AEM UNICORE

An Innovation in Transformer Design and Manufacture

Operating Instructions
Programming Manual Version 7f
Installation and Maintenance Manual
Carbide Blades

AEM UNICORE
An Innovation in Transformer Design and Manufacture

Table of Contents

AEM UNICORE
An Innovation in Transformer Design and Manufacture

Version information

Current Software: Version 7f
Software Release Date: Jan 2003

Features incorporated in Version 7f

Some V6 core programs have been combined in V7.
ZIP1, ZIP2 and OCTGAP have been dropped in V7 but can still be run as V6 files.
Trigonometry of the various corner combinations and core faces has been improved.
All cores now have an adjustable inner corner radius.
Some cores have an outer butt section for ease of assembly, which can be set to zero.
Side and End cut cores now included in the same program, as well as 30deg and 45 deg corner radius selection.
The Diverging Distributed Gap (DDGAP) core has an adjustable overlap spread variable and an adjustable outer butt section.
Choke cores BUT2 (single phase) and BUT3 (three phase) have a leg extension variable, which allows the faces to lay flat without clamping. This is independent of tightness factor.
ECORE program has been debugged with improved face geometry. Side and End cuts for both 30deg and 45deg corners incorporated in same program.
MINI-D core released in V7. Micro distributed gap single-phase core for smaller voltage transformers.
ENDOLAP core released. This is a spiral wound, end overlapping, diverging gap core for single phase power distribution transformers. Overlap spread is adjustable, as is cut position, corner type, inner corner radius and outer butt section.
E-LAP core released. This is a spiral wound, end overlapping, diverging gapped three phase core for power distribution applications. Features include : Side and End cut in the same program, 30deg and 45deg corners, adjustable inner corner radius, variable overlaps on inner cores and a different number on the outer, adjustable space allowable between the inner cores, selectable outer butt section for inners and outer.
DUOCORE released. This is a spiral wound, end overlapping, diverging gapped, double cut, single or three phase core with mating halves for ease of assembly into voltage transformers.
Improved core mass calculations.
Tightness Factor’s have been reset to a default of zero for all Core Definition programs.
Improved calculation of cut position.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Software Overview

The philosophy behind the AEM Unicore software is one of simplicity. Every attempt has been made to remove complexity for the Machine Operator, and to simplify the process of producing Unicores. Although the "behind the scenes" computation is complex, from the Operators standpoint the only requirement is to accurately enter data into a single page Core Definition file.

The SEW axis drive has two different memories.
The **non-volatile** memory retains a series of subroutines and trigonometric calculations which are addressed by the Core Definition file entered by the Operator. This non-volatile memory holds all the workings of the software version release, and will stay resident in the axis drive (even after power down) until over written by a service technician.
The **volatile** memory retains only what the Operator has entered in the Core Definition file. This file is over-written when a new core is produced, or lost completely in the event of a power down.

In the same way the Unicore machine does away with cumbersome jigs, mandrels and other production fixtures, so too can we do away with retention of software. It is no longer necessary to save or track a whole disk full of programs. The intention is to enter the dimensions for the core just before it's to be made, and to lose this program the moment the core run is completed. It is not necessary to save every program to disk, although this is quite possible and often done. Rather we suggest the data to make the core, such as the Window Width, Length, Build Up etc is kept on record by Production Management (which it is anyway) and only when it comes time to produce a batch of Unicores is the data entered into the Core Definition file and downloaded to the Unicore machine.

There are several good reasons why this philosophy has been adopted:

Large amounts of disk space, and management resources, are not used up in storing, tracking or maintaining the Core Definition programs. The data to make the core will always be available in the general day-to-day Production Management system used by the Unicore producer, but the requirement to key this into a program file, which must be tracked and recorded, has been removed.

The Operator will always have to measure and enter the Strip Thickness into the Core Definition file because this changes with each coil of steel. Therefore he might as well enter all the other parameters at the same time. This reduces the number of times the file is accessed and hence the chance of making a typing error.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Having the Operator enter the data pushes the responsibility of first pass Quality Control onto the shop floor, specifically the Operator in front of each machine. This person is the best suited for the first look judgement on the quality of a core. With a sound knowledge of the few parameters that can be changed, the Operator can very quickly instigate minor adjustments to the product without drawing on management resources and supervisor time. As each lamination is produced, the Operator has ample time to inspect the current build-up, therefore the Operator can recognise and make adjustment to a core, even before that core has been completed, without bothering a supervisor. The art of “core interpretation” has moved up several levels now we have an accurate process of making cores which demands precision control. The Operator can adjust the Fold Angle without changing the program and turn an acceptable core into a work of art, similarly the Tightness Factor can be adjusted to tighten up a loose core without requiring supervisor clarification. We are not suggesting the complete removal of a Quality Control procedure, instead we are stressing the value of Operator training and the importance of “first look” core interpretation, two vital factors in producing a perfect Unicore.

Upgrading from one version to the next is much simpler. AEM Cores has no control over the Operating System used in the SEW axis drive (although we write the software which sits on this system). Therefore we cannot guarantee backwards integration on future version releases. Hence a Core Definition file saved in the 1998 release of Version 5, is not guaranteed to work with the year 2002 release of Version 7 (although every effort will be made to try and achieve this).

Having said all that, there will be Unicore machine users who prefer to save and recall their programs for repetitive use. This is perfectly fine, and the facility is there to save the files to disk if required.

Procedure to Load SEW Software to a PC

This procedure outlines the method for loading the SEW operational software to a PC using the CD labelled “AEM Unicore Version 7 WIN98”

There are two program folders required to run the SEW axis drive:

MD_SHELL which is initially used to commission the drive, but thereafter used as a gateway to MD_POS.

MD_POS is the main programming software, accessed from MD_SHELL. This program allows the Operator to call up programs, modify the parameters of the Core Definition file and save them to the axis.

Loading MD_SHELL … for W98 use MD_SHELL v1.90

Insert the CD into the drive, go the START Menu -> RUN ->BROWSE and find the file **INSTALL.bat** in the MD_SHELLv19 directory. Double Click and hit OK to activate this program. Alternatively you can type the command :
D:\md_shellv19\install.bat :where D: refers to the CD drive designation.
Down arrow once to highlight the ENGLISH language and hit Enter.
Read and Acknowledge the information on the next page.
Select the disk to load software to, default C:
Acknowledge the creation of the file directory \MD_SHELL. The INSTALL program will then decompress and download all the relevant files to this directory and inform you of a successful completion.
Create a shortcut on the Desktop which points to the executable file **C:\MD_SHELL\MD_SHELL.exe** with a working directory of C:\MD_SHELL\MD_SHELL. Call this Shortcut “AEM Unicore Software”, this will be the gateway to MD_POS software (via MD_SHELL) to allow you to program the Unicore machine.
Run MD_SHELL from the recently created Desktop icon and check the version number in the bottom right hand corner is indeed v1.90.
From MD_SHELL go to **Options -> Select Palette Colours -> 0** <enter> This will change the screen background to something less stressful on the eyes.
Go to **Interfaces -> PC Interface -> AC Servo on COM1** to ensure the MD_SHELL program communicates through serial COM1, although there are other options in this list, the program can ONLY communicate via COM1. Therefore a serial mouse at this port must be moved to another, or be replaced with a PS2 mouse.
Go to Interfaces -> Servo Controller Interface -> RS232 via USS, RS485 is the correct option, which should also be the default.
The MD_SHELL software is now correctly set up, time to load the MD_POS software and the AEM Unicore specific programs.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Loading MD_POS… for W98 use MD_POS v5.00

Using the Windows New ->Folder facility, create a directory under the root called C:\MD_POS

Insert the CD into the drive, go the START Menu -> Run and type the following :

D:\MD_POS5\INSTALL.bat c:\md_pos <enter> …..where D: represents the CD drive, change to the appropriate drive specification if required.

1. This will copy all the files from the CD to the appropriate directory C:\MD_POS and create the required subdirectories. It will inform you of a successful completion.

2. Close that window when “Finished”

There should now be two new directories on the C: drive C:\MD_SHELL and C:\MD_POS. Neither of these are true Windows applications, instead they are DOS applications which can be run via Windows 95 and W98.

Running MD_SHELL and MD_POS

1. Double click the Desktop icon called “AEM Unicore Software” created in step (6) of the MD_SHELL load procedure.

2. Select **Environment ->MD_POS** and answer “Yes” to run MD_POS.

3. To Exit MD_POS select Exit, answer **NO** to the “Data of Axis has changed do you want to Store Data?” and **YES** to the “Do you wish to Exit”?

Note : Windows 98 has a problem processing the com port initializations. What this means is the version numbers reported above will work, however repeated entry and exit from the MD_POS program will not work. If you boot the machine, run MD_SHELL and MD_POS ....and stay in the MD_POS program you can up and download programs as many times as you like. However, exiting the MD_POS program leaves the com port open and unable to communicate with the Unicore machine a second (or subsequent) time. Remedy is a complete cold boot of the computer and then the Unicore machine (hanging the com port of the computer also hangs the drive). This is a reported bug with SEW which trips up the Windows handling of the com ports. No fix will be issued from SEW. AEM strongly recommend using W95, where this problem does not occur.

Loading the AEM Unicore Software

The AEM Cores Unicore software will be supplied on CD and/or electronically as a self extracting file. The filename and the directory on the CD will reflect the version number of the current release.

Create a directory/folder under C: root called Version ‘x’, where the ‘x’ denotes the software version to be loaded. DO NOT delete any previous versions, always backup and retain old versions for future reference.

For example: Create the folder C:\VERSION7

Copy the entire folder from the CD to this area. If AEM has emailed you the self extracting file, simply copy this file to the same directory and double click to decompress.

The MD_POS program defaults to the data directory C:\MD_POS\DATEN. Therefore it makes sense to copy the template **Core Definition files** to this area. If the Operator should inadvertently over-write any of these files, there will always be a backup copy on the hard disk. Copy only those files the Customer would use to the following directory C:\MD_POS\DATEN, select from the following:

STEPBUT7	DGAP7	DDGAP7	LAM7	ECORE7
BUT2XL7	BUT3XL7	MINI-D7	ENDOLAP7	ELAP7
COREGAP7	DUO7e	UNCUT7		

The directory C:\VERSION7 will also contain many other subroutines which are not copied to the DATEN directory, but should be kept on file with the Customer.

The CD is a **READ ONLY** device and will contain files which have a Read Only attribute. Before MD_POS can read any of the files which have been imported to the DATEN directory, you must use Windows Explorer to remove the read only attribute for each file. Right click on the entire DATEN directory, select Properties, and de-select the tick box for Read Only. You may wish to do this to any directory copied from the CD. If you do not perform this step these files will appear blank when accessed via MD_POS.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Procedure to Load Programs to SEW Non-Volatile Memory

This procedure describes the steps required to load programs to the SEW non-volatile memory. This should only be performed when instructed by AEM Cores, such as installing a new software release or upgrading a patch fix specific to the Customer's requirements.

The SEW drive has two memories:
Volatile which is erased on power down.
Non-volatile which is a battery backed memory into which the various subroutines are stored.

The SEW will defer first to the volatile memory when searching for a particular program. These programs are labelled P00...P99, the program which the customer modifies when entering the core dimensions is P30.

Programs and AEM subroutines are always loaded to the volatile memory for testing. When satisfied the programmer can then burn these into non-volatile memory as detailed below. The P30 program modified by the customer for each core is a disposable program, which when loaded into the memory takes precedence over the residing P30, which incidentally is the 10 test strips first cut on power up (TEST10).

The programmer must have available a CD with the new programs.

Turn the Unicore machine OFF ...wait 5 seconds, then ON again.

Copy the contents of the VERSION7 directory from the CD to the personal computer. Always make sure you backup the entire contents of that directory before over writing any files. As each new version is released, create a new directory labelled accordingly. For example, create the directory "Version7" and copy the contents of the same directory from the CD to this directory. The previous "Version6" directory should remain untouched.

Check the current version loaded into the Unicore machine by interrogating the axis directly. MD_POS -> Programming -> Program -> Axis will list the contents of the SEW axis memory. Look for obvious version numbers after each file name. Specifically PLC6 or CALC6 will give you the clue.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Using the normal procedure for downloading files to the SEW, save each program to the Axis using: MD_POS -> Programming -> Program -> Disk and load the following 25 files, one by one into the memory.

ANTIDRIFT	LAMMOVE7	TEST10	BUT2MXL7
BUT3MXL7	DGMOV7	DDGMOV7	UCMOV7
FOLD7d	PLC7	HOME7	CUT7d
SBMOVE7	CALC7	ECOREKG7	ELAPM7
EMOVE7	EOLMOV7	LAMKG7	MINIMOV7
RECTKG7	CALC6	KILO7	GAPMOV7
DUOM7e			

Burn the volatile to non-volatile. **MD_POS -> Programming -> Store Data -> Axis 0 ->Store**......the drive will return with “Storing Data to Axis” and then drop back to the same screen. Click on “Cancel” or the little square in the top left corner of that small window to return to the main MD_POS screen.

Cycle the power OFF and ON again. The machine is now ready for use.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Deleting the Memory of the SEW Drive

DO THIS ONLY UNDER THE EXPLICIT INSTRUCTION FROM AEM PERSONNEL

- On a very rare occasion you may be instructed to erase the entire memory of the SEW drive by AEM personnel. Proceed with **CAUTION,** this can create more problems than you really want, and can side track you from the fault diagnosis process.

- You will need to reload the UCMxxx.par and UCMxxx.mpa parameter files specific to that particular machine after this procedure.

- If you have not been **DIRECTLY INSTRUCTED** by AEM to do this procedure then **DON'T GO ANY FURTHER**. Incorrectly assuming you need to delete the memory of the SEW drive will cost the Customer **DOWNTIME**.

Ensure SEW drive power isolator is OFF, on PKZ rotary isolator inside switchboard (not main power isolator).

Delete the memory of the SEW drive to remove any resident programs.
Set up laptop and communications cable.
Ensure SEW rotary isolator switch is OFF, the drive must be de-energised, only 24Vdc power to the brains is required.
Check the status LED is showing either 4 or 6, not 7. If showing '7' turn off SEW rotary isolator on electrical panel, if anything other than 4 or 6, then go no further and contact AEM.
Start MD_POS. Upload from the axis anything in the memory, probably some test routines remnant from the SEW factory. This will test the communications to the drive.
MD_POS ->SETUP-> Manual Mode -> type %CL PXX <enter> in the command line. All upper case, with a space between CL and PXX. This deletes the memory.
Store Data and cycle the power to the drive.
The drive will now be blank and you need to reload the 2x parameter files specific to that machine.
Start MD_SHELL -> Load Parameter file UCMxxx.par
Start MD_POS -> Machine Params -> Disk -> UCMxxx.mpa -> Save as Axis
Store Data
Cycle power and reload all the subroutines into non-volatile memory.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Comments on the SEW Operational Software

AEM Cores assumes no responsibility for the Operating System and file management capabilities of the SEW programs. SEW provide the programming language, data file management, up and down load facility and the provision to commission, modify and store the axis parameter sheet information. AEM cannot accept responsibility for the Human Interface of this operational system. We do accept responsibility for the Unicore specific programs we have written.

The keystrokes required to modify and download programs will quickly become second nature. AEM has requested an improved User Interface from SEW. Be aware that this Operational System is a generic programming base which is used to create a variety of applications for the SEW axis drive. Therefore there are a few keystrokes which are used only for commissioning and storing programs to the non-volatile memory. There is no way AEM can lockout access to these facilities, that is the domain of SEW and the design of their User Interface. The Operator should be aware of what NOT to touch, although anything he may inadvertently do is totally recoverable.

Do **NOT**, at any time (unless specifically instructed), answer Yes to the "Store Data?" query which will pop up if you select the Store Data option from the Programming menu. This also occurs when exiting the MD_POS package back to MD_SHELL or Windows (DOS).

In the top left hand corner of any opened menu, there is a little green/blue square. Click on this to escape from that screen without saving data. This will speed the movement between screens.

The process of downloading to the SEW axis is very straight forward:
Load a template Core Definition file from the Disk and place in buffer memory
Modify the Core Definition file as appropriate
Save that file to Axis memory.

Refer to the **Unicore Machine Operating Instructions** for the necessary keystrokes required to load, modify and download a program.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Unicore Machine Operating Instructions

These instructions must be read and understood in their entirety before operating the machine.

For SAFE OPERATION operators must be fully trained and supervised when using the Unicore machine

CAUTION
Never put any part of your body or any other object within the confines of the safety hood while the machine is operating.

Overview

The Unicore Machine is a computer controlled strip forming machine used to manufacture three dimensional, shaped, single or multiple faced transformer cores.

The Unicores are built up from the inside out, each lamination is accurately produced so it nests perfectly with the one before. Various corner and face geometry's are available via the software.

After loading strip into the machine, a default routine is run to automatically cut ten test strips. These are measured with a micrometer to determine the true strip thickness in a stack (ie. includes stacking factor). This value, along with others like Window Width, Window Length, Build Up etc is entered into the Core Definition program and downloaded to the Unicore machine.

The Operator can then select Automatic cycle and Start to begin making Unicores.

The Operator can conveniently interrupt the program at any stage with a HOLD function. This also serves as a safety interlock in the event of an air pressure drop or personnel ingress into the restricted area of the hood. The program can then be restarted at any point after a HOLD function.

The cycle is completed when the final Build Up has been reached. The Unicore machine will display a steady green LED and await cycle Start on the next core.

What follows is a detailed explanation of all the steps necessary to safely operate a Unicore machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Operation Definitions

1. Console

A five button control console is mounted on a swivel arm to allow operator access from a variety of positions around the Unicore machine.

2. Hold

At anytime during a program cycle, pushing the HOLD button on the console will halt the current program execution. The button will illuminate and latch in, and the machine will come to an orderly stop. To continue, the operator must first release the HOLD push button, then acknowledge with START.

Note: This circuit is known as the Interlock circuit and incorporates several functions.

If you hit HOLD during a move, the Unicore machine will complete the move and then come to an orderly stop.

Pressing HOLD during a fold or cut operation will allow the Unicore machine to complete the fold or cut movement and then come to an orderly stop

HOLD can be pressed as many times as needed during a program run.

HOLD function allows the operator to catch up, take a break, attend to other business…. it acts as a feed hold facility.

The Interlock Circuit monitors the air pressure input. If the mains pressure drops below 0.5kPa then the Unicore machine will instigate a HOLD function. Once air pressure has been re-applied, the program cycle can continue as normal with an acknowledgment from the START button.

The Interlock Circuit is connected to the safety hood. If the safety hood is opened the HOLD function will activate. Therefore, if the operator opens the hood whilst the program is in cycle then the Unicore machine will instigate a HOLD function and come to an orderly stop. Once the safety hood has been closed, the program can continue with an acknowledgement via the START button.

The scenarios described in the last two points above will show up as an illuminated HOLD button....without the operator pressing this button. If the HOLD button illuminates for no obvious reason, look for air pressure drops or incorrectly closed safety hood.

3. Roller

Toggle switch on the console lifts and lowers the Upper Roller. This function operates in both Manual and Automatic mode and is used to load and reset strip in the machine.

4. Manual/Auto

This rotary switch will latch in either Manual or Auto.

5. Manual Mode

To load and access programs the Unicore machine must be in Manual. The strip will jog slowly forward if the START button is pushed whilst in Manual Mode.

6. Automatic Mode

The Unicore machine must be placed in Auto to run a program.

Note: Switching from Auto back to Manual will reset the program, and allow it to be run again from the beginning. It is not necessary to switch out of Auto after each program run. On the successful completion of a program, push START to re-run the same cycle.

7. Start

The START push button jogs the strip forward if in Manual Mode and starts a new program cycle if in Auto. It also acknowledges the removal of the HOLD button and continues the program from where it left off.

8. Stop

The latching STOP button will halt program operation, shut down the hydraulics, relax all pneumatic circuits and disable the drive axis. This is the operator's first choice in the event of a sudden stop requirement. It does NOT remove the program from memory. Recover from the Console STOP by pulling OUT the red STOP button.

9. Counter

The Console Counter registers the mass of steel produced per lamination in 1/10th kilogram increments.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

10. EMERGENCY STOP

The red self latching mushroom push button on the hood is the Emergency Stop. It will shut down everything, remove power to the drive, shut down the hydraulics, relax the pneumatics and shut down all control and power circuits in the switchboard. The core definition program will also be deleted. Pull the red mushroom OUT to reset.

11. Machine Console - LED

The LED indicator will show GREEN when the program is finished and RED if an error is found. GREEN flashes indicate either the Guillotine Blade (long - short flash) or Folder Bar (short - short flash) has not fully returned to the up position.

12. Fault

Red LED indicator illumination during program execution indicates a fault condition. Use the MD_POS diagnostics page from the main menu to read what number error message is active. Refer to the SEW Operating Instructions for a description, then contact AEM Cores for an explanation of the fault condition.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Strip Loading

Select a coil of strip. Ensure it is free of surface defect, slitting deformities, twist, “oil can effect”, coil break or “wavy edge”. The less inherent stresses in the parent coil the better the Unicore produced.

Load steel onto decoiler ensuring the strip coil despools forward from the top of the coil. (Decoiler not supplied by AEM CORES PTY LTD - refer to your decoiler operating instructions for safe use.) Ensure the on-demand feed sensor of the decoiler does not place any load on the feed mechanism of the Unicore machine

Activate the strip decoiler and release sufficient strip to reach the Unicore machine which should be located about 5 metres from the decoiler.

Feed the strip through the guide rollers which can be adjusted using the guide arm adjusting knob located on the right side of the Unicore machine.

Feed the strip between the Unicore machine rollers. Note the Roller toggle switch on the Machine Console must be in the UP position, which will lift the top roller and allow strip to be positioned.

Tighten the guide arm adjusting knob so that the strip is secured with no less than 1.0mm movement between the guide rollers.

Push the strip over the Lifter Plate and under the Guillotine, the strip must protrude at least 25 mm from the front of the Unicore machine.

Lower the top roller using the Roller toggle switch on the Machine Console. Roller pressure can be adjusted via the roller pressure regulator mounted inside the hydraulic/pneumatic enclosure on the right side of the machine. This is factory set at 3.5 kPa and would only need to be changed in unusual circumstances such as obvious slippage of the strip in the rollers. Too much pressure, greater than 4.5kPa, will be detrimental to smooth strip feeding.

With the machine in Manual mode, the strip can be slowly jogged forward through the die area by pressing the START button.

Select AUTO mode and START program execution. If no program has been loaded then 10 test pieces will be cut which can then be measured with a micrometer to determine strip thickness. This value is a requirement of the Core Definition programs, along with the other dimensional data required for a particular core type.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Program Selection & Core Making

Ensure the machine is in Manual mode on the console.

Reset the Console STOP button (pull out).

On the computer, select the "Unicore programming" icon, to start MD_SHELL.

On the menu bar select ENVIRONMENT
Select MD_POS
Select YES (to quit MD_SHELL and enter MD_POS)
Select OK (Programming software for MOVIDYN positioning module)
Select PROGRAMMING
Select PROGRAM
Select DISK (this defaults to ..\MD_POS\DATEN directory)
Select Core Definition file (ie: DGAP7, ECORE7 etc)
Select OPEN
Edit to define core size and characteristics
Select PROGRAMMING
Select SAVE AS
Select AXIS
Select axis 0
Select YES (overwrite existing P30 file)

After the program has transferred, select Auto mode.

Push the Console START button (HOLD button must be out).

As the Unicore machine forms each lamination, lightly grasp the strip between forefinger and thumb and remove the guillotined segment. Do not grasp the strip by the edges. Ensure the lamination is removed before the next one starts to be formed.

After the first few laminations have been produced, check the dimensions are correct and if necessary adjust the program. Check the correct corner angle is being formed. Adjust the folder if necessary by loosening (but not removing) the Folder Bar bolts, then turn the thumb wheel slightly to raise or lower the Folder Bar. Tighten the bolts and continue with program execution, or restart the program from the beginning.

IMPORTANT: THE FOLDER CLAMP SCREWS MUST BE TIGHT BEFORE OPERATION OF THE MACHINE OTHERWISE THE MACHINE WILL BE DAMAGED.

Place the formed lamination on the workbench and be ready to grasp the next one. Build the Unicore up from the inside out, inner most lamination first.

At any point the HOLD button can be activated. This brings the machine to an orderly stop. Restart from the same point by releasing the HOLD button and selecting the Console START button.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Cleaning Schedule

New coil

The Unicore machine MUST BE KEPT **CLEAN**. The coating on most electrical steels creates abrasive powder when cut and folded. This will build up on the feed rollers, over the die pins in the head, and fill the shoulder bolt access holes. It is recommended procedure to remove this build up of powder each time a new coil of strip is used. Wipe down the upper and lower rollers with a solvent impregnated cloth, then clean the cabinet top, shelf and surrounds.

Daily

Remove powder from around and under the Lifter Plate and Clamp Bar in the head. Clean Base Plate and strip entry points. Clean both rollers thoroughly with a solvent impregnated cloth. Check oil level in the sight glass. Clean fan filter on rear of cabinet.

Monthly

This is at the discretion of the Customer. AEM suggests that once every month (or several months depending on use) the die cages are flushed and dried to remove any embedded dust particles. Liberally squirt a light machine oil (WD40) onto the exposed bearing cages of the head. Use HEADTEST to oscillate the fold and cut actions to work this oil through the cages. Be generous with the oil in an attempt to flush the dirt out. Then clean and dry the cages with compressed air and rags to ensure there is no residual oil left to attract more dust. It is critical that the cages are blown dry and all residual oil is removed before resuming operation.

Look after the Unicore machine by keeping it clean, and it will look after you.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

The Importance of Strip Thickness

The Unicore software relies very heavily on an accurate determination of the Strip Thickness. This is because the nature of the process is basically a build up of laminations, hence a build up of tolerance errors. A feed error of only a few microns will quickly build up to an accumulated error of a few millimetres (!) if applied to every lamination made. The Unicore machine is capable of making very accurate, consistent cores, however the onus is still on the human Operator to enter the data correctly.

Strictly speaking we are not necessarily interested in the Strip Thickness at all, rather the stacking ability of the laminations, since we are using a “stack” of folded laminations to make up a complete Unicore. Hence the procedure to measure strip thickness includes the Stacking Factor component as well as the pure Strip Thickness. Stacking Factor is not an entry in the Core Definition file, but it is affected by various anomalies such as edge burr, strip camber, wavy coil and surface treatment such as laser or mechanical scribing. The figure we enter in the Core Definition file takes account of all these factors.

The Strip Thickness can also vary quite considerably, even within the same coil of steel. For a start the actual strip thickness is NEVER the same as the parent coil data sheet. It is usually (but not always) several microns undersized. Due to the cold rolling process of nominal GOSS we have found variations in Strip Thickness between the start and finish of a coil, and indeed two coils slit from the same parent coil. Never assume a Strip Thickness. Always measure a new coil, and always suspect a variance in Strip Thickness if all your attempts to tighten (or loosen) a Unicore fails when applying conventional core interpretation techniques.

All trigonometric calculations within the Unicore suite of programs are based on an accurate determination of Strip Thickness. You will not produce good Unicores unless the procedure to measure Strip Thickness is adhered to and provides a consistent benchmark on which all other calculations can be based. A procedure needs to be established to ensure all Operators measure Strip Thickness consistently.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Procedure to Measure Strip Thickness

The procedure to measure Strip Thickness is quite straight forward:

Turn the machine on.
Load the strip
Go to Auto and push Start.

This will cut 10 straight laminations which need to be measured with a micrometer. Divide the reading by ten and you have a value to enter for Strip Thickness which includes the Stacking Factor for that coil.

Enter this value in the Core Definition file.

Example:
The Operator loads the coil onto the decoiler, turns the Unicore machine on and feeds the strip through the guide rollers. He selects Auto and pushes Start. The Unicore machine will self home and then cut 10 straight laminations 100mm long. This stack is measured with a micrometer and the decimal point moved one place to the left (divide by the 10 laminations). This value can then be entered in the Core Definition file as the Strip Thickness.

It is quite important to establish a consistent method of using a micrometer between Operators. Those with a heavy hand will tend to measure a Strip Thickness which is slightly less than others. We use and recommend a plunger style dial calliper, such as the one supplied by Mitutoyo Corporation, called the Pocket Thickness Gauge 0.1mm - 10mm code: 7309.

One final note on Strip Thickness: if in doubt, round UP to the nearest micron.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Core Interpretation

With the correct training an Operator can very quickly learn to “interpret” a core from the Unicore machine. There are several indicators which can be used to determine the requirements for a perfect Unicore. We need to discuss these indicators before we can address the problem of which parameters in which programs need to be changed. The mechanics of loading and downloading programs from disk to the Unicore machine are addressed in the Operators Manual. A discussion of what variables do what for each core face will follow.

What is the Perfect Unicore?

The dimensions of the core must be correct and within tolerance
Fold Angle must be correct.
The faces should meet without overlap or gap (unless it’s a gapped core, whereby the gap should be as specified).
The legs should be straight or bowed out slightly, never inwards.
The folds making up the corners must nest exactly with each other.
There must not be any mismatched laminations
The core must be of the correct “tightness”
The strip must not be wavy, cambered or deformed
The legs of the core must not be twisted, the core must sit flat.
The cut edge burr must be acceptable (varies depending on customers requirements)

We will address and discuss each of these in turn. Let’s assume the Operator has loaded the coil, measured the Strip Thickness, and entered the value into the Core Definition program. The other parameters such as Window Width, Window Length, Build Up etc are also modified at this stage to comply with the work instruction pertaining to this batch of Unicores. The file is down loaded to the Unicore machine, which is then run in Automatic mode to produce the first inner lamination. The Operator is standing there with the first lamination in hand, the Quality Control hat goes on, what is the next move?

1. The dimensions of the core must be correct and within tolerance

The first check should be on the very first lamination. With a suitable ruler the Window Length and Width must be verified, the Strip Width can also be measured at this point. The position of the Cut is also checked, as well as the type of corner. A core with three folds to produce a 30 degree corner will very quickly be evident on the first lamination if the Fold Angle is still set at 45 degrees.

If all these indicators are within tolerance, then go ahead and produce more laminations.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

2. Fold Angle must be correct

The perfect lamination does not necessarily make the perfect Unicore. It is the summation of all the laminations in the build up which we are interested in. Therefore do not be discouraged if the first few laminations are not perfectly square, because this is not what we want. Take a careful look at the distance between the folds on each corner. For the majority of cores this is set at a default of 2mm between folds. Therefore a 45 degree or 90 degree corner is produced by folding twice, and by altering the spacing between folds. In the case of the 90 degree corner, this is kept constant through the entire Build Up. For a 45 degree corner, the increment starts at 2mm and indexes out to produce a diverging fold line. For a 30 degree corner, there are three folds at 30 degrees each to make up the resultant 90 degree turn in the steel, but with a much more rounded profile.

The 2mm default corner "radius" can cause a problem in the first 6-10 laminations because the action of folding the second (or third) fold in a corner has a habit of opening out the first fold. This phenomena will decrease and eventually disappear as the increment between folds increases with each lamination produced. There is a point of diminishing returns reached whereby there is no further degradation of the first fold due to the action of the second. This is usually around the 6^{th} to 10^{th} lamination of any core.

An easy way to demonstrate this is to set the Fold Angle at approximately 45 degrees and produce laminations for say a STEPBUTT core. Lay each lamination on the table (without stacking them) in a line from left to right. You will notice that regardless of what the initial fold angle was, the first 6 to 10 laminations will show a "closing up" of the folded lamination until they are subsequently all the same. There is a point reached where the increment to the corner radius has exceeded the interference between the folds, the folded laminations are then consistent.

At this point, say the 10^{th} lamination, we need to set the Fold Angle to suit the core.

A correctly folded lamination will not be rectangular, rather it should have a slightly open face gap of approximately 5mm. Set the 10^{th} lamination to have this characteristic, and you will note that the preceding laminations will now all be under-folded and much more open. This is a desirable condition for two reasons:

The "open" inner laminations exert an outward pressure on the core and keep the inner window firm without fear of collapse.

If the inner laminations were square this means the outer laminations would be over folded and the core would be too tight to assemble.

Set the 10^{th} lamination as described. Always try to bring the Folder Bar DOWN to set the correct angle. This way the trial laminations produced will always be under-folded and still useable in a core. So far we have not scrapped any material. All these modifications can be done "on the run", on the first core of a batch, without any waste.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3. The faces should meet without overlap or gap

At this stage the Operator should have at least 10 laminations on the table, the last of which should be a slightly open rectangle. Assemble these laminations from the inside out and tap them flat on the table. Due to the tight tolerances used in producing each lamination, they will not nest if they are sitting up off the table. Each lamination must be placed around the previous one such that their edges are flat. This is an assembly technique which is quite natural and takes no time for the Operator.

At this point the Operator should be inspecting the gap between the faces. Obviously the first thing to check is if it's the correct face required by the work instruction. Circumferential pressure on the core stack will bring the faces together until they meet. Check that they do so. If not the core is too tight, which could be an over folded corner, an incorrectly measured Strip Thickness, or an incorrect Tightness Factor entered in the software.

A Gapped core should have the gap measured with a suitable ruler to check it is within tolerance.

4. The legs should be straight or bowed out slightly, never inwards

It is important to understand the relationship between Fold Angle and the tightness of a core (the Tightness Factor). A core is too tight if:

The laminations cannot be pushed into a pyramid shape with reasonable force
The corners pull tight and do not nest correctly
The faces diverge and do not meet with reasonable circumferential force
The laminations just don't stack at all and the core ends up like an open fan.
The inner faces meet at each cut, but the outer laminations have a gap. These are all indicators of excessive tightness.

There is a particular bias associated with tightness and Fold Angle. A core with a slightly over-folded corner will very quickly become too tight to assemble. Yet a core with the same degree of under-folding will fit together perfectly. There is more detrimental bias to over-folding. The Fold Angle MUST be set correctly before any interpretations can be made with regards the adjustment of Tightness Factor in the software. There is very little to be gained from inspecting a core which has an incorrect Fold Angle.

One indicator of the over-folded lamination is the inwardly bowed lamination legs. This will be evident in a single lamination to the trained eye, but most evident in a partially built up core where the legs (especially the Window Width) will be bowed inwards. There is no necessity to waste this core and start again, simply interrupt the program flow with the HOLD function, raise the Folder Bar slightly and continue. Unless the over-fold is severe (in which case it should have been recognized earlier) then the core will still be useable.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

5. The folds making up the corners must nest exactly with each other

Still on the Fold Angle, a close inspection of the corners will show if they are nesting correctly. Each lamination should nest perfectly with the one before. There must not be any “pulling” of the laminations or interference with the inside edges. Two factors affect the corner nesting, one is software driven via the Tightness Factor variable, the other is Fold Angle. Extensive testing of the software has resulted in a trigonometric model of the correct corner feeds and increments. An unusual property of the strip steel may cause a divergence from this model. However, an incorrectly set Fold Angle will very quickly cause the same problems with nesting.

Essentially, the Fold Angle must be correctly set before any further interpretation of the core makes sense. The 10th lamination must be a slightly open rectangle, and the corners must nest without interference.

6. There must not be any mismatched laminations

A lamination is unacceptable when it is not sitting flush with the ones on either side, or has an air gap at the point of folding with respect to the previous lamination. Mismatched laminations are usually due to a physical factor of the strip, or incorrect Operator handling rather than a programming error.

If the strip is oily, burred, wavy, cambered or in any other way defective then this will have a detrimental effect on the core. Air gaps, pinching, waves, twist and pulling at the corners are all indicators of bad strip. Interestingly this may only occur at infrequent times throughout the core. If the entire coil of strip is affected then the chances of producing a good Unicore are low. You must have good steel to make good Unicores. However, if the damage to the coil is only on one edge, due to handling faults for instance, then only the occasional lamination may be affected and the Unicore may pass inspection at the discretion of the user. Often the odd mismatched lamination will straighten out in the annealing process.

Operator interference is a common cause of mismatched laminations, but usually only in he early stages of training. Any heavy handed Operators soon learn not to “grab” the strip, rather they control the lamination with one finger and allow the Unicore machine to guillotine the lamination free. If the Operator pulls, twists or in any way attempts to extract the lamination from the Unicore machine before the guillotine operation, then this tends to stretch the lamination, open the folds and causes the lamination mismatch.

Always be on guard when training new Operators for over eagerness to grab the lamination before it has been completely formed by the Unicore machine. Human intervention and degraded strip is the main cause of mismatched laminations.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

7. The core must be of the correct tightness

Tightness is a very subjective term. AEM Cores cannot specify exactly what degree of tightness is acceptable for every customer. We can demonstrate several techniques to indicate how a core should be interpreted and what to do about it.

A core that is too **TIGHT**:

a) Will not assemble easily and about 15-20mm into the Build Up, the laminations will begin to pull on the corners.
b) Will not have meeting faces and the gap will increase as the Build Up progressively increases.
c) Will not pyramid with reasonable force.

A core that is too **LOOSE**:

a) Will exhibit “slop” and excessive air gaps between the laminations. With the core flat on the table you will be able to move the inner laminations around sideways with respect to the outer laminations.
b) The faces will begin to over lap with increasing Build Up
c) The core will pyramid easily, to the point of being difficult to handle in the extreme case.

There is a variable in the software termed “Tightness Factor”. We introduce this variable at this point in the discussion because it is a meaningless parameter if all the Fold Angle issues demonstrated above are not addressed first.

The Tightness Factor is a fine tune parameter. The Operator can turn an acceptable Unicore into a very good core by tweaking this variable. Having said that, we do not envisage constant adjustment of this parameter. Typically one or two iterations are required before the desired result is reached. Many customers leave the Tightness Factor at default, which has been carefully determined by AEM using empirical data. The facility is there to tweak the trigonometric model in such a way to produce a very accurate, consistent core.

Tightness factor merely adds to the Strip Thickness in microns, but only in certain sections of the feed-fold cycle. If Strip Thickness is measured correctly then this will put the core within the acceptable “ball park”. Modifications to Strip Thickness are not necessary (for a particular coil) unless the strip characteristics change by more than 5-10 microns. Tightness Factor allows the Operator to fine tune the product.

Extensive testing at AEM has determined a default Tightness Factor for each and every core product available. Running with this default will yield an acceptable core.

It’s not possible to change the Tightness Factor of a core during a program run. However, you may stop the program, change the Tightness Factor and then continue with the same core using the Restart facility detailed below.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Add or subtract (negative values of Tightness Factor are allowed) by 1-2 microns at a time.

For a core that is **too tight**, **add** to the Tightness Factor.
For a core that is **too loose**, **subtract** from the Tightness Factor.

Example (1):
The Operator has measured the Strip Thickness correctly and has set the Fold Angle as specified above. A core is produced which progressively gets more and more difficult to stack, requiring constant attention from the Operator to hold the faces together whilst placing the next lamination. The faces on the inner laminations (first 12-15mm of Build Up) meet without a gap, but no matter how much circumferential force is applied, the gap between the faces begins to open up as the Build Up increases. This core is too tight. Add 2 microns to the Tightness Factor and begin the next core. About 10mm into the Build Up there should be a noticeable difference in the ease of assembly.

Example (2):
A core is produced which easily pyramids and the inner laminations slop around within the outer laminations. Immediately suspect an incorrect Strip Thickness measurement because it has been known that the first few meters of a fresh coil from the mill is indeed thicker than the main body of steel in the roll. The test laminations cut from this initial section will be artificially thicker than the rest of the coil, causing an incorrectly inflated Strip Thickness to be entered. Re-measure the strip thickness using steel from the now partially depleted coil and make any necessary adjustment to the software. If this still produces a core which is too loose, then subtract a few microns from the Tightness Factor and continue to do so until the core passes inspection.

We have found that although this sounds like a lot of re-iterative work, and wasted cores, in fact the default Tightness Factor will yield acceptable cores first time, any slight modification of the parameter can be performed on subsequent cores in the same batch run without waste or lost time.

It is certainly beneficial to the smooth flow of product from the Unicore machine to hand the responsibility of interpreting the core and adjusting the Tightness Factor to the Operator. These are small (yet important) variations the Operator can make to the product which will yield a better core without absorbing supervisory resources. The Unicore machine should operate as a standalone cell, no jigs, fixtures, mandrels or black art involved in the production of cores.

We consider the techniques of core interpretation to be an important first pass inspection in the Quality Control process and encourage our Clients to hand this responsibility to the Operator. Although there is some new terminology to learn, and some careful observations to make, there are really only two variables to change: Fold Angle and Tightness Factor. Neither of these are difficult concepts to grasp or liable to cause problems in the continual production of Unicores.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

8. The strip must not be wavy, cambered or deformed

Garbage in, garbage out. Quite obviously the strip loaded to the Unicore machine must be acceptable for making cores. The feed rollers may help to flatten any edge burr on a coil of strip, but other phenomena such as camber and wavy strip may not fare so well.

Unicores are produced by a precision feed-fold sequence, the programming is in microns, the tolerances in the decimals of a millimetre. Introducing dimensionally unstable coil strip into this system will produce varying results.

Induced stresses in the strip such as “oil can” effect, camber, twist and waviness are all unacceptable characteristics and should not be used. Their effect on the core is pronounced and will show up as mismatched laminations (more than the occasional one or two) and a core that will not sit flat on the table. Twisted legs, flared faces, air gaps and tight corners are all indicative of deformed strip.

Do not confuse this phenomena with the occasional mismatched lamination. Usually the occasional damaged lamination can be accepted (depending on the level of Quality Control used by the Client). What we’re discussing here is an entire roll of strip steel which is consistently producing unacceptable cores.

The Unicore machine is not at fault, change strip.

9. The legs of the core must not be twisted, the core must sit flat

When assembling the Unicore on the table, it’s very important to ensure each lamination is sitting flush with the table and not sticking up above the side of the core. If this is correctly performed and the legs of the core are still twisted then this is indicative of either warped strip or an incorrectly ground lower guillotine fold radius.

The case of deformed strip has already been addressed in (8) above. However, if the tooling shop were not careful in honing a consistent radius on the front of the Lower Guillotine blade then the fold may appear skewed which results in a twisted lamination. This is a very rare occurrence, because general tool sharpening practices tend to minimise any error. However, the Client must always inspect any work performed on the Lower Guillotine blade before fit up. The actual radius is not that critical however it should be in the order of 1-1.5mm. What IS important is it should be consistent and not tapered along the length of the front edge of the Lower Guillotine blade. A tapered radius will cause the fold to skew across the strip width and the legs of the Unicore will be twisted.

Incorrect radius is a very rare occurrence. Most leg twist will be due to strip deformation and not the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

10. The cut edge burr must be acceptable

Burr on the cut edge is an important consideration when making Unicores. A burr of less than 0.025mm is considered very good, less than 0.05mm is certainly acceptable and some applications can tolerate as much as 0.08mm. We aim for zero burr.

Burr is easy to notice, difficult to measure and certainly subjective with regards Quality Control. In some Unicore applications the cut burr will not cause any problem although in other applications it may. AEM is committed to an ongoing research program targeting this problem.

Over time a burr will develop and the cut edge will deteriorate. When the burr is unacceptable the guillotine blades need to be removed and sharpened.

HEADTEST

There is a program called HEADTEST which enables the Customer to operate the head without feed operations. This program is kept in the Version7 directory and is loaded to the machine just like any other program. This program has two lines which call the Guillotine and Fold routines, which will shuttle the respective components up and down as fast as possible to allow head tuning, cleaning or sensor adjustment without axis feed operations.

To test the Guillotine operation, place a semi colon (;) in front of the line N025. To operate just the Fold action place a semi colon in front of line N020. The semi-colon will tell the drive to ignore that line and allow program flow of all the remaining code.

```
%P30 (HEADTEST)
;Program to test functionality of Unicore Head.
;Place semi-colon (;) in front of line which you DO NOT wish to execute
N010 SET 0
N020 JMP P21   ;Call GUILLO
N025 JMP P20   ;Call FOLD
N030 JMP N010
END
```


95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Explanation of the RESTART facility

Every program (except straight cut laminations and BUT3CUT three phase choke) has the ability to restart the core at any point in the Build Up. If the program should be interrupted for any reason: end of coil, power down, Emergency Stop, there exists the possibility to continue building a partially constructed core from where it was interrupted. This is most likely to occur when the coil of strip runs out during a core. Changing to a new coil will not be a problem.

Measure the current Build Up as accurately as possible (to within 0.1mm), and enter this figure in microns into the RESTART Build Up parameter of the Core Definition file. Go to Auto and push Start. The Unicore machine will self home and then pause for a few seconds whilst it performs the necessary calculations for the current build up and then it will proceed to produce a lamination which nests with the previous stack. Continue making the core until successful completion at the specified final Build Up.

Note that the Strip Thickness is still a requirement and is unique to each coil of strip. Therefore if the coil is changed half way through a core, then the pre-requisite 10 test strips still need to be cut and measured. This is entered in the Core Definition program along with the RESTART build up, as well as the original core dimension data. Regardless of the thickness of the previous coil, the Unicore will produce a lamination which matches the partially constructed core.

There is no need to manually subtract any dimension from the measured build up of a partial core, so long as the technique of measuring that core is accurate to within 0.1mm. In other words, don’t get into the habit of subtracting one lamination thickness each time you require a Restart, instead get into the habit of using a digital vernier to measure the Build Up instead of a ruler. Emphasis should be placed on developing a uniform technique between operators to ensure consistent measurements.

One final note on Restart. The E core program actually makes three cores: two inners and an outer, labelled “core 1,2 and 3" respectively. The Restart facility for the E core will require an extra input to define which core you wish to restart at. It will then complete all the other outstanding cores accordingly.

This completes the discussion on Core interpretation and the various factors which constitute a good Unicore. Although daunting at first, this will all come second nature with a little training and practice. Most customers already making cores are familiar with these terms and will already be applying these techniques to their own product.

What follows is a description of all the variables which the Operator can change in the Core Definition file.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

UNICORE DEFINITION FILES

Step Butt (STEPBUT7)

Description: The STEPBUT7 face is a series of flat steps which increment out at an angle parallel to the corner folds. The corners are selectable between 90 and 45 degree. All dimensions regarding the step are adjustable. There is only one cut per lamination.

Application: Shell type transformers of less than 3kVA.

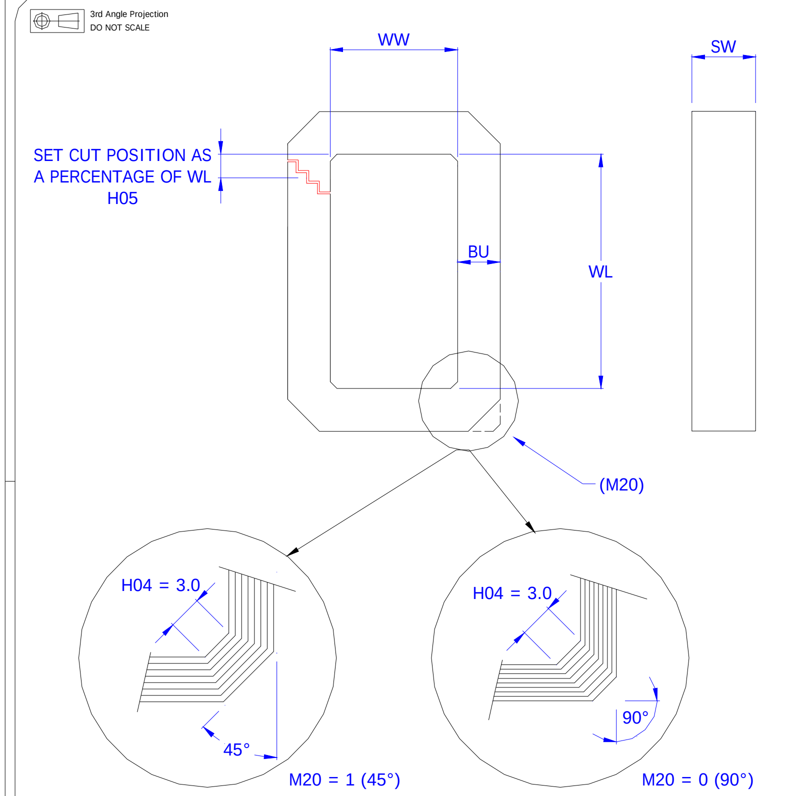
Features: Ease of assembly, especially when coupled with a STEPBUTT frame.

Filename: STEPBUT7

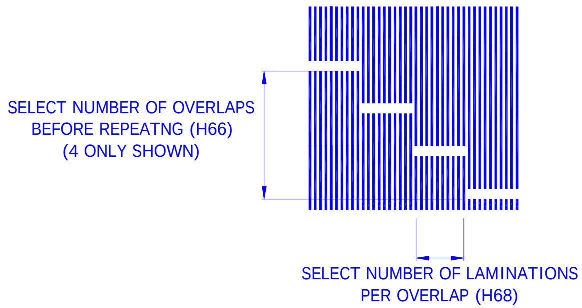
```
%P30 (STEPBUT7)
;STEP BUTT Unicore SINGLE CUT
;This is the Core Definition Program generated by the operator

;Core Dimensions
N010 SET H00=120000     ;WL in microns
N020 SET H01=80000      ;WW in microns
N030 SET H03=10000      ;BUP in microns
N035 SET H79=50000      ;Strip Width in microns
N038 SET H78=1          ;Numbers of strips in machine
N040 SET M20=1          ;Square Corner = 0 (90 deg)
                        ;Angled Corner = 1  (45 deg)
N045 SET H04=3000       ;Set inner corner radius (microns)
N050 SET H66=20         ;Number of overlaps before repeating
N060 SET H68=10         ;Number of lams per overlap
N070 SET H05=7          ;Set cut position as percentage of WL
N080 SET H02=270        ;Strip Thickness (ST) in microns
N090 SET H06=0          ;Tightness Factor +ve is looser, -ve tighter
N100 SET H34=0          ;Specify Restart BUILD-UP microns

N125 SET M22=0          ;DO NOT CHANGE
N130 SET M01=1          ;DO NOT CHANGE
N200 JMP P41            ;DO NOT CHANGE

END
```


95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au



CLOSEUP OF CUT PATTERN



WL	MM $^{+0.5}_{-0.0}$	
WW	MM $^{+0.5}_{-0.0}$	
BUP	MM $^{+0.5}_{-0.0}$	
SW	MM $^{+0.25}_{-0.25}$	
M20	1	- CORNER SELECTION 0 = 90° 1 = 45°
H04	3000 MICRON	- CORNER RADIUS
H66	20	- # OVERLAPS BEFORE REPEAT
H68	10	- # LAMINATIONS PER OVERLAP
H05	7%	- CUT POSITION
MATL		

A.E.M. PART # STEPBUT7

RECTANGULAR UNICORE WITH 45°/90° CORNERS
AND A ONE CUT STEP BUTT FACE

Title: 45°/90° STEP BUTT UNICORE

Eng : M. NAVACCHI	Scale:	Drawing File	Assoc Text File	Assoc Program
Date : DEC 2001	No Scale			STEPBUT7

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

STEPBUTT ....continued. Detailed description of File: STEPBUT7

%P30 (STEPBUT7)	Program number and name. This MUST NOT be altered.
N010 SET H00=120000	**Window Length** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N020 SET H01=80000	**Window Width** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=10000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N038 SET H78=1	**Number of Strips in the machine**. Used when two strip are run parallel to calculate mass of throughput. Range: 1 or 2
N040 SET M20=1	**Flag for setting Corner Angle** Square corner = 0 90 degree generated from 2x 45 degree folds spaced the same distance throughout the Build Up Angled corner = 1 90 degree generated from 2x 45 degree folds with an increasing increment between folds throughout the Build Up. Range: 0 or 1
N045 SET H04=3000	**Inner Corner Radius** in microns. Default to 3000 microns. Range: 2000 – 10000 microns. Increment: 500 microns
N050 SET H66=20	**Number of Steps** (overlaps) before repeating. This is the number of flat steps in the Stepbutt face before the cascade is repeated. This should be set high (for large BUP cores this could be 50) otherwise a stepped sawtooth will develop. Range: 1 - 100 Increment: 1 unit (step)
N060 SET H68=10	**Number of Laminations in each step**. This determines the width of each step in the face. The more laminations the deeper the step. Use 6 laminations for small cores (WL < 70mm) and 10 or more for larger cores. This can be used to produce a single cut, flat faced core, by increasing the Number of Lamination in each step to more than the total number of laminations in the entire core. Range: 1 - 1000000 Increment: 1 unit (lamination)

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

STEPBUTT ....continued. Detailed description of File: STEPBUT7 ....continued

N070 SET H05=7 — **Set the Start Position** for the Lamination (position of the cut face) as a **percentage** of the Window Length. 3mm (5%) is the minimum length for small cores (< 70mm WL) and for larger cores it should be 10-15mm (5-7%). **The Start Position cannot be closer than 25mm from the Window End opposite the cut face**. The Lower Guillotine is 25mm wide, if the cut is placed less than 25mm from the last fold then the lamination will be drawn back into the die area which may result in strip damage.
Range: 5 - 50%   Increment: 1%

N080 SET H02=270 — **Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer.
Range: 100 - 500 microns   Increment: 1 micron

N090 SET H06=0 — **Tightness Factor** in microns. Closely associated and dependent on an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques.
Range: -50 -> +50 microns   Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

N100 SET H34=0 — **Restart Build-up** in microns. Should a core be interrupted during assembly it can be restarted by measuring the Build Up and entering this figure as the Restart position. The accuracy of the subsequent lamination produced is dependent on the accuracy of core measurement, use a digital vernier rather than a ruler to achieve +/-0.1mm tolerance. This facility is also useful when making cruciform or composite material cores.
Range: Unlimited   Increment: 1 micron

N125 -> N200 — These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Distributed Gap (DGAP7)

Description: The **Distributed Gap** (DGAP7) face is a series of laminations with overlapping cuts along one leg of the core. Selectable 45 deg or 90 deg corner angles, with adjustable inner corner radius. All dimensions regarding the overlaps are adjustable. There is only one cut per lamination.

Application: Transformers greater than 1kVA

Features: Traditional distributed gap face, low loss applications.

Filename: DGAP7

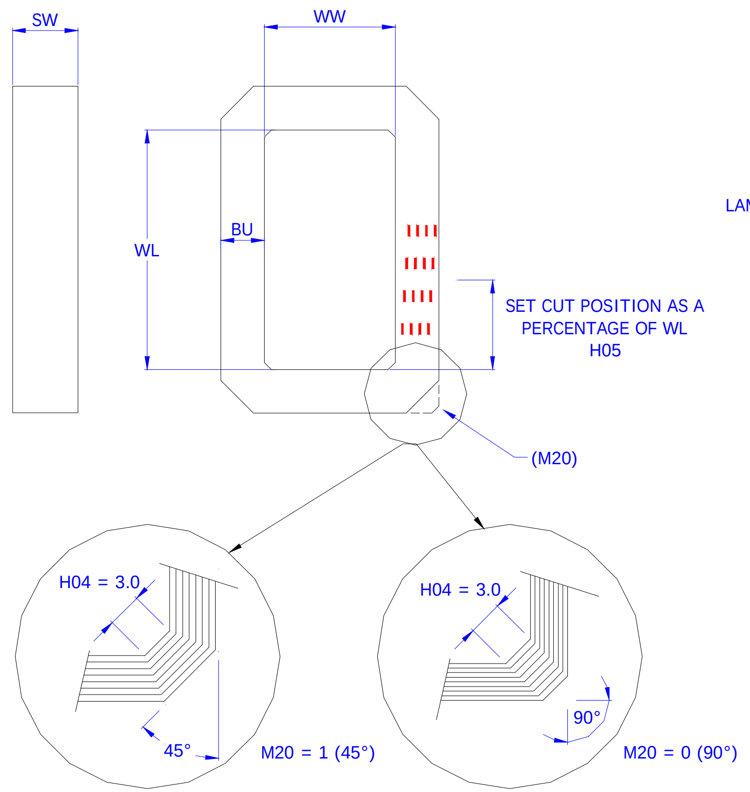
```
%P30 (DGAP7)
;SINGLE CUT Distributed Gap Unicore
;This is the Core Definition Program generated by the operator
;Core Dimensions
N010 SET H00=120000     ;WL in microns
N020 SET H01=80000      ;WW in microns
N030 SET H03=10000      ;BUP in microns
N035 SET H79=50000      ;Strip Width in microns
N038 SET H78=1          ;Numbers of strips in machine
N040 SET M20=1          ;Square Corner = 0 (90 deg)
                        ;Angled Corner = 1 (45 deg)
N045 SET H04=3000       ;Set inner corner radius (microns)
N050 SET H66=5          ;Number of overlaps before repeating
N060 SET H68=1          ;Number of lams per overlap
N065 SET H20=14000      ;Lamination Overlap in microns
N100 SET H05=10         ;Set cut position as percentage of WL
N120 SET H02=270        ;Strip Thickness (ST) in microns
N130 SET H06=0          ;Tightness Factor +ve is looser, -ve tighter
N140 SET H34=0          ;Specify Restart BUILD-UP microns

N150 SET M22=0          ;DO NOT CHANGE
N160 SET M07=1          ;DO NOT CHANGE
N200 JMP P41            ;DO NOT CHANGE
END
```

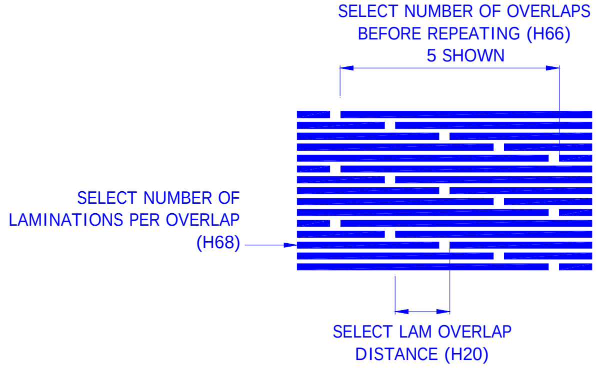

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM UNICORE
An Innovation in Transformer Design and Manufacture

3rd Angle Projection
DO NOT SCALE





WL	MM $^{+0.5}_{-0.0}$	
WW	MM $^{+0.5}_{-0.0}$	
BUP	MM $^{+0.5}_{-0.0}$	
SW	MM $^{+0.25}_{-0.25}$	
M20	1	- CORNER SELECTION 0=90° 1=45°
H04	3000 microns	- CORNER RADIUS
H66	5	- # OF OVERLAPS BEFORE REPEAT
H68	1	- # LAMINATIONS PER OVERLAP
H20	14000 microns	- LAMINATION OVERLAP DISTANCE
H05	10%	- CUT POSITION
MATL		

A.E.M. PART # DGAP7

RECTANGULAR UNICORE WITH 45°/90° CORNERS AND A ONE CUT, DISTRIBUTED GAP FACE.

Title: 45°/90° DISTRIBUTED GAP UNICORE

Eng : M. NAVACCHI	Scale:	Drawing File	Assoc Text File	Assoc Program
Date : DEC 2001	No Scale			DGAP7

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

DGAP7 ....continued. Detailed description of File: DGAP7

%P30 (DGAP7)	Program number and name. This MUST NOT be altered.
N010 SET H00=120000	**Window Length** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N020 SET H01=80000	**Window Width** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=10000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N038 SET H78=1	**Number of Strips in the machine**. Used when two strip are run parallel to calculate mass of throughput. Range: 1 or 2
N040 SET M20=1	**Flag for setting Corner Angle** Square corner = 0 90 degree generated from 2x 45 degree folds spaced the same distance throughout the Build Up Angled corner = 1 90 degree generated from 2x 45 degree folds with an increasing increment between folds throughout the Build Up. Range: 0 or 1
N045 SET H04=3000	**Inner Corner Radius** in microns. Default to 3000 microns. Range: 2000 – 10000 microns. Increment: 500 microns
N050 SET H66=5	**Number of Steps** (overlaps) before repeating. This is the number of lamination steps in the distributed face before the cascade is repeated. It's a balance between magnetic performance and ease of assembly. Range: 1 - 100 Increment: 1 unit (step) Recommendation: Use 2 to 20 steps depending on design.
N060 SET H68=1	**Number of Laminations in each step**. This determines the number of laminations in each step of the face. Range: 1 – 4 Increment: 1 unit (lamination)

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

DGAP7 ....continued. Detailed description of File: DGAP7

N065 SET H20=14000

Lamination Overlap in microns. This is the amount each lamination step overlaps the preceding one. The longer the overlap the easier to assemble, balance this consideration against the Number of Steps. Try to achieve a long Lamination Overlap without decreasing the Number of Steps to a point where magnetic performance begins to degrade.
Range: Unlimited Increment: 1 micron

N100 SET H05=10

Set the **Start Position** for the Lamination (position of the cut face) as a **percentage** of the Window Length. 3mm (5%) is the minimum length for small cores (< 70mm WL) and for larger cores it should be at least 10-15mm (5-7%). The Start Position cannot be closer than 25mm from the Window End opposite the cut face. The Lower Guillotine is 25mm wide, if the cut is placed less than 25mm from the last fold then the lamination will be drawn back into the die area which may result in strip damage.
Range: 5 - 50% Increment: 1%

N120 SET H02=270

Strip Thickness in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer.
Range: 100 - 500 microns Increment: 1 micron

N130 SET H06=0

Tightness Factor in microns. Closely associated and dependent on an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques.
Range: -50 -> +50 microns Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

N140 SET H34=1

Restart Build-up in microns. Should a core be interrupted during assembly it can be restarted by measuring the Build Up and entering this figure as the Restart position. The accuracy of the subsequent lamination produced is dependent on the accuracy of core measurement. Use a digital vernier rather than a ruler to achieve +/- 0.1mm tolerance. This facility is also useful when making cruciform or composite material cores.
Range : Unlimited Increment: 1 micron

N150 -> N200

These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Diverging Distributed Gap (DDGAP)

Description: The **Diverging Distributed Gap** (DDGAP) face is a series of laminations with overlapping cuts along one leg of the core, similar to a standard Distributed Gap. However, the cascade of cut faces fans out or diverges to produce a distributed gap face with no two cut faces sitting adjacent to each other between lamination stacks. The corners are selectable between 30 and 45 degree, inner corner radius is adjustable, cut position selectable between Side or End cut. All dimensions regarding the overlaps can be automatically calculated by the software, or selectable by the operator. The outer butt section build up is selectable, as is the position of the cut.

Application: Transformers greater than 1kVA

Features: Traditional distributed gap face, low loss applications.

Filename: DDGAP7

```
%P30 (DDGAP7)
;SINGLE CUT Doubly Distributed Gap with BUTT Outer Unicore
;This is the Core Definition Program generated by the operator
;Core Dimensions
N010 SET H00=120000          ;WL in microns
N020 SET H01=80000           ;WW in microns
N030 SET H03=10000           ;BUP in microns
N035 SET H79=50000           ;Strip Width in microns
N038 SET H78=1               ;Numbers of strips in machine
N039 SET M21=0               ;Side Cut WL = 0    End Cut WW = 1
N040 SET M22=0               ;45 deg corner = 0 ,  30 deg corner = 1
N045 SET H04=3000            ;Set inner corner radius (microns)
N048 SET H67=0               ;Overlap spread (microns) Full spread = 0
N050 SET H66=5               ;Number of overlaps before repeating
N060 SET H68=1               ;Number of lams per overlap
N070 SET H45=0               ;Butt Outer Build Up (microns) No Butt = 0
N080 SET H48=30              ;Butt Outer Cut position % (10-50%)
N100 SET H05=10              ;Set cut position as percentage of WL
N120 SET H02=270             ;Strip Thickness (ST) in microns
N130 SET H06=0               ;Tightness Factor +ve is looser, -ve tighter
N140 SET H34=0               ;Specify Restart BUILD-UP microns

N150 SET M20=1               ;DO NOT CHANGE
N160 SET M08=1               ;DO NOT CHANGE
N200 JMP P41                 ;DO NOT CHANGE
END
```

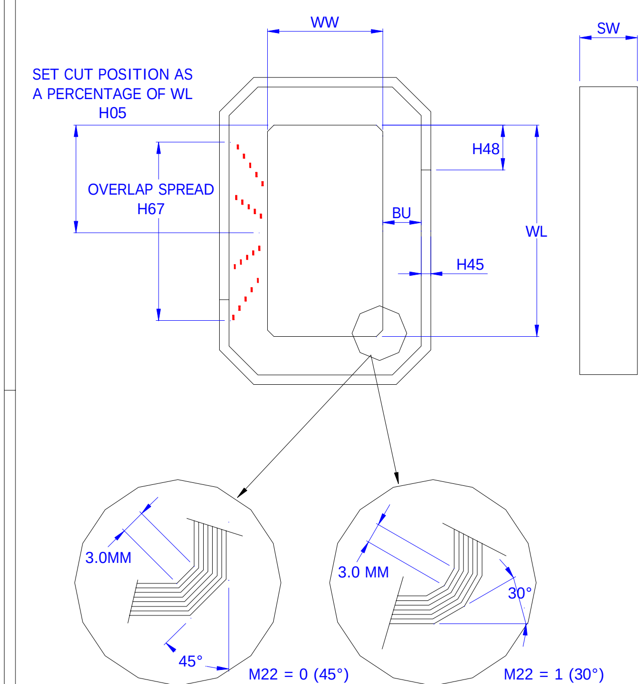

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM UNICORE
An Innovation in Transformer Design and Manufacture

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

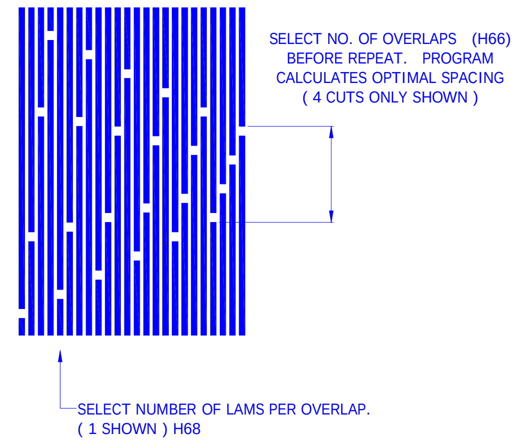
3rd Angle Projection
DO NOT SCALE

CUTS AVAILABLE ON WINDOW LENGTH (WL)
OR WINDOW WIDTH (WW)



LAM OVERLAP INCREASES WITH
INCREASING BUILD UP.
NO GAP SITS OVER PREVIOUS.

CLOSEUP OF CUT PATTERN



WL	MM $^{+0.5}_{-0.0}$	
WW	MM $^{+0.5}_{-0.0}$	
BUP	MM $^{+0.5}_{-0.0}$	
SW	MM $^{+0.25}_{-0.25}$	
M21	0	- CUT POSITION WL = 0 WW = 1
M22	0	- CORNER SELECTION 0=45° 1 =30°
H04	3000 microns	- INNER CORE RADIUS
H67	0	- OVERLAP SPREAD %
H66	5	- # OF OVERLAPS BEFORE REPEAT
H68	1	- # OF LAMS PER OVERLAP
H45	0 microns	- BUTT OUTER BUILDUP
H48	30	- BUTT OUTER CUT POSITION %
H05	10	- CUT POSITION AS A PERCENTAGE OF WL
MATL		

A.E.M. PART #DDGAP7

RECTANGULAR UNICORE WITH 30°/45° CORNERS
AND A ONE CUT DIVERGING DISTRIBUTED GAP FACE

Title: 30°/45° DIVERGING DISTRIBUTED GAP UNICORE

Eng : M. NAVACCHI	Scale:	Drawing File	Assoc Text File	Assoc Program
Date : DEC 2001	No Scale			DDGAP7

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

DDGAP7 ....continued. Detailed description of File : DDGAP7

%P30 (DDGAP7)	Program number and name. This MUST NOT be altered.
N010 SET H00=120000	**Window Length** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N020 SET H01=80000	**Window Width** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=10000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N038 SET H78=1	**Number of Strips in the machine**. Used when two strips are run parallel to calculate mass of throughput. Range: 1 or 2
N039 SET M21=0	**Flag for setting Cut Placement** Side Cut on WL = 0 End Cut on WW = 1 Range: 0 or 1
N040 SET M22=0	**Flag for setting Corner Angle** 45 deg corner = 0 2x 45 degree folds with an increasing increment between folds 30 deg corner = 1 3x 30 degree folds with an increasing increment between folds Range: 0 or 1
N045 SET H04=3000	**Inner Corner Radius** in microns. Default to 3000 microns. Range: 2000 – 10000 microns. Increment: 500 microns
N048 SET H67=0	**Overlap Spread** in microns. Set overall face distribution with this parameter. Setting H67 = 0 will automatically distribute the face over the maximum allowable distance along the leg. Range: 0 - (Leg length – 25mm) Increment: 100 microns
N050 SET H66=5	**Number of Steps** (overlaps) before repeating. This is the number of lamination steps in the distributed face before the cascade is repeated. It’s a balance between magnetic performance and ease of assembly. Range: 1 - 100 Increment: 1 unit (step) Recommendation: Use 2 to 20 steps depending on design.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

DGAP7 ....continued. Detailed description of File: DGAP7

N060 SET H68=1	**Number of Laminations in each step**. This determines the number of laminations in each step of the face. Range: 1 – 4 Increment: 1 unit (lamination)
N070 SET H45=0	**Butt Outer Build Up** in microns. Setting to zero will disable this feature. Range: 0 –> max BUP Increment: microns
N080 SET H48=30	Butt Outer Cut Position as percentage of leg length. Range: 10-50% Increment: 1 %
N100 SET H05=10	Set the **Start Position** for the Lamination (position of the cut face) as a **percentage** of the Window Length. 3mm (5%) is the minimum length for small cores (< 70mm WL) and for larger cores it should be at least 10-15mm (5-7%). The Start Position cannot be closer than 25mm from the Window End opposite the cut face. The Lower Guillotine is 25mm wide, if the cut is placed less than 25mm from the last fold then the lamination will be drawn back into the die area which may result in strip damage. Range: 5 - 50% Increment: 1%
N120 SET H02=270	**Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer. Range: 100 - 500 microns Increment: 1 micron
N130 SET H06=0	**Tightness Factor** in microns. Closely associated and dependent on an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques. Range: -50 -> +50 microns Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

N140 SET H34=0	**Restart Build-up** in microns. Should a core be interrupted during assembly it can be restarted by measuring the Build Up and entering this figure as the Restart position. The accuracy of the subsequent lamination produced is dependent on the accuracy of core measurement. Use a digital vernier rather than a ruler to achieve +/-0.1mm tolerance. This facility is also useful when making cruciform or composite material cores. Range: Unlimited Increment: 1 micron
N150 -> N200	These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Mini-Distributed Gap (Mini-D7)

Description: The **Mini Distributed Gap** (Mini-D7) core belongs in the suite of distributed face cores but is used for quick assembly of small voltage transformers less than 3kVa. It is a series of laminations with very small overlapping steps clustered towards one end of the core leg. The number of steps increases with build up, which means the packets of laminations become bulkier as the build up increases. The cascade of cuts diverges to produce a distributed gap face with no two cut faces sitting adjacent to each other between lamination stacks. The corners are selectable between 45 and 90 degree and the inner corner radius is adjustable

Application: Voltage transformers smaller than 3kVA

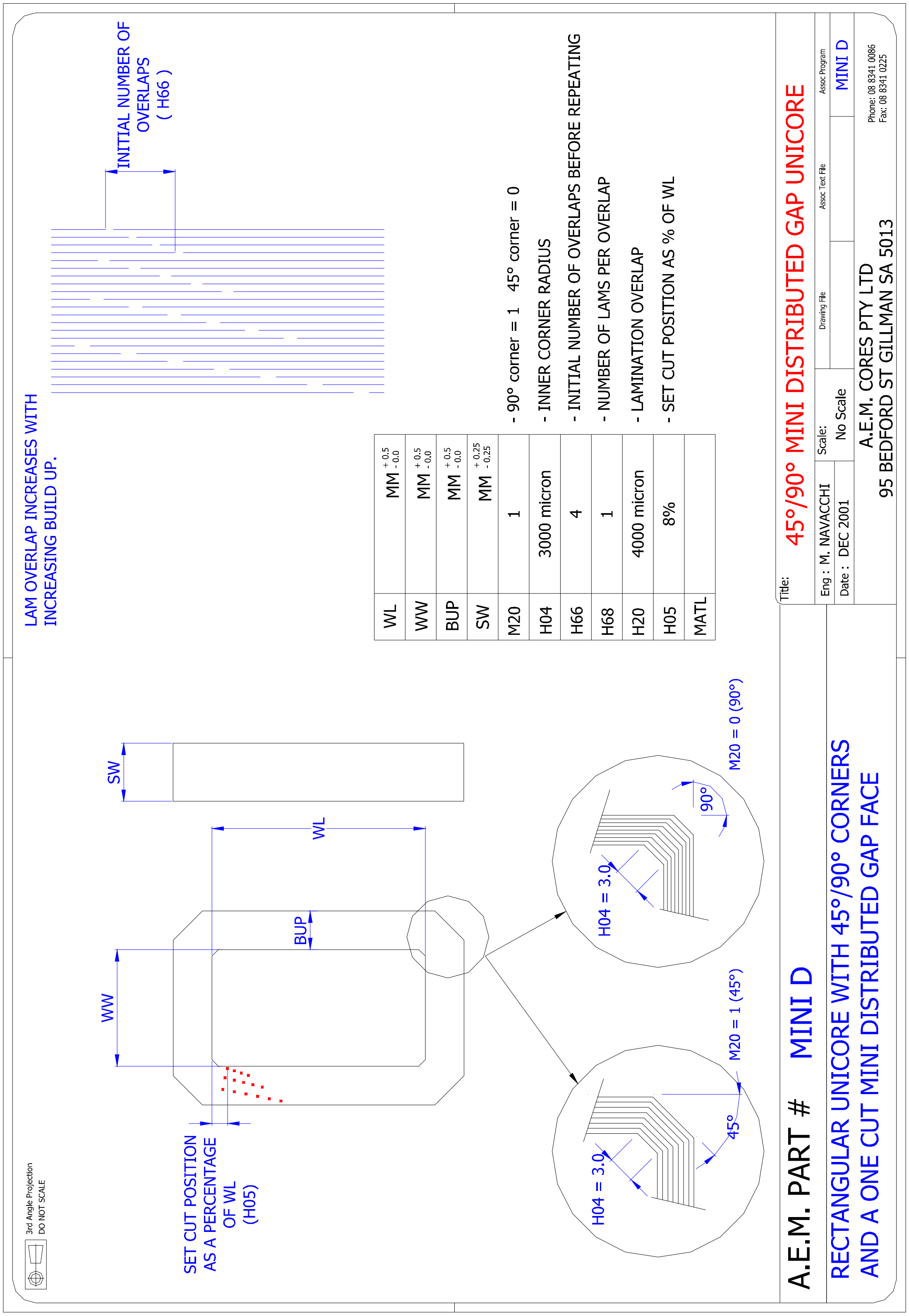
Features: Ease of assembly, low loss face.

Filename: Mini-D7

```
%P30 (Mini-D7)
;SINGLE CUT MINI-D Distributed Gap Unicore
;This is the Core Definition Program generated by the operator
;Core Dimensions
N010 SET H00=120000          ;WL in microns
N020 SET H01=80000           ;WW in microns
N030 SET H03=10000           ;BUP in microns
N035 SET H79=50000           ;Strip Width in microns
N038 SET H78=1               ;Numbers of strips in machine
N040 SET M20=1               ;Square Corner = 0 (90 deg)
                             ;Angled Corner = 1 (45 deg)
N045 SET H04=3000            ;Set inner corner radius (microns)
N050 SET H66=4               ;Initial number of overlaps before repeating
N060 SET H68=1               ;Number of lams per overlap
N065 SET H20=4000            ;Lamination overlap in microns
N100 SET H05=8               ;Set cut position as percentage of WL
N120 SET H02=270             ;Strip Thickness (ST) in microns
N130 SET H06=0               ;Tightness Factor +ve is looser, -ve tighter
N140 SET H34=0               ;Specify Restart BUILD-UP microns

N150 SET M22=0               ;DO NOT CHANGE
N160 SET M03=1               ;DO NOT CHANGE
N200 JMP P41                 ;DO NOT CHANGE
END
```


95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM UNICORE
An Innovation in Transformer Design and Manufacture



Mini-D ....continued. Detailed description of File: Mini-D7

%P30 (MINI-D7)	Program number and name. This MUST NOT be altered.
N010 SET H00=120000	**Window Length** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N020 SET H01=80000	**Window Width** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=10000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N038 SET H78=1	**Number of Strips in the machine**. Used when two strips are run parallel to calculate mass of throughput. Range: 1 or 2
N040 SET M20=1	**Flag for setting Corner Angle** 90 deg corner = 0 2x 45 degree folds with constant increment between folds 45 deg corner = 1 2x 45 degree folds with an increasing increment between folds Range: 0 or 1
N045 SET H04=3000	**Inner Corner Radius** in microns. Default to 3000 microns. Range: 2000 – 10000 microns. Increment: 500 microns
N050 SET H66=4	**Initial Number of Steps** (overlaps) before repeating. This is the number of lamination steps in the distributed face before the cascade is repeated. This will increment at the build up increases. Range: 1 - 100 Increment: 1 unit (step) Recommendation: Use 4 to 6 steps depending on design.
N060 SET H68=1	**Number of Laminations in each step**. This determines the number of laminations in each step of the face. Range: 1 – 4 Increment: 1 unit (lamination)
N065 SET H20=4000	**Lamination Overlap** in microns. This is the amount each lamination step overlaps the preceding one. Range: 1000 – 6000 microns Increment: 500 microns

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Mini-D ....continued. Detailed description of File: Mini-D7

N100 SET H05=8	Set the **Start Position** for the Lamination (position of the cut face) as a **percentage** of the Window Length. 3mm (5%) is the minimum length for small cores (< 70mm WL) and for larger cores it should be at least 10-15mm (5-7%). The Start Position cannot be closer than 25mm from the Window End opposite the cut face. The Lower Guillotine is 25mm wide, if the cut is placed less than 25mm from the last fold then the lamination will be drawn back into the die area which may result in strip damage. Range: 5 - 50% Increment: 1%
N120 SET H02=270	**Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer. Range: 100 - 500 microns Increment: 1 micron
N130 SET H06=0	**Tightness Factor** in microns. Closely associated and dependent on an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques. Range: -50 -> +50 microns Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

N140 SET H34=0	**Restart Build-up** in microns. Should a core be interrupted during assembly it can be restarted by measuring the Build Up and entering this figure as the Restart position. The accuracy of the subsequent lamination produced is dependent on the accuracy of core measurement. Use a digital vernier rather than a ruler to achieve +/-0.1mm tolerance. This facility is also useful when making cruciform or composite material cores. Range: Unlimited Increment: 1 micron
N150 -> N200	These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Straight Lamination (LAM7)

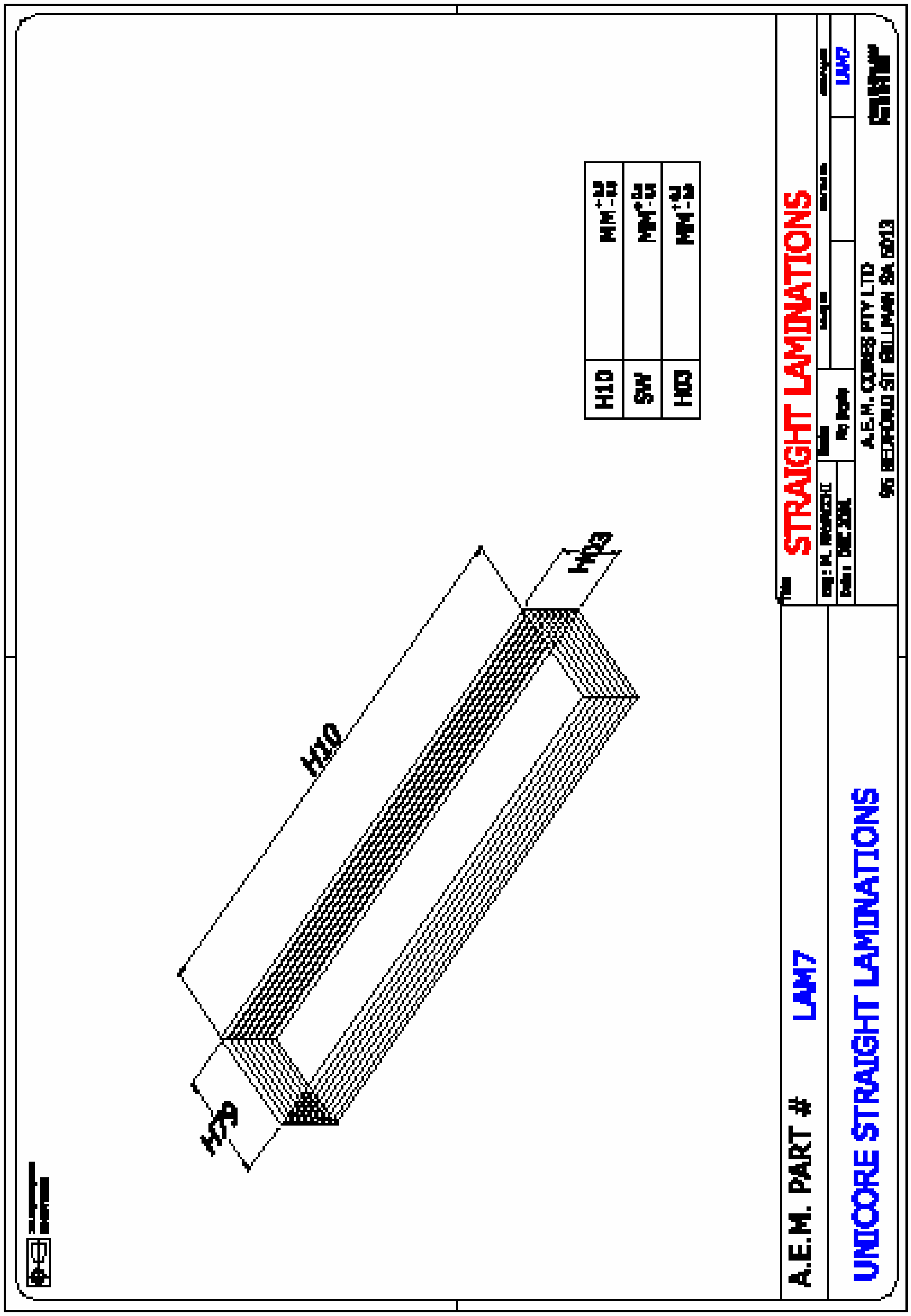
Description: The Unicore machine can cut straight Laminations. Enter the strip thickness and desired stack height, the laminations will be cut to the specified length.

Application: Built up transformers and chokes

Filename: LAM7

```
%P30 (LAM7)
;Straight Lamination
;This is the Core Definition Program generated by the operator
;Lamination length
N010 SET H10=100000        ;Length of Lamination in microns
N030 SET H02=270           ;Set Strip Thickness
N040 SET H79=50000         ;Set Strip Width
N050 SET H03=100000        ;Set Stack Height (BUP) in microns
N060 SET H78=1             ;Number of strips in machine

N130 SET M04=1             ;DO NOT CHANGE
N200 JMP P41               ;DO NOT CHANGE
END
```


AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au


H10
SW
H03
STRAIGHT LAMINATIONS
A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
A.E.M. PART #
LAM7
UNICORE STRAIGHT LAMINATIONS

%P30 (LAM7)	Program number and name. This **MUST NOT** be altered.
N010 SET H10=100000	**Length of Lamination** in microns. This may need to be adjusted depending on the condition of the strip. Range: Unlimited Increment: 1 micron
N030 SET H02=270	**Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise the final stack height will be incorrect. Refer to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer. Range: 100 - 500 microns Increment: 1 micron
N040 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N050 SET H03=100000	**Stack Height** in microns. Using the Strip Thickness the Unicore machine will calculate a resultant Stack Height and complete the program when this number of laminations has been reached. Range: Unlimited Increment: 1 micron
N060 SET H78=1	**Number of Strips** in the machine. Used when two strips are run parallel to calculate mass of throughput. Range: 1 or 2
N130 -> N200	These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Uncut Core (UNCUT7)

Description: The **Uncut** core is a rectangular Unicore, with no cut faces. The start and stop cut is on the same end of the core and will overlap the centre line to facilitate easy access with a TIG welding nozzle. There is a choice of 90 or 45 degree corners, with an adjustable corner radius.

Application: All transformer sizes

Features: Similar magnetic characteristics to a toroid.

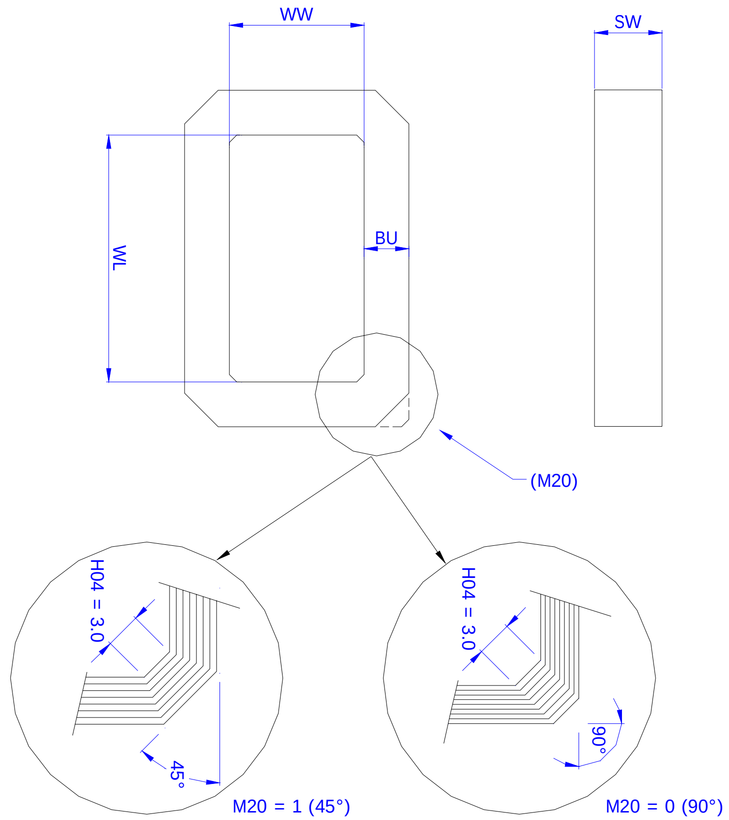
Filename: UNCUT7

```
%P30 (UNCUT7)
;UNCUT Unicore
;This is the Core Definition Program generated by the operator
;Core Dimensions
N010 SET H00=120000     ;WL in microns
N020 SET H01=80000      ;WW in microns
N030 SET H03=10000      ;BUP in microns
N035 SET H79=50000      ;Strip Width in microns
N038 SET H78=1          ;Number of strips in machine
N040 SET M20=1          ;Square Corner = 0 (90 deg)
                        ; Angled Corner = 1 (45 deg)
N110 SET H04=3000       ;Set inner corner radius (microns)
N120 SET H02=270        ;Strip Thickness (ST) in microns
N130 SET H06=0          ;Tightness Factor +ve is looser, -ve tighter
N140 SET H34=0          ;Specify Restart BUILD-UP microns

N160 SET M22=0          ;DO NOT CHANGE
N170 SET M02=1          ;DO NOT CHANGE
N200 JMP P41            ;DO NOT CHANGE
END
```


95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3rd Angle Projection
DO NOT SCALE



WL	MM + 0.5 / - 0.0	
WW	MM + 0.5 / - 0.0	
BUP	MM + 0.5 / - 0.0	
SW	MM + 0.25 / - 0.25	
M20	1	- CORNER SELECTION 0=90° 1=45°
H04	3000 micron	- CORNER RADIUS
MTL		

A.E.M. PART # UNCUT7

UNCUT RECTANGULAR UNICORE WITH 45°/90° CORNERS

Title: 45°/90° UNCUT UNICORE

Eng : M. NAVACCHI	Scale:	Drawing File	Assoc Text File	Assoc Program
Date : DEC 2001	No Scale			UNCUT7

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

UNCUT7 ....continued. Detailed description of File: UNCUT7

%P30 (UNCUT7)	Program number and name. This **MUST NOT** be altered.
N010 SET H00=120000	**Window Length** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N020 SET H01=80000	**Window Width** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=10000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N038 SET H78=1	**Number of Strips** in the machine. Used when two strips are run parallel to calculate mass of throughput. Range: 1 or 2
N040 SET M20=1	**Flag for Setting Corner Angle** Square corner = 0 90 degree generated from 2x 45 degree folds spaced the same distance throughout the Build Up Angled corner = 1 90 degree generated from 2x 45 degree folds with an increasing increment between folds throughout the Build Up. Range: 0 or 1
N045 SET H04=3000	**Inner Corner Radius** in microns. Default to 3000 microns. Range: 2000 – 10000 microns. Increment: 500 microns
N120 SET H02=270	**Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer. Range: 100 - 500 microns Increment: 1 micron

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

UNCUT7 ....continued. Detailed description of File: UNCUT7

N130 SET H06=0 **Tightness Factor** in microns. Closely associated and dependent on an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques.
Range: -50 -> +50 microns Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

N140 SET H34=0 **Restart Build-up** in microns. Should a core be interrupted

during assembly it can be restarted by measuring the Build Up and entering this figure as the Restart position. The accuracy of the subsequent lamination produced is dependent on the accuracy of core measurement. Use a digital vernier rather than a ruler to achieve +/-0.1mm tolerance. This facility is also useful when making cruciform or composite material cores.
Range : Unlimited Increment: 1 micron

N150 -> N200 These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Gapped Core (COREGAP)

Description: A rectangular Unicore with a programmable gap in one leg. The corners are selectable between 45 and 90 degree, inner corner radius is adjustable, cut position selectable between Side or End cut and the gap spacing is programmable.

Applications: Chokes

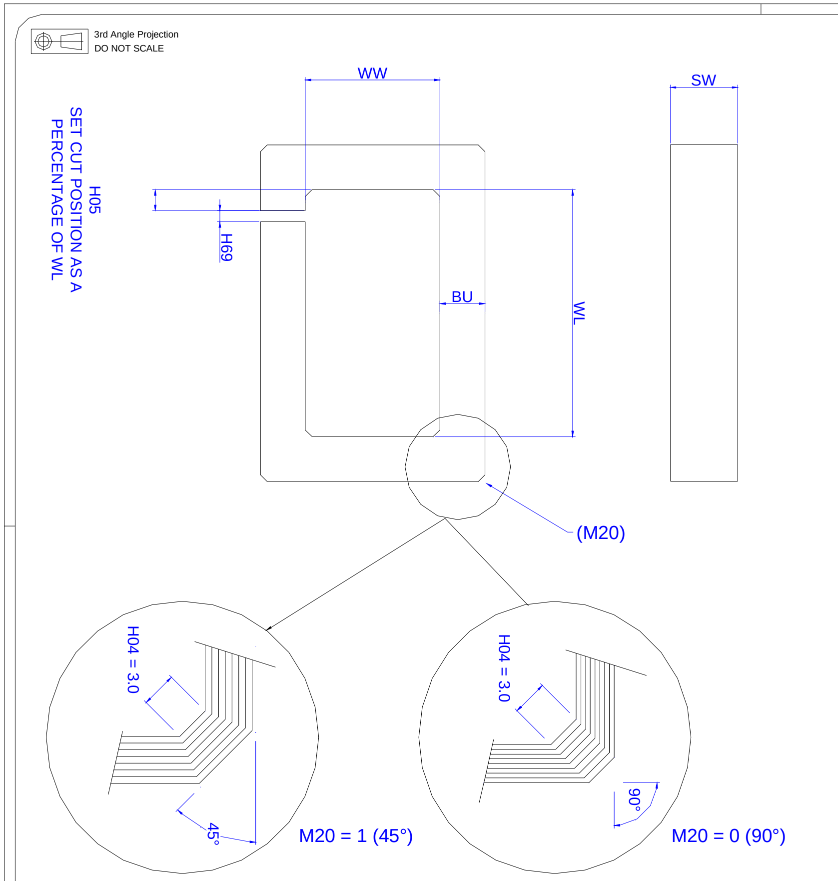
Filename: COREGAP7

```
%P30 (COREGAP7)
;Rectangular Unicore SINGLE GAP
;This is the Core Definition Program generated by the operator
;Core Dimensions
N010 SET H00=120000     ;WL in microns
N020 SET H01=80000      ;WW in microns
N030 SET H03=10000      ;BUP in microns
N035 SET H79=50000      ;Strip Width in microns
N038 SET H78=1          ;Numbers of strips in machine
N040 SET M20=1          ;90 deg corner = 0 ,  45 deg corner = 1
N050 SET M21=0          ;Side Cut WL = 0    End Cut WW = 1
N060 SET H69=5000       ;Set gap in microns
N090 SET H04=3000       ;Set inner corner radius (microns)
N100 SET H05=20         ;Set cut position as percentage of WL
N120 SET H02=270        ;Strip Thickness (ST) in microns
N130 SET H06=0          ;Tightness Factor +ve is looser, -ve tighter
N140 SET H34=0          ;Specify Restart BUILD-UP microns

N150 SET M20=0          ;DO NOT CHANGE
N160 SET M06=1          ;DO NOT CHANGE
N200 JMP P41            ;DO NOT CHANGE
END
```


95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3rd Angle Projection
DO NOT SCALE



WL	MM $^{+0.5}_{-0.0}$	
WW	MM $^{+0.5}_{-0.0}$	
BUP	MM $^{+0.5}_{-0.0}$	
SW	MM $^{+0.25}_{-0.25}$	
M20	1	CORNER SELECTION 0=90° 1=45°
M21	0	GAP ON WL=0, GAP ON WW=1
H69	5000	SET GAP IN MICRONS
H04	3000	SET INNER CORNER RADIUS
H05	20	CUT POSITION AS A % OF WL
H02	270	STRIP THICKNESS
MATL		

A.E.M. PART # COREGAP7

RECTANGULAR UNICORE WITH 90°/45° CORNERS
AND A ONE CUT GAPPED FACE

Title: 90°/45° GAPPED CORE

Eng : M. NAVACCHI
Date : FEB 2002
Scale: No Scale
Drawing File
Assoc Text File
Assoc Program: COREGAP7

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

AEM UNICORE
An Innovation in Transformer Design and Manufacture

COREGAP7 ....continued. Detailed description of File: COREGAP7

%P30 (COREGAP7)	Program number and name. This MUST NOT be altered.
N010 SET H00=120000	**Window Length** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N020 SET H01=80000	**Window Width** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=10000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N038 SET H78=1	**Number of Strips in the machine**. Used when two strips are run parallel to calculate mass of throughput. Range: 1 or 2
N040 SET M20=0	**Flag for setting Corner Angle** 90 deg corner = 0 2x 45 degree folds with constant increment between folds 45 deg corner = 1 2x 45 degree folds with an increasing increment between folds Range: 0 or 1
N050 SET M21=0	**Flag for setting Cut Placement** Side Cut on WL = 0 End Cut on WW = 1 Range: 0 or 1
N060 SET H69=5000	**Gap Spacing** in microns. Default to 5000 microns. Range: 0 – 10000000 microns. Increment: 100 microns
N090 SET H04=3000	**Inner Corner Radius** in microns. Default to 3000 microns. Range: 2000 – 10000 microns. Increment: 500 microns

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

N100 SET H05=20	Set the **Start Position** for the Lamination (position of the cut face) as a **percentage** of the Window Length. 3mm (5%) is the minimum length for small cores (< 70mm WL) and for larger cores it should be at least 10-15mm (5-7%). The Start Position cannot be closer than 25mm from the Window End opposite the cut face. The Lower Guillotine is 25mm wide, if the cut is placed less than 25mm from the last fold then the lamination will be drawn back into the die area which may result in strip damage. Range: 5 - 50% Increment: 1%
N120 SET H02=270	**Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer. Range: 100 - 500 microns Increment: 1 micron
N130 SET H06=0	**Tightness Factor** in microns. Closely associated and dependent on an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques. Range: -50 -> +50 microns Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

N140 SET H34=0	**Restart Build-up** in microns. Should a core be interrupted during assembly it can be restarted by measuring the Build Up and entering this figure as the Restart position. The accuracy of the subsequent lamination produced is dependent on the accuracy of core measurement. Use a digital vernier rather than a ruler to achieve +/-0.1mm tolerance. This facility is also useful when making cruciform or composite material cores. Range: Unlimited Increment: 1 micron
N150 -> N200	These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Double Cut BUTT (BUT2XL7)

Description: The **Double Cut BUTT (BUT2XL7)** core resembles a traditional C core because the legs are flat faced and square. A rectangular lamination is formed with a cut on each leg, the corners are selectable between 45 and 90 degrees and inner corner radius is adjustable. The 'legs' have an independent variable for micro adjustment of the length, this 'leg extension' enables the core faces to lay flat without the need for clamping.

Application: Single phase chokes.

Filename: BUT2XL7

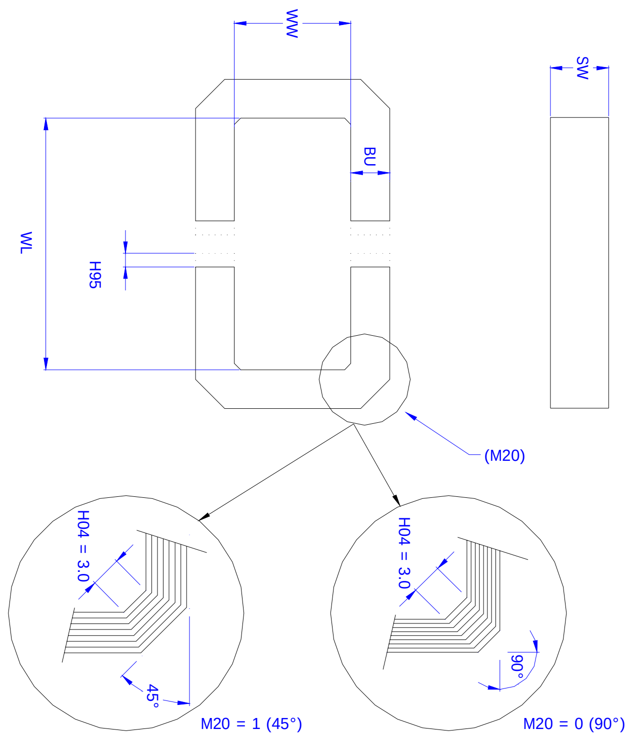
```
%P30 (BUT2XL7)
;DOUBLE CUT BUTT FACE with Leg Extension Unicore (C CORE EQUIVALENT)
;This is the Core Definition Program generated by the operator
;Core Dimensions
N010 SET H00=120000     ;WL in microns
N020 SET H01=80000      ;WW in microns
N030 SET H03=10000      ;BUP in microns
N035 SET H79=50000      ;Strip Width in microns
N038 SET H78=1          ;Numbers of strips in machine
N040 SET M20=1          ;Square Corner = 0  (90 deg)
                        ;Angled Corner = 1   (45 deg)
N090 SET H04=3000       ;Set inner corner radius (microns)
N100 SET H02=270        ;Strip Thickness (ST) in microns (SET EXACT)
N110 SET H06=0          ;Tightness Factor +ve is looser, -ve is tighter
N115 SET H95=0          ;Leg Extension (1-30micron). No Extension = 0
N120 SET H34=0          ;Specify Restart BUILD-UP in microns

N150 SET M22=0          ;DO NOT CHANGE
N160 SET H94=1100       ;Fold radius compensation (radius of fold microns)
N170 SET M16=1          ;DO NOT CHANGE
N200 JMP P41            ;DO NOT CHANGE

END
```


95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3rd Angle Projection
DO NOT SCALE

WL IS THE TOTAL WL FOR A MATED CORE. THIS DRAWING SHOWS THE GAP FOR CLARITY.



WL	MM $^{+0.5}_{-0.0}$	
WW	MM $^{+0.5}_{-0.0}$	
BUP	MM $^{+0.5}_{-0.0}$	
SW	MM $^{+0.25}_{-0.25}$	
M20	1	- CORNER SELECTION 0=90° 1=45°
H04	3000	- CORNER RADIUS
H95	0	- LEG EXTENSION
H94	1100	- FOLD RADIUS COMPENSATION
MTL		

A.E.M. PART # BUT2XL7

RECTANGULAR UNICORE WITH 45°/90° CORNERS AND A TWO CUT BUTT FACE

Title: 45°/90° BUTT 2 CUT UNICORE

Eng : M. NAVACCHI	Scale:	Drawing File	Assoc Text File	Assoc Program
Date : DEC 2001	No Scale			BUT2XL7

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

BUT2XL7 ....continued. Detailed description of File: BUT2XL7

%P30 (BUT2XL7)	Program number and name. This **MUST NOT** be altered.
N010 SET H00=120000	**Window Length** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N020 SET H01=80000	**Window Width** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=10000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N038 SET H78=1	**Number of Strips** in the machine. Used when two strip are run parallel to calculate mass of throughput. Range: 1 or 2
N040 SET M20=1	**Flag for setting Corner Angle** Square corner = 0 90 degree generated from 2x 45 degree folds spaced the same distance throughout the Build Up Angled corner = 1 90 degree generated from 2x 45 degree folds with an increasing increment between folds throughout the Build Up. Range: 0 or 1
N090 SET H04=3000	**Inner Corner Radius** in microns. Default to 3000 microns. Range: 2000 – 10000 microns. Increment: 500 microns
N100 SET H02=270	**Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer. Range: 100 - 500 microns Increment: 1 micron

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

BUT2XL7 ....continued. Detailed description of File: BUT2XL7

N110 SET H06=0	**Tightness Factor** in microns. Closely associated and dependent on an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques. Range: -50 -> +50 microns Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

N115 SET H95=0	**Leg Extension** variable. Allows micro adjustment of the cut legs to enable the cut faces to lay flat without clamping. Range: 0 – 30 microns Increment: 1 micron
N120 SET H34=0	**Restart Build-up** in microns. Should a core be interrupted during assembly it can be restarted by measuring the Build Up and entering this figure as the Restart position. The accuracy of the subsequent lamination produced is dependent on the accuracy of core measurement. Use a digital vernier rather than a ruler to achieve +/-0.1mm tolerance. This facility is also useful when making cruciform or composite material cores. Range: Unlimited Increment: 1 micron
N160 SET H94=1100	**Fold Radius Compensation** is a variable used to “tune” the trigonometric feed calculations to compensate for variations in the radius of the Lower Guillotine blade front edge. As the blades are sharpened the fold radius on the front edge must be re-honed, typically this should be 1mm radius. If this is not performed accurately by the Toolmaker (tradesman) then the accuracy of the point of fold may drift. This will have no effect on any other core, except the BUT2 and BUT3 Cut cores. If the face of the BUT2XL7 core tends to slope away from the inner lamination, then increase the Fold Radius compensation in increments of 100 microns until the face is flat. If the faces slope inwards, decrease this value. This figure is unique to a particular Lower Guillotine blade and will need to be re-addressed if there is a change of blades. Range: 100 - 5000 Increment: 100 microns
N150 -> N200	These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Triple Cut BUTT (BUT3XL7)

Description: The **Triple Cut BUTT (BUT3XL7)** core resembles a traditional E core because the legs are flat faced and square. A rectangular lamination is formed with a cut on each leg, the corners are selectable between 45 and 90 degrees and inner corner radius is adjustable. The 'legs' have an independent variable for micro adjustment of the length, this 'leg extension' enables the core faces to lay flat without the need for clamping.

Application: Three phase chokes.

Filename: BUT3XL7

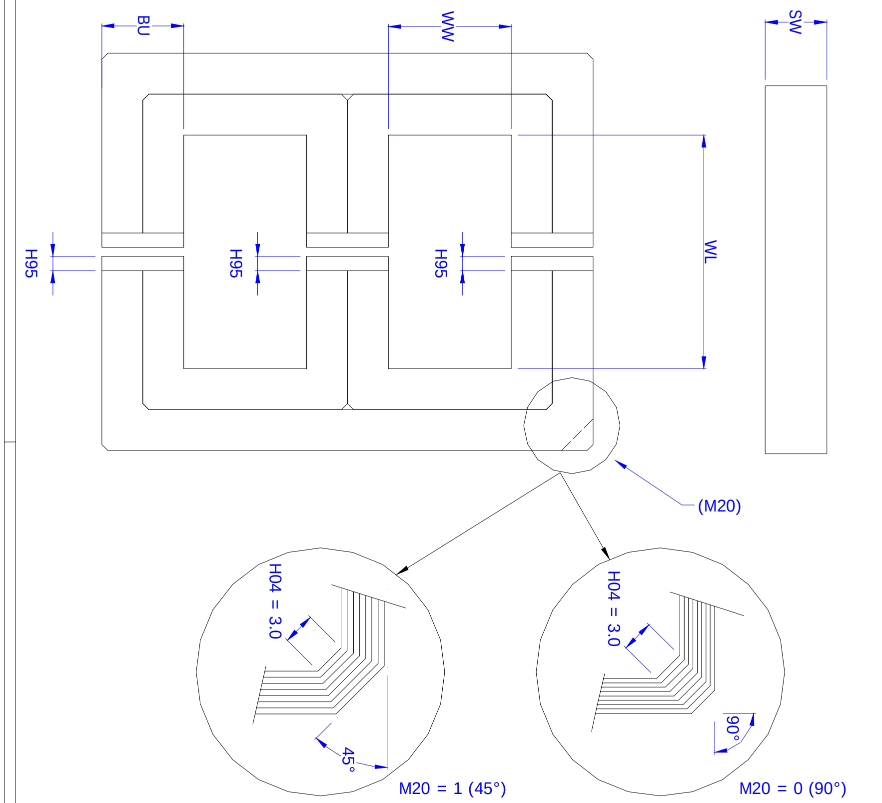
```
%P30 (BUT3XL7)
;TRIPLE CUT BUTT FACE E CORE with Leg Extension Unicore
;This is the Core Definition Program generated by the operator
;Core Dimensions
N010 SET H00=120000     ;WL in microns
N020 SET H01=80000      ;WW in microns
N030 SET H03=20000      ;BUP in microns
N035 SET H79=50000      ;Strip Width in microns
N038 SET H78=1          ;Numbers of strips in machine
N040 SET M20=1          ;Square Corner = 0 (90 deg)
                        ;Angled Corner = 1 (45 deg)
N090 SET H04=3000       ;Set inner corner radius (microns)
N120 SET H02=270        ;Strip Thickness (ST) in microns
N130 SET H06=0          ;Tightness Factor +ve is looser, -ve is tighter
N135 SET H95=0          ;Leg Extension (1-30micron). No Extension = 0

N150 SET M22=0          ;DO NOT CHANGE
N160 SET H94=1100       ;Fold radius compensation (radius of fold microns)
N170 SET M15=1          ;DO NOT CHANGE
N200 JMP P41            ;DO NOT CHANGE

END
```


95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3rd Angle Projection
DO NOT SCALE

WL IS THE TOTAL WL FOR A MATED CORE. THIS DRAWING SHOWS THE GAP FOR CLARITY.



WL	MM $^{+0.5}_{-0.0}$	
WW	MM $^{+0.5}_{-0.0}$	
BUP	MM $^{+0.5}_{-0.0}$	
SW	MM $^{+0.25}_{-0.25}$	
M20	1	- CORNER SELECTION 0=90° 1=45°
H04	3000	- CORNER RADIUS
H95	0	- LEG EXTENSION
H94	1100	- FOLD RADIUS COMPENSATION
MTL		

A.E.M. PART# BUT3XL7

UNICORE E CORE WITH 45°/90° CORNERS AND A 3 CUT STEPLESS BUTT FACE

Title: 3 PHASE 45°/90° BUTT 3 CUT UNICORE

Eng : M. NAVACCHI	Scale:	Drawing File	Assoc Text File	Assoc Program	
Date : DEC 2001	No Scale			BUT3XL7	

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

BUT3XL7 ....continued. Detailed description of File: BUT3XL7

%P30 (BUT3XL7)	Program number and name. This **MUST NOT** be altered.
N010 SET H00=120000	**Window Length** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N020 SET H01=80000	**Window Width** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=20000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N038 SET H78=1	**Number of Strips** in the machine. Used when two strip are run parallel to calculate mass of throughput. Range: 1 or 2
N040 SET M20=1	**Flag for setting Corner Angle** Square corner = 0 90 degree generated from 2x 45 degree folds spaced the same distance throughout the Build Up Angled corner = 1 90 degree generated from 2x 45 degree folds with an increasing increment between folds throughout the Build Up. Range: 0 or 1
N090 SET H04=3000	**Inner Corner Radius** in microns. Default to 3000 microns. Range: 2000 – 10000 microns. Increment: 500 microns
N120 SET H02=270	**Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer. Range: 100 - 500 microns Increment: 1 micron

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

BUT3XL7 ....continued. Detailed description of File: BUT3XL7

N130 SET H06=0	**Tightness Factor** in microns. Closely associated and dependent on an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques. Range: -50 -> +50 microns Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

N135 SET H95=0	**Leg Extension** variable. Allows micro adjustment of the cut legs to enable the cut faces to lay flat without clamping. Range: 0 – 30 microns Increment: 1 micron
N160 SET H94=1100	**Fold Radius Compensation** is a variable used to “tune” the trigonometric feed calculations to compensate for variations in the radius of the Lower Guillotine blade front edge. As the blades are sharpened the fold radius on the front edge must be re-honed, typically this should be 1mm radius. If this is not performed accurately by the Toolmaker (tradesman) then the accuracy of the point of fold may drift. This will have no effect on any other core, except the BUT2 and BUT3 Cut cores. If the face of the BUT2CUT core tends to slope away from the inner lamination, then increase the Fold Radius compensation in increments of 100 microns until the face is flat. If the faces slope inwards, decrease this value. This figure is unique to a particular Lower Guillotine blade and will need to be re-addressed if there is a change of blades. Range: 100 - 5000 Increment: 100 microns
N150 -> N200	These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

E Core (ECORE7)

Description: The **E Core** (ECORE7) resembles a traditional E core with a distributed gap selectable on either the Side (WL) or End (WW). A rectangular lamination is formed with a cut on one leg, the corners are selectable between 30 and 45 degrees and the inner radius is set at 3mm. The dimensions of the distributed gap on the inners is selectable, the overlap length is then doubled for the outer core. This program is basically a revamp of ECORE6 from Version 6.

Application: Three phase transformers.

Filename: ECORE7

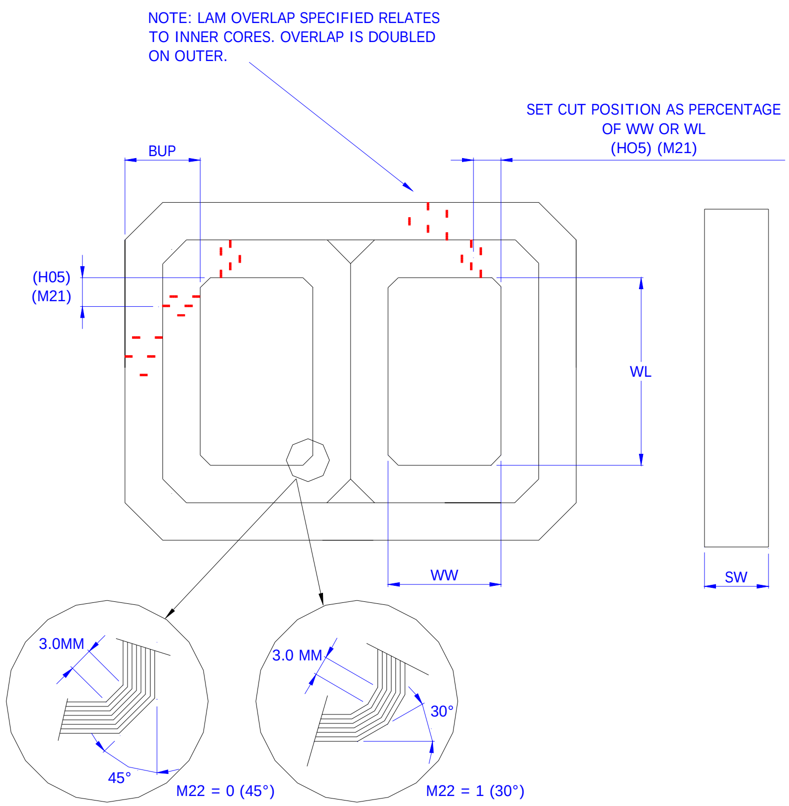
```
%P30 (ECORE7)
;E Core Unicore Cut on WW or WL
;This is the Core Definition Program generated by the operator
;Core Dimensions
N010 SET H01=120000    ;WL in microns
N020 SET H00=80000     ;WW in microns
N030 SET H03=20000     ;BUP in microns
N035 SET H79=50000     ;Strip Width in microns
N038 SET H78=1         ;Numbers of strips in machine
N045 SET M22=0         ;45 degree corner = 0
                       ;30 degree corner = 1
N048 SET M21=0         ;End Cut on Window Width  = 0
                       ;Side Cut on Window length = 1
N050 SET H66=3         ;Number of overlaps before repeating
N060 SET H68=2         ;Number of lams per overlap
N065 SET H20=15000     ;Lamination overlap in microns
N100 SET H05=7         ;Set cut position as percentage of WW or WL
N120 SET H02=270       ;Strip Thickness (ST) in microns
N130 SET H06=0         ;Tightness Factor +ve is looser, -ve tighter.
N140 SET H34=0         ;Specify Restart BUILD-UP microns
N145 SET H40=1         ;Restart core number (1, 2 or 3)

N150 SET M20=1         ;DO NOT CHANGE
N160 SET M09=1         ;DO NOT CHANGE
N200 JMP P31           ;DO NOT CHANGE (CALC6 routine not CALC7)

END
```

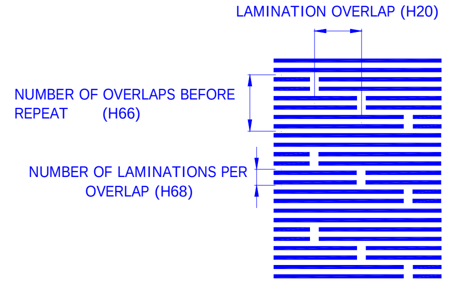

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3rd Angle Projection
DO NOT SCALE

CUTS AVAILABLE ON WINDOW LENGTH (WL)
AND WINDOW WIDTH (WW)





CLOSEUP OF CUT PATTERN

GAPS DEFAULT TO 0 MICRON WIDE
SHOWN EXPLODED FOR CLARITY

CORNER RADII
ARE SET TO 3MM

WL	MM $^{+0.5}_{-0.0}$	
WW	MM $^{+0.5}_{-0.0}$	
SW	MM $^{+0.5}_{-0.0}$	
BU	MM $^{+0.25}_{-0.25}$	
M22	0	- CORNER SELECTION O=45° 1=30°
M21	0	- CUT POSITION WW =0 WL =1
H66	3	- # OVERLAPS BEFORE REPEATING
H68	2	- # LAMINATIONS PER OVERLAP
H20	15000 micron	- INNER CORE OVERLAP LENGTH
H06	DEFAULT = 2	- TIGHTNESS FACTOR
H05	7%	- CUT POSITION AS A PERCENTAGE OF WW OR WL
MTL		

A.E.M. PART# ECORE7

E-CORE UNICORE WITH 30°/45° CORNERS AND
A ONE CUT DISTRIBUTED GAP FACE

Title: 3 PHASE 30°/45° DISTRIBUTED GAP FACE UNICORE

Eng : M. NAVACCHI	Scale:	Drawing File	Assoc Text File	Assoc Program
Date : DEC 2001	No Scale			ECORE7

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013

Phone: 08 8341 0086
Fax: 08 8341 0225

ECore7 ....continued. Detailed description of File: ECORE7

%P30 (ECORE7)	Program number and name. This **MUST NOT** be altered.
N010 SET H01=120000	**Window Length** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N020 SET H00=80000	**Window Width** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=20000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N038 SET H78=1	**Number of Strips** in the machine. Used when two strips are run parallel to calculate mass of throughput. Range: 1 or 2
N045 SET M22=0	**Flag for setting Corner Angle** 45 degree corner = 0 90 degree generated from 2x 45 degree folds with an increasing increment between folds throughout the Build Up. 30 degree corner = 1 90 degree generated from 3x 30 degree folds with an increasing increment between folds throughout the Build Up. Range: 0 or 1
N048 SET M21=0	**Flag for setting Cut Location** End Cut on Window Width = 0 Side Cut on Window Length = 1 Range : 0 or 1
N050 SET H66=3	**Number of Overlaps** before repeating. This is the number of lamination steps in the distributed face before the cascade is repeated. It's a balance between magnetic performance and ease of assembly. Range: 1 - 100 Increment: 1 unit (step) Recommendation: Use 2 to 20 steps depending on design.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

ECore7 ....continued. Detailed description of File: ECORE7

N060 SET H68=2	**Number of Laminations in each step**. This determines the width of each step in the face, the more laminations the deeper the step. Range: 1 - 100 Increment: 1 unit (lamination)
N065 SET H20=15000	**Lamination Overlap** in microns. This is the amount each lamination step overlaps the preceding one. Range: Unlimited Increment: 1 micron
N100 SET H05=7	Set the **Start Position** for the Lamination (position of the cut face) as a **percentage** of the Window Length or Window Width (depending on Cut Position). 3mm (5%) is the minimum length for small cores (< 70mm WL) and for larger cores it should be at least 10-15mm (5-7%). The Start Position cannot be closer than 25mm from the Window End opposite the cut face. The Lower Guillotine is 25mm wide, if the cut is placed less than 25mm from the last fold then the lamination will be drawn back into the die area which may result in strip damage. Range: 5 - 50% Increment: 1%
N120 SET H02=270	**Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer. Range: 100 - 500 microns Increment: 1 micron
N130 SET H06=0	**Tightness Factor** in microns. Closely associated and dependent on an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques. Range: -50 -> +50 microns Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

ECore7 ....continued. Detailed description of File: ECORE7

N140 SET H34=0

Restart Build-up in microns. Should a core be interrupted during assembly it can be restarted by measuring the Build Up and entering this figure as the Restart position. The accuracy of the subsequent lamination produced is dependent on the accuracy of core measurement. Use a digital vernier rather than a ruler to achieve +/-0.1mm tolerance. This facility is also useful when making cruciform or composite material cores.

For E cores, this Restart Build Up refers to the build up of the individual core, not the total build up. See the note with reference to the Restart Core Number.
Range: Unlimited Increment: 1 micron

N145 SET H40=1

Restart Core Number refers to the three cores which make up the E core. The first inner is core 1, the second is core 2, the outer is core 3. To Restart a core the Restart Buildup must be entered as well as the Restart Core Number it refers to.
Range: 1, 2 or 3 Increment: 1 unit

N150 -> N200

These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

End Overlap (ENDOLAP7)

Description: The **End Overlap Distributed Gap** (ENDOLAP) face is a series of laminations with overlapping cuts along one leg, which is spiral wound so each lamination butts onto the next lamination rather than to itself. The cut faces diverges to produce a distributed gap face with no two cut faces sitting adjacent to each other between lamination stacks. The corners are selectable between 30 and 45 degree, inner corner radius is adjustable, cut position selectable between Side or End cut. All dimensions regarding the overlaps can be automatically calculated by the software, or selectable by the operator. The outer butt section build up is selectable, as is the position of the cut.

Application: Single phase transformers greater than 1kVA

Features: Lower loss than DDGAP due to the spiral winding of laminations.

Filename: ENDOLAP7

```
%P30 (ENDOLAP7)
;SINGLE PHASE END OVERLAP DDGAP with Overlap Spread and BUTT Outer
;This is the Core Definition Program generated by the operator
;Core Dimensions
N010 SET H00=120000     ;WL in microns
N020 SET H01=80000      ;WW in microns
N030 SET H03=10000      ;BUP in microns
N035 SET H79=50000      ;Strip Width in microns
N038 SET H78=1          ;Numbers of strips in machine
N039 SET M21=0          ;Side Cut WL = 0    End Cut WW = 1
N040 SET M22=0          ;45 deg corner = 0 ,  30 deg corner = 1
N050 SET H66=6          ;Number of overlaps before repeating
N055 SET H67=0          ;Overlap spread (microns) Full spread = 0
N058 SET H45=0          ;Butt Outer Build Up (microns) No Butt = 0
N059 SET H48=30         ;Butt Outer Cut position % (10-50%)
N060 SET H04=3000       ;Set inner corner radius (microns)
N120 SET H02=270        ;Strip Thickness (ST) in microns
N130 SET H06=0          ;Tightness Factor +ve is looser, -ve tighter
N140 SET H34=0          ;Specify Restart BUILD-UP microns

N150 SET M20=1          ;DO NOT CHANGE
N160 SET M19=1          ;DO NOT CHANGE
N200 JMP P41            ;DO NOT CHANGE
END
```


95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

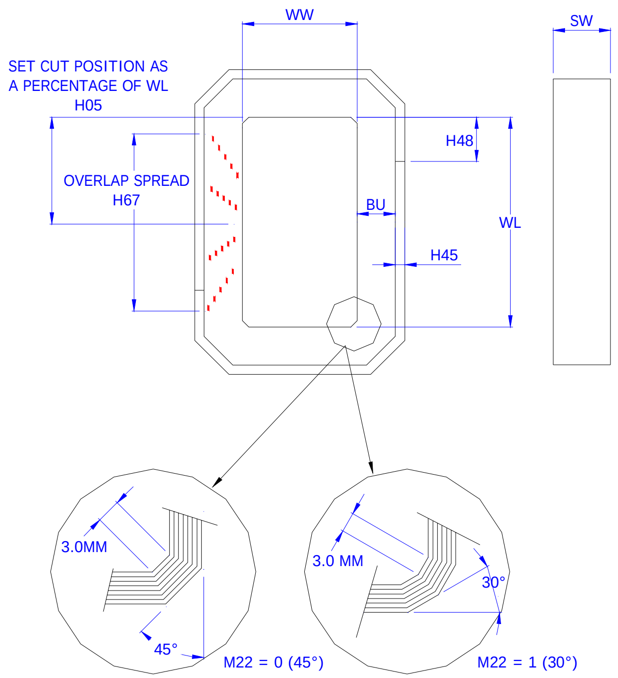
AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

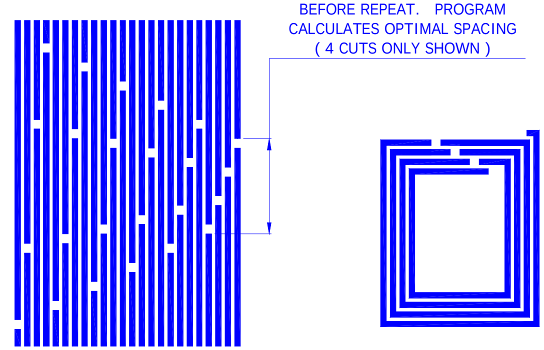
3rd Angle Projection
DO NOT SCALE

CUTS AVAILABLE ON WINDOW LENGTH (WL)
OR WINDOW WIDTH (WW)

LAM OVERLAP INCREASES WITH
INCREASING BUILD UP.
NO GAP SITS OVER PREVIOUS.

SELECT NO. OF OVERLAPS (H66)
BEFORE REPEAT. PROGRAM
CALCULATES OPTIMAL SPACING
(4 CUTS ONLY SHOWN)





WL	MM + 0.5 - 0.0	
WW	MM + 0.5 - 0.0	
BUP	MM + 0.5 - 0.0	
SW	MM + 0.25 - 0.25	
M21	0	- CUT POSITION M21=0 (WL) M21=1 (WW)
M22	0	- CORNER SELECTION M22=0 (45°) M22=1 (30°)
H66	6	- # OF OVERLAPS BEFORE REPEAT
H67	0	- OVERLAP SPREAD %
H45	0 microns	- BUTT OUTER BUILDUP
H04	3000 microns	- INNER CORNER RADIUS
MATL		

A.E.M. PART #ENDOLAP7

RECTANGULAR UNICORE WITH 30°/45° CORNERS
AND A ONE CUT DIVERGING DISTRIBUTED GAP FACE

Title: 30°/45° END OVERLAP DISTRIBUTED GAP UNICORE

Eng : M. NAVACCHI	Scale:	Drawing File	Assoc Text File	Assoc Program
Date : DEC 2001	No Scale			ENDOLAP7

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

ENDOLAP7 ....continued. Detailed description of File : ENDOLAP7

%P30 (ENDOLAP7)	Program number and name. This MUST NOT be altered.
N010 SET H00=120000	**Window Length** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N020 SET H01=80000	**Window Width** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=10000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N038 SET H78=1	**Number of Strips in the machine**. Used when two strips are run parallel to calculate mass of throughput. Range: 1 or 2
N039 SET M21=0	**Flag for setting Cut Placement** Side Cut on WL = 0 End Cut on WW = 1 Range: 0 or 1
N040 SET M22=0	**Flag for setting Corner Angle** 45 deg corner = 0 2x 45 degree folds with an increasing increment between folds 30 deg corner = 1 3x 30 degree folds with an increasing increment between folds Range: 0 or 1
N050 SET H66=6	**Number of Steps** (overlaps) before repeating. This is the number of lamination steps in the distributed face before the cascade is repeated. It is a balance between magnetic performance and ease of assembly. Range: 1 - 100 Increment: 1 unit (step) Recommendation: Use 2 to 20 steps depending on design.
N055 SET H67=0	**Overlap Spread** in microns. Set overall face distribution with this parameter. Setting H67 = 0 will automatically distribute the face over the maximum allowable distance along the leg. Range: 0 (full spread) -> (Leg length – 25mm) Inc: microns

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

ENDOLAP7 ....continued. Detailed description of File: ENDOLAP7

N058 SET H45=0	**Butt Outer Build Up** in microns. Setting to zero will disable this feature. Range: 0 –> max BUP Increment: microns
N059 SET H48=30	**Butt Outer Cut Position** as a percentage of leg length. Range: 10-50% Increment: 1 %
N060 SET H04=3000	**Inner Corner Radius** in microns. Default to 3000 microns. Range: 2000 – 10000 microns. Increment: 500 microns
N120 SET H02=270	**Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer. Range: 100 - 500 microns Increment: 1 micron
N130 SET H06=0	**Tightness Factor** in microns. Closely associated and dependent on an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques. Range: -50 -> +50 microns Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

N140 SET H34=0	**Restart Build-up** in microns. Should a core be interrupted during assembly it can be restarted by measuring the Build Up and entering this figure as the Restart position. The accuracy of the subsequent lamination produced is dependent on the accuracy of core measurement. Use a digital vernier rather than a ruler to achieve +/-0.1mm tolerance. This facility is also useful when making cruciform or composite material cores. Range: Unlimited Increment: 1 micron
N150 -> N200	These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

ELAP (ELAP7)

Description: The **ELAP** (ELAP7) face is the three phase version (Evans style) of the ENDOLAP core. Three cores (2x inners, 1x outer) with overlapping cuts along one leg of the core, which is spiral wound so each lamination butts onto the next lamination rather than to itself. The cut faces diverges to produce a distributed gap face with no two cut faces sitting adjacent to each other between lamination stacks.

The corners are selectable between 30 and 45 degree, inner corner radius is adjustable, cut position selectable between Side or End cut. All dimensions regarding the overlaps can be automatically calculated by the software, or selected by the operator. The outer butt section build up is variable, as is the position of the cut. There is a programmable gap between the inner cores. The number of overlaps for the inner cores is independent to the number of overlaps in the outer section.

Application: Three phase transformers greater than 1kVA

Features: Lower loss than ECORE7 due to the spiral winding of laminations.

Filename: ELAP7

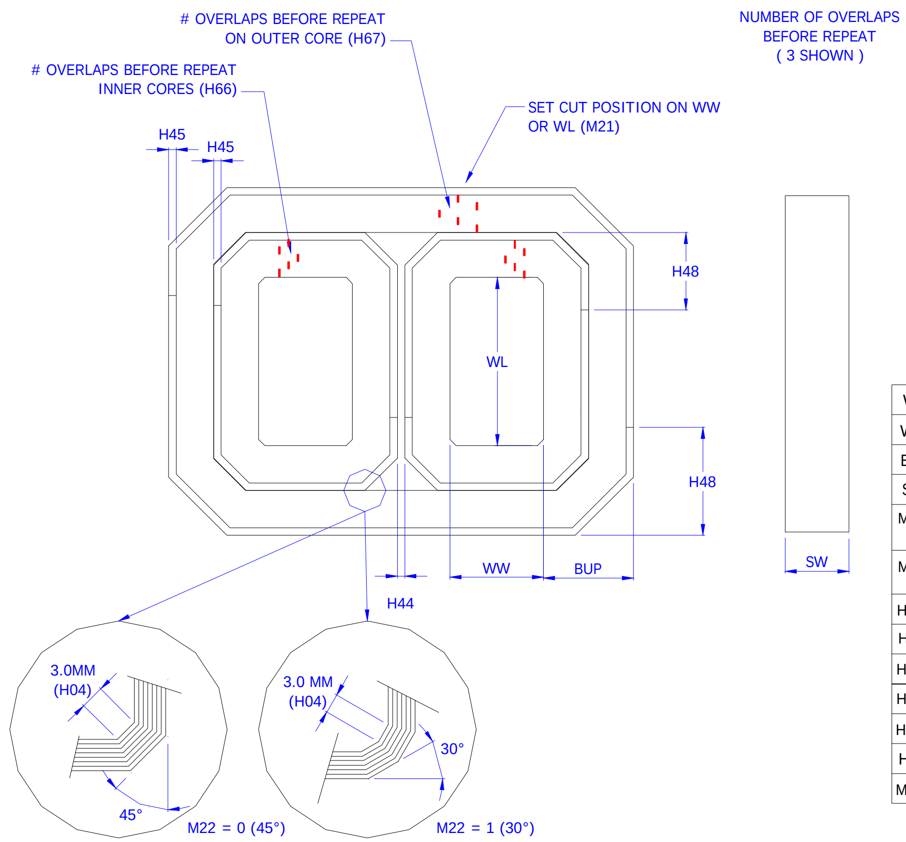
```
%P30 (ELAP7)
;THREE PHASE SINGLE CUT END OVERLAP DDGAP with Overlap Spread and BUTT Outer
;This is the Core Definition Program generated by the operator
;Core Dimensions
N010 SET H00=120000       ;WL in microns
N020 SET H01=80000        ;WW in microns
N030 SET H03=20000        ;BUP in microns
N035 SET H79=50000        ;Strip Width in microns
N038 SET H78=1            ;Numbers of strips in machine
N039 SET M21=1            ;Side Cut WL = 0    End Cut WW = 1
N040 SET M22=1            ;45 deg corner = 0 ,  30 deg corner = 1
N050 SET H66=3            ;Number of overlaps on inner cores
N055 SET H67=8            ;Number of overlaps on outer cores
N060 SET H04=3000         ;Set inner corner radius (microns)
N070 SET H44=0            ;Set space between inner cores (microns)
N080 SET H45=0            ;Butt Outer Build Up (microns) No Butt = 0
N090 SET H48=30           ;Butt Outer Cut position % (10-50%)
N120 SET H02=270          ;Strip Thickness (ST) in microns
N130 SET H06=0            ;Tightness Factor +ve is looser, -ve tighter
N140 SET H34=0            ;Specify Restart BUILD-UP microns
N142 SET H40=1            ;Restart core number (1,2 or 3)

N150 SET M20=1            ;DO NOT CHANGE
N160 SET M18=1            ;DO NOT CHANGE
N200 JMP P41              ;DO NOT CHANGE
END
```

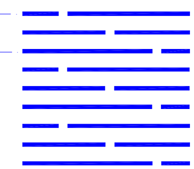

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

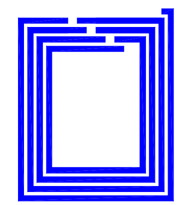
AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM UNICORE
An Innovation in Transformer Design and Manufacture

3rd Angle Projection
DO NOT SCALE







GAPS DEFAULT TO 0 MICRON WIDE. - SHOWN EXPLODED FOR CLARITY

INNER CORE RADII DEFAULT TO 3MM

WL	MM $^{+0.5}_{-0.0}$	
WW	MM $^{+0.5}_{-0.0}$	
BUP	MM $^{+0.5}_{-0.0}$	
SW	MM $^{+0.25}_{-0.25}$	
M21	1	- CUT POSITION WW =1 WL =0
M22	0	- CORNER SELECTION O=45° 1=30°
H66	3	- # OVERLAPS ON INNER CORES
H67	8	- # OVERLAPS ON OUTER CORE
H04	3000 microns	- INNER CORE RADIUS
H44	0	- SPACE BETWEEN INNER CORES
H45	0 microns	- BUTT OUTER BUILDUP
H48	30 %	- BUTT OUTER CUT POSITION
MATL		

A.E.M. PART# E-LAP7

SPIRAL WOUND E-CORE WITH 30°/45° CORNERS AND
A ONE CUT END OVERLAPPED DISTRIBUTED GAP FACE

Title: 3 PHASE 30°/45° DISTRIBUTED GAP FACE UNICORE

Eng : M. NAVACCHI	Scale:	Drawing File	Assoc Text File	Assoc Program
Date : DEC 2001	No Scale			E-LAP7

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

E-LAP7 ....continued. Detailed description of File: E-LAP7

%P30 (ELAP7)	Program number and name. This MUST NOT be altered.
N010 SET H00=120000	**Window Length** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N020 SET H01=80000	**Window Width** in microns. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=20000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns. This is used to calculate the throughput of the machine in kilograms, as recorded on the Kilogram counter. Range: 25,000 - 300,000 microns Increment: 1 micron
N038 SET H78=1	**Number of Strips in the machine**. Used when two strip are run parallel to calculate mass of throughput. Range: 1 or 2
N039 SET M21=1	**Flag for setting Cut Placement** Side Cut on WL = 0 End Cut on WW = 1 Range: 0 or 1
N040 SET M22=1	**Flag for setting Corner Angle** 45 deg corner = 0 2x 45 degree folds with an increasing increment between folds 30 deg corner = 1 3x 30 degree folds with an increasing increment between folds Range: 0 or 1
N050 SET H66=3	**Number of Steps** (overlaps) on **INNER CORES** before repeating. This is the number of lamination steps in the distributed face before the cascade is repeated. It's a balance between magnetic performance and ease of assembly. Range: 1 - 100 Increment: 1 unit (step) Recommendation: Use 2 to 20 steps depending on design.
N055 SET H67=8	**Number of Steps** (overlaps) on **OUTER CORE** before repeating. This is the number of lamination steps in the distributed face before the cascade is repeated. Range: 1 - 100 Increment: 1 unit (step) Recommendation: Use 2 to 20 steps depending on design.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

E-LAP7 ....continued. Detailed description of File: E-LAP7

N060 SET H04=3000	**Inner Corner Radius** in microns. Default to 3000 microns. Range: 2000 – 10000 microns. Increment: 500 microns
N070 SET H44=0	**Space between INNER Cores.** Set the gap between the inner cores in microns. Range: 0 – 30000 microns Increment: 100 microns
N080 SET H45=0	**Butt Outer Build Up** in microns. Setting to zero will disable this feature. Range: 0 –> max BUP Increment: microns
N090 SET H48=30	**Butt Outer Cut Position** as a percentage of leg length. Range: 10-50% Increment: 1 %
N120 SET H02=270	**Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer. Range: 100 - 500 microns Increment: 1 micron
N130 SET H06=0	**Tightness Factor** in microns. Closely associated and n an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques. Range: -50 -> +50 microns Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

N140 SET H34=0	**Restart Build-up** in microns. Should a core be interrupted during assembly it can be restarted by measuring the Build Up and entering this figure as the Restart position. The accuracy of the subsequent lamination produced is dependent on the accuracy of core measurement. Use a digital vernier rather than a ruler to achieve +/-0.1mm tolerance. This facility is also useful when making cruciform or composite material cores. Range: Unlimited Increment: 1 micron
N142 SET H40=1	**Restart Core Number** refers to the three cores which make up the E core. The first inner is core 1, the second is core 2, the outer is core 3. To Restart a core the Restart Buildup must be entered as well as the Restart Core Number it refers to. Range: 1, 2 or 3 Increment: 1 unit
N150 -> N200	These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

DUO Core (DUO7F)

Introduction: The Duo core was created in response to feedback from customers who requested a Unicore for easier and more convenient assembly. The Duo core has two halves, male and female.

Description: The **DUO-Core** (DUO) is built up as a series of laminations with overlapping cuts along both core legs. Although there are two cuts it is a true End Overlap type core with all of the advantages that this offers. The cut faces diverge to produce a distributed gap with no two cut faces(in a DUO1) sitting adjacent to each other. The core has two mating halves which are not identical so cannot be reversed. Each half is made separately. Features include; Three Phase (Evans) core or Single Phase core, insertion helper strips, full size inner lamination and an outer TIG/Spot weld lamination which is use to strap the core. Corner angle is 45 degrees. Inner corner 'radius'(length), start position(of cuts), number of overlaps and number of laminations per overlap can all be specified. The Evans cores can have a gap programmed between the inner cores, used to pack or wedge the cores tightly inside the coil. This core should also have the outer legs of the core packed or wedged inside the coils after assembly. The minimum window dimensions are, Length=80mm and Width=40mm.

Application: Single phase core type and three phase (Evans style) transformers. The Duo core can also be used in shell type applications, but attention must be given to fixing or clamping of the leg that is not inside the coil.

Duo Core Program Features/Options:

1) Window Length set by operator will increase by 1.4x(corner size). This will allow laminations to lay flat against the inside of the coil. The true coil or bobbin length should be entered as the window length.
2) Option for Three Phase Evans/'E' type core or Single Phase Core.
3) For Single Phase cores, an option exists to select a TIG/spot weld lamination to suit either a SHELL or CORE type transformer configuration.
4) 45 degree corners only.
5) Option to set corner 'radius' (length).
6) Option to allow a wedging space between the inner cores of a 3-phase core for packing/wedging. The space is the difference between the core build up and the measured inside width of the bobbin or coil.
7) Option to manually set the number of overlaps or allow automatic setting.
8) Option to set the start position or automatic.
9) Option to have 2 insertion helper strips made automatically.
10) Option to set the number of laminations per overlap
11) The first lamination is a full turn to aid assembly.
12) The last lamination has full length legs for TIG-spot welding.
13) Option to set the number of laminations per overlap

Duo Core Features and Considerations:

1) Easy and reliable assembly
2) Low loss due to overlap face and reduced stressing of the core during assembly.
3) Overlap core type so that small gaps are not important.
4) By TIG-spot welding the last full-length lamination, banding is not required.
5) The Duo Core has the option of multiple laminations per overlap. Using 2 or 3 laminations per overlap (we suggest a maximum of 3) will reduce the number of packets for assembly and therefore assembly time to approximately one half and one third respectively. Losses and the risk of noise may increase slightly as the number of laminations per layer is increased.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

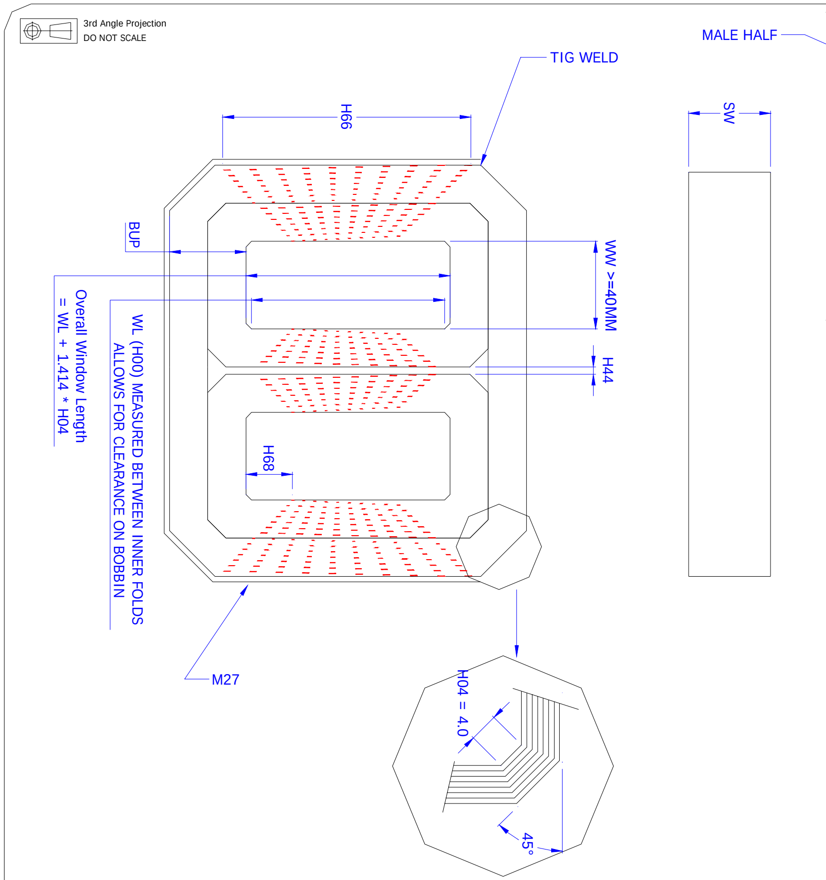
Filename: DUO7F

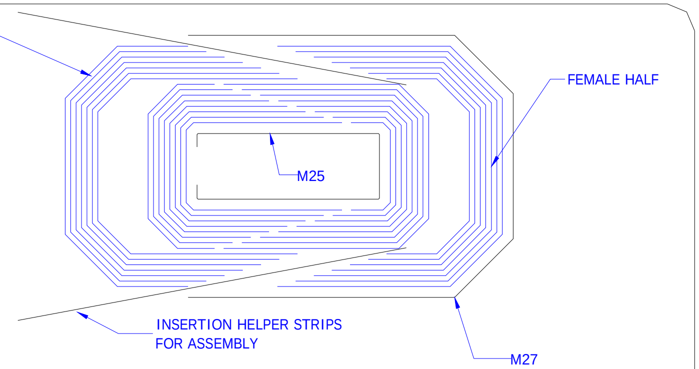
```
%P30 (DUO7F)
;3 Phase (Evans) or Single Phase Unicore 2 cuts on WL, DDGAP
N010 SET H00=135000     ;WL in microns(will increase 1.4xcorner)
N020 SET H01=45000      ;WW in microns
N030 SET H03=44000      ;BUP in microns
N035 SET H79=0          ;Strip Width in microns
N038 SET H78=1          ;Numbers of strips in machine
N047 SET M24=1          ;3 Phase (Evans) =0 ,  Single Phase = 1
N048 SET M29=0          ;Single Phase Type: SHELL=0, CORE=1
N050 SET M23=1          ;Insertion helper strips No=0  Yes=1
N058 SET H68=0          ;Start position (=>25000) Machine Set = 0
N060 SET H66=0          ;Number of Overlaps, Machine Set=0
N062 SET H70=3          ;Number of Laminations per Overlap (1-3)
N065 SET H44=0          ;3 Phase inner cores spacing(microns) Auto=0
N070 SET H04=4000       ;Set inner corner radius (microns)
N120 SET H02=270        ;Strip Thickness (ST) in microns
N130 SET H06=0          ;Tightness Factor +ve is looser, -ve tighter
N140 SET H34=0          ;Restart BUILD-UP for core number(microns)
N145 SET H40=1          ;Restart core number (Single Phase Female=1, Male=2)
                        (3 Phase: Female=1,2,3 MALE=4,5,6)


N150 SET M21=1          ;DO NOT CHANGE
N152 SET M20=1          ;DO NOT CHANGE
N153 SET M25=1          ;DO NOT CHANGE
N154 SET M27=1          ;DO NOT CHANGE
N156 SET M26=0          ;DO NOT CHANGE
N158 SET M28=0          ;DO NOT CHANGE
N159 SET H06+2          ;DO NOT CHANGE
N160 SET M34=0          ;DO NOT CHANGE
N161 SET M35=0          ;DO NOT CHANGE
N162 SET H95=0          ;DO NOT CHANGE
N163 SET H69=0          ;DO NOT CHANGE
N170 SET M05=1          ;DO NOT CHANGE
N200 JMP P41            ;DO NOT CHANGE
END
```


95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3rd Angle Projection
DO NOT SCALE





WL	MM +0.5 -0.0	
WW	MM +0.5 -0.0	
BUP	MM +0.5 -0.0	
SW	MM +0.25 -0.25	
M24	1	E CORE (EVANS) =0, C CORE =1
M23	1	INSERTION HELPER STRIPS; NO=0, YES=1
M25	1	FULL SIZE 1st LAMINATION; NO=0,YES=1
M27	1	FULL LAST LAM FOR TIG; NO=0,YES=1
H68	0	OVERLAP START POSITION, MACHINE SET =0
H66	0	NUMBER OF OVERLAPS, MACHINE SET =0
H70	3	NUMBER OF LAMINATIONS PER OVERLAP
H44	2000	SET SPACE BETWEEN INNER CORES
H04	4000	SET INNER CORNER RADIUS
H02	270	STRIP THICKNESS (MICRONS)
H06	0	TIGHTNESS FACTOR
MAT		

A.E.M. PART# DUO7

SINGLE OR THREE PHASE DUO CORE WITH DIVERGING DISTRIBUTED GAP ON BOTH LEGS, 45 DEGREE CORNER ONLY.

Title: DUO 7

Eng : M Jenkinson
Date : Sept 2002
Scale: No Scale

Drawing File	Assoc Text File	Assoc Program
		DUO7E

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

DUO7 Detailed description of File: DUO7

(DUO7F) %P30	Program number and name. This **MUST NOT** be altered.
N010 SET H00=120000	**Window Length** in microns. This measurement allows for the possible interference between the corner radius and the bobbin. Therefore the WL entered will be between the two inner most folds on the window leg, not the ends of the window. Additional tolerance may be added to ease assembly with the bobbin. Overall window length is a function of the inner corner radius and will be greater than the WL entered by 1.414*H04.For a default corner radius of 4mm, the overall Window Length will be 5.65mm longer. Minimum window length is 80mm Range: 80mm (min) - > Unlimited (max) Increment: 1 micron
N020 SET H01=80000	**Window Width** in microns. The 1st inner lamination will limit the minimum window width to 40mm. Additional tolerance may be added to ease assembly with the bobbin. Range: Unlimited Increment: 1 micron
N030 SET H03=50000	Core **Build Up** in microns. Final BUP is dependent on the precision used to measure strip thickness. Range: Unlimited Increment: 1 micron
N035 SET H79=50000	**Strip Width** in microns.
N038 SET H78=1	**Number of Strips in the machine**. Range: 1 or 2
N047 SET M24=1	**Flag for selecting Core Type** Three phase Evans core = 0 Single phase core = 1 Range: 0 or 1
N048 SET M29=0	**Flag for selecting single phase SHELL type or CORE type TIG/Spot weld lamination** Shell = 0 Core = 1 Range 0 or 1
N050 SET M23=1	**Flag for selecting Insertion Helper** No = 0 Yes = 1 Range: 0 or 1

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

DUO7....continued. Detailed description of File: DUO7

N058 SET H68=0	**Flag for selecting start position** Machine sets start position = 0 Or specify start position (must be greater than 25000)
N060 SET H66=0	**Number of Overlaps** per packet/chapter. Leaving this parameter at the default value of zero will cause the program to calculate this parameter automatically. Range: 0 or 1->1000 Increment: 1 lamination
N062 SET H70=3	**Number of Laminations per overlap** As the number of laminations per overlap increase, the number of packets needed to achieve the BU is decreased. Range: 1, 2 or 3 Increment: 1 lamination
N065 SET H44=2000	**Space between INNER Cores.** Set the gap between the inner cores in microns. Range: 0 – 30000 microns Increment: 100 microns 0 = Default Settings: WL ≤ 105mm → spacing = 3mm 105 < WL ≤ 260 → spacing = 4mm WL > 260 → spacing = 5mm
N070 SET H04=4000	**Inner Corner Radius in microns.** Default to 4000 microns. Range: 3500 – 10000 microns. Increment: 500 microns
N120 SET H02=270	**Strip Thickness** in microns. Measuring the thickness accurately is **VERY** important otherwise core Build Up and Tightness will vary. Refer to the extensive discussion on this topic in the above text with particular reference to the procedure on how to measure a stack of test laminations on first power up. Use a micrometer. Range: 100 - 500 microns Increment: 1 micron
N130 SET H06=0	**Tightness Factor** in microns. Closely associated and dependent on an accurate Strip Thickness measurement. Refer to the discussion in the above text, with particular reference to **Core Interpretation** techniques. Range: -50 -> +50 microns Increment: 1 micron

Recommendation: Make small (1-2 micron) adjustments either side of the default. If the Tightness Factor exceeds +/- 10 microns then the Strip Thickness is incorrect.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

DUO7 ....continued. Detailed description of File: DUO7

N140 SET H34=0	**Restart Build-up** in microns. Should a core be interrupted during assembly it can be restarted by measuring the Build Up and entering this figure as the Restart position. Note that the Restart Build Up for a 3 phase core is only the Build Up of the individual inner or outer core. The accuracy of the subsequent lamination produced is dependent on the accuracy of core measurement. Use a digital vernier rather than a ruler to achieve +/-0.1mm tolerance. This facility is also useful when making cruciform or composite material cores. Range: Unlimited Increment: 1 micron
N145 SET H40=1	**Restart Core Number** refers to either the Female or Male part of the core, and in the case of 3 phase cores, it also refers to the individual inner or outer core. Single Phase: Female=1, Male=2 3 Phase: Female=1,2,3 and Male=4,5,6 Range: 1,2,3,4,5 or 6 Increment: 1 unit
N150 -> N200	These lines **MUST NOT BE MODIFIED** as they are machine commands which, if altered, will stop the machine.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

UNICORE MACHINE INSTALLATION

Outline

The Unicore machine crate has been designed to be opened in a specific order to ensure the machine is handled in a safe and responsible manner. Please ensure these instructions are read and understood fully before attempting to commission the Unicore machine.

The “Southco” keys are needed for access to the electrical and pneumatic/hydraulic cabinets and should **NOT BE GIVEN TO OPERATORS**. They should remain in the possession of management or competent tradespersons. Operators are not to be allowed access to the machine cabinets.

Procedure

The machine is packed on its front face in a wooden crate measuring 1900mm high x 1020mm deep x 1380mm high weighing approximately 950kgs. Please note that the machine has a high centre of gravity when stood up so unpacking should be **SUPERVISED AND DIRECTED BY A COMPETANT PERSON**.

Remove one side of the crate **ONLY** (as marked on the box) by undoing the tekscrews. Carefully remove the document package, toolbox, front shelf and shipping box containing the tool grinding jig from beside the machine. As far as practical, inspect the machine for transport damage and photograph if any damage visible. Report any transport damage to AEM Cores AND your Transport Company. Refit the side of the crate securely to ensure integrity of the box whilst standing the machine upright.

Under strict supervision, carefully and gently stand the machine and crate up onto the end with the wooden bearers.

Remove the sides and top of the crate. Remove the plastic packing and inspect for any transport damage. Report any such damage to AEM Cores AND the Transport Company responsible, photograph if necessary.

Carefully slide the blades of a fork lift between the Unicore machine and the wooden crate base. Elevate and secure the machine safely. The machine is bolted to this base, support the weight of the wooden crate and unscrew the four 3/8”UNF x 4inch long hex head bolts holding the assembly together. These are located under the crate and screw UP into the feet of the machine.

Screw the four rubber stoppers supplied into the recess in the underside of each foot, until 2-3mm of rubber is still showing proud of the bottom. Place the Unicore machine on the floor in the desired location and level the machine by adjusting the feet.

The Unicore Machine must be level with equal weight applied to each foot. A spirit level placed on any flat, machined surface will suffice as a datum.

Open each side door with the Southco Key, and check internal components for transport damage. Photograph and report any damage.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Fill the hydraulic tank with standard hydraulic oil, Fuch Neodrol SAE32 or equivalent with a viscosity range from 32-38. Total tank capacity is 78 litres. Fill the tank until the sight glass shows an oil level 10mm below the TOP mark. This will be about 65-70 litres.

A fresh oil filter has been fitted before shipment, no need to check this item.

Connect the air supply to the blue bulkhead fitting located under the decoiler power outlet. The fitting is a female 3/8" BSP, take care to use a spanner to prevent the bulkhead fitting from rotating while making this connection. Incorrect fit up may cause the air line inside the cabinet to be pinched off and restrict air flow. The air supply must be clean and **FREE OF OIL**. The pneumatic valves **MUST NOT BE LUBRICATED** otherwise they will fill with oil and slow down the machine operation.

Connect 3 phase 415Vac power, 3x Active, 1x Neutral, 1x Earth to the power cable supplied (To be performed by competent electrician only). 20 Amp motor start fuses are required, total current draw in operation is typically 6-8 Amps, motor start is by DOL contactor (1.5kW electric motor on hydraulic pack). Wire codes as follows:

RED – Phase 1
WHITE – Phase 2
BLUE – Phase 3
BLACK – Neutral
YELLOW / GREEN - Earth

If the Unicore machine has been supplied with a star point transformer then this needs to be installed in the supply line. This unit will step the supply voltage to match the requirements of the Unicore machine as well as provide a Neutral.

Fit shelf (if required) with bolts supplied.

If desired, wire the decoiler with the Clipsal 5pin plug supplied, and connect to the outlet on rear of machine, (to be performed by a competent electrician only). Ensure the on-demand feed sensor of the decoiler does not place any load on the feed mechanism of the Unicore machine.

Refer to "**Bleeding the Hydraulic System"** in the **Maintenance Manual** BEFORE you proceed with power up.

Place the contents of the enclosed document package in the document holder found inside the electrical enclosure door for safe keeping.

The Unicore Machine is now ready for onsite commissioning.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Maintenance Instructions

All maintenance (except cleaning schedule) must be performed by a competent tradesperson.
Before attempting any repair or alteration of the machine please contact AEM CORES PTY LTD.

Cleaning / Maintenance Schedule

New coil

The Unicore machine MUST BE KEPT **CLEAN**. The coating on most electrical steels creates abrasive powder when cut and folded. This will build up on the feed rollers, over the die pins in the head, and fill the shoulder bolt access holes. It is recommended procedure to remove this build up of powder each time a new coil of strip is used. Wipe down the upper and lower rollers with a solvent impregnated cloth, then clean the cabinet top, shelf and surrounds.

Daily

Remove powder from around and under the Lifter Plate and Clamp Bar in the head.
Clean Base Plate and strip entry points.
Clean both rollers thoroughly with a solvent impregnated cloth.
Check oil level in the sight glass.
Clean fan filter on rear of cabinet.
Check and if necessary empty Festo Air Service Unit bowls.

Monthly

This is at the discretion of the Customer. AEM suggests that once every month (or several months depending on use) the die cages are flushed and dried to remove any embedded dust particles. Liberally squirt a light machine oil (WD40) onto the exposed bearing cages of the head. Use HEADTEST to oscillate the fold and cut actions to work this oil through the cages. Be generous with the oil in an attempt to flush the dirt out. Then clean and dry the cages with compressed air and rags to ensure there is no residual oil left to attract more dust. It is critical that the cages are blown dry and all residual oil is removed before resuming operation.

Quarterly

Grease bridge plate. Only use one pump of grease gun per nipple.

Bleeding the Hydraulic System

The hydraulic system must have all the air bled before the first operation and each time the oil is replaced, and **MUST** be performed by competent and suitably qualified electrical and mechanical tradespersons.

BEFORE STARTING THIS PROCEDURE ENSURE ALL HYDRAULIC FITTINGS ARE TIGHT.

Pull out the red mushroom **ESTOP** button and release the control console E-stop.

Turn power **OFF** at the rotary isolator mounted on the door of the electrical cabinet. Open the electrical cabinet door.

Find the **R1** relay inside the electrical cabinet; pull **OUT** the blue manual override tag. Pull **OUT** the blue manual override tag on **R3** relay. Close the door and turn **ON** the rotary isolator power switch, this will start the hydraulic motor and cause the guillotine hydraulic ram to descend.

The relief valve will open and the motor will load up as pressure is applied. You may crack open the orange valve stem on the manifold block which isolates the pressure gauge, this will indicate the hydraulic pressure opening the relief valve.

Open the top safety hood and carefully crack any hose fitting leading to the **TOP** of the hydraulic ram. Allow oil to flow until no air is visible and tighten fitting.

Turn **OFF** power and open electrical cabinet. Turn **OFF R3** relay by pushing in the blue manual override. Activate **R4** relay in a similar fashion. Close electrical cabinet and turn **ON** power. The ram will retract into the up position.

Crack any hose fitting near the ram on the lower hose assembly until oil flows without any sign of air, then tighten fitting.

Repeat steps 5 to 9 at least once more, or until satisfied.

Turn **OFF** power, open electrical cabinet and shut down the hydraulic pump by pushing in the manual override tag of relay **R1**. Check relays **R3** and **R4** are also reset before closing the electrical cover. Close the isolator valve to the hydraulic pressure gauge. Close the safety hood.

Load the program **HEADTEST**, place a semi-colon in front of the line calling for the Fold subroutine and run just the repetitive Guillotine routine. Gently crack the hydraulic fittings at the cylinder entry points until no more air is evident.

Note: If the guillotine makes a loud “crack” each time it cuts steel, then this is an indicator of residual air in the system. The hydraulics will self bleed to a small extent, but the majority of the air must be removed with conventional bleeding techniques as described above.

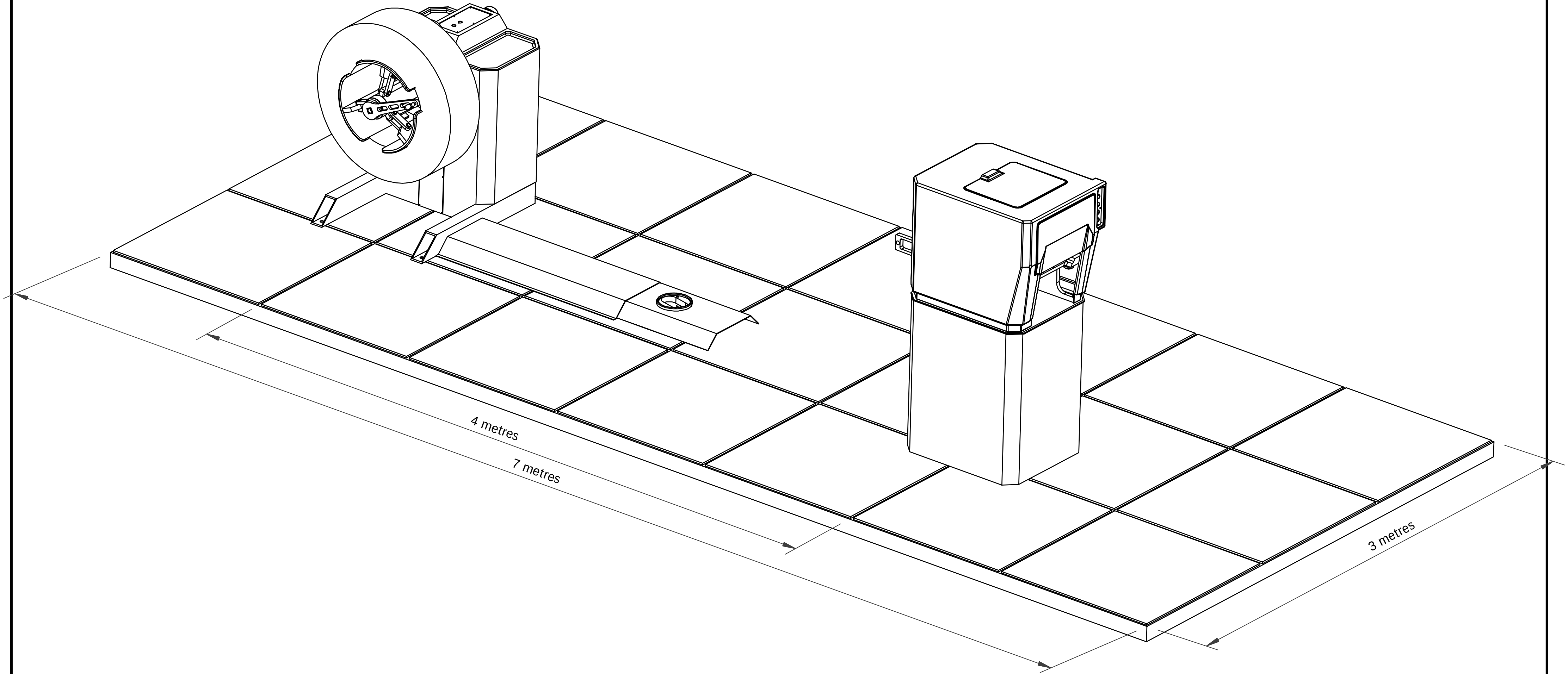
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Machine Floor Plan Layout

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3rd Angle Projection

Always check that this drawing version is the most current.



Min suggested working area - 7m x 3m.

Sheet 1 of 1	All dimensions in Millimetres. General Tolerances (Unless Noted Otherwise) 0.00 +/- 0.05mm 0.0 +/- 0.1mm 0 +/- 0.5mm	Date Revised Revision	Revised by: 0

Drawing Title

Unicore_Decoiler Floor Plan

Author	Part Number	Drawing File Name
markn Date 9/02/2006		G:\Aem\Aem_Eng\2500_machine\PRODUCTION_DRAWINGS\Assembly dwgs\Floor plan.idw

DWG APPROVED FOR MANUFACTURE?

AEM CORES PTY LTD
95 BEDFORD STREET, GILLMAN, SOUTH AUSTRALIA, 5013

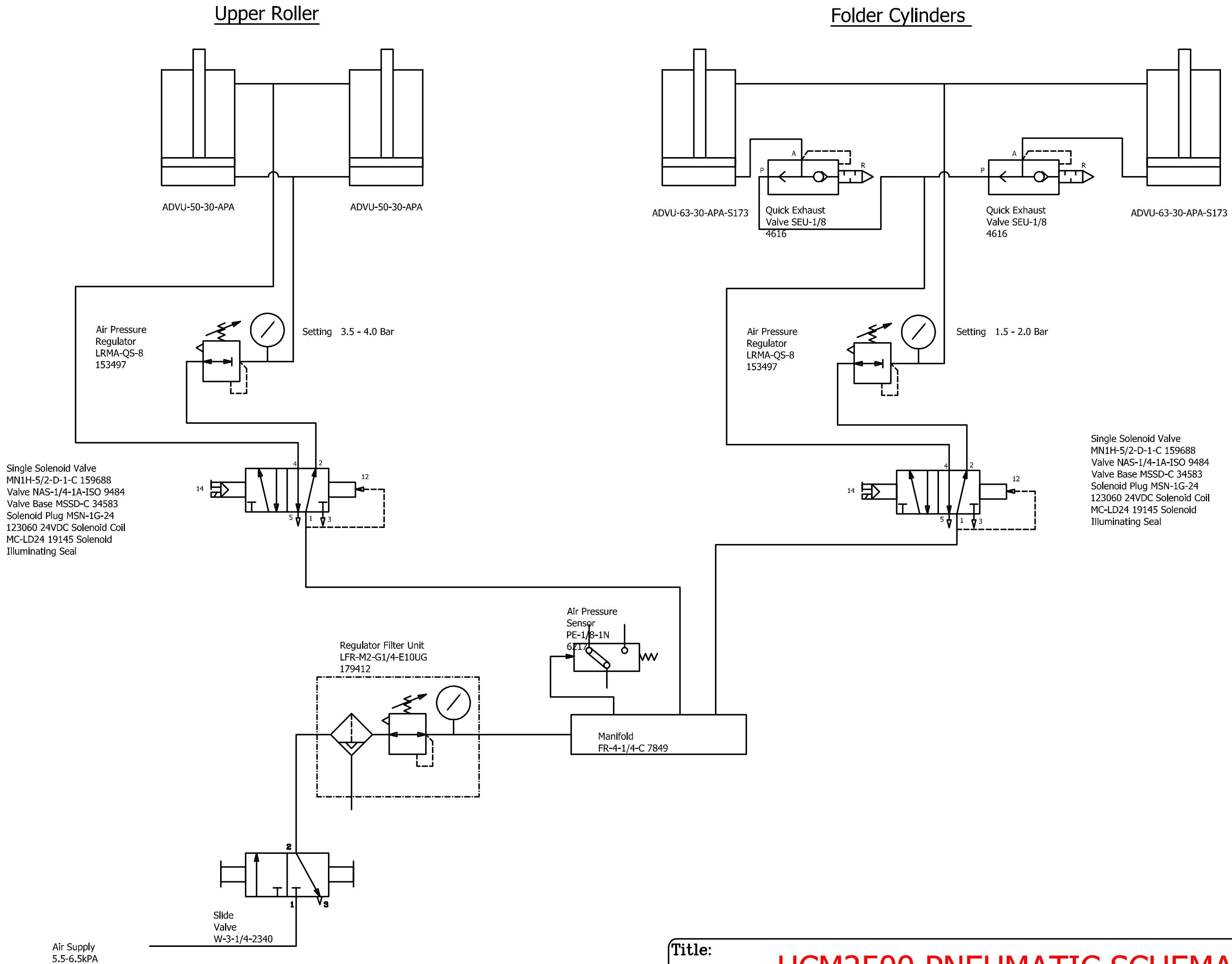
PHONE 61 8 8341 0086
FAX 61 8 8341 0225
WEB www.aemcores.com.au

Machine Schematics v2500

Pneumatic Schematic

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3rd Angle Projection
DO NOT SCALE



Comments:

Comments:

Title: UCM2500 PNEUMATIC SCHEMATIC

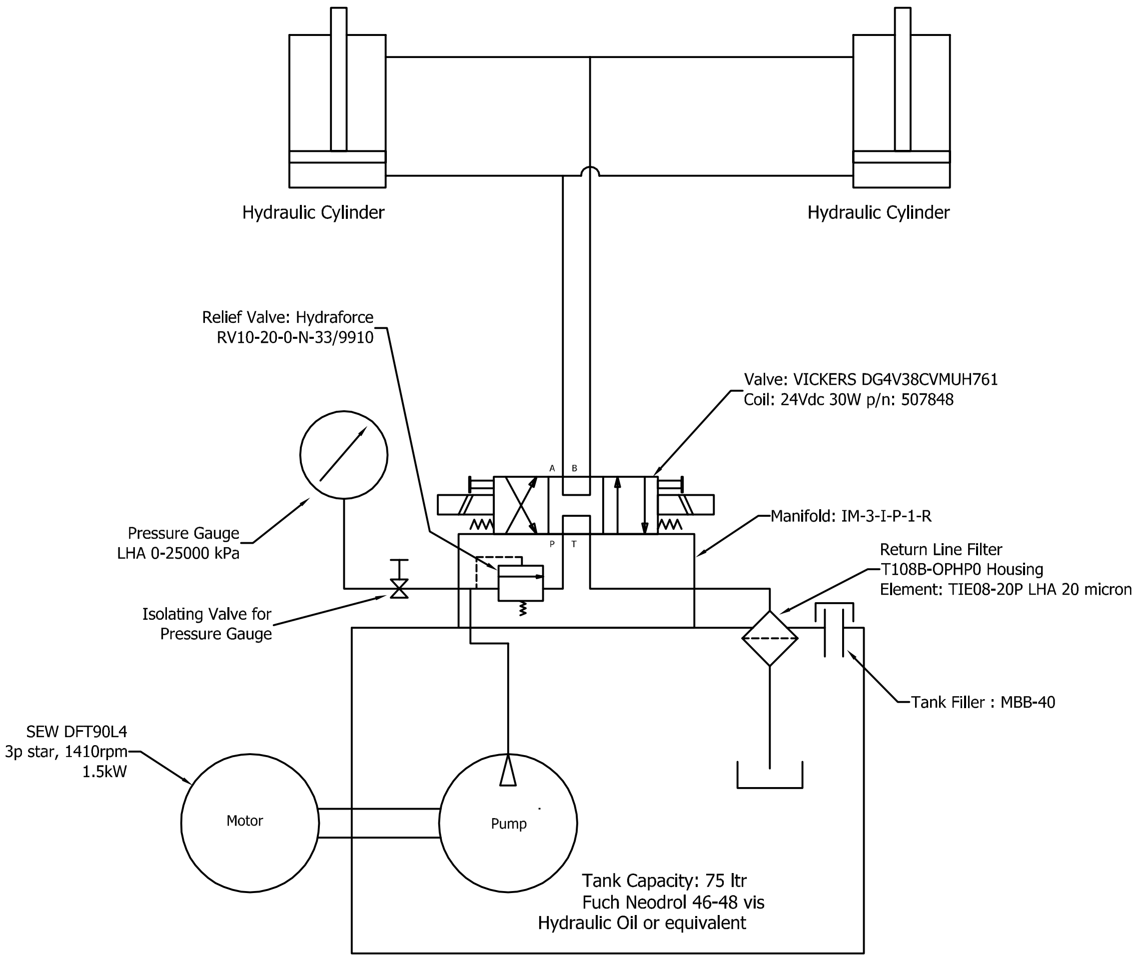
Eng : Mark J	Scale:	Drawing File	Assoc Text File	Assoc Program
Date : 8/6/99	No Scale			

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

Hydraulic Schematic

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3rd Angle Projection
DO NOT SCALE



UCM2000 Unicore Machine Hydraulic Schematic

All Dimensions in Millimeters, General Machine Tolerance +/-0.05mm, unless specified otherwise.

Comments:

Comments:

ACADv13.0 Layers / View Co-ords: HYDRAULIC_SCHEMATIC View: Top

Title: UCM2500 HYDRAULIC SCHEMATIC

Eng :	Mark J	Scale:	Drawing File	Assoc Text File	Assoc Program
Date :	3/6/99	No Scale			

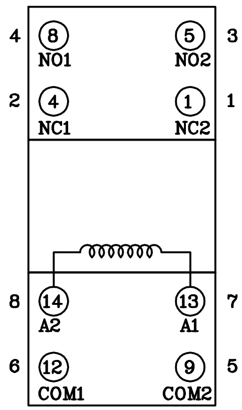
A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
Phone: 08 8341 0086
Fax: 08 8341 0225

Wiring Schematic 1

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Terminology and Nomenclature

Drawing: UCC2508301101



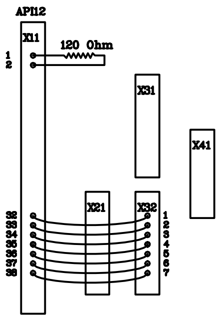
Relay Base RS351-550 UCC2507603060

Wire Codes and Colours

240Vac Active RED
240Vac Neutral Black
-24/0Vdc PURPLE
+24Vdc ORANGE

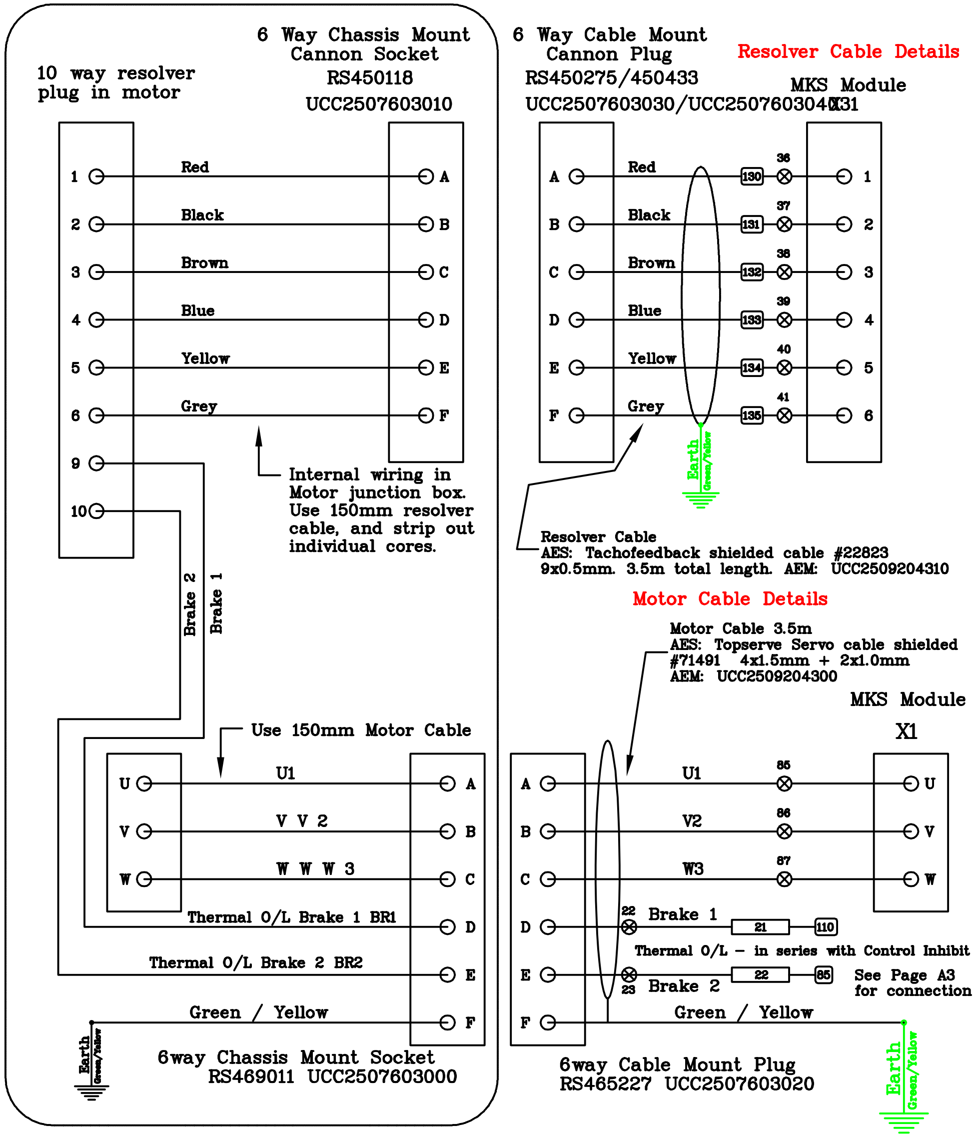
Operator's Console Cable 5m

Cable No	Terminal No	Colour
0	9	Purple
1	10	Blue/red
3	11	Brown
4	12	Brown/Green
5	13	Pink
6	14	Grey
7	15	Green
8	16	Blue
9	17	Yellow
10	18	Red
11	19	White
12	20	Black
13	21	Yellow/Brown
14	24	White/Yellow
15	25	Green/White



SEW MKS Axis Plug layout

WARNING
This Schematic
Does Not Conform
to Australian Wiring
Standards.



Servo Motor SEW DFY71S terminal box
UCC2504805630 3000rpm, 400V, 5Amp

WARNING
This Schematic
Does Not Conform
to Australian Wiring
Standards.

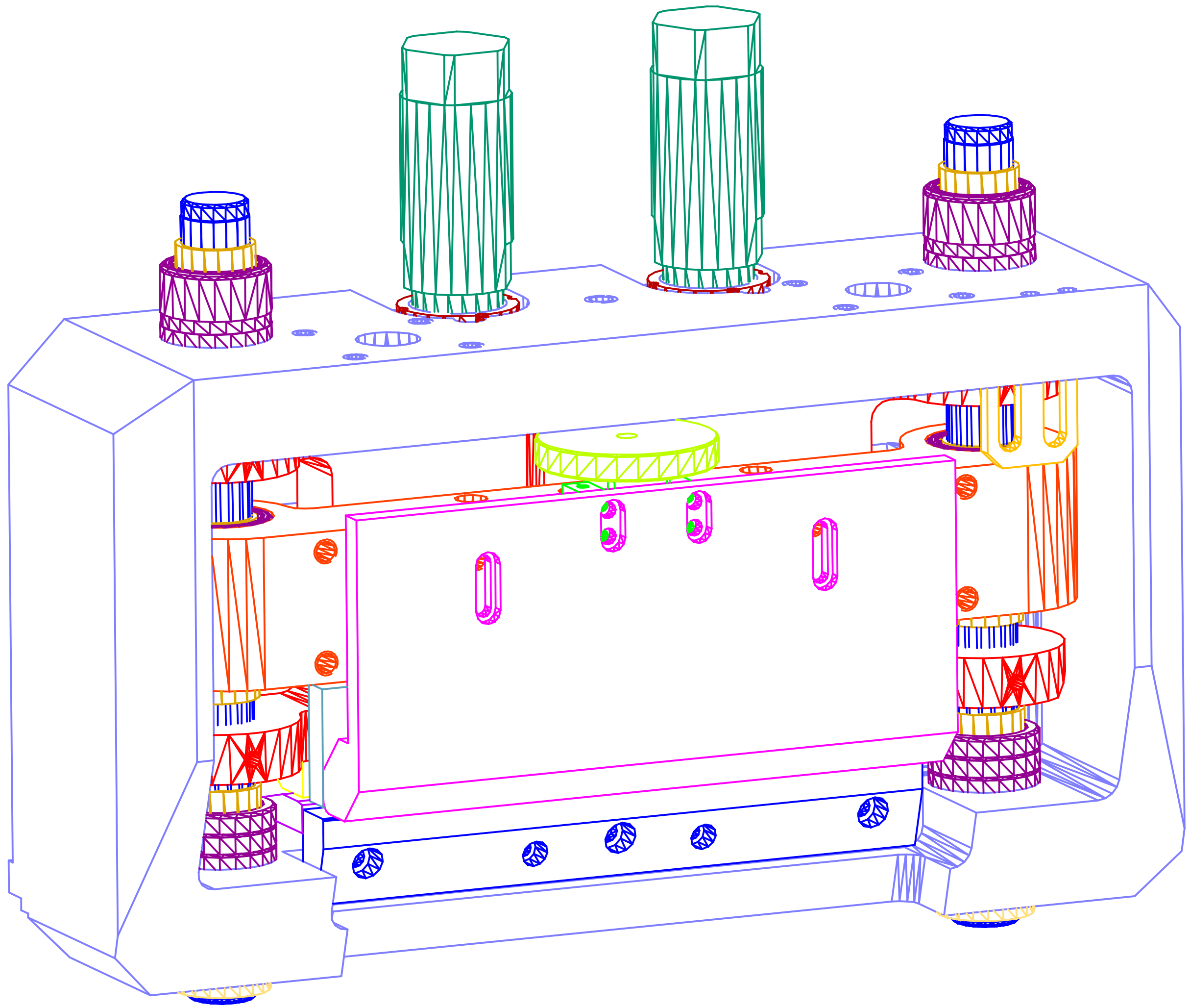
Wiring Schematic 2

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Head UCHB2500

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3RD ANGLE PROJECTION
DO NOT SCALE



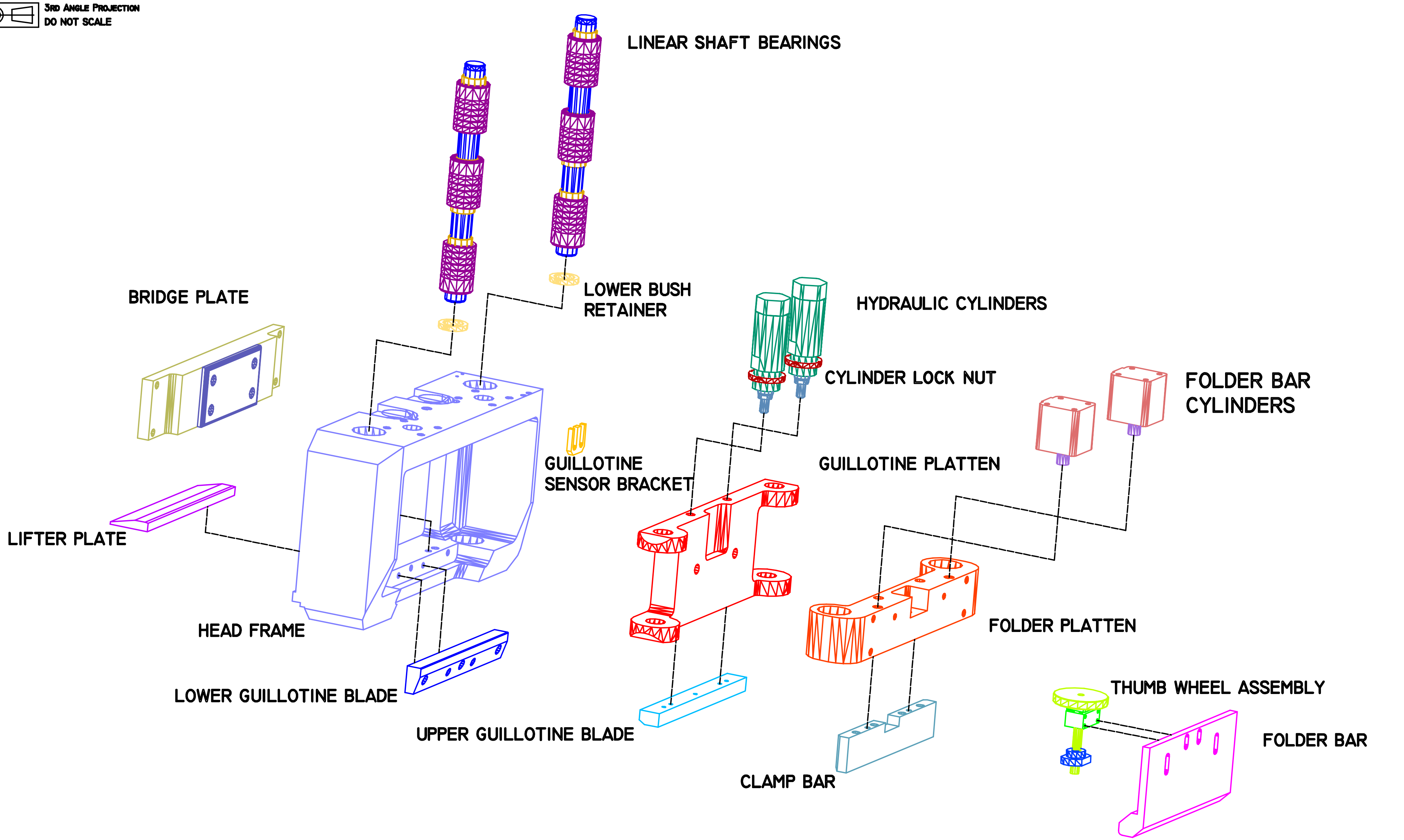
NOTES

TITLE: UNICORE 2500 HEAD ASSEMBLY		
ENG : M. NAVACCHI	SCALE:	ASSOC PROGRAM(S)
DATE : DEC 2001	NO SCALE	

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013

PHONE: 08 8341 0086
FAX: 08 8341 0225
WWW.AEMCORES.COM.AU

3RD ANGLE PROJECTION
DO NOT SCALE



TITLE: HEAD UCHB2500 - EXPLODED VIEW

ENG : M. NAVACCHI	SCALE:	DRAWING FILE	ASSOC TEXT FILE	ASSOC PROGRAM
DATE : OCT 2000		UCHB2500100000		

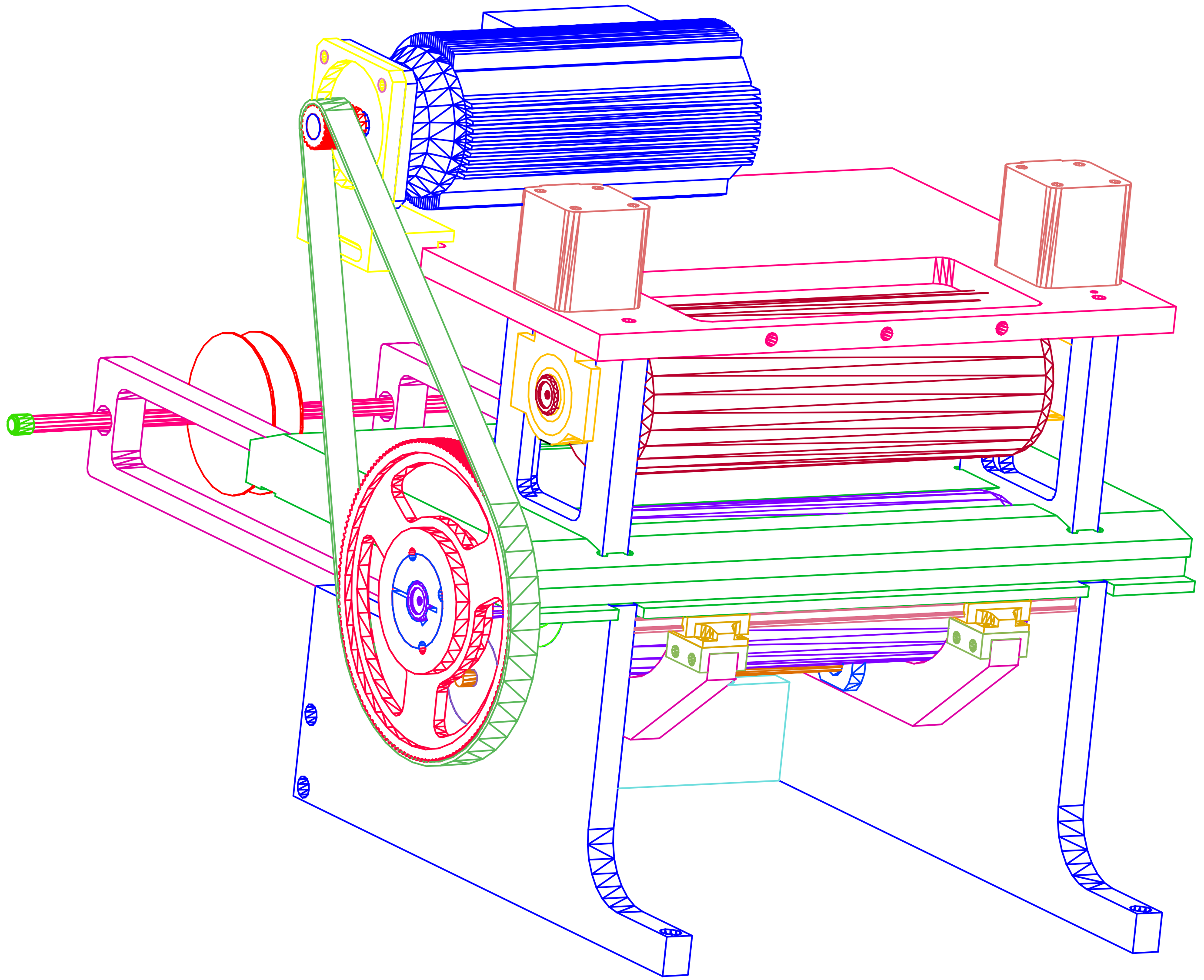
A.E.M. CORES PTY LTD
95 BEDFORD STREET, GILLMAN
SOUTH AUSTRALIA 5013

PHONE +61 8 83410086
FAX +61 8 83410225

Rollfeeder UCM2500

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3RD ANGLE PROJECTION
DO NOT SCALE



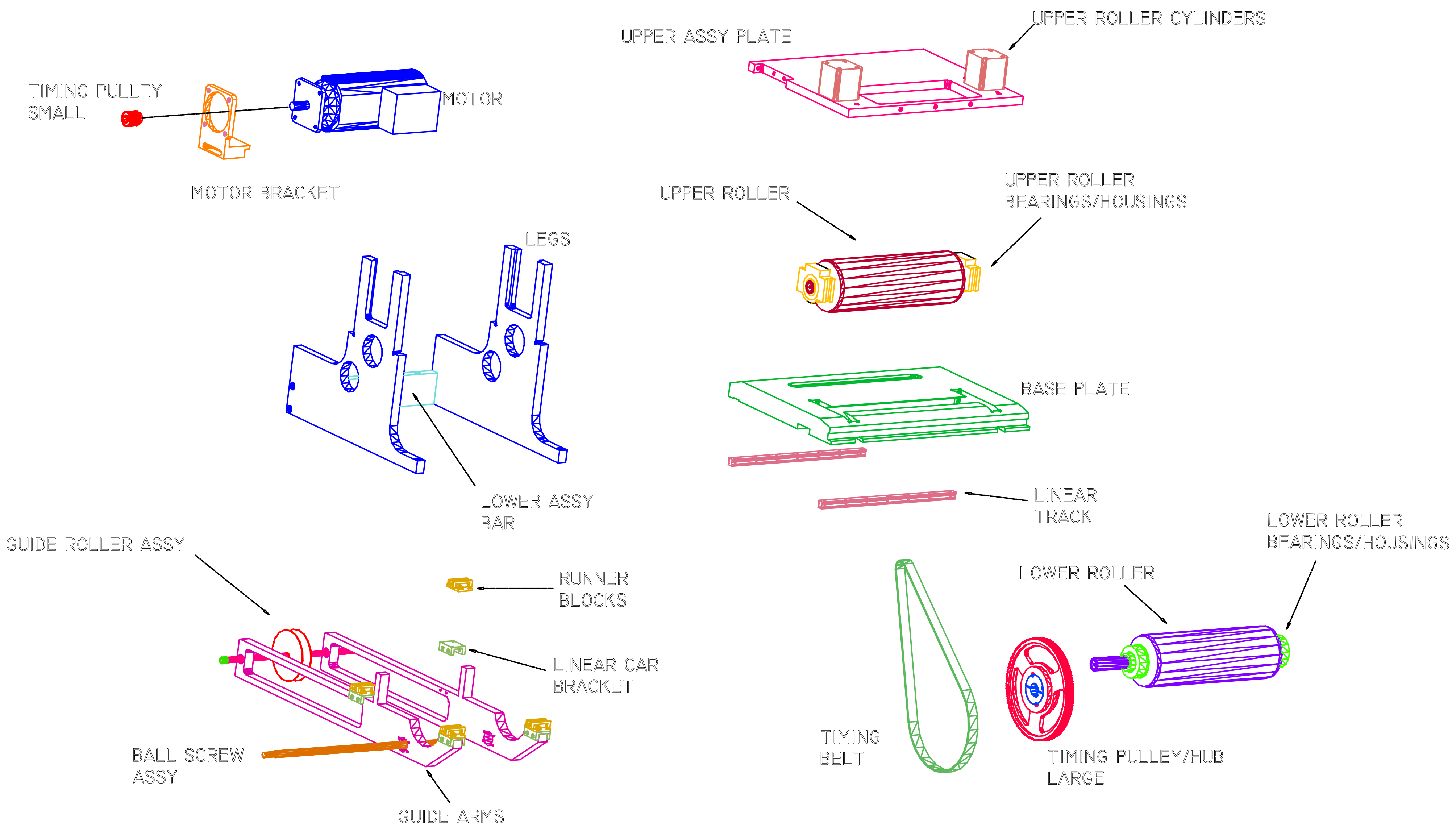
NOTES

TITLE: UNICORE 2500 ROLLFEEDER ASSEMBLY		
ENG : M. NAVACCHI DATE : DEC 2001	SCALE: NO SCALE	ASSOC PROGRAM(S)

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013

PHONE: 08 8341 0086
FAX: 08 8341 0225
WWW.AEMCORES.COM.AU

3RD ANGLE PROJECTION
DO NOT SCALE



TITLE: ROLLFEEDER UCM2500 - EXPLODED VIEW

ENG :M. NAVACCHI	SCALE:	DRAWING FILE	ASSOC TEXT FILE	ASSOC PROGRAM
DATE :OCT 2000	NO SCALE	UCM2500100000		

A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
PHONE: 08 8341 0086
FAX: 08 8341 0225

CARBIDE BLADE INSTALLATION AND RESHARPEN PROCEDURE

This procedure outlines the steps required to install and sharpen the tungsten carbide tooling used in the Unicore UCHB2500 head. This must only be performed by a competent tradesman or maintenance personnel who have read and understood this document.

It is strongly recommended that the person performing the grinding operation should be familiar with the action of the head and the mechanics involved.

The Tungsten Carbide blades provided by AEM Cores Pty Ltd are fabricated from a strip of carbide, bedded in epoxy and bolted to a tool steel holder. These blades are brittle and require careful handling.

A tooling set comprises three items, all of which require grinding during re-sharpen:

- **Upper Guillotine**
- **Lower Guillotine**
- **Lifter Plate**

The Upper Guillotine blade includes slotted bolt holes which allow lateral movement to facilitate the setting of the blade clearance.

Blade Clearance is set with a **0.0125mm** (0.0005”) shim.

This is a good time to thoroughly clean the head and components within.

Any sign of impact damage due to debris caught under the Lifter Plate must be noted.

Take particular note of the Lower Guillotine blade seat, this must be flat and without damage to the top lip (from debris caught under the Lifter Plate). This is a good opportunity to run a fine hone stone over the lower blade seat and look for high spots.

There is no guarantee of performance with a carbide blade. Typically we expect between 300,000 to 500,000 cut operations between re-sharpening.

Each blade has at least 3mm of life when new, a typical re-sharpen (without excessive wear or blade damage) would likely remove 0.05-0.1mm of life.

Refer to the attached drawing: “Guillo Blade Resharpen Detail” for specific details on which faces to grind and how the blades interact in operation.

Incorrect grinding and fit up practises have lead to field failures or low cut performance, we strongly suggest the recommendations in this document be passed on to all personnel involved.

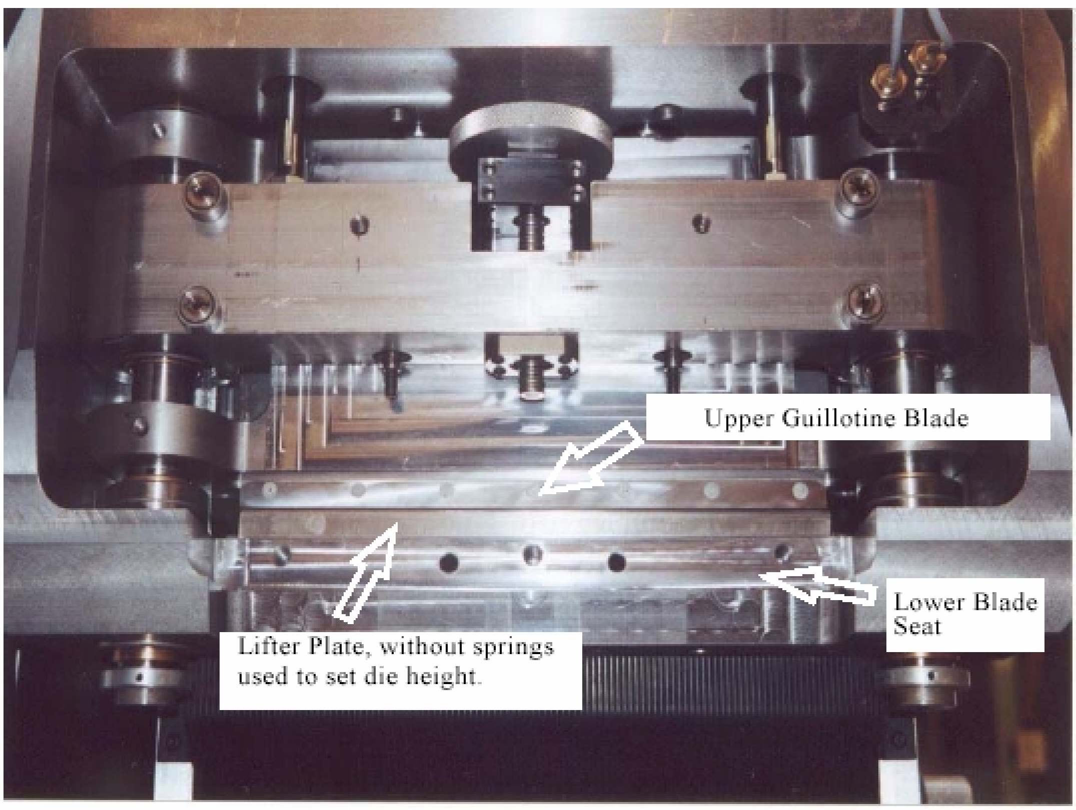
Unless specifically stated otherwise, throughout this entire procedure and whenever there are personnel working ‘within’ the head area, the red mushroom ESTOP push button must be pushed IN and all power to the Unicore Machine must be OFF at the rotary isolator on the door.

General Overview of the Head

This picture shows the lower jaw of the Unicore head UCHB2500 ready for Carbide Blade installation. The Lower Guillotine has been removed, the Upper Guillotine has been fitted loosely, and the Lifter Plate is used to set the height of the die so the Upper Guillotine overlaps the Lower.

The head is now ready for the Lower Guillotine to be fitted and the clearance to be set.

Now follow the instructions to see how this is done.



95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

1) Remove ALL tooling and **clean the head thoroughly**.

2) Inspect the underside of the Lifter Plate and the corresponding top surface of the 'lower jaw' of the frame. It's possible for steel slivers to be caught under the Lifter Plate and be hammered into the lower jaw. Inadequate cleaning, magnetised tooling or incorrect removal of laminations by the operator is the primary cause of such damage.

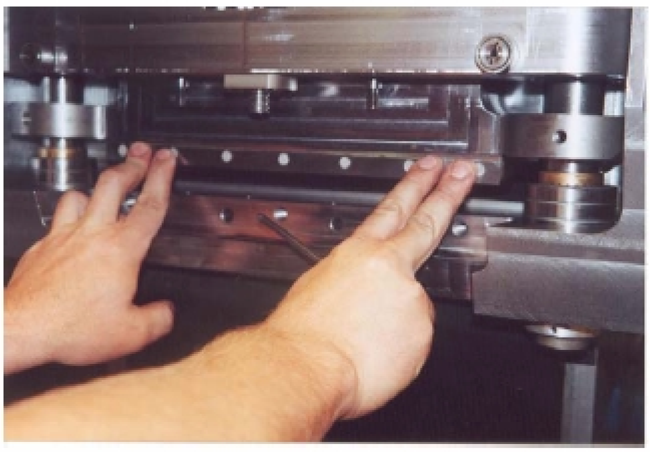
3) If there is damage to the lower jaw, run a **fine hone stone** along the front face of the lower guillotine seat to check for high spots. If the seat has been damaged by debris caught under the Lifter Plate it will show as **shiny high spots** along the top edge of the seat. These are easily removed with the hone stone until flat.

4) With the Lower Guillotine blade REMOVED we set the height of the Upper Guillotine blade in the 'down cut' position by using the Lifter Plate as a height gauge.

   a. Clean and fit the Upper Guillotine blade into the recess provided in the Guillotine Platen. Use **SIX** M6 x 25mm SHCS bolts to loosely secure the blade. The centre bolt hole is in-accessible, but you can reach 6 of the 7 available bolts with the standard v2500 Unicore head.

   b. The carbide blades have 1.5mm lateral movement on the slotted bolts holes to facilitate the setting of blade clearance. The Upper Guillotine should be loosely supported by these bolts with just enough pressure on the bolts to enable the blade to slide with firm finger pressure.

   c. Push the Upper Guillotine firmly towards the **rear** of the machine before proceeding.



95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

d. Fit the Lifter Plate into the head WITHOUT the springs, using 2x M10x50mm shoulder bolts.

e. Lower the Upper Guillotine blade down onto the Lifter using the hydraulics as follows:

   i. Ensure machine is OFF and open electrical cabinet door.

   ii. Pull out **blue** manual override tag on relay R1 (hydraulic motor start contactor).

   iii. Pull out **blue** manual override tag on relay R3 (guillotine down contactor).

   iv. Close cabinet door and turn machine ON at rotary isolator. This will start the hydraulic pump and push the upper guillotine down onto the Lifter Plate.

   v. Turn the machine OFF and open the electrical cabinet door.

   vi. Reset relays R1 and R3 by pushing in the blue manual override tags.

   vii. Pull out the blue manual override tag on relay R4 (guillotine up contactor), but leave relay R1 OFF.

   viii. Close the door and turn the machine on with the rotary isolator. This will allow the hydraulic valve spool to release the pressure on the cylinder.

   ix. Turn the machine OFF, open the door and reset the manual tag on relay R4

   x. Ensure the machine is turned OFF before proceeding to the next step.

f. Remove the Lifter Plate from under the Upper Guillotine, some slight upwards assistance on the guillotine platen may be required.

g. The Upper Guillotine should now be at the ‘down position’ for a cut. It is important that the upper guillotine blade completely overlaps the lower guillotine to ensure the correct clearance can be set.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

5) With the Lifter Plate removed, ensure the Upper Guillotine is pushed towards the **rear** of the machine. Clean and fit the Lower Guillotine blade into position using all five retaining bolts, tighten all bolts firmly. Only use high tensile socket head cap screws class 12.9. Torque M10 bolts to 70 Nm (52ft.lbs), M8 bolts to 36 Nm (27ft.lbs).

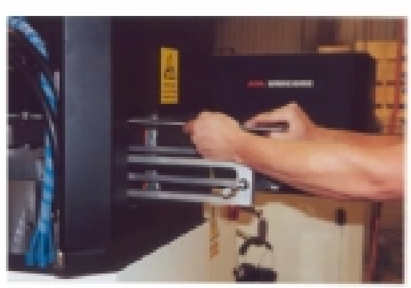
This photograph shows the Upper Guillotine blade in the ‘down cut’ position, with the Lower Guillotine installed ready to set the clearance with shims.

6) Insert **0.0125mm** (0.0005”) **stainless steel shim** (Starrett 12” feeler stock part number 667-1/2) between the Upper and Lower Guillotine blades in two places, **50mm** (2”) **in from either end**. This shim sets the clearance between the blades so there must be an overlap between the Upper and Lower blade, if not, **remove** the Lower Guillotine and repeat step 4).

7) Turn off air in hydraulic cabinet with blue shuttle valve.

8) Either **pull** the Upper Guillotine blade onto the shims, or (after raising the plastic strip dampener) use a helper to **push** the aluminium sheet (supplied with the machine) into the rear throat of the machine as shown in the photograph. This aluminium sheet is used to push on the back of the upper guillotine blade. With the upper guillotine blade pushed and held firmly against the shims, tighten the bolts holding the Upper Guillotine. Only use high tensile socket head cap screws class 12.9. Torque M6 bolts to 15 Nm (11ft.lbs). Use all six available bolts holes in upper guillotine blade (centre hole not accessible). Progressively tighten the six bolts until full torque has been achieved, ensure the shim has not moved during tightening.

This photograph shows the steel plate used to push the Upper Guillotine forward onto the shims.



9) CHECK both shims are held firmly once the bolts are tight. If one is loose then the blade has come away from the lower blade and the clearance will be wrong. (If this is the case you must repeat step 8).

10) Once satisfied the blade clearance is correct, and all retaining screws in the Upper Guillotine are tight then **remove** the Lower Guillotine blade and retrieve the shims.

11) Lift the guillotine platen as follows:
    a. Open the electrical cabinet, pull out the **blue** manual override tag on relays R1 (Hydraulic Motor Start) and R4 (Guillotine Up).
    b. Close door and turn on, this will lift the Guillotine Platten.
    c. Turn Off, open the door and reset relays R1 and R4.

12) Reinstall the Lifter Plate with the conical compression springs and shoulder bolts. The springs ‘point’ downwards, smallest diameter at the bottom.

13) Re-install the Lower Guillotine blade, ensuring the Lower Seat is perfectly clean. Be sure to tighten the screws firmly and check the 1mm radius on the forward fold edge of the blade (refer to drawing). Only use high tensile socket head cap screws class 12.9. Torque M10 bolts to 70 Nm (52ft.lbs), M8 bolts to 36Nm (27ft.lbs).

14) Turn on air in hydraulic cabinet with blue shuttle valve.

15) Install Clamp Bar, note spring condition, replace if necessary.
Ensure BS-110 O-Rings are under the heads of the shoulder bolts.

16) Re-install the Folder Bar.

17) Installation procedure complete, close Safety Hood and power up machine

Caution: Do not operate the Guillotine without strip on initial start up. There is a risk of clashing if the blade set up has not been performed correctly. Wear safety glasses and cut wide strip on first run after a blade reset.

Important Maintenance:

As Carbide Blades have a longer cutting life than tool steel blades the regular cleaning routine is often forgotten. It is important to remove the Lower Guillotine blade and Lifter Plate (but not Upper Guillotine) at least weekly and remove any build up of powder and steel debris as damage to the lower guillotine seat may occur. Removing these two items is quick and easy and will not necessitate a reset of the Upper Guillotine.

Procedure for Resharpening Unicore Carbide Blades

CAUTION

This work must be undertaken by competent, qualified and experienced trades personnel only. Due to the brittle nature of the carbide blades, they must be handled with extreme care. Failure to do so may cause premature damage or wear and compromise the cutting performance, resulting in void of warranty.

Introduction

The Unicore Machine blade system comprises the following three components, all three must be ground to sharpen the 'set'. All components are designed to be sharpened using conventional grinding equipment. The blades consist of a carbide insert bedded in epoxy resin and bolted to a steel holder. This bond is permanent and will last the life of the blade unit. Care must be taken not to cause localised over heating of the carbide whilst grinding, this may affect the epoxy and cause voids under the carbide.

Upper Guillotine

This is a stress relieved spring steel holder with a bonded carbide insert. When handling the blade, always protect the carbide edge. The blade life and performance can be maintained by ensuring the integrity of this edge, any shipping or damage to this edge will reduce the quality of the cut.

- The upper blade has a 1.5 mm shear along its length which must match the shear in the Lifter Plate.
- There is also 0.1 mm (0.0005") negative rake ground into the shear face.
- A 0.1 mm step protects the carbide from impact with the Lifter Plate.
- These angles must be maintained to ensure correct blade performance.

Lower Guillotine

This is a thru-hardened, tool steel holder with a bonded carbide insert. When handling the blade, always protect the carbide edge. The blade life and performance can be maintained by enduring the integrity of this edge, any shipping of this edge will reduce the quality of the cut to the laminations.

- The lower blade cutting faces are ground square.
- All tool holder faces must be ground flush to the carbide insert.
- The blade holder is manufactured from tool steel, thru-hardened to 58 HRC.
- The 1 mm fold radius needs to be checked after each grind. A simple hand hone and radius gauge will suffice.

Lifter Plate

The lifter plate is manufactured from thru-hardened tool steel.

- It has 1.5 mm longitudinal shear along its length to match the upper blade.
- Only grind the top surface, **remove the same amount as was ground off the Lower Guillotine blade.**

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

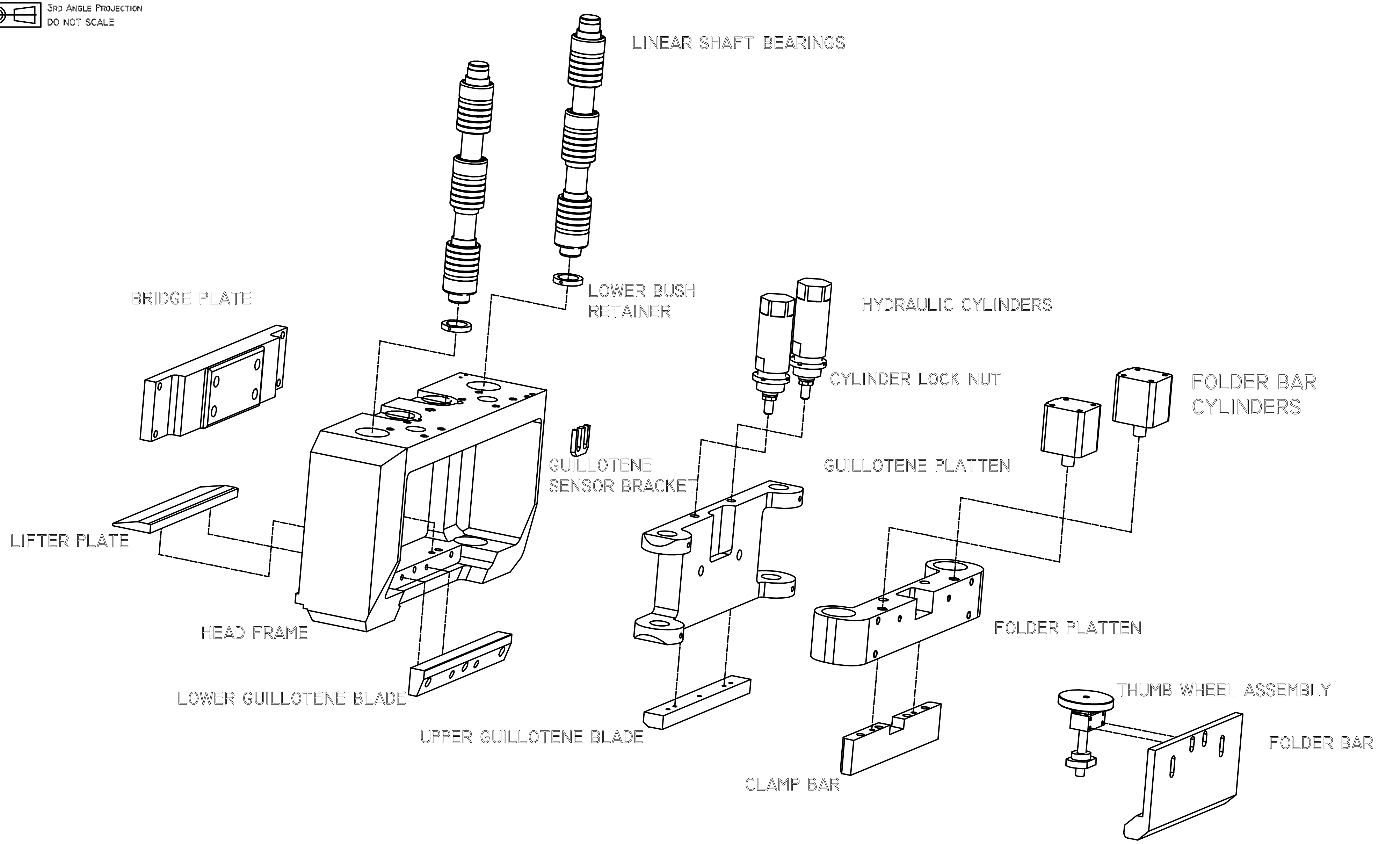
Recommended Grinding Practices

The grinding carbides must be undertaken by competent, qualified and experienced trades personnel only.

- Suggested grinding wheel for carbide: **DN180-R100-BA-1/8**. This wheel and grinding advise available from American Diamond Tool Co USA www.americandiamondtool.com.
- Most grinding shops would grind the tool steel holders with a conventional wheel, and the carbide with a diamond wheel. It is important to select the correct wheel for the material to avoid localised heating, wheel loading or excessive stress on the blades.
- AEM has been successful in grinding both the tool steel and carbide faces with the same diamond wheel when merely re-sharpening blades. If removing more material (to grind a chip out) then we recommend separate grinding wheels and only sharpen the final edge with the same diamond wheel. This will depend on the operating procedure employed in your grinding shop.
- Cobalt compatible water based **COOLANT** should be used whilst grinding the carbide.
- Coolant **MUST** be used to grind the tool steel holder to avoid over heating of the epoxy bed.
- Fine feeds only to be used whilst grinding the carbide, ensure a rotational speed in excess of 4400sfpm.
- Remove the **absolute minimum** material from each blade.
- There is no guarantee of performance with a carbide blade. Typically we expect between 300,000 to 500,000 cut operations between re-sharpening.
- Each blade has at least 3 mm of life when new, a typical re-sharpen (without excessive wear or blade damage) would likely remove 0.05-0.1 mm of life.
- Refer to the drawing “Guillo Blade Resharpen Detail” Jan 2004 for details on which surfaces to grind.
- Check parallel surfaces of the Upper Guillotine after grinding the cut face before deciding to touch the shear face. If this is necessary then ensure the 0.1 mm negative rake is maintained.
- **Measure the height** of the Lower Guillotine blade before and after sharpening, **remove the same amount** from the top of the Lifter Plate taking care to maintain the 1.5 mm longitudinal shear.
- Only remove material from the top surface of the Lower Guillotine blade.
- Avoid localised hot spots whilst grinding the tungsten carbide, this may cause stress points leading to micro-fractures and premature failure.
- The blades must be clocked to within 0.01 mm (0.0005”) longitudinally before grinding.
- **Demagnetise** all tooling after grinding.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

3RD ANGLE PROJECTION
DO NOT SCALE



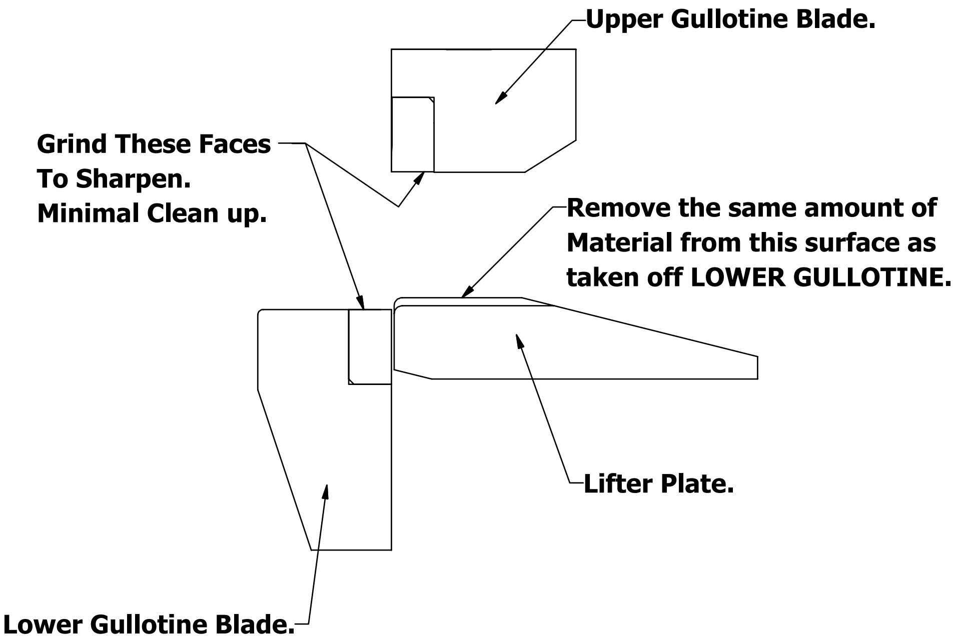
TITLE: UCHB2500 HEAD - EXPLODED VIEW				
ENG : M. NAVACCHI	SCALE:	DRAWING FILE	ASSOC TEXT FILE	ASSOC PROGRAM
DATE : OCT 2000	NO SCALE	UCHB2500100000		

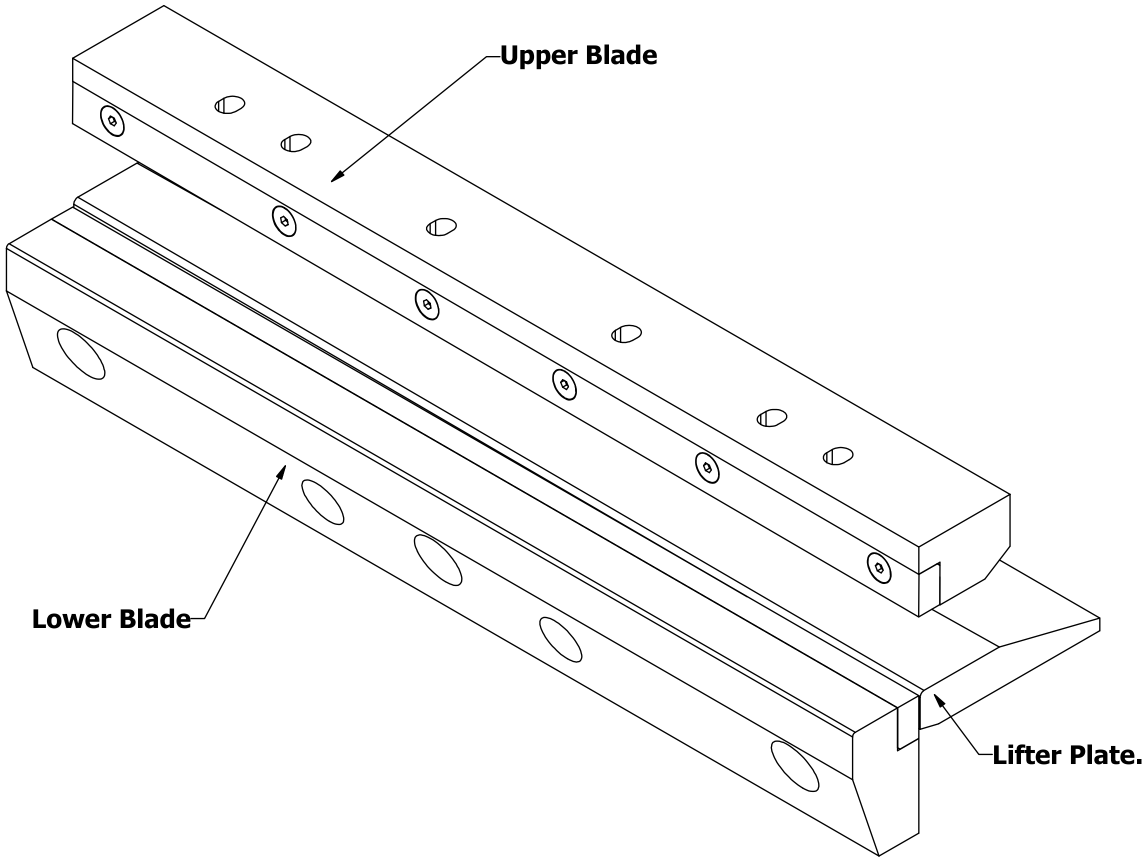
A.E.M. CORES PTY LTD
95 BEDFORD ST GILLMAN SA 5013
PHONE: 08 8341 0086
FAX: 08 8341 0225

3rd Angle Projection

Always check that this drawing version is the most current.

Blade Configuration On Assembly.





All Grinding To Be Flat Within 0.005mm (0.0002").

1	Title adjustment only.	06-07-2005	MN
	All dimensions in Millimetres. General Tolerances (Unless Noted Otherwise) 0.00 +/- 0.05mm 0.0 +/- 0.1mm 0 +/- 0.5mm	**Date Revised**	**Revised by:**
		Revision	1

Drawing Title

Blades and Lifter Resharpen

Author RAVI

Date 25/05/2005

Part Number

Drawing File Name

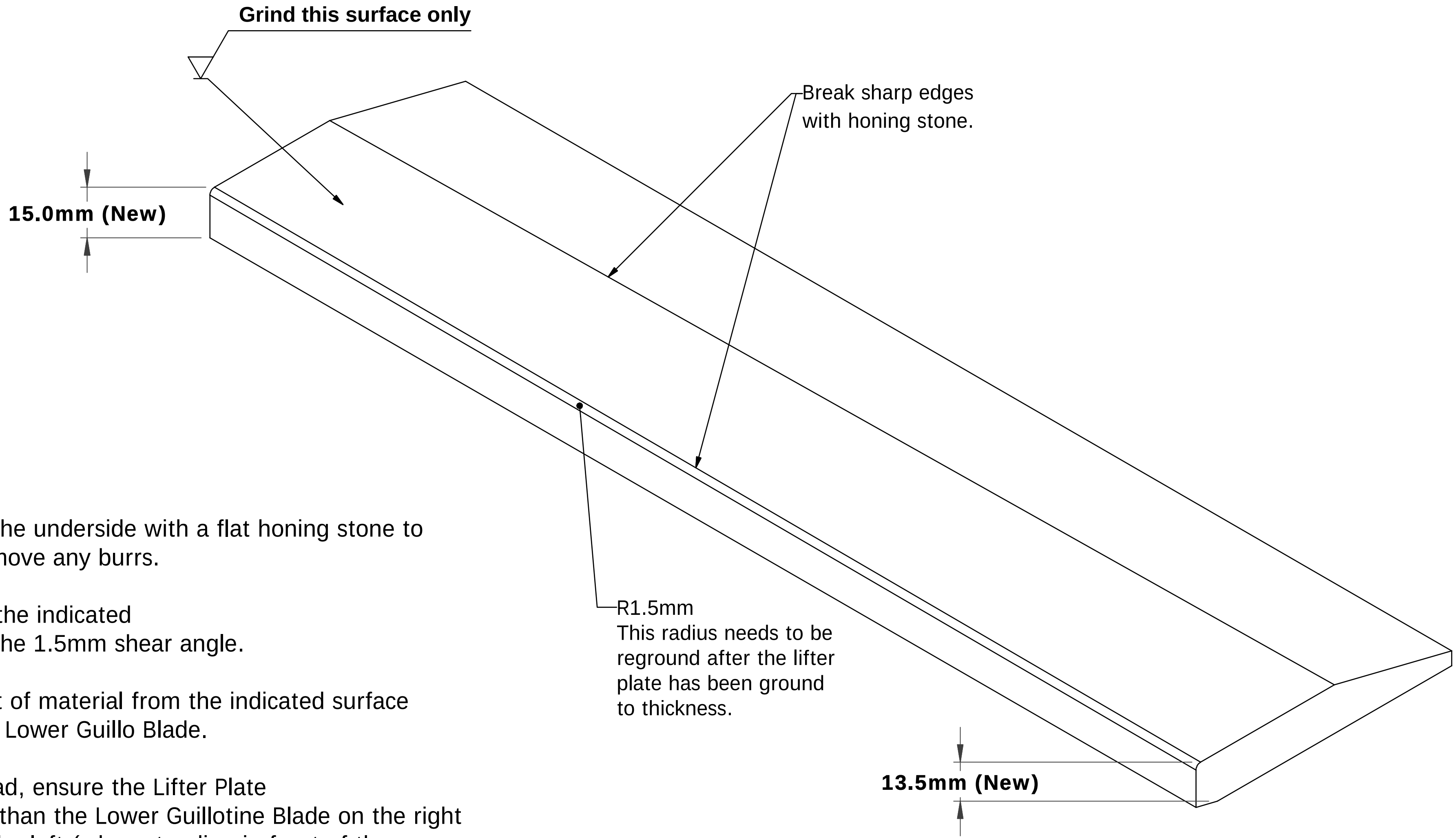
Guillo Blade Resharpen Detail.

AEM CORES PTY LTD
95 BEDFORD STREET, GILLMAN, SOUTH AUSTRALIA, 5013

PHONE 61 8 8341 0086
FAX 61 8 8341 0225
WEB www.aemcores.com.au

3rd Angle Projection

Always check that this drawing version is the most current.



Before grinding, clean the underside with a flat honing stone to ensure flatness and remove any burrs.

Remove material from the indicated surface only. Maintain the 1.5mm shear angle.

Grind the same amount of material from the indicated surface as is removed from the Lower Guillo Blade.

When assembled in head, ensure the Lifter Plate remains 0.5mm higher than the Lower Guillotine Blade on the right and 2.0mm higher on the left (when standing in front of the machine).

1	Text only changes.	03-08-2005	MN
		Date Revised	Revised by:
		Revision	1

All dimensions in Millimetres. General Tolerances (Unless Noted Otherwise)
0.00 +/- 0.05mm
0.0 +/- 0.1mm
0 +/- 0.5mm

Drawing Title
LIFTER PLATE REGRIND DETAIL

Author RAVI
Date 25/05/2005
Part Number
Drawing File Name

AEM CORES PTY LTD
95 BEDFORD STREET, GILLMAN, SOUTH AUSTRALIA, 5013
PHONE 61 8 8341 0086
FAX 61 8 8341 0225
WEB www.aemcores.com.au

3rd Angle Projection

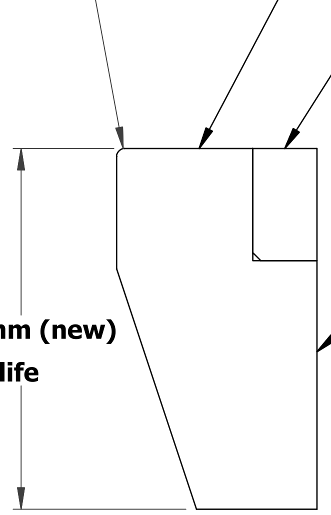
Always check that this drawing version is the most current.

Lower Guillotine Blade Resharpen Detail.

Grind R1.0 -0.0/+0.2 mm Radius
On Front fold Edge Check
With Radius gauge.
*ENSURE PARALLEL ALONG
THE LENGTH*

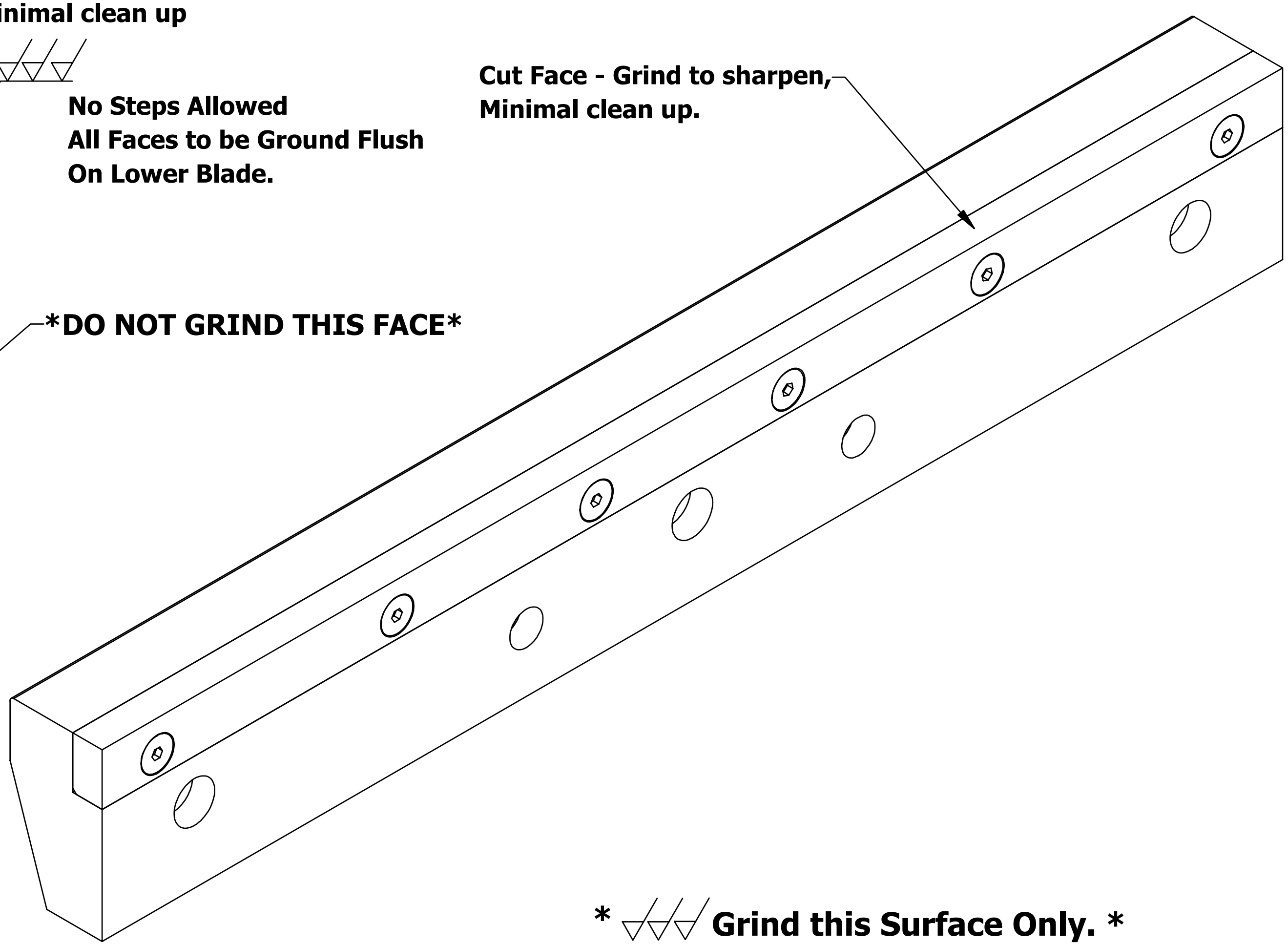
Cut Face- Grind to sharpen,
Minimal clean up

No Steps Allowed
All Faces to be Ground Flush
On Lower Blade.



DO NOT GRIND THIS FACE

Cut Face - Grind to sharpen,
Minimal clean up.



* Grind this Surface Only. *

All Grinding To Be Flat Within 0.005mm (0.0002")

1	Drawing title adjustment only.	06-07-2005	MN
		Date Revised	**Revised by:**
	All dimensions in Millimetres. General Tolerances (Unless Noted Otherwise) 0.00 +/- 0.05mm 0.0 +/- 0.1mm 0 +/- 0.5mm	Revision	1

Drawing Title: LOWER GUILLOTINE BLADE RESHARPEN

Author	Part Number	Drawing File Name
RAVI		**Lower Gullotine Blade Resharpen Detail**
Date 25/05/2005		

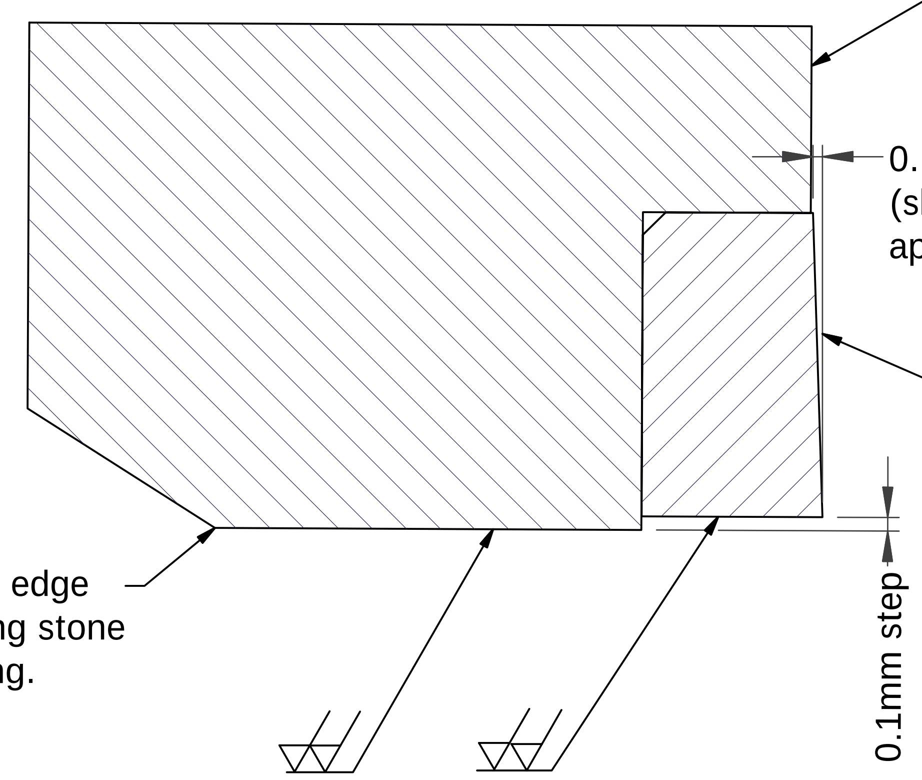
AEM CORES PTY LTD
95 BEDFORD STREET, GILLMAN, SOUTH AUSTRALIA, 5013

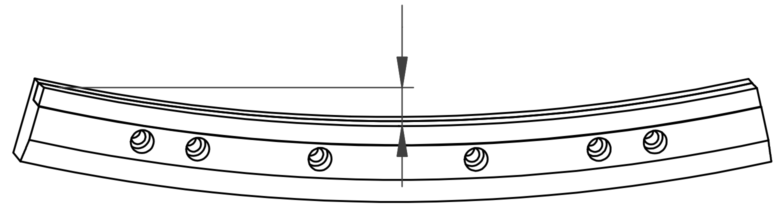
PHONE 61 8 8341 0086
FAX 61 8 8341 0225
WEB www.aemcores.com.au

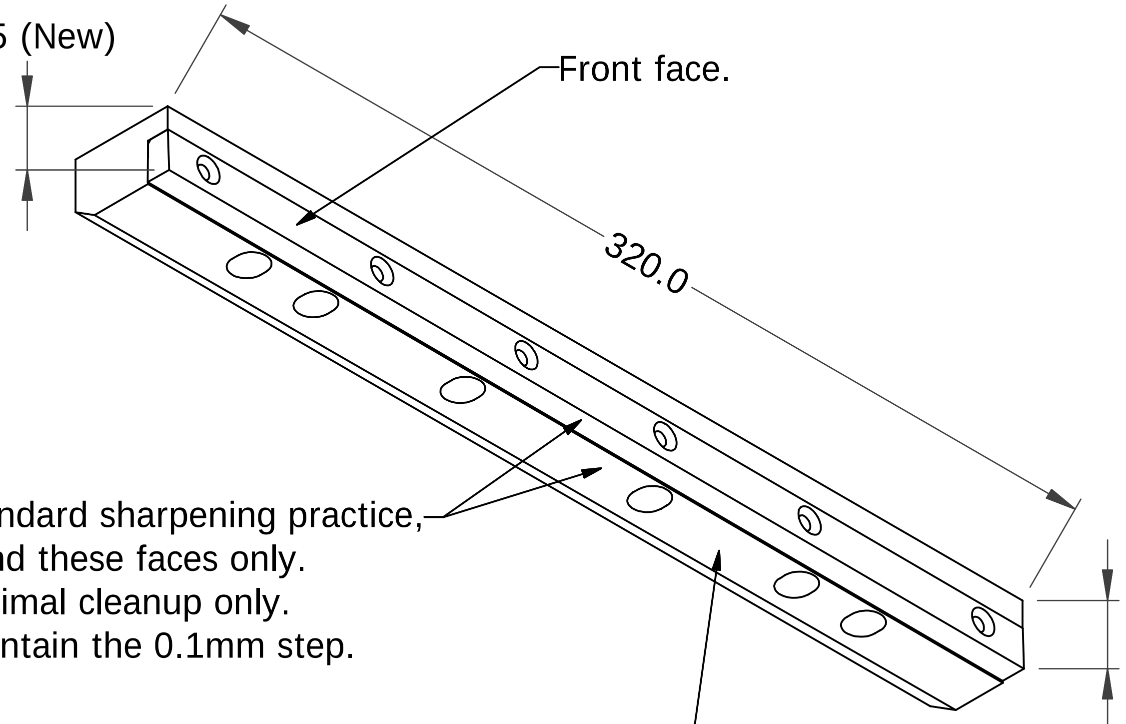
3rd Angle Projection

Always check that this drawing version is the most current.

Section View of Upper Blade







All Grinding To Be Flat Within 0.005mm (0.0002").

Standard sharpening practice, grind these surfaces only.
For large chips or warped blade, also grind front face.

2	Clearances and rake angles highlighted.	07-12-2005	MN	Drawing Title: UPPER GUILLOTINE BLADE RESHARPEN
1	Drawing title adjustment only	06-07-2005	MN	
All dimensions in Millimetres. General Tolerances (Unless Noted Otherwise) 0.00 +/- 0.05mm; 0.0 +/- 0.1mm; 0 +/- 0.5mm		Date Revised	Revised by:	Author: Markn; Date: 25/05/2005; Part Number; Drawing File Name: Upper gullotine Blade Resharpen Detail
		Revision	2	

AEM CORES PTY LTD
95 BEDFORD STREET, GILLMAN, SOUTH AUSTRALIA, 5013
PHONE 61 8 8341 0086
FAX 61 8 8341 0225
WEB www.aemcores.com.au

INSTALLATION PROCEDURE FOR UNICORE MACHINE POWER TRANSFORMER

Overview

The Unicore Machine (UCM2500) can be supplied with an optional power transformer. This unit performs the following functions:

a) Selectable input line voltage
b) Selectable output voltage depending on frequency of hydraulic motor
c) Creates a NEUTRAL line for a single phase supply to the machine electronics

Specification

Input Voltages: 380, 440, 480, 530Vac 50/60Hz 3 phase
Output Voltages: 415 Vac (for 50Hz), 460Vac (for 60Hz) 3 phase + Neutral (Star point)
Power: 8kW 75% duty cycle delta primary, star secondary
Current: 20Amps at 415Vac

Installation

1) The power transformer is a separate unit supplied in a vented steel enclosure. It can be situated remotely from the Unicore Machine if required. The power lead attached to the Unicore machine can be fed directly into one of the cable glands fitted to the enclosure. The line power feed enters through the second cable gland. The cable glands are standard M20 glands capable of receiving cables up to 15mm diameter.

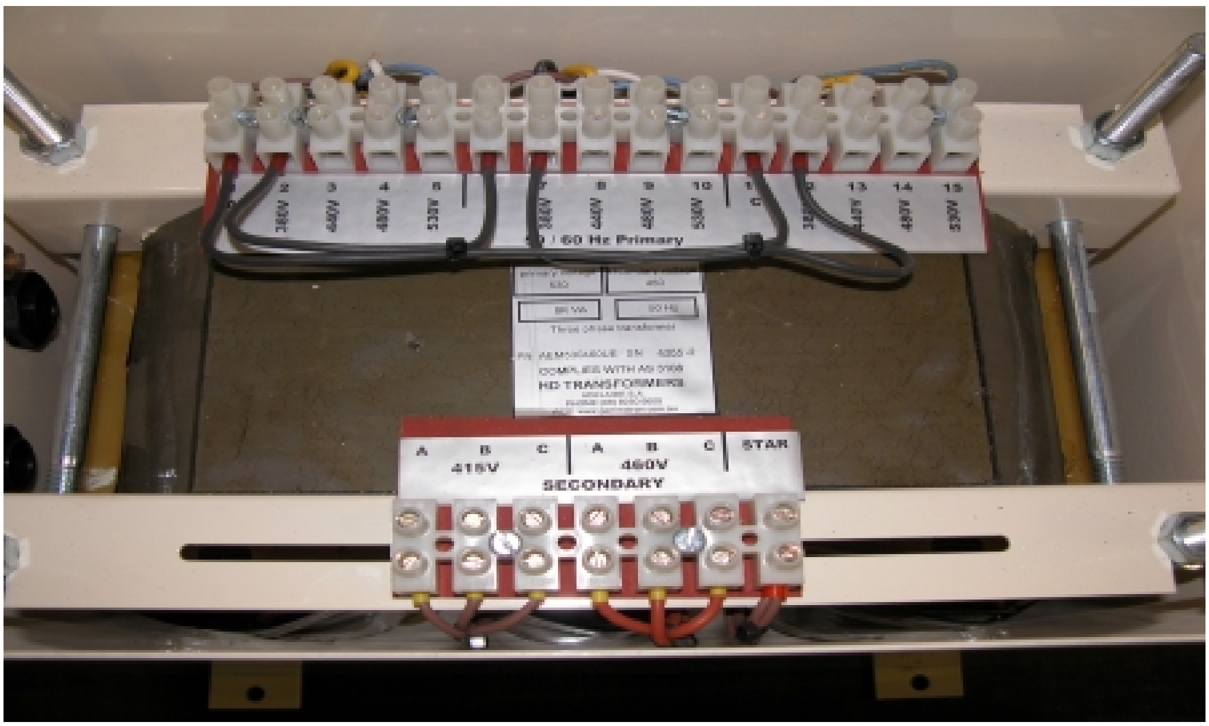
2) Connect line power to the appropriate Primary input terminals, ensure the jumpers are configured correctly for the line voltage. A schematic of the correct jumper wiring is attached inside the enclosure.

3) Connect the Unicore Machine power lead to the Secondary.
   a. The **Black** Neutral goes to the Start Point.
   b. The **Green / Yellow** Earth connects to the common Earth stud.
   c. If the supply FREQUENCY is 50Hz, use the 415V terminals.
      If the supply FREQUENCY is 60Hz, use the 460V terminals.
      i. **Red** phase to terminal A
      ii. **White** phase to terminal B
      iii. **Blue** phase to terminal C

Electric motors operating at 60Hz have a different power curve to 50Hz motors, therefore the Secondary voltage needs to be correctly set at 460Vac for a 60Hz application.

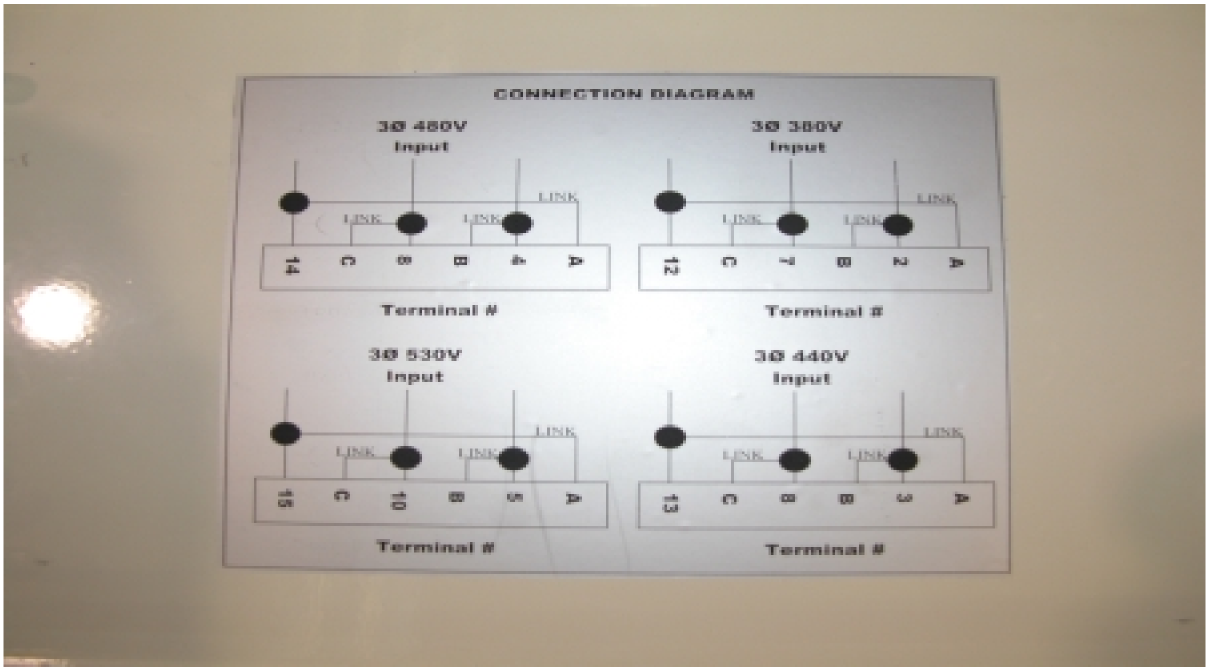
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au

Always check the Secondary voltage with a multimeter before powering the Unicore Machine. This procedure must only be performed by a competent electrical technician. Incorrect wiring of the power transformer will void the warranty of the Unicore Machine.



View inside Unicore Machine enclosure, showing terminal strips and jumpers.

AEM Cores Pty Ltd
95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au



Schematic (inside enclosure) showing jumper settings for various voltages.

95 Bedford Street, Gillman, South Australia 5013 Australia
Tel: +61 8 8341 0086 - Fax: +61 8 8341 0225
sales@aemcores.com.au
www.aemcores.com.au