

Document Number: L4614

MHT420-H

HOT TAPPING MACHINE

OPERATION & MAINTENANCE MANUAL

Version History

All Enerpac. documentation is quality controlled and audited in accordance with **BS EN ISO 9001:2008**; the scope of which covers design, manufacture and repair of in-situ machine tools.

Version No.	Implemented By	Revision Date	Approved By	Approval Date	Comments
5	STH	19/10/2020	DMS	19/10/2020	Updated GA drawings, updated section 1.1 image
6	STH	12/2020	-	-	Rebrand
7	STH	11/11/2021	OR	11/11/2021	Minor updates following top cap and lifting shackles addition
A	SV	03/05/2023	DC	03/05/2023	GA updated

Operation & Maintenance Manual Approval

The undersigned acknowledge they have reviewed this Machine Operation & Maintenance Manual and agree with the approach it presents. Changes to this Operation & Maintenance Manual will be coordinated with, and approved by, the undersigned or their designated representatives.

Approver 1

Signature:



Date:

08/10/2018

Print Name:

Geoff Bull

Title:

Operations Manager

Approver 2

Signature:



Date:

08/10/2018

Print Name:

Richard Barlow

Title:

General Manager

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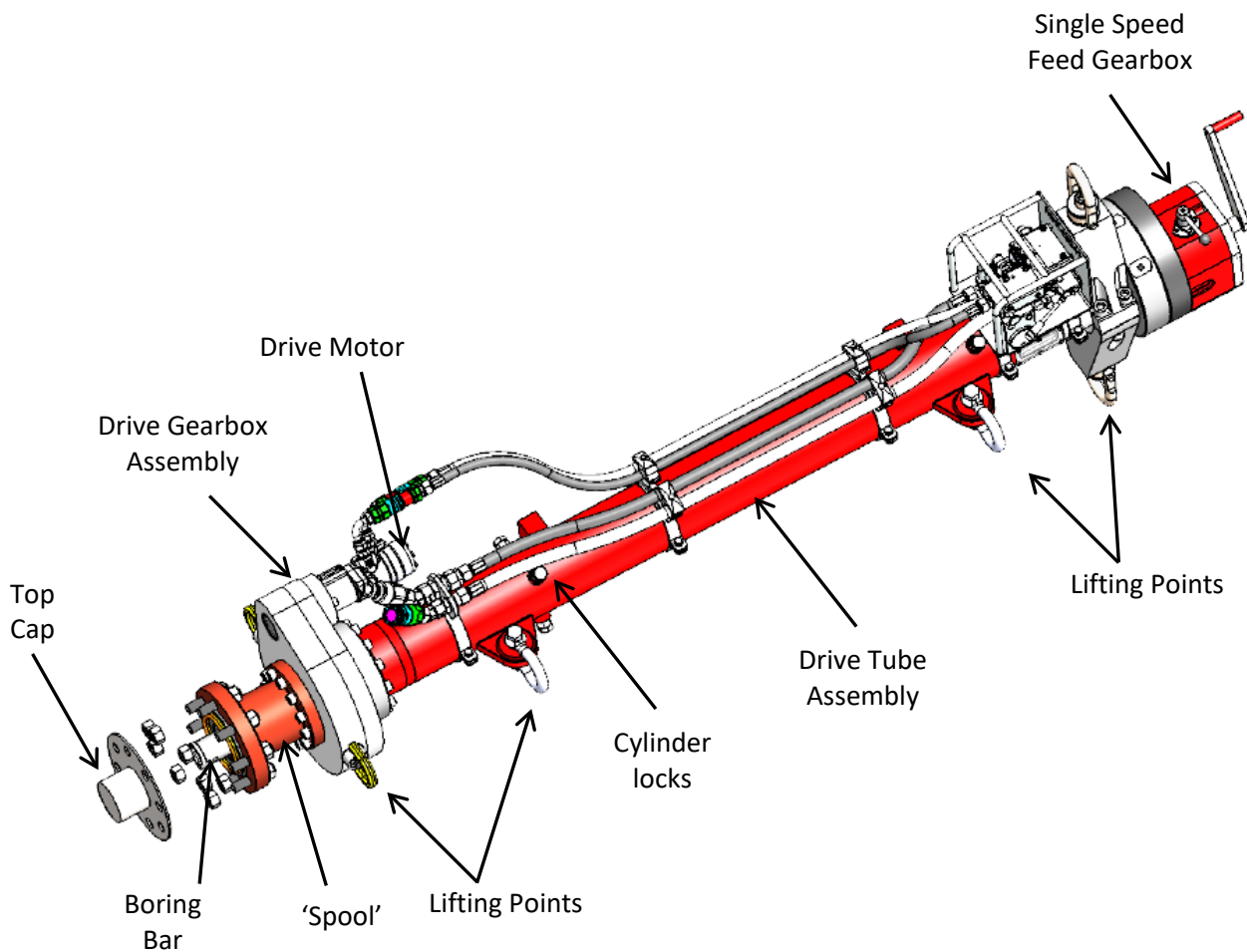
1. Introduction

1.1. Overall Equipment Description

The MHT420-H is a 72" stroke, hot tapping machine used to make connections & branches into pipelines without the need for a shutdown procedure.

The MHT420-H has been designed to make $\varnothing 4'' - \varnothing 20''$ holes easily in various material pipelines & vessels.

It is hydraulically operated with industry standard boring bar connection & a range of flange adapters to accept current hot tapping tooling.



2. Health and Safety

Enerpac has made every effort to ensure that the Information given in this Operation & Maintenance manual, 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 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.

2.1. Mandatory Safety Signs (for the purpose of trials at Enerpac)

ISO 7010 SYMBOL	SAFETY DESCRIPTION
	WEAR EYE PROTECTION
	EAR PROTECTION MUST BE WORN
	HARD HATS MUST BE WORN
	PROTECTIVE GLOVES MUST BE WORN
	PROTECTIVE FOOTWEAR MUST BE WORN
	OVERALLS MUST BE WORN
	MACHINE GUARDS MUST BE USED

2.2. Machine Hazards Signs

ISO 7010 SYMBOL	HAZARD DESCRIPTION
	DANGER HIGH VOLTAGE
	WARNING MOVING MACHINERY
	CAUTION MOVING MACHINERY
	WARNING KEEP HANDS CLEAR

2.3. Safety Procedures

Detailed in this chapter is a list of good Health and Safety practices that Enerpac advise users to adhere to. Due to the nature of portable machine tools, not every eventuality can be catered for and the following is not exhaustive, as such Enerpac strongly advise that the user carries out their own risk assessments based on the machining and environment in which they intend to use the machinery.

2.3.1. Pre-Operational Safety Checks

1. Always read safety signs / labels
2. Ensure no slip / trip hazards are present in workspaces and walkways
3. Locate and ensure you are familiar with the operation of the ON / OFF starter and E-Stop (*if fitted*)
4. Do not leave equipment on top of the machine
5. Ensure each tool is in good condition and securely mounted
6. Secure / Remove loose items
7. Faulty equipment must not be used. **Immediately report any suspect machinery**

2.4. Operational Safety Checks

1. Operator is fully conversant and trained in use of equipment
2. Keep clear of moving machine parts
3. Never leave the machine running unattended
4. Follow correct clamping procedures - keep overhangs as small as possible and check work piece is secure
5. Set the correct speed to suit the tool, the depth of cut and the material
6. Before making adjustments and measurements or before cleaning swarf accumulations switch off and bring the machine to a complete standstill

2.4.1. Housekeeping

1. Switch off the machine
2. Remove milling cutters, drill attachments and tap attachments and store them safely (if applicable)
3. Leave the machine and work area in a safe, clean and tidy state

2.4.2. Potential Hazards

1. Sharp cutters
2. Moving components – hair / clothing entanglement
3. Eye injury
4. Skin irritation
5. Metal splinters and burrs
6. Flying debris

3. Handling

Customers, users and operators of the machines must be aware of the nature of the equipment supplied.

Although inherently robust, the machine is a precision tool and may be damaged by poor handling, tipping and falling, inadequate transport arrangements over e.g. rough terrain, misuse by operators and use outside its design specification.

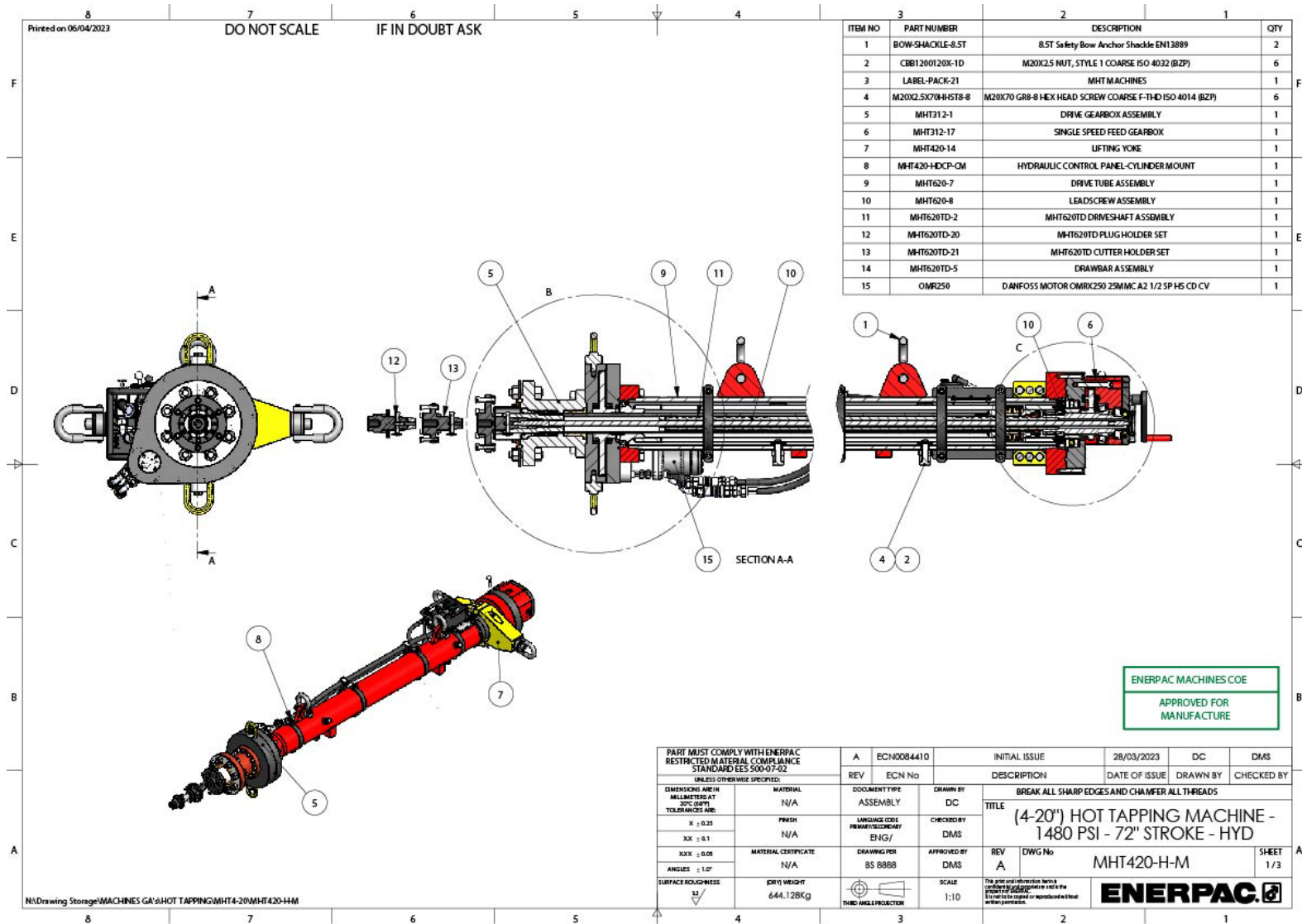
Such poor handling may result in either broken or damaged parts or disturbance to fine settings resulting in an inability to meet the specified machining tolerances and capabilities.

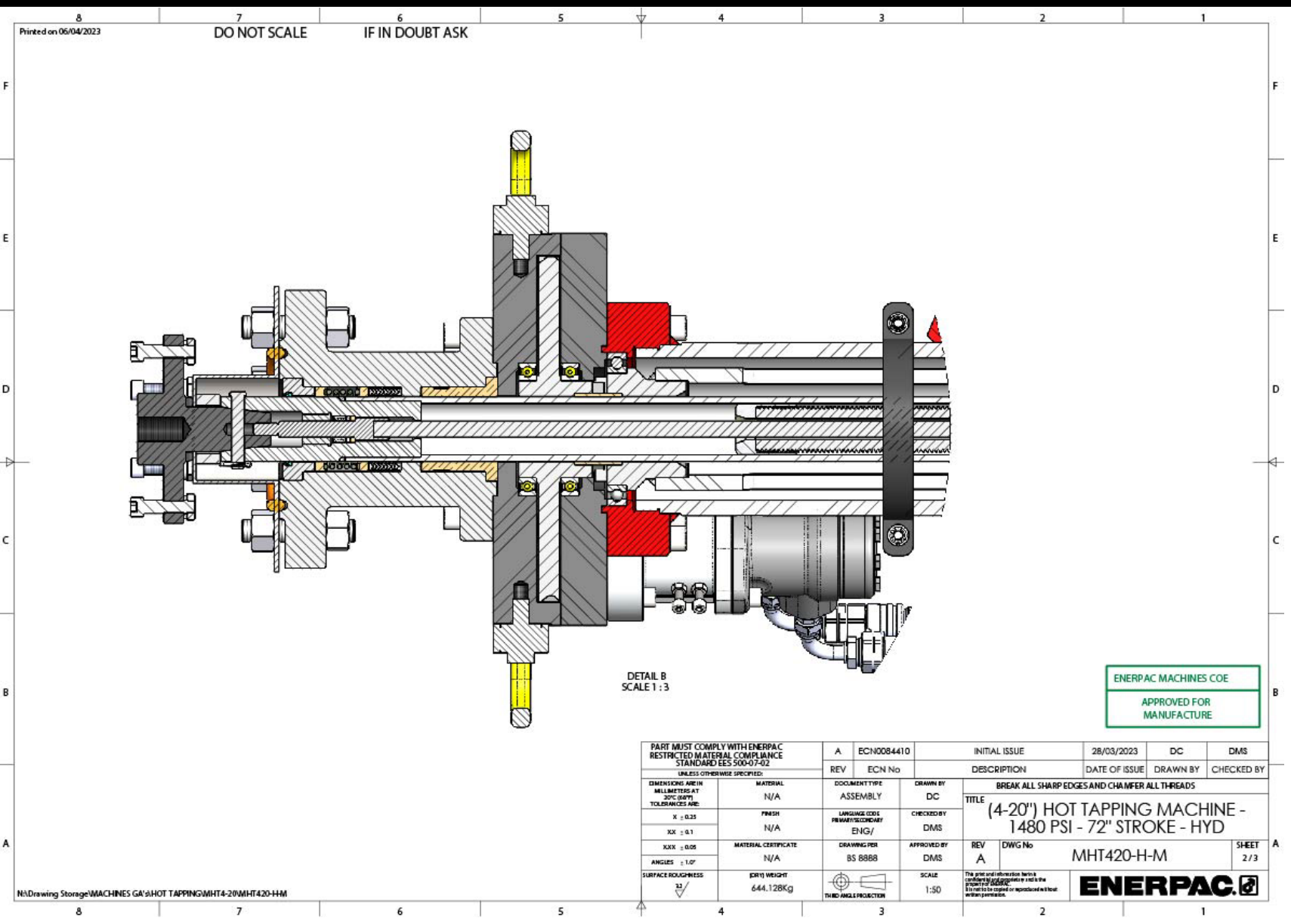
4. Machine Specification

The Enerpac MHT420-H Hot Tapping Machine has been modularly designed for accurate in-situ machining of work surfaces, to this end the constituent parts are easily manipulated by hand or crane.

Description	Value	
Cutting Stroke	1829mm	72"
Cutting Tool Diameters	102 – 508mm	4 – 20"
Max Working Pressure	100 bar	1450 psi
Max Operating Temperature (<i>Continuous</i>)	200°C	390°F
Boring Bar Diameter	75mm	2.95"
Cutter RPM Range	5-40 RPM	
Pneumatic Drive Motor Output (<i>At 6 bar & 2900L/min</i>)	3 Kw	4 Hp
Hydraulic Drive Motor Output (<i>At 100 bar & 50L/min</i>)	4 Kw	5.4 Hp
Hydraulic Supply Required	50 L/min	11 Gal
Pneumatic Supply Required	2900 L/min	2900 L/min
Auto Feed Rate (<i>Single Speed</i>)	0.076mm	0.003"
Manual Feed Rate	8.46mm/rev	0.333"/rev
Machine Weight	450 Kg	990 Lbs
Designed For General Use		

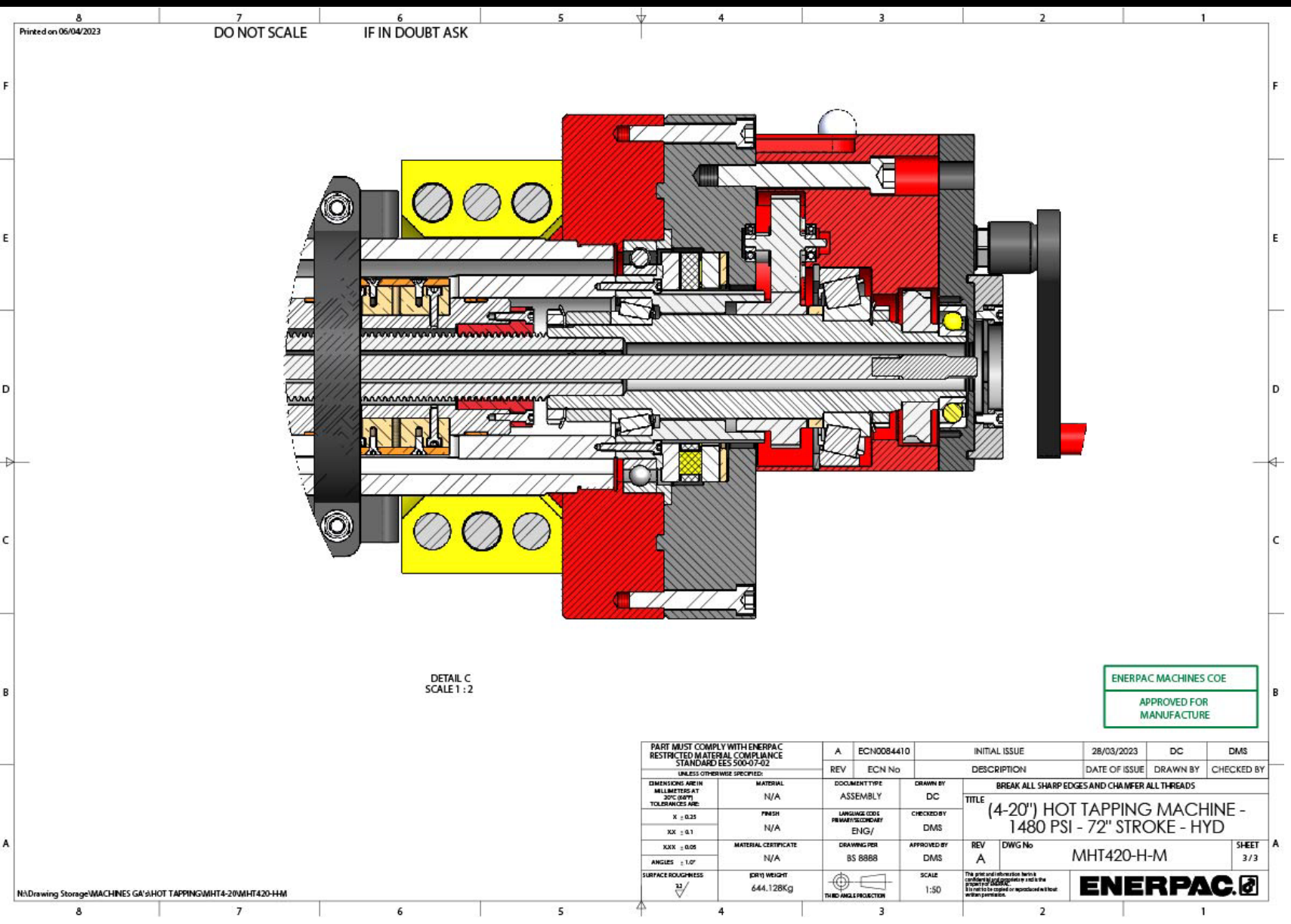
5. General Assembly Drawings





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Doc: MML265 Issue: 002 Issue Date: 10.10.2018



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DO NOT SCALE

6
IF IN DOUBT ASK

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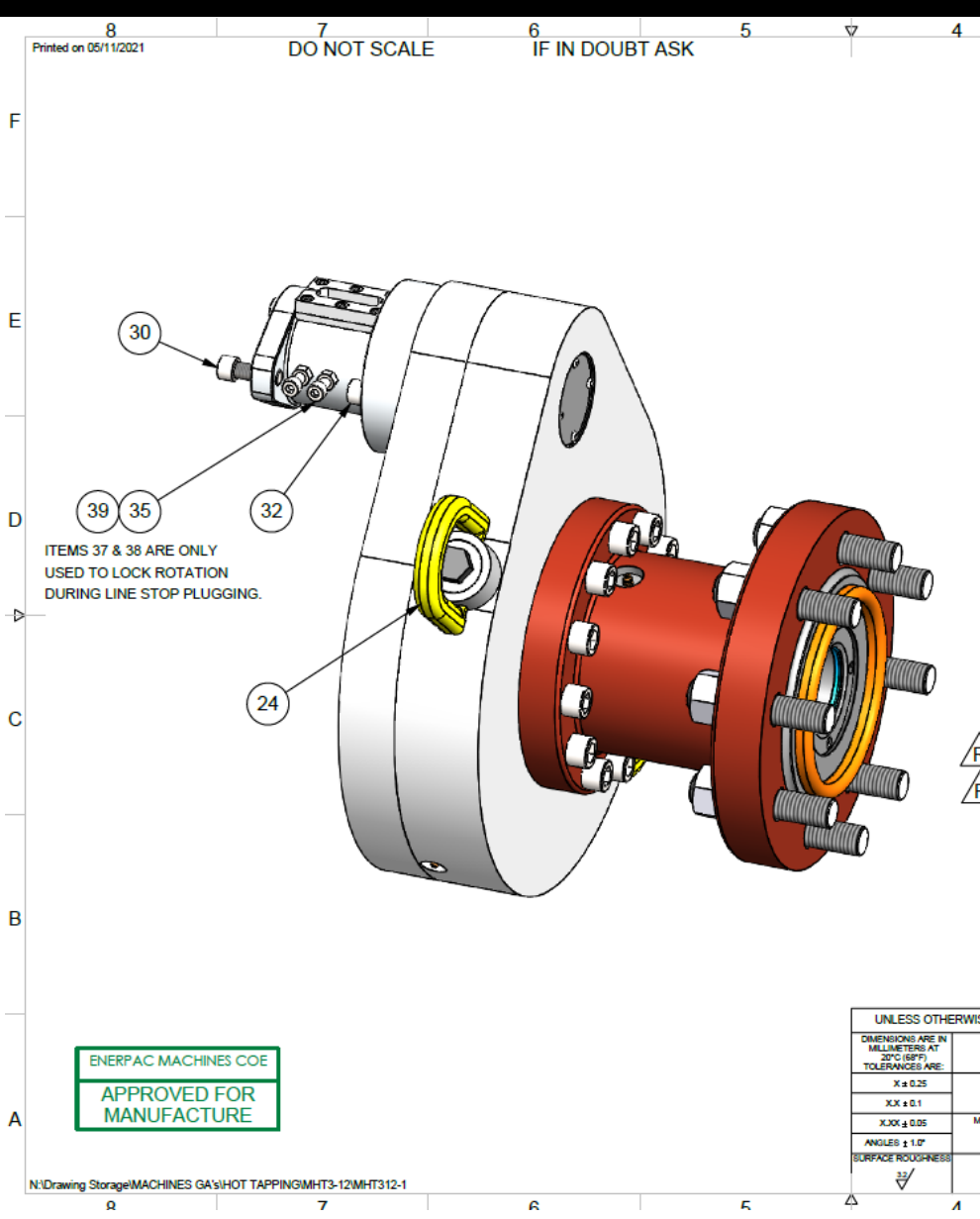
E

D

C

B

A



ITEMS 37 & 38 ARE ONLY USED TO LOCK ROTATION DURING LINE STOP PLUGGING.

ITEM NO	PART NUMBER	DESCRIPTION	QTY
1	MHT312-1-001	GEARBOX BODY	1
2	MHT312-1-004	125I DRIVE GEAR	1
3	MHT312-1-002	GEARBOX LID	1
4	MHT312-1-005	25I HELICAL GEAR	1
5	MHT312-1-009	BEARING CAP	1
6	MHT312-1-010	MOTOR SPOOL	1
7	MHT312-1-011	MOTOR ADAPTER SHAFT	1
8	MHT312-1-014	MHT312 SPOOL	1
9	MHT312-1-006	BUSH	1
10	MHT312-1-015	HEADED BUSH	1
11	MHT312-1-018	PLAIN BUSH	2
12	MHT312-1-019	SEAL CARTRIDGE	1
13	MHT312-1-020	COMPRESSION SPRING	1
14	MHT312-1-023	WINDOW MOUNT	1
15	MHT312-1-024	VIEW PORT	1
16	MHT312-1-025	KEEPER PLATE	1
17	6210-2RS	RADIAL BEARING	1
18	61919-2RS	RADIAL BEARING	2
19	CHD44371-SWAN-200DEG-CHEVRON	CHEVRON SEAL 2.5in x 3.25 x 1.25 VITON PACKERS	1
20	MB4	lock washer	1
21	KM4	locknut	1
22	3304-2RS	Angular contact ball bearings, double row	1
23	KK8-7-40A	TYPE A KEY	1
24	RLP-M16-10	ROTATING LIFTING POINT	2
25	R37	RING-JOINT GASKET	1
26	SWAN202500-FLN2V	Swan seal with O-Ring	1
27	M0	STRAIGHT GREASE NIPPLE	2
28	12X80DOWEL	12X80 DOWEL HARDENED STEEL DIN 6325	1
29	1-4NPT-BLANKING-PLUG-HP	1/4" NPT PORT PLUG	1
30	CCZ1227028-1A	SCREW-SHCS, FLAT, HEX, M12X1.75X35, STL/12.9, ZINC	2
31	CCZ1637028-1A	M16X80 GR12-9 SOCKET HEAD CAP SCREW COARSE ISO 4762 (BZP)	12
32	CCZ1237028-1A	SCREW-SHCS, FLAT, HEX, M12X1.75X80, STL/12.9, ZINC	2
33	CCZ1035028-1A	M10X55 GR12-9 SOCKET HEAD CAP SCREW COARSE ISO 4762 (BZP)	14
34	CCZ521028-1A	M5X20 GR12-9 SOCKET HEAD CAP SCREW COARSE ISO 4762 (BZP)	8
35	CCZ526028-1A	M5X40 GR12-9 SOCKET HEAD CAP SCREW COARSE ISO 4762 (BZP)	2
36	CBE415028-1E	M4X10 GR10-9 BUTTON HEAD CAP SCREW COARSE ISO 7380 (BZP)	4
37	STUD-7/8"-9 UNC x 4.375	7/8"-9 UNC STUD x 4.375" LONG ASTM A193 B7	8
38	7/8"-9 UNC HHNUT	7/8"-9 UNC HEAVY HEX NUT	16
39	CBB1080120X-1D	M8X1.25 NUT, STYLE 1 COARSE ISO 4032 (BZP)	2
40	MHT312-1-021	TOP CAP	1

Note:
Item 40 not shown
QTY 8 of item 38 not shown

ENERPAC MACHINES COE

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UNLESS OTHERWISE SPECIFIED:

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TOLERANCES ARE:	N/A	ASSEMBLY	KB	TITLE	
X ± 0.25	FINISH	LANGUAGE CODE	CHECKED BY	DRIVE GEARBOX ASSEMBLY	
XX ± 0.1	N/A	ENIG//	RH	REV	
XXX ± 0.05	MATERIAL CERTIFICATE	DRAWING PER	APPROVED BY	DWG No	
ANGLES ± 1.0°	N/A	B5 8888	RS	MHT312-1	
SURFACE ROUGHNESS	(DRY) WEIGHT	SCALE	SHEET		
3.2	151.680Kg	1:3	1/2		



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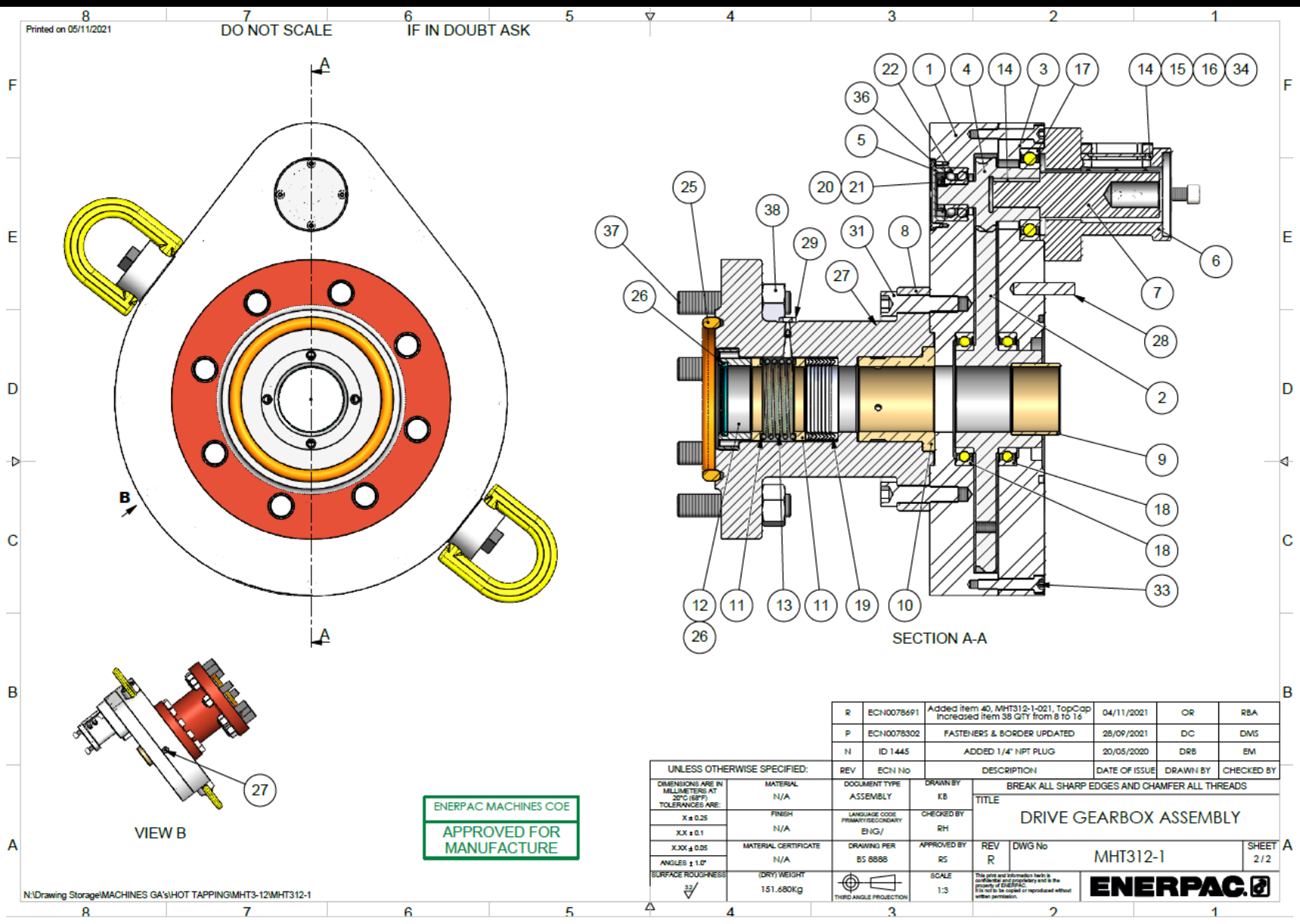


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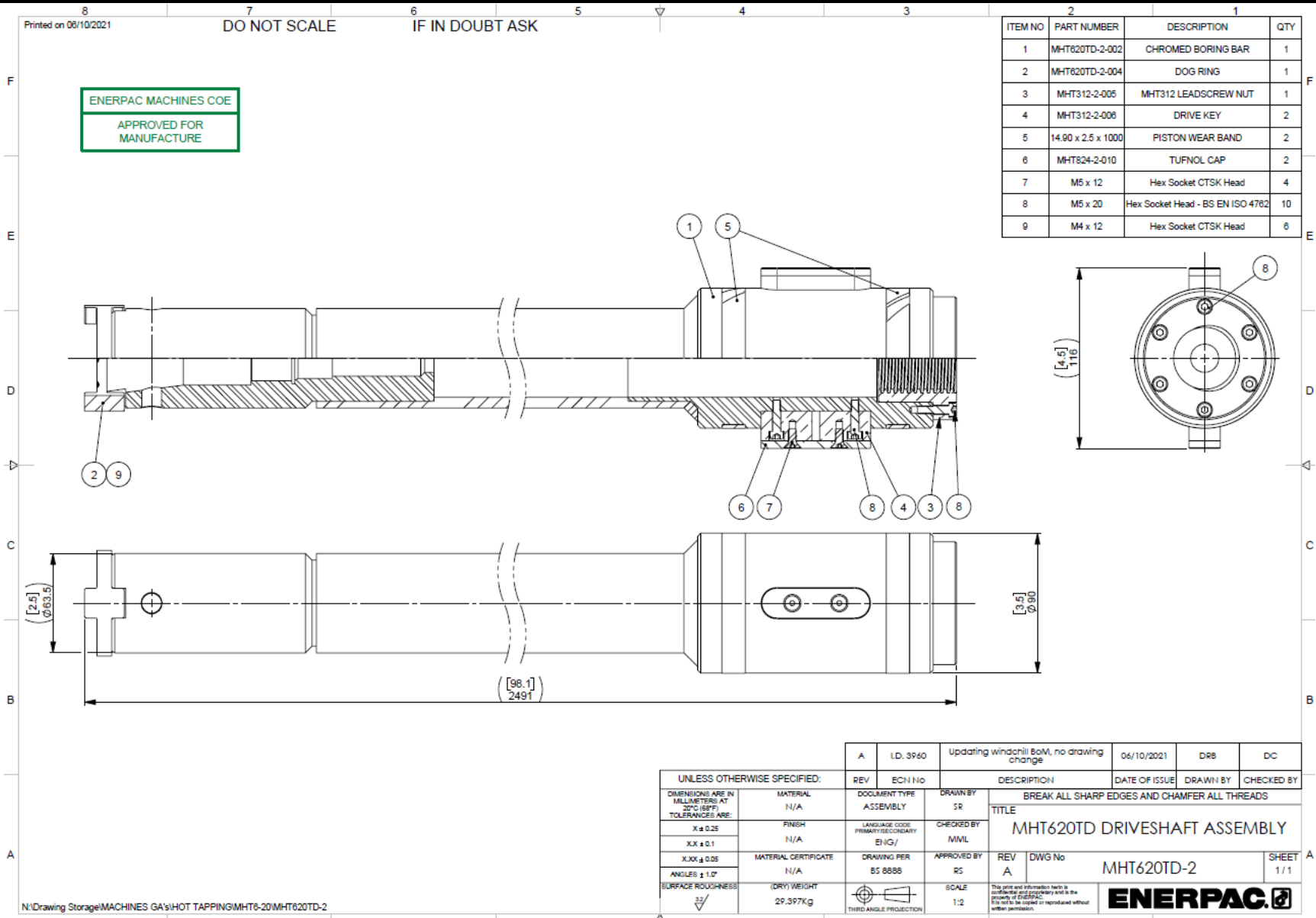
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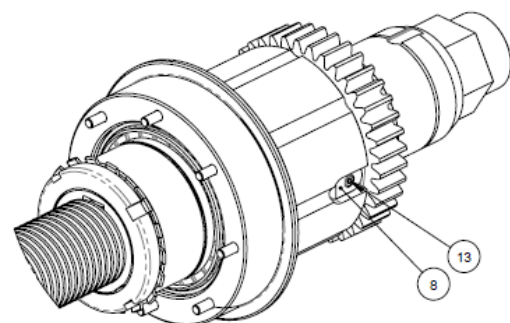
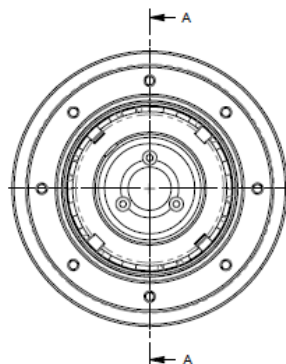
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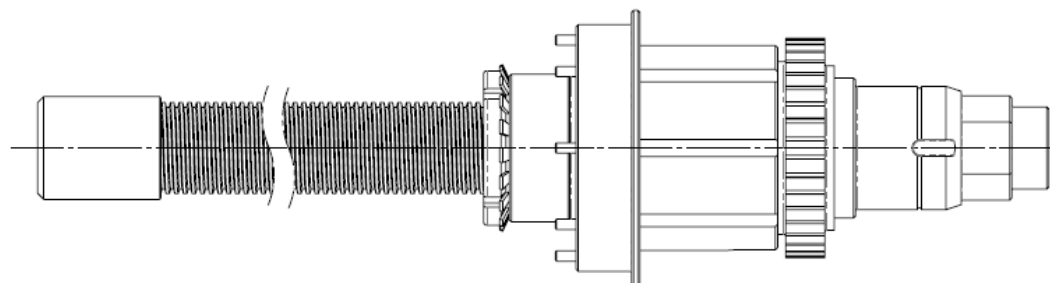
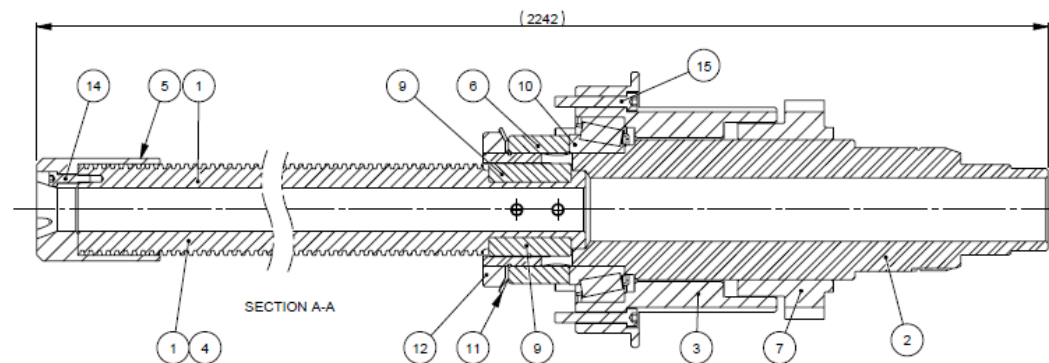
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SCALE 1 : 2



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ITEM NO.	REV.	PART NUMBER	DESCRIPTION	QTY.	ITEM NO.	REV.	PART NUMBER	DESCRIPTION	QTY.
1		MHT620-8-001	LEADSREW	1	9		14 x 9 x 40	PARALLEL KEY - TYPE A	2
2		MHT416-4-002	ADAPTER SHAFT	1	10		33011/Q	TAPER ROLLER BEARING	1
3		MHT416-4-003	END CAP	1	11		MB11	LOCK WASHER	1
4		MHT416-4-004	GRUB SCREW	4	12		KM11	LOCK NUT	1
5	A	MHT416-4-005	TUFFNUT	1	13		M3 x 8	Hex Socket Head - BS EN ISO 4762	1
6		MHT420-4-002	BEARING SPACER	1	14		M4 x 16	Hex Socket Head - BS EN ISO 4762	3
7	A	MHT312-4-003	40t DRIVE GEAR	1	15		M5 x 35	Hex Socket Head - BS EN ISO 4762	8
8	A	MHT312-4-006	DRIVE KEY	1					

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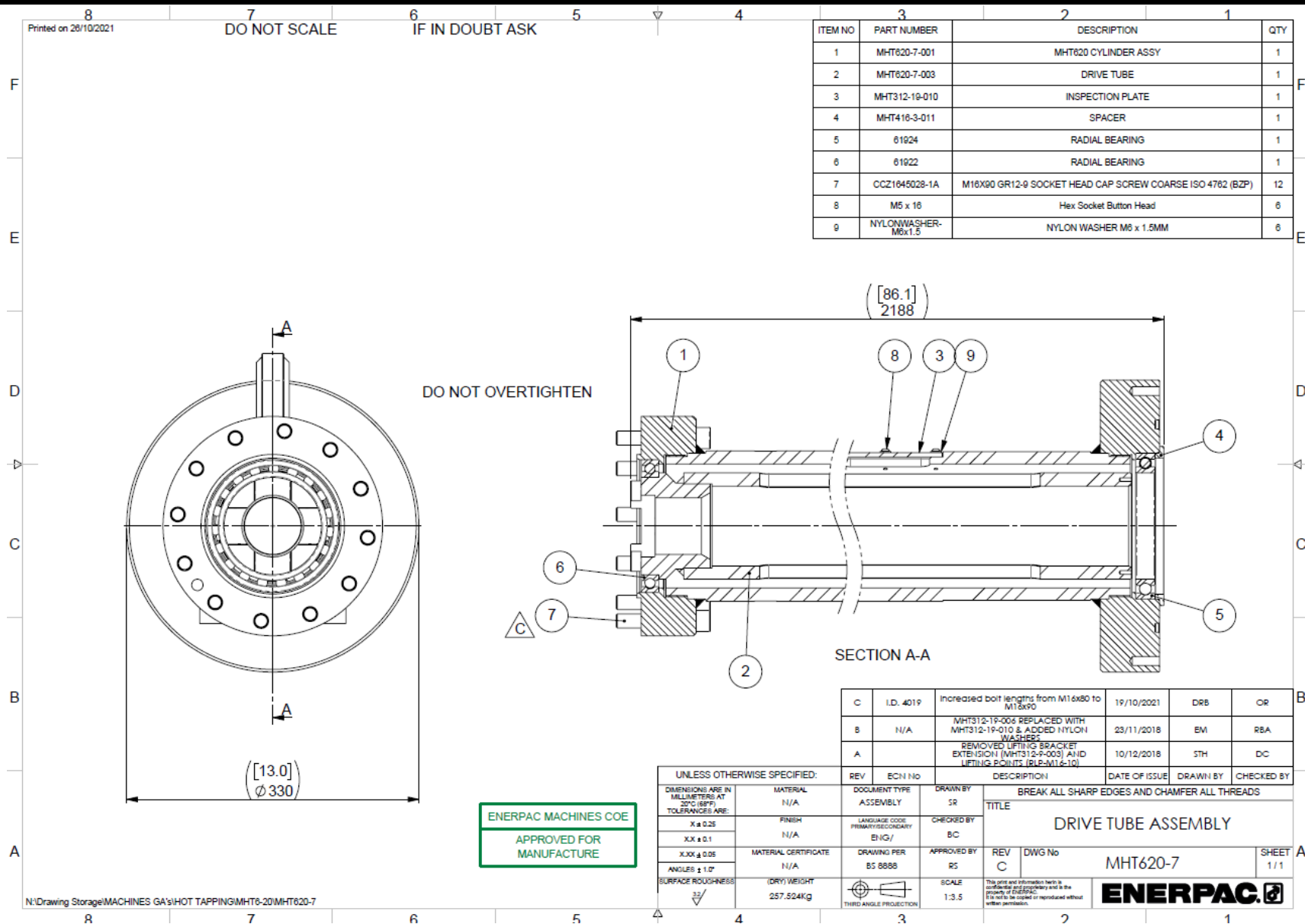
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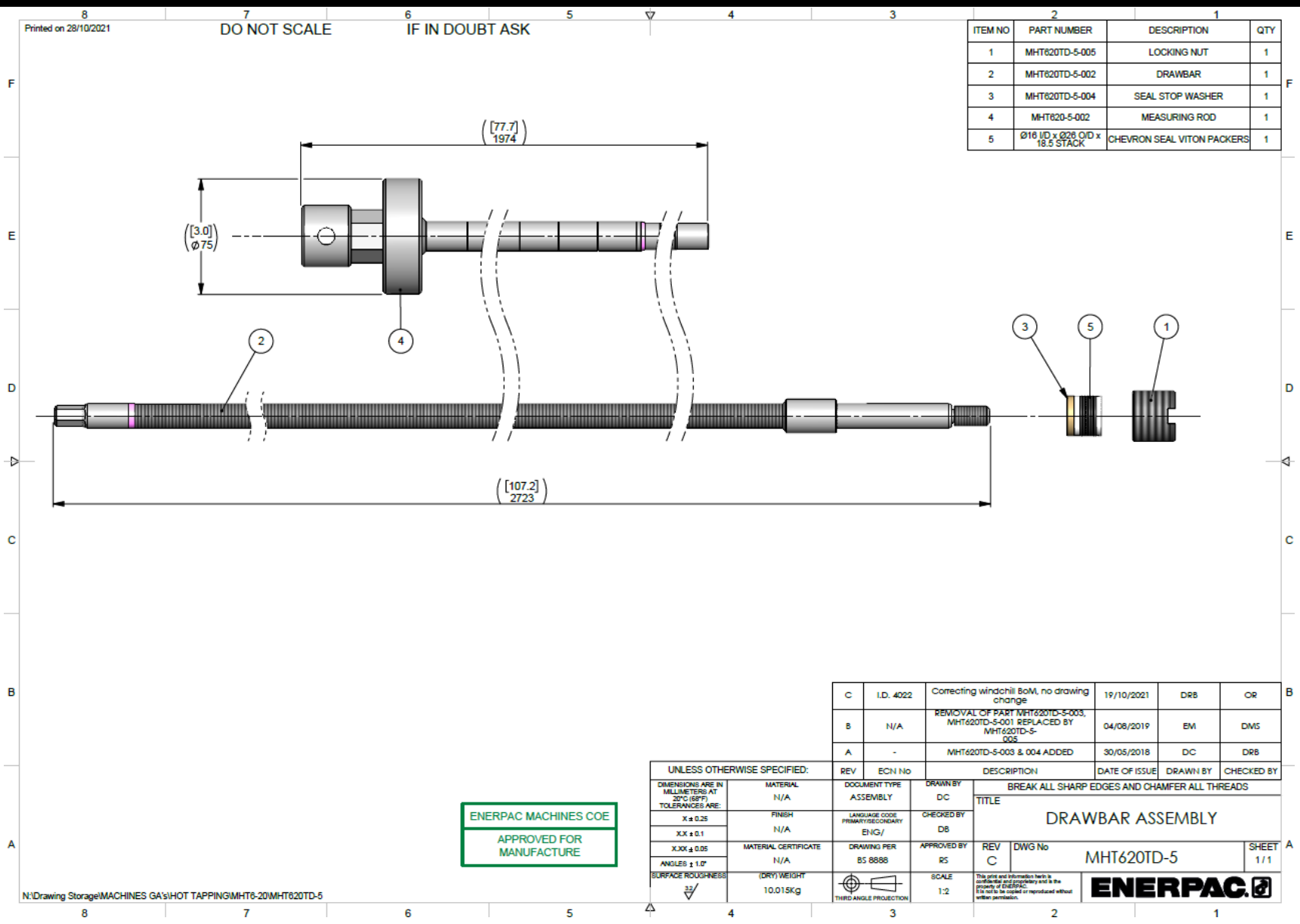
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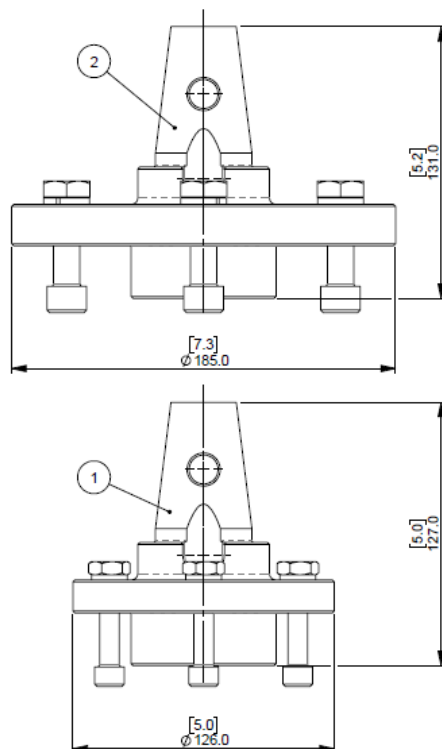




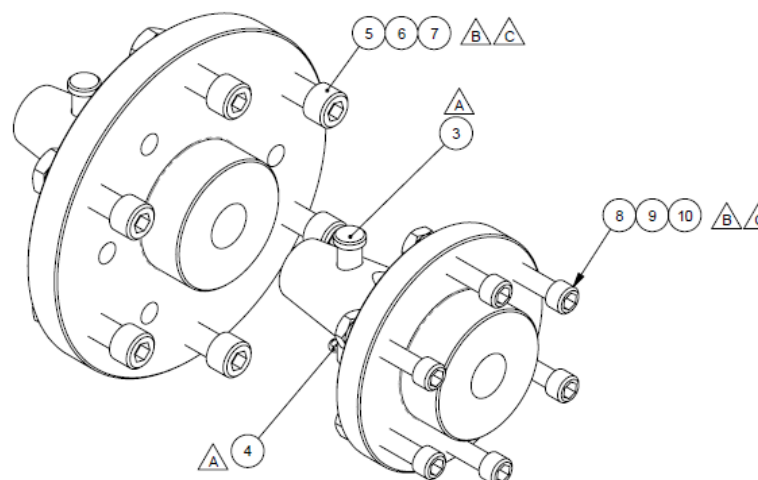
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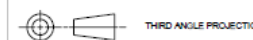
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	MHT620TD-21-001	6"-12" CUTTER HOLDER	1
2	MHT620TD-21-002	14"-20" CUTTER HOLDER	1
3	MHT620TD-21-003	CLEVIS PIN	2
4	DIN914_M4x20	DIN 94 SPLIT PIN	2
5	12-20UNFx2-SHCS	1/2"-20 UNF x 2" SOCKET HEAD CAP SCREW FULL THREAD	6
6	12SPRINGWASHER	1/2" SPRINGWASHER	6
7	12NYLOCNUT	1/2" NYLOC NUT	6
8	38-16UNCx2-SHCS	3/8"-16 UNC x 2" SOCKET HEAD CAP SCREW FULL THREAD	6
9	38SPRINGWASHER	3/8" SPRING WASHER	6
10	38NYLOCNUT	3/8" NYLOC NUT	6



C	-	1/2" FULL THREAD BOLT UPDATED TO 1/2" FULL THREAD SHCS. 3/8" FULL THREAD BOLT UPDATED TO 3/8" FULL THREAD SHCS. PART NUMBERS UPDATED TO MATCH WINDCHILL	17/09/2019	RW	D8
B	3526	Added missing fasteners	19/10/2018	DRB	DMS
A	11/A	MHT620TD-21-003 & SPLIT PINS ADDED.	04-Apr-16	SR	AMQC
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WEIGHT 9.277kg
DRAWN BY SR 22/01/2016
CHECKED BY BC 22/01/2016
APPROVED BY --
TITLE MHT620TD CUTTER HOLDER SET
SCALE: 1:2

MIRAGE
PORTABLE PERFORMANCE

10 ENTERPRISE WAY, JUBILEE PARKWAY,
STORES ROAD, DERBY DE21 4BB
TEL (01332) 291767 FAX (01332) 370356
E MAIL info@mirage-machines.co.uk

DWG NO MHT620TD-21
SHEET 1 OF 1

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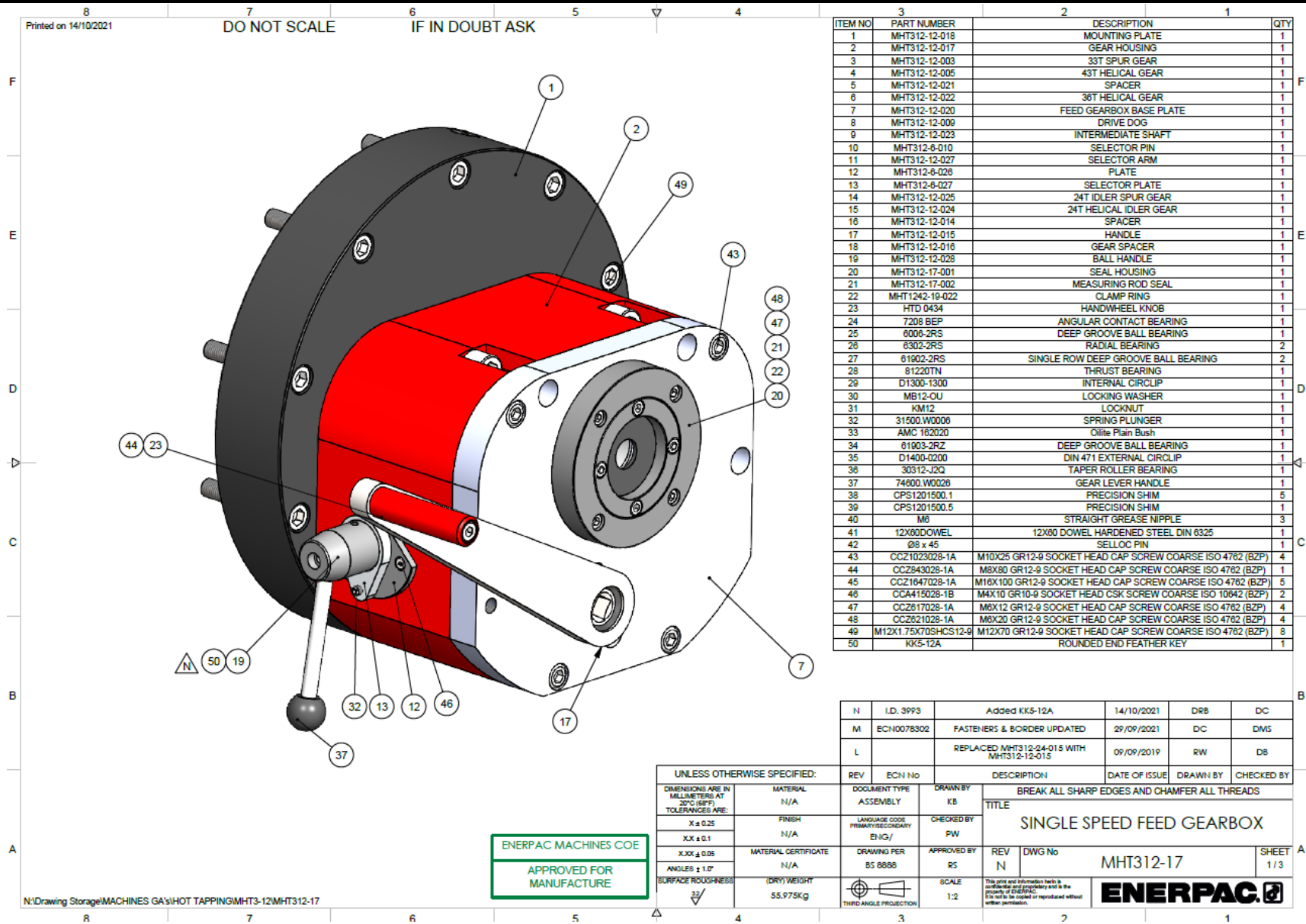
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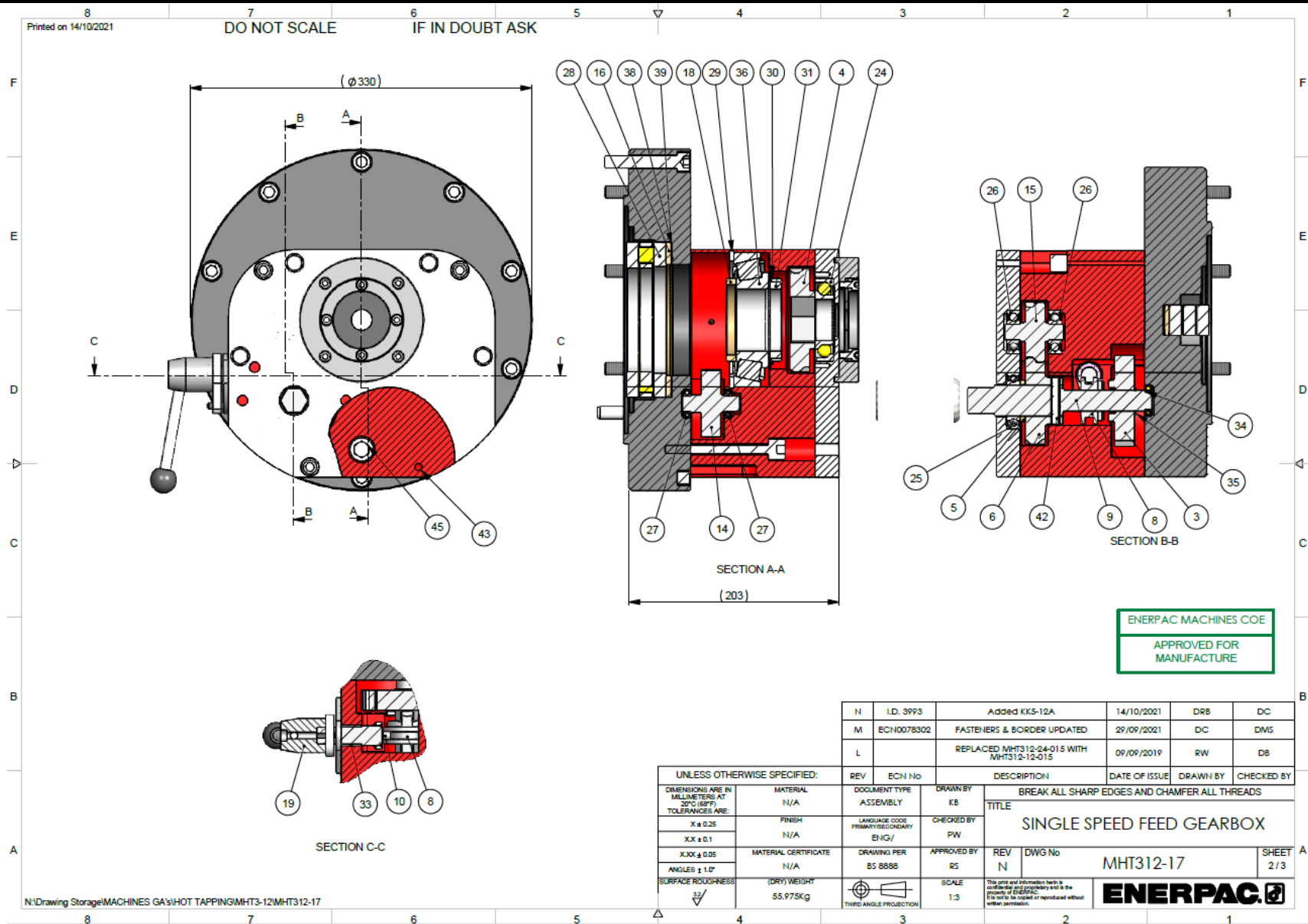
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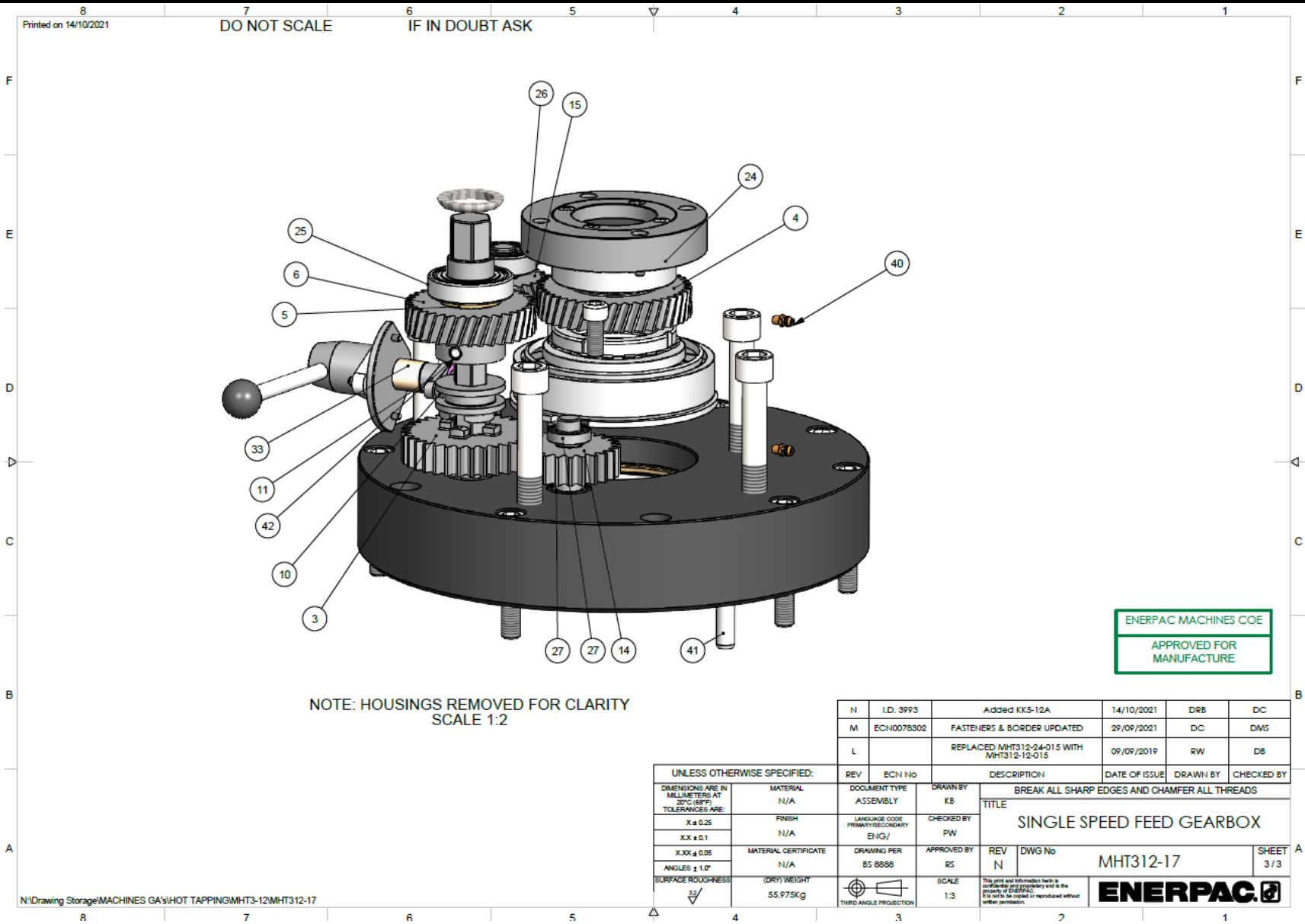
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Issue Date: 10.10.2018



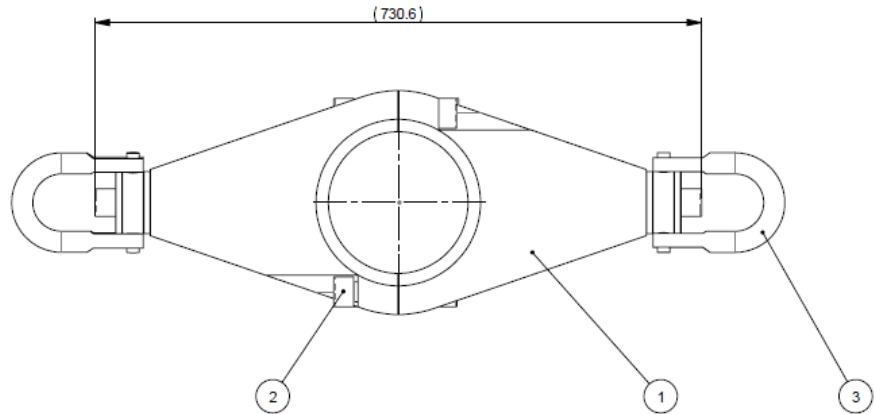
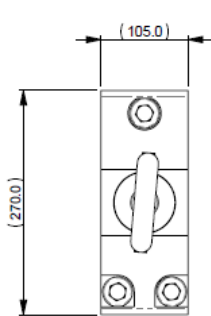




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ITEM NO.	PART NUMBER	DESCRIPTION	Class	QTY.
1	MHT420-14-001	1/2 LIFTING YOKE		2
2	M24 x 90	Hex Socket Head - BS EN ISO 4762	12.9	6
3	swivel_hoist_rings_1016668 M24	swivel_hoist_rings_1016668 M24		2

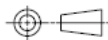
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LOAD TEST IN ACCORDANCE WITH MMT-52

C		MHT420-14-002 AND ASSOCIATED FASTENERS REMOVED	30/08/2019	DWS	RW
B		'LOAD TEST' NOTE ADDED	31/08/2018	RBI	DC
A	3302	REMOVED M16x40 BOLT, M16x25 BOLTS ARE NOT M16x30. ADDED BOLT CLASS (detail)	03-Apr-17	DRB	SR
REV.	INC.	DESCRIPTION	DATE	DRAWN BY	APPROVED



THIRD ANGLE PROJECTION

BREAK ALL SHARP EDGES AND CHAMFER ALL THREADS

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MIRAGE
AN ENERPAC BRAND

WEIGHT 72.749kg
DRAWN BY AMACI 18/10/2016
CHECKED BY MML 18/10/2016
APPROVED BY MML 18/10/2016

10 ENTERPRISE WAY, JUBILEE PARKWAY,
STORES ROAD, DERBY DE21 4BB
TEL (01332) 291767 FAX (01332) 370358
E MAIL info@mirage-machines.co.uk

TITLE LIFTING YOKE
SCALE: 1:5

DWG No MHT420-14
SHEET 1 OF 1

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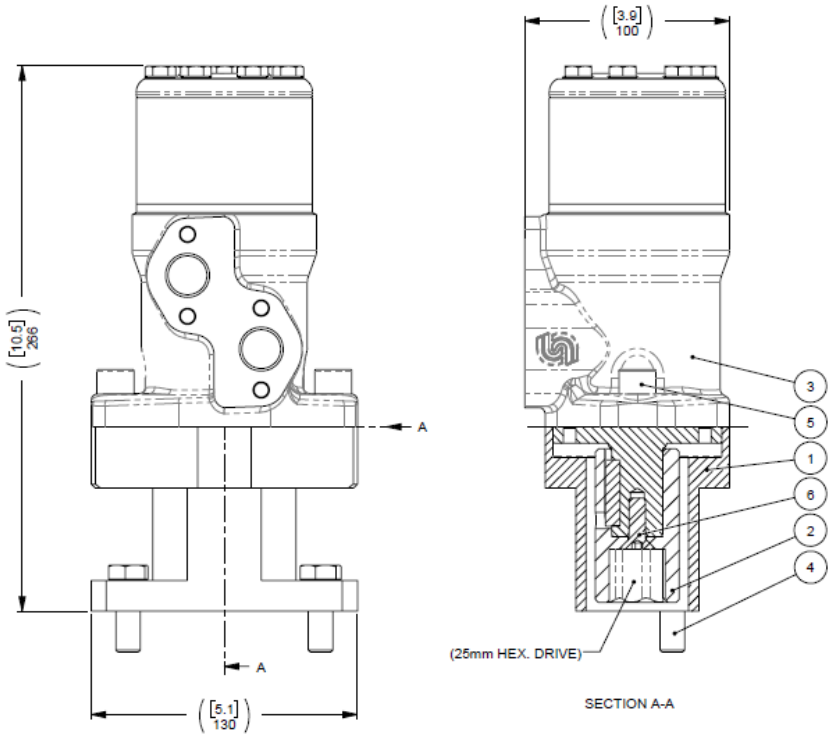
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Issue Date: 10.10.2018

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ITEM NO.	REV.	PART NUMBER	DESCRIPTION	QTY.
1	A	MHT312-24-014	REACTION ARM	1
2		MHT312-24-011	25mm A/F DRIVE SOCKET	1
3		151-0318	OMP 400	1
4		M12x35	Hex Screw	2
5		M12 x 35	Hex Socket Head - BS EN ISO 4762	2
6		M8 x 25	Hex Socket CTSK Head - BS EN ISO 10642	1

A	N/A	KK8-7-32 KEY REMOVED, ONE SUPPLIED WITH 151-0318.	23-Aug-17	SR	
REV.	INC.	DESCRIPTION	DATE	DRAWN BY	APPROVED
			THIRD ANGLE PROJECTION		
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WEIGHT		10.297kg			
DRAWN BY		AMG	16-Aug-17		
CHECKED BY		MM	16-Aug-17		
APPROVED BY					
TITLE		FAST TRAVERSE UNIT	DWG No		MHT312-24
		SCALE: 1:2			SHEET 1 OF 1



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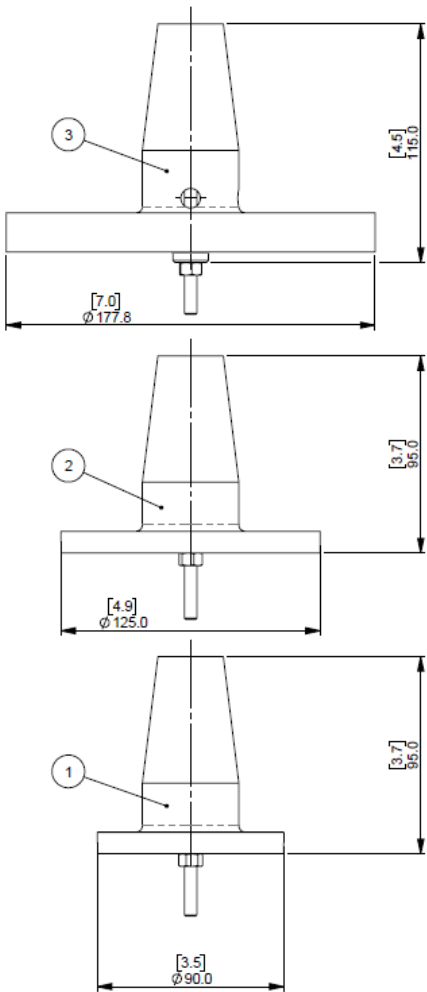
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N:\Drawing Storage\MACHINES GA\HOT TAPPING\MHT3-12\MHT312-24
A3 ASSEMBLY (AUTO) - 7-4-2009

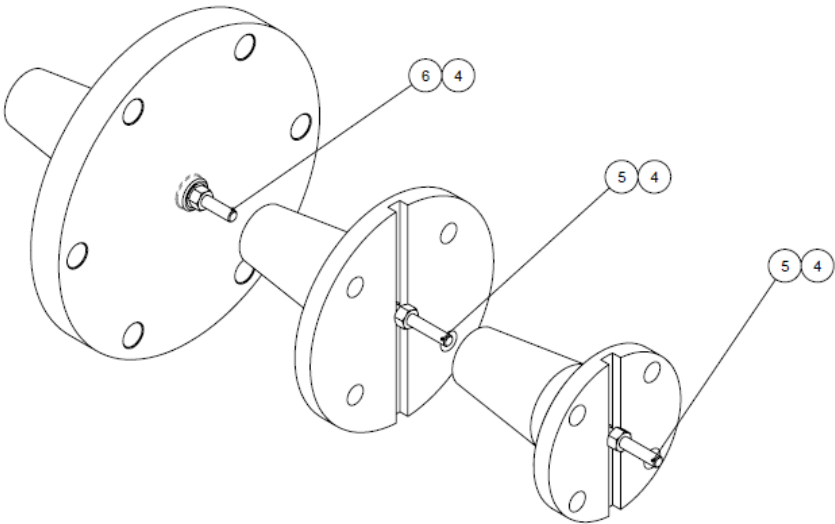
Printed on 08-Apr-16

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ITEM NO.	REV.	PART NUMBER	DESCRIPTION	QTY.
1		MHT620TD-20-001	6" PLUG HOLDER	1
2		MHT620TD-20-002	8"-16" PLUG HOLDER	1
3		MHT620TD-20-003	16"-20" PLUG HOLDER	1
4		M6	Hex Nut Grade C - BS EN 24034	3
5		M6 x 80	Hex Socket Head - BS EN ISO 4762	2
6		M6x100	Hex Socket Head - BS EN ISO 4762	1



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A	N/A	M&M100&80 BOLTS & M6 NUTS ADDED.	08-Apr-16	SR	DC	
REV.	INC.	DESCRIPTION	DATE	DRAWN BY	APPROVED	
		THIRD ANGLE PROJECTION	 MIRAGE PORTABLE PERFORMANCE			
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WEIGHT 7.702kg		10 ENTERPRISE WAY, JUBILEE PARKWAY, STORES ROAD, DERBY DE21 4BB TEL (01332) 291787 FAX (01332) 370356 E MAIL info@mirage-machines.co.uk				
DRAWN BY SR 14-Jan-16 CHECKED BY BC 22-Jan-16 APPROVED BY -- TITLE		DWG No MHT620TD-20 SHEET 1 OF 1				
MHT620TD PLUG HOLDER SET		A3				
SCALE: 1:2						

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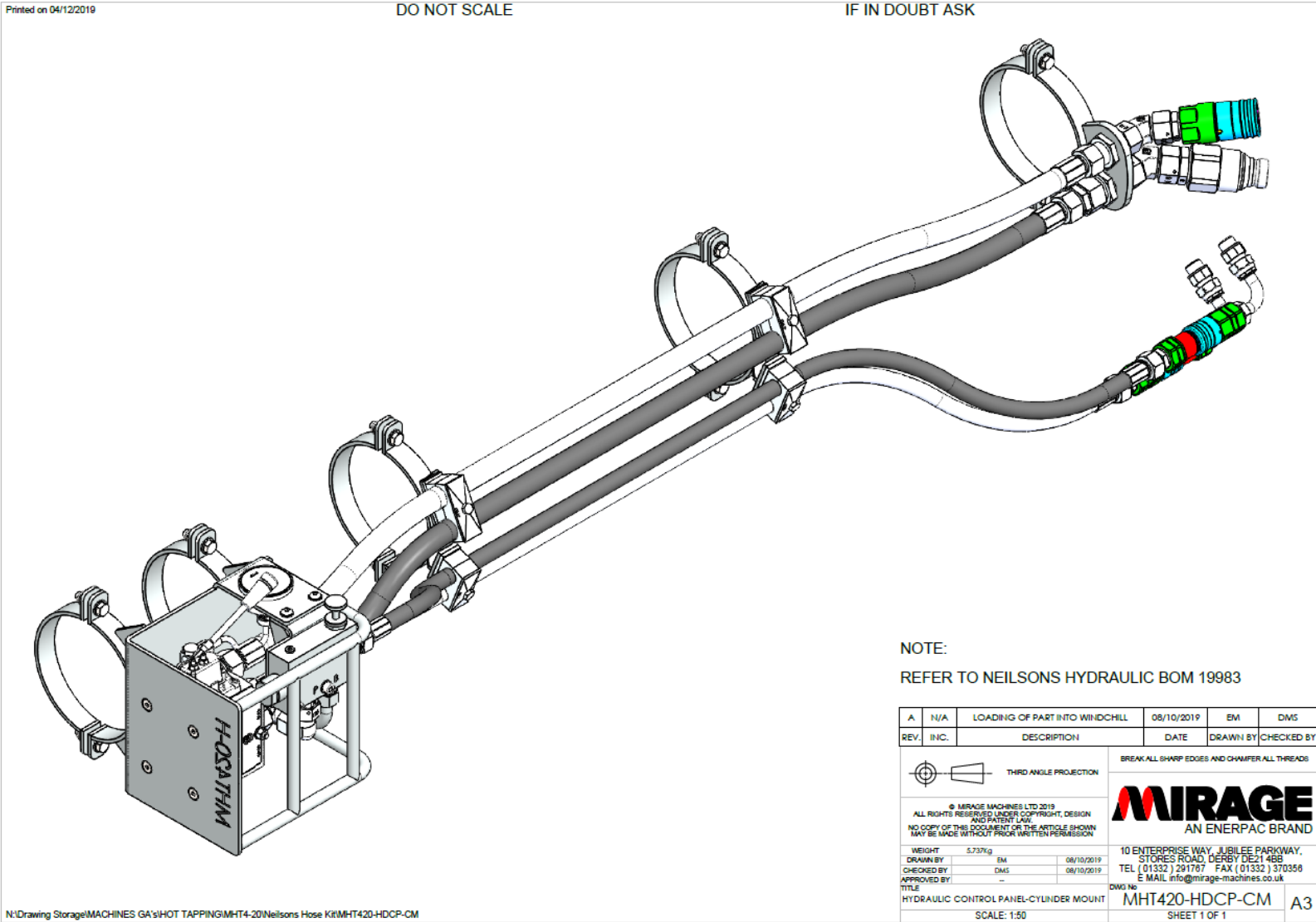
10 ENTERPRISE WAY, JUBILEE PARKWAY,
STORES ROAD, DERBY DE21 4BB
TEL (01332) 291767 FAX (01332) 370358
E MAIL info@mirage-machines.co.uk

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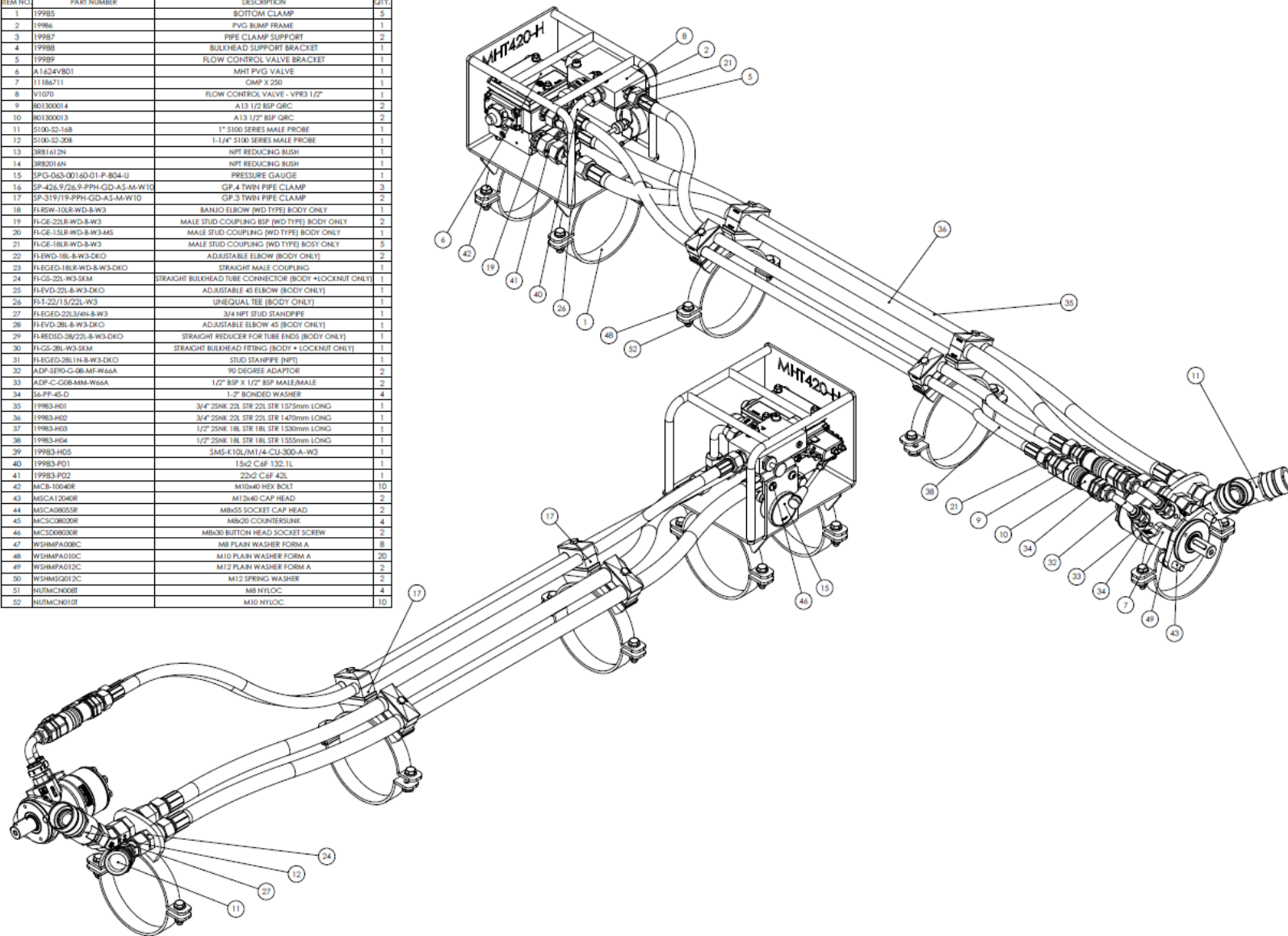
Doc: MML265

Issue: 002

Issue Date: 10.10.2018



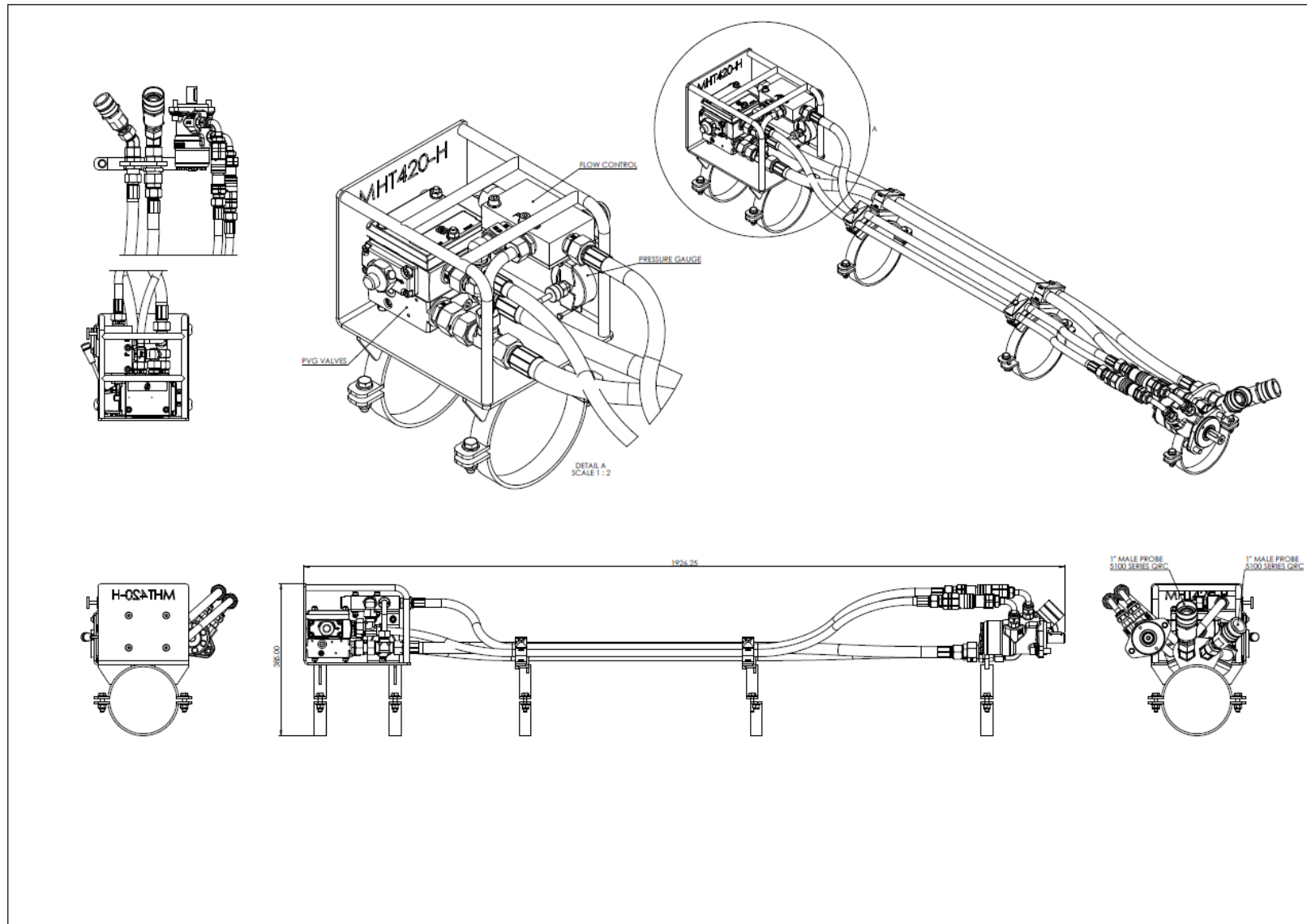
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	19985	BOTTOM CLAMP	5
2	19986	PVG BUMP FRAME	1
3	19987	PIPE CLAMP SUPPORT	2
4	19988	BULKHEAD SUPPORT BRACKET	1
5	19989	FLOW CONTROL VALVE BRACKET	1
6	A1424V801	MHT PVG VALVE	1
7	11186711	OMP X 250	1
8	V1070	FLOW CONTROL VALVE - VPR3 1/2"	1
9	801300014	A13 1/2" BSP GRC	2
10	801300013	A13 1/2" BSP GRC	2
11	5100-S2-148	1" 5100 SERIES MALE PROBE	1
12	5100-S2-208	1-1/4" 5100 SERIES MALE PROBE	1
13	3851612N	NPT REDUCING BUSH	1
14	3850014N	NPT REDUCING BUSH	1
15	SP-043-00140-D1-P-804-U	PRESSURE GAUGE	1
16	SP-426-9/24.9-PPH-GD-A3-M-W10	GP 4 TWIN PIPE CLAMP	3
17	SP-319/19-PPH-GD-A3-M-W10	GP 3 TWIN PIPE CLAMP	2
18	FL85W-10LR-WD-B-W3	BANJO ELBOW (WD TYPE) BODY ONLY	1
19	FL-GE-22LR-WD-B-W3	MALE STUD COUPLING BSP (WD TYPE) BODY ONLY	2
20	FL-GE-15LR-WD-B-W3-MS	MALE STUD COUPLING (WD TYPE) BODY ONLY	1
21	FL-GE-18LR-WD-B-W3	MALE STUD COUPLING (WD TYPE) BODY ONLY	5
22	FL-FWD-18L-B-W3-DKO	ADJUSTABLE ELBOW (BODY ONLY)	2
23	FL-EGED-18LR-WD-B-W3-DKO	STRAIGHT MALE COUPLING	1
24	FL-GS-22L-W3-SKM	STRAIGHT BULKHEAD TUBE CONNECTOR (BODY LOCKNUT ONLY)	1
25	FL-EVD-22L-B-W3-DKO	ADJUSTABLE 45 ELBOW (BODY ONLY)	1
26	FL-T-22/15/22L-W3	UNEQUAL TEE (BODY ONLY)	1
27	FL-EGED-22L-VAN-B-W3	3/4" NPT STUD STANDPIPE	1
28	FL-EVD-28L-B-W3-DKO	ADJUSTABLE ELBOW 45 (BODY ONLY)	1
29	FL-REDID-28/22L-B-W3-DKO	STRAIGHT REDUCER FOR TUBE ENDS (BODY ONLY)	1
30	FL-GS-28L-W3-SKM	STRAIGHT BULKHEAD FITTING (BODY + LOCKNUT ONLY)	1
31	FL-EGED-28LIN-B-W3-DKO	STUD STANDPIPE (NPT)	1
32	ADP-SE90-G-06-MF-W66A	90 DEGREE ADAPTOR	2
33	ADP-C-G08-MM-W66A	1/2" BSP X 1/2" BSP MALE/MALE	2
34	SL-PP-45-D	1/2" BONDIED WASHER	4
35	19983-H01	3/4" 25Nk 22L STR 22L STR 1575mm LONG	1
36	19983-H02	3/4" 25Nk 22L STR 22L STR 1470mm LONG	1
37	19983-H03	1/2" 25Nk 18L STR 18L STR 1530mm LONG	1
38	19983-H04	1/2" 25Nk 18L STR 18L STR 1530mm LONG	1
39	19983-H05	SMS-K10L/M1/4-CU-300-A-W3	1
40	19983-P01	15x2 C-6F 132.1L	1
41	19983-P02	22G C-6F 42L	1
42	MCB-10040R	M10x40 HEX BOLT	10
43	MSCA12040R	M12x40 CAP HEAD	2
44	MSCA0805R	M8x5 SOCKET CAP HEAD	2
45	MCS020020R	M8x20 CONTERBUNK	4
46	MCS008030R	M8x30 BUTTON HEAD SOCKET SCREW	2
47	WSHMPA008C	M8 PLAIN WASHER FORM A	8
48	WSHMPA010C	M10 PLAIN WASHER FORM A	20
49	WSHMPA012C	M12 PLAIN WASHER FORM A	2
50	WSHMD0012C	M12 SPRING WASHER	2
51	NUTMCN008T	M8 NYLOC	4
52	NUTMCN010T	M10 NYLOC	10



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Issue: 002

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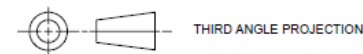
Printed on 06/11/2018

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PART NO.	DESCRIPTION	QTY.
MHT312-4-006	DRIVE KEY	1
M3x8	SOCKET HEAD CAP SCRW (SELF COLOUR)	1
SWAN2202500-FLN2V	SWAN SEAL WITH O-RING	1
CH044371-SWAN-200DEG-CHEVRON	CHEVRON SEAL 2.5in x 3.25 x 1.25	1
14.9x2.5x1000	PISTON WEAR BAND	1
MHT312-12-014	SPACER	1
MHT312-12-016	GEAR SPACER	1
Ø16 I/D x Ø26 O/D x 18.5 STACK	CHEVRON SEAL	1
MHT312-1-006	BUSH	1
MHT312-2-006	DRIVE KEY	2
M5x20	SOCKET HEAD CAP SCREW (SELF COLOUR)	4
MHT824-2-010	TUFNOL CAP	2
M5x12	SOCKET HEAD COUNTERSUNK SCREW (SELF COLOUR)	4
6210_2RS1	BEARING	1
61919-2RS1	BEARING	2
3304-2RS1	BEARING	1
61922	BEARING	1
61924	BEARING	1
33011_Q	BEARING	1
81220 TN	BEARING	1

B	-	Updated table to reflect new design	06/11/2018	DRB	EM
A		UPDATED DUE TO MACHINE UPDATES (NEW DRIVE TUBE ASSEMBLY & KEYS, NEW SEALS).	28/10/2015	SR	BC
REV.	INC.	DESCRIPTION	DATE	DRAWN BY	APPROVED



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SPARES KIT

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DWG No

MHT420-H-SK

SHEET 1 OF 1

A4

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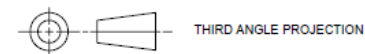
Printed on 23/11/2018

DO NOT SCALE

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	PART NO.	DESCRIPTION	QTY
	KEN-602-5500K	BALL DRIVER "L" WRENCHES	1
B	KEN-601-5170K	17mm ALLEN KEY LONG ARM	1
	KEN-601-5140K	14mm ALLEN KEY LONG ARM	1
	KEN-582-3230K	24mm COMBI SPANNER	1
	KEN-582-2820K	30mm COMBI SPANNER	1
	KEN-582-2830K	32mm COMBI SPANNER	1
B	KEN-582-6430K	1/2" RATCHET	1
	MMT-55	WELDED DRIVE BAR	1
	TOOLBOX-706-4701	TOOLBOX STANLEY FATMAX 1-95-615	1
	SELLOC-8x45	8 x 45 SELLOC PIN	10
	MMT-1-003	EXTRACTION TOOL	1
	95350.W0125	FACE SPANNER, ADJUSTABLE WITH FIXED PINS	1
	MMT-1-011	Nylon Locator	1
	MMT-33	Locknut Spanner Kit	1
	KEN-601-5190K	19mm ALLEN KEY LONG ARM	1
	MHT312-12-015	SHORT HANDLE	1
C	KZ011922	GEDORE 3293 U-3 REVERSABLE RATCHET 3/4 DR 620MM OAL	1
	ISM25X3/4	LJ01 25MMX3/4SD IMPACT SOCKET	1
	MHT620TD-TK-001	CHEVRON SETTING TOOL	1

C	-	Added reversible ratchet, setting tool, 32mm combi, and impact socket	23/11/2018	DRB	RBA
B	-	Added 30mm spanner and 17mm allen key	16/11/2018	DRB	DMS
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MHT420-H-TK

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DWG No

MHT420-TK

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Issue: 002

Issue Date: 10.10.2018

6. Installation

6.1. Fitting Cutters & Pilot Drills

Shown below is data relating to the cutters & pilot drills that are compatible with the MHT4-20 'Hot Tapping Machine'.

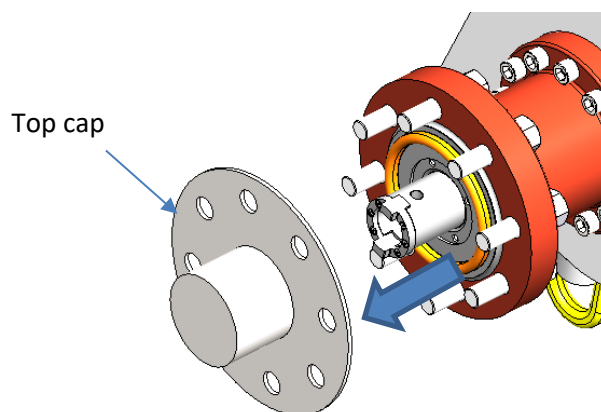
Cutter diameters increase in 2 inch (50.8mm) steps from 4 to 20 inches. Each cutter has a unique, corresponding pilot drill, the correct pilot drill MUST be used with its corresponding cutter. All these cutters & drills are available from Enerpac.

Select the required cutter & pilot drill combination from the list below for your required application.

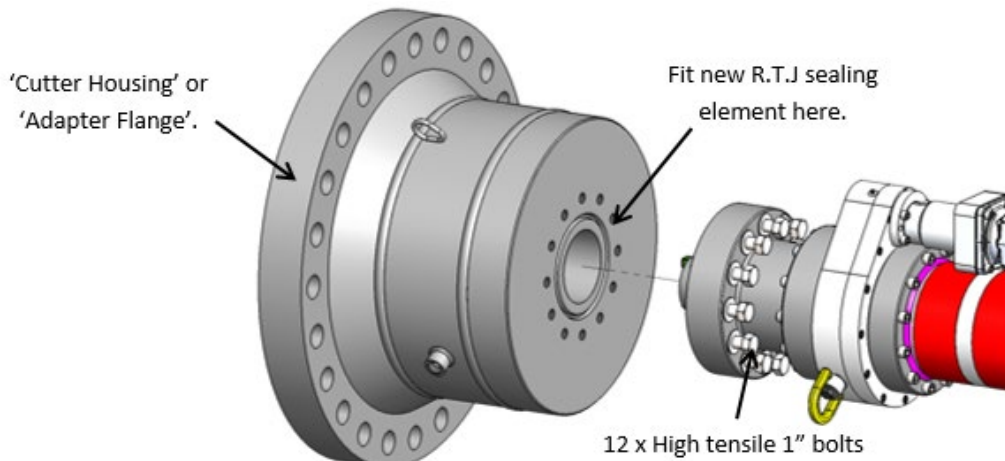
MHT4-20 Standard, Hot Tapping Cutter Data										
Cutter Adapters	Nominal Cutter Size		Actual Cutter Size		Standard Hot Tap Cutters			Standard Hot Tap Pilot Drills		
Part No	In	DN	In	MM	Lbs	Kgs	Part No	Part No	Lbs	Kgs
MHT416-6-001	4	100	3.43	87.3	2	1	HTC4	SHTPD4	0.5	0.2
MHT620TD-21-001	6	150	5.47	138.9	5.75	3	HTC6	SHTPD6	2	0.9
	8	200	7.31	185.8	14.5	7	HTC8	SHTPD8	2	0.9
	10	250	9.5	241.3	22.5	10	HTC10	SHTPD10	2	0.9
	12	300	11.5	292	35	16	HTC12	SHTPD12	5	2.2
MHT620TD-21-002	14	350	12.75	324	42	19	HTC14	SHTPD14	5.5	2.5
	16	400	14.69	373	61	28	HTC16	SHTPD16	6	2.7
	18	450	15.06	383	73.5	33	HTC18	SHTPD18	6	2.7
	20	500	17	432	84	38	HTC20	SHTPD20	6.5	2.9

The MHT4-20 comes with three different cutter adapters, the MHT610TD-21-002 which is for cutter diameters of between 14 & 20 inches, the MHT610TD-21-001 for cutter diameters of 6 to 12 inches & the MHT416-6-001 for cutter diameters of 4 inches. Depending on which cutter is being used, select the appropriate cutter adapter (see table above).

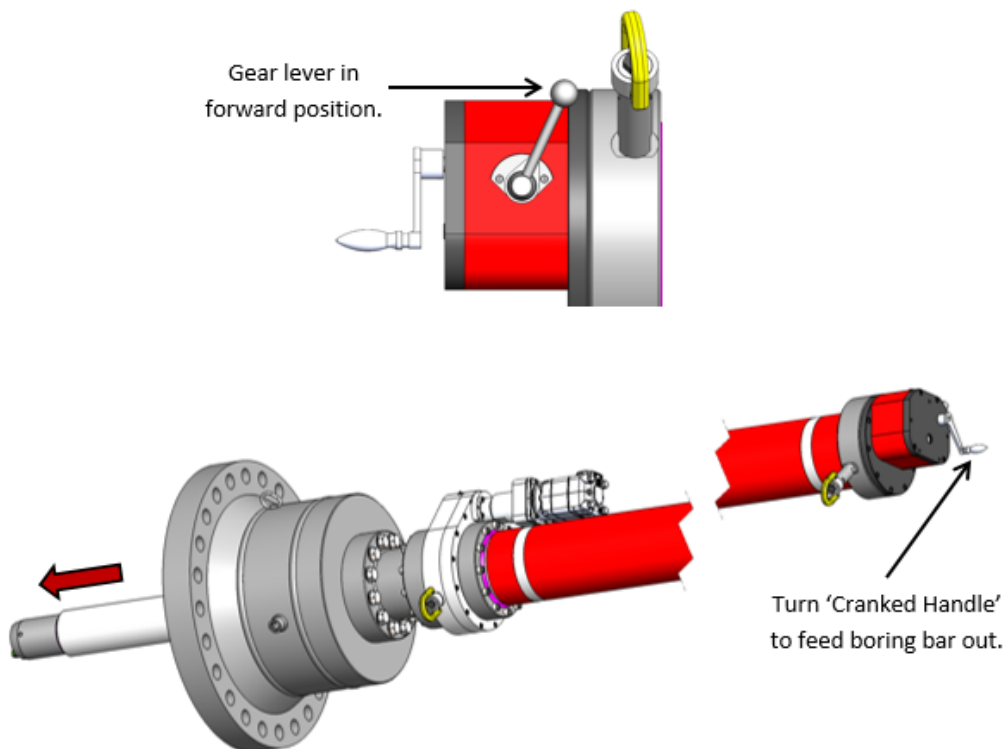
Before fitting the cutter and pilot drill, the top cap must be removed by unscrewing 8x 7/8" UNC nuts.



A 'cutter housing' or 'adapter flange' is fitted before the cutter itself. This acts as an adapter between the hot tapping machine & the 'Gate Valve' as well as housing the cutter assembly. Be sure to fit a new R.T.J sealing element between the 'cutter housing' & MHT Hot Tapping Machine.



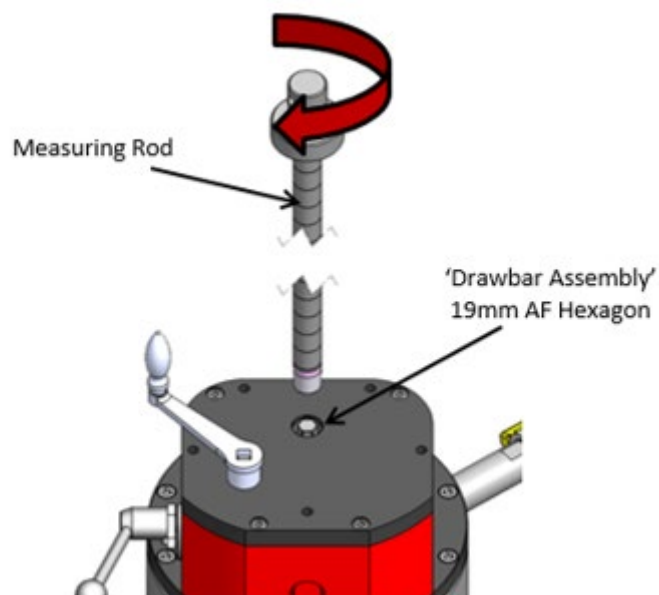
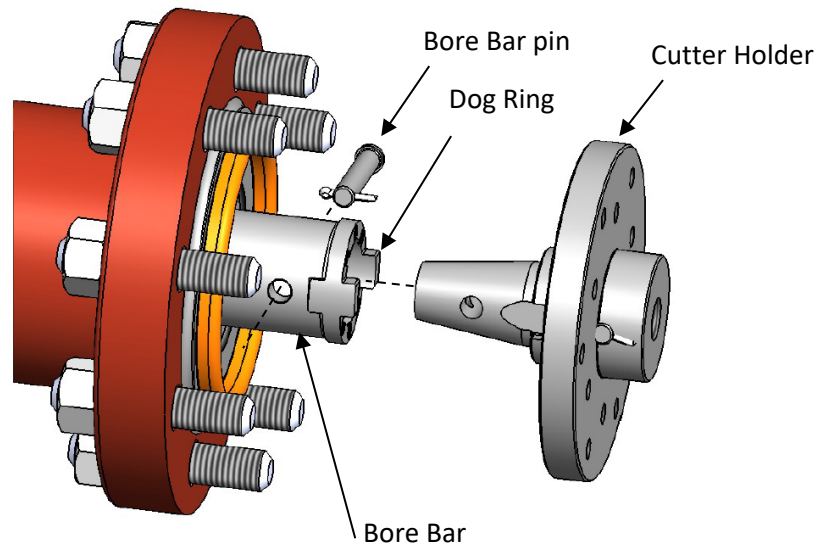
Extend the boring bar by positioning the gear lever in the neutral position & turning the 'Cranked Handle' until it protrudes from the 'Cutter Housing', this will allow the cutter adapter to be fitted easily.



Alternatively, instead of using the crank handle, the fast traversal motor (MHT312-24) can be installed to advance the boring bar. (Refer to Section 8.9)

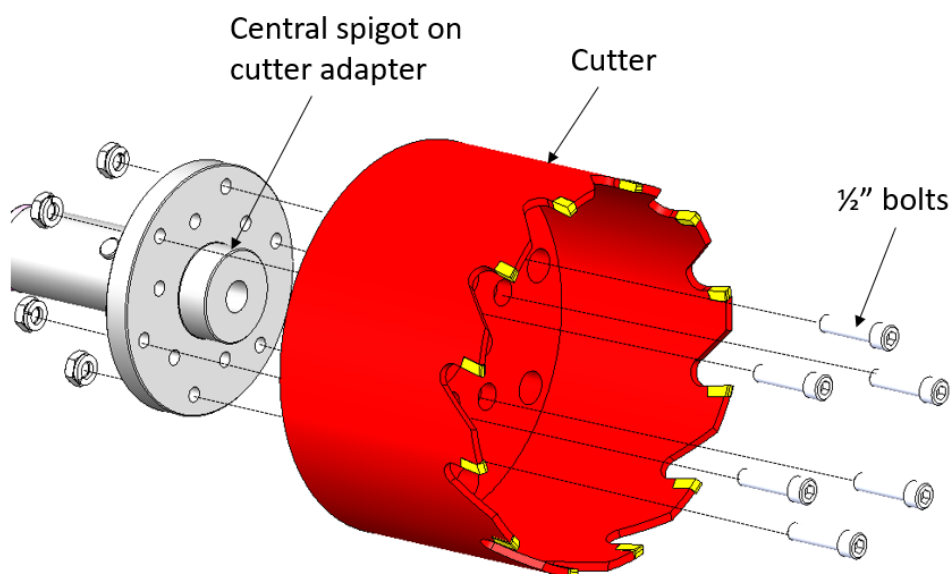
Note: The 'Cutter Housing' is not shown in subsequent diagrams to allow them to be viewed easily.

To install the cutter holder, align its slots with the 'Dog ring' on the boring bar, push holder into tapered bore, insert 'Boring Bar Pin', retaining split pins & tighten drawbar using the 'Measuring Rod' from the back of the gearbox.

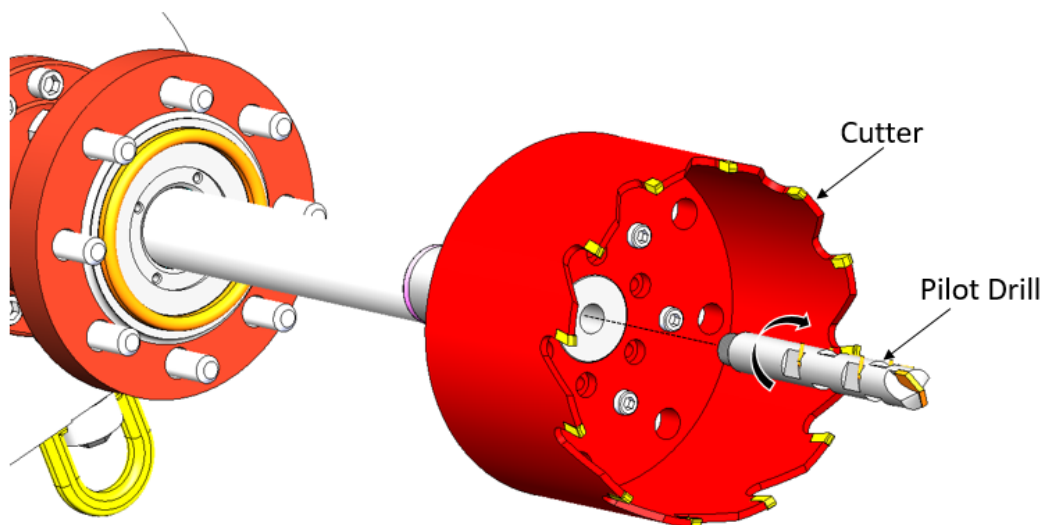


Note: The following instructions do not apply to the entire range of cutters & pilot drills, this example is specifically for an 18" cutter.

To fit cutter, install onto central spigot of cutter adapter, rotate until the six holes align & secure using six M12 bolts.

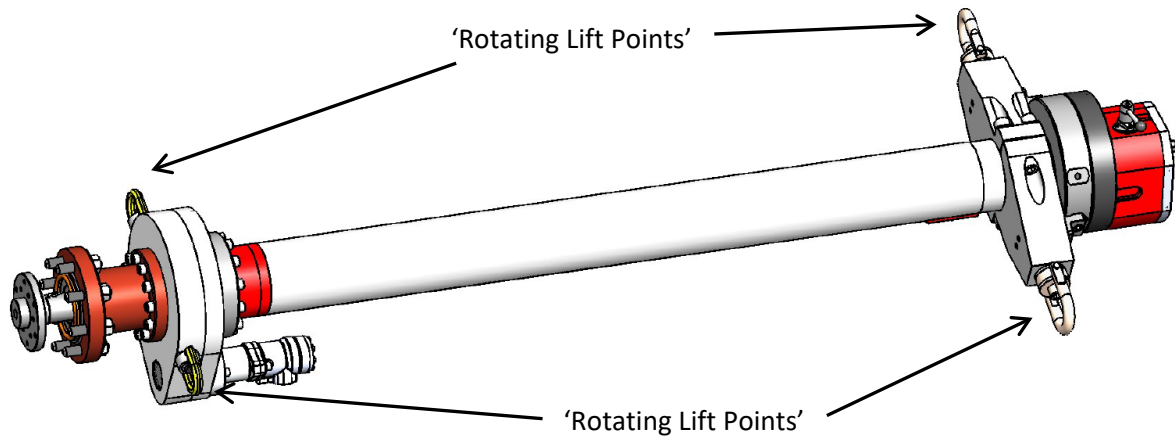


The pilot drill is screwed into the central spigot.

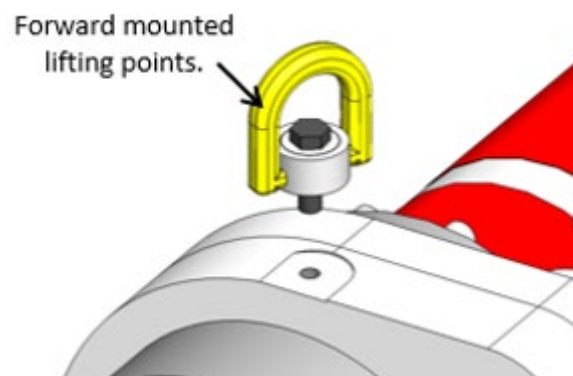


6.2. Lifting

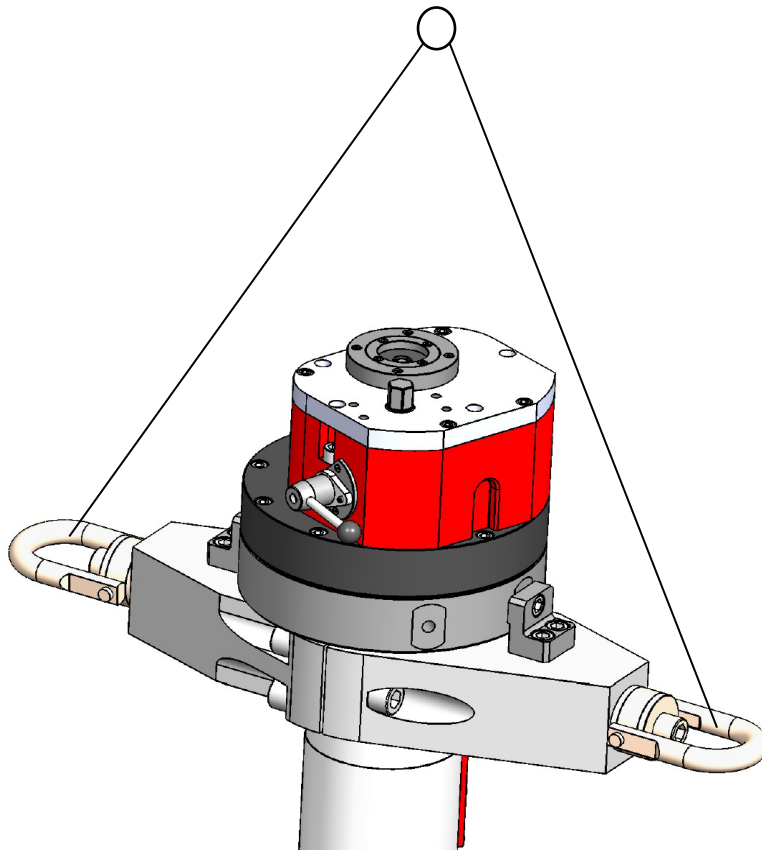
The MHT4-20 is lifted & installed using a combination of four 'Rotating Lift Points' mounted along the body of the machine as can be seen below.



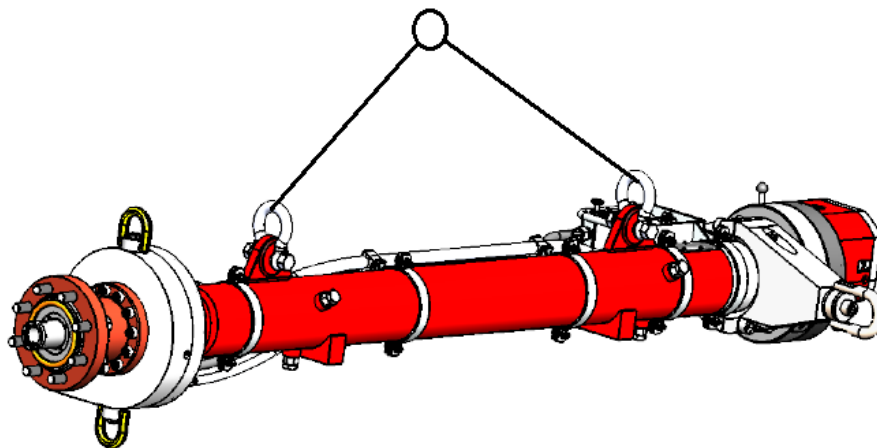
If not already installed, fit the 'Rotating Lift Points' by screwing them into the machine body.



Tighten the M16 lifting point bolts with a torque wrench to 305Nm (225 Lb/ft).



If lifting the machine in a vertical arrangement, with the nose of the machine pointing downwards then only use the rearward mounted lifting points with suitable lifting equipment i.e. overhead crane as shown above.



If lifting the machine in a horizontal arrangement the two lifting points along the body of the machine should be used along with suitable lifting equipment i.e. overhead crane as shown above.

6.3. *Securing to pipeline.*

What follows is a guideline only, all pipeline connecting scenarios cannot be predicted, therefore a job specific mounting procedure should be constructed before attempting to mount the machine.

The MHT420-H is mounted to a live pipeline via a pre-installed 'Gate Valve'. It is secured by a series of twelve high tensile 1" studs & nuts to the cutter housing or 'Adapter Flange'. The 'Adapter Flange' is then secured to the 'Gate Valve' by a similar series of bolts or studs.

Before making any attempt to secure the MHT420-H to a 'Gate Valve', measurements should be taken to predict how far the cutter should be fed until it has completely cut through one side of the pipe wall. Use the 'Hot Tapping Data Sheet' in the back of this manual to record such measurements.

1. Retract the cutter into the 'Cutter Housing' to prevent it clashing with any of the pipeline assembly whilst lifting the hot tapping machine into place.
2. Fit a new sealing element between the 'Cutter Housing' & the 'Gate Valve'.
3. Safely lift & manoeuvre the MHT hot tapping machine until the 'Cutter Housing' is roughly aligned with the 'Gate Valve'.
4. Ensure that before securing the MHT to the pipeline, it is orientated such that the gearbox controls will be easily accessible when the machine is in place.
5. Align the corresponding holes between the 'Cutter Housing' & 'Gate Valve', insert appropriate studs & nuts & tighten equally using a calibrated torque wrench to the correct torque figure.
6. To make sure the cutter has not been trapped, rotate the 'Cranked Handle' to check the cutter can move freely up & down the cutter housing.
7. The MHT is now properly installed & the Motor hoses can now be connected.

6.4. Service and Supplies

In hydraulic configuration the MHT's OMP250 hydraulic motor requires a flow rate of 60 litres per minute at 140 bar of pressure (16 gallons per minute at 2030 psi) to operate correctly.

6.4.1. Personnel

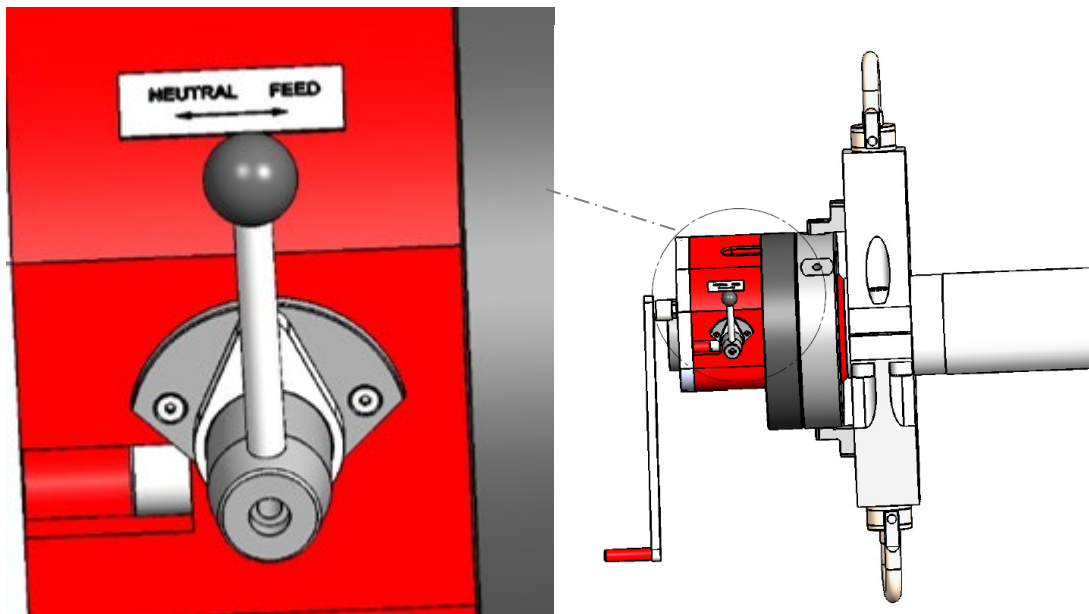
As a specialist portable machine the minimum standard for an operator is to be:

- The operator must be trained and conversant with the MHT420-H.
- The operator to be able to identify the correct and incorrect use of static or portable machines
- Comply with all local and internationally recognised safe use of powered machines

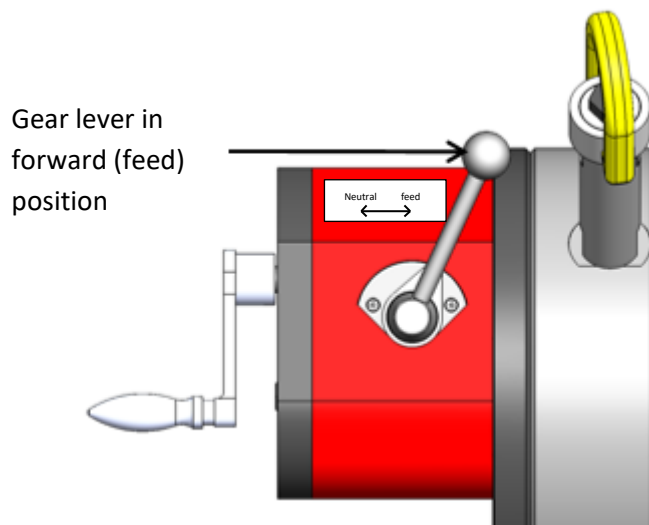
7. Machine Operation

Note: Before turning the hydraulic motor on ensure the 'Crank Handle' is removed or the gear lever is in the neutral position otherwise this will rotate when the motor is turned on.

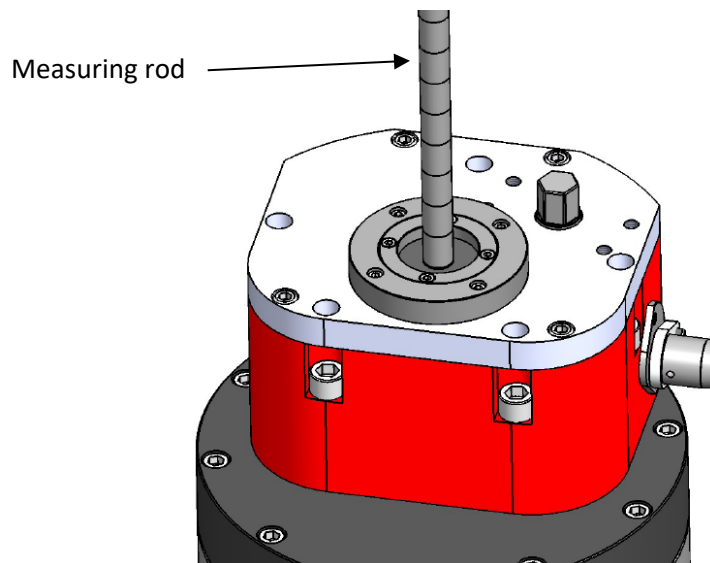
1. To position the cutter & pilot drill assembly prior to cutting, turn the 'Crank Handle' with the gear lever in neutral, the motor turned off & the 'Gate Valve' open until the pilot drill stops when it hits the pipe. Turn the 'Crank Handle' the opposite direction 1/2 turn to allow a gap between the pilot drill & pipe.
2. Ensure the cutter does not feed forwards when the hydraulic motor is turned on by positioning the gear lever in the neutral position.



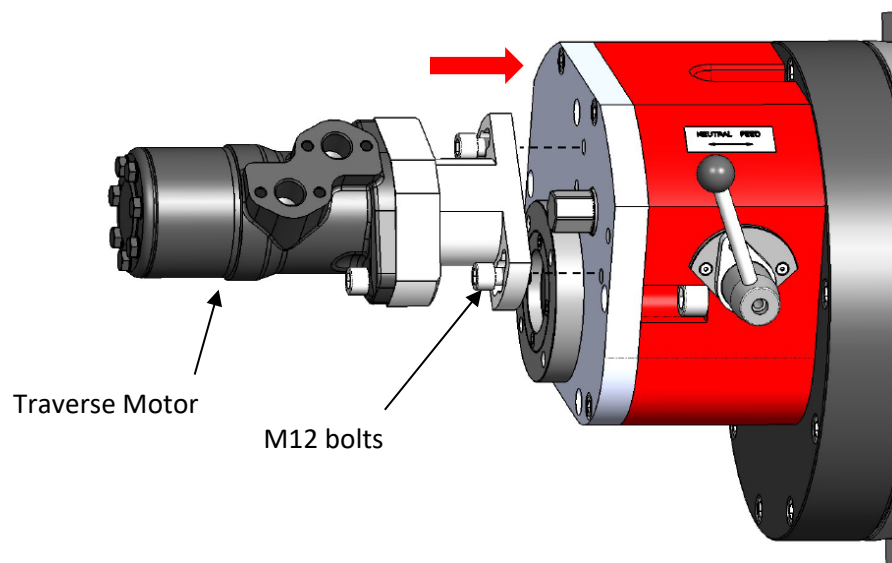
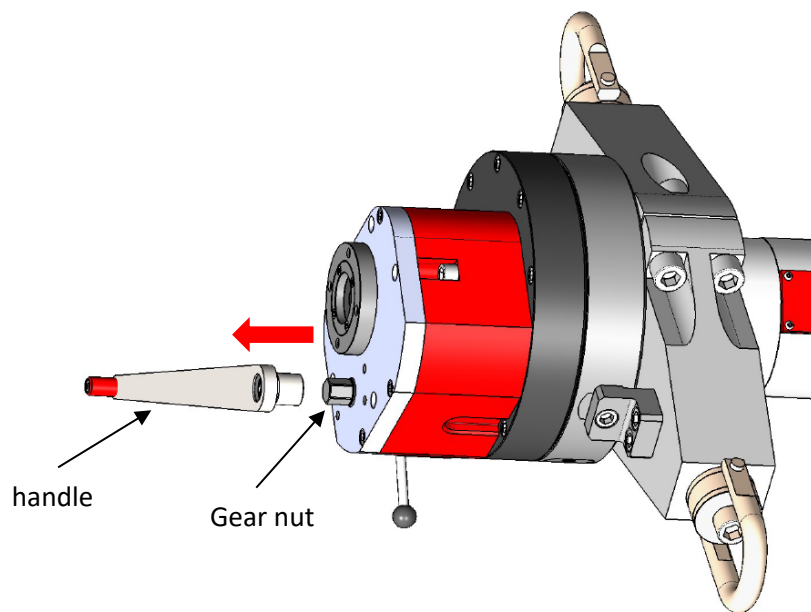
3. Start the cutter rotation by engaging the hydraulic motor, the cutter will now be rotating but not feeding towards the pipe.
4. Note where the measuring rod is sitting at the back of the gearbox, this is marked at 25.4mm (1") increments, use these along with pre-cut data that should have been recorded on the 'Hot Tapping Data Sheet' at the back of this manual as a guide for how far the cutter needs to be advanced.
5. To start feeding the cutter towards the pipe, push the gear lever forwards (towards the cutter end of the machine). The hydraulic motor can be slowed momentarily to make the gear selection easier, return motor to operational speed afterwards.



6. Using the 'Measuring Rod' & pre-cut data which should have been recorded on the 'Hot Tapping Data Sheet' at the back of this manual, continue to feed the cutter into the pipeline until it has made a complete cut through one side of the pipe.



7. Stop the cutter from feeding by returning the gear lever to the central, neutral position & turn the hydraulic motor off.
8. Retract the cutter by turning the 'Cranked Handle'. The pipeline 'coupon' will be retained by the pilot drill, this can be recovered later when the machine is removed from the pipeline.
9. To quickly return the assembly, remove the 'Cranked Handle'. **Ensure the machine is in neutral.** Then Attach the Fast Traverse Motor using 2 X M12 bolts. Refer to below images, and note that the motor will be initially fixed to the hydraulic control unit. Ensure that the cutter is not spinning during fast traverse by hydraulically locking the feed motor. Note that the hydraulic controls for the drive motor have grub screws which prevent the use of the drive motor to reverse the cutter out – this is to stop the cutter tips from being stripped from the cutter.

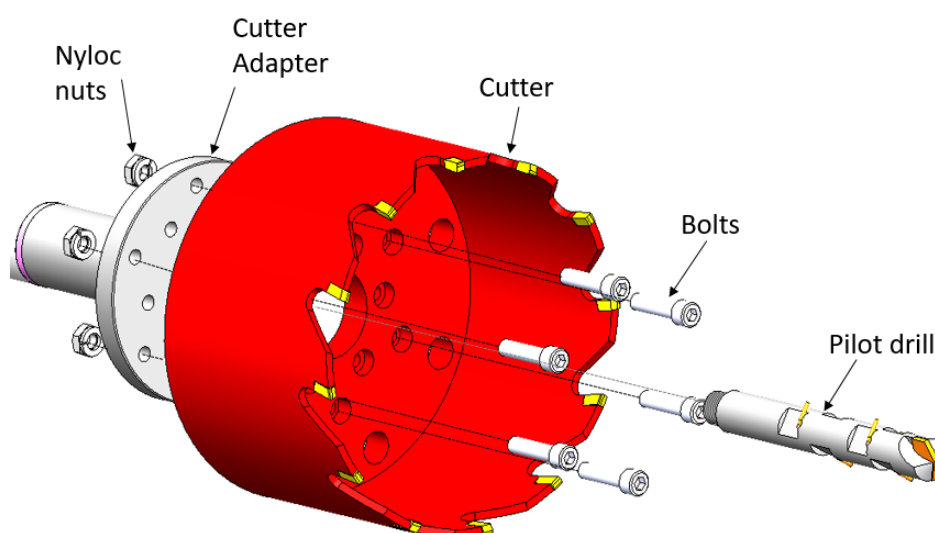


8. Completion Plug Installation Guidance

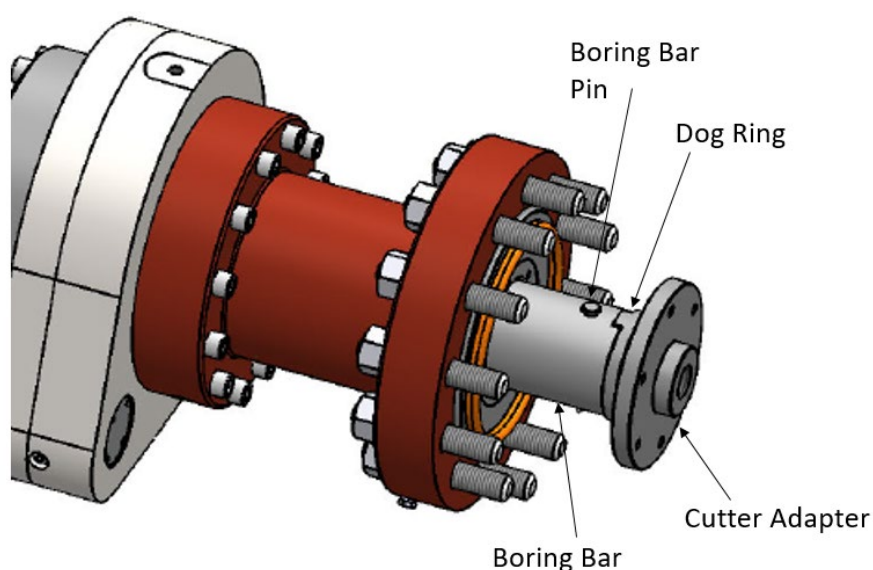
The MHT420-H can be used to install a completion plug which is used to seal the opening branch in the pipeline used by the cutting operation of the hot tapping machine.

To install the plug to the hot tapping machine, the cutter and adapter must first be removed.

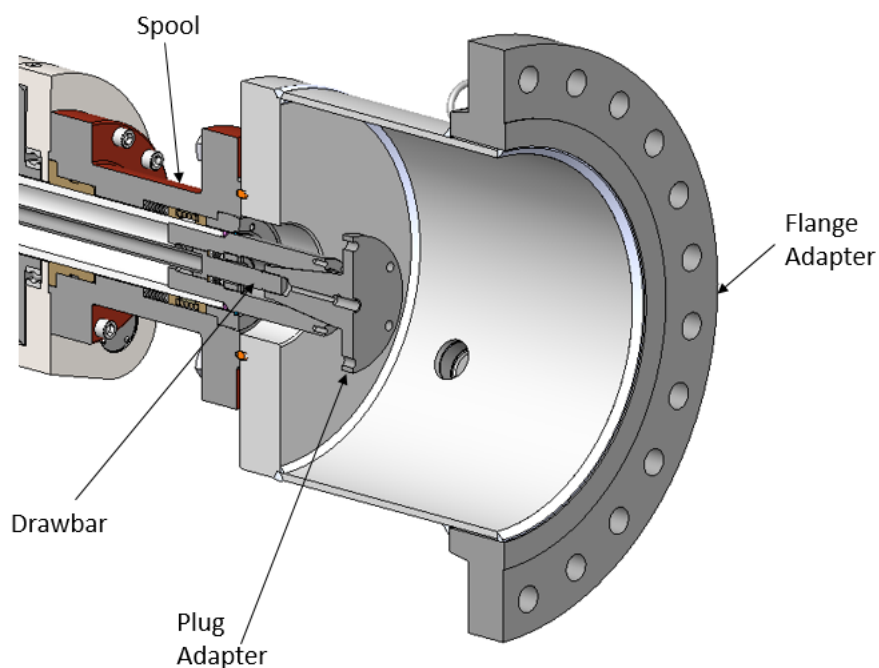
The Cutter and pilot drill is removed from the cutter adapter by unscrewing 6 bolts and Nyloc nuts.



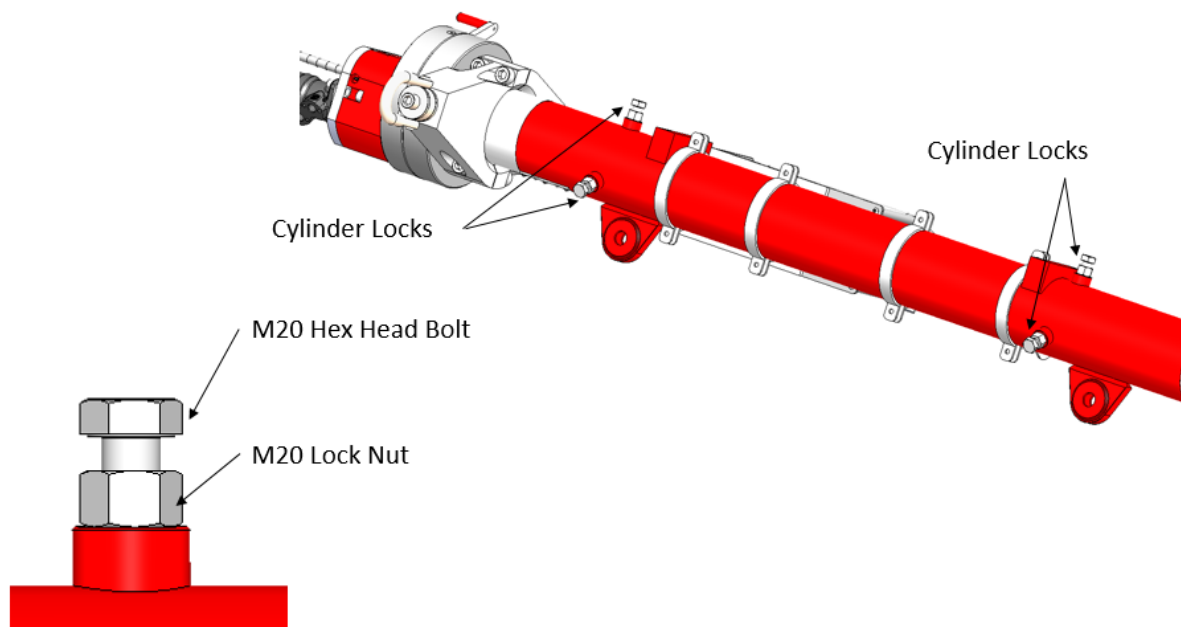
The cutter adapter should then be detached by removing the boring bar pin and then unscrewing the drawbar from the cutter adapter. The dog ring should also be removed.



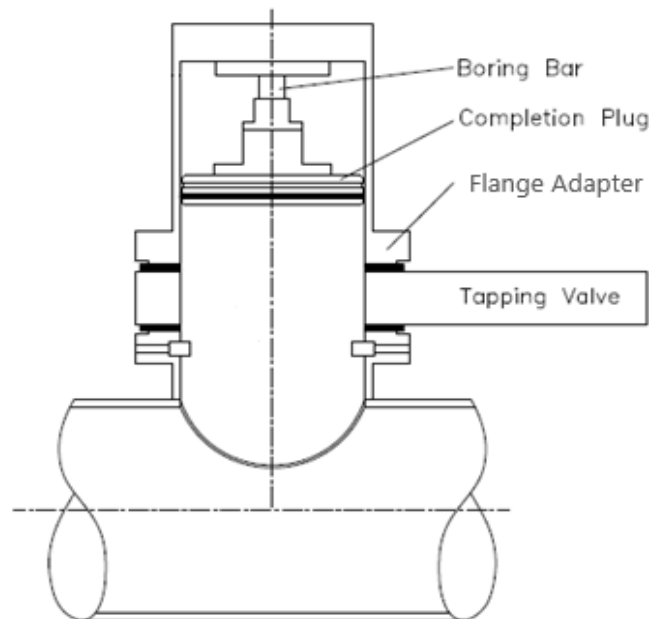
Fit the required size flange adapter to the spool end. The plug adapter can now be installed. Use the measuring rod to rotate the drawbar into the plug adapter. Do not overtighten.



To ensure that the cylinder does not rotate when traversing the plug to position, lock 6 x M20 bolts. There are 2 banks of 3x M20 bolts. Each should be tightened by loosening the locknut, then tightening the bolt to the cylinder, and finally re-tightening the lock nut.

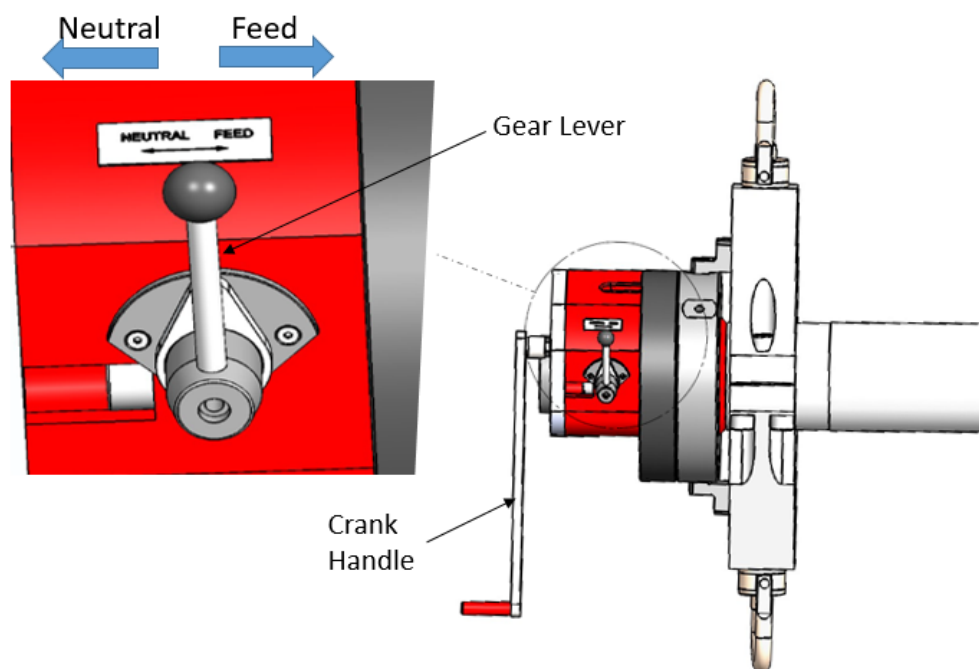


Fit the completion plug to the plug adapter, and securely remount machine to the gate valve.

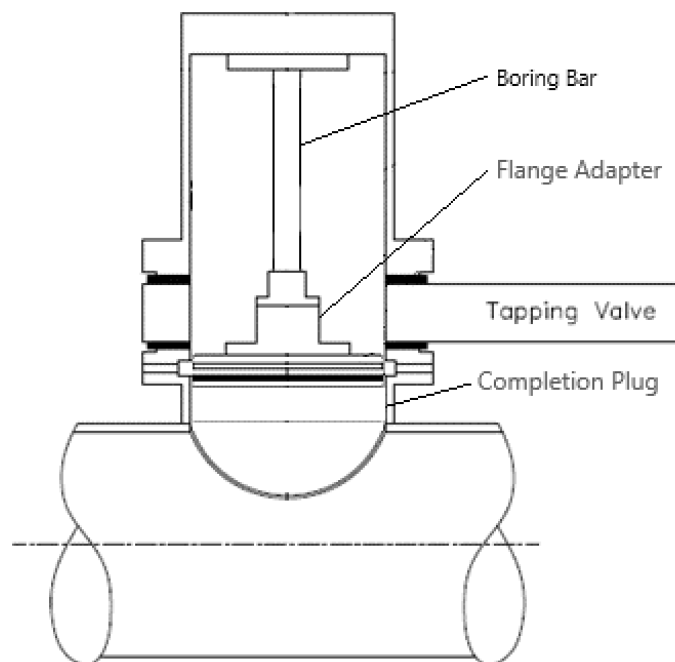


If available, the fast traverse can be used to position the plug into the gate valve branch for 95% of the distance – refer to section 7, machine operation – on guidance of using the fast traverse.

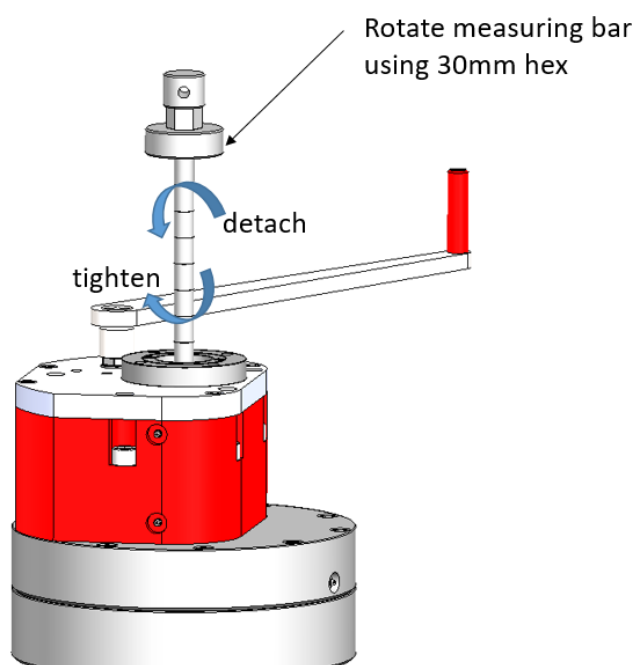
For the final 5%, use the 'Crank Handle', turning it clockwise with the gear lever pushed in the neutral position, and the motor turned off.



When the plug is in position, secure the completion plug as required.



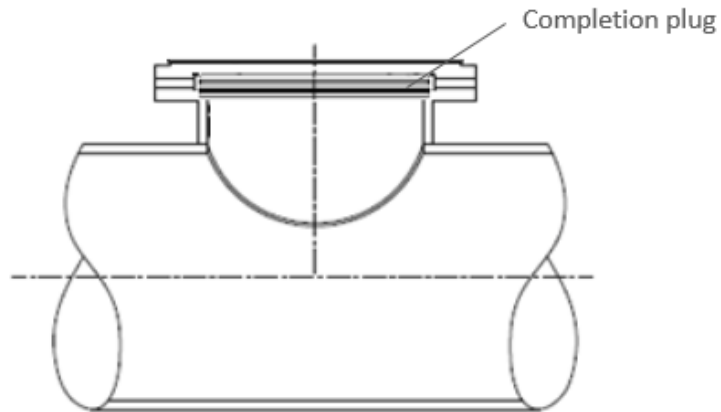
Once the plug is secured satisfactorily, the plug and plug adapter are separated from the hot tapping machine by using the measuring bar to unscrew the drawbar from the plug adapter. Continue to rotate the measuring bar until the drawbar is detached.



Once the drawbar has been detached from the plug holder, begin retracting the boring bar using the crank handle. Withdraw the first 50mm using the crank handle. Once past this point, the fast traverse motor can be used if supplied.

When the boring bar is retracted and the completion plug is safely secured, the hot tapping machine can be removed from the gate valve.

The plug adapter should be removed from the plug for future use, and a suitable blind flange should be fitted.



9. Machine Maintenance

General wear and tear items should be replaced with like for like components as per the machine general assembly drawings detailed in this manual. Failure to do so may result in a machine that is not fit for purpose and is outside the design intent it was supplied for. Items that require specific maintenance regimes and products will be detailed here in.

General Maintenance Schedule		
Time Period	Action	Recommended Lubricant
After every use	Clean all cutting debris from machine. Pay particular attention to lead screws, pivots, sealing, sliding & rotating faces. Re-attach the top hat to protect the boring bar.	General water displacing, cleaning oil.
As required	Replace cutting tool/cutting tool inserts.	N/A
Every 10 hours	Apply a small amount of low viscosity oil to all lead screws, pivots, sliding & rotating faces.	Mineral based SAE 10 oil.
	Check all securing nuts & bolts are tight.	N/A
Every 100 hours	Check for backlash in lead screw/lead screw nut & correct if necessary.	N/A
Before long term storage (12 months minimum)	Protect machine, components & accessories from corrosion. Store all machine components securely in original packing box.	General, oil based, rust inhibitor.

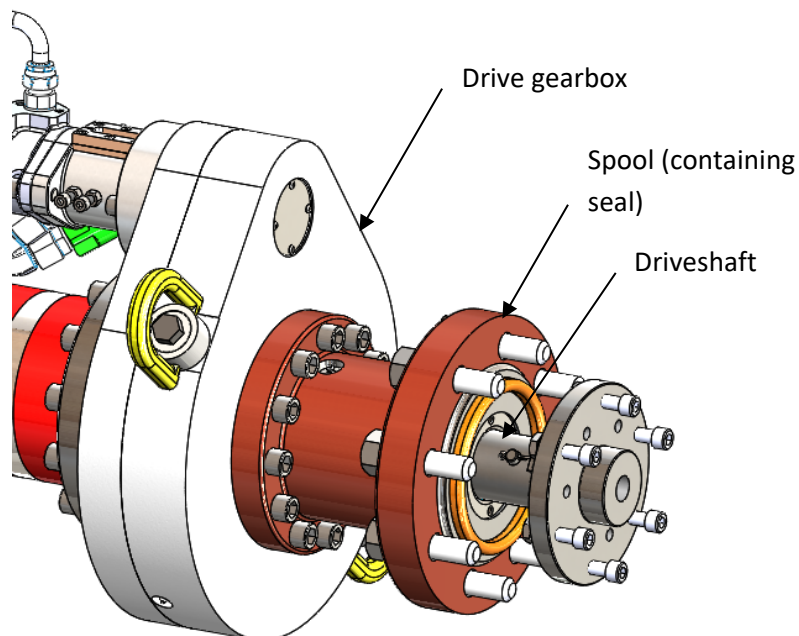
9.1. Maintenance

- To ensure that the machine is lubricated, either apply grease through the grease point on the machine spool, or extend the boring bar completely and apply oil to the bar.
- Check the tightness of the seal cartridge located in the spool and the locking nut within the driveshaft end.
- Remove the inspection cover on the main cylinder and check the keys. Wind the driveshaft assembly out of the way to access the leadscrew and apply grease to it.
- The machine seals must be pressure tested before every use of the machine.
- Pay close attention to the full thread length of the feedscrew, check for signs of wear or damage

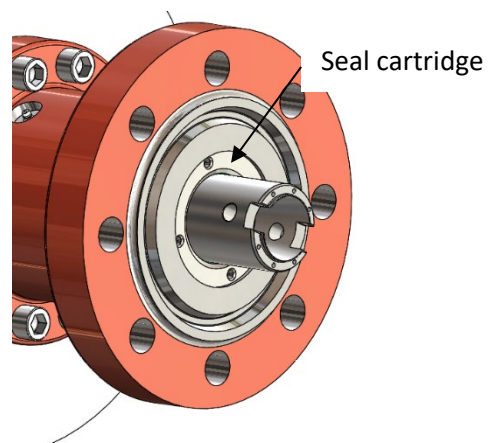
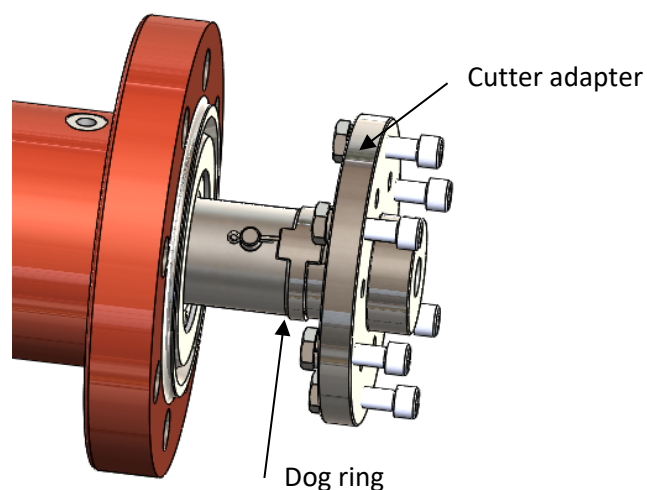
9.2. Seal Replacement Procedure

9.2.1. Replacing the Spool seal

The seal is housed in the MHT312-1 drive gearbox assembly.

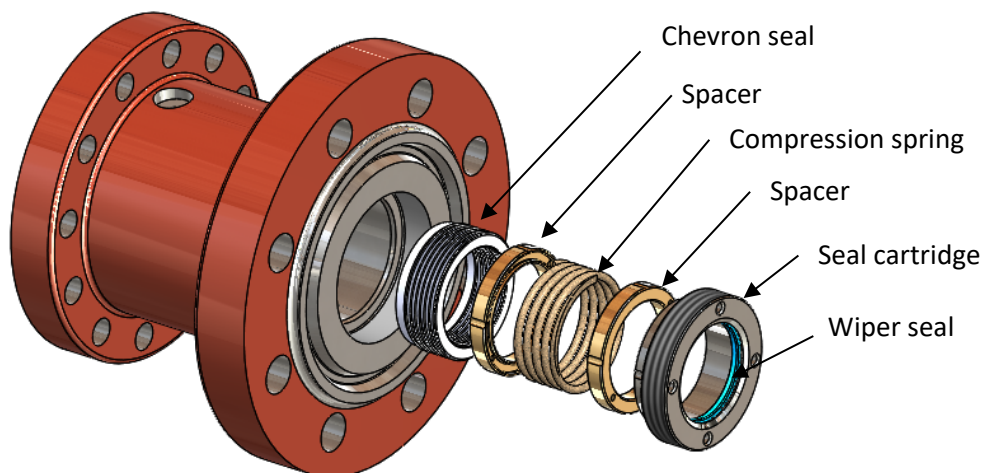


1. Before removing the spool from the drive gearbox, ensure that the cutter holder and dog ring have been removed from the driveshaft.

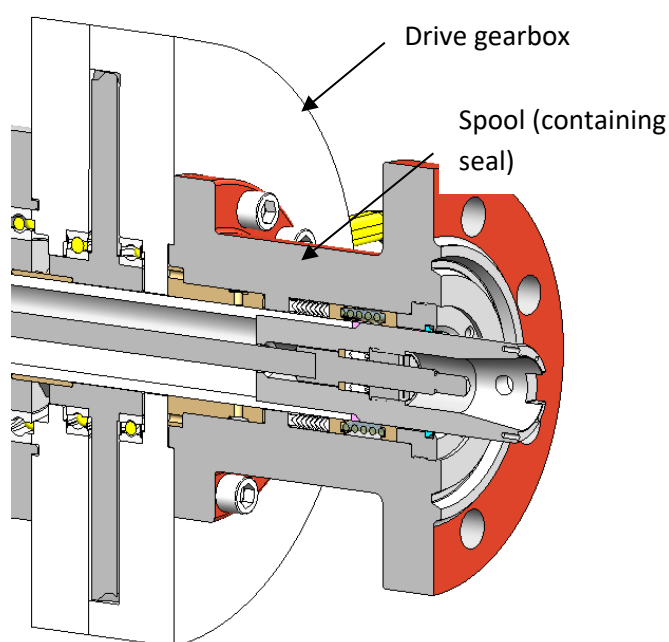


2. Then slightly loosen the seal cartridge using a face spanner (p/n 95350.W0125). Note that this is a left-hand thread.
3. Unbolt the spool assembly from the drive gearbox, and carefully remove the spool from the drive shaft.

4. Fully unscrew the seal cartridge and remove it from the spool.
5. Remove the spacers and compression spring.
6. Remove the existing chevron seal.

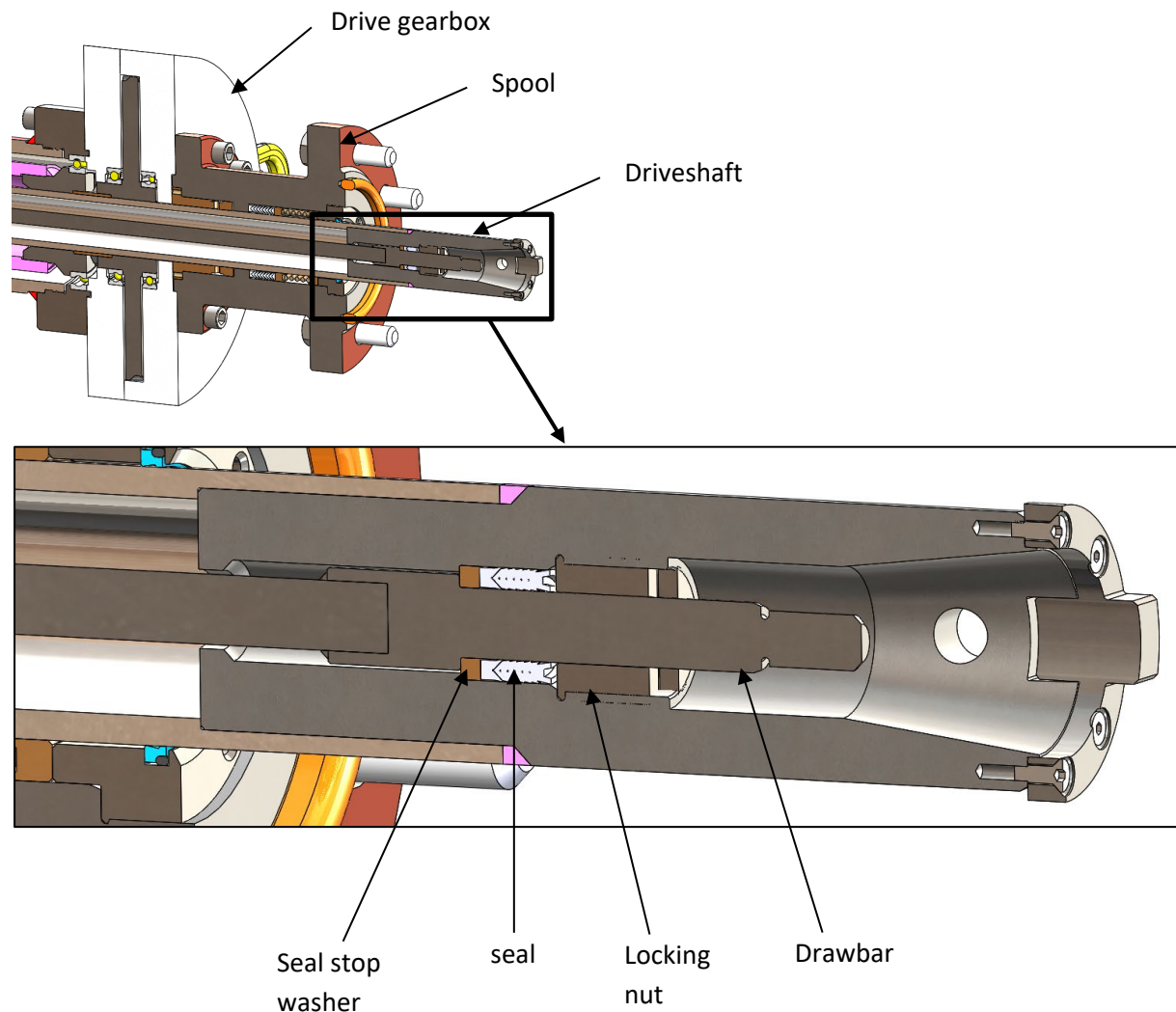


7. As the new seal is positioned in the spool, oil the individual components and ensure the chevrons are facing the same direction as shown on the machine general assembly drawing.
8. Replace wiper seal within the seal cartridge (SWAN2202500-FLN2V).
9. Then replace the remaining components as shown above.
10. Ensure the drive shaft is clean and debris free before re-fitting the spool onto it. Take care not to damage the surface of the seal.
11. Connect the spool to the drive gearbox using the M16 bolts.

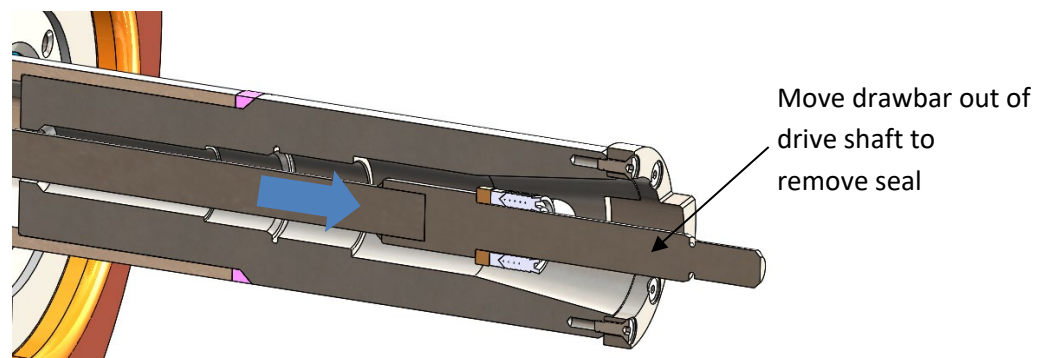


9.2.2. Replacing the Drawbar seal

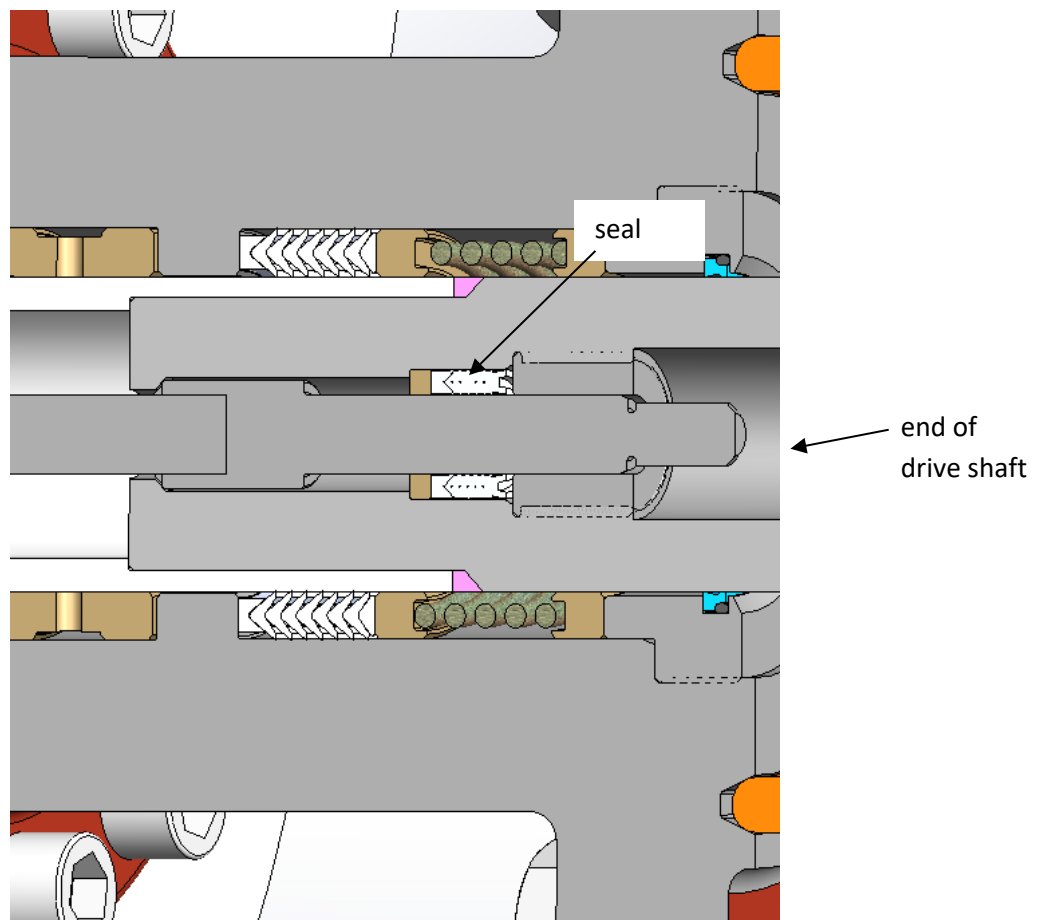
The drawbar seal can be found in the drive shaft as shown below.



1. Remove the locking nut (MHT1242-5-005) from within the driveshaft taper using the extraction tool (MMT-1-003). Note this is a left hand thread.
2. When the locking nut is removed, push the drawbar (MHT620TD-5-002) forward to release the seal assembly and remove the existing chevron seal package.



3. Oil the individual components as they are fitted and ensure that the chevrons are facing the same way as shown below.



4. Retract the drawbar back into the drive shaft.
5. Ensure the seals are fully pushed into the bore by using the chevron seal setting tube (MHT620TD-TK-001).
6. Refit and fully tighten the locking nut.

10. Troubleshooting Guide

Symptom	Possible cause	Action
The machine will not rotate	1. Hydraulic/Pneumatic supply not available	Check supply
	2. Hydraulic/Pneumatic 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
	5. Faulty valve or emergency shut off operational	Check supply to motor
The machine does not traverse	1. The feed control valve is not correctly set	Check position
	2. Drive gear problem	Remove and check drive assembly operation
	3. Depth of cut too deep	Remove cut and check rotation

In the event that the cutter has become stuck and the instructions in the machine operation section have not solved the issue;

The hydraulic controls for the drive motor have grub screws which prevent the use of the drive motor to reverse the cutter out – this is to stop the cutter tips from being stripped from the cutter. If all other methods have been exhausted, then adjust those grub screws to allow the drive motor to reverse the cutter out. This will almost certainly damage the cutter, so it must only be considered as a last resort.

11. Appendices

11.1. Hot Tapping Data Sheet

Customer Details.....Contact Number.....
Contact Details.....Date / Time.....

Tap Details.

Tap Size.....
Flange Rating.....
Orientation.....
Branch wall Thickness.....
Valve Type.....
Bore Details.....

Pipe Details.

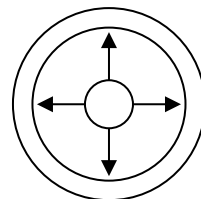
Pipe Size.....
Wall Thickness.....
Material.....
Product Type.....
Pipe Pressure.....
Temperature.....

Flow rate-.....Customer Signature.....
Recommended Flow rates, Gas 20mph; 30fps; 10m/s. Liquids 10mph; 15fps; 5m/s.

Tapping Machine Operational Checks.

Tapping adapter bolts secure.....Y/N
Cutter holder screws secure.....Y/N
Cutter retaining screws secure.....Y/N
Pilot drill / retaining screws secure....Y/N

Boring Bar Alignment Check.



Check Boring bar is central to Hot Tapping Adapter Y/N

Hot Tapping operation Dimensions.

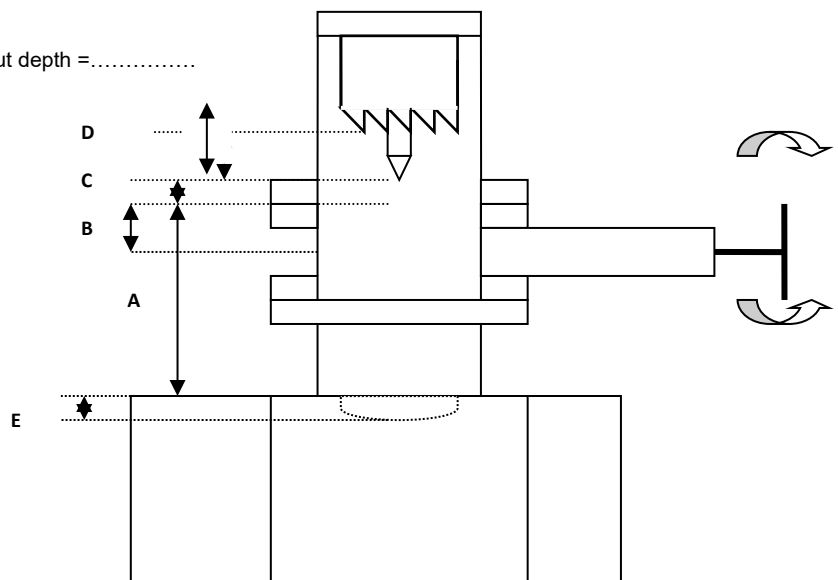
A, Flange to pipe =.....
B, Top valve to gate =.....
C, Pilot drill to flange =.....
D, Cutter to flange =.....E, Coupon cut depth =.....

Hot Tapping Cutting Distances.

Pilot Drill to pipe, $A+C$ =.....
Cutter to Pipe, $A+D$ =.....
Total Cut Distance, $A+D+E$ =.....
(E =Ref Coupon Distance Chart).

Valve Details.

Valve Flange to Gate B =.....
Number of turns to close / open



Technician Signature.....Customer Signature.....
Date.....Date.....

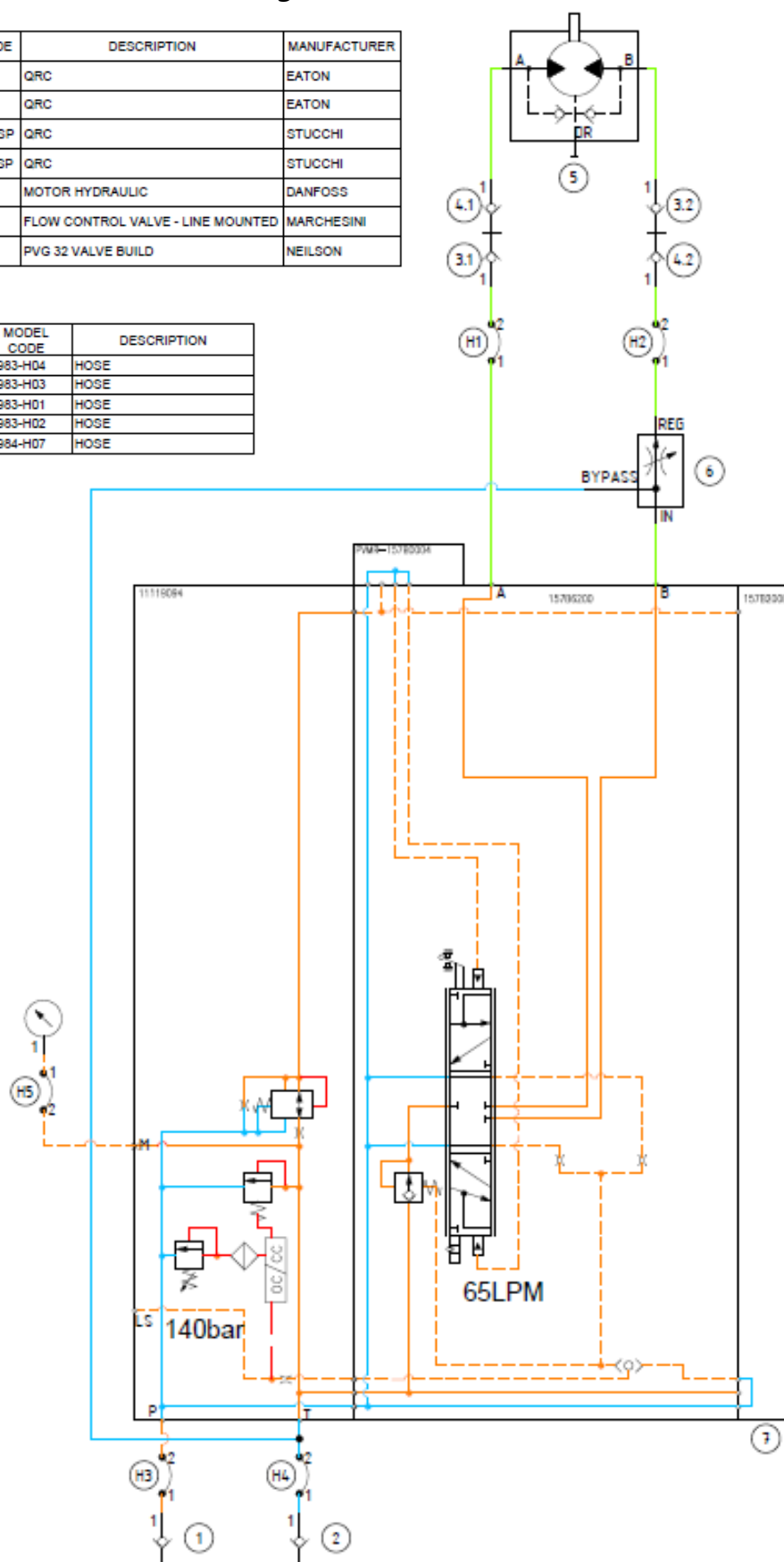
11.2. Recommended torque settings for fasteners

Thread Ø	Tensile Strength		Torque Setting	
	kN	lbs	Nm	in - lbs
M3	6.54	1470	2.1	19
M4	11.4	2560	4.6	41
M5	18.5	4160	9.5	85
M6	26.1	5870	16	140
M8	47.6	10700	39	350
M10	75.4	17000	77	680
M12	110	24700	135	1200
M14	150	33700	215	1900
M16	204	45900	330	2900
M20	306	68800	650	5750
M22	374	83950	875	7725
M24	441	99100	1100	9700
M30	701	158000	2250	19900
M32	860	193500	3050	27000
M36	1020	229000	3850	34100

11.3. Hydraulic schematic diagram

ITEM ID	QUANTITY	MODEL CODE	DESCRIPTION	MANUFACTURER
1	1	5100-S2-16B	QRC	EATON
2	1	5100-S2-20B	QRC	EATON
3	2	F. A13 1/2" BSP	QRC	STUCCHI
4	2	M.A13 1/2" BSP	QRC	STUCCHI
5	1	OMT 500	MOTOR HYDRAULIC	DANFOSS
6	1	VPR3 1/2"	FLOW CONTROL VALVE - LINE MOUNTED	MARCHESINI
7	1	A2028VB01	PVG 32 VALVE BUILD	NEILSON

HOSE ID	QUANTITY	MODEL CODE	DESCRIPTION
H1	1	19983-H04	HOSE
H2	1	19983-H03	HOSE
H3	1	19983-H01	HOSE
H4	1	19983-H02	HOSE
H5	1	19984-H07	HOSE



11.4. General Notes

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