

MM2000I

OPERATING & MAINTENANCE MANUAL

ISSUE NUMBER	GENERATED BY	CHECKED BY	DATE
2	RB	RS	09/07/10
3	RS	RS	27/07/11

Products Overview

Mirage has developed a wide range of portable machines for a wide variety of industries and applications. We have a fully dedicated team of engineers to assist you in solving your in situ machining problems.

Product List

Model	Range
FLANGE FACING	
MM300e	0 - 12"
MM600e	0 - 24"
MM600ie	0 - 80"
MM1080ie	0 - 120"
MM610i	2 - 24"
MM860i	6 - 34"
MM1500i	12 - 60"
MM2000i	24 - 80"
MM3000i	45 - 120"
DRILLING & TAPPING	
HT20	2"
HT40	4"
HT50	5"
MILLING	
MR1000 - 3000	0.8m - 3m
MRY1500 - 3000	1.3m - 3m
WP2500 - 8000	1.8m - 8m
GM1000 - 10000	1.0m - 10m
HOT TAPPING	
HTM150	1/2" - 4"
HTM150XL	1/2" - 6"
CHT815 - 4000	2 - 48"
PIPE CUTTING / BEVELLING	
MSF300 - 1220	12 - 48"
LINE BORING	
LB30	1.5" - 6"
LB3060	1.5" - 24"
LB100	6 - 36"
LB150	12 - 60"



Flange facing

(0 - 315") Internal, external mounting and machining of all flange types and groove details including RTJ and compact flanges



Drilling

(0 - 5") Pneumatic or hydraulic portable drill



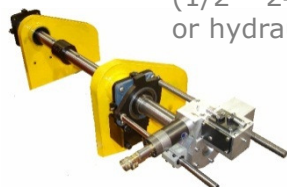
Tapping

(0 - 7") Pneumatic or hydraulic portable tapping machines



Milling

(50 - 120") 2 axis
(393 x 120") 3 axis / gantry



Line Boring

(1/2 - 24") Pneumatic or hydraulic



Hot Tapping

(1/2 - 36") Pneumatic or hydraulic



Hydraulic Power units

50 LPM @ 80 bar
380/440V 3 ph supply



Pipe cutting / prepping

(8 - 36") Pneumatic or hydraulic

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Important Notice

Mirage Machines Ltd has made every effort to ensure that the Information given in this technical leaflet and other publications relating to this machine is correct and understandable. However it is acknowledged that there may be errors or omissions in this publication.

The company reserves the right to modify its products without notification and consequently to supply machines that may not be in accordance with the descriptions and procedures within this publication.

The company also reserves the right not to provide updates, corrections or amendments to this publication but will endeavour to keep its customers up to date with all changes that may affect the machine operation or safety.

Health & Safety at Work Act

Section 6[4] of the above act requires manufacturers to advise their customers on the safety and handling precautions to be observed when installing , operating, maintaining and servicing their products. Accordingly, the following points should be noted:-

1. The relevant sections of these instructions should be carefully read before proceeding.
2. Installation, maintenance and servicing should only be carried out by suitably trained and competent personnel.
3. Normal safety procedures must be taken into account to avoid the possibility of an accident occurring.
4. Any safety equipment necessary for the maintenance / use of the equipment is the responsibility of the customer. Mirage Machines Ltd accepts no responsibility for accidents that may occur due to incorrect installation, maintenance or use.

GENERAL OPERATION

The following procedures are provided to enable your Mirage machine to be installed and function correctly and safely.

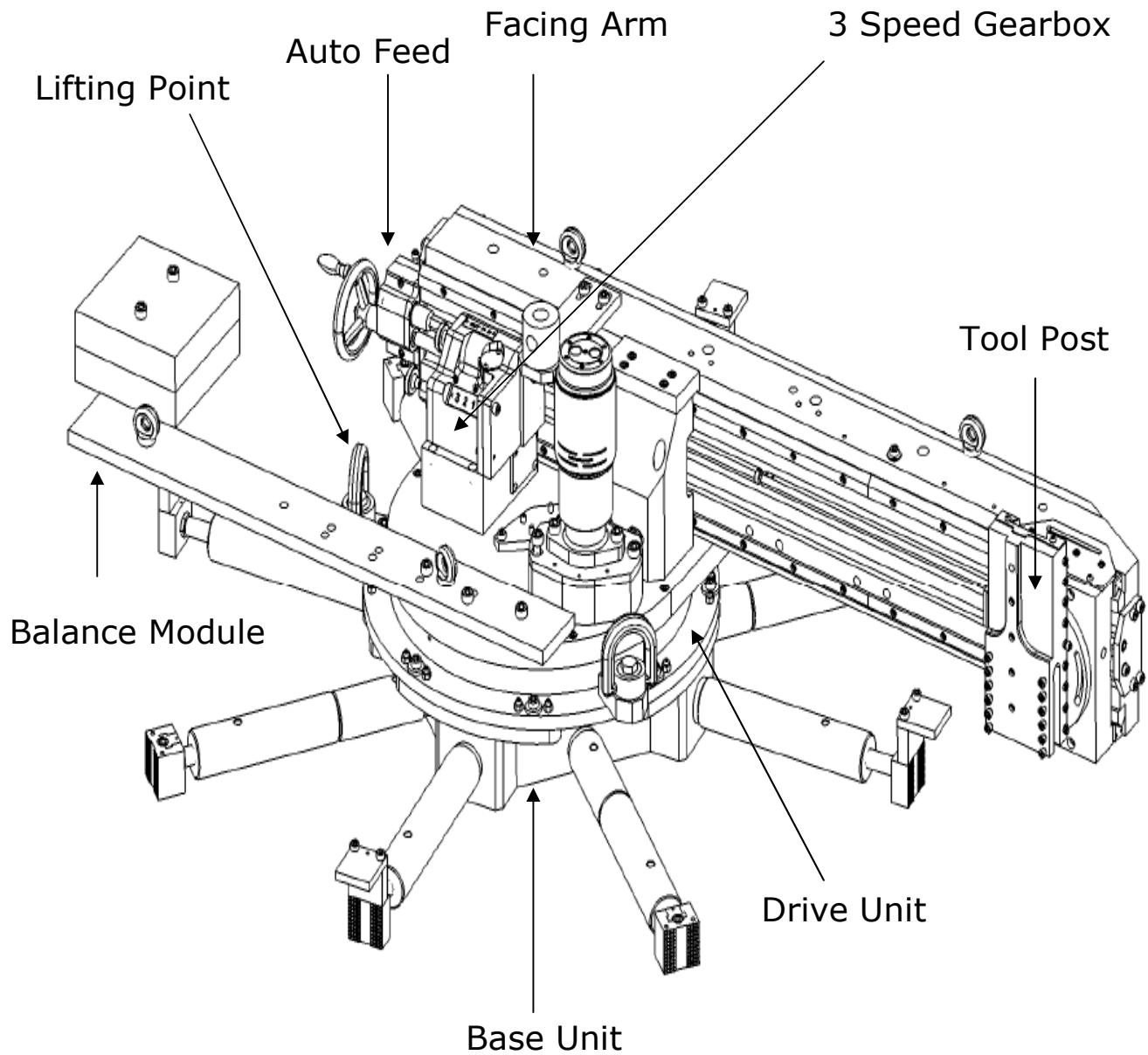
PLEASE READ THE FOLLOWING BEFORE PROCEEDING

1. All safety procedures must be observed prior to operating the equipment.
2. Do not pressurise the equipment if the inlet hose or serviceability of the equipment is suspect.
3. The operators must wear the correct safety equipment whilst operating this equipment.
4. Do not attempt to machine above the specification of the machine or below the specified sizes. This will invalidate the guarantee.
5. Do not attempt to machine if the locking of the machine is suspect or below that recommended.
6. Ensure that the machine gearbox is stored in neutral and the HPU is turned off and the valve is in the closed position. This is important before connecting the hydraulic supply to the machine.
7. Never allow another person to operate the HPU control valve whilst you are using the machine.
8. Never leave the machine working unattended or leave the hydraulics pressurised whilst disconnected.
9. Make sure that all personnel are fully trained in both the operation of the machine and all the relevant safety aspects.

CAUTIONS

1. Do not attempt to alter the feeds whilst the machine is rotating.

Machine Features

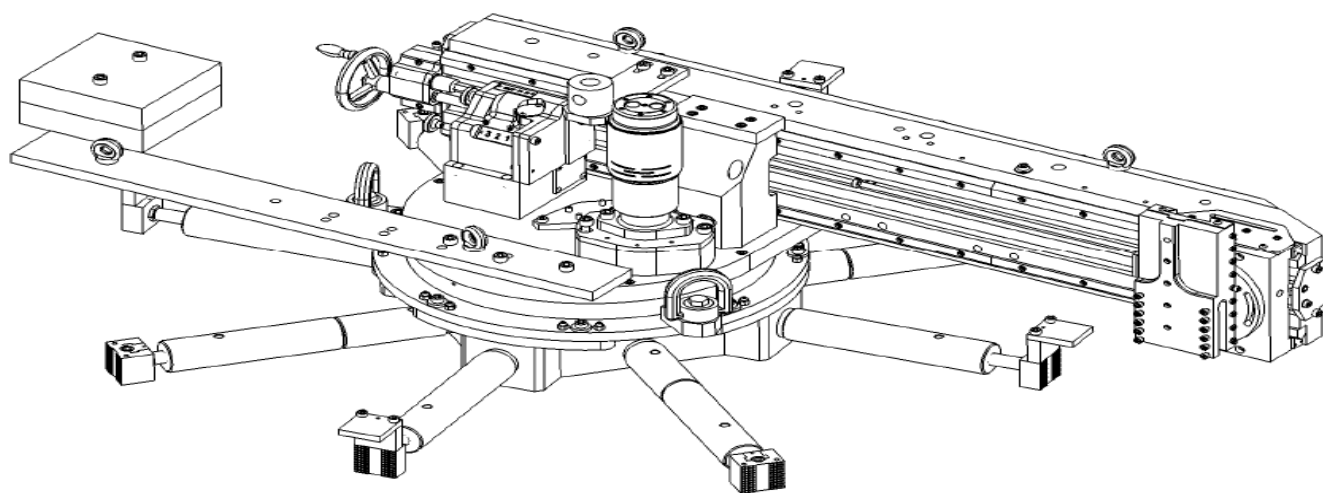


Technical details

Minimum Facing diameter	610mm	24"
Maximum Facing diameter	2032mm	80"
Minimum Clamping diameter	604mm	23.75"
Maximum Clamping diameter	2032mm	80"
Minimum swing diameter	1800mm	45"
Tool post travel	102mm	4"
R.P.M	Min: 5	Max: 20
Drive – Pneumatic @ 90 p.s.i.	3.0hp	2.23 Kw
Air Consumption / supply required	98 s.c.f.m	2.69 m3/m

Min rotation: 1800mm

Max rotation: 2234mm

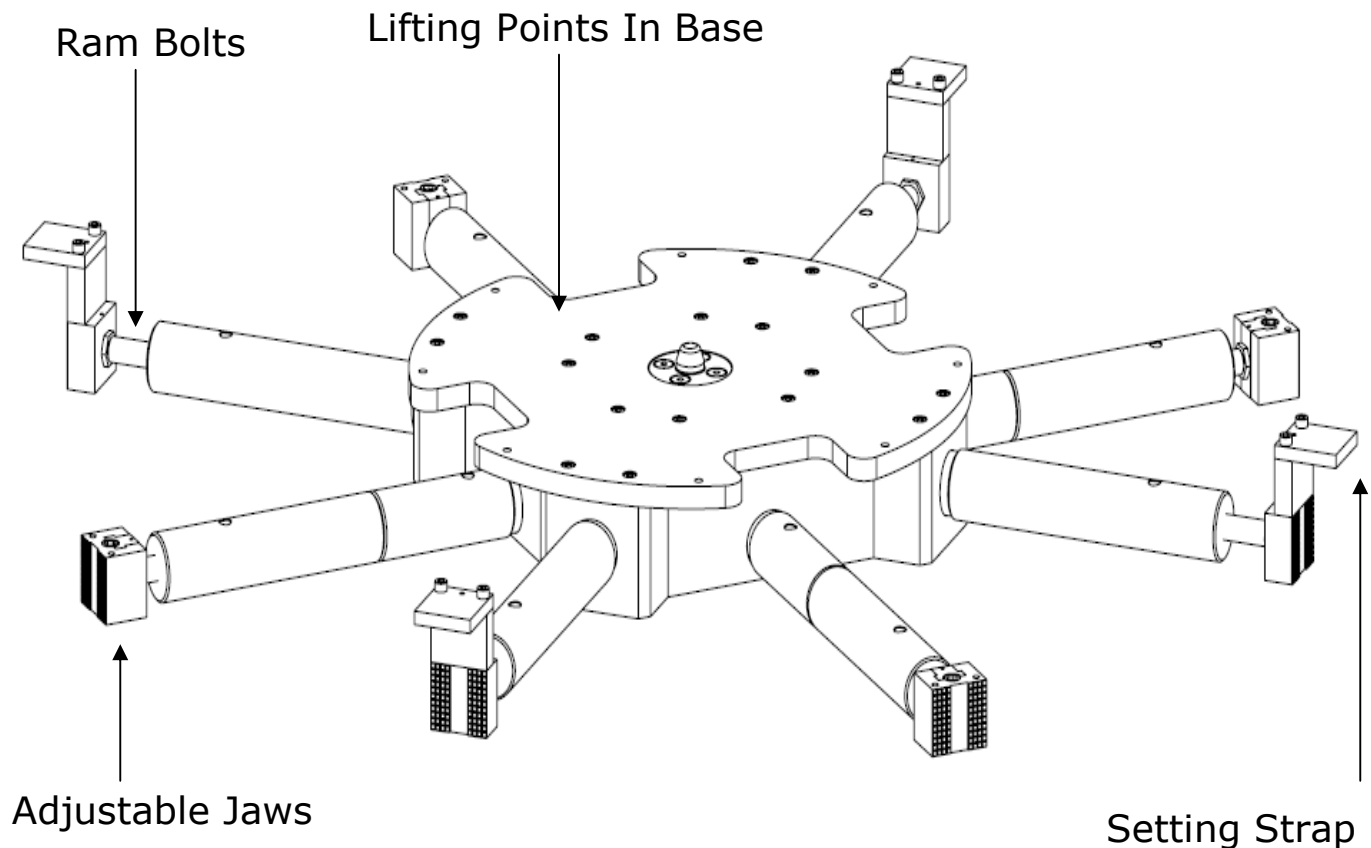


Packing details

MM 2000i Flange Facing Machine comprising:			
1	MM2000I-1		Drive Hub & Balance Assembly
1	MM2000I-2		Facing Arm
1	MM2000I-3		Gearbox Support Unit
1	MM2000I-4		Arm Support Assembly
1	MM2000I-10		Base Assembly
1	MM2000I-8		Transfer Bulk Head
1	MM2000I-18		Drive Gear Unit – Pneumatic
1	MM1080IE-39		Air Distributor Assembly
1	MM1080ie-33		3 Speed Gearbox
1	MM1080ie-2		Tool post Assembly
1	LARGE-ALK		Air Lubricator Assembly

Packing Details

MM2000I-TK Tool Kit comprising:			
1			Tool Roll
1			Metric Hexagon Key Set 1.5 - 10mm
1			17mm Hexagon Key
1			14mm Hexagon Key
1			10mm Combination Spanner
1			13mm Combination Spanner
1			22mm Combination Spanner
1			24mm Combination Spanner
1			27mm Combination Spanner
10			Inserts Grade SM80
1			SDNC-N1616-H11 Tool Holder
1			10mm Hexagon L-Wrench Ball Driver
1			Mag base - DTI
1			1/2" Cobalt Toolbit
1			44 P30 Brazed Tool

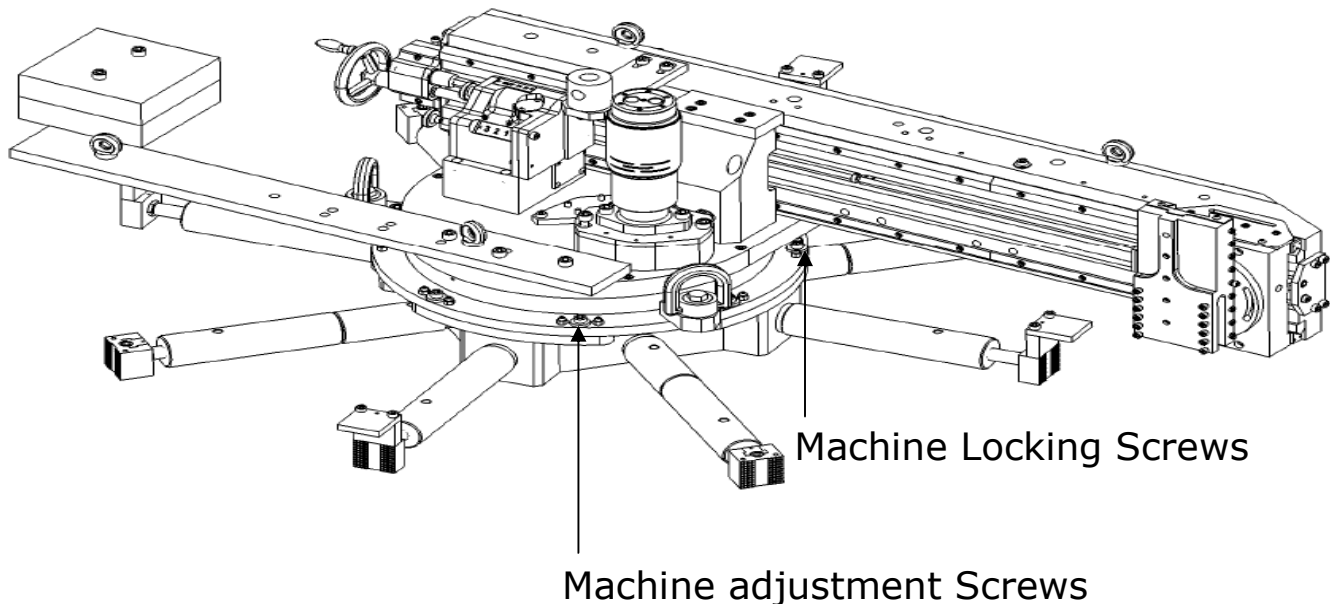


1.1 Base assembly installation

1. Measure the inside diameter of the flange to be machined and ensure this is within the working parameters of the machine.
2. From the pages showing the recommended base size and parts combination select the required components. Screw the base components into the correct base until they measure equally 6mm (0.25") below the inside diameter from step 1.
3. Bolt the setting straps onto the fixed jaws.
4. Position the base into the flange bore. Check the centralisation by measurement and adjust Using ram bolts as necessary.
5. Adjustments can be made by tightening and loosening opposing adjustable jaws, it is recommended that the setting straps are left in place until the base unit is fully installed.

		1088mm BASE MM2000i-10A	590mm BASE MM2000i-10B	MM1500i-5-001 4" EXTENSION	MM1500i-5-002 6" EXTENSION	MM1500i-5-003 8" EXTENSION	MM1500i-5-004 10" EXTENSION	MM1500i-5-005 12" EXTENSION	MM1 8427 LONG RAM BOLT	MM1 8426 SHORT RAM BOLT	MM1500i-5-006 PLAIN JAW PAD	MM1500i-5-008 ADJ. BLOCK
MAX CLAMPING Ø	MOUNTING POINTS											
24"	OUTER		✓						✓			✓
	INNER											
26"	OUTER		✓						✓			✓
	INNER											
28"	OUTER		✓						✓	✓	✓	✓
	INNER											
30"	OUTER		✓						✓			✓
	INNER			✓						✓	✓	
32"	OUTER		✓	✓					✓	✓	✓	✓
	INNER											
34"	OUTER		✓	✓					✓	✓	✓	✓
	INNER											
36"	OUTER		✓	✓	✓				✓	✓	✓	✓
	INNER											
38"	OUTER		✓	✓	✓				✓	✓	✓	✓
	INNER											
40"	OUTER		✓	✓					✓		✓	✓
	INNER				✓	✓				✓		
42"	OUTER		✓		✓				✓	✓		✓
	INNER					✓					✓	
44"	OUTER		✓		✓				✓		✓	
	INNER						✓			✓		✓
46"	OUTER		✓			✓			✓	✓	✓	✓
	INNER						✓					
48"	OUTER		✓			✓		✓	✓	✓	✓	✓
	INNER											
	1088 A/F	✓							✓	✓	✓	✓
50"	OUTER		✓				✓		✓	✓	✓	✓
	INNER							✓				
	1088 A/F	✓							✓	✓	✓	✓
52"	OUTER		✓					✓		✓	✓	
	INNER			✓		✓			✓			✓
	1088 A/F	-	-	-	-	-	-	-	-	-	-	-
54"	OUTER		✓					✓		✓	✓	
	INNER				✓	✓			✓			✓
	1088 A/F	-	-	-	-	-	-	-	-	-	-	-
55"	OUTER		✓					✓	✓	✓	✓	
	INNER				✓		✓			✓		✓
56"	1088 A/F	✓		✓					✓	✓	✓	✓
58"	1088 A/F	✓		✓					✓	✓	✓	✓
60"	1088 A/F	✓		✓	✓				✓	✓	✓	✓
62"	1088 A/F	✓		✓					✓	✓	✓	✓
64"	1088 A/F	✓			✓				✓	✓	✓	✓
66"	1088 A/F	✓			✓	✓			✓	✓	✓	✓
68"	1088 A/F	✓				✓			✓	✓	✓	✓
70"	1088 A/F	✓					✓		✓	✓	✓	✓
72"	1088 A/F	✓					✓	✓	✓	✓	✓	✓

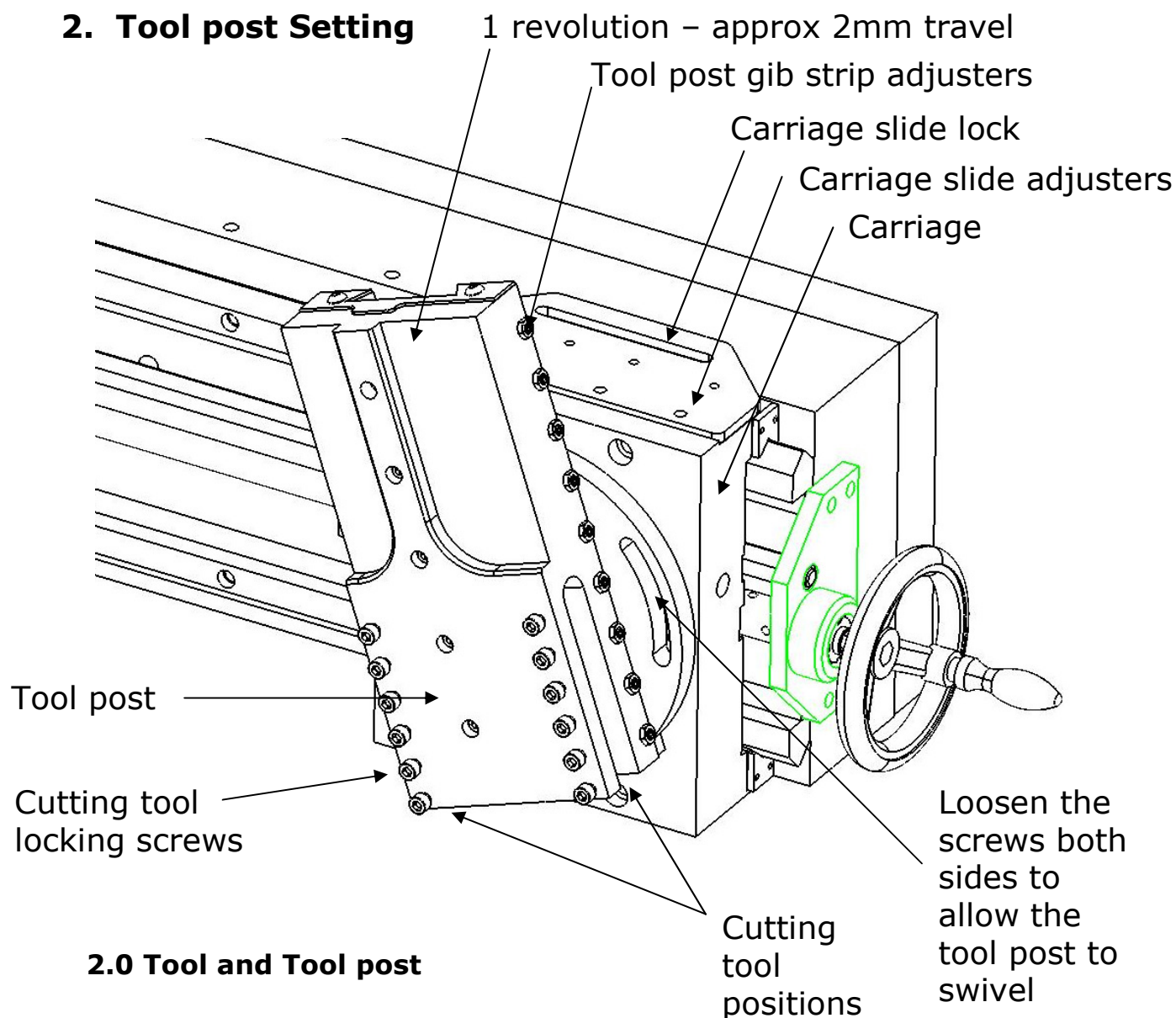
1. Installation



1.3 Machine installation

1. A central location spigot is provided for exact location of the machine, this is fixed to the centre of the machine base.
2. Ensure the tool post is fully retracted and the cutting tool has been removed.
3. Lift the machine carefully over the spigot and align bolt hole positions to avoid having to rotate the machine any great distance.
4. Lock the machine in position.
5. A magnetic base clock is provided in the tool kit to aid radial adjustment of the machine. This can be placed on the tool post and positioned onto the work piece.
6. Survey the flange and, if required, the adjustable bolts can be used to adjust the machine parallel with the flange.
7. Adjustments can be made to the fixed jaws by tapping the jaw with a soft drift if required.

2. Tool post Setting



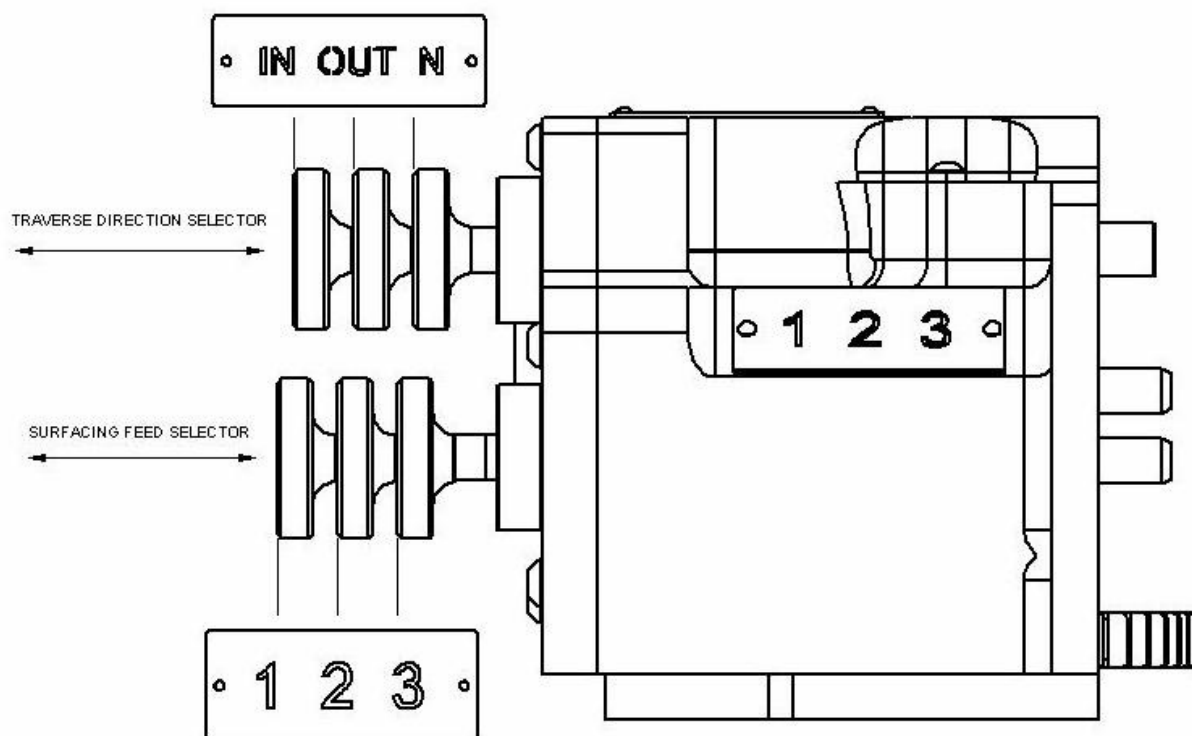
2.0 Tool and Tool post

1. Install the tool provided in either of the tool slots and tighten – over tightening of the screws could result in thread or tool post damage.
2. The angle of the tool post may be altered – loosen the 2 off screws as indicated and the tool post will swivel. Tighten the 2 off screws to lock at the required angle.
3. The tool post will feed approximately 2mm (0.078”) per revolution. Accurate depth of cut setting is achieved by placing the magnetic clock on the tool post zero the dial on the flange face and then add depth of cut.

CAUTION

When facing ensure the carriage slide lock is removed. When boring ensure the lock is tightened to maintain a fixed carriage position.

3. Facing Feed Gear Selection



Selector Position	1		2		3	
Feed rate / rev. OUT	0.80mm	0.031"	0.33mm	0.013"	0.21mm	0.008"
Feed rate / rev. IN	0.68mm	0.026"	0.26mm	0.010"	0.18mm	0.007"

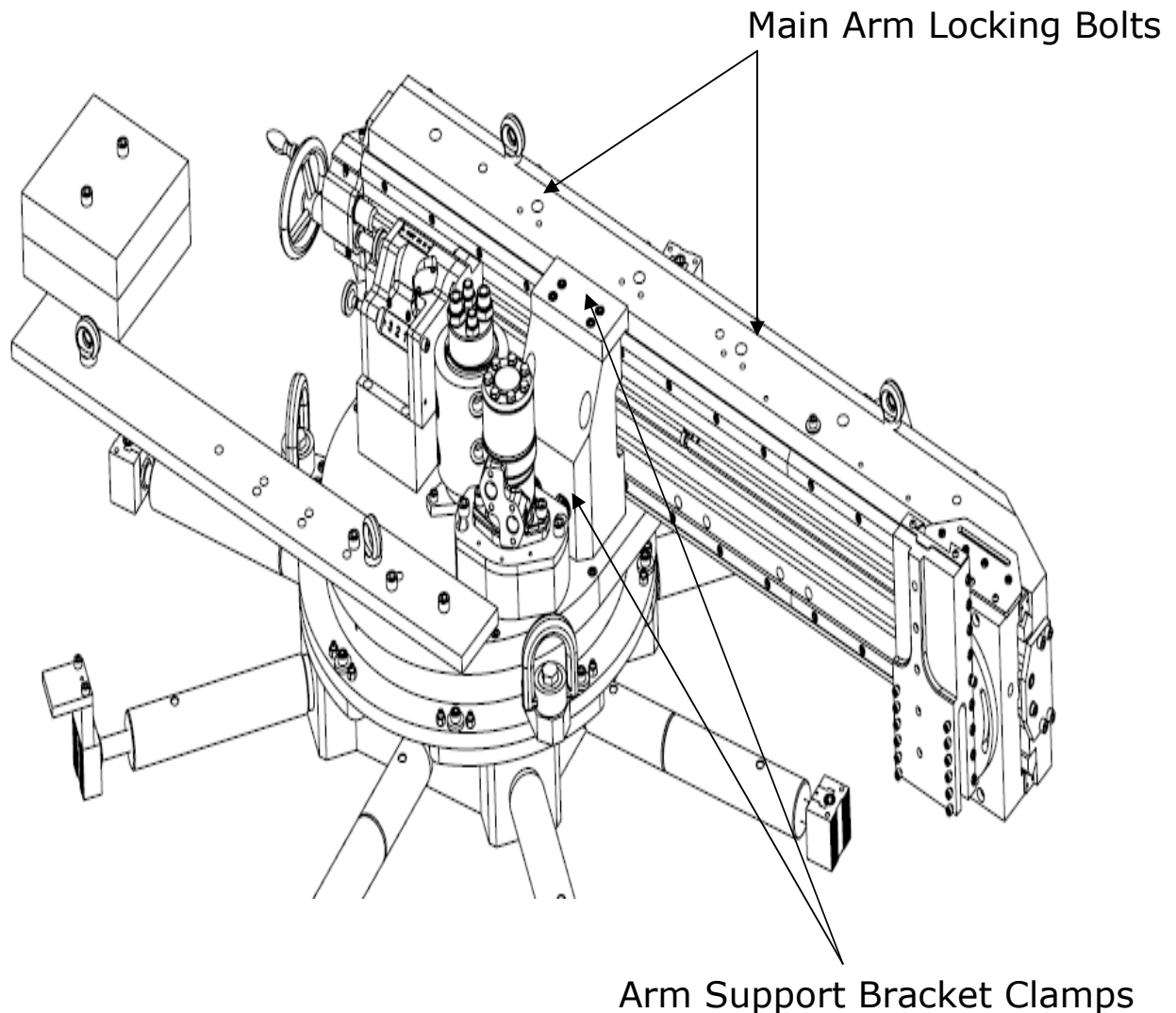
3.0 Selecting Feed rate

1. Check feed rate table. (See appendix 1.)
2. Select required feed and push or pull feed selector to required position.

3.1 Selecting Feed direction

1. Check required direction IN will traverse the tool towards centre – OUT will traverse the tool away from centre.
2. Select required direction and push or pull feed selector to required position.
3. The direction lever can be rotated to engage feed rate and direction gears and will not rotate when both are fully engaged.

4. Surfacing Arm Setting



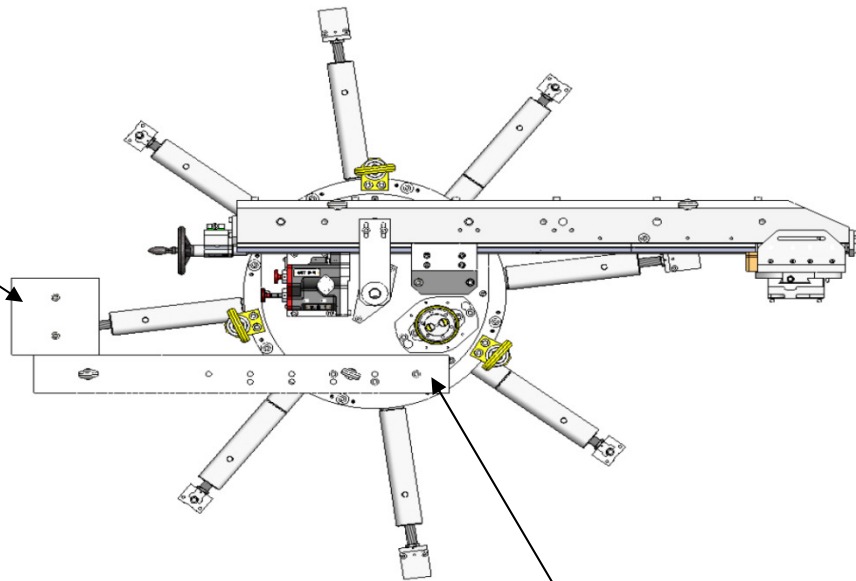
4.0 Surface arm position setting

1. When it is necessary to move the surfacing arm, loosen the main drive to arm locking bolts.
2. Loosen the arm clamp plate screws in the arm support bracket and the arm should now slide. Slide to the required position.
3. To accurately locate the arm apply finger tight pressure to the main drive – arm locking bolts and then whilst supporting the arm weight tighten the clamp screws in order from 1 – 3 and then fully tighten the drive – arm locking bolts. This will ensure the arm is located correctly and is perpendicular to the rotation drive hub.

5. Balancing

Weights –add
and remove as
necessary.
Position on plate
to optimize
machine balance

2 o'clock position –
machine rotation will
increase if incorrectly
balanced



7 o'clock
position –
machine
rotation will
slow if
incorrectly
balanced

Attach
balance plate
here then add
weights once
in a fixed
position

5.0 Machine Balancing

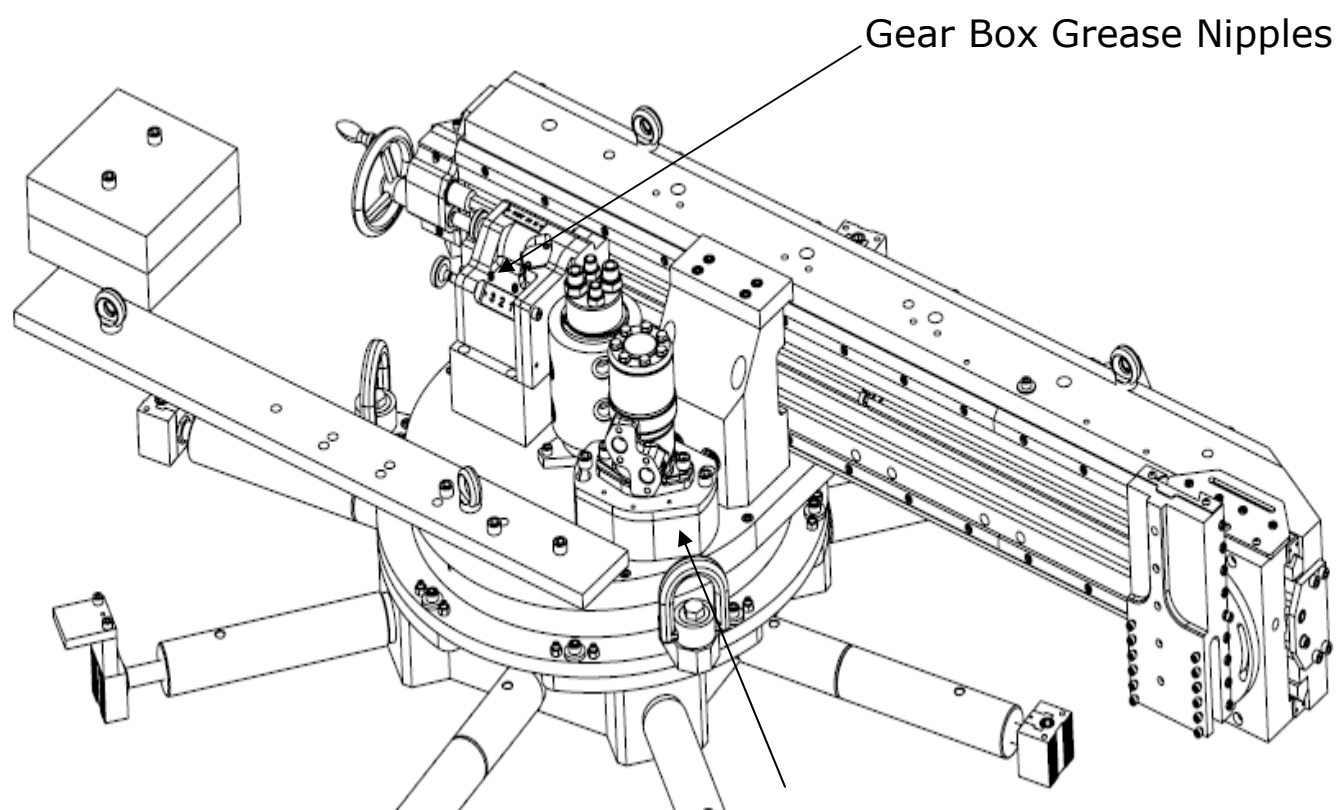
1. When machining in any angular position other than horizontal it is necessary to balance the machine. Attach the balance plate to the machine. Failure to balance the machine correctly will increase load on the drive components.
2. To obtain balanced rotation add or remove weights and move their position on the plate to obtain smooth rotation. There should be no increase or decrease in rotational speed. Pay particular attention to 7 o'clock and 2 o'clock positions as this will be where the weight shift will be greatest.
3. For more accurate balancing the motor can be removed and the machine swung by hand until it rotates at an even pace with no evidence of speed increase.

1. Fault Diagnosis

Symptom	Possible cause	Action
The machine will not rotate	1. Air supply not available	Check supply
	2. Air supply is below the minimum required to operate the machine	Check supply
	3. Drive motor faulty	Remove motor and check operation
	4. Damage to drive gear train	Remove motor and check free rotation
The machine does not traverse	1. The feed selector is not correctly positioned and the facing feed gears are not engaged	Check position
	2. The direction selector is in neutral or not correctly engaged – if both gears are engaged this should not rotate	Check position and ensure there is no rotation
	3. Drive key problem	Remove and check gearbox assembly operation
	4. Carriage has been run off the lead screw	Check lead screw nut and screw are engaged
Poor surface finish on the flange	1. Machine out of balance	Check balance
	2. Machine base incorrectly installed	Check installation
	3. Machine installation bolts not tightened	Check bolts
	4. Turning tool not ground correctly or worn	Check tool & replace
	5. Depth of cut too deep	Reduce depth of cut
	6. Too much play in tool post gib strip or carriage	Adjust tool post & carriage
	7. Too much play in main drive bearings	Adjust drive dampener's
	8. Worn drive motor	Check motor
	9. Poorly adjusted surfacing arm	Check and adjust
	10. General poor machine condition	Refer to Mirage

1. Maintenance - General

Period	Task	Lubricant
After each use	1. Clean all components and lightly oil	SAE 10 oil or WD40
	2. Check all components are present and stored correctly	
	3. Check tools and regrind or reorder inserts	
	4. Check and adjust gib strip and carriage	Reference corrective maintenance section
Weekly under use	1. Grease main hub bearings – 5 shots	00 EP Lithium semi fluid grease
	2. Grease gearbox – 2 shots	00 EP Lithium semi fluid grease
	3. Grease tool post rack	00 EP Lithium semi fluid grease
	4. Lightly oil slide ways	SAE 10 oil
	5. Clean and oil base components	SAE 10 oil



Remove to Grease Main Bearing

2. Maintenance - Corrective

2.0 Facing arm (Ref MM2000i-2)

1. Remove the main arm bolts. Slacken off the adjuster screws in the arm support unit which clamps the surfacing arm perpendicular to the hub and remove clamping plate .
2. Arm should then slide backwards to release
3. Insert 2 x M16 eye bolts into arm, remove arm using vertical lift

The procedure for installation is the reverse of the removal ensuring that the PTO box (ref mm2000i-8) fits into the gearbox opening and it is in mesh with the output gear in the gearbox.

To check the correct installation - lift in the surfacing arm should be no more than 0.15mm (0.005").

2.1 Tool post gib strip (Ref MM1080IE-2)

1. Slacken lock nuts on the gib strip adjusters and slacken grub screws.
2. Working from one end adjust grub screws only when there is sufficient location on the slide way to prevent over tightening. To adjust tighten fully then back off one quarter of a turn and tighten the lock nut.
3. Check the tool post movement along its stroke to ensure free sliding movement and no sideways movement.

2. Maintenance - Corrective

2.2 Slide way Carriage (ref mm2000i-2)

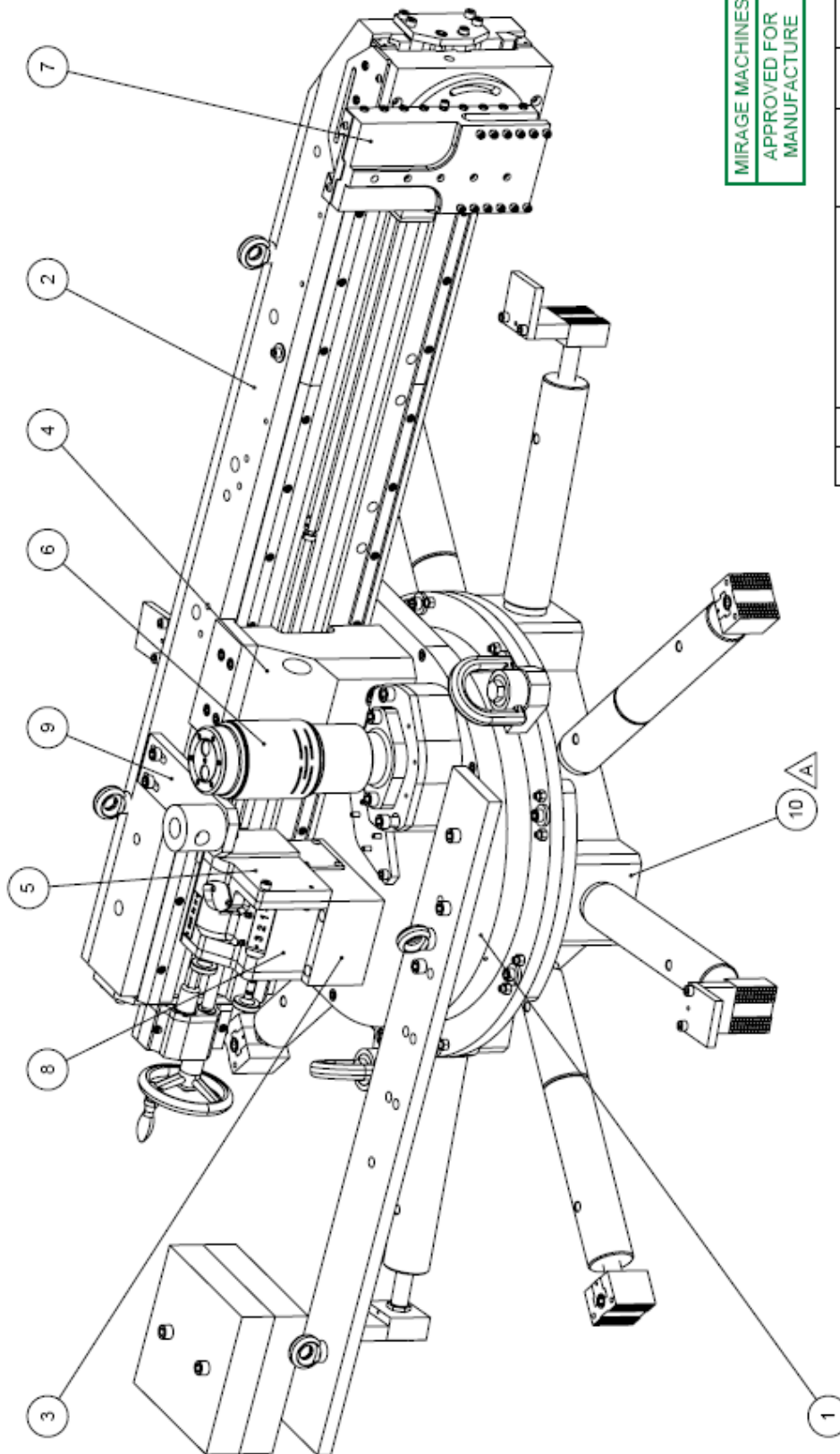
1. Slacken lock nuts on the gib strip adjusters and slacken grub screws.
2. Working with the hand wheel ensure the carriage will slide whilst tightening the grub screws and then use the lock nuts to fix the adjustment.

To check the correct installation – there should be no free play in the carriage slide assembly.

IF IN DOUBT ASK

DO NOT SCALE

Printed on 23/06/2010



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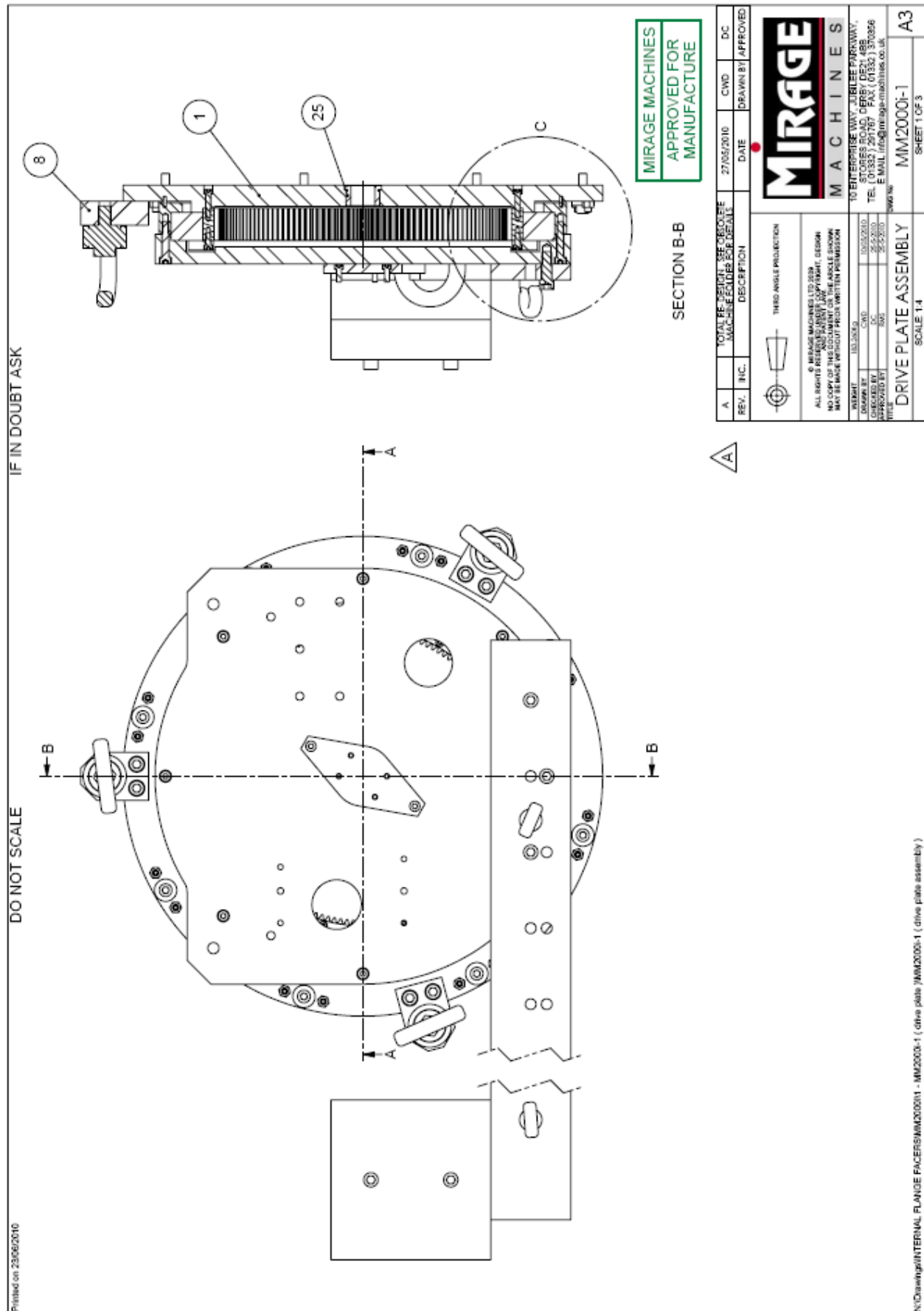
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A		MM2000I-10 WAS MM2000I-5	21/6/2010	DC		CND

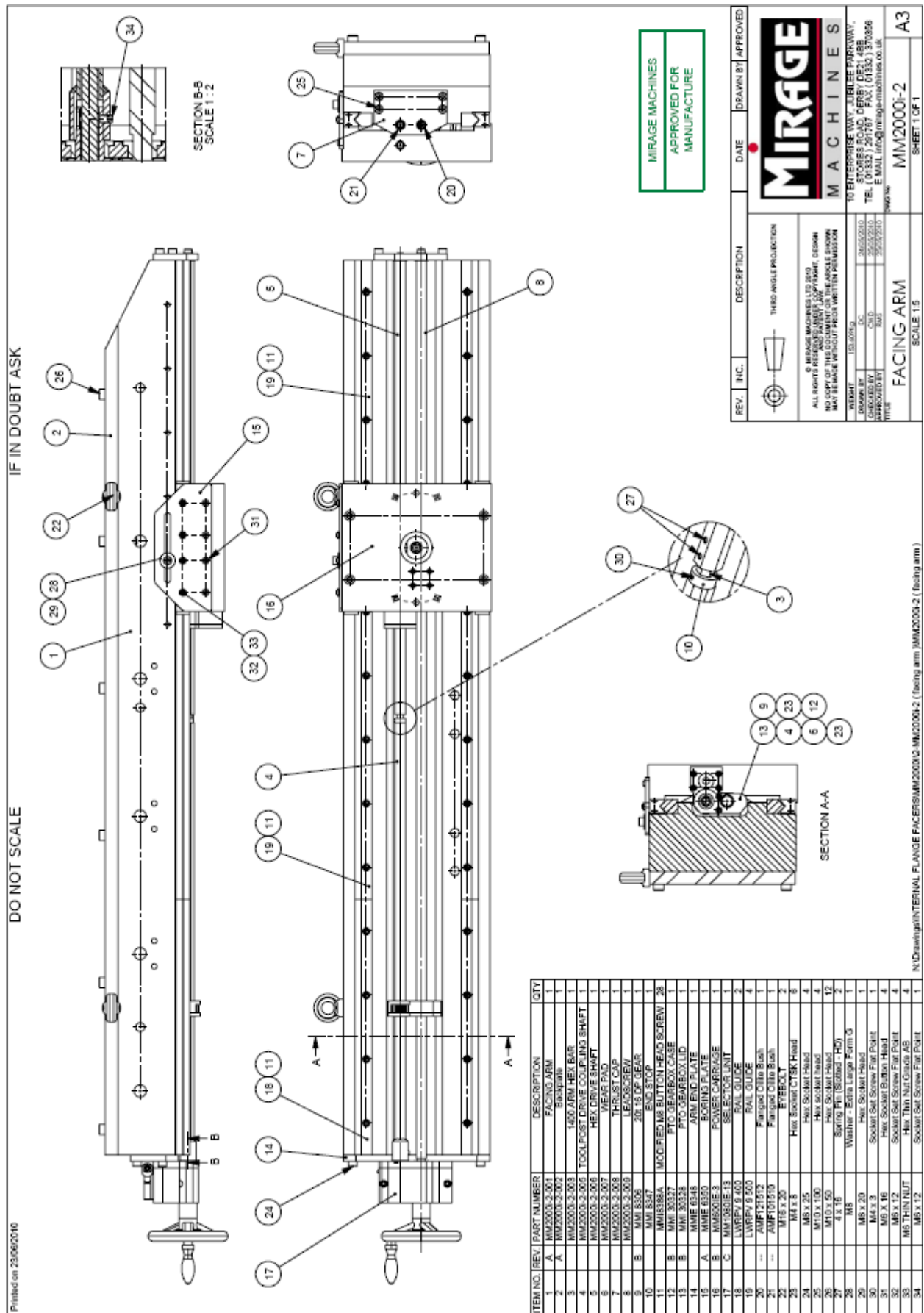
MIRAGE MACHINES 10 ENTERPRISE WAY, LUBLEE PARKWAY, STOKES ROAD, CHERY, DE21 4BB TEL: (01332) 267767 FAX: (01332) 370286 E MAIL: info@mirage-machines.co.uk		TO ENTERPRISE WAY, LUBLEE PARKWAY, STOKES ROAD, CHERY, DE21 4BB TEL: (01332) 267767 FAX: (01332) 370286 E MAIL: info@mirage-machines.co.uk
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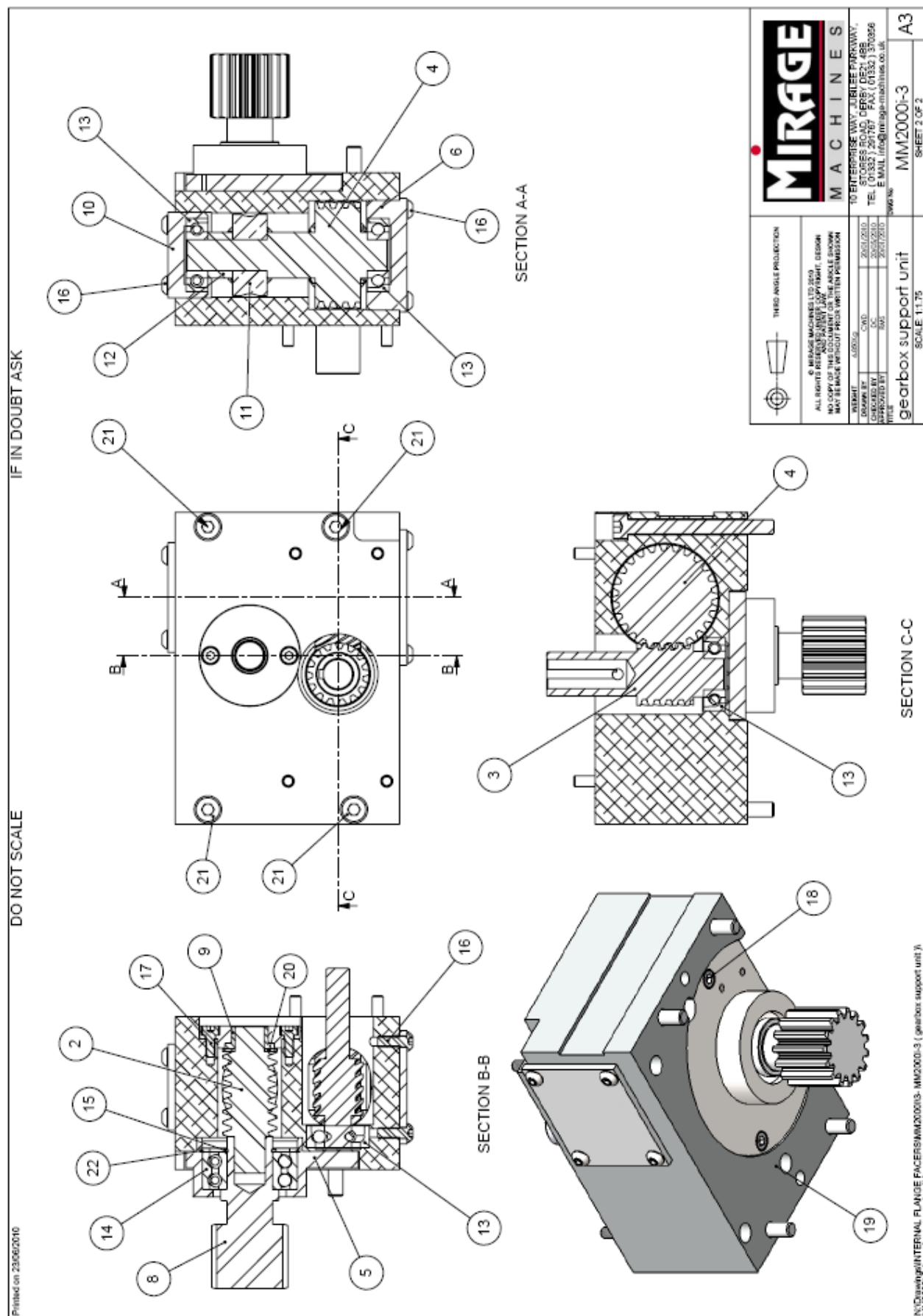
GENERAL BY: 23/10/09 CHECKED BY: CND APPROVED BY: 05/06/2010 05/06/2010	SCALE 1:5 General Assembly (Pneumatic) MM2000I: A - 0 A3 SHEET 1 OF 1
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ITEM NO.	REV.	PART NUMBER	DESCRIPTION	QTY
1	A	MM2000I-1	DRIVE PLATE ASSEMBLY	1
2		MM2000I-2	FACING ARM	1
3		MM2000I-3	GEARBOX SUPPORT UNIT	1
4		MM2000I-4	ARM GUIDE SUPPORT ASSEMBLY	1
5	A	MM2000I-5	TRANSFER BULKHEAD	1
6		MM2000I-6	DRIVE GEAR UNIT - PNEUMATIC	1
7		MM1080IE-2	TOOL POST ASSEMBLY	1
8		MM1080IE-3	3 SPEED GEARBOX	1
9		MM1080IE-39	AIR DISTRIBUTOR ASSEMBLY	1
10		MM2000I-10	BASE ASSEMBLY	1

N:\Drawing\INTERNAL FLANGE FACERS\MM2000I-0 - MAIN ASSEMBLY\MM2000I-0 (PNEUMATIC)



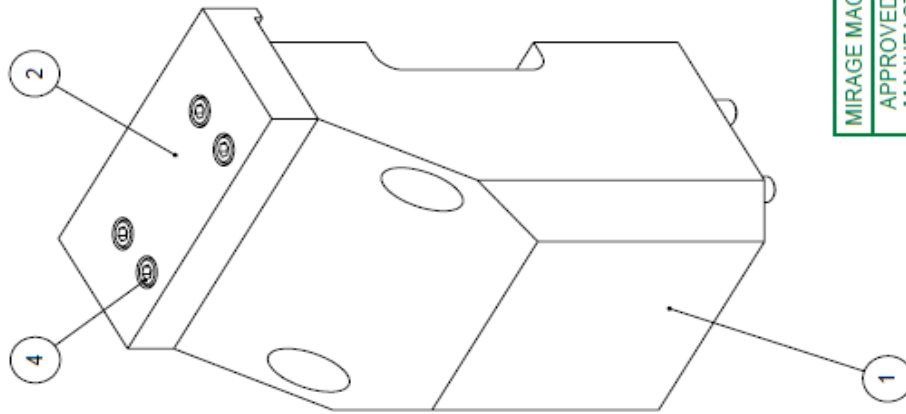




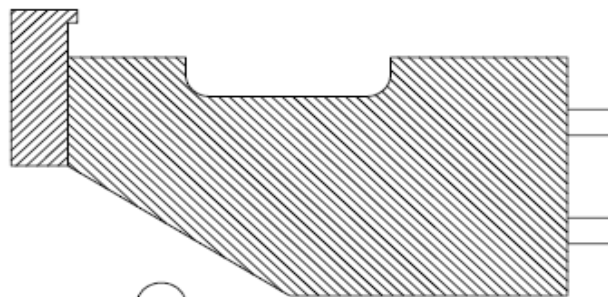
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DO NOT SCALE

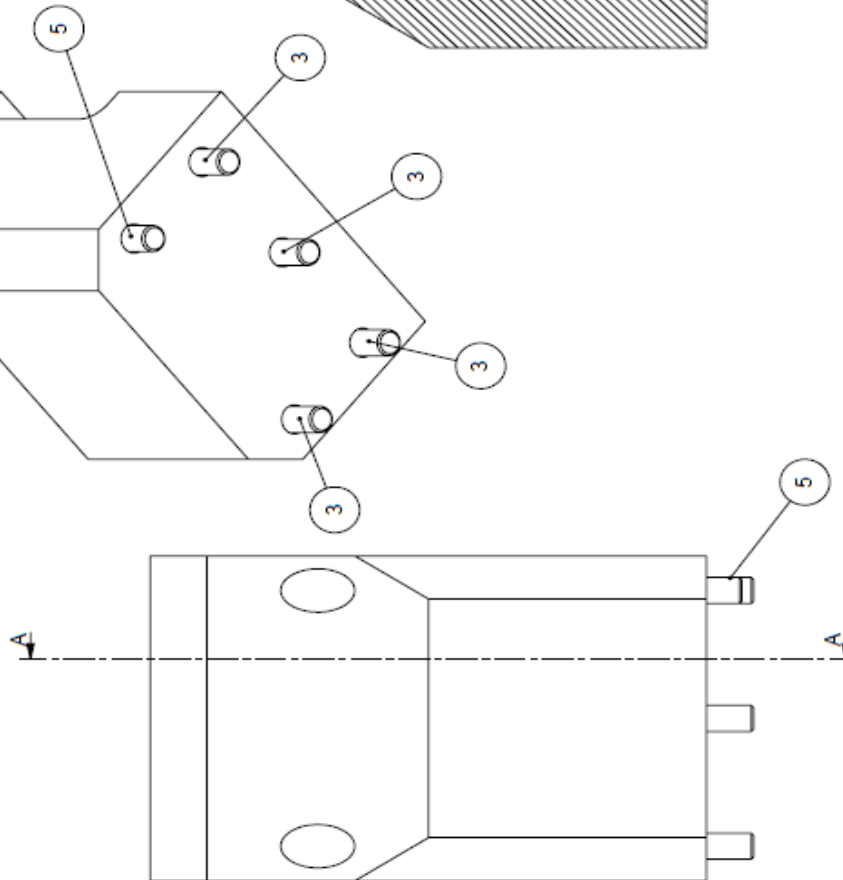
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SECTION A-A



ITEM NO.	REV.	PART NUMBER	DESCRIPTION	QTY.
1	A	MM2000i-4-001	arm guide support block	1
2		MM2000i-4-002	guide support block top bar	1
3		M12 x 120	Hex Socket Head	4
4		M8 x 30	Socket Head Cap Screw	4
5		M12 x 110	Socket Head Cap Screw	1

B	1098	7. M12 x 110 support to arm guide removed (as required)	28/10/2010	CWD	KAW
A		Module change - previously MM2000-4 (base assembly)	27/05/2010	CWD	DC
REV.	INC.	DESCRIPTION	DATE	DRAWN BY	APPROVED



THIRD ANGLE PROJECTION

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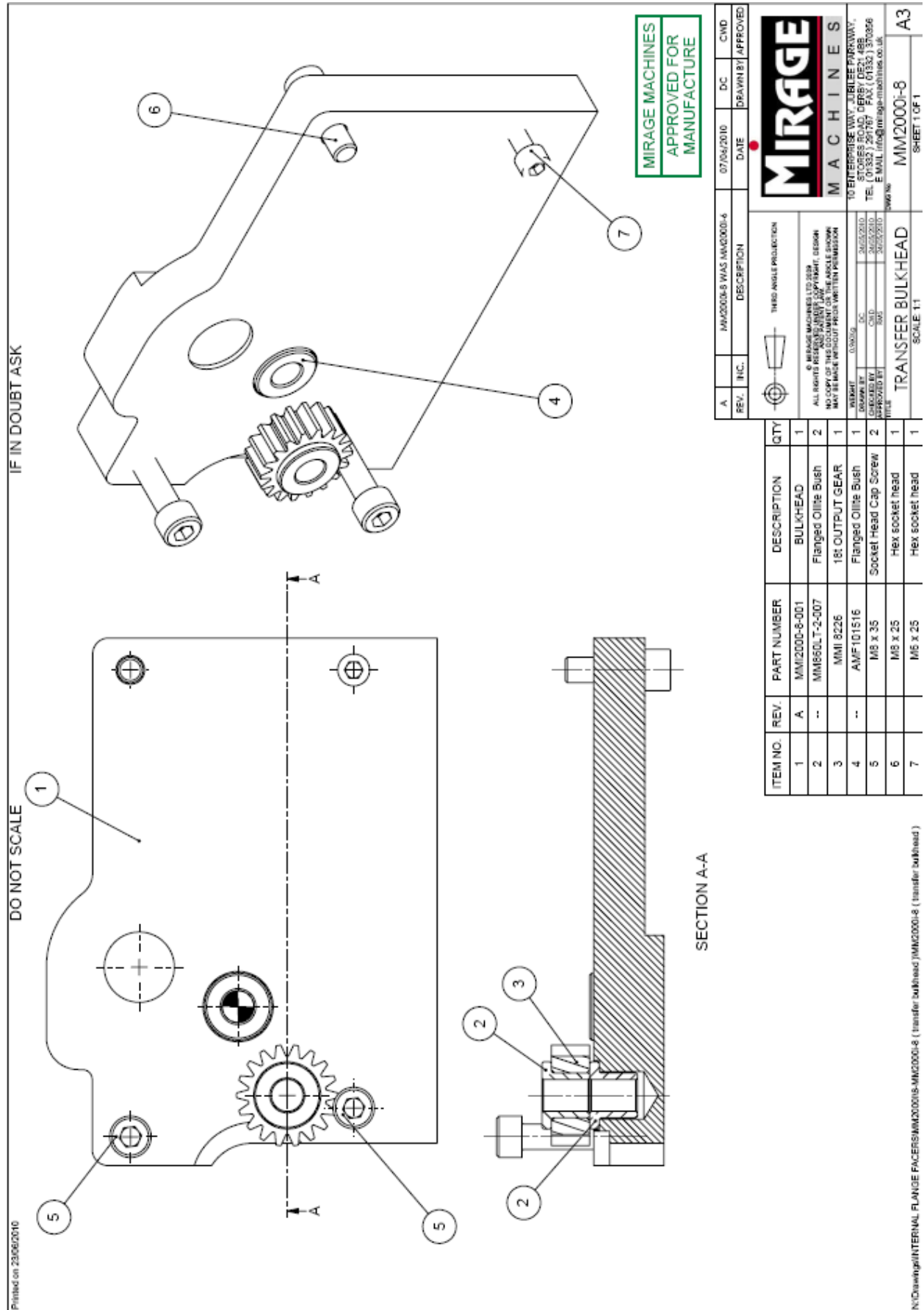
WEIGHT: 0.011 kg
DRAWN BY: CWD
CHECKED BY: KAW
APPROVED BY: RAG
DATE: 28/10/2010

10 ENTERPRISE WAY, JUBILEE PARKWAY,
RITCHIE ROAD, DERBY DE11 4BB
TEL: 01332 1291767 FAX: 01332 370356
E-MAIL: info@mirage-machines.co.uk

A

N:\Drawings\INTERNAL FLANGE FACER\MM2000i-4-MM2000-4 (arm guide support unit)\MM2000i-4 (arm guide support assembly)
A3 ASSEMBLY (AUTO) - 7-4-2009

MM2000i-4
SHEET 1 OF 1

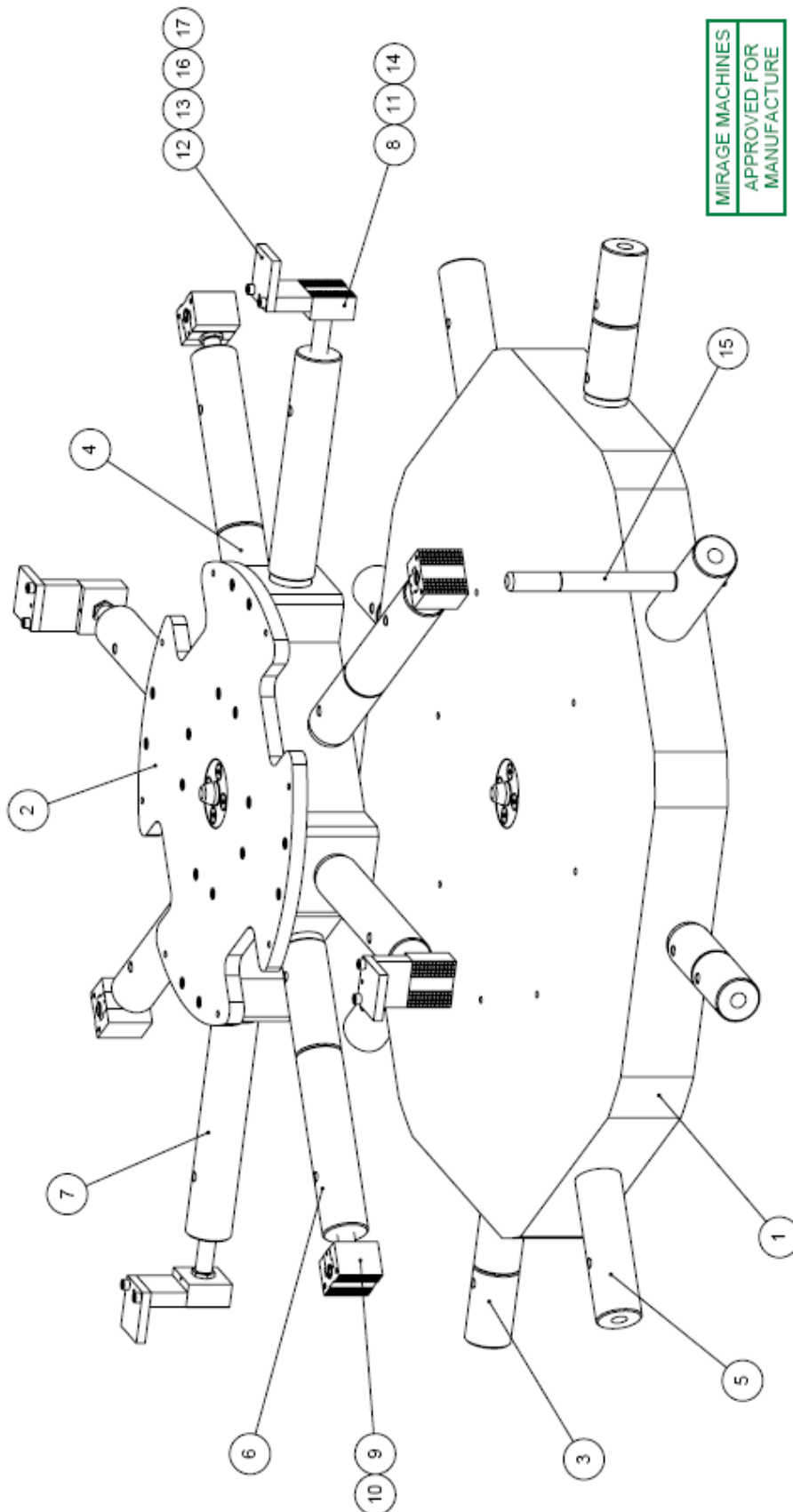


N:\Drawing\INTERNAL FLANGE FACERS\MM2000I\8-MM2000I-8 (transfer bulkhead) (transfer bulkhead)

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DO NOT SCALE

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MIRAGE MACHINES
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ITEM NO	REV	PART NUMBER	DESCRIPTION	QTY	REV.	INC.	DESCRIPTION	DATE	DRAWN BY	APPROVED
1		MM2000-10A	100mm BASE	1						
2		MM2000-10B	500mm BASE ASSEMBLY	1						
3		MM2000-10C	4" EXTENSION	8						
4	A	MM2000-10D	5" EXTENSION	4						
5	A	MM2000-10E	6" EXTENSION	4						
6		MM2000-10F	7" EXTENSION	4						
7		MM2000-10G	8" EXTENSION	4						
8	A	MM2000-10H	PLAIN JAW PAD	4						
9	A	MM2000-10I	ADJUSTABLE JAW ASSEMBLY	4						
10	C	MM2000-10J	SPACER BOLT	4						
11	C	MM2000-10K	LARGE RAIL BOLT	4						
12	A	MM2000-10L	SETTING STRAP PLATE	4						
13	A	MM2000-10-M1	SPACER BLOCK	4						
14		3150 W004	SPRING PLUNGER	4						
15		M11-19420	TOMMY BAR	1						
16		M8 x 20	Hex Socket Head	8						
17		M8 x 25	Hex Socket Head	4						

10 ENTERPRISE HWY. JUBILEE PARKWAY, ST. LOUIS, MO 63104 TEL: (314) 333-2070 FAX: (314) 333-2070 E-MAIL: info@mirage-machines.co.uk	
3106 NW	
BASE ASSEMBLY	
MM2000i-10	
A3	
SHEET 1 OF 1	

MIRAGE
MACHINES

10 ENTERPRISE WAY, LITTLE PIRRAWAY,
STONES ROAD, CHERY DE 21 488
TEL: (01332) 261767 FAX: (01332) 370356
E-MAIL: info@mirage-machines.co.uk

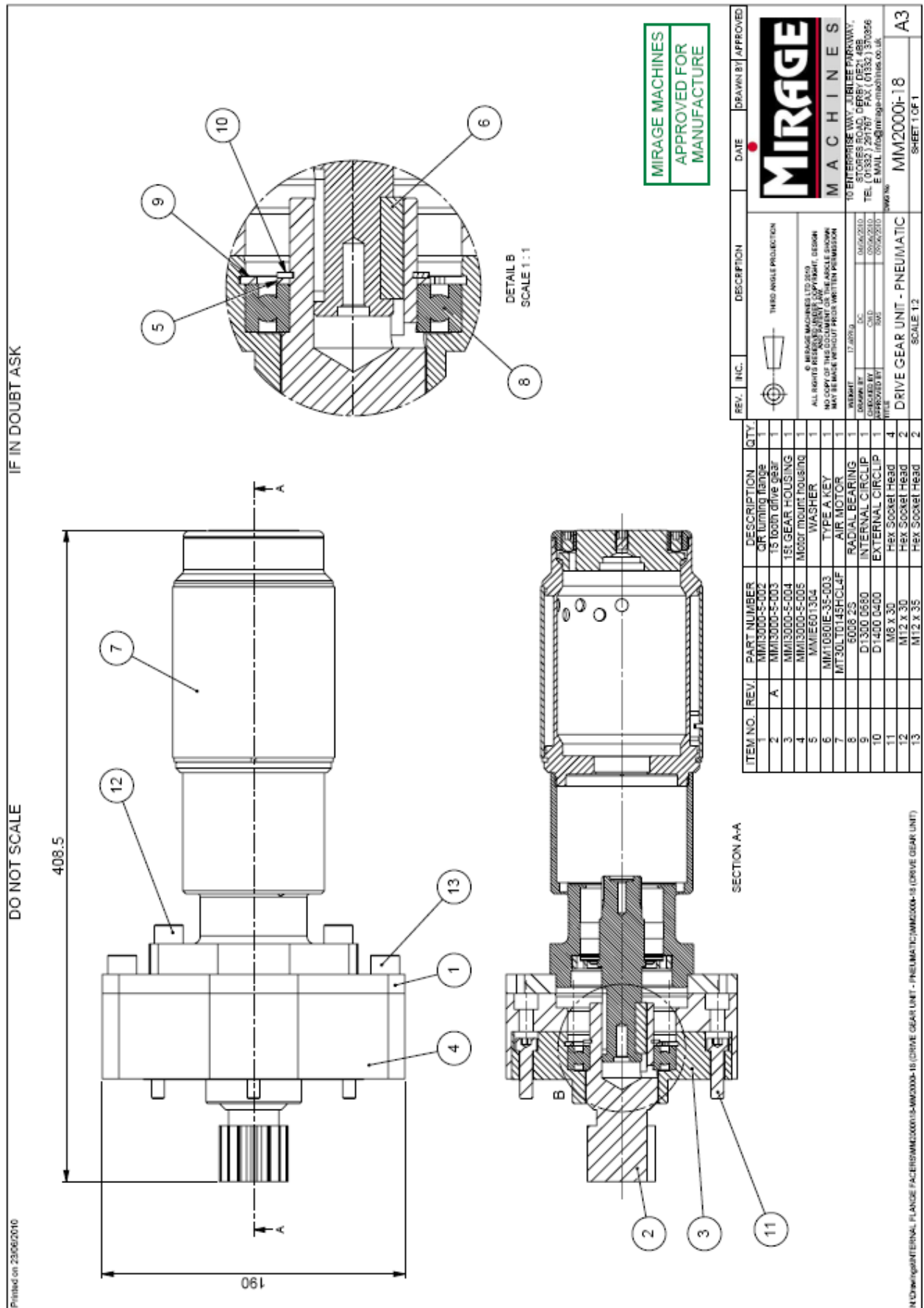
BASE ASSEMBLY

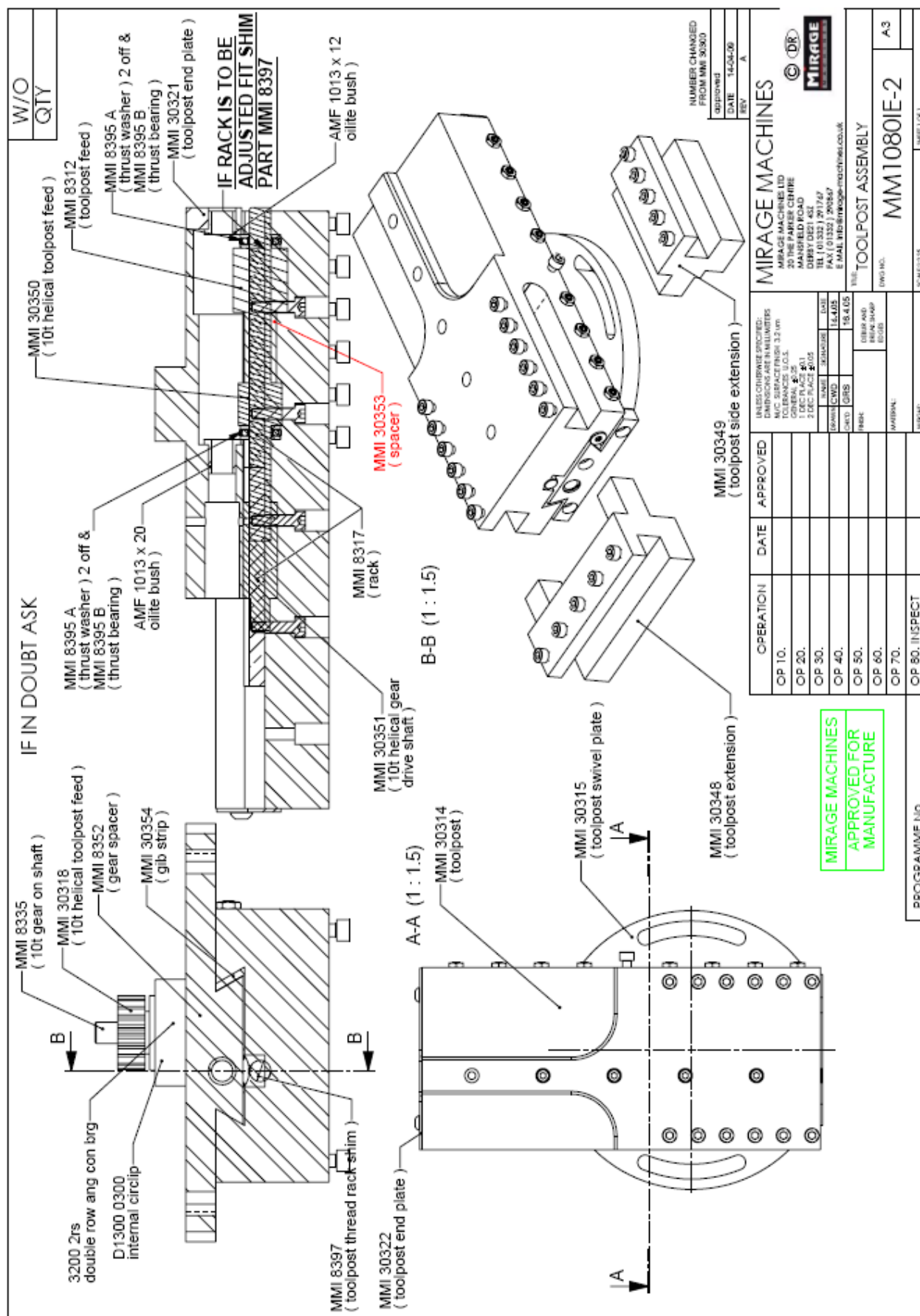
SCALE 1:1

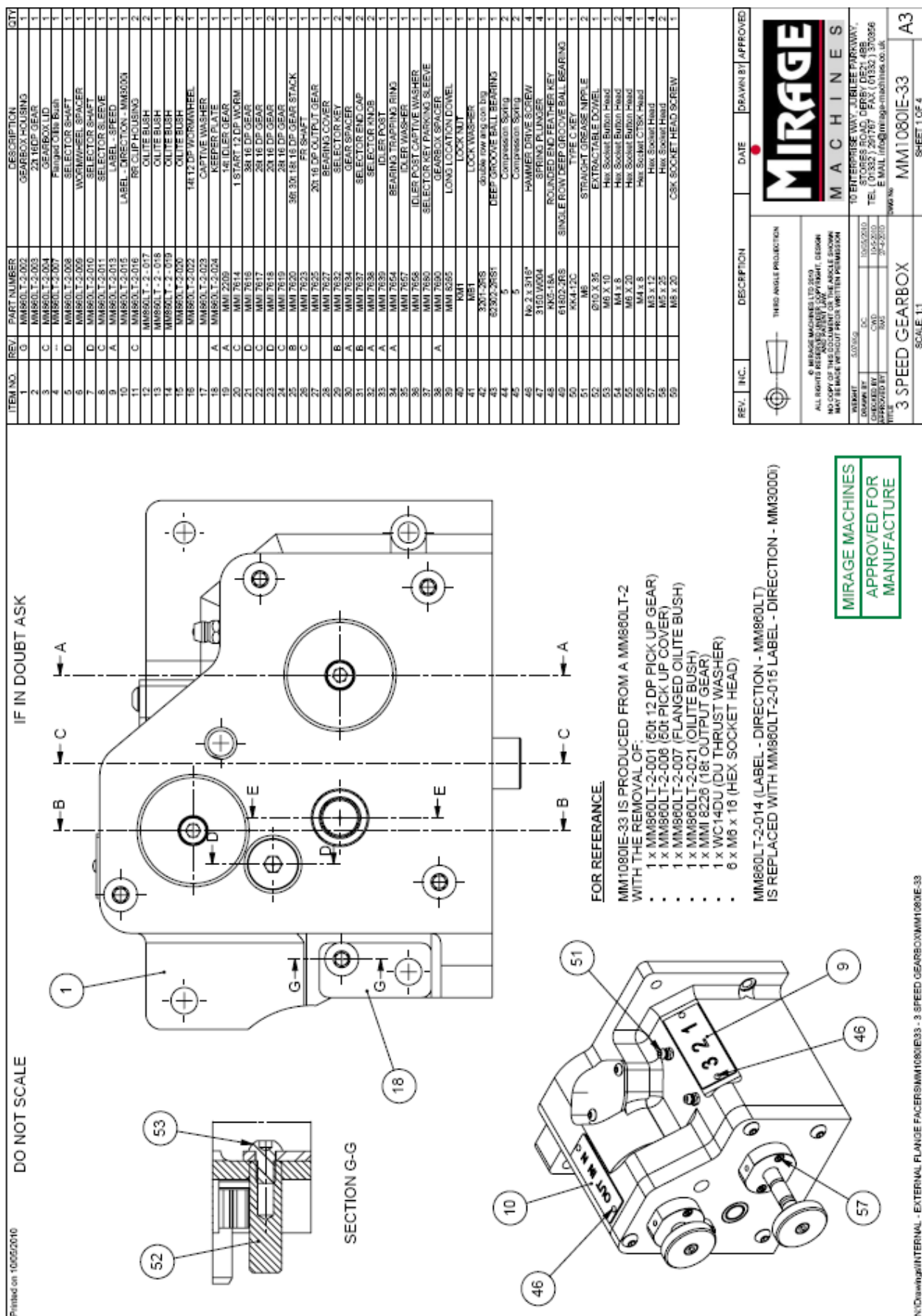
MM2000I-10

SHEET 1 OF 1

N:\Drawing\INTERNAL FLANGE FACERS\MM2000I\10-MM2000I (BASE ASSEMBLY)\MM2000I-10



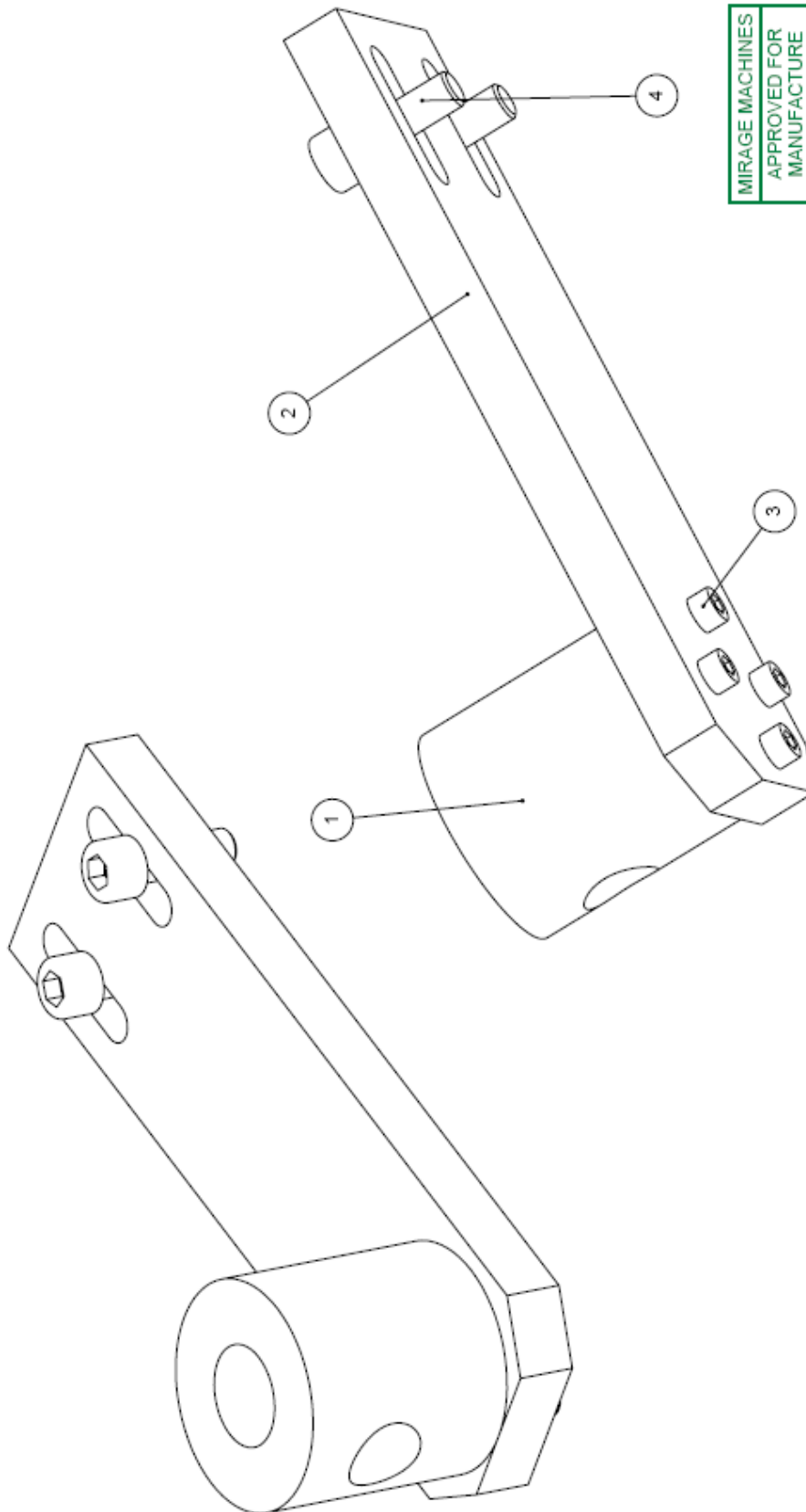




IF IN DOUBT ASK

DO NOT SCALE

Printed on 23/06/2010



REV.	INC.	DESCRIPTION	DATE	DRAWN BY	APPROVED
		THIRD ANGLE PROJECTION			
MIRAGE MACHINES MACHINES TO ENTERPRISE WAY, JUBILEE PARKWAY, STONES ROAD, CHEREY DE21 4BB TEL: (01332) 251767 FAX: (01332) 370896 E MAIL: info@mirage-machines.co.uk					
ITEM NO. 1000000 DRAWN BY: CWD CHECKED BY: DC APPROVED BY: DC DATE: 08/06/2010 08/06/2010 08/06/2010					
Part Name: MM1080IE-39 SCALE: 1:1 SHEET 1 OF 1					

ITEM NO.	REV.	PART NUMBER	DESCRIPTION	QTY.
1		MM1080IE-39-001	Air distributor	1
2		MM1080IE-39-002	air distributor mounting plate	1
3		M6 x 30	Hex Socket Head	4
4		M10 x 30	Hex Socket Head	2

N:\Drawing\INTERNAL - EXTERNAL FLANGE FACES\MM1080IE-A39 - AIR DISTRIBUTION\MM1080IE-39 (air distributor assembly)

Appendix 1. Flange face surface finish

ANSI / ASME 16.5, 16.47, 16.42 – ISO 7005-1

Finish	Surface finish	Feed Rate	Tool Radius	Depth of cut
RF – Stock finish	125 – 500 μ in 3.2 – 12.5 μ m	0.032" 0.80mm	0.063" 1.60mm	0.006" 0.15mm
RF - Smooth	125 – 250 μ in 3.2 – 6.3 μ m	0.012" 0.30mm	0.032" 0.80mm	0.002" 0.05mm
Hydrogen	79 – 125 μ in 2 – 3.2 μ m	0.008" 0.20mm	0.015" 0.40mm	0.002" 0.05mm
RTJ	32 – 63 μ in 0.8 – 1.6 μ m	0.008" 0.20mm	0.015" 0.40mm	0.002" 0.05mm

Micrometer μ m	Micro – Inch μ in	Roughness Grade N	Roughness Grade ∇
12.5	500	N10	∇
6.3	250	N9	$\nabla \nabla$
3.2	125	N8	$\nabla \nabla$
1.6	63	N7	$\nabla \nabla$
0.8	32	N6	$\nabla \nabla \nabla$
0.4	16	N5	$\nabla \nabla \nabla \nabla$

NOTES