



HALL Technical Services, LLC

B737-MAX8 TOWBAR MANUAL

FOR USE WITH -900ER, -MAX8, - MAX9



HALL Technical Services, LLC

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2021-12-21 INITIAL RELEASE

2022-1-14 ADD HANDLE TIMING

revision 1



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-MAX8 (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-MAX8 Maximum Takeoff Weight = 181,200 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 dry lubricant (WD-40 Dry Lubricant or Similar). 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. Handle Timing and Adjustment

When replacing the handle weldment (TB-7378-HDL) the handle must be properly aligned on the actuating screw (TB-7378-TL). The handle should go from slightly past parallel with the top of the head at both the open and closed position.

To properly rack the hand on the screw, place the slide lock into vice with the wide side parallel to the ground. Place the handle barrel on the thread so that the first thread catches near the 1" o'clock position, when facing the nut on the handle. Rotate the handle until the barrel of the handle contact the block. The handle should be near parallel and ideally slight below.

Starting Position



Proper Finishing Position



The latch must easily close over the handle when operating.

When replacing the handle or thread check that the motion of the handle is easy throughout the entire range of motion. The rear bearing block alignment is critical to the proper function of the towbar. While tightening the screws holding the rear bearing block, continuously move the handle throughout its entire range of motion to verify alignment. If the handle catches or becomes difficult at any point, loosen the rear block and start over.



6. Replacement Parts

Part Number	Description
TB-MAX8-HL-SS	Towbar complete with Lift Kit & Soft Start & ASL
TB-MAX8-HAC-ASL	Head & Adapter Assembly
TB-7378-HA-ASL	Head Assembly
TB-MAX8-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.*

7. 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.

8. Warranty

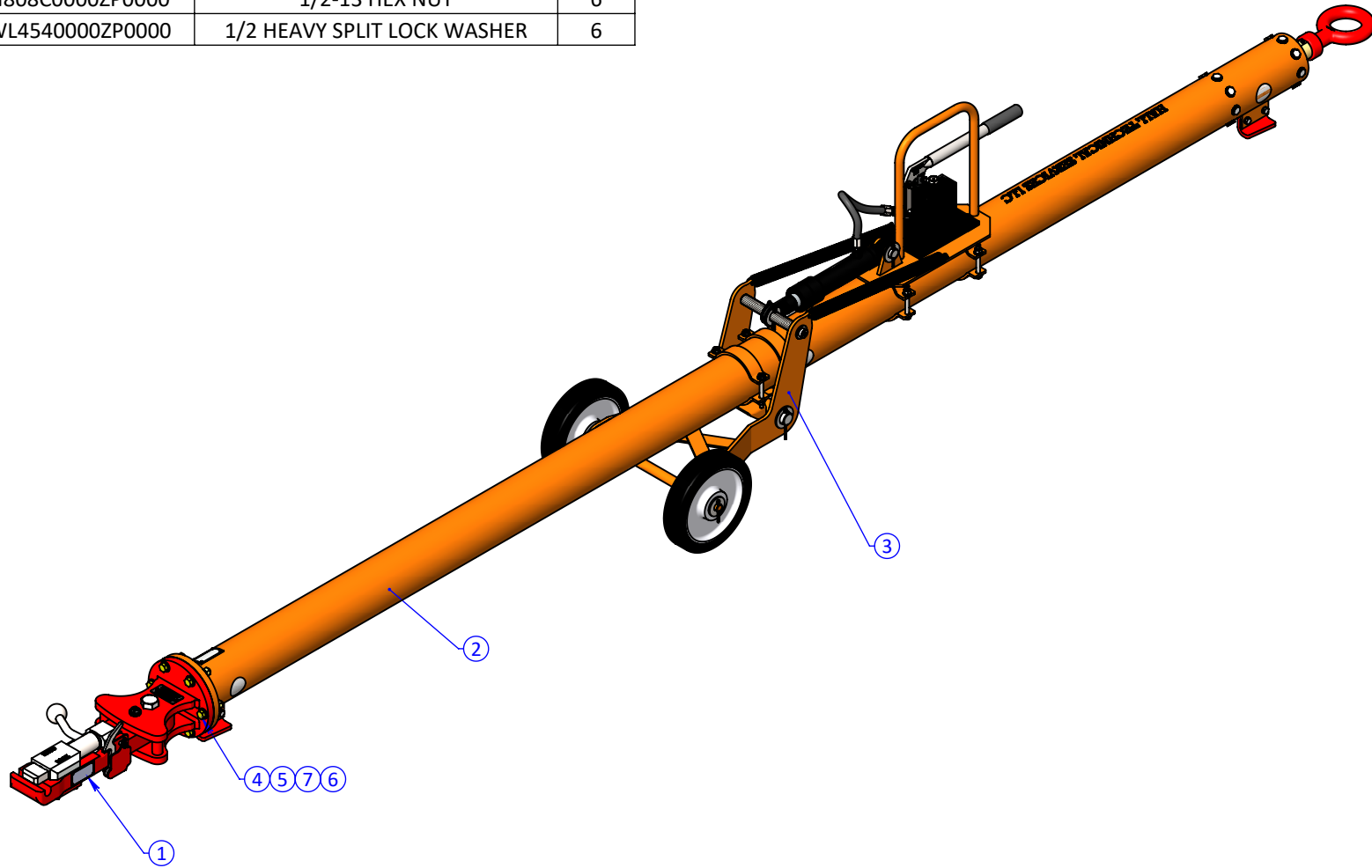
Warranty: All parts are guaranteed against defects for one year. If at any time this manual is not followed it will void the warranty (preventive maintenance logs are required for all warranty replacement parts). All replacement parts must be genuine Hall Industries parts.

9. Drawings List

TB-MAX8-HL-SS	Towbar Complete, Soft Start
TB-MAX8-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

ITEM NO.	PART NUMBER	DESCRIPTION	
1	TB-MAX8-HAC-ASL	HEAD AND ADAPTER COMPLETE	1
2	TB-T5-TE-SS	5" SOFT START TUBE & EYE W/HD	1
3	TB-T5-HL	LIFT KIT, TOWBAR, 5"	1
4	H508C0080ZP0000	1/2-13 x 2 1/2 HEX CAP SCREW	6
5	WH4520000ZP0000	1/2 WASHER, SAE TYPE A	12
6	N808C0000ZP0000	1/2-13 HEX NUT	6
7	WL4540000ZP0000	1/2 HEAVY SPLIT LOCK WASHER	6

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK



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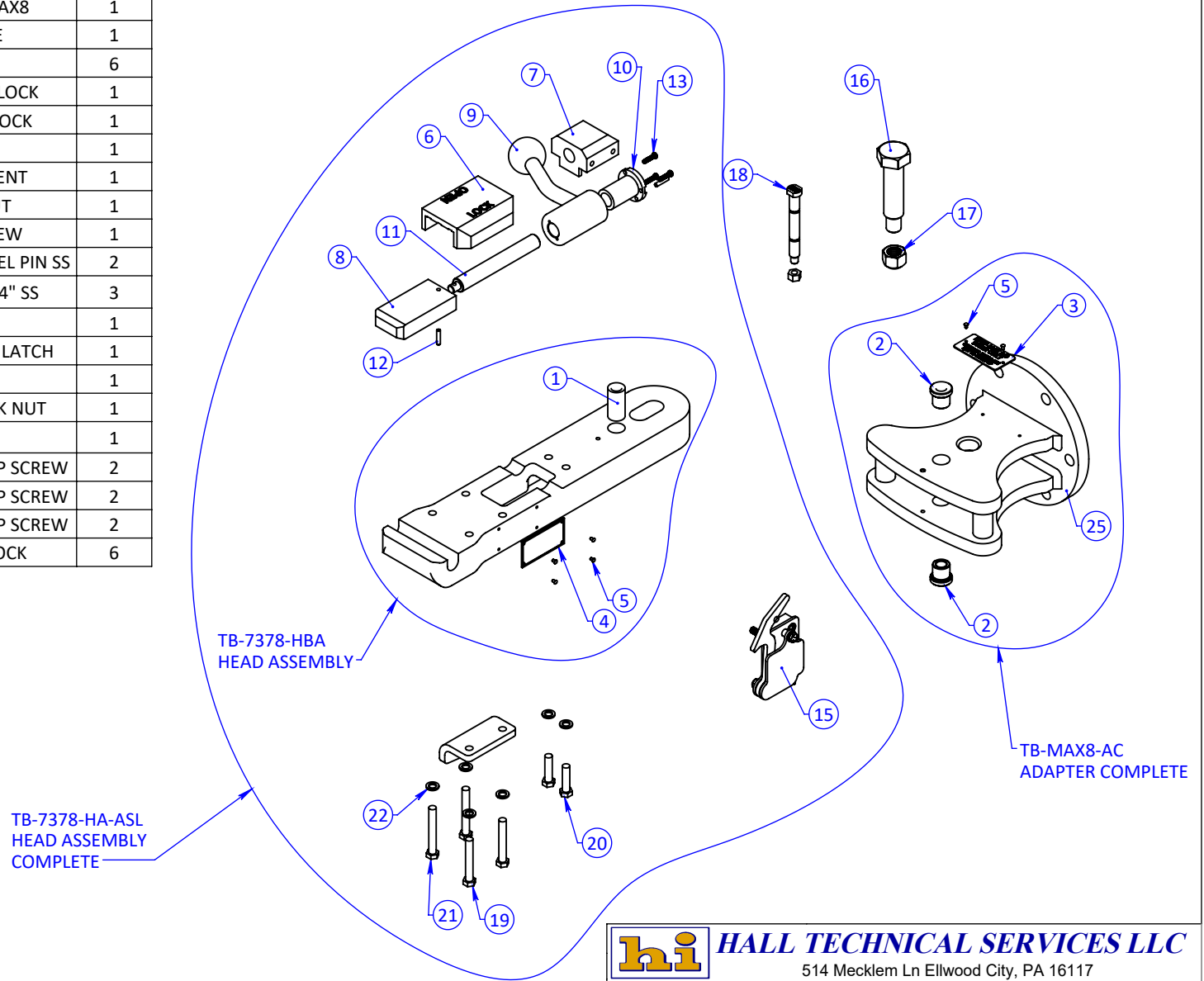
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	MAX8 TOWBAR	
TOLERANCES		FILE NAME	TB-MAX8-HL-SS TOWBAR COMPLETE	
ANGLE	.XX .XXX	DESCRIPTION	MAX8 COMPLETE	
± 0.5°	± .01 ± .005	CHECK	DATE	DATE
X<12"=± 1/32" X>12"=± 1/16"		MRE	12/21/2021	DATE
		DHW	12/20/2021	DATE
SIZE	DWG/PART NO.	SCALE	WEIGHT	SHEET
A	TB-MAX8-HL-SS	1:48	345 LBS	1 OF 1
REV				
0				

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-7378-HB	HEAD BUSHING	1
2	TB-7378-AB	ADAPTER BUSHING	2
3	TB-MAX8-TAG-A	ADAPTER TAG, MAX8	1
4	TB-TAG-METAL-CE	TAG METAL CE	1
5	TB-8849-14	DRIVE RIVET	6
6	TB-7378-FBB	FRONT BEARING BLOCK	1
7	TB-7378-RBB	REAR BEARING BLOCK	1
8	TB-7378-SL	SLIDE LOCK	1
9	TB-7378-HDL	HANDLE WELDMENT	1
10	TB-7378-TLN	ACTUATING NUT	1
11	TB-7378-TL	ACTUATING SCREW	1
12	TB-7378-DP1	3/16"OD x 7/8"L DOWEL PIN SS	2
13	90666A014	LP SHCS 10-32 x 3/4" SS	3
14	TB-7378-DP	DRAG PLATE	1
15	TB-7378-ASL	AUTOMATIC SAFETY LATCH	1
16	TB-7378-PB	PIVOT BOLT	1
17	TB-8312-B5	.75-10 STOVER LOCK NUT	1
18	TB-MAX8-SP	SHEAR BOLT	1
19	H506C0080ZP0000	3/8-16 x 2 1/2 HEX CAP SCREW	2
20	H506C0048ZP0000	3/8-16 x 1 1/2 HEX CAP SCREW	2
21	H506C0088ZP0000	3/8-16 x 2 3/4 HEX CAP SCREW	2
22	8980-2-2	WASHER NORDLOCK	6

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REV	DESCRIPTION	DATE	BY	CHK



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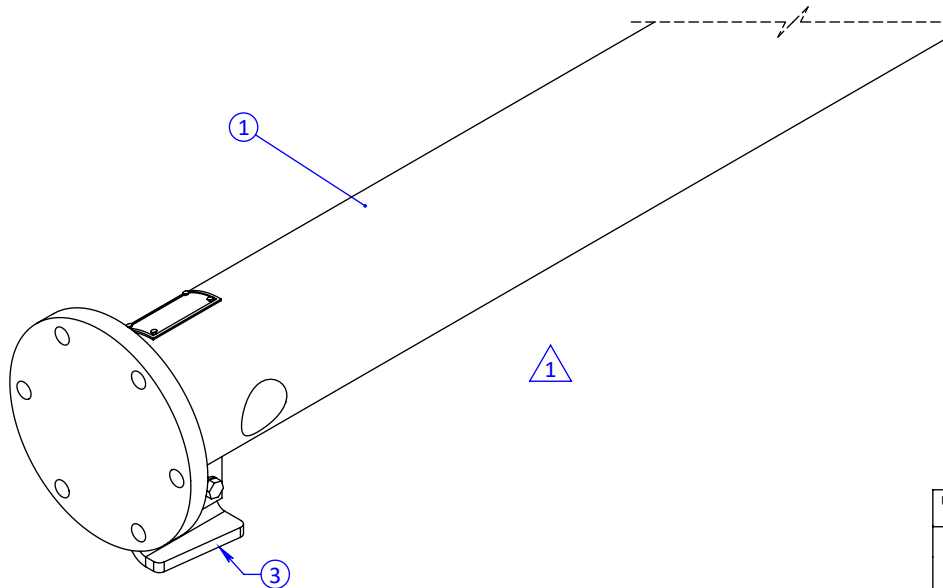
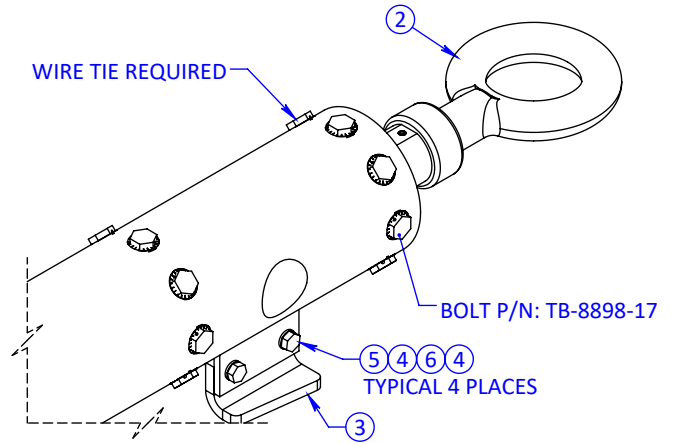
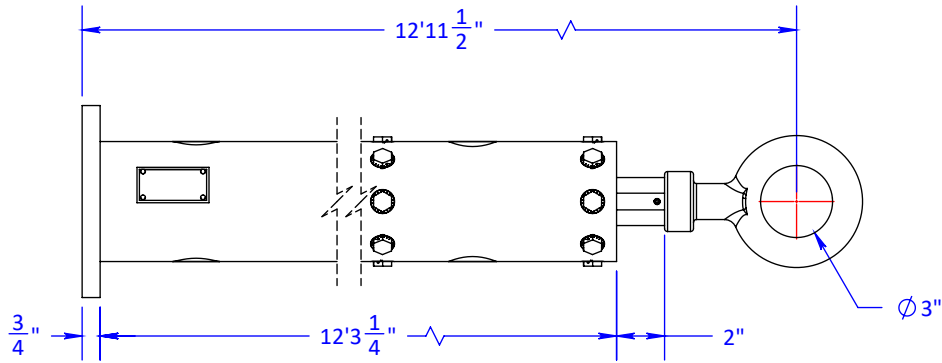
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	MAX TOWBAR	
TOLERANCES		FILE NAME	MAX HEAD ASSEMBLY	
ANGLE	.XX .XXX	DESCRIPTION	HEAD AND ADAPTER COMPLETE	
± 0.5°	± .01 ± .005	CHECK	DATE	DATE
X<12"=±1/32" X>12"=±1/16"		MRE	12/20/2021	
		DRAWN	DATE	DATE
		DHW	12/17/2021	
SIZE	DWG/PART NO.	SCALE	WEIGHT	SHEET
A	TB-MAX8-HAC-ASL	1:8	68.97 LBS	1 OF 1
REV				
0				

NOTES:

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

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	REMOVE BAR STICKER	12/20/2021	DHW	MRE



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	NYLOCK NUT, 3/8"-16 GR.8

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		hi 514 Mecklem In Ellwood City, PA 16117 Hall Industries, Inc.	
TOLERANCES		PROJECT	5" SOFT START TOWBAR
ANGLE	.XX .XXX	FILE NAME	TB-T5-TE-SS 5in TUBE & SS EYE W HD
± 0.5°	± .01 ± .005	DESCRIPTION	TOWBAR TUBE W/ SOFT START EYE
X<12"=± 1/32" X>12"=±1/16"		CHECK	DATE
THIRD ANGLE PROJECTION		VTM	10/17/2013
		DRAWN	DATE
		BJE	12/12/2017
SIZE	DWG/PART NO.	SCALE	WEIGHT
A	TB-T5-TE-SS	1:6	175 LBS
REV		SHEET 1 OF 1	
1			

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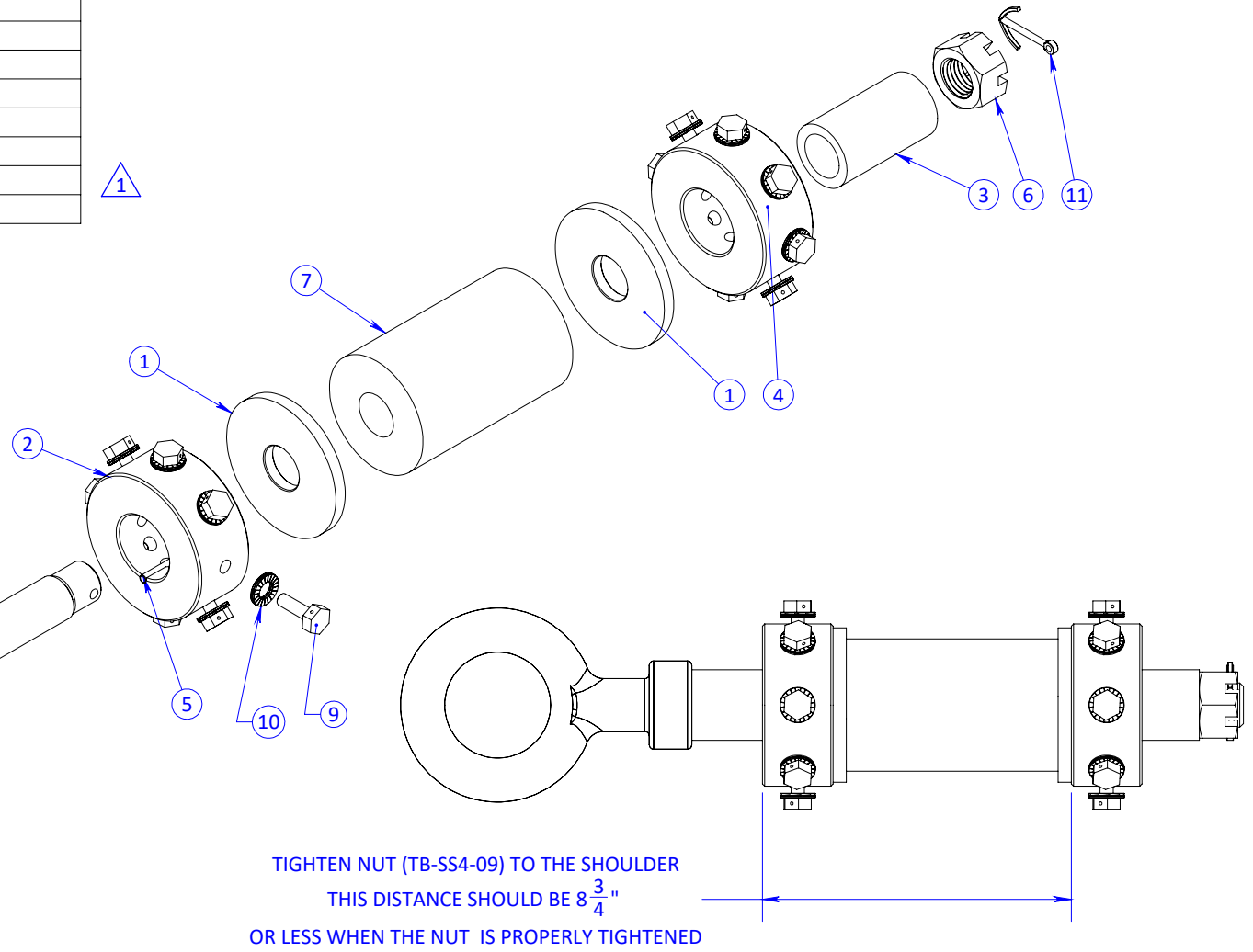
ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	TB-SS5-02	STOP
2	1	TB-SS5-04	END GUIDE
3	1	TB-SS4-05	TUBING
4	1	TB-SS5-06	END GUIDE NO HOLE
5	1	TB-SS4-07	DOWEL PIN 1/4" DIA. x 2" LONG SS
6	1	TB-SS4-09	NUT
7	1	TB-SS5-10	CUSHION 5"
8	1	TB-SS4-11	EYE & SHAFT
9	16	TB-8898-17	DRILLED HEAD BOLT
10	16	TB-8898-17-LW	LOCK WASHER
11	1	TB-8849-6	COTTER PIN
12	4	TB-8898-18-A	SAFE-T WIRE
13	4	TB-8898-18-W	SAFE-T WIRE WASHER

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	ADDITION OF SAFE-T WIRE TO BOM	11/15/2019	DHW	MRE

NOTES:

1. USE ANTI-SEIZE ON ALL THREADED HARDWARE.
2. SAFE-T WIRE AND WASHER NOT SHOWN

1



TIGHTEN NUT (TB-SS4-09) TO THE SHOULDER
THIS DISTANCE SHOULD BE $8\frac{3}{4}$ "
OR LESS WHEN THE NUT IS PROPERLY TIGHTENED

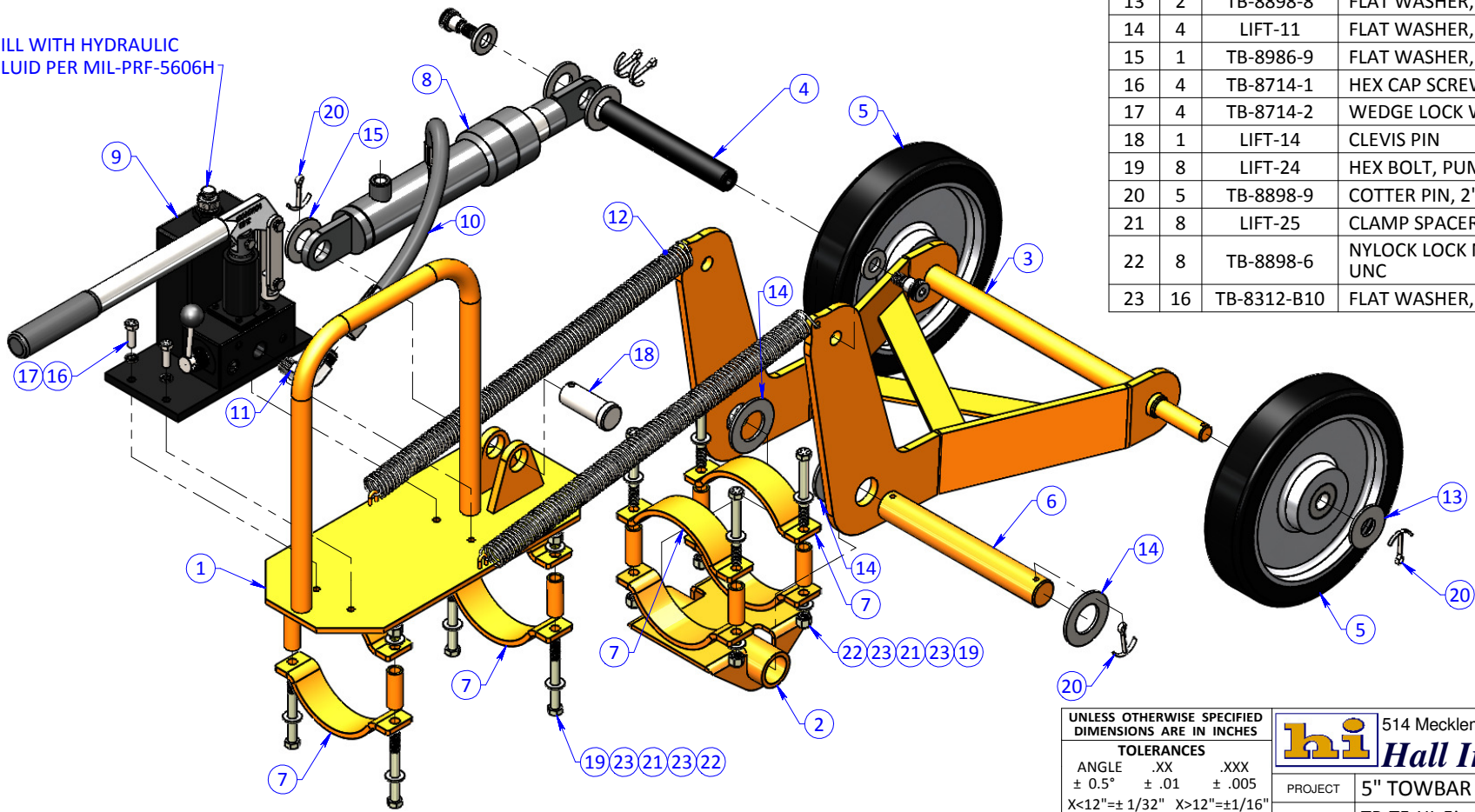
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	5" TOWBAR (7378)	
TOLERANCES		FILE NAME	TB-SS5 SOFT START 5IN TUBE	
ANGLE	.XX .XXX	DESCRIPTION	SOFT START 5 INCH	
± 0.5"	± .01 ± .005	CHECK	DATE	DATE
X<12"=± 1/32" X>12"=± 1/16"		VTM	2/12/2018	DATE
		DRAWN	DATE	DATE
		BJE	4/25/2013	DATE
SIZE	DWG/PART NO.	SCALE	WEIGHT	SHEET
A	TB-SS5	1:5	46.16 LBS	1 OF 1
REV				
1				

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

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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

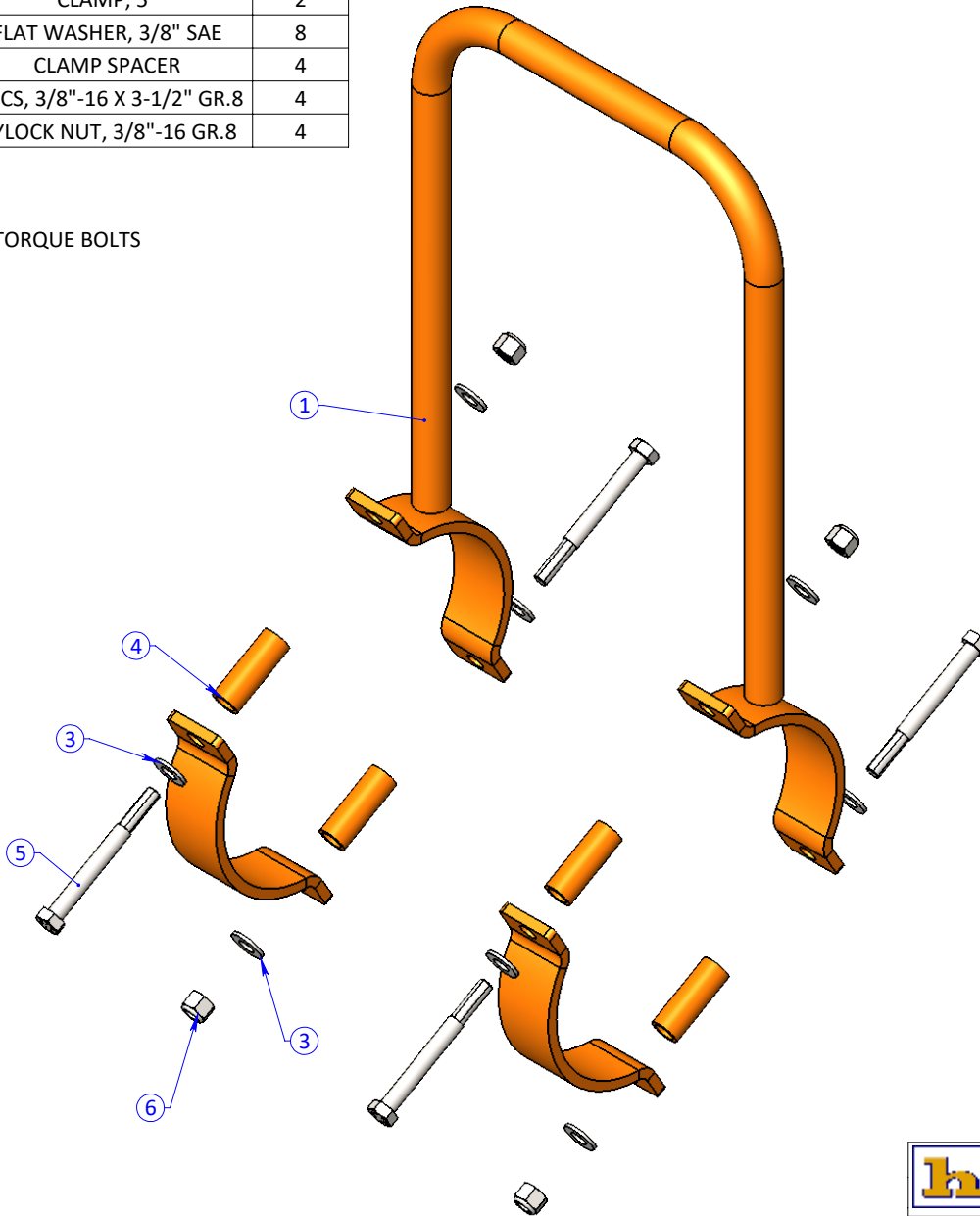
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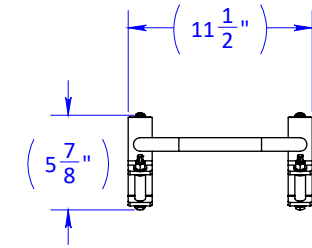
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-7378-CH	5IN CLAMP HANDLE	1
2	TB-T5-C	CLAMP, 5"	2
3	TB-8312-B10	FLAT WASHER, 3/8" SAE	8
4	LIFT-25	CLAMP SPACER	4
5	LIFT-24	HHCS, 3/8"-16 X 3-1/2" GR.8	4
6	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8	4

NOTES:

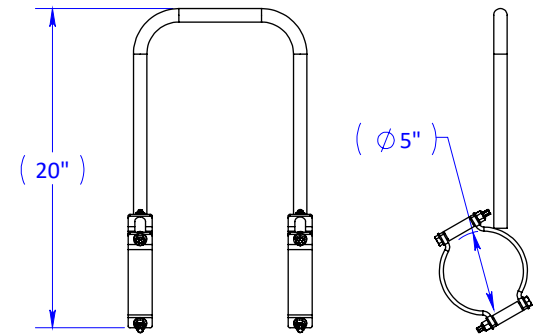
1. SHIP ASSEMBLED, DO NOT TORQUE BOLTS



REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK



COLLAPSED VIEW
SCALE 1:12



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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	7378 TOWBAR	
TOLERANCES		FILE NAME	TB-7378-BOH 5IN BOLT ON HANDLE	
ANGLE .XX .XXX		DESCRIPTION	5IN BOLT ON HANDLE	
± 0.5° ± .01 ± .005		CHECK	DATE	DATE
X<12"=± 1/32" X>12"=± 1/16"		JDB	2/20/2020	2/20/2020
SIZE	DWG/PART NO.	SCALE	WEIGHT	SHEET
A	TB-7378-BOH	1:4	3.98 LBS	1 OF 1
REV	0			

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