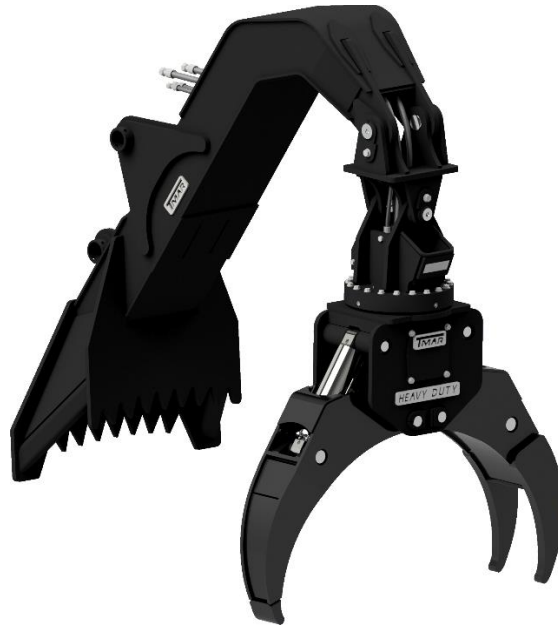


OWNER'S MANUAL



T-MAR INDUSTRIES LTD. **HEEL GRAPPLE**

OPERATION, MAINTENANCE, AND PARTS

CUSTOMER: _____

GRAPPLE MODEL: HD52S - 106D0358 **SERIAL:** _____

HEEL MODEL: _____ **SERIAL:** _____

Parts / Product Support

Toll Free (North America) 1-800-208-2217

Phone (250) 286-9500 | Fax (250) 286-9501



Factory / Head Office

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Campbell River, BC. V9H 1N6

www.tmarequipment.com

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FORESTRY ATTACHMENTS

WARRANTY POLICY

1. WARRANTY POLICY

- The warranty policy covers workmanship and material defects for T-MAR manufactured Heel Grapples, Saw Units, Heel Racks and Brush Rakes.
- **One-year** parts and labor, from the date the warranted attachment(s) are delivered to the end user.
- Attachments that are **NOT SOLD** to an end user within **18 months** of delivery from the factory will need to be re-certified by T-MAR to be eligible for this warranty policy.
- A properly filled out Warranty Registration Form must be signed by the end user and submitted to T-MAR within **5 days** to validate all aspects of this warranty.

2. T-MAR'S OBLIGATIONS

- If a defect in material or workmanship is reported to T-MAR during the warranty period, T-MAR will, during its normal working hours as required, work to correct the defect and repair the covered attachment(s).
- At T-MAR's sole discretion, provide new, remanufactured, or repaired parts and/or components.

3. CUSTOMER'S OBLIGATIONS

- Obtain prior authorization from T-MAR for any costs related to repairs, replacement, or any warranty related work.
- Obtain prior authorization from T-MAR for labour time and rates before commencing any work that may be covered by warranty.
- Pay any taxes applicable to the supply of goods or services in relation to the attachment(s).
- Pay for T-MAR's costs and expenses in relation to the investigation of complaints other than a defect in material or workmanship.

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CUSTOMER'S OBLIGATIONS CONT'D

- Provide notice within **15 days** of a warrantable failure or defect.
- Return product(s) within **30 days** of CLAIM NUMBER being issued – shipped **PREPAID**.
- Parts will be invoiced and later reimbursed if they are determined to be covered by warranty.

4. T-MAR IS NOT RESPONSIBLE FOR THE FOLLOWING

- Lubricating oils, filters, coolant, and other maintenance items.
- Overtime premiums, second man coverage, meals, travel, and accommodations.
- Any costs associated with the delivery of the attachment(s) and/or parts to an approved facility for repair.
- Any use or installation that T-MAR, at its sole discretion, determines was improper.
- Defects and malfunctions of any other attachments or systems not installed by T-MAR.
- Installation and use of pilot operated check valves (Lock Valves)
- Ballooning of cylinder barrels
- Damage to attachment during transportation and delivery.
- Accident, abuse, neglect, improper repair, contamination, or improper lubrication of attachment(s).
- Repair or maintenance for general wear and tear or misuse of attachment(s).
- Profit losses or compensation during down time if repairs are necessary.
- Rental costs for attachment(s) should they be incurred.
- Services and materials provided by others without prior approval.
- Damage resulting from not following manufacturer recommended service intervals, including the use of correct fluids and filters.
- Damage to other equipment.
- Additional costs associated with warranty claims outside the province or state where the product was shipped by T-MAR

5. OTHER SUPPLIED COMPONENT WARRANTY

As specified by the component manufacturer

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6. LIMITATION OF LIABILITY

The liability of T-MAR to the customer is limited. There are no representations, warranties, agreements, or conditions, express or implied, collateral, statutory or otherwise, applicable to the sale, lease, or rental of the warranted product(s) other than as expressly stated above. This Warranty is in substitution for damages or relief to which the customer might otherwise be entitled at law, or in equity, including any claim for fundamental breach, or breach of a fundamental term, of any contract with T-MAR. The customer waives the benefit of any implied or statutorily imposed conditions, warranties, or like protections, including any that may be provided in any applicable sale of goods legislation. The liability of T-MAR is limited to the repair or replacement of parts and components and the provision of labour. T-MAR, their employees, agents, and contractors shall not under any circumstances be liable to the customer or any other person for personal injuries (including death) or for any loss or damage to property, or business (including loss of income, profit or use) either direct, indirect, or consequential, whether to parts, or components, or the warranted product(s), whether caused or contributed to or by the default or negligence of T-MAR, their employees, agents, or contractors, or by any other act or omission whatsoever.

7. FORCE MAJEURE

T-MAR's obligation to perform hereunder shall be deferred to the extent and for so long as T-MAR's performance is prevented or delayed, and T-MAR shall incur no liability with respect to such delay or inability to perform, due to an event or circumstance (whether or not in existence or known to T-MAR at the time T-MAR agreed to its obligations hereunder) that is beyond T-MAR's reasonable control, including but not limited to a labour strike, lockout, labour slowdown or other labour disruption affecting T-MAR or any of its sub-contractors or sub-suppliers of any tier.

8. REPLACED ITEMS

Items replaced under the warranties herein shall become the property of T-MAR. Replacement parts and components are covered by this warranty for the remainder of the warranty Period.

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T-MAR STANDARD WARRANTY

ONE (1) YEAR PARTS & LABOUR:

- Heel Grapple
- Grapple Saw
- Heel Rack
- Brush Rake
- NEW Manufactured Parts and/or Components

SIX (6) MONTHS PARTS & LABOUR:

- Yarding Grapple
- Remanufactured Parts and/or Components

THREE (3) MONTHS PARTS & LABOUR:

- Grapple Camera

***ANY OTHER SUPPLIED COMPONENT WILL BE AS SPECIFIED BY THE COMPONENT MANUFACTURER**

****Attachments that are NOT SOLD to an end user within 18 months of delivery from the factory will need to be re-certified by T-MAR to be eligible for this warranty policy.**

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T-MAR INDUSTRIES LTD.

ATTACHMENT WARRANTY PROCESS

1. Attachment Warranty Claim Forms are PDF fillable and can be requested from warranty@t-mar.com if you do not already have a copy.
2. To place an Attachment Warranty Claim, the PURCHASER must submit an Attachment Warranty Claim Form to warranty@t-mar.com or by fax to 250-286-9501. Once the Claim Form as been received, a CLAIM NUMBER will be issued and sent to you via email.
3. Once the CLAIM NUMBER is obtained, the alleged warrantable attachment and/or part shall be returned at your expense directly to us or the location designated by us at the time the CLAIM NUMBER is issued. The attachment and/or part **MUST** be returned within thirty (30) days of the CLAIM NUMBER issuance for the claim to remain valid. All shipping boxes and packing slips **MUST** be marked with the valid CLAIM NUMBER.
4. If the attachment and/or part returned with the CLAIM NUMBER is found to be warrantable and covered by our Limited Warranty, T-MAR, at its sole discretion, will use new, remanufactured, or repaired parts and/or components. All parts and/or components will be sent via standard shipping at no charge. Expedited shipping will be invoiced accordingly.
5. For immediate solutions, the customer may order a replacement attachment and/or parts from an approved distributor at the purchaser's expense. If it is determined by T-MAR to be warrantable after its return with the CLAIM NUMBER, we will issue a credit for the replacement attachment and/or part including standard shipping.
6. If any attachment and/or part returned with a valid CLAIM NUMBER and is NOT found to be warrantable, a replacement part will NOT be sent, nor a credit issued. We will return the attachment and/or part to the purchaser at the purchaser's expense.
7. As stated in our FORESTRY ATTACHMENTS WARRANTY POLICY prior authorization must be obtained for any costs related to repairs, replacement, or ANY warranty related work or the claim will be denied.

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FLUSH SYSTEM BEFORE CONNECTING GRAPPLE



1. Connect the grapple-open and grapple-close hoses together.
2. Run the grapple-open or close function for thirty (30) seconds.
3. Repeat with the rotation hoses. This will replenish the lines with fresh oil and deliver any contaminants to the return filter.

SYSTEM CONTAMINATION IS THE LEADING CAUSE OF COMPONENT FAILURE. MOST OIL IN THE GRAPPLE CIRCUIT DOES NOT CIRCULATE BACK TO THE TANK DURING REGULAR OPERATION.

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SAFE OPERATION

- Operators must read and understand the information provided in this manual before attempting to operate this attachment.
- Failure to follow these instructions may void warranty and may result in equipment damage and/or injury or death.
- This attachment and the machine to which it is attached should only be operated by trained personnel who are familiar with the use of this type of equipment.
- Do not lift, carry or suspend loads near people or equipment, or in a way that a dropped load could strike a person or equipment.
- Do not operate this equipment near overhead powerlines.
- Do not operate this equipment under the influence of drugs or alcohol.
- The grapple, heel, and base machine shall be inspected before every use. Any deficiencies found during inspection that could affect the safe use of the system shall be corrected before the machine is used.
- This attachment is designed for the handling of felled logs in a timber harvesting application. The attachment is not designed for any other use.
- The rotation motor is intended for grapple positioning only.

Do not use the rotate function while handling logs.



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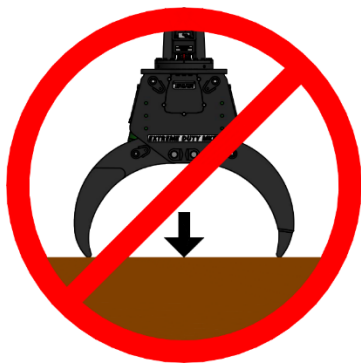
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LOAD HOLDING VALVES

- **This attachment is equipped with counterbalance type load holding valves to reduce the chance of undesired grapple leg movement in case of hose rupture, etc.**
- **Replacement with any pilot operated check or load holding valves other than those approved by the factory will void the grapple warranty.**
- **The grapple should never be forced into the ground unless the legs are fully open and the “grapple open” function is held active.**
- **Never swing the grapple legs or the load being held by the grapple into a fixed object.**
- **This grapple was not designed for the removal of stumps (stump pulling).**
- **This grapple was not designed to assist in machine positioning. The heel rack may be used for this purpose.**
- **Failure to follow these instructions may void warranty, and may result in equipment damage, injury, or death.**



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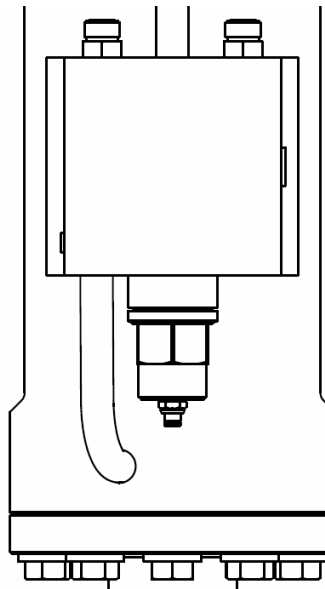
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COUNTERBALANCE LOAD HOLDING VALVES

- Counterbalance valves will hold applied and induced pressures inside the grapple cylinders up to a set pressure limit.
- Fluid will relieve when this limit is exceeded.
- This is designed to prevent cylinder damage and mechanical failure.
- If the load exceeds the design limit of the grapple this system can cause undesired grapple leg movement which may result in loads being released.



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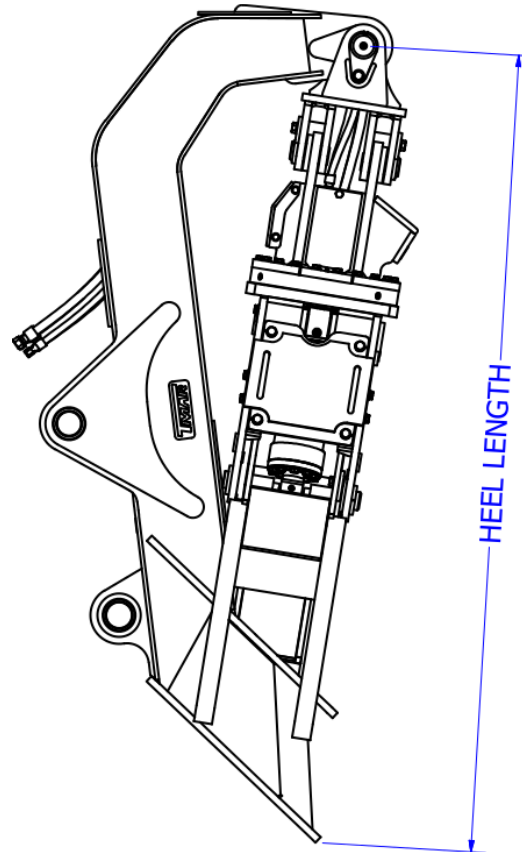
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HEEL LENGTH



GRAPPLE		SOLID LINK	PASSTHRU LINK
106D0358	HD52S	93"	96"

- Optimal heel length is listed for the grapple.
- A heel length 10% or more shorter than the listed value is generally not acceptable.
- Consult T-MAR engineering department for further information.

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INSPECTION

- **The grapple, heel, and base machine shall be inspected before every use. Any deficiencies found during inspection that could affect the safe use of the system shall be corrected before the machine is used.**
- **Check all surfaces and weld joints for signs of cracks or deformation.**
- **Ensure that all guards are installed.**
- **Check that all fasteners are present and tight.**
- **Inspect all pin bores for bushing wear. Signs or wear include excess clearance between the pin and the bushing or an oval shaped bore.**
- **Ensure that all grease fittings are present, undamaged, and functional.**
- **Inspect the hydraulic fittings and components for any signs of leakage.**
- **Inspect the hydraulic hoses for wear or deformation.**

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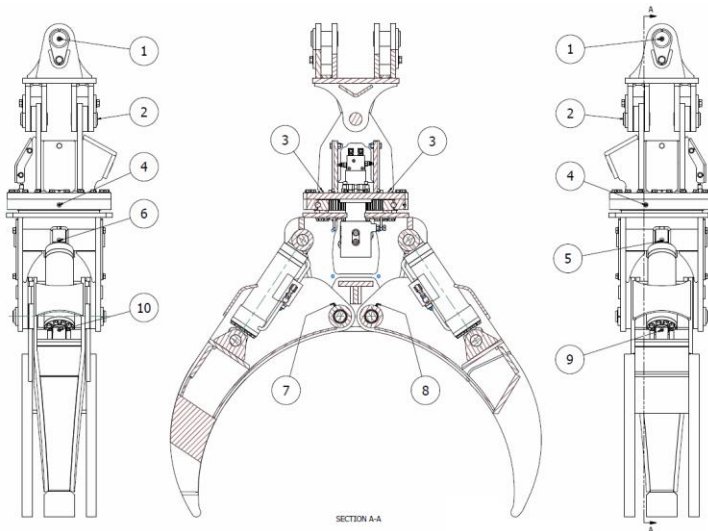
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MAINTENANCE

- Regular maintenance is essential to the longevity and safe use of this attachment. Failure to follow these instructions voids warranty and may result in equipment damage, injury, or death.
- Never attempt a repair that you are not qualified to perform or do not fully understand.
- It is recommended that only T-MAR genuine parts are used in the repair and maintenance of this attachment. Use of unapproved components may void warranty.
- All components must be lubricated with moly EP grease at the intervals in the below chart:

PASS THRU LINK



LUBRICATION CHART			
ITEM	QTY	DESCRIPTION	INTERVAL
1	2	Link to Heel Pin	Twice Daily
2	2	Link to Tophead Pin	Twice Daily
3	2	Tophead Bearing Gear	Twice Daily
4	4	Bearing	Once Daily
5	1	Wide Leg Cylinder Tailhold Pin	Twice Daily
6	1	Narrow Leg Cylinder Tailhold Pin	Twice Daily
7	2	Narrow Leg Pivot Pin	Twice Daily
8	2	Wide Leg Pivot Pin	Twice Daily
9	1	Wide Leg Cylinder Rod End Pin	Twice Daily
10	1	Narrow Leg Cylinder Rod End Pin	Twice Daily

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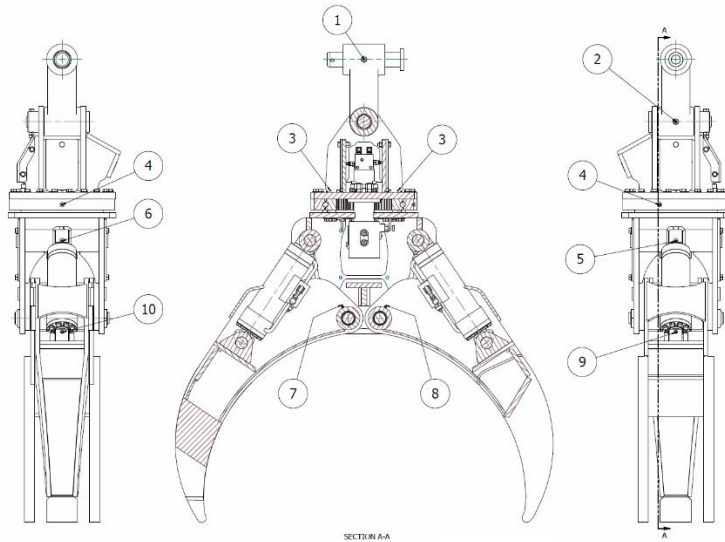
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MAINTENANCE CONT'D

SOLID LINK



LUBRICATION CHART			
ITEM	QTY	DESCRIPTION	INTERVAL
1	1	Link to Heel Pin	Twice Daily
2	1	Link to Tophead Pin	Twice Daily
3	2	Tophead Bearing Gear	Twice Daily
4	4	Bearing	Once Daily
5	1	Wide Leg Cylinder Tailhold Pin	Twice Daily
6	1	Narrow Leg Cylinder Tailhold Pin	Twice Daily
7	2	Narrow Leg Pivot Pin	Twice Daily
8	2	Wide Leg Pivot Pin	Twice Daily
9	1	Wide Leg Cylinder Rod End Pin	Twice Daily
10	1	Narrow Leg Cylinder Rod End Pin	Twice Daily

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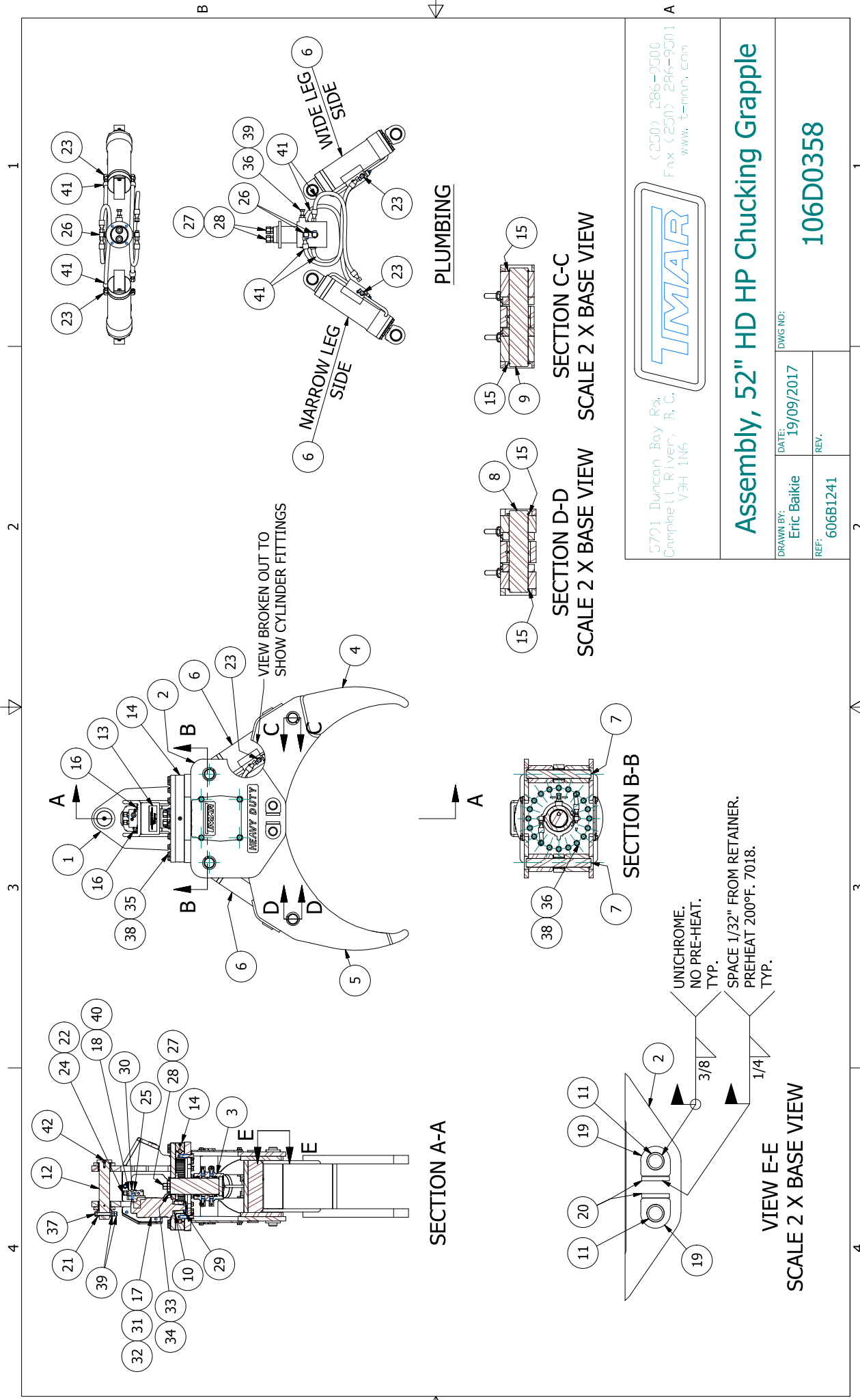
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Assembly, 52" Heavy Duty HP Chucking Grapple**Ref. No:****606B1241****Rev. D**

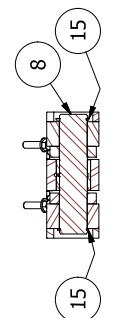
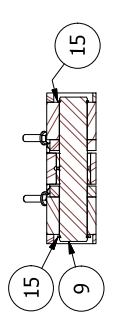
Ref.	Part No:	Description	Qty.
---	106D0358	Complete Assembly	---
1	206D0324	Top Head	1
2	206D0280	Mid Section	1
3	206B1204	Swivel	1
4	206B0750	Wide Leg	1
5	206B0751	Narrow Leg	1
6	270C0098	Cylinder Assembly	2
7	306A0193	Pin, Cylinder Mount Tailhold	2
8	306A0651	Pin, Cylinder Rod Mount (Narrow Leg)	1
9	306A0652	Pin, Cylinder Rod Mount (Wide Leg)	1
10	306B0198	Pinion Gear	1
11	306B0201	Ø2 1/4 Pin, Leg Mount	2
12	306B1106	Link Pin	1
13	333A0093	Weld-On Serial Plate, 106D0358	1
14	343B0011	Grapple Slew Bearing	1
15	345A0136	Retaining Ring	8
16	371A0120	Relief Valve Cartridge	2
17	371B0016	Rotate Motor Assembly	1
18	371C0047	Cross Port Relief Manifold	1
19	406A0738	D-Style Pin Retainer	2
20	406A0204	Pin Stop	2
21	406B1117	Pin Retainer	1
22	5650-8-8	Straight Fitting, -8 MORB to -8 MORF	2
23	5652-8-8	Elbow 90, -8 MFFO to -8 MORB	4
24	58C-8	Cap, -8 FFFO	2
25	50HP-8	Hex Socket Plug, -8 ORB	2
26	5652-8-10	Elbow 90, -8 MFFO to -10 MORB	4
27	5650-12-12	Adapter, -12 MORF to -12 MORB	2
28	58C-12	Cap, -12 FFFO	2
29	FCP532-212	COTTER PIN 5/32 X 2 1/2	1
30		HEX SOCKET HD CAPSCREW 3/8 - 16 UNC X 1 3/4	4
31	FCSCBSC12-134	FLANGE 12-POINT CAPSCREW 1/2 - 13 UNC X 1 3/4	4
32	345A0015	Washer 1/2 X .15 Thick	4

Assembly, 52" Heavy Duty HP Chucking Grapple**Ref. No:****606B1241****Rev. D**

Ref.	Part No:	Description	Qty.
33		HEX HD CAPSCREW M14 X 2.0 X 50	4
34	SHP.40255	LOCKWASHER M14	4
35	SHP.0122078	HEX HD CAPSCREW M16 X 2.0 X 60	20
36	SHP.40762	HEX HD CAPSCREW M16 X 2.0 X 70	21
37	SHP.40768	HEX HD CAPSCREW M16 X 2.0 X 120	1
38	SHP.34882	FLAT WASHER M16, HARD	40
39	SHP.90711	HEX NUT M16 X 2	3
40	OR2-12	O-Ring	2
41	72A6039 CL28	Hose Assembly	4
42	345A0068	1/8" NPT Grease Fitting	2
43	306A0197	Shim 1/16", Legs and Cylinders	1
44	306A0198	Shim 1/8", Legs and Cylinders	1
45	206A0671	Fastener Kit, HD HP	1
46	206A0675	Fitting Kit, HD HP	1

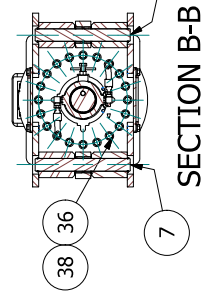


PLUMBING

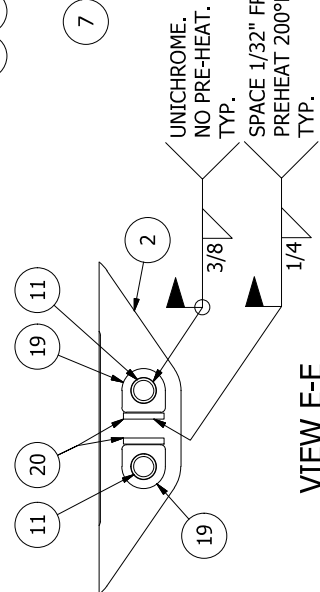


SECTION C-C
SCALE 2 X BASE VIEW

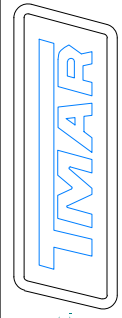
SECTION D-D
SCALE 2 X BASE VIEW



SECTION B-B



VIEW E-E
SCALE 2 X BASE VIEW



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Assembly, 52" HD HP Chucking Grapple

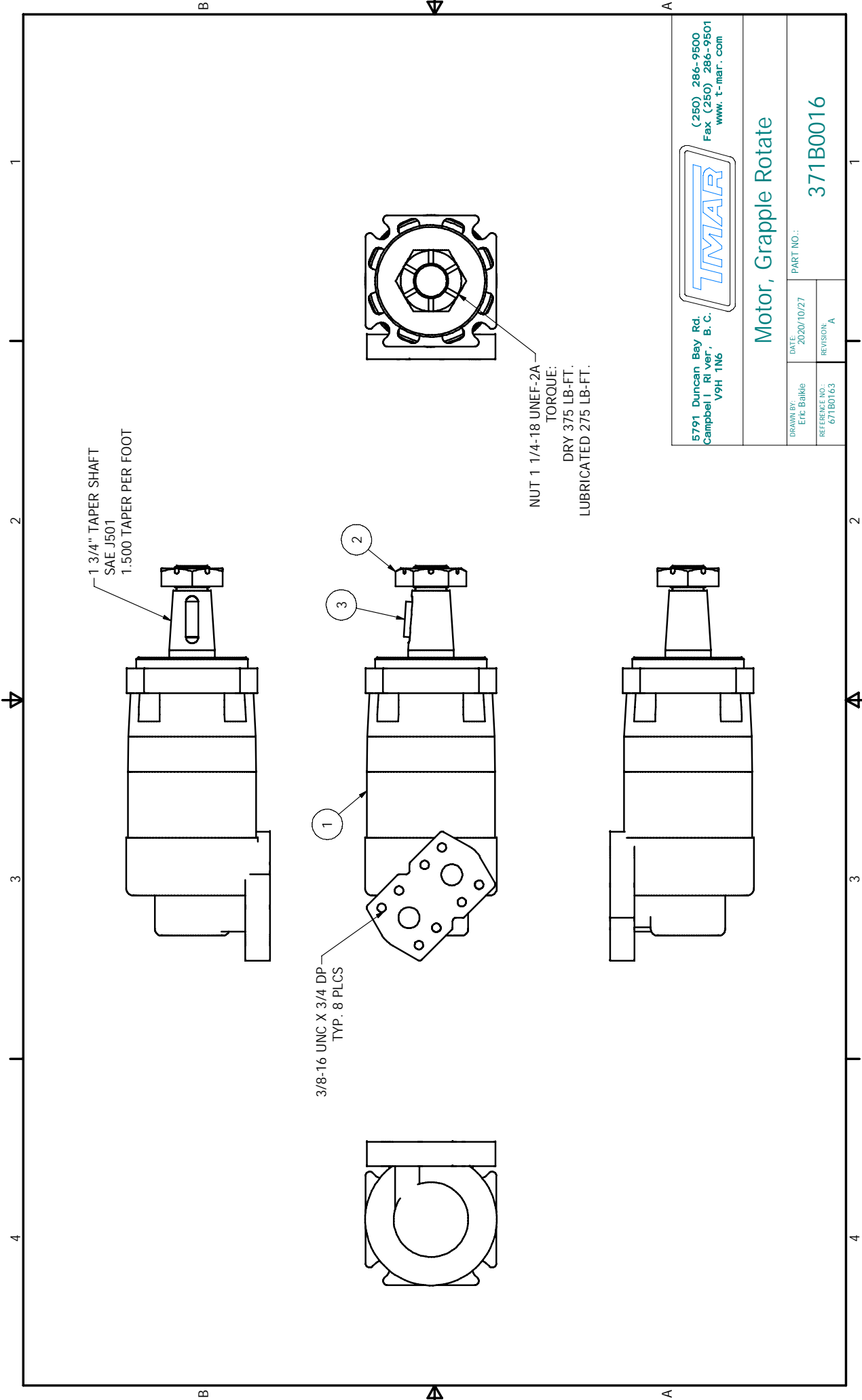
DRAWN BY: Eric Baikie		DATE: 19/09/2017		DWG NO: 106D0358	
REF: 606B1241		REV.			

Assembly, Rotation Motor
Applicable Serial Numbers:

All Units

Ref. No: **671B0163**
Rev. A

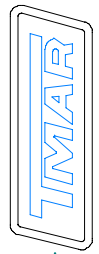
Ref.	Part No:	Description	Qty.
---	371B0016	Complete Assembly	---
1	---	Motor, Char Lynn	1
2	---	Nut, 1 1/4 - 18 UNEF, Castelated	4
3	---	CF. Square, 7/16" x 1 1/4" Long	1



1 3/4" TAPER SHAFT
SAE J501
1.500 TAPER PER FOOT

3/8-16 UNC X 3/4 DP
TYP. 8 PLCS

NUT 1 1/4-18 UNEF-2A
TORQUE:
DRY 375 LB-FT.
LUBRICATED 275 LB-FT.



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Motor, Grapple Rotate

DRAWN BY: Eric Baillie	DATE: 2020/10/27	PART NO.:
REFERENCE NO.:	REVISION:	
671B0163	A	371B0016

Assembly, Top Head

Ref. No: 606B1128

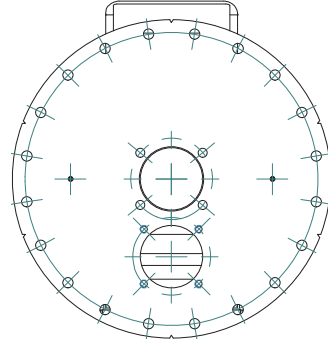
Rev. _

Ref.	Part No:	Description	Qty.
---	206D0324	Complete Assembly	---
1	306D0325	Top Head	1
2	306B1264	Motor Guard	1
3	406B1120	Side Guard	2
4	342B0057	Bushing, 3 OD x 2 1/2 ID x 2 LG	2
5		HEX HD BOLT M14 X 2 X 40	4
6		FLAT WASHER M14, HARD	4
7		HEX HD BOLT M16 X 2 X 50	2
8	SHP.90711	HEX NUT M16 X 2	2
9	345A0068	1/8" NPT Grease Fitting	2
10	206D0324-FK	Fastener Kit (Includes Items 4-9)	1

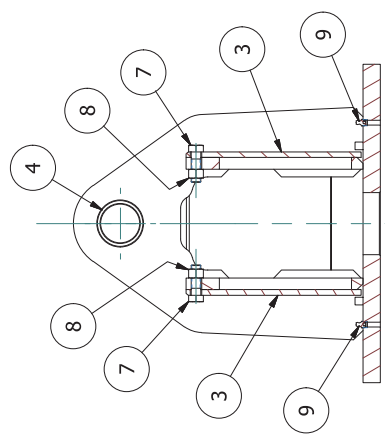
Notes:

- 1.) Use with Hydraulic Swivels with 4" pilot only.

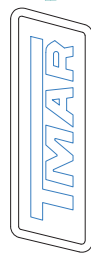
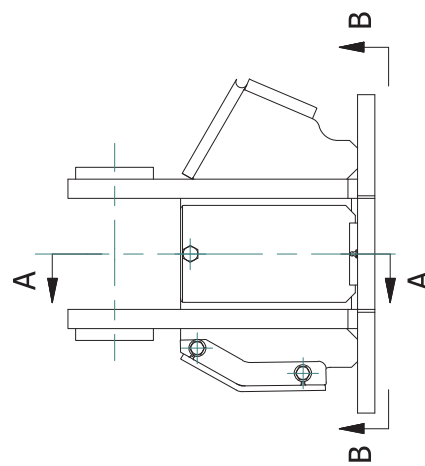
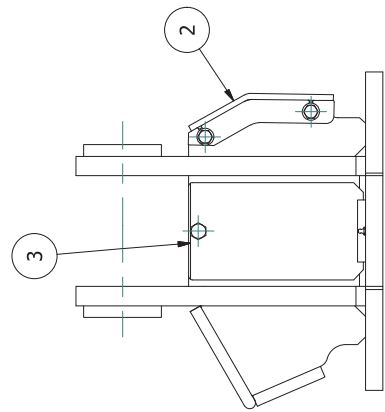
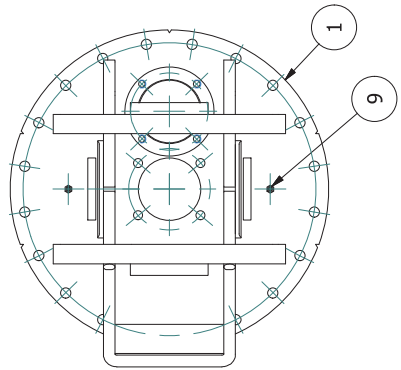
1 2 3 4



VIEW B-B



SECTION A-A



5791 Durcan Bay Rd.
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 V9H 1N6

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Top Head Assembly, MKIII

DRAWN BY: Eric Baikie	DATE: 09/05/2016	PART NO.:
REFERENCE NO.:	606B1128	

206D0324

1 2 3 4

B A

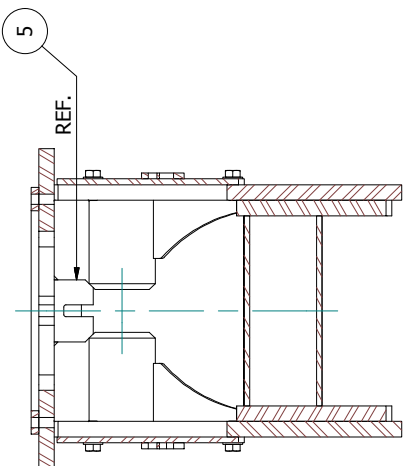
A B

Assembly, HD Mid Section

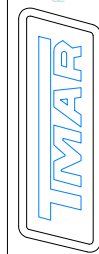
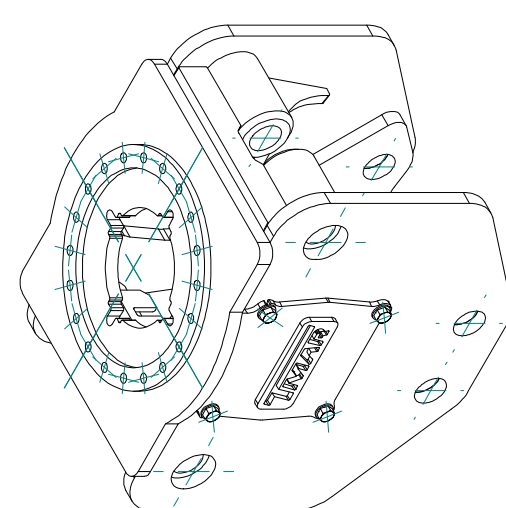
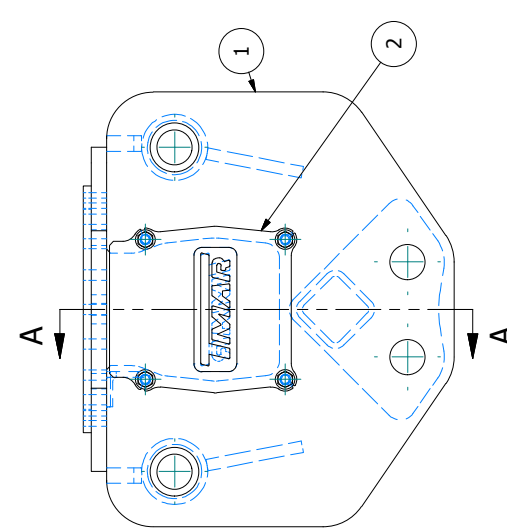
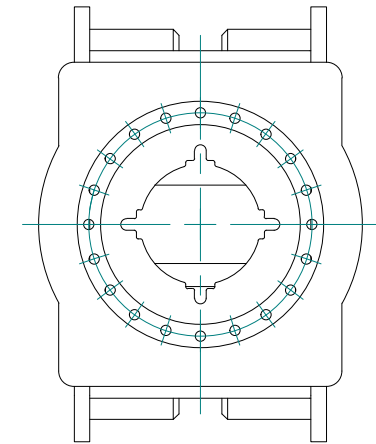
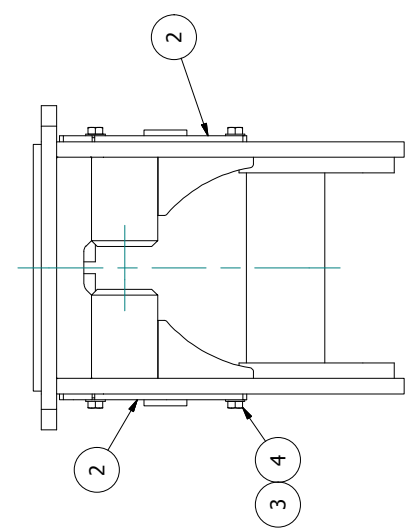
Ref. No: 606B0957

Ref.	Part No.	Rev.	Description	Qty.
---	206D0280		Complete Assembly	---
1	306D0267	C	Mid Section	1
2	306B0714		Front Guard Plate Weldment	2
3	---		FLAT WASHER 5/8	8
4	---		HEX HD BOLT 5/8 - 11 UNC X 1 1/2 GR8	8
5	406A0644		Anti-Rotation Tab (REF.)	1

1 2 3 4



SECTION A-A



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Assembly, HD Mid Section

DRAWN BY: Al Lee
 DATE: 2013/07/29
 PART NO.: 206D0280

REFERENCE NO.: 606B0957

206D0280

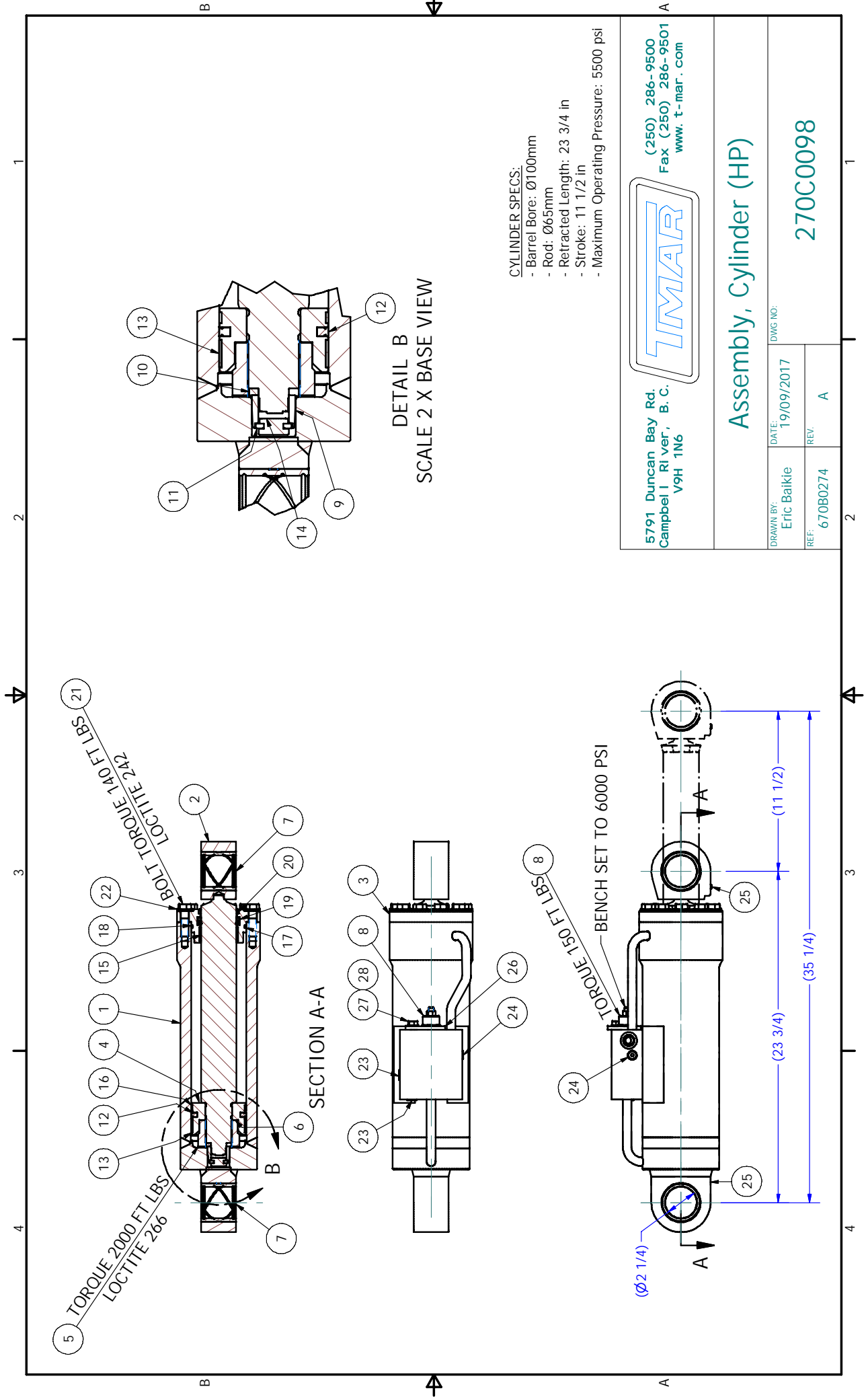
1 2 3 4

Assembly, 100mm Cylinder, 11 1/2" Stroke, -8 Ports**Ref. No:****670B0274****Applicable Serial Numbers:** All Units**Rev. A**

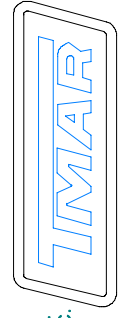
Ref.	Part No:	Description	Qty.
---	270C0098	Complete Assembly	---
1	370D0076	Cylinder Barrel	1
2	370B0118	Rod, Cylinder	1
3	370C0097	Gland, Cylinder	1
4	370C0273	Piston, Cylinder	1
5	370B0110	Nut, Piston	1
6	370A0074	Shim	1
7	342A0025	Bushing	2
8	371A0401	Counterbalance Valve	1
9	370A0065	Ring, Cushion	1
10	370A0069	Ring Spacer	1
11	370A0068	Stopper	2
12	347A0352	Piston Seal	1
13	347A0353	Wear Ring	1
14	347A0180	Cushion Seal	1
15	347A0181	Wear Ring, Rod	1
16	347A0354	Wear Ring	1
17	347A0182	O-Ring	1
18	347A0183	Backup Ring	1
19	347A0184	Rod Seal (c/w Backup Ring)	1
20	347A0351	Rod Wiper	1
21		HEX HD CAPSCREW M14 X 2.0 X 50	10
22		FLAT WASHER M14, HARD	10
23	50HP-6	Hex Socket Plug, -6 ORB	2
24	50HP-4	Hex Socket Plug, -4 ORB	1
25	MSCLCN5000	1/8 NPT Grease Nipple	2
26	372B0581	Cartridge Retainer	1
27	SHP.40694	HEX HD CAPSCREW M10 X 1.5 X 30	1
28	SHP.40223	FLAT WASHER M10	1
29	270A0103	Seal Kit, Piston & Gland	1
30	270A0100	Fastener Kit	1

Notes:

1. Exchange cylinders are available on a cost-of-repair basis.



- CYLINDER SPECS:**
- Barrel Bore: Ø100mm
 - Rod: Ø65mm
 - Retracted Length: 23 3/4 in
 - Stroke: 11 1/2 in
 - Maximum Operating Pressure: 5500 psi



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Assembly, Cylinder (HP)

DRAWN BY: Eric Baikie		DATE: 19/09/2017		DWG NO: 270C0098	
REF: 670B0274		REV: A			

Assembly, Swivel (HP)

Ref. No: 606B1314

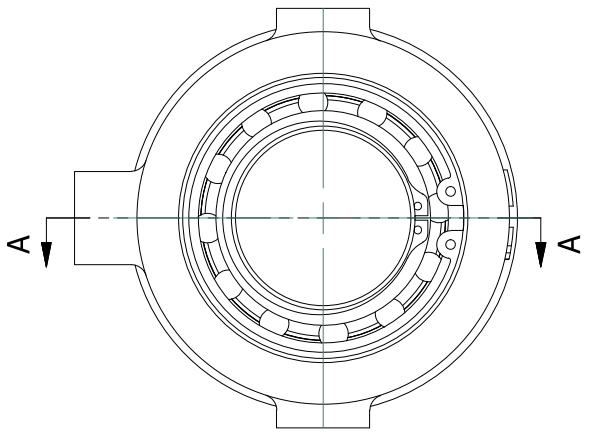
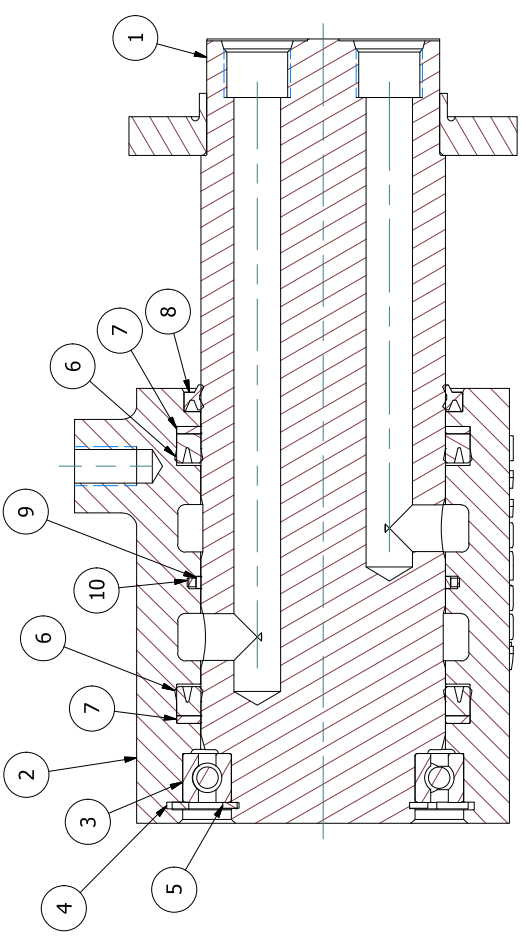
Rev. 0

Ref.	Part No:	Rev.	Description	Qty.
---	206B1204		Complete Assembly	---
1	306B0512		Swivel Core Weldment	1
2	306D0351		Housing, Swivel Outer	1
3	343A0015		Bearing	1
4	348A0023		Retaining Ring, Internal	1
5	348A0012		Retaining Ring, External	1
6	347A0013		Seal, U-Cup	2
7	347A0014		Backup Ring	2
8	347A0015		Wiper, Metal Clad	1
9	347A0188		Seal Ring, Carbon Teflon	1
10	347A0189		Seal, Square Ring	1
11	206A0658		Seal Kit (Includes Items 4-10)	1

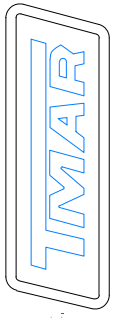
Notes:

- 1.) Exchange swivels are available on a cost-of-repair basis.
- 2.) Swivel core top ports: -12 ORB x 2.
- 3.) Swivel housing side ports: -10 ORB x 4.
- 4.) Mounting Hardware:
 - SHP.40738 (M14 X 2.0 X 50) x 4
 - SHP.40386 (M14 lock washer) x 4
 - GTSOR-10 #10 ORB O-rings x 4
 - GTSOR-12 #12 ORB O-rings x 2

1 2 3 4



SECTION A-A



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Assembly, Swivel (HP), -10 Ports

DRAWN BY: Eric Baikie	DATE:	05/07/2018	DWG NO: 206B1204
	REF:	606B1314	

Assembly, 52" Narrow Leg

Ref. No: 606B0958

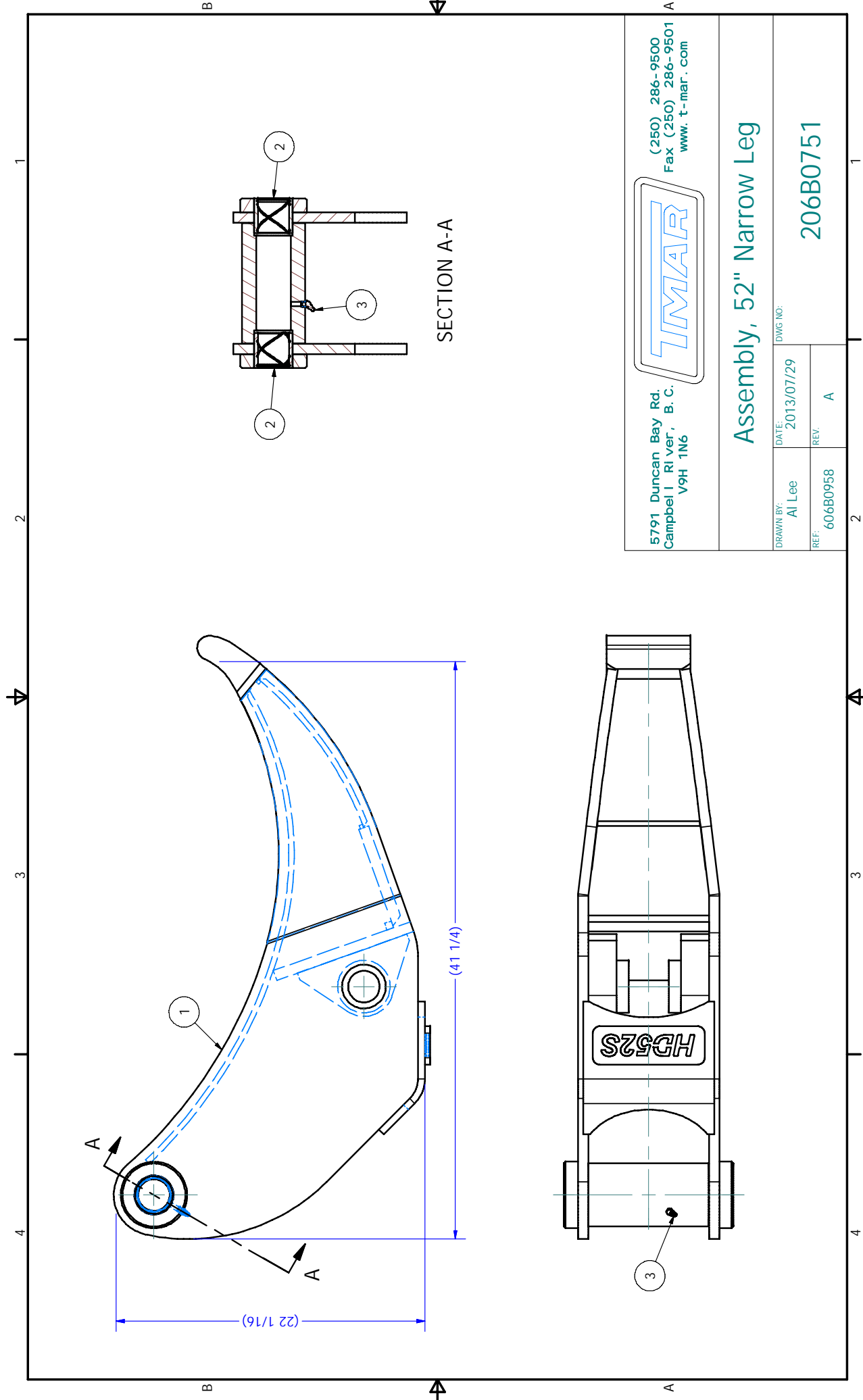
Applicable Serial Numbers: All Units

Rev. A

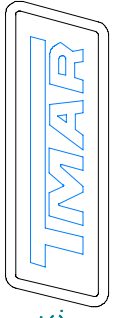
Ref.	Part No.	Description	Qty.
---	206B0751	Complete Assembly	---
1	306D0220	Narrow Leg Weldment	1
2	342A0025	Bushing	2
3	372A0074	Grease Fitting, 1/8 NPT, 45°	1

Notes:

1. Grapples with a serial number before 16666 use spacer 306A0196 between bushings



SECTION A-A



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 Campbell River, B. C.
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Assembly, 52" Narrow Leg

DRAWN BY: Al Lee		DATE: 2013/07/29		DWG NO: 206B0751	
REF: 606B0958		REV: A			

Assembly, 52" Wide Leg

Ref. No: 606B0960

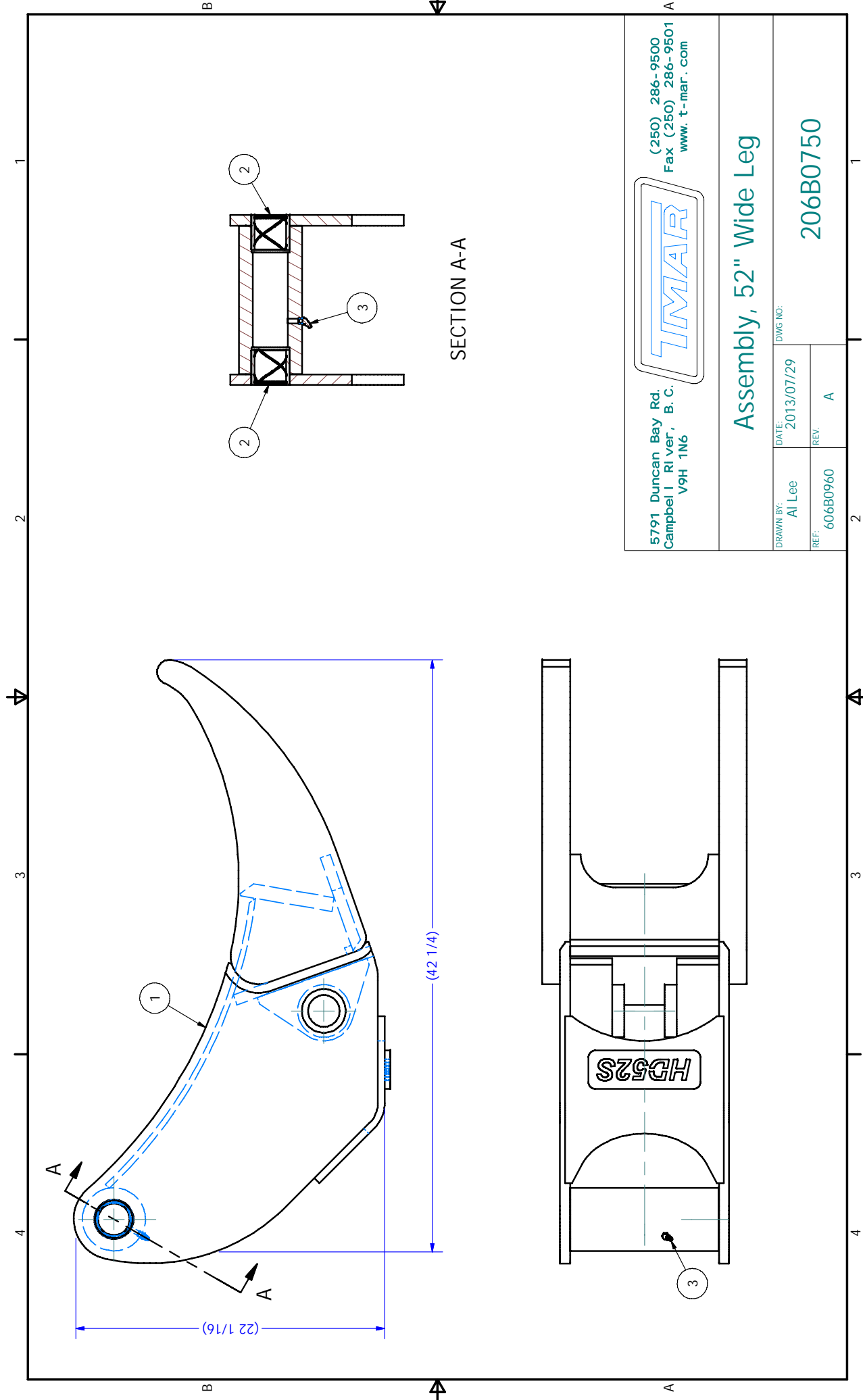
Applicable Serial Numbers: All Units

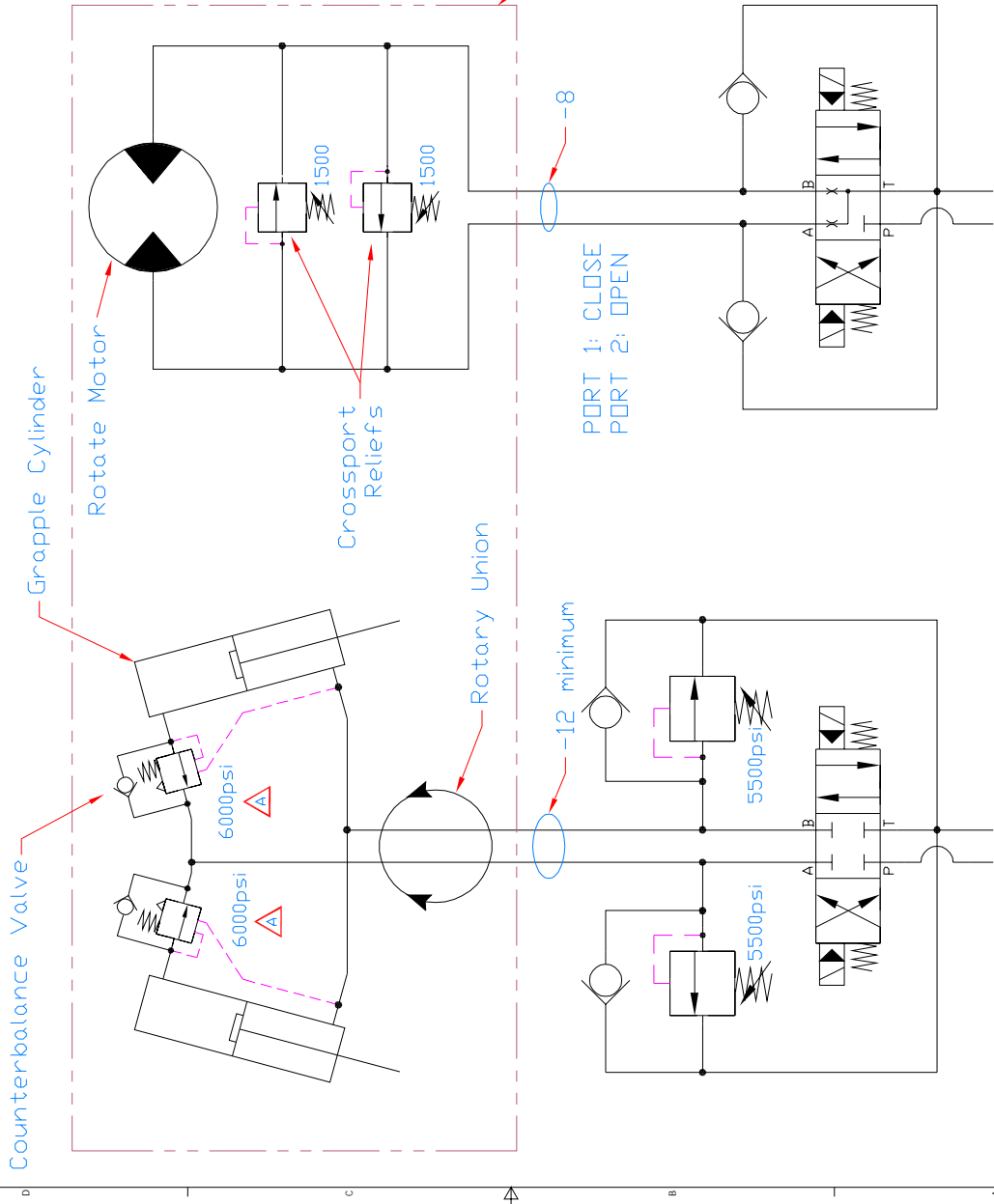
Rev. A

Ref.	Part No.	Description	Qty.
---	206B0750	Complete Assembly	---
1	306D0219	Wide Leg Weldment	1
2	342A0025	Bushing	2
3	372A0074	Grease Fitting, 1/8 NPT, 45°	1

Notes:

1. Grapples with a serial number before 16666 use spacer 306A0196 between bushings





Pressure and Flow Recommendations
Dual Cylinder Heavy Duty Grapples

- Open / Close Circuit
- Maximum Recommended Flow - 60 GPM
- Recommended System Pressure - 4000 PSI
- Maximum System Pressure - 5000 PSI
- Maximum Part Relief Setting - 5500 PSI
- Minimum Piping Size - -12 (-16 Preferred)
- Counterbalance Valve Setting - 6000PSI
- Grapple Rotate Circuit
- Recommended Flow - 8-12 GPM, 12 GPM Max.
- Recommended System Pressure - 1000 PSI
- Maximum System Pressure - 1300 PSI
- <Crossport Reliefs Factory Set at 1500 PSI>

Components Supplied as Part of the Grapple

Flow should be set to 37-60 GPM to achieve a closing time of 1.2-2.0 seconds. 50 GPM recommended.

TIMAR

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DRAWN BY:	DATE:	DWG NO:
A/Lee	2015/03/26	506B0768
REF:	REV.	A
606B1035		

Hydraulic Schematic, HD Grapple (HP)

Port Reliefs and Makeup Checks must be provided as noted.