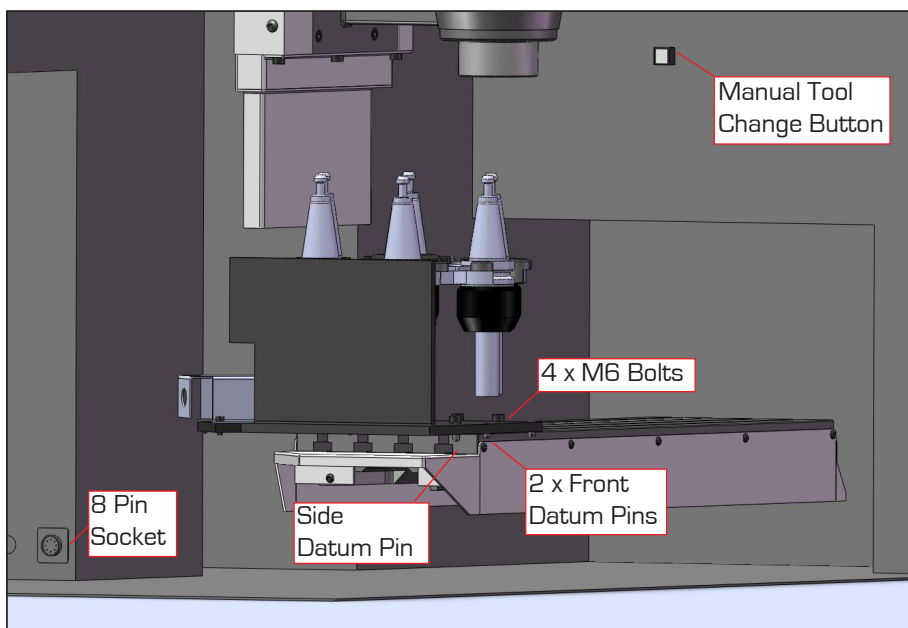
To change the cutting tool in the holder use the two spanners as shown below to unclamp the tool.



6: Performing a Tool Change - ATC

If the machine is fitted with the 6 or 8 station ATC, care must be taken to ensure that the correct tools are in the relevant pocket in the carousel. On reading a tool change operation line in the CNC program, the machine will:

- A) Move all three machine axes will to the tool change position
- B) Automatically open the lid of the carousel
- C) Place the current tool back in the holder
- D) Rotate the carousel to the new tool
- E) Collect the new tool
- F) Automatically resume the machining



The VMC 1300 Pro can be supplied with an Auto Tool Changer fitted as an option. With the ATC fitted X axis travel is limited to 250mm. However the ATC can be removed thereby allowing the full 375mm X Axis travel.

The Manual Tool Change Button is used to release a tool from the spindle, it is located inside the machine as it only to be used with the door open. Ensure that the tool is held when pressing the button to prevent it falling out and causing damage. this button can be useful for sorting the tools into the correct pockets of the carousel.

6: Removing the ATC

To Remove the ATC

Before carrying out the following procedure, ensure that all tools and toolholders are removed from the carousel and spindle.

1. Reference the machine axes.
2. Move X axis to X=200.
3. Open machine door.
4. Switch off power to the machine.
5. Disconnect ATC cable from 8 pin socket on side wall of cabinet tool store recess.
6. Remove 4 x M6 bolts.
7. Lift ATC from machine and carefully store until required again.
8. Close door and restart machine.

The machine software will recognise the new soft wired limits and will allow full 375mm of X axis travel.

After removing the Auto Tool Changer tool changing must be carried out manually as follows:-

To load a tool.

Present tool to spindle with left hand while pressing the Manual Tool Change Button with right hand.

Push tool fully into spindle and release push button. Tool should now be retained in spindle.

To release a tool.

While holding the tool with left hand, press the Manual Tool Change Button with right hand to release the tool. Lower tool from spindle and release push button.

6: Refitting the ATC

To Fit the ATC

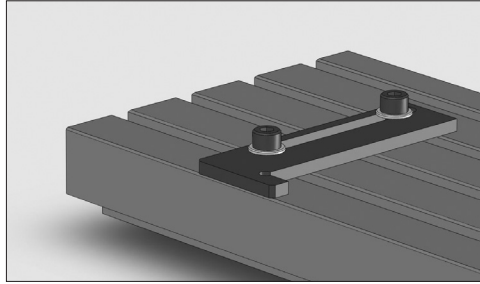
Before carrying out the following procedure, ensure that there are no tools or toolholders in the carousel or spindle.

1. Reference the machine axes.
2. Move X axis to X=200.
3. Open machine door.
4. Switch off power to the machine.
5. Ensure that T nuts are still in place in the appropriate table T slots.
6. Place ATC on table and locate using datum pins on ATC base.
 - Push ATC backward and ensure that both front datum pins are in contact with front edge of table.
 - Slide ATC to the right, ensuring that front datum pins remain in contact with table, until the side datum pin contacts the end face of the table.
7. Fit 4 x M6 bolts.
8. Connect ATC cable to 8 pin socket on side wall of cabinet tool store recess.
9. Close door and restart machine.

The machine software will recognise the new soft wired limits and will restrict X axis travel to 250mm.

For further information on toolchanger settings refer to help files on VR Milling CD ROM.

7: Datum Plate



The datum plate is an L shaped bracket, used for helping to replace work in identical positions on the machine table. This allows projects to be configured using the same workpiece and tool offsets, since the billet can always be placed accurately in position on the machine table - hence the name “datum” plate.

It is fixed against the machine table using two tee nut assemblies which can be moved to the required position for the datum plate.

The tee nuts slide along T shaped channels that run horizontally along the machine bed - these retain the datum plate in position when the allen headed bolts are tightened.

Fitting of Datum Plate.

To fit the datum plate in position on the machine table, place it at the end of the T shaped channels.

Align each Tee-nut with its respective channel and slide it into position.

Slide the datum plate along the machine table to the required position. Note that the datum plate can be adjusted forwards and backwards [ie. parallel to the Y axis], if required.

Once the datum plate has been positioned in approximately the correct place, tighten each of the allen headed bolts, by turning them in a clockwise direction until they just begin to grip the plate to the table surface. It must still be possible to move the datum plate, since it may require final adjustments if it needs to be lined up square with respect to the machine axes.

Removal of Datum Plate.

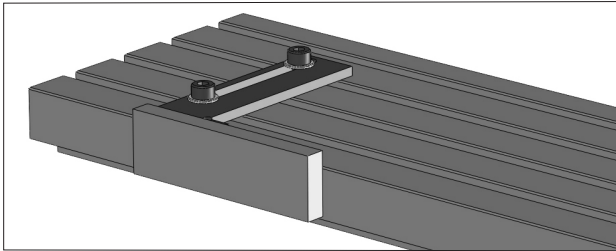
To remove the datum plate, loosen the 2 allen headed bolts, by turning them in an counterclockwise direction.

Slide the datum plate along the machine table, until the Tee-nuts are released from their channels, then withdraw the datum plate from the machine table.

7: Setting the Datum Plate

The following diagrams illustrate the various methods that can be used when positioning the datum plate square with respect to the machine table (ie. the edges of the datum plate run exactly parallel with the X and Y machine axes). Each method varies according to the level of position accuracy required.

Datum Plate Setting Method 1.



This method is useful if the front face of the datum plate can be positioned exactly level with the front edge of the machine table.

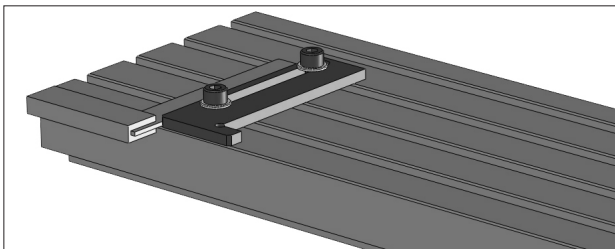
Use the true flat face of a section of material, such as a piece of flat steel bar.

Press the steel bar firmly against the front edge of the table and adjust the datum plate so its front face also touches the surface of the steel bar.

Tighten the allen headed bolts.

Note that although this method is quick, it is also fairly inaccurate.

Datum Plate Setting Method 2.

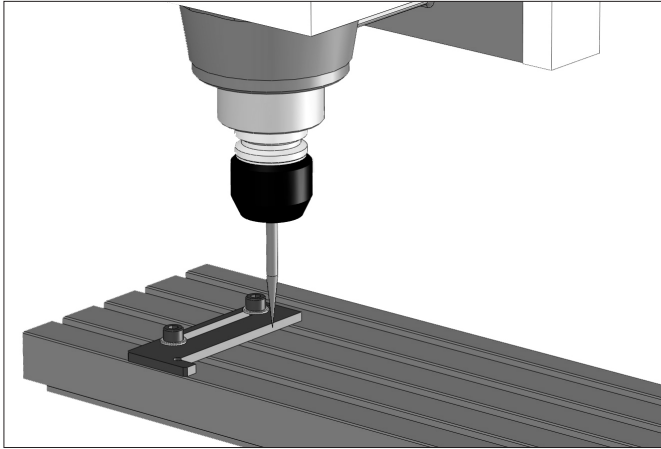


To obtain a better degree of accuracy, use an engineers square lined up against the front edge of the machine table. Adjust the datum plate so it touches the engineers square and tighten the allen headed bolts.

This method has the added advantage of allowing the datum plate to be fixed further into the middle of the machine table.

7: Setting the Datum Plate

Datum Plate Setting Method 3.



Set up the machine so a pointer is held in place of the cutting tool.

Align the pointing tool so it is positioned slightly above one of the 2 edges of the datum plate, which run parallel with the Y axis.

Start with the pointer near the back of the datum plate edge you have chosen.

Move the pointer towards the front of the datum plate, checking that the tip of the pointer is still lined up exactly over the edge you have chosen.

If the pointer does not align, readjust the position of the datum plate.

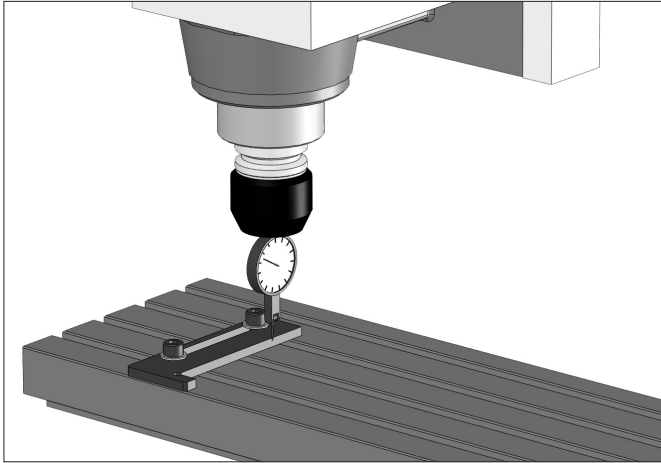
Keep repeating these steps, moving the pointer forwards and backwards along the datum plate edge, until a suitable degree of accuracy has been obtained.

For a final check, the pointer can be moved above and along one of the datum plate edges which run parallel to the X axis.

Finally, tighten the allen headed bolts to fix the datum plate firmly in place.

7: Setting the Datum Plate

Datum Plate Setting Method 4.



Set up the machine so a dial gauge is held in place of the cutting tool.

Align the dial gauge so it is positioned along one of the 2 sides of the datum plate, which run parallel with the Y axis.

Start with the dial gauge near the back of the datum plate edge you have chosen.

Move the dial gauge towards the front of the datum plate, checking that the values indicated on the dial gauge do not alter.

If the values do alter, readjust the position of the datum plate until the values are constant.

Keep repeating these steps, moving the dial gauge forwards and backwards along the datum plate edge, until a suitable degree of accuracy has been obtained.

Finally, tighten the allen headed bolts to fix the datum plate firmly in place.

8: Miteebite

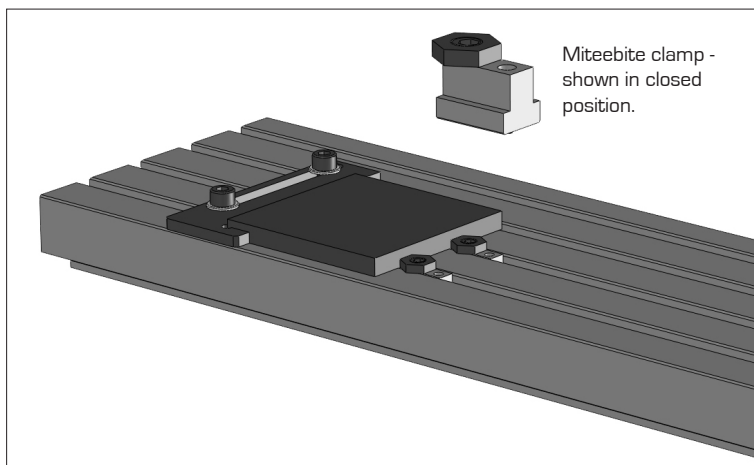
Miteebite clamps are a quick and versatile method of securing most pieces of work to the machine table.

In the example shown below, two miteebite clamps are used with a datum plate to clamp a sheet of MDF.

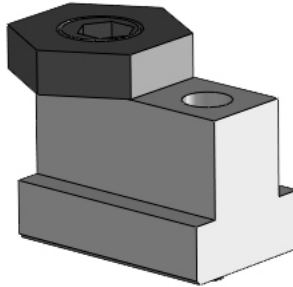
The MDF is used as a sub-table - to permit through machining, and as a safety measure to prevent damage occurring to the machine table itself, should a problem occur when milling.

The actual workpiece, such as a sheet of plastic, would be held in place on the sub-table using double sided tape.

The billet is usually positioned with its front and lefthand edges aligned with the front and lefthand edges of the sub-table.



8: How does a Miteebite Clamp work?



The base of the Miteebite clamp consists of a Tee-nut, with 2 threaded holes passing right through its section from top to bottom.

One of these threaded holes contains a grubscrew. When this is tightened, the base of the grubscrew pushes against the bottom face of the T channel in which it has been placed, securing the Tee-nut in position.

The other threaded hole contains a bolt which has its head and allen key hole machined slightly off centre. A hexagon washer spins freely around this bolt head.

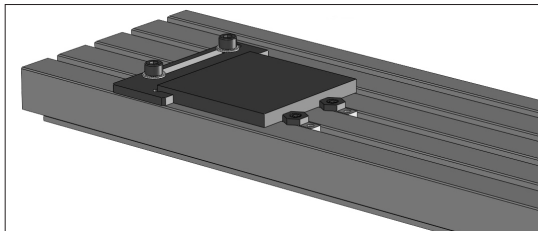
The bolt behaves in a similar way to a cam when rotated. If the allen key hole is facing away from the grubscrew, then the hexagon washer is slack against the work [ie. the Miteebite is open].

If the bolt is then turned through 180 degrees so that the allen key hole is now facing towards the grubscrew, then the hexagon washer will be tight against the work [ie. the Miteebite is closed].

Continual turning of the bolt is unnecessary, since the full range of movement for the hexagon washer is covered in a single 360 degree rotation of the bolt.

In this respect, the hexagon washer will not tighten further if the bolt is continually turned clockwise.

8: Using Miteebite Clamps



The example used in the description below explains the fitting procedure for a temporary MDF sub-table, onto which a plastic sheet can be attached using double sided tape.

Set the Datum Plate into position, then place the temporary MDF sub-table onto the machine table, so it is located correctly against the edges of the datum plate.

Next, position the Miteebites into their respective T channels and slide them along until they touch the sub-table. Ensure that one of the six flat sides of the hexagon washers press against the subtable, not one of the hexagon points.

The hexagon washers should be positioned at this stage so they are open (ie. the off-centre allen key holes on the bolts should be facing away from the grub screws).

Now tighten the grub screws in each Miteebite to lock them firmly in position. At this stage, it should still be possible to remove the subtable.

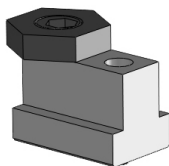
Remember, the grub screws only lock the Miteebites in position on the machine table - it is the hexagon washers which actually lock the sub-table in position.

To lock the temporary MDF bed firmly in place, turn the bolts with the off-centre allen key holes 180 degrees so the hexagon washers are in the closed position (ie. the off-centre allen key holes on the bolts should now be facing towards the grub screws).

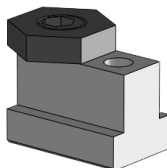
Now that the Miteebites have been set, the sub-table can be continually withdrawn from the machine table, then replaced, always to the same position.

This is an advantage for jobs involving the repeat milling of pieces of work, such as a small production run or a college class/group project.

Hexagon washer set
in closed position.



Hexagon washer set
in open position.

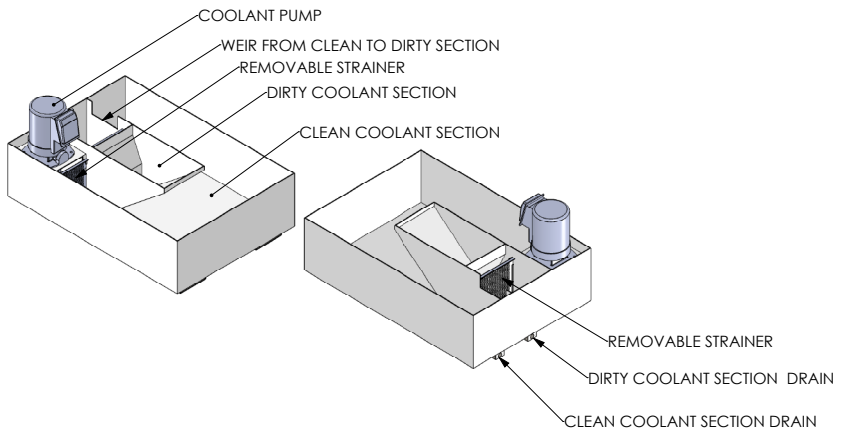


9: Flood Coolant Option

The VMC 1300 Pro is supplied with Flood Coolant fitted as an option. The system comprises a coolant tank with pump unit housed in the machine base and a magnetic manifold mounted flexible hose for coolant distribution in the machine cabinet. The coolant return to the tank is via a perforated strainer in the cabinet floor and flexible ducting.

The coolant tank is segregated into separate compartments with baffles and strainers to cause weiring of the coolant, and to allow settling of swarf particles on the floor of the dirty section of the tank.

The tank has 2 drain points, one for the dirty section of the tank and one for the clean section. Both drain points can be accessed through the door in the machine base. The majority of the coolant in the clean side can be drained using the pump to exhaust the coolant through the manifold and nozzle into a suitable container.



The coolant level in the tank should be checked when all coolant has drained back to the tank and there is no residual coolant in the system. The level in the clean section should be maintained between 5mm below the weir and 50mm below the weir.

The coolant should be pre-mixed in accordance with the manufacturer's recommendations before being added slowly to the dirty section of the coolant tank.

The coolant may be added through the perforated strainer in the cabine floor if preferred, but care must be taken to allow time for coolant to completely flow through the system when checking level as above. The capacity of the coolant tank is 25 litres.

9: Flood Coolant

A suitable coolant should be selected which has good anti-corrosion characteristics, low odour, low frothing, and is easy to clean. It should also comply with any local Health and Safety requirements. Generally a water based semi-synthetic coolant should fulfil the above requirements.

The flood coolant manifold must always be positioned to ensure that it does not contact the workpiece during machining, or interfere with the operation of the Auto Indexing Turret. Likewise the coolant hose and nozzle should be carefully positioned with the coolant always directed at the cutting tool.

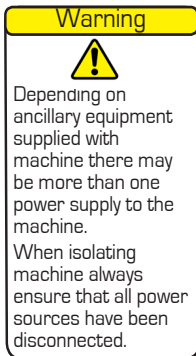
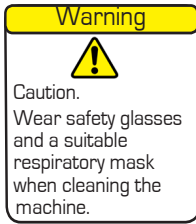
Swarf Removal

Swarf should be regularly swept down into the sloping trough at the front of the machine cabinet and removed on a daily basis, or more frequently if the machine is used for extensive periods. The machine should be thoroughly cleaned when changing from cutting with coolant to cutting without coolant, and vice versa. If the machine is to be used for machining of non metallic materials and without coolant, it is advisable to fit a suitable blanking plate over the perforated strainer.

Procedure for cleaning the Coolant Tank

The coolant tank should be drained and refilled with a suitable cleaning fluid (recommended by the coolant supplier). The fluid should be pumped around the coolant system. The duration of the cleaning cycle and the frequency with which it is carried out should be advised by the coolant supplier.

10: Planning Procedure for Maintenance Work



When carrying out any maintenance, pay special attention to the following items, ensuring safe and correct working procedures in accordance with Health and Safety Regulations in your establishment:

- Before starting any maintenance work, define the task and obtain the information relevant to carry out the maintenance. Also, define the time period needed to complete the task, to obtain the correct tools and order any spare parts, if required.
- During the maintenance work period, display a suitable notice stating that the machine is under maintenance and should not be used until the notice is removed.
- Safety must be a priority when carrying out any maintenance work. Covers and safety guards that are removed during the maintenance work must be replaced after the task is completed.
- All work must be carried out by suitably qualified personnel.
- Never attempt to access the electronic hardware systems of the machine with the mains power switched ON.
- Hazardous voltages can still exist immediately after switching off the power. If the machine has previously been switched on, wait at least 10 minutes before attempting to open the electrical panel access plate.
- When replacing electrical components, ensure the new parts are of suitable replacement specification.
- All work completed on the machine, whether progressive, or preventative, should be logged to ensure a complete service record is available for future referral. We recommend the maintenance logs at the end of the maintenance section are used to log any maintenance tasks undertaken.
- When maintenance work has been completed, check that the replaced or serviced parts work correctly, before allowing general operation of the machine.

10: Maintenance Schedule

Every Day (and, if necessary between components)

- Remove any swarf, particularly from the Y axis bellows.
- Clean tooling system and tool holders.

Every Week

- Clean the machine thoroughly.
- Check all exposed screws and nuts for tightness.
- Check flood coolant level. Replenish if necessary.
- Check oil level if auto lubrication option fitted. Replenish if necessary.
- Visually check door for signs of cracks or chips. Any damage should be reported immediately to Denford and a suitable replacement obtained without delay.

Door Part Number VMC/0506 & Window Part Number VMC/0502_V2

- Check guard door top retention catch for correct operation. If it fails to operate correctly, a replacement should be obtained without delay.

Retention Catch Part Number SCF50530

Every Two Months

- Check the condition of any electrical connections.
- Check and thoroughly clean all components of the tooling system.
- Check all cables for kinks and breaks.

Every Three Months

- Clean microswitches.
- Lubricate the machine ballscrews and linear rails (if auto lubrication not fitted).

Every Six Months

- Remove the chuck jaws and clean the chuck.
- Drain and clean out coolant tank and replace coolant.

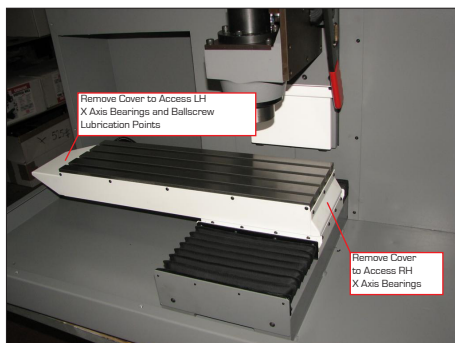
Every Twelve Months

- Check machine alignments and accuracy.
- Check spindle bearing adjustment.
- Check spindle drive belt for wear.
- Check and re-grease axis bearings - not required if sealed bearings are fitted.
- Check spindle drive belt for wear.
- Drain and clean out coolant tank, flush entire coolant system and renew coolant.

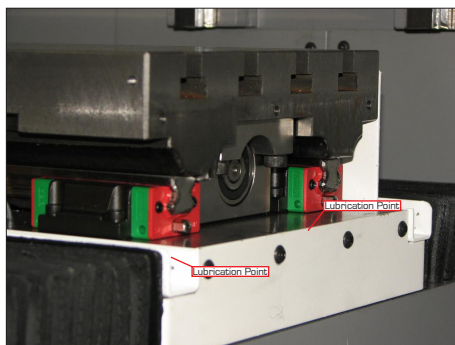
1 1: Lubrication Chart

Lubrication point	Lubricating System	Frequency		Quantity
Machine Slideways	Grease Gun to Grease Nipple	Every 6 Months	Shell Alvania II or equivalent	Apply until grease exudes from seals
Axis Ballscrews	Grease Gun to Grease Nipple	Every 3 Months	Shell Alvania II or equivalent	Apply until grease exudes from seals
Axis Bearings	Apply by Syringe	Every 12 Months	Shell Alvania II or equivalent	2cc/bearing
Spindle Bearings	Apply by Syringe	On Bearing Renewal	Kluber Isoflex NBU15	4cc/bearing

12: X Axis Lubrication

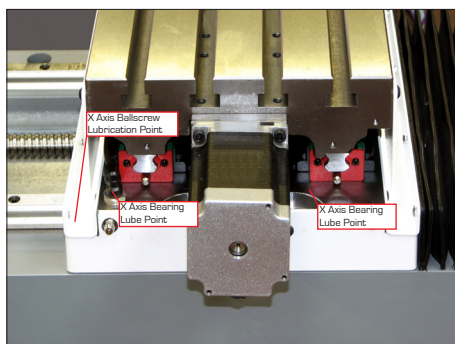


Four lubrication points for the X axis bearings and one point for the X axis ballscrew are located at the sides of the machine saddle. To access these points remove the covers as shown.



For best access to the two right hand X axis bearing lubrication points, jog the X axis fully to the left.

Using a suitable grease gun apply lubricant to the lubrication points.

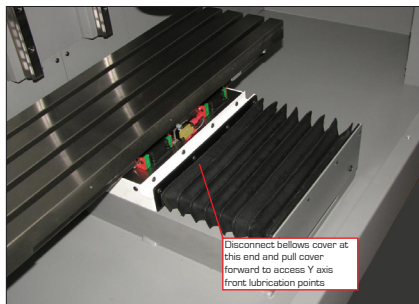


For best access to the two left hand X axis bearing lubrication points and the X axis ballscrew lubrication point, jog the X axis fully to the right.

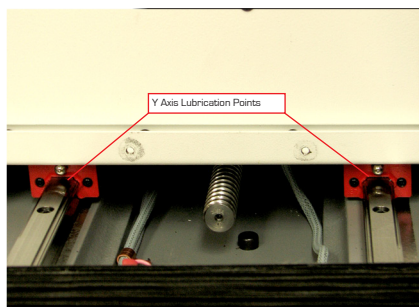
Using a suitable grease gun apply lubricant to the lubrication points.

Finally refit covers and jog axis from side to side 3 or 4 times to distribute lubricant.

13: Y Axis Lubrication

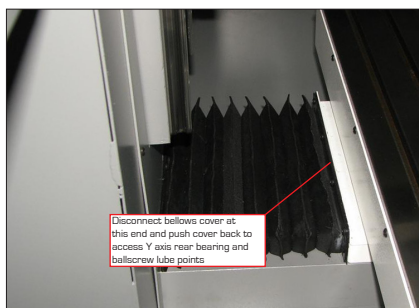


Two lubrication points for the front Y axis bearings are located at the front of the machine saddle. To access these points remove the front bellows cover as shown.

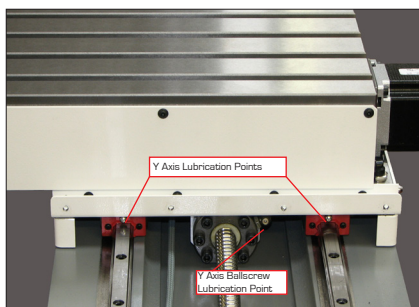


For best access to the two front Y axis bearing lubrication points, jog the Y axis fully back.

Using a suitable grease gun apply lubricant to the lubrication points.



Two lubrication points for the rear Y axis bearings, and the Y axis ballscrew are located at the rear of the machine saddle. To access these points remove the rear bellows cover as shown.

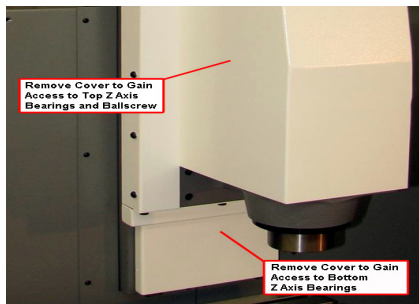


For best access to the two back Y axis bearing and Y axis ballscrew lubrication points, jog the Y axis fully forward.

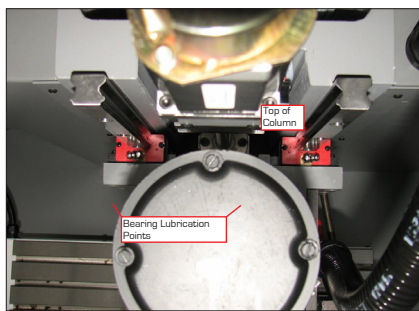
Using a suitable grease gun apply lubricant to the lubrication points.

Finally refit covers and jog axis to and fro 3 or 4 times to distribute lubricant.

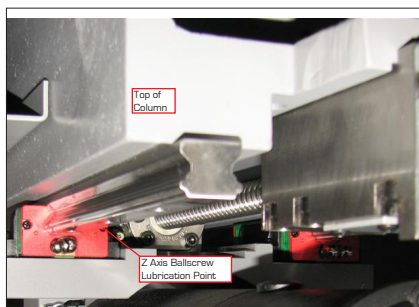
14: Z Axis Lubrication



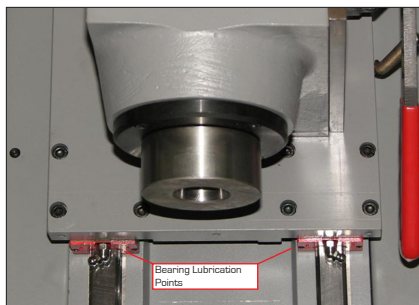
Four lubrication points for the Z axis bearings and one point for the Z axis ballscrew are located around the spindle head. To gain access to these points, remove cabinet top cover, then jog Z axis to top position and remove covers as shown.



Using a suitable grease gun apply lubricant to the top Z axis bearing lubrication points.



Using a suitable grease gun apply lubricant to the Z axis ballscrew lubrication point.



Using a suitable grease gun apply lubricant to the bottom Z axis bearing lubrication points.

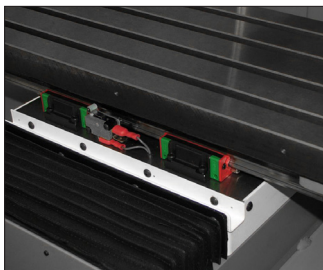
Finally refit covers and jog axis up and down 3 or 4 times to distribute lubricant.

15: Cleaning the Microswitches

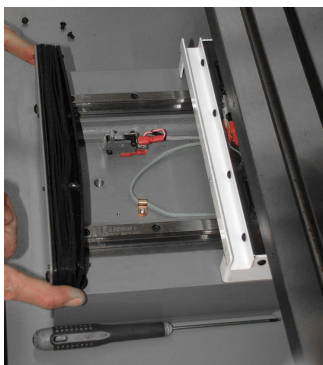
The X,Y and Z axes all have microswitches.

Using a soft bristled brush, carefully clean dust and debris away from the microswitch, to an area where it can be removed using a vacuum cleaner.

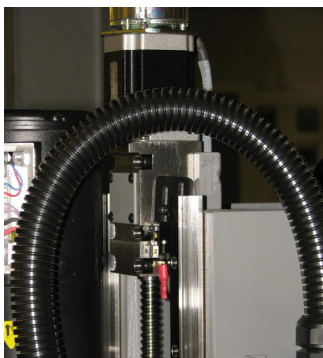
All three axis microswitches should be cleaned: they can be found in the locations shown below.



X Axis



Y Axis



Z Axis

16: Maintenance Log

Date of maintenance work.	Name of personnel carrying out the maintenance.	Details of maintenance work completed.



16: Maintenance Log

Date of maintenance work.	Name of personnel carrying out the maintenance.	Details of maintenance work completed.



17: Technical Support

Denford Limited provides unlimited telephone and e-mail Technical Support on this CNC machine to registered users. On-site visits by our engineers may be chargeable. Please refer to the information held in your separate Warranty pack, for specific details.

Before contacting Denford for support, please read your hardware and software manuals and check the Denford websites for support.

Internet (access technical support and FAQ sections):

www.denfordata.com/bb

When you request support, please be at your CNC machine, with your hardware and software documentation to hand. To minimise delay, please be prepared to provide the following information:

- CNC Machine Serial Number (from the machine ID panel).
- Registered user's name / establishment name.
- The CNC machine control software name and version number (from the "Help/About" menu option).
- The wording of any error messages that appear on your computer screen, if applicable.
- A list of the steps that were taken to lead up to the problem.
- A list of any maintenance work that has been carried out on the CNC machine.

Address: Denford Limited,
Armytage Road,
Brighouse,
West Yorkshire,
HD6 1QF,
UK.

Telephone: +44 (0) 1484 728000

E-mail: technical@denford.co.uk

Times: Monday to Thursday 8.30am - 4.30pm GMT
Friday 8.30am - 1.00pm GMT

17: Specification of the VMC 1300 Pro

Safety Features:

- Manual operation, totally enclosed, interlocked, safety guard door.
- Emergency stop button.
- Toolpath graphics to verify part programs prior to machining.

Mechanical Details:

- Travel X axis - 375mm (14.75")
Travel X Axis with ATC in Position - 250mm (10")
- Travel Y axis - 150mm (6")
- Travel Z axis - 235mm (9.25")

Dimensions:

- Machine width - 1300 Promm (51.2")
- Machine width with base - 1330mm (52.4")
- Machine width with base and PC extension - 1965mm (77.4")
- Machine height - 1000mm (39.4")
- Machine height with base - 1830mm (72")
- Machine depth - 750mm (29.5")

Weights:

- Machine weight - 353kg (777 lbs)
- Machine weight on base - up to 560kg (1232 lbs) depending on options fitted.

Electrical Details:

- Mains supply required:
220/240Volts, 50Hz, 10 Amps.
- Spindle motor: 1.6 kw
- Spindle Speeds: 0 - 6000RPM.
- Axis stepper motors

Performance:

- Rapid traverse rate up to 5000 mm/min (197 in./min)
- Max Feed traverse rate up to 5000 mm/min (197 in./min)



Declaration of Conformity

The responsible person and person
authorised to compile the Technical File

Mr Stephen Oddy

Business Name:

Denford Ltd

Address:

Armytage Road
Brighouse
W Yorkshire
HD6 1QF
United Kingdom

Declares that the Machinery Described:

Make:

Denford Ltd

Models:

VMC1300 & VMC1300 PRO
Manufactured from January 1st 2023

We hereby declare that the product
described above, to which this declaration of
conformity refers to, is in conformity with
the essential requirements of the following
standards:

Supply of Machinery (Safety) Regulations 2008
BS EN 19085-1 :2021
BS EN 19085-3 :2021
The Electromagnetic Compatibility Regulations 2016
RoHS Directive:2011/65/EU
ISO 13849-1:2015(EN)

Signature of responsible person

A handwritten signature in black ink, appearing to read "S. Oddy".

Position:

Managing Director

Date:

7th December 2022



Declaration of Conformity

The responsible person and person
authorised to compile the Technical File

Mr Stephen Oddy

Business Name:

Denford Ltd

Address:

Armytage Road
Brighouse
W Yorkshire
HD6 1QF
United Kingdom

Declares that the Machinery Described:

Make:

Denford Ltd

Models:

VMC 1300 & VMC1300 PRO
Manufactured from January 1st 2023

We hereby declare that the product
described above, to which this declaration of
conformity refers to, is in conformity with
the essential requirements of the following
standards:

Machinery Directive: 2006/42/EC
EN 19085-1 :2021
EN 19085-3 :2021
EMC Directive:2014/30/EU
RoHS Directive:2011/65/EU
ISO 13849-1:2015(EN)

Signature of responsible person

Position:

Managing Director

Date:

7th December 2022

17: VMC 1300 Pro Noise Level Test

NL-VMC-02S Results

Noise Level test

Test Report No: NL-VMC-02S

Machinery Manufacturer: Denford Limited.

Machinery Type/Model: VMC 1300 CNC Milling Machine

Equipment:

Meter Ref. Standard ST-805

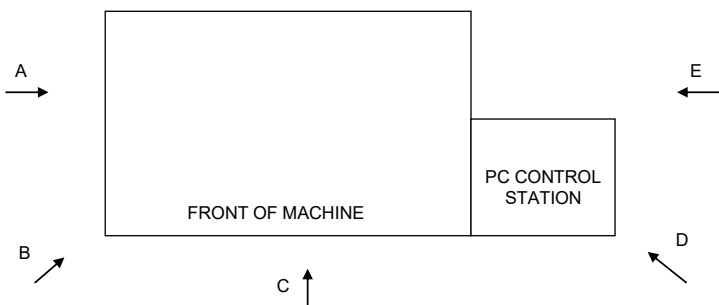
Denford VMC 1300

Test Conditions:

Spindle speed: 0 - 4000 RPM.

Axis speed: 0 - 5000 mm/min

Ambient background noise: 50 dB(A).



A, B, C, D & E are measurement positions 1 metre from the machine and at a height of 1.6 metres above floor level.

Results;

All values are measured in dB(A)

Condition	A	B	C	D	E
Test Program	65	64	67	66	67

Test Program






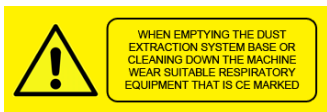



Spindle speed varying between 0 and 4000 RPM

Machine axes in combination 0 to 3,500mm/min.

ATC Cycle – Spindle Stationary – machine axes in combination 0 to 5000 rpm.

The entire test cycle was run at each of the positions shown and the maximum figures registered at each position were recorded in the above table.

17: Labels used in Manual or on Machine

Label	Description & Location
	Description - Earth Label Location - Electrical Cabinet
	Description - Protected Earth label Location - Electrical Cabinet
	Description RJ45 / Ethernet Connection label Location - Right hand side of machine
	Description - Refers to an immediately impending danger. If the danger is not avoided, it could result in death or severe (crippling) injury. Please consult the manual where this symbol is displayed. Location - Machine
	Description Refers to a possibly dangerous situation. If it is not avoided, it could result severe injury. Location - Machine Manual and machine
	Description - PPE warning label Location - Right hand side of machine
	Description - Safety warning Location - Right hand side of machine
	Description - PAT Testing Label Location - Right hand side of machine
	Description - Hazardous Voltage Warning Location - Machine

18: Glossary

BILLET	A small bar of plastic or metal in an intermediate stage of manufacture.
CAD	Computer Aided Design - the use of a wide range of computer based tools that assist engineers, architects and other design professionals in their design of "real world" objects.
CAM.....	Computer Aided Manufacture - software that is capable of creating tool cutter paths in a number of different axes for different CNC systems. Usually taking the design input from CAD system.
CNC.....	Computer Numerical Control - a computerised system of hardware and software, which controls the movement of a machine tool.
DRIVE	The controller unit for a disk system.
DRY RUN	An operation used to test how a CNC program will function without driving the machine itself.
DWELL	A programmed time delay.
EDIT	The mode used for altering the content of a CNC program via the Desktop Tutor or qwerty keyboard.
END OF BLOCK SIGNAL	The symbol or indicator [;] that defines the end of a block of data. The equivalent of the PC [return] key.
ERROR.....	The deviation of an attained value from a desired value.
G-CODE	The programming language understood by the machine controller.
FEEDRATE	The rate, in mm/min or in/min at which the cutting tool is advanced into the workpiece. For milling and drilling, the feedrate applies to the reference point on the end of the axis of the tool.
FILE	An arrangement of instructions or information, usually referring to work or control settings.
FORMAT	The pattern or way that data is organised.
FNC	FANUC Miller file, extension ".fnc". Contains G and M codes describing the machine and cutting operations.
G CODE	A preparatory code function in a CNC program that determines the control mode.
HARDWARE	Equipment such as the machine tool, the controller, or the computer.
HOME	Operation to send the axes of the CNC machine to their extreme limits of movement. Defines the co-ordinate based grid system of the CNC machine. Commonly referred to as homing the machine, or sending the machine to its home position.
INCREMENTAL	Incremental programming uses co-ordinate movements that are related from the previous programmed position. Signs are used to indicate the direction of movement.
INPUT	The transfer of external information [data] into a control system.
INTERFACE	The medium through which the control/computer directs the machine tool.

18: Glossary

JOG CONTROL	Manual movement mode for the machine axes, using very small pre-defined movements, called jog steps. One stepped movement is applied per movement using the machine offset facility. key/button press.
M CODE	A miscellaneous code function in a CNC program used to indicate an auxiliary function (ie, coolant on, tool change etc.).
MACHINE DATUM	A fixed zero reference point set by the machine manufacturer. The machine datum is used to define the co-ordinate based grid system of the CNC machine. All machining co-ordinates originate from this point. However, this point can be temporarily moved
MACHINE OFFSET	The workpiece offset file used with VR and real CNC machines.
MDI	Manual Data Input - A method used for manually inserting data into the control system (ie, Desktop Tutor, qwerty keyboard etc.).
MODAL	Modal codes entered into the controller by a CNC program are retained until changed by a code from the same modal group or cancelled.
NC	Numerical control.
OFFSET	Combination of two types of file, the workpiece offset and the tool offset. Used to describe the workpiece datum, a zero reference used on the CNC machine to ensure machining occurs in the correct place on the billet. Offsets are used to shift parts of the three dimensional co-ordinate based grid system, used by the CNC machine.
PART DATUM	Used as a zero reference point in a CNC file. All machining co-ordinates originate from this point.
PART PROGRAM	A list of coded instructions which describes how the designed part, or component, will be manufactured. The part program is also referred to as the CNC file, program, or G and M code program.
PC	Personal computer.
POST PROCESSOR.....	A file or setting that contains instructions for a CAM system, detailing how to create CNC code that can be understood by a particular CNC system (e.g. VR CNC Milling).
PROGRAM	A systematic arrangements of instructions or information to suit a piece of equipment.
RAPID TRAVERSE.....	Fast movement of the cutting tool through the machine axes between cutting settings.
REFERENCE POINTS	The machine has reference points used in setting the limits of movement for its slides [axes].
REMOVEABLE MEDIA.....	A computerised storage medium that is not permanently attached to the system, e.g. Floppy Disk, Flash Memory Card, USB Memory Key, CD/DVD disc.
SPINDLE MOTOR.....	The removable cutting head [motor]. Also referred to as the machine head.
RPM.....	Revolutions per minute [rev/min] - a measure of spindle speed.
SLIDES	The machine axes - see axis.
SPINDLE SPEED	The rate of rotation (velocity) of the machine head / cutting tool, measured in RPM.

18: Glossary

SOFTWARE	Programs, tool lists, sequence of instructions etc...
TOOL OFFSET	When machining, allowances must be made for the size of tools being used, since they all differ in length. The tool offset is the amount the Z value must be moved (or offset), so that all the different cutting tool tips used line up with each other, so they can all be used by one CNC file. See OFFSET.
TRAVERSE	Movement of the cutting tool through the machine axes between cutting settings.
TXT	Standard Windows text only file, extension ".txt".
WORK (WORKPIECE)	The actual material being machined. The work is sometimes referred to as the billet or stock.
WORKPIECE DATUM	Used as a zero reference point on the real billet. All machining co-ordinates originate from this point, when offset files are used.
WORKPIECE OFFSET	A file containing X and Z values that can shift the entire three dimensional co-ordinate based grid system, used by the CNC machine. See OFFSET.
WORD	A combination of a letter address and digits, used in a CNC program (ie, G42, M04 etc.).
VIRTUAL REALITY.....	A fully interactive, three dimensional, computer based simulation of a real world object or event.
Z TOOL OFFSET	See Tool Offset

19: Notes

Use this page to make a note of any parts of the software you have changed or configured, for example, common tooling set-ups, machine parameters, changes to installation paths or passwords etc.

This image shows a single page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, leaving small margins at the top and bottom. There are no vertical margin lines, text, or other markings on the page.