



MEFE
MITCHELL ENGINEERING
FOOD EQUIPMENT PTY LTD

Operating Manual



Knife Sharpening Machine

Variable Speed

CAT 139V100

Revision 1

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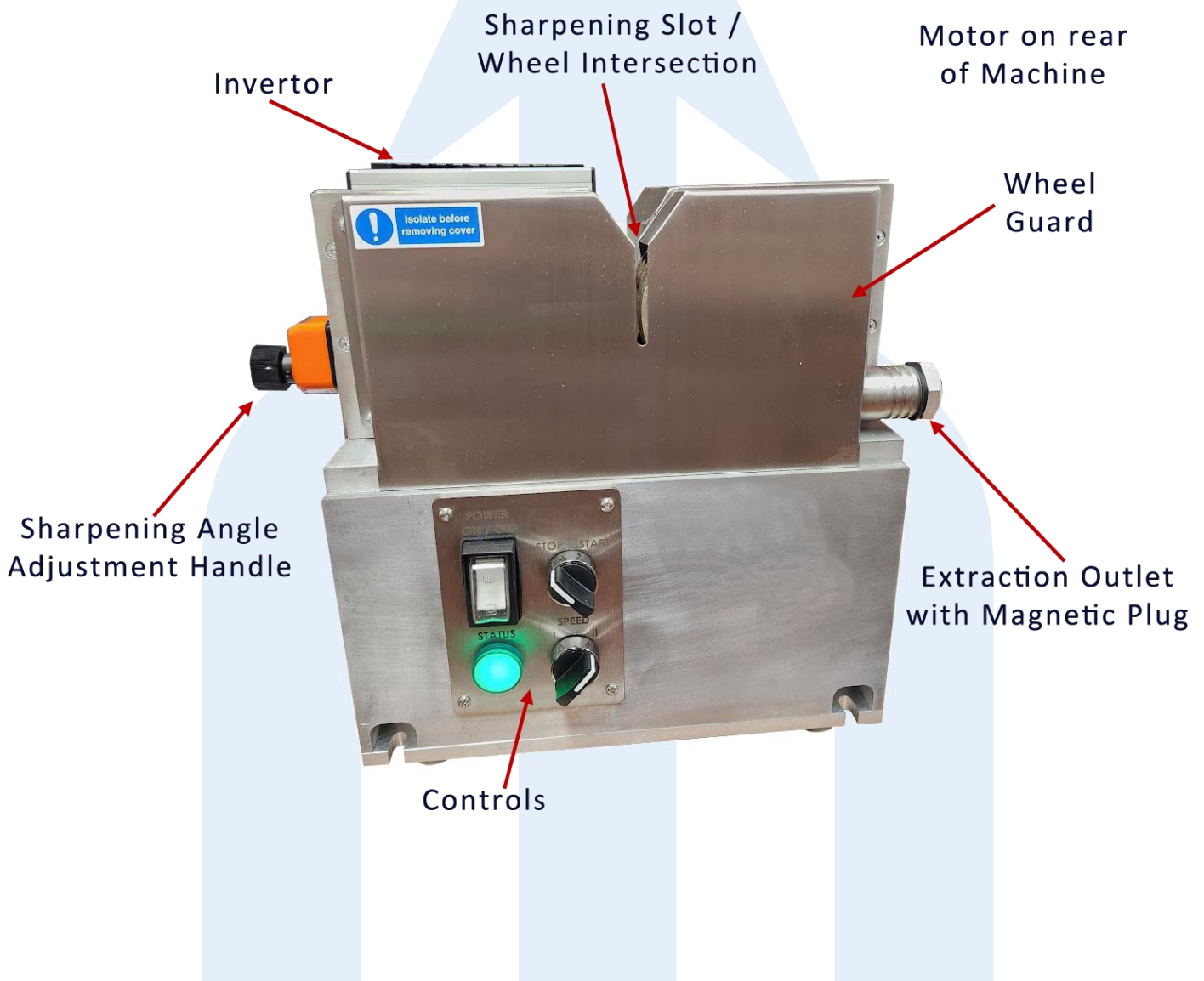
1. Machine Overview

The machine is supplied with spiral abrasive wheels, which are suitable for sharpening (and re-sharpening in service environments) a wide range of handheld designs (whether a handle is fitted or not). This is a dry grinding operation. A range of angles can be sharpened, depending on the size of wheel fitted by virtue of adjacent centres. It is also possible to open the wheels to a position which will product blade thinning.

The standard wheels supplied on the machine have a small front radius, which aids the operator when blades have a concave shape or a small radius at the choil, e.g. a boning knife. The wheels will also sharpen the vast majority of straight or convex formed blades. Straight form wheels are recommended in applications where it is required to sharpen the blade right into the choil e.g. pocket and pen knives.

All personnel should read this manual before installing or using the machine.

Fig 1



2. Specification

Size and Weight

Height: 330mm
Width: 410mm
Depth: 360mm
Weight: 40kg

IP50 - Wipe down only

Motor

220-240V - 50Hz
3ph 0.55kW

Inverter

220-240V - 50Hz
0.75kW
1ph to 3ph

Machine Supply

1ph 20-240V 50Hz

Wheel Spindle Speed

I - 800RPM
II - 1300RPM

Wheels:

Standard 38mm wide spirally interlocking, in sizes across ->
CBN coated - B126 and B76 Grit standard

The wheel spindle speed is correct for the type of wheels fitted to this machine and should not be altered except in consultation with the manufacturer.

Wheel Size	Surface Speed m/min
40°	388
60°	466

3. Inventory

1 x Sharpening Machine
1 x Pair Spiral Interlocking Abrasive Wheels (size according to customer choice)
1 x 30mm A/F box spanner with "T" bar
1 x 3.0m hex driver tool
1 x "spider pin" wheel locating tool
1 x Safety Glasses
1 x Instruction Manual

3. Installation

Check and identify the equipment supplied against the inventory schedule on previous page and inspect for any defects occurring in transit before preparing the machine for use.

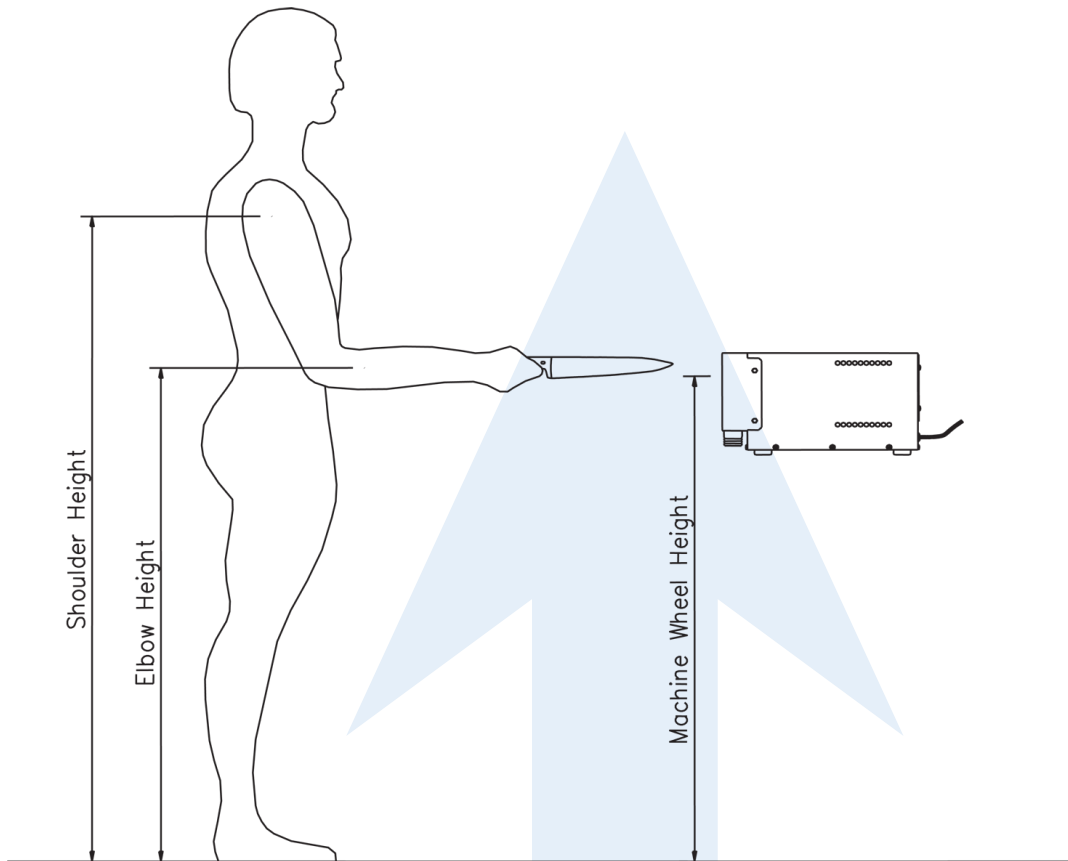


Fig 2

Site the machine on a firm level bench convenient for connection to electrical supply and extraction equipment. It may be free standing on the rubber feet, or bolted down through the holes in the base plate for 8mm screws, in which case remove the rubber feet.

The machine should be set at a height such that a relatively tall person meets the arrangement shown in figure 2. Adjust the position for shorter operators using a board / plinth in order to achieve an elbow height slightly above the wheel level.

Connecting to a power supply

The machine should be connected to a suitable single-phase electrical supply of the rating according to the factory site specified by the customer. The machine should always be earthed.

Wiring Convention -

Live Brown

Neutral Blue

Earth Green / Yellow

The machine has an internal under volt / no volt release and motor protection with the inverter safety features.

The direction of rotation is as follows:

LEFT HAND spindle rotates ANTICLOCKWISE and

RIGHT HAND spindle rotates CLOCKWISE (i.e. in the direction of the arrows on the wheel guard)

If grinding wheels are supplied separately, before fitting inspect them for any transit damage. Fit the wheels by following the refitting procedure on page 17. On start up there should be no ringing noise indicating wheel interference.

4. Dust Extraction

There is very little wheel wear using the CBN abrasive wheels. However, the main by-product of sharpening will be particles of steel dust produced by grinding. Small magnets fitted inside the wheel guard will retain some of the dust. Larger amounts can be removed locally from the machine using a suitable extraction system.

The wheel guard of this machine has been fitted with an extraction outlet ready to be connected to a suitable system. The outlet should be covered when not in use, using the magnetic cap provided (see Fig 1).

5. Safety

As with any grinding machine, there is an element of risk to the user of either trapping or physical abrasion to parts of the body. However, the design of the V100 incorporates several features to reduce the chance of accidental injury.

- All mechanical moving parts are fully enclosed in solid guarding.
- The guarding incorporates a “V” shape aperture, small enough to prevent finger trapping while allowing the blade to reach the abrasive wheels.
- The risk of grinding wheel bursting (as with conventional wheels) is negligible due to the solid steel construction of the wheels.
- The surface speed of the abrasive wheels is considerably less than that for conventional wheels.
- The interlocking principle of the wheels and their upwards direction of rotation, presents a positive location and makes it easier for the operator to present the blade to the wheels than in any other similar off-hand grinding operation.

Ensure the following precautions are taken before operating the machine

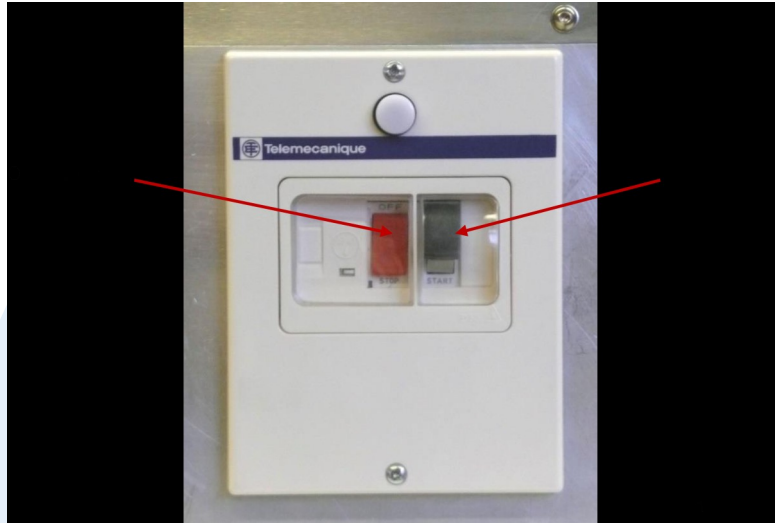
- All the guards are in place
- Wear safety glasses or a face shield at all times whilst operating the machine.
- The wheels are not loose, damaged, or badly adjusted for clearance
- Do not start the machine with anything obstructing the wheels
- Only apply knife blades to the wheels – anything else will invalidate the guarantee
- Do not grind anything less than 50 Rockwell
- Employ dust control and / or protective measures appropriate to the materials being ground
- Provide appropriate training to operators in the use of the machine and techniques of grinding components. MEFE can provide training and / or video instructions by agreement.
- Ensure the machine is isolated from the electrical supply when fitting new wheels, carrying out routine maintenance or any other activity where moving parts of the machine are exposed.

6. Operating the Machine

Run the machine only when the wheels are secured and set up correctly, refer to the Refitting section (page 17). Ensure that all the guards are fitted securely.

Single Speed Version

Start and stop the grinding wheels using the appropriate buttons on the front of the machine. See fig 3. Allow the machine to run up to full speed (approx. 5 seconds) and proceed only if the wheels are in good order and running satisfactorily.



Dual Speed Version

The operator can select one of two speeds for the grinding wheels.

The fast setting (II) is used for quickly regenerating the sharpened angle when a knife has become badly worn or suffered edge damage.

The slow setting (I) is used for the final one or two passes of the blade passing through the wheels. This lowers the risk of softening the cutting edge which will reduce the life of the sharpened edge.

To start the machine, press the power on switch, wait until the Drive Healthy LED is on. The Start / Stop Switch can be moved to Start position. It will start at whichever speed is selected below. The speed can be altered while the machine is running.

Note, the machine will not start automatically if the switch has been left in the Start position upon last shut down.

To stop the machine, move the Start / Stop switch to the Stop position and wait until the machine has spun down and is at a full stop (approx. 5 seconds). The On / Off switch can then be pressed.

DO NOT press the On / Off switch without stopping the machine first. This may damage the inverter due to the momentum of the wheels.



Fig 4

Changing the Speed

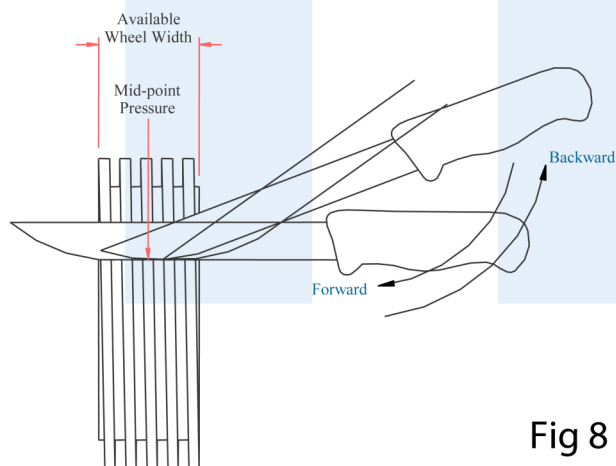
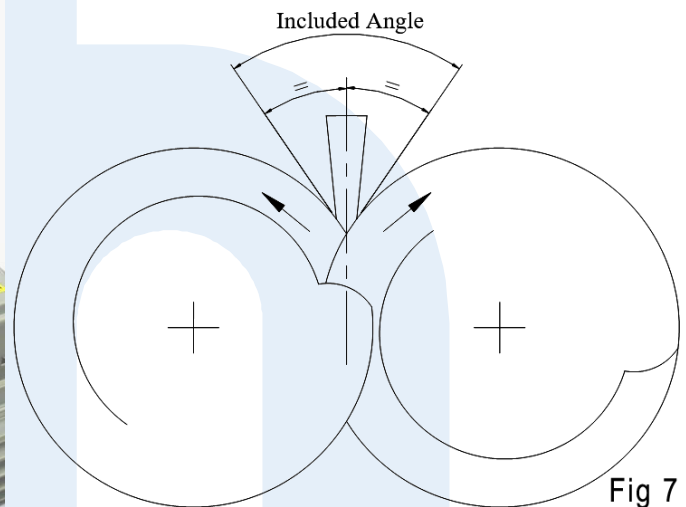
As standard; Speed I is set at 800 RPM, Speed II is set at 1300 RPM. If required, the velocity of each setting can be changed. The below procedure explains how to do this.

DO NOT change any of the other settings on the inverter. This may cause irreparable damage to the inverter, motor or V100 mechanical components. Changing any other settings will result in the warranty being void.

1. Turn the V100 on, but do not start the motor.
2. Press and hold the square button on the inverter until a P-00 program starts flashing.
3. Using the up and down arrows, navigate to P-38 (Parameter Access Lock) and change the value to 0. This will unlock the inverter settings.
4. Press the square button to accept the change and navigate to either P-20 (Speed II) or P-21 (Speed I). The value is shown in RPM.
5. Once the speed has been changed to the desired setting, press the square button to confirm. Navigate back to P-38, set the value to 1 and hold the square button. This will re-lock the inverter and avoid any accidental changes.

7. Principle of Sharpening

The design and arrangement of the interlocking wheels on the machine means that there is a fixed angle in the “valley” at the intersection of the wheels. This angle is determined by the diameter and the centres of the wheel, see Setting the Grinding Angle, Page 11. When the wheels are rotating, an abrasive surface is generated due to the CBN coating. This surface is capable of grinding simultaneously on both sides of a knife blade. The opposing spiral interlocking wheels means they can run together in opposite directions without contact, creating an intersection point for sharpening.



a).

Fig 8

The knife should be held by its handle in the operators hand and offered into the intersection of the wheels, applying a light downwards pressure making the edge of the blade contact in the very bottom of the “V”.

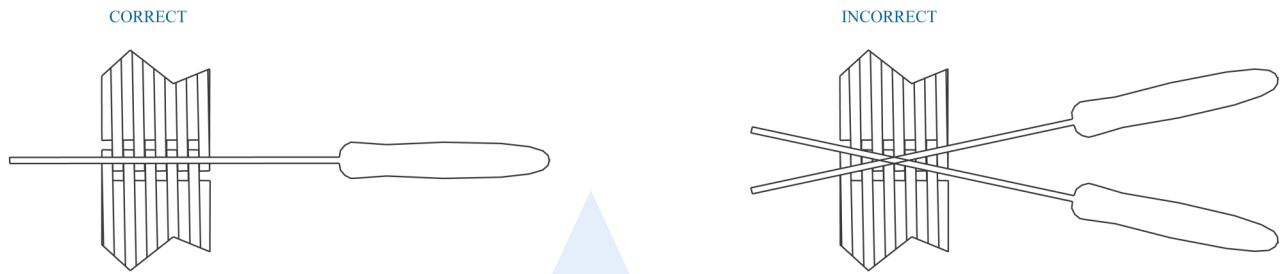


Fig 9

b). Whilst maintaining the attitude of the blade vertical (Fig 8) and parallel (Fig 9) to the intersection of the wheels; the blade should be traversed in a motion which maintains the profile of the edge in contact with the wheels and the line of the “V” form normal to the curvature of the blade (as in Fig 7).

Depending upon the blade edge thickness, a combination of several passes through the wheels with a contact pressure applied is required to ensure a sharp edge is produced. Ensure that sharpening has fully taken place with the sides of the blade coming to a sharp point. This can be achieved by looking vertically on to the blade edge, under a bright light. If the blade is not completely sharpened, a shiny reflection will be seen.

The component should be kept constantly moving in the forward and backward motion to ensure an even grind over the length of the blade edge and reduce the risk of overheating. Blades should be first applied to and removed from the wheels in the middle of the width available (Fig 9)

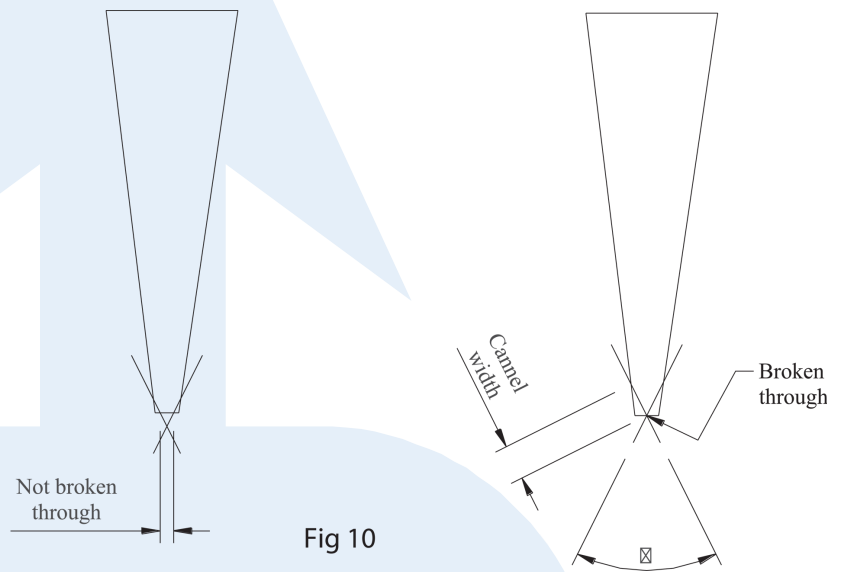


Fig 10

8. Useful Hints

1. Do not hold the knife handle with too rigid a grip. Adopt a comfortable and relaxed attitude at the wrist and fingers. This will allow the blade to self-align itself in the intersection of the wheels. Using the forefinger on the back of the blade helps to control the pressure.
2. Avoid excessive use or over pressure on the front or back of the wheels (where the spiral runs out) as this causes chatter and damage to the wheels.
3. Avoid passing the blade over the front and back edges of the wheels at an incorrect attitude as this causes indentations in the ground edge and damage to the wheels as shown in figure 11 below.

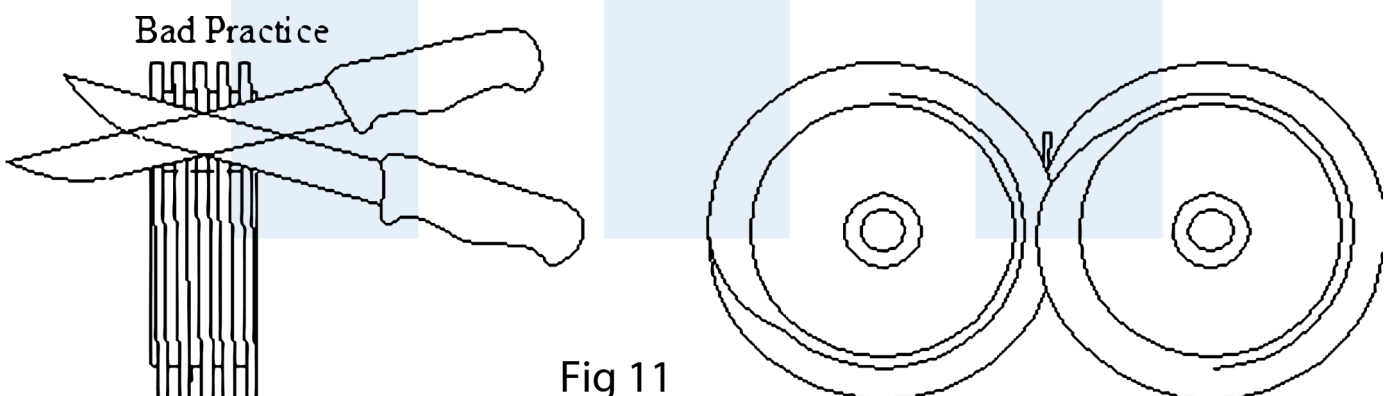


Fig 11

4. Avoid starting to sharpen by placing the blade point first down into the wheels or withdrawing the blade point over the front edge as both these will cause the blade to receive a kick as shown in figure 12.
5. Special non-standard wheels can be manufactured to cater for blades, which may have a concave shape on the cutting edge as shown in figure 13. Contact MEFE for further details.
6. Where it is particularly important to sharpen the blade right up to a position very close to the handle, then it is very useful to fit a stop either to contact the point of the blade or the front of the handle whichever is the most suitable. This will give the operator confidence to enter the blade with the handle as close to the front of the wheel as possible.
7. No two knife designs have the same blade edge profile. This means that the blade motions for each pattern through the wheels should be designed to optimise the number of passes required (and thus shorten the process time) and utilisation of the available wheel surface.

Bad Practice

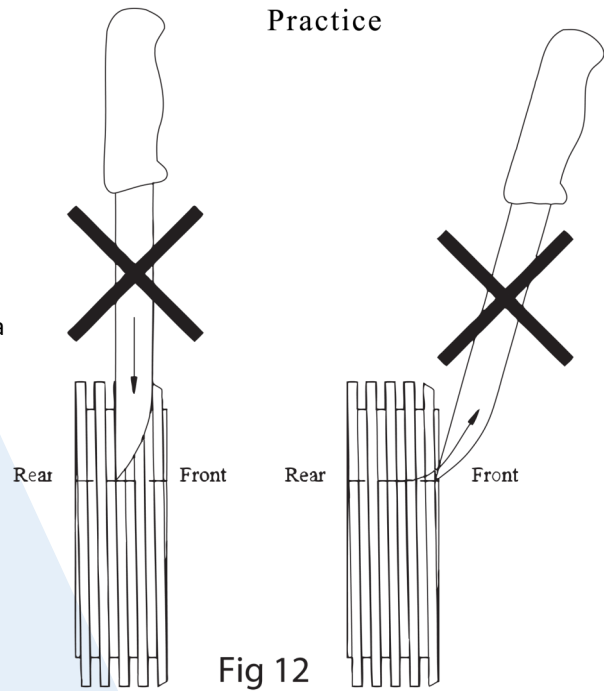


Fig 12

8. Although CBN has a high thermal stability, a coolant/lubricant should be used wherever practical. It has a good dry performance when used for sharpening operations by hand, however, the use of a lubricant will increase wheel life by as much as 50% over a dry operation provided that the right coolant is used.

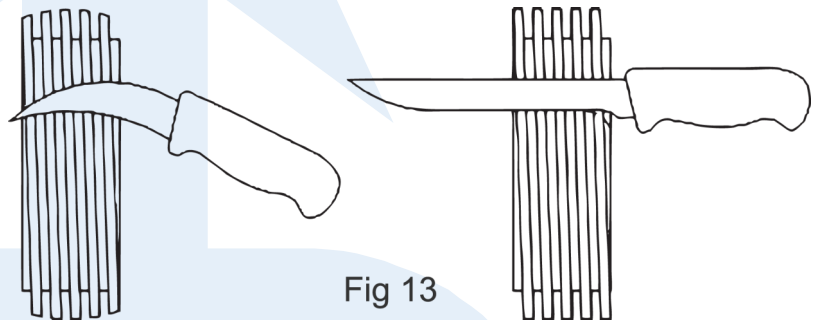


Fig 13

Water-based coolant can reduce the life of the wheels and therefore these should not be used.

The use of straight sulphated mineral oils is recommended. However, problems of oil mist (which requires the use of air filtering systems) arises when copious amounts are used. When sharpening knives, a much simpler techniques can be used without these problems occurring. Simply wipe the edge of the knife to be sharpened over the surface of a felt pad standing in a dish of oil. A small amount of oil will be transferred locally to the blade without any undue excess.

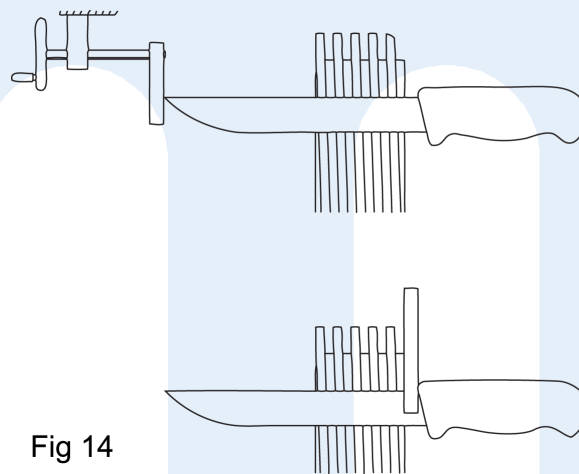


Fig 14

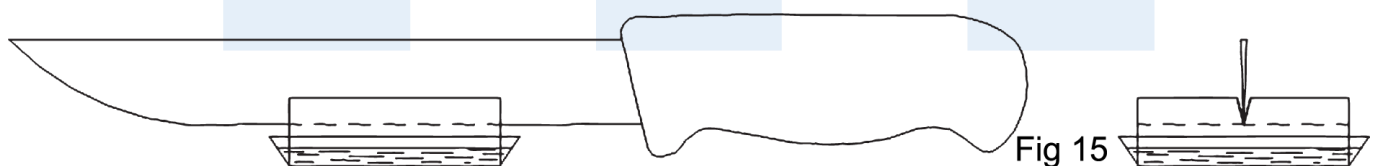


Fig 15

9. Selecting and Setting the Grinding Angle

The V100 knife sharpening machine has an adjustable sharpening angle, and with the correct size grinding wheels, can easily be set to sharpen knives for different users e.g.

Knife Type	Grinding Angle (inclusive)
Table Blades	>55°
Kitchen / Professional Knives	30°
Professional / Special Knives	25°

A feature of the machine is that grinding wheel centres can be adjusted to set the required angle ground on the blade. The range of angles obtainable is determined by the diameter and amount of interlocking of the wheels. Table 1 shows the relationship between these parameters, based on the diameter of new wheels. The user should note that if damaged or worn wheels were salvaged by turning down on diameter, the relationship would be slightly different.

The V100 accepts all “100” designated wheels, 30°, 45°, 60°, each of which provides a different range of sharpening. The standard offered is the 60° wheels, which gives the maximum sharpening angle and range. Other sizes of wheel are optional.

The machine is fitted with a mechanical stop at the minimum wheel centres (92.4mm) for safety as this prevents the wheels coming into contact at maximum engagement. At the opposite limit the wheels can disengage by a few millimetres to allow blade thinning or separate wheel removal. The best setting for thinning operation is a gap of 0.5mm, which should be set using a thickness gauge with the wheel’s stationary.



Locate the adjusting handle on the left-hand side of the machine (figure 16). Make the necessary adjustment by turning the handle in the appropriate direction – anticlockwise to increase the included angle and clockwise to decrease the included angle, when looking from the side.

To assist the user in setting a desired sharpening angle, the machine has a digital indicator fitted to the adjusting spindle. This is geared in relation to the pitch of the lead screw and can be used to determine the current wheel centres and thus the angle by look up table - Table 1.

As this is an external indicator, adjustments can therefore be made on the fly whilst the machine is running. The maximum range of travel (adjustment of centres) is 16mm. This is represented by 000.0 (minimum centres 92.4) to 015.6 (maximum centres 108) at the indicator. So for example to set 30° using new 40° wheels (from Table 1) move the indicator to 002.6. When using the pin tool to change the wheels, adjust the slide so the reading is 000.0.

Fig 16

Table 1

60° Wheels

Sharpening Angle °	Setting Required							
	Indicator Reading	Centres 107.2mm	Indicator Reading	Centres 106.2mm	Indicator Reading	Centres 105.2mm	Indicator Reading	Centres 104.2mm
61	000.0	92.4						
60	000.5	92.9	000.0	92.4				
59	000.9	93.3	000.1	92.5				
58	001.4	93.8	000.5	92.9				
57	001.8	94.2	001.0	93.4	000.1	92.5		
56	002.3	94.7	001.4	93.8	000.5	92.9		
55	002.7	95.1	001.8	94.2	000.9	93.3	000.1	92.5
54	003.2	95.6	002.3	94.7	001.4	93.8	000.5	92.9
53	003.6	96.0	002.7	95.1	001.8	94.2	000.9	93.3
52	004.0	96.4	003.1	95.5	002.2	94.6	001.3	93.7
51	004.4	96.8	003.5	95.9	002.6	95.0	001.7	94.1
50	004.8	97.2	003.9	96.3	003.0	95.4	002.1	94.5
49	005.2	97.6	004.3	96.7	003.4	95.8	002.5	94.9
48	005.6	98.0	004.7	97.1	003.7	96.1	002.8	95.2
47	005.9	98.3	005.0	97.4	004.1	96.5	003.2	95.6
46	006.3	98.7	005.4	97.8	004.5	96.9	003.6	96.0
45	006.7	99.1	005.8	98.2	004.8	97.2	003.9	96.3
44	007.0	99.4	006.1	98.5	005.2	97.6	004.2	96.6
43	007.4	99.8	006.4	98.8	005.5	97.9	004.6	97.0
42	007.7	100.1	006.8	99.2	005.8	98.3	004.9	97.3
41	008.0	100.4	007.1	99.5	006.2	98.6	005.2	97.6
40	008.4	100.8	007.4	99.8	006.5	98.9	005.6	98.0
39	008.7	101.1	007.7	100.1	006.8	99.2	005.9	98.3
38	009.0	101.4	008.1	100.5	007.1	99.5	006.2	98.6
37	009.3	101.7	008.3	100.8	007.4	99.8	006.5	98.9
36	009.6	102.0	008.6	101.0	007.7	100.1	006.7	99.1
35	009.9	102.3	008.9	101.3	008.0	100.4	007.0	99.4
34	010.2	102.6	009.2	101.6	008.2	100.6	007.3	99.7
33	010.4	102.8	009.5	101.9	008.5	100.9	007.5	99.9
32	010.7	103.1	009.7	102.1	008.8	101.2	007.8	100.2
31	010.9	103.3	010.0	102.4	009.0	101.4	008.0	100.4
30	011.2	103.6	010.2	102.6	009.3	101.7	008.3	100.7
29	011.4	103.8	010.5	102.9	009.5	101.9	008.5	100.9
28	011.7	104.1	010.7	103.1	009.7	102.1	008.7	101.1
27	011.9	104.3	010.9	103.3	009.9	102.3	009.0	101.4
26	012.1	104.5	011.1	103.5	010.1	102.5	009.2	101.6
25	012.3	104.7	011.3	103.7	010.3	102.7	009.4	101.8
24	012.5	104.9	011.5	103.9	010.5	102.9	009.6	102.0
23	012.7	105.1	011.9	104.1	010.7	103.1	009.7	102.1
22	012.9	105.3	011.9	104.3	010.9	103.3	009.9	102.3
21	013.0	105.4	012.1	104.5	011.1	103.5	010.1	102.5
20	013.2	105.6	012.2	104.6	011.2	103.6	010.3	102.7
19	013.4	105.8	012.4	104.8	011.4	103.8	010.4	102.8
18	013.5	105.9	012.5	104.9	011.5	103.9	010.6	103.0
17	013.7	106.1	012.7	105.1	011.7	104.1	010.7	103.1
16	013.8	106.2	012.8	105.2	011.8	104.2	010.8	103.2
15	013.9	106.3	012.9	105.3	011.9	104.3	010.9	103.3
14	014.0	106.4	013.0	105.4	012.1	104.5	011.1	103.5
13	014.1	106.6	013.2	105.6	012.2	104.6	011.2	103.6
12	014.3	106.7	013.3	105.7	012.3	104.7	011.3	103.7
11	014.3	106.7	013.3	105.8	012.4	104.8	011.4	103.8
10	014.4	106.8	013.4	105.8	012.4	104.8	011.4	103.8
9	014.5	106.9	013.5	105.9	012.5	104.9	011.5	103.9
8	014.6	107.0	013.6	106.0	012.6	105.0	011.6	104.0
7	014.6	107.0	013.6	106.0	012.6	105.0	011.6	104.0
6	014.7	107.1	013.7	106.1	012.7	105.1	011.7	104.1
5	014.7	107.1	013.7	106.1	012.7	105.1	011.7	104.1
4	014.8	107.2	013.8	106.2	012.8	105.2	011.8	104.2
3	014.8	107.2	013.8	106.2	012.8	105.2	011.8	104.2
2	014.8	107.2	013.8	106.2	012.8	105.2	011.8	104.2
1	014.8	107.2	013.8	106.2	012.8	105.2	011.8	104.2
0	014.8	107.2	013.8	106.2	012.8	105.2	011.8	104.2

40° Wheels

Sharpening Angle °	Setting Required							
	Indicator Reading	Centres 98.3mm	Indicator Reading	Centres 97.3mm	Indicator Reading	Centres 96.3mm	Indicator Reading	Centres 95.3mm
40	000.0	92.4						
39	000.3	92.7						
38	000.6	92.9						
37	000.8	93.2						
36	001.1	93.5	000.2	92.5				
35	001.4	93.8	000.4	92.8				
34	001.6	94.0	000.7	93.0				
33	001.9	94.3	000.9	93.3	000.0	92.3		
32	002.1	94.5	001.2	93.5	000.2	92.6		
31	004.2	94.7	001.4	93.8	000.4	92.8		
30	002.6	95.0	001.6	94.0	000.6	93.0		
29	002.8	95.2	001.8	94.2	000.9	93.2	000.0	92.3
28	003.0	95.4	002.0	94.4	001.1	93.4	000.1	92.5
27	003.2	95.6	002.2	94.6	001.3	93.6	000.3	92.7
26	003.4	95.8	002.4	94.8	001.5	93.8	000.5	92.9
25	003.6	96.0	002.6	95.0	001.6	94.0	000.7	93.0
24	003.8	96.2	002.8	95.2	001.8	94.2	000.8	93.2
23	004.0	96.3	003.0	95.3	002.0	94.4	001.0	93.4
22	004.1	96.5	003.1	95.5	002.2	94.5	001.2	93.5
21	004.3	96.7	003.3	95.7	002.3	94.7	001.3	93.7
20	004.4	96.8	003.4	95.8	002.5	94.8	001.5	93.9
19	004.6	97.0	003.6	96.0	002.6	95.0	001.6	94.0
18	004.7	97.1	003.7	96.1	002.7	95.1	001.8	94.1
17	004.8	97.2	003.9	96.2	002.9	95.2	001.9	94.3
16	005.0	97.3	004.0	96.4	003.0	95.4	002.0	94.4
15	005.1	97.5	004.1	96.5	003.1	95.5	002.1	94.5
14	005.2	97.6	004.2	96.6	003.2	95.6	002.2	94.6
13	005.3	97.7	004.3	96.7	003.3	95.7	002.3	94.7
12	005.4	97.8	004.4	96.8	003.4	95.8	002.4	94.8
11	005.5	97.8	004.5	96.9	003.5	95.9	002.5	94.9
10	005.6	97.9	004.6	96.9	003.6	95.9	002.6	94.9
9	005.6	98.0	004.6	97.0	003.7	96.0	002.6	95.0
8	005.7	98.1	004.7	97.1	003.7	96.1	002.7	95.1
7	005.7	98.1	004.7	97.1	003.7	96.1	002.8	95.1
6	005.8	98.2	004.8	97.2	003.8	96.2	002.8	95.2
5	005.8	98.2	004.8	97.2	003.8	96.2	002.8	95.2
4	005.9	98.2	004.9	97.2	003.9	96.2	002.9	95.2
3	005.9	98.3	004.9	97.3	003.9	96.3	002.9	95.3
2	005.9	98.3	004.9	97.3	003.9	96.3	002.9	95.3
1	005.9	98.3	004.9	97.3	003.9	96.3	002.9	95.3
0	005.9	98.3	004.9	97.3	003.9	96.3	002.9	95.3

Visual Adjustment of Angle

Locate the adjusting handle on the left-hand side of the machine (figure 16). Make the necessary adjustment by turning the handle in the appropriate direction – anticlockwise to increase the included angle and clockwise to decrease the included angle, when looking from the side.

It is advised that the adjustment is made with the machine stopped and disconnected from the electrical supply. Remove the wheel guard and measure the wheel centre distance between two same points on the front of the wheels.

Alternatively, the angle may be changed with the machine running if you have a measuring device such as a laser goniometer available. This can measure the angle produced on the blade after sharpening. Make small re-adjustments as necessary and measure a sharpened blade. This is the most accurate way to set the angle required.

Sharpening Angle °	Wheel Centres Required				Sharpening Angle °	Wheel Centres Required			
	Wheel Size					Wheel Size			
	70°	60°	45°	30°		70°	60°	45°	30°
71	92.65				35	108.53	102.52	96.00	
70	93.22				34	108.83	102.80	96.26	92.40
69	93.79				33	109.11	103.07	96.51	92.64
68	94.35				32	109.39	103.34	96.76	92.88
67	94.90				31	109.66	103.59	97.00	93.11
66	95.44				30	109.92	103.84	97.23	93.33
65	95.98				29	110.18	104.08	97.45	93.54
64	96.51				28	111.42	104.31	97.67	93.75
63	97.03				27	111.66	104.53	97.88	93.95
62	97.55				26	110.88	104.74	98.08	94.14
61	98.05	92.63			25	111.10	104.95	98.27	94.33
60	98.55	93.10			24	111.31	105.15	98.46	94.51
59	99.05	93.56			23	111.52	105.34	98.64	94.68
58	99.53	94.02			22	111.71	105.52	98.81	94.84
57	100.01	94.47			21	111.89	105.70	98.97	95.00
56	100.48	94.92			20	112.07	105.87	99.13	95.15
55	100.94	95.35			19	112.24	106.03	99.28	95.29
54	101.40	95.78			18	112.40	106.18	99.42	95.43
53	101.84	96.21			17	112.55	106.32	99.55	95.56
52	102.28	96.62			16	112.69	106.45	99.68	95.68
51	102.71	97.03			15	112.83	106.58	99.80	95.79
50	103.13	97.43			14	112.95	106.70	99.91	95.90
49	103.55	97.82			13	113.07	106.81	100.01	96.00
48	103.96	98.21			12	113.18	106.91	100.11	96.09
47	104.36	98.58			11	113.28	107.01	100.20	96.18
46	104.75	98.95	92.66		10	113.37	107.09	100.28	96.25
45	105.14	99.32	93.00		9	113.47	107.17	100.35	96.38
44	105.51	99.67	93.33		8	113.57	107.24	100.41	96.44
43	105.88	100.02	93.66		7	113.59	107.30	100.47	96.49
42	106.24	100.36	93.97		6	113.64	107.35	100.52	96.53
41	106.59	100.69	92.29		5	113.69	107.40	100.56	95.56
40	106.94	101.02	94.59		4	113.74	107.43	100.6	96.59
39	107.21	101.33	94.89		3	113.76	107.46	100.63	96.61
38	107.60	101.64	95.18		2	113.78	107.48	100.64	96.62
37	107.92	101.94	95.46		1	113.80	105.50	100.66	96.62
36	108.23	102.24	95.73		0	113.80	107.50	100.66	
Wheels Separated									

10. Abrasive Wheels

The grinding wheels on this machine are of spiral interlocking design. They are solid steel and supplied as a pair. When loading the wheels onto the machine, ensure the wheel numbers match. They are drilled on the front face to accept a wheel alignment tool, which assists in running clearance. See section Removing and Fitting Wheels.

Several sizes of standard wheel are available with a thin uniform electroplated coating of CBN abrasive on the periphery of the form. Standard abrasives are CBN126 and 76 grit although both coarser and finer grades are available on request.

Due to the construction, there is very little wear on these wheels during the grinding process. Which means no form of compensation for wheel wear or consistent grinding is required. In most cases, due to the CBN coating, the wheels can be used dry due to the speed the machine is designed to run at.

CBN has been found to be particularly suitable for applications such as knife sharpening where a small depth of cut per pass is required. It is a very cool cutting abrasive, and as such does not normally cause scorch of martensitic stainless steels used for knives even when used in the dry condition, except in cases where heavy metal removal is required, or excessive pressure is used. Excessive pressure may reduce wheel life and affect the corrosion resistance of stainless-steel blades and in certain circumstances lead to cracking.

All wheels for the V100 machines are drilled in the front face to receive a wheel alignment tool, which assists in setting up the running clearance.

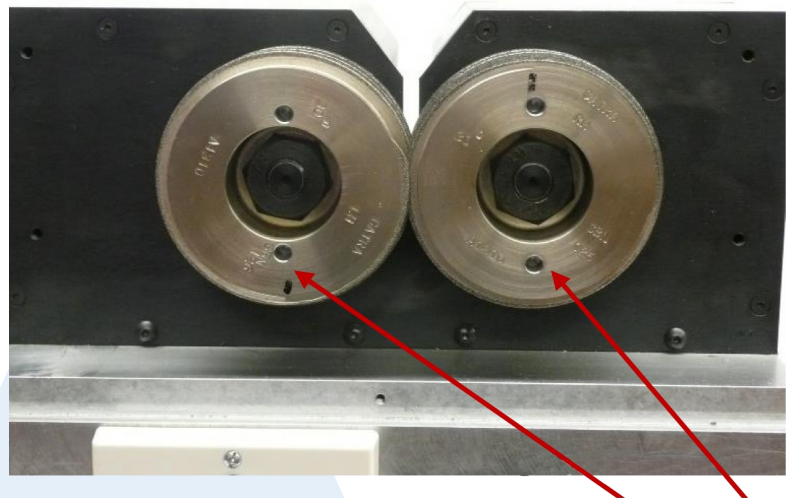


Fig 17

Adjustment Pinholes

11. Care of Wheels

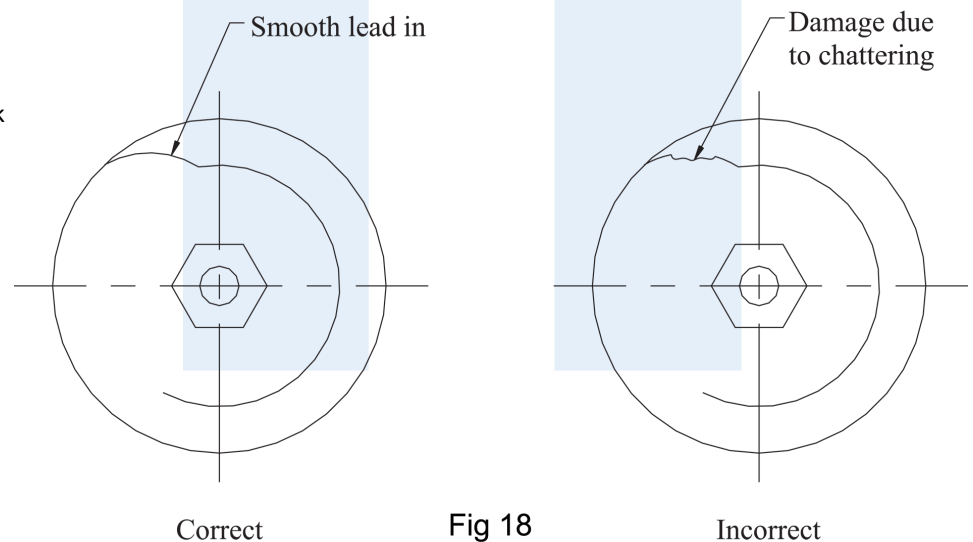
The spiral-whetting wheel should always be handled carefully, both on and off the machine. Extra care should be taken not to damage either the CBN coating or the bores and boss faces.

If damage has occurred due to chattering, usually on the lead in of the spiral form, this can be rectified by removing the wheels from the machine and smoothing in the damage with an engineer's file to produce a burr free leading angle again.

If the wheels are incorrectly interlocked damage will occur to the edges of the abrasive coating and to the grooves in the wheels. A distinctive ringing noise will signify this problem. To correct this the clearance of the wheels must be re-set as described in the following section, Removing and Fitting Wheels.

In extreme cases of incorrect interlock serious damage may occur if an attempt to use the machine is made.

Damage resulting in unnecessary loss of wheel life will be caused if grinding is continued when the coating becomes excessively worn, in whole or part, resulting in the steel surface of the wheel being exposed. Before this occurs, ensure the wheels are re-coated.



Correct

Fig 18

Incorrect

12. Abrasive Recoating

With increased use, the single layer abrasive becomes worn and loses its bite without loss of wheel size.

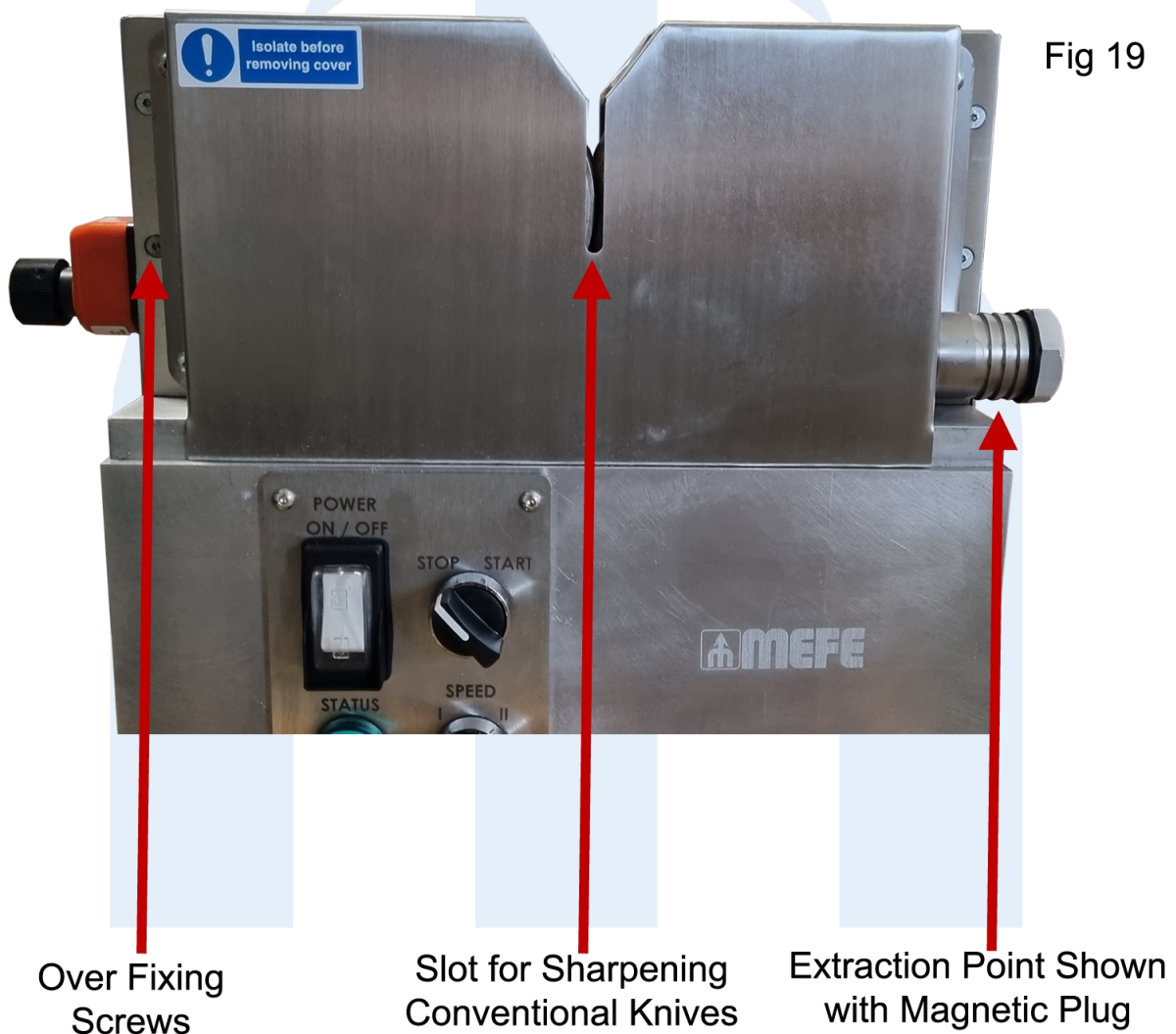
Normally, wheels can be chemically stripped of the electroplate and any CBN recovered. If the form has not been damaged the wheel can be recoated. This process can be repeated several times. However, if the form is damaged, it will need to be re-machined to the original profile before re-plating. Depending on the application there will be a limit to the number of times this can be done before a new wheel is required.

The recoating service is available through MEFE. The use of spare pairs of wheels is recommended to ease this process.

13. Removing and Fitting Wheel Guard

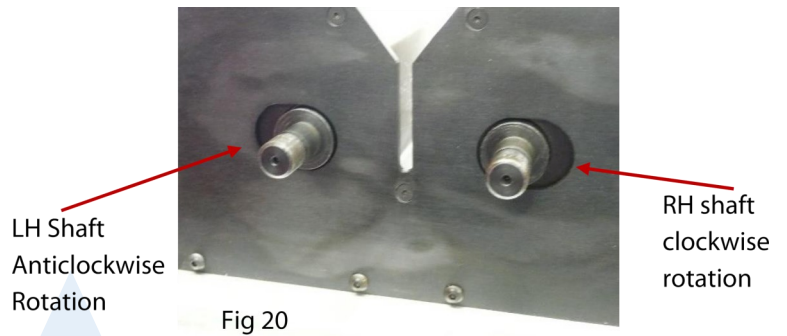
Access to change or inspect the abrasive wheels is gained by removing the wheel cover.

1. Isolate the machine from the electrical supply.
2. Remove the 4 screws retaining the wheel cover using the 8mm A/F spanner supplied or socket and remove the box cover.
3. Refitting is the reverse of the above. When offering the guard back onto the machine line up the screw holes.
4. Fit and tighten the fixing screws with the "V" form aligned to the back plate "V". Never run the machine without fixing the guard securely with all the screws.



14. Removing and Fitting Wheels

Isolate the machine and remove the wheel cover shown in the previous section. Each wheel fits on a plain shaft, with nut for securing. Viewed from the front of the machine the direction for tightening these is shown in figure 20.



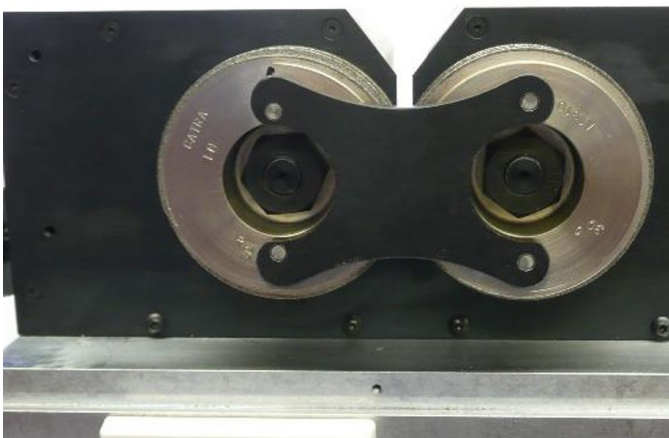
Wheels are drilled with 2 holes in the front face to facilitate the alignment tool shown in figure 21.

Removal

For standard interlocking wheels of any size, adjust the centres to the minimum 92.4mm and turn the wheels by hand until the pin holes are aligned as shown in figure 22. Note that the holes in the left-hand wheel have smaller centres than those of the right-hand wheel. There is only one orientation for the spanner to fit the wheels.



1. Offer the tool up to the wheels and if necessary, make small adjustments to the wheel centres and rotation until the pins locate and the tool fits flush to the face of the wheels figure 22.
2. Hold the tool in place and then use the box spanner to loosen each nut, as shown in figure 23. When the nuts are loose, the tool can be put aside, and the nuts completely removed.
3. Open the centres until the wheels disengage and pull each wheel off its shaft individually.



DO NOT hammer the wheels or apply unequal leverage at the periphery of the wheels with tools. This may cause bruising or other damage to the wheels.

If there is a difficulty in removing wheels, there is some other underlying problem. E.g., wheels jammed, binding or bruising on shafts caused by undue care.

Refitting

Before refitting a pair of wheels make sure that both shafts, threads and shoulders are clean and free from dirt, rust and physical damage. Grease has been applied on the shafts at time of manufacture, re-apply as required. Identify the appropriate wheel and nut for each shaft. Wheels are labelled RH and LH with mark side facing the operator. Clean the bores of the wheels.

Because there is no key drive (location) for the wheels, clearance can be set freely and must be set properly for the wheels to run. The advantage of using the alignment tool is that the running clearance between wheels is automatically set. This removes any necessary judgement required by the operator.

The procedure below demonstrates how to correctly fit the wheels.

1. Adjust the slide so the setting block comfortable fits in all four holes in the wheels. There is only one orientation for the spanner to fit the wheels.
2. Wind the slide outwards slightly, until the setting block is tight in the wheels.
3. Tighten up the Right-hand wheel first. **DO NOT OVER TIGHEN.** If the wheel slips or belt jumps, remove the spanner and take off the setting block to start again.
4. Tighten the Left-hand wheel. This wheel should be less susceptible to slipping after tightening the right-hand wheel first.
5. Wind the slide inwards slightly and remove the setting block. If one of the wheels turns and the other doesn't when released, it's likely that the wheels have slipped and they will be touching. If they are touching, the wheels will be damaged if the machine is started. **DO NOT** run the machine if this happens. Undo the wheels and restart from Step 1.

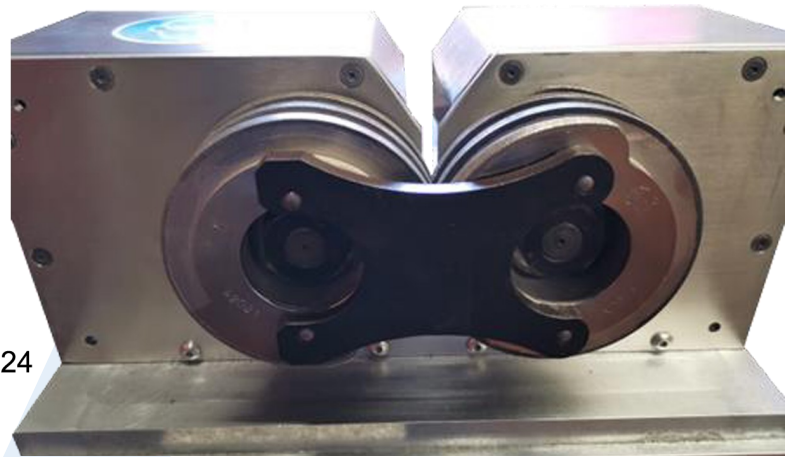


Fig 24

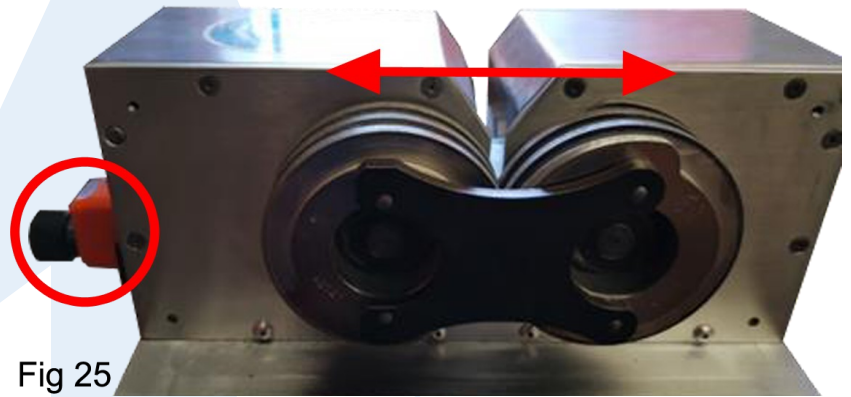


Fig 25

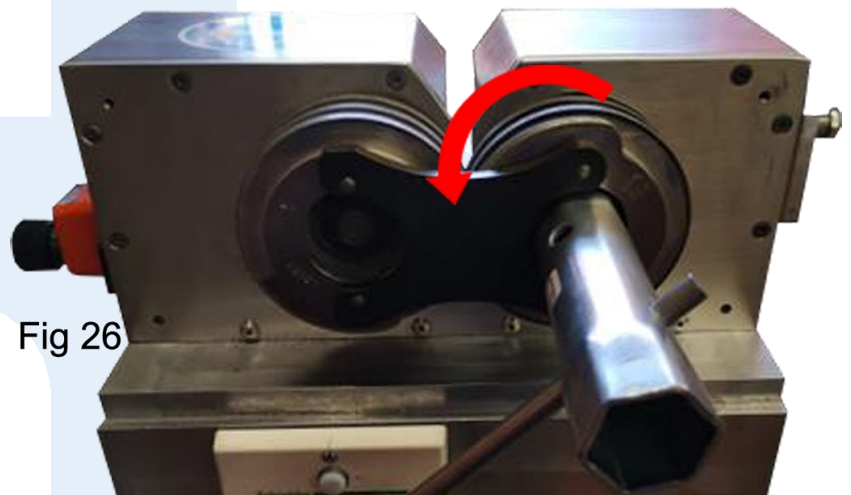


Fig 26

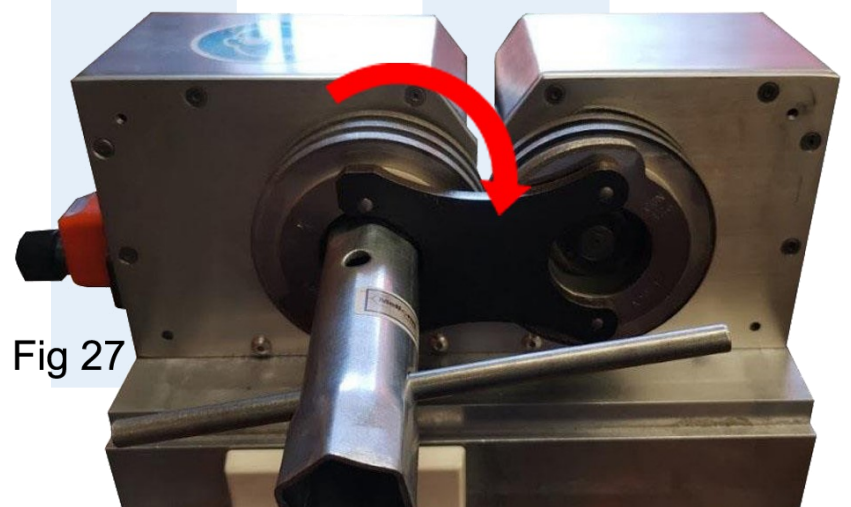


Fig 27

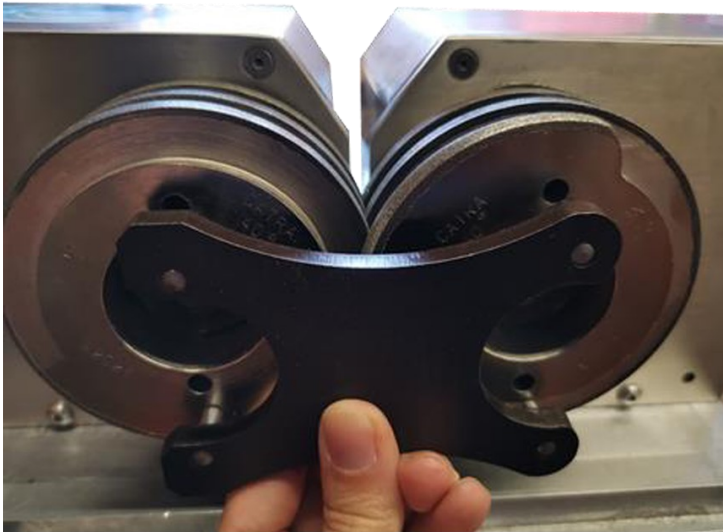


Fig 28

If the wheels will spin freely by turning the whole drive system over by hand and are not touching as shown in figures 29 & 30, replace the wheel cover. Adjust the wheel centres to the desired sharpening handle.

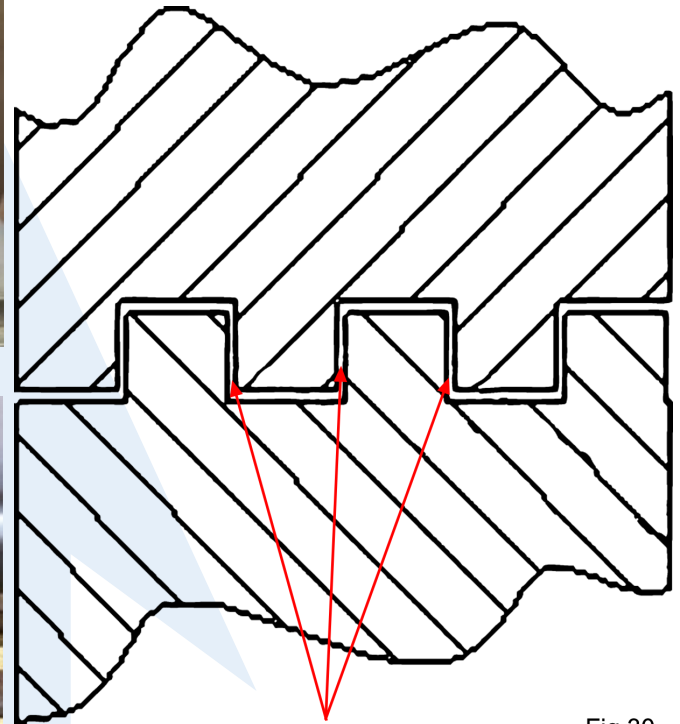


Fig 30

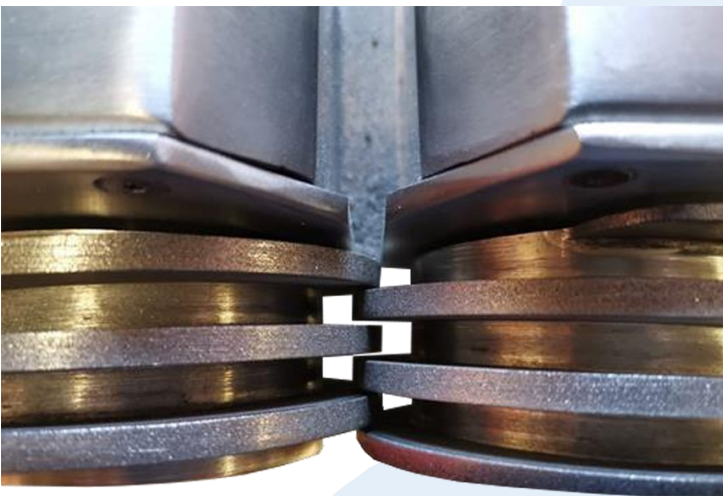


Fig 29

15. Maintenance

The V100 should need very little user maintenance throughout its lifetime, aside from regular grinding dust removal. Please follow the below maintenance guidelines to ensure the machine remains in serviceable condition.

- We recommend the grinding dust is removed at regular intervals (possibly daily if under heavy usage) or whenever required. This ensures the grinding wheels are not covered in dust which will reduce the efficiency and life of them.
- The machine external covers are made of stainless steel, which will maintain a good appearance and is easily cleaned. Covers can be cleaned using proprietary degreasing agents or hot soapy water. Use a wet cloth and dry the surfaces afterwards.
- The machine has an overall IP 50 rating – machine to be wipe down only.
- The condition of the wheel abrasive surface should be monitored daily, and recoating arranged when grinding becomes less effective and before the coating has been worn through.
- All internal bearings are sealed and greased for life and other parts suitably lubricated on assembly. There are no user adjustments required on the internal drive assembly.

However, if the machine is used in a heavy-duty application and the user has qualified engineering staff at the plant then an internal inspection, clean and grease would be beneficial. We would recommend this at 240-300 hours intervals.

- Ensure that the electrical supply is disconnected before removing the screws, which hold the rear cover.
- Periodically check the condition of the drive belt. In normal use the drive belt should not require any manual adjustment due to the spring-loaded tensioning device. For this to work effectively the tensioner should be free to move on its pivot. If it becomes necessary to make adjustment/replace the belt, contact MEFE for advice.
- When the back cover is removed take the opportunity to inspect the housing slide and adjusting screw. These are not constantly moving items and should not suffer extremes of wear however it should be always free to move when sharpening angle is altered. Inspect for wear by applying a turning moment to the moving housings whilst moving the centres over the full working range. Inspect and apply grease as necessary to maintain ease of movement and corrosion protection. Use a high-grade lithium-based grease.

Regulations require that this portable unit is electrically tested on a regular basis or whenever a fault is detected and rectified. This includes:

- Inspection of external cable for damage (e.g. abrasion) and security
- Correct fuse fitted to plug and functionality of strain relief mechanism
- Continuity Test
- Earth bonding test (do not clip onto wheels / spindles for this test)
- Insulation Test

The above maintenance can be carried out at MEFE. Please contact us for further information.

Bad practice in setting up/changing the grinding wheels may result in damage to the spindles or the drive system and should be avoided. Also running the machine with an obvious fault condition or with unexplained noise coming from the motor / drive housing may result in damage requiring costly repairs and will invalidate the guarantee. Always switch off and investigate any suspected problems.

In the event of unexpected problems with the machine please contact MEFE.

Waste Electrical & Electronic Equipment

Ensure this product is disposed of responsibly.

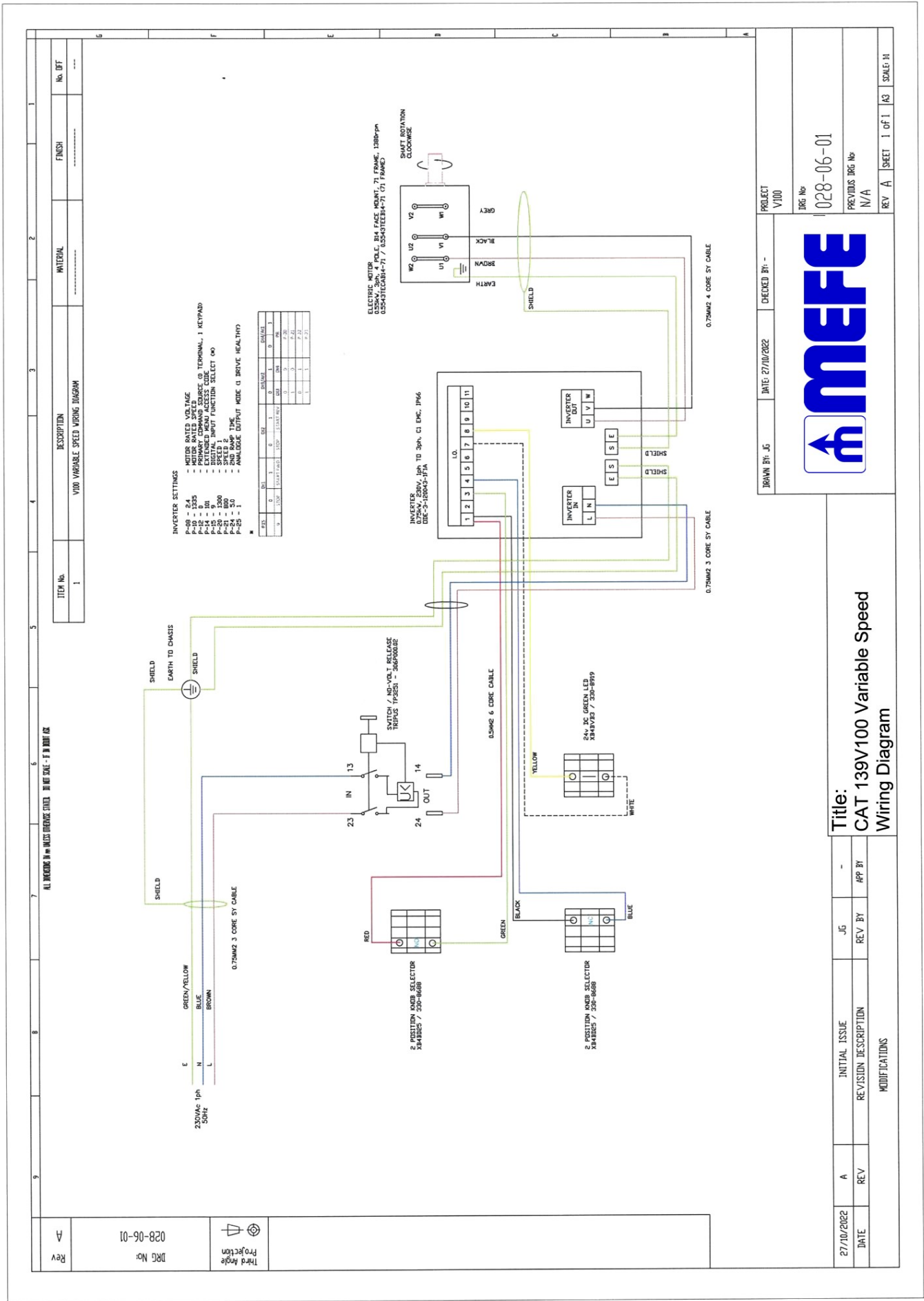
This symbol on the product, packaging or literature indicates that it should not be disposed of with general or household waste at the end of its working life. By disposing of this equipment responsibly you will help to prevent possible harm to the environment or human health.

If you find that your MEFE product needs replacement or is of no further use to you then separate it from other types of waste and ensure that it enters a stream for appropriate recycling. Local agencies/regulations may provide for separate collections of electrical items, from households or at municipal waste sites, which are then sent to approved recycling plants.

If you are unable to dispose of this item locally then you may send it to us for recycling.

- We will only accept equipment of our manufacture (purchase order or serial number verified).
- You must contact us prior to sending any item/s in order to verify the details and obtain our acknowledgement.
- We must receive a written declaration that you wish us to dispose of or recycle the item/s.

16. Appendix 1 - Wiring Diagram



PROJECT: V/00
 DATE: 27/10/2022
 DRAWN BY: JG
 CHECKED BY: -
 DECEDED BY: -
 MEFÉ
 DRG No: 028-06-01
 PREVIOUS DRG No: N/A
 REV A SHEET 1 of 1 K3 SCALE: 1:1

Title: CAT 139V100 Variable Speed Wiring Diagram

DATE	REV	INITIAL	ISSUE	DESCRIPTION	MODIFICATIONS
27/10/2022	A	JG	REV	REV	REV

17. Appendix 2 - Health and Safety Product Data Sheet

CBN Abrasive Coating Grinding Wheels

Product

Grinding Wheels normally supplied as a steel core with selected peripheral surfaces coated with a single layer of CBN grit using the electroplated bond system.

Use

For sharpening and other form grinding operations on hardened cutlery and / or other tool types.

Physical Data

These wheels will usually take the form of our standard spiral interlocking wheels (pairs) or bespoke profiled wheels for form grinding to special design.

Core Steel Specification BS970 : Pt1 1983 070M20 (Lead Free)

Dimensions

8" (200mm) Spiral Wheels	Ø203mm x 63.5mmW	6kg each
5.5" (140mm) Spiral Wheels	Ø140mm x 38mmW	2.1kg each
4" (100mm) Spiral Wheels	Ø96mm x 38mmW	1.7kg each
Typical Serrating Wheel	Ø178mm x 25mmW	2kg each

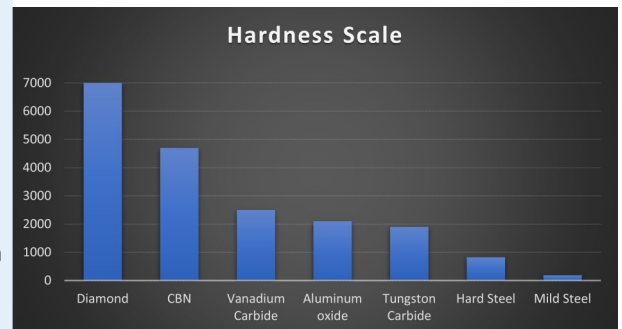
Surface Speeds:

10 - 20m/s Dry

10 - 50m/s With Adequate Lubrication

Abrasive

Cubic Boron Nitride (CBN) is the second hardest known material (2nd only to diamond). It is crystalline material, which is synthesised under conditions of extreme pressure and temperature and the crystals are blocky and regular in shape with very good cutting edge presentation. In the key characteristics of an abrasive i.e. high hardness, abrasion resistance, strength and resistance to thermal and chemical attack CBN exceeds the performance of conventional abrasives such as silicon carbide and aluminium oxide. Its good thermal stability is better than diamond for grinding ferrous materials.



Grits

There are two main manufacturers of this material and the general purpose grit supplied for use on these type of wheels is an uncoated grade and is black in colour. The more commonly available grit sizes are shown in the following Table:

FEPA Standard Grit Size	US Standard Grit Sizes Mesh
D 213	B 213 70 / 80
D 181	B 181 80 / 100
D 151	B 151 100 / 120
D 126	B 124 120 / 140
D 107	B 107 140 / 170
D 91	B 91 170 / 200
D 76	B 76 200 / 230
D 64	B 64 230 / 270
D 54	B 54 270 / 325
D 46	B 46 325 / 400
Diamond	CBN

Bond Systems

These electroplated wheels consist of a single layer of super abrasive particles bonded to the steel wheel surface by a nickel matrix. This bonding process has the advantage that wheels can be manufactured reasonably economically with various forms and contours.

As the nickel is deposited onto the core it entraps the CBN particles in a strong mechanical grip. This type of bond system is impractical to dress and thus this puts more importance on the wheel alignment on the machine and accuracy of manufacture of the initial core shape.

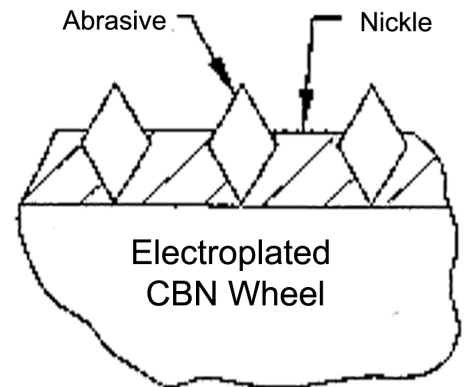
This system does not rely on fresh grits being presented by breakdown of the bond. In normal grinding the chips wear by shearing along cleavage planes. The disadvantage is that the single layer coating has a finite life. On the other hand wheels can normally be recoated thus making it a cost effective route.

General Safety

Care should be taken when handling these wheels. In some cases the weight of a single wheel or hub assembly may be significant. Whilst normally all sharp edges are removed during manufacture the abrasive surface can offer a small risk of abrasion during handling.

Prepare in advance and consult individual machine manuals for instructions regarding removal and fitting of wheels.

Employ good housekeeping in the work area and wear suitable overalls, gloves and safety footwear. Good personal hygiene in conjunction with suitable barrier creams is also recommended.



The method of storage and packaging for transportation should be carefully considered. Strong and stable wooden racking is recommended with individual wheels protected by 1" polystyrene separation.

Particular importance should be given to prevention of damage to the CBN coated surfaces, bores and boss faces.

Do not pack wheels in multiples, without layers of separating materials, or where the cumulative weight is outside the range of the available manual or mechanical lifting equipment.

Hazards & Precautions:

When handled and used for their intended purpose the constituents of these wheels are considered unlikely to present a health hazard.

Nickel may be a mild irritant to sensitive skin in prolonged continuous contact. The use of barrier creams and gloves when handling wheels is recommended.

The main area of concern when using these products is in the grinding operation, which can give rise to airborne dust. This will take the form of particles / chippings of the material being ground. Provided that the grinding wheel is not abused then particles of grit produced will be insignificant compared to those of the product being ground.

The user should take appropriate action to reduce the degree of exposure to and risk of inhalation of this nuisance material. This should include provision of adequate and efficient local exhaust, the wearing of suitable eye protection and other appropriate safety apparel.

Disposal / Recycling

One of the advantages of this type of wheel is that when the single layer abrasive is completely dulled it can be recoated. With good operator training and back up wheels in place it should be possible to release a dull wheel from production before any of the grit / bond has been damaged. The normal procedure is then to send the wheel back to MEFE where the coating can be reclaimed and replaced by our contractor.

If a wheel is badly used or has reduced in size so as not to be reusable by reforming and recoating, then the core blank should be recycled in the normal way with ferrous materials via the local metals dealer.