



HALL Technical Services, LLC

B737-MAX9/10 TOWBAR MANUAL



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2018-05-09 Part Number Additions; Additional Drawings

revision 0

revision 1



0. Index

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1. Specifications

1.1. Compatible Aircraft

1.1.1. Boeing 737-MAX9 & MAX10

1.2. Physical Specifications

Part Number	Description	Weight	Length
TB-MAX9-SS	Towbar complete with Lift Kit & Soft Start	~345 lbs	~15'
TB-7378-HA-ASL	Head Assembly (no adapter)	40 lbs	1'-7 3/8"
TB-MAX9-AC	Adapter Assembly	29 lbs	8 5/16"
TB-T5-SS	Towbar Tube Assembly w/ Lift Kit & Soft Start	277 lbs	13'-3"
TB-T5-TE-SS	Towbar Tube & Eye, Soft Start	176 lbs	13'-3"

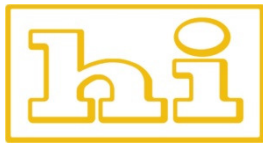
1.3. Shear Pin

Shear Pin

TB-MAX9-SP

Shear Value: 29,000 lbs

NOTE: Shear pins are produced in controlled batches; only use Hall Industries shear pins. Shear pin testing and manufacturing records are permanently stored for reference. Failure to use Hall Shear Pin shall void warranty.



2. Safety

To ensure safe operation, please read the following statements and understand their meaning. This manual contains safety precautions which are explained below.

WARNING!

Warning is used to indicate the presence of a hazard which will or can cause minor personal injury or property damage if the Warning Notice is ignored.

CAUTION!

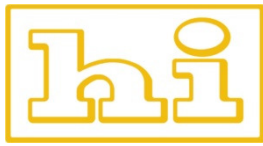
Caution is used to indicate the presence of a hazard which will or can cause personal injury or property damage if the Caution Notice is ignored.

WARNING!

A damaged or bent towbar should not be used. Towbar should be repaired or replaced.
BENT TOWBARS CAN NOT BE REPAIRED AND MUST BE REPLACED.

WARNING!

Always use lifting mechanism to raise and lower towbar.



3. Operating Procedures

THE FOLLOWING IS A RECOMMENDATION ONLY. ALWAYS FOLLOW AIRCRAFT MANUFACTURERS PROCEDURES AND AIRLINE SPECIFIC OPERATING PROCEDURES FOR PUSHBACK AND TOWING OPERATIONS

3.1. Responsibility

- Operator of the tractor must understand that it is his/her responsibility to move the aircraft safely in accordance with the aircraft manufacturers operational procedures.
- Employer of tractor operator is responsible for providing sufficient operator training to ensure safe operation of towbar for pushback and towing operations

The following are recommendations.

3.2. Inspect the Towbar prior to each use:

- 3.2.1. Visually inspect shear pin for correct installation and that it is the correct shear pin marked 737-MAX9/10 (see image below). Verify that shear pin is not broken.



- 3.2.2. Visually verify that the Pivot bolt nut is present on underside of adapter.
- 3.2.3. Visually inspect towbar tube for cracks at welded joints.
- 3.2.4. Visually inspect tow eye assembly for damage and loose or missing hardware.
- 3.2.5. Visually inspect wheel carriage for damage and loose or missing components.
- 3.2.6. Visually inspect adapter to tube flange bolts (Torque as required 80 lb-ft).
- 3.2.7. Check head latch mechanism for proper travel and locking action in both forward and back positions. Inspect for damage and loose or missing components.

WARNING! DO NOT attempt to push or tow an aircraft with a damaged towbar.

3.3. Use the correct size Aircraft Tow Tractor:

An important consideration for safe movement of an aircraft is using the correct category of tractor for pushback and towing operations. Incidents are more likely to occur when using a tractor that is either too large or too small for a particular aircraft. Consult the Aircraft Manufacturers Ground Towing Requirements chart to obtain tractor draw bar pull and total wheel traction requirements based on aircraft and environmental conditions.



- Boeing 737-MAX9 Maximum Takeoff Weight = 194,700 lbs
- Category 2 Tow Tractor is recommended.

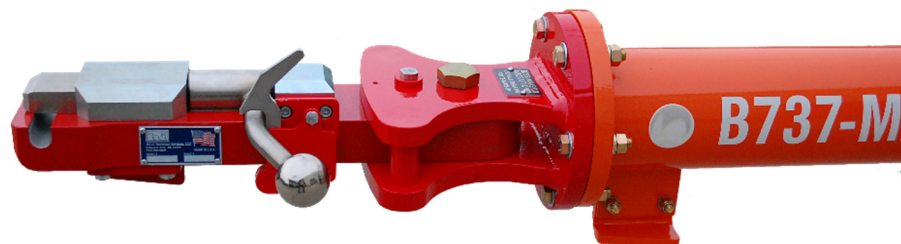
Category	Aircraft Maximum Takeoff Weight	Tractor Draw Bar Pull
1	Up to 50,000 kg (110,000 lbs.)	14,000 kg (8,800 lbs.)
2	Up to 150,000 kg (330,690 lbs.)	212,000 kg (26,455 lbs.)
3	Up to 260,000 kg (573,196 lbs.)	318,000 kg (39,683 lbs.)
4	More than 260,000 kg (573,196 lbs.)	440,000 kg (88,184 lbs.)

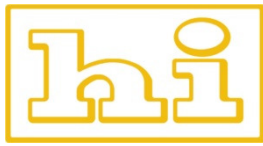
Source: IATA "Airport Handling Ground Support Equipment" Specification AHM 955: "Functional Specification for an Aircraft Tractor"

- 3.4. Attach towbar to aircraft first, then to tractor.
- 3.5. Towbar should be horizontal to ground or up to 2" (5cm) higher at the aircraft end.
- 3.6. Do not exceed a 90 degree angle between towbar and pushback tractor. Damage to towbar or aircraft can occur.
- 3.7. Always start a pushback with the tractor in-line with the towbar.
- 3.8. Attach the Towbar to the Aircraft
 - 3.8.1. First check that the towbar head handle is in the OPEN position.



- 3.8.2. Line up towbar to nose pin of aircraft and slide head under the nose pin.
- 3.8.3. Rotate the handle to slide the locking plate over the nose pin into the LOCK position. **"LEFT IS LOCKED"**. Verify auto safety latch is latched. The head can only be disengaged by operation of the handle.





3.9. Attach the Towbar to the Tow Tractor

- 3.9.1. Use the hydraulic pump to lift the towbar to the correct engagement height with the tow tractor.
- 3.9.2. Position the tractor and install the hitch pin.
- 3.9.3. Release the hydraulic pump allowing the wheels to rise up off the ground.

WARNING! Tow or push the aircraft only if the towbars' tires are not touching the ground.

3.10. Push the Aircraft

THE FOLLOWING IS ACCEPTABLE PRACTICE. ALWAYS FOLLOW AIRCRAFT MANUFACTURER & AIRLINE SPECIFIC PROCEDURES FOR PUSHBACK AND TOWING OPERATIONS

NOTE: If at any time the shear pin yields or breaks, carefully bring the aircraft to a stop. Follow aircraft manufacturers and/or airline nose landing gear inspection procedures prior to installing a new shear pin to continue the operation.

3.11. Disconnect the Towbar from the Aircraft and return to gate

- 3.11.1. Lower the wheels to approximately 1" from ground using the hydraulic pump.
- 3.11.2. Position feet away from underneath the towbar.
- 3.11.3. Hold back auto safety latch.
- 3.11.4. Rotate handle to OPEN position, dropping towbar to ground, clearing the NLG hookup pin.
- 3.11.5. Back tractor with towbar away from aircraft.



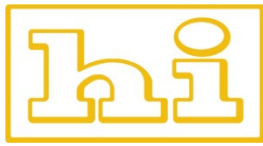
4. Preventive Maintenance

NOTE: Hall Industries recommends using this maintenance procedure monthly (or as required by airlines maintenance procedures). Replace worn or damaged parts as needed.

- 4.1. Replace Shear Pin. Shear pin should have a slight vertical play, spin freely and the nut should not be tight to the head. A very small gap (0.001"-0.020" feeler gage) between the nut and the head is required.
- 4.2. Check Pivot Bolt. Verify nut is present and tightened to contact.
- 4.3. Check Shear Pin Bushings. They should not be worn, cracked, or otherwise damaged.

NOTE: Always replace bushings as a set. Never replace only one bushing.

- 4.4. Check adapter/tube flange bolts for tightness. Torque to 80 lb-ft.
- 4.5. Check wheels and wheel carriage assembly for bent, broken, or worn parts. Lubricate pivot points using Hall dry lubricant (P/N TB-LUBE). Inspect hydraulic fittings for leaks. With hydraulic lift in the down / collapsed position Inspect hydraulic fluid for level and quality. Add hydraulic fluid if necessary. Use hydraulic fluid per MIL-PRF-5606H.
- 4.6. Check head assembly for operation of lock mechanism. Verify that all bolts and Nord-Lock washers are present and fully torqued (33 lb-ft). Bolts are located underneath the head.
- 4.7. Inspect jaw for excessive wear or cracking. Replace head if cracked.
- 4.8. Verify operation of auto safety latch and repair or replace components as required.
- 4.9. Check tow eye and hardware for condition. Check that all hardware is tight. Verify that tow eye rotates a little bit in each direction and then hits a stop.
- 4.10. Check main body tube for bending or cracking.
- 4.11. If the drag plate is worn and towbar head or eye is dragging use replacement drag plate kit.
- 4.12. Clean, repaint or touch-up paint as required.
- 4.13. Inspect tags and labels. Replace if damaged or missing (see the drawings in the attachment section for labels and placements).



5. Replacement Parts

Part Number	Description
TB-MAX9-SS	Towbar complete with Lift Kit & Soft Start & ASL
TB-MAX9-HAC-ASL	Head & Adapter Assembly
TB-7378-HA-ASL	Head Assembly
TB-MAX9-AC	Adapter Assembly
TB-7378-DP	Drag Plate
TB-7378-TLN	Actuating Nut
TB-T5-SS	Towbar Tube Assembly w/ Lift Kit & Soft Start
TB-T5-TE-SS	Towbar Tube & Eye, Soft Start
TB-SS5	Soft Start Assembly

**See attached drawings for additional individual part numbers*

**All hardware must be Grade 5 or Grade 8.*

6. End of Life Statement

This towbar is designed to provide years of reliable service, but at some point in time it may be necessary to retire the unit from service. To protect our environment specific guidelines and requirements should be followed.

The towbar is primarily constructed of plated or painted carbon steel with a few components made of stainless steel 303/304 alloy and aluminum alloys and contains no hazardous materials. Please follow country, regional or local requirements for materials recycling.

7. Warranty

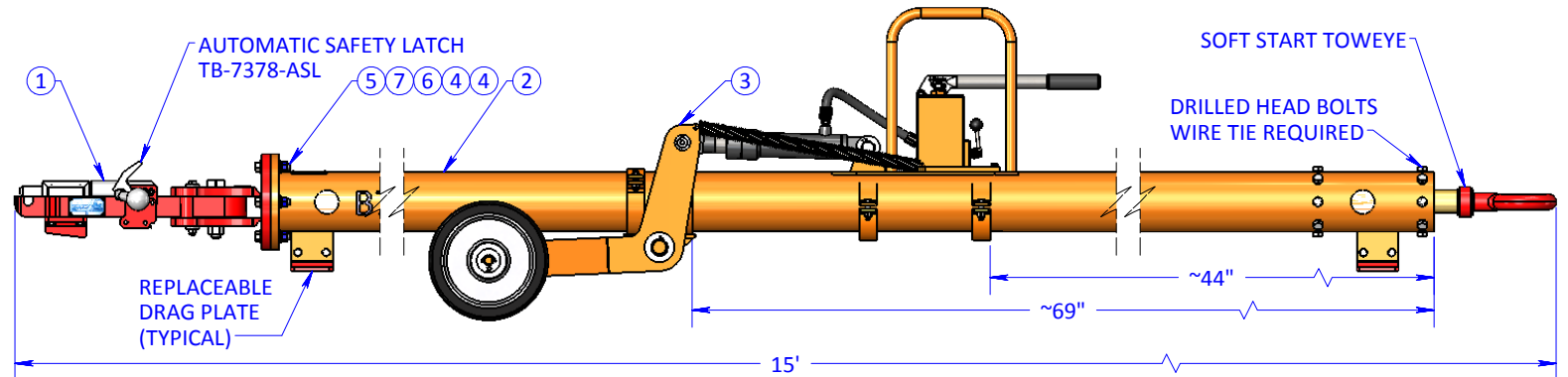
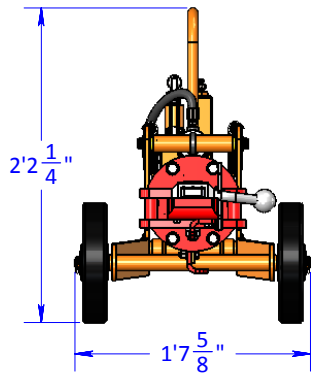
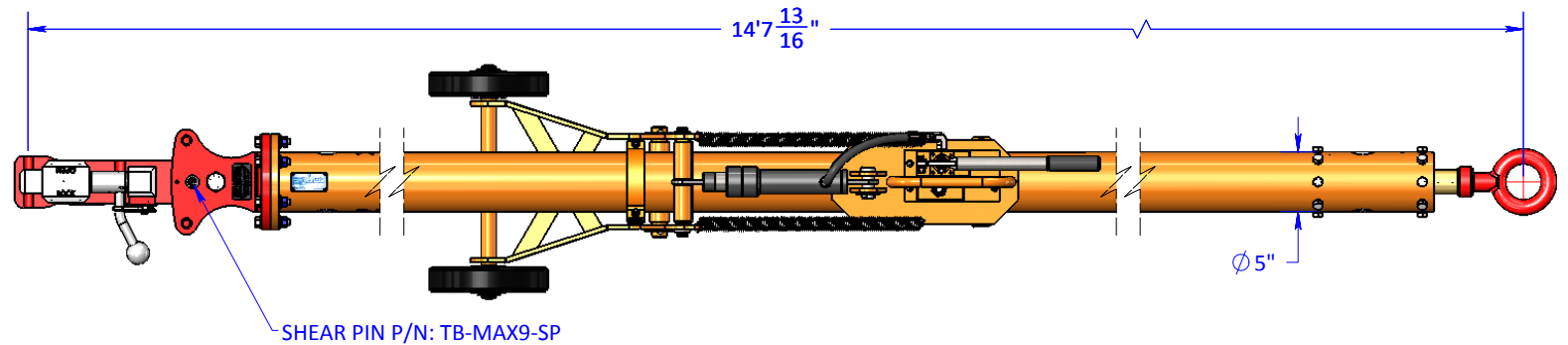
Warranty: All parts are guaranteed against defects for one year. If at any time this manual is not followed it will void the warranty (preventive maintenance logs are required for all warranty replacement parts). All replacement parts must be genuine Hall Industries parts.

8. Drawings List

TB-MAX9-SS	Towbar Complete, Soft Start
TB-MAX9-HAC-ASL	Head and Adapter – Individual Components
TB-7378-ASL	Automatic Safety Latch
TB-T5-TE-SS	Tube & Eye with Hardware (Soft Start Tow eye)
TB-SS5	Soft Start Assembly
TB-T5-HL	Lift Kit for 5" Towbar Tube
TB-T5-SF	Shear Flag (Optional)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TB-MAX9-HAC-ASL	HEAD AND ADAPTER COMPLETE
2	1	TB-T5-TE-SS	5" SOFT START TUBE & EYE W/HD
3	1	TB-T5-HL	LIFT KIT, 5"
4	12	WH4520000ZP0000	1/2 WASHER, SAE TYPE A
5	6	92865A722	1/2-13 x 2 1/2 HEX CAP SCREW
6	6	91102A033	1/2 HEAVY SPLIT LOCK WASHER
7	6	HN08C0000ZP0000	1/2-13 HEX NUT

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK



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TOLERANCES		
ANGLE	.XX	.XXX
± 0.5°	± .01	± .005
X<12"=± 1/32"	X>12"=±1/16"	

THIRD ANGLE PROJECTION

CHECK	DATE
BJE	12/12/2017
DRAWN	DATE
VTM	10/25/2017

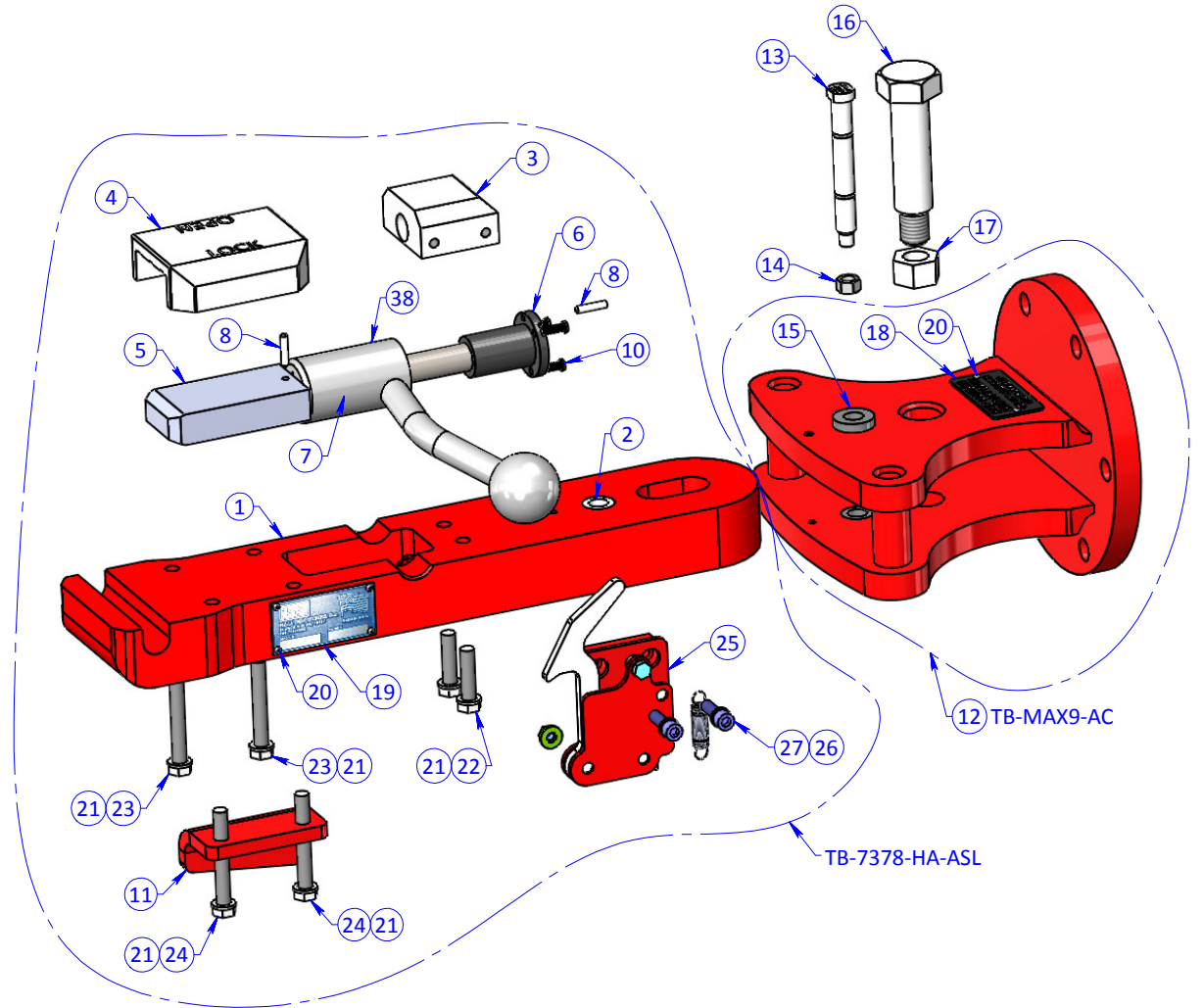
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Hall Industries, Inc.

PROJECT	737 MAX9 TOWBAR		
FILE NAME	TB-MAX9-SS 737 MAX9 TOWBAR SS		
DESCRIPTION	737 MAX 9 TOWBAR W/ SOFT START		
SIZE	DWG/PART NO.	REV	
A	TB-MAX9-SS	0	
SCALE 1:16	WEIGHT: 345 LBS	SHEET 1 OF 1	

ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	TB-7378-HBA	HEAD BODY ASSEMBLY
2	1	TB-7378-HB	HEAD BUSHING
3	1	TB-7378-RBB	REAR BEARING BLOCK
4	1	TB-7378-FBB	FRONT BEARING BLOCK
5	1	TB-7378-SL	SLIDE LOCK
6	1	TB-7378-TLN	ACTUATING NUT
7	1	TB-7378-TL	ACTUATING SCREW
8	2	TB-7378-DP1	3/16"OD x 7/8"L DOWEL PIN SS
9	1	TB-7378-HDL	HANDLE WELDMENT
10	3	90666A014	LP SHCS 10-32 x 3/4" SS
11	1	TB-7378-DP	DRAG PLATE
12	1	TB-7378-AC	ADAPTER ASSEMBLY
13	1	TB-MAX9-SP	SHEAR BOLT
14	1	TB-7378-SLN	3/8-24 LOCKNUT
15	2	TB-7378-AB	ADAPTER BUSHING
16	1	TB-7378-PB	PIVOT BOLT
17	1	TB-8312-B5	LOCKNUT 3/4"-10 STOVER
18	1	TB-MAX9-TAG-A	MAX9/10 ADAPTER TAG
19	1	TB-TAG-METAL	HALL INDUSTRIES TAG
20	6	TB-8849-14	DRIVE RIVET
21	6	8980-2-2	WASHER NORDLOCK
22	2	H506C0048ZP0000	3/8-16 x 1 1/2 HEX CAP SCREW
23	2	H506C0080ZP0000	3/8-16 x 2 1/2 HEX CAP SCREW
24	2	H506C0088ZP0000	3/8-16 x 2 3/4 HEX CAP SCREW
25	1	TB-7378-ASL	AUTO SAFETY LATCH
26	2	TB-8714-2	5/16" WEDGE LOCK WASHER
27	2	90128A583	5/16-18 x 1, SHCS

NOTES:

1. USE BLUE LOCTITE ON ALL THREADS (EXCEPT 14 & 17).



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TOLERANCES

ANGLE	.XX	.XXX
± 0.5°	± .01	± .005
X<12"=± 1/32"	X>12"=±1/16"	

THIRD ANGLE PROJECTION

CHECK	DATE
HALL	11/15/2017
DRAWN	DATE
HALL	11/15/2017

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Hall Industries, Inc.

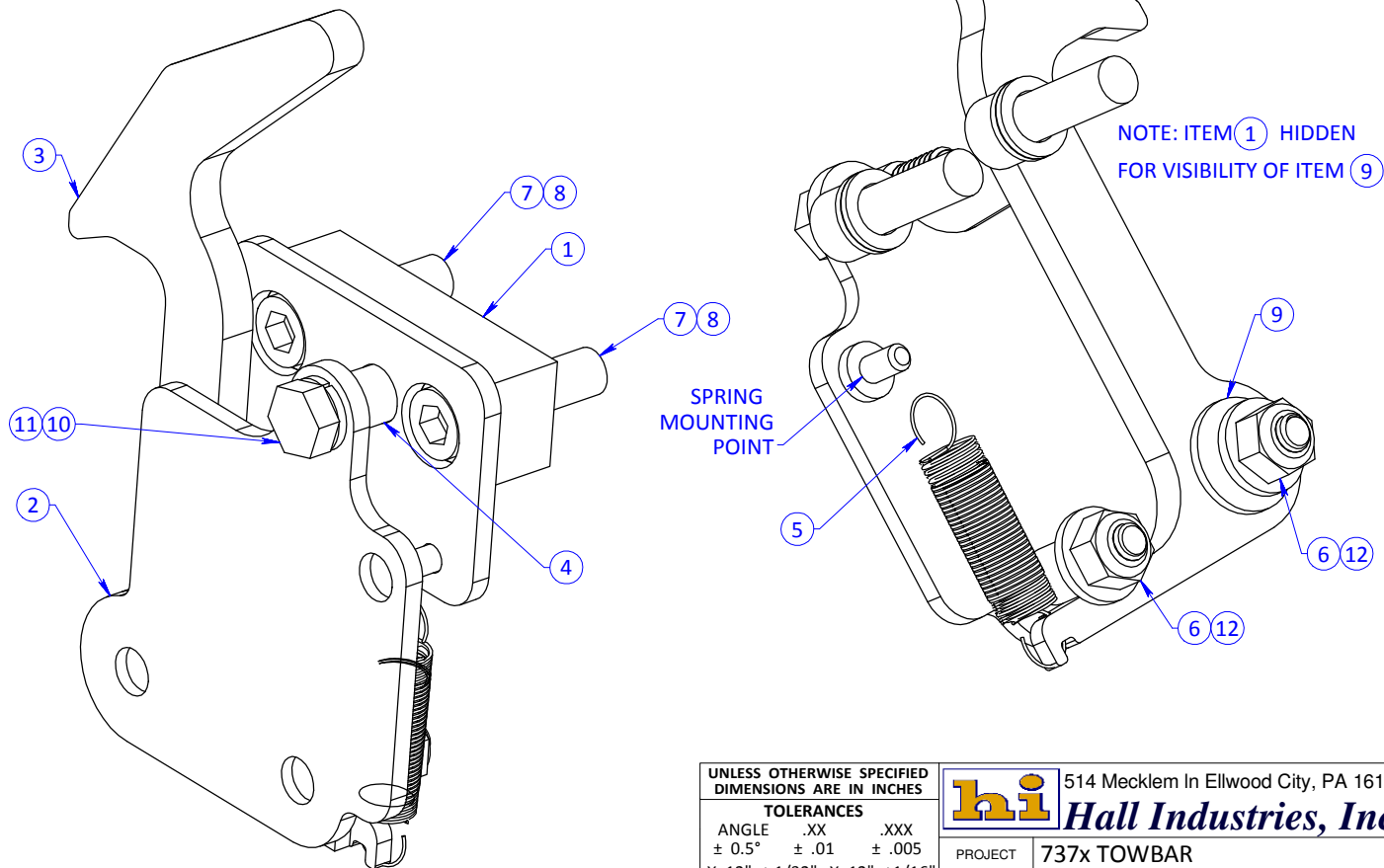
PROJECT	737 MAX9/10 TOWBAR		
FILE NAME	UA-MAX9-HAC HEAD+ADAPTER COMPLETE PARTS ONLY		
DESCRIPTION	HEAD AND ADAPTER COMPLETE		
SIZE	DWG/PART NO.	REV	
A	TB-MAX9-HAC-ASL	M2	
SCALE 1:5	WEIGHT: 70 LBS	SHEET 1 OF 1	

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TB-7378-L2	AUTO LATCH BASE
2	1	TB-7378-LCW	LATCH COVER WELDMENT
3	1	TB-7378-L1	SAFETY LATCH HOOK
4	1	TB-7378-L6	LATCH STOP
5	1	TS-737-ASL-3	EXTENSION SPRING
6	2	TB-EMB170-153-C	1/4-20 NYLOCK NUT
7	2	90128A583	5/16-18 x 1, SHCS
8	2	TB-8714-2	5/16" WEDGE LOCK WASHER
9	1	TB-8312-B10	FLAT WASHER
10	1	92865A537	1/4-20 x 1/2 HEX CAP SCREW
11	1	AP1525-2014	1/4 HEAVY SPLIT LOCK WASHER
12	2	90126A029	1/4 WASHER, SAE TYPE A

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK

NOTES:

1. ASSEMBLE LATCH STOP INTO BASE, USING RED LOCTITE.
2. INSERT (7) & (8) INTO BASE.
3. ASSEMBLE SPRING ONTO LATCH HOOK.
4. ASSEMBLE LATCH HOOK AND WASHER TO COVER.
5. FIT COVER SUBASSEMBLY ONTO BASE, STRETCHING SPRING.
6. ASSEMBLE NYLOCK NUTS, USING NEVER-SEIZE.



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TOLERANCES		
ANGLE	.XX	.XXX
± 0.5°	± .01	± .005
X<12"=± 1/32"	X>12"=±1/16"	

THIRD ANGLE PROJECTION

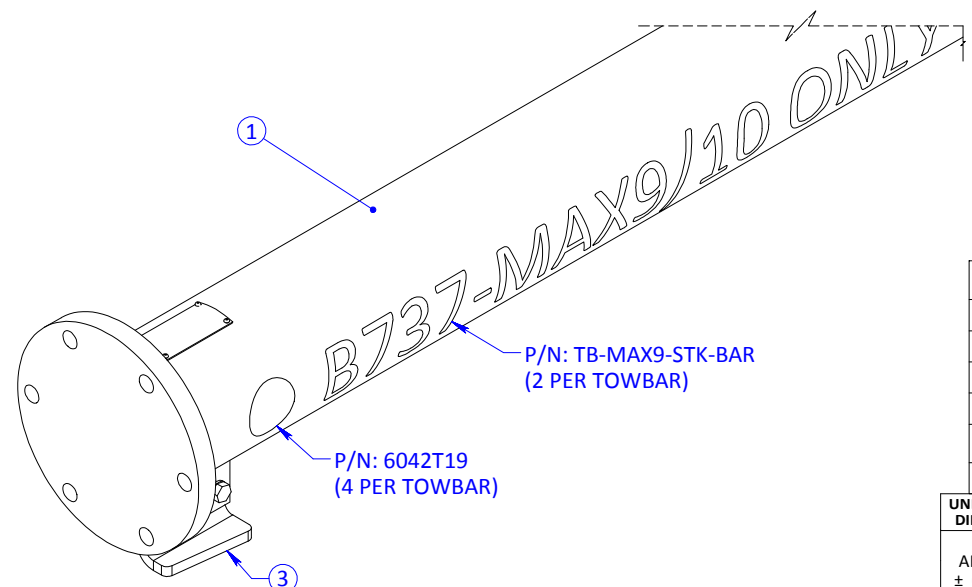
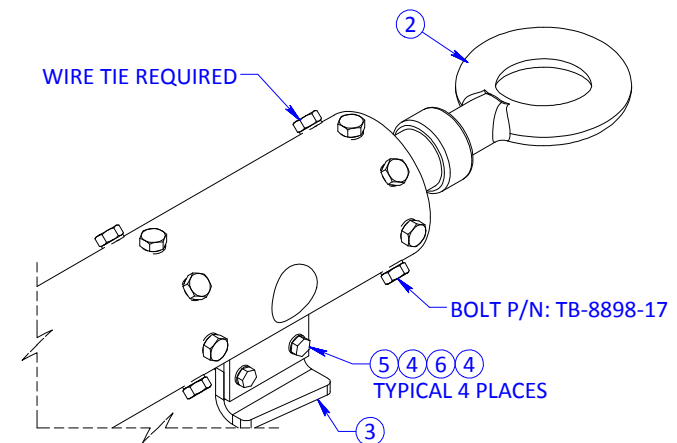
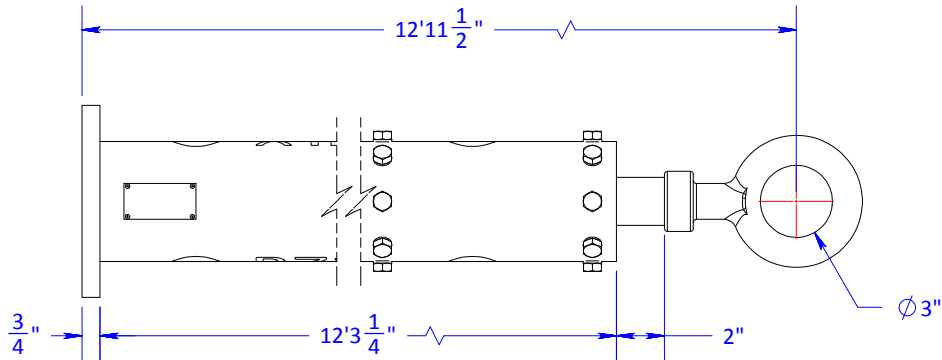
CHECK	DATE
BJE	3/1/2018
DRAWN	DATE
MCKENNA	3/1/2018

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Hall Industries, Inc.

PROJECT	737x TOWBAR		
FILE NAME	TB-7378-ASL SAFETY LATCH		
DESCRIPTION	AUTOMATIC SAFETY LATCH		
SIZE	DWG/PART NO.	REV	
A	TB-7378-ASL	0	
SCALE 1:1.2	WEIGHT: 1.28 LBS	SHEET 1 OF 1	

NOTES:

1. ANTI-SEIZE ALL THREADS & WIRE TIE BOLTS.



ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TB-T5-T-SS	5" TUBE W/TAG&DECAL
2	1	TB-SS5	SOFT START 5 INCH
3	2	TB-7378-DP	DRAG PLATE
4	8	8980-2-2	WASHER NORDLOCK
5	4	TB-T5-H1	3/8-16 x 1 3/8 HEX CAP SCREW
6	4	TB-8898-6	LOCK NUT

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	
TOLERANCES	
ANGLE	.XX .XXX
± 0.5°	± .01 ± .005
X<12"=± 1/32"	X>12"=±1/16"
THIRD ANGLE PROJECTION	
CHECK VTM	DATE 10/17/2013
DRAWN BJE	DATE 12/12/2017

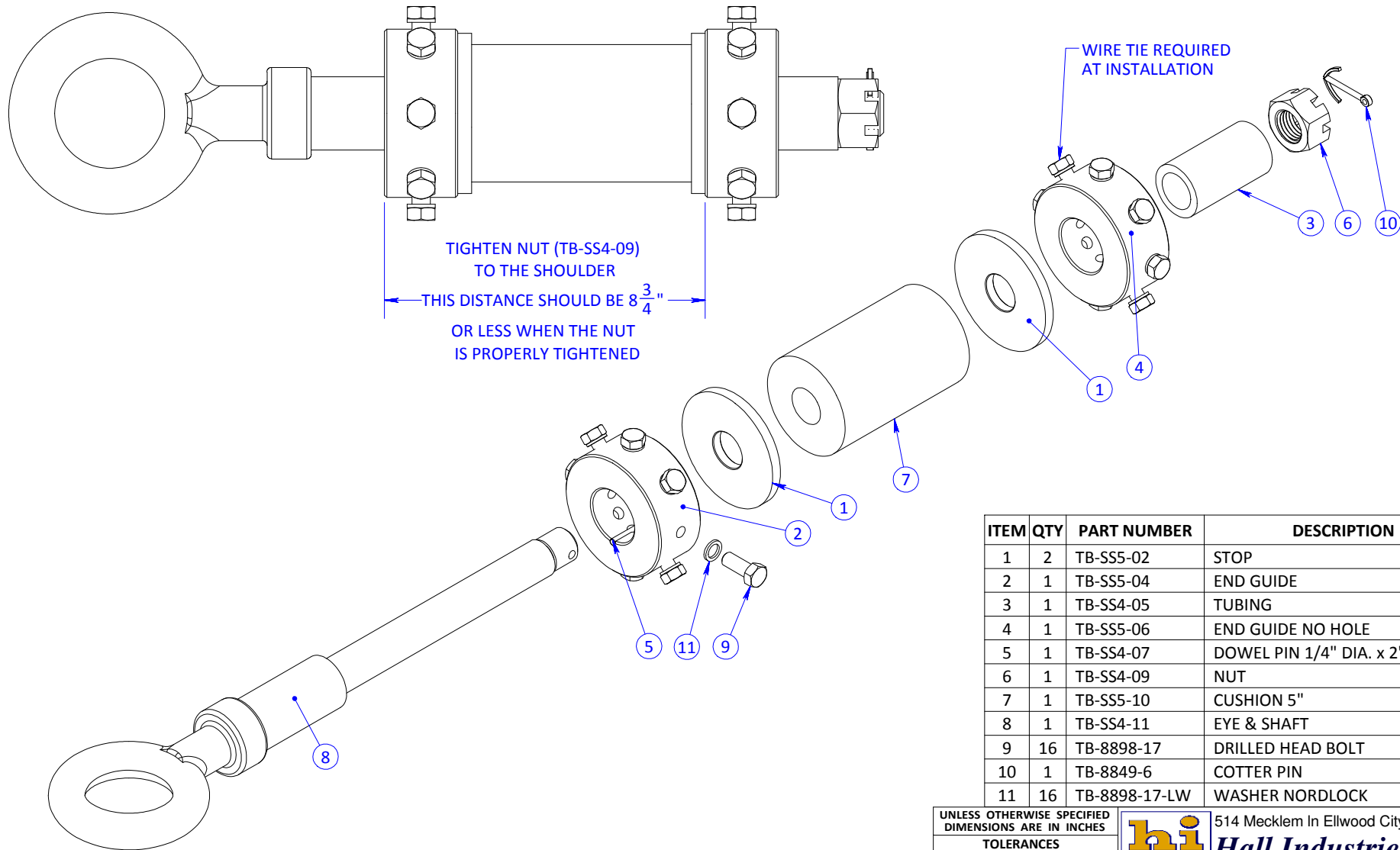
		514 Mecklem In Ellwood City, PA 16117	
PROJECT		5" SOFT START TOWBAR	
FILE NAME		TB-T5-TE-SS 5in TUBE & SS EYE W HD	
DESCRIPTION		TOWBAR TUBE W/ SOFT START EYE	
SIZE	DWG/PART NO.	REV	
A	TB-T5-TE-SS	0	
SCALE 1:6	WEIGHT: 176 LBS	SHEET 1 OF 1	

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NOTES:

1. USE ANTI-SEIZE ON ALL THREADED HARDWARE.



ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	TB-SS5-02	STOP
2	1	TB-SS5-04	END GUIDE
3	1	TB-SS4-05	TUBING
4	1	TB-SS5-06	END GUIDE NO HOLE
5	1	TB-SS4-07	DOWEL PIN 1/4" DIA. x 2" LONG SS
6	1	TB-SS4-09	NUT
7	1	TB-SS5-10	CUSHION 5"
8	1	TB-SS4-11	EYE & SHAFT
9	16	TB-8898-17	DRILLED HEAD BOLT
10	1	TB-8849-6	COTTER PIN
11	16	TB-8898-17-LW	WASHER NORDLOCK

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOLERANCES

ANGLE	.XX	.XXX
± 0.5°	± .01	± .005
X<12"=± 1/32"	X>12"=±1/16"	

THIRD ANGLE
PROJECTION

CHECK VTM	DATE 2/12/2018
DRAWN BJE	DATE 12/12/2017

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PROJECT 5" TOWBAR (7378)

FOLDER /
FILE NAME TB-SS5 SOFT START 5IN TUBE MANUAL

DESCRIPTION SOFT START 5 INCH

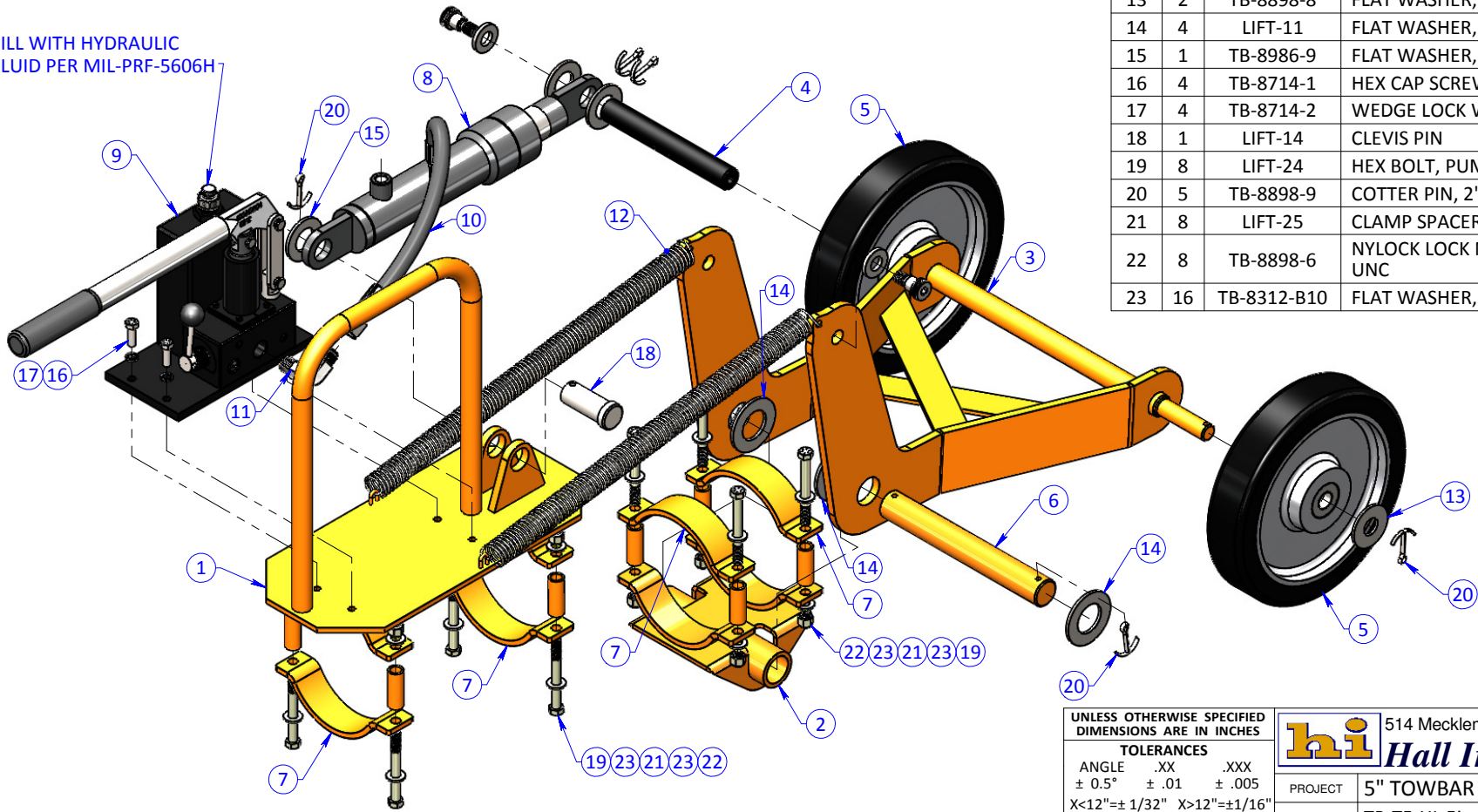
SIZE DWG/PART NO.
A TB-SS5

SCALE 1:5 WEIGHT: 38.32 LBS SHEET 1 OF 1

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FILL WITH HYDRAULIC FLUID PER MIL-PRF-5606H



ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	LIFT-16	5IN PUMP MOUNTING BRACKET; SO
2	1	LIFT-7	ARM PIVOT WELDMENT; SO
3	1	LIFT-3-SO	WHEEL ARM WELDMENT; SO
4	1	LIFT-2R	CYLINDER PIVOT PIN ASSY, LIFT KIT; SO
5	2	TB-8898-7	WHEEL
6	1	LIFT-4	LIFT KIT LOWER PIVOT SHAFT
7	4	TB-T5-C	CLAMP, 5" TB LIFT-KIT; SO
8	1	TB-8714-20	LIFT CYLINDER
9	1	TB-8714-24	HYDRAULIC PUMP ASSEMBLY
10	1	TB-8714-23	HYDRAULIC HOSE, LIFT KIT
11	1	TB-8714-43	90 DEG. ELBOW
12	1	TB-8714-10	SPRING, EXTENSION
13	2	TB-8898-8	FLAT WASHER, 7/8 USS
14	4	LIFT-11	FLAT WASHER, 1 3/8"
15	1	TB-8986-9	FLAT WASHER, 1 1/16"
16	4	TB-8714-1	HEX CAP SCREW 5/16-18 X 1
17	4	TB-8714-2	WEDGE LOCK WASHER, 5/16"
18	1	LIFT-14	CLEVIS PIN
19	8	LIFT-24	HEX BOLT, PUMP MOUNTING
20	5	TB-8898-9	COTTER PIN, 2" LENGTH
21	8	LIFT-25	CLAMP SPACER
22	8	TB-8898-6	NYLOCK LOCK NUT, Zn-PLTD, 3/8"-16 UNC
23	16	TB-8312-B10	FLAT WASHER, 3/8" SAE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES		
ANGLE	.XX	.XXX
± 0.5°	± .01	± .005
X<12"=± 1/32"	X>12"=± 1/16"	

THIRD ANGLE PROJECTION

CHECK	DATE
VTM	3/19/2018
DRAWN	DATE
BJL	2/21/2018

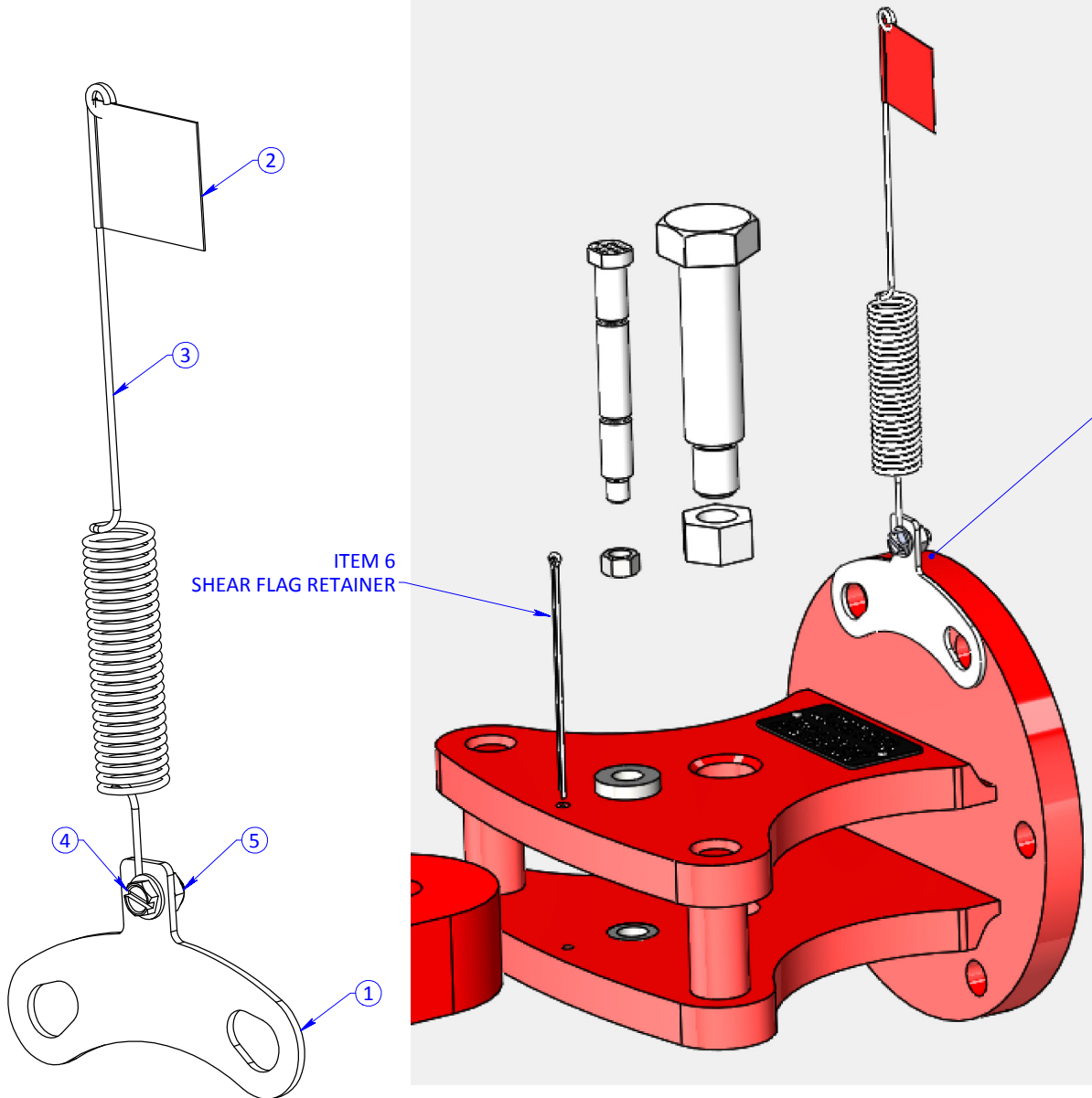
hi 514 Mecklem In Ellwood City, PA 16117
Hall Industries, Inc.

PROJECT	5" TOWBAR TUBE
FILE NAME	TB-T5-HL 5in LIFT KIT; MANUAL
DESCRIPTION	LIFT-KIT, TOW BAR, 5" OD
SIZE	DWG/PART NO.
A	TB-T5-HL
SCALE 1:7	WEIGHT: 96 LBS
	SHEET 1 OF 1

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REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK



INSTALLATION LOCATION

ITEM 6
SHEAR FLAG RETAINER

NOTES:

1. SHEAR FLAG IS OPTIONAL ITEM, AND IS ORDERED AS A STAND-ALONE ITEM.
2. BEND SPRING DOWN AND ATTACH TO TOP OF SHEAR PIN RETAINER.
3. INSERT RETAINER THROUGH ADAPTER AND HEAD AND BEND END TO KEEP RETAINER IN PLACE.
4. REPLACE AFTER EVERY SHEAR PIN OVERLOAD EVENT.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TB-7378-FG-1	FLAG MOUNTING PLATE
2	1	TB-7378-FG-2	FLAG
3	1	TB-7378-FS	FLAG SPRING
4	1	90316A537	SHEAR FLAG SCREW
5	1	90101A230	SHEAR FLAG LOCKNUT
6	1	TB-7378-SFR	SHEAR FLAG RETAINER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOLERANCES		
ANGLE	.XX	.XXX
± 0.5°	± .01	± .005
X<12"=± 1/32"	X>12"=±1/16"	

hi 514 Mecklem In Ellwood City, PA 16117
Hall Industries, Inc.

THIRD ANGLE
PROJECTION

PROJECT	TOWBARS
FILE NAME	TB-T5-SF SHEAR PIN FLAG ASSY
DESCRIPTION	SHEAR FLAG ASSEMBLY

CHECK	DATE
VTM	5/9/2018
DRAWN	DATE
BJE	5/9/2018

SIZE	DWG/PART NO.	REV
A	TB-T5-SF	0
SCALE 1:2	WEIGHT: 0.28 LBS	SHEET 1 OF 1

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