

# TUBE•LINE™

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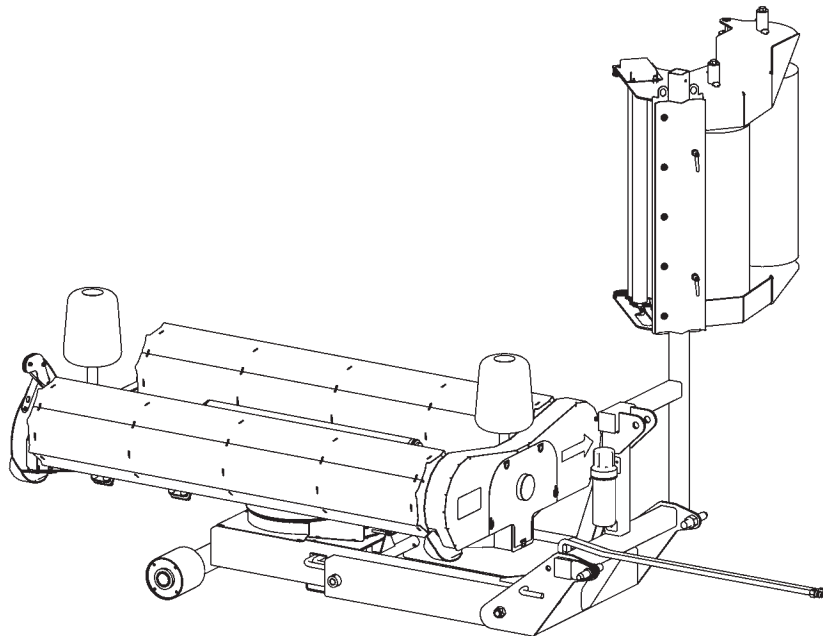
# Parts Manual

Keep this manual with the machine at all times.

# TL1000R

Balewrapper

# TL1000R



# Parts Manual

Thank you for choosing the Tubeline TL1000R Individual Bale Wrapper. Our hope is that it will give you many years of productive service. This machine is designed to wrap single round bales in a film of plastic to protect the material and preserve the moisture content.

## Parts Manual Usage

This parts manual is used to order replacement parts by means of part breakdowns and their corresponding part lists. Each page contains a different range of integrated parts. Each illustration visually represents machine components. The part lists contain information needed to order replacement parts. Part lists include the following columns:

**ITEM** - Number matching parts breakdown balloons.

**QTY** - Quantity of components included in this breakdown, not entire machine.

**PART NUMBER** - The number to be used when placing an order.

**DESCRIPTION** - Term used to confirm its matching part number.

**NOTE** - Column may be added to part lists when a serial break or additional information is required.

Remember to always have your machine model and serial number on hand when ordering parts.

## Part Orders

Part orders are taken by your local Tubeline dealer and fulfilled through a regional distributor. For quick service please record your dealer name and contact information in the [Serial Number](#) section.

## Manuals

Parts manuals are printed and shipped with machines as they leave the manufacturer. Your machine may include parts or features not yet included in the initially shipped manual. The latest manual version can be found at [www.tubeline.ca/support](http://www.tubeline.ca/support). Tubeline reserves the right to update and change manuals as seen fit. Dealers are informed of any pressing changes/ modifications. They can help you with any questions regarding replacement parts.

## Serial Number

The implement serial number is located on the front right corner of the frame. (See below) This number helps us to track changes and improvements and must be mentioned when ordering parts or requesting service. For your convenience, a space has been provided inside the front cover of this manual to record the serial number, model number, purchase date, and dealer name.

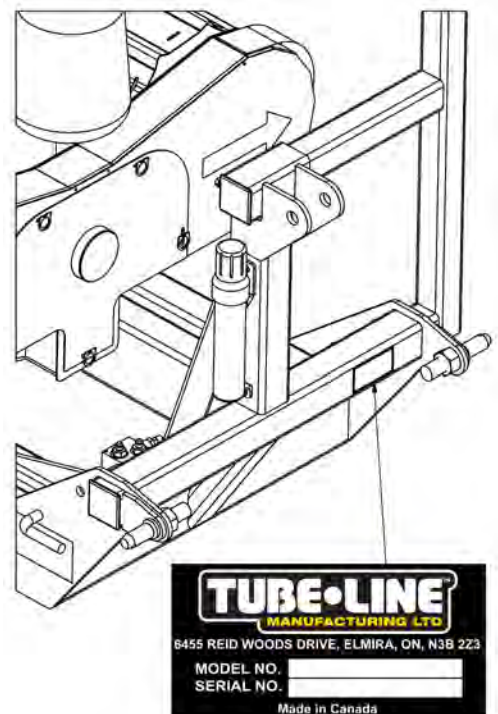
Model No: \_\_\_\_\_ TL1000R

Serial No: \_\_\_\_\_

Date Purchased: \_\_\_\_\_

Dealer Name: \_\_\_\_\_

Dealer Contact: \_\_\_\_\_

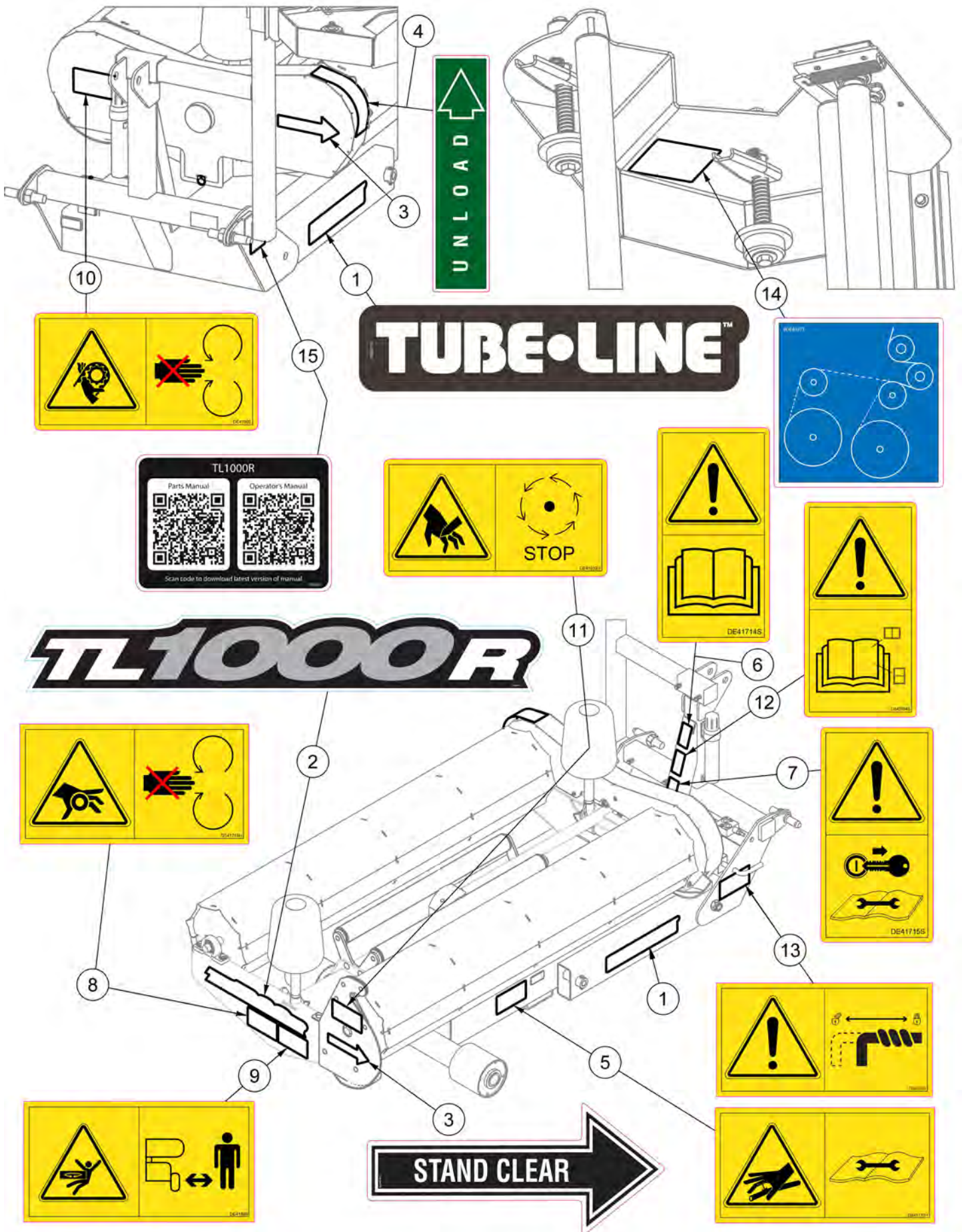


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# Section 1: Parts Lists & Breakdowns

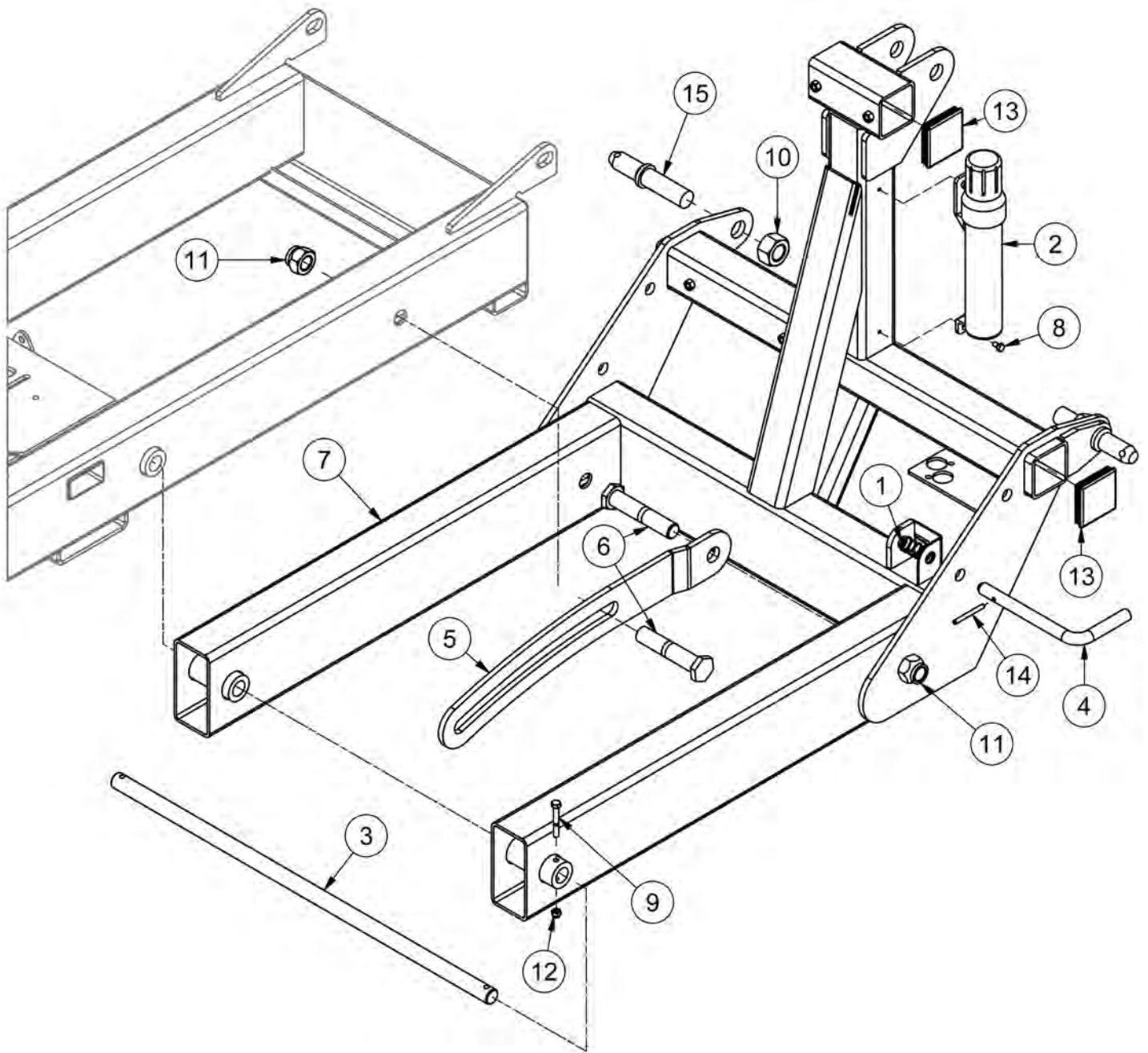
# Safety Decal Location



## Safety Decal Location

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	DE28146	Tubeline Decal 4" x 16"
2	1	DE36073	Decal Model Number for TL1000R
3	2	DE36075	Decal for TL1000R - Stand Clear RH
4	1	DE36080	Decal for TL1000R - Unload
5	1	DE41713H	ISO Decal - High Pressure Fluid Horizontal
6	1	DE41714S	ISO Decal - Read Operator's Manual (50mm X 96mm)
7	1	DE41715S	ISO Decal - Remove Key Before Repair (50mm X 96mm)
8	1	DE41716H	ISO Decal - Shaft Entanglement Horizontal
9	1	DE41899	ISO Decal - Stand Clear of Indi Wrapper
10	1	DE41902	ISO Decal - Chain Entanglement
11	1	DE41913H	ISO Decal - Stop Moving Parts Before Handling
12	1	DE42784S	ISO Decal - Read OM Decal Section (50mm x 96mm)
13	1	DE42858	ISO Decal - TL1000R Transport Lock
14	1	DE43227	TL1000R Tensioner Wrap Decal
15	1	DE50025	TL1000R QR Code

# Main Frame

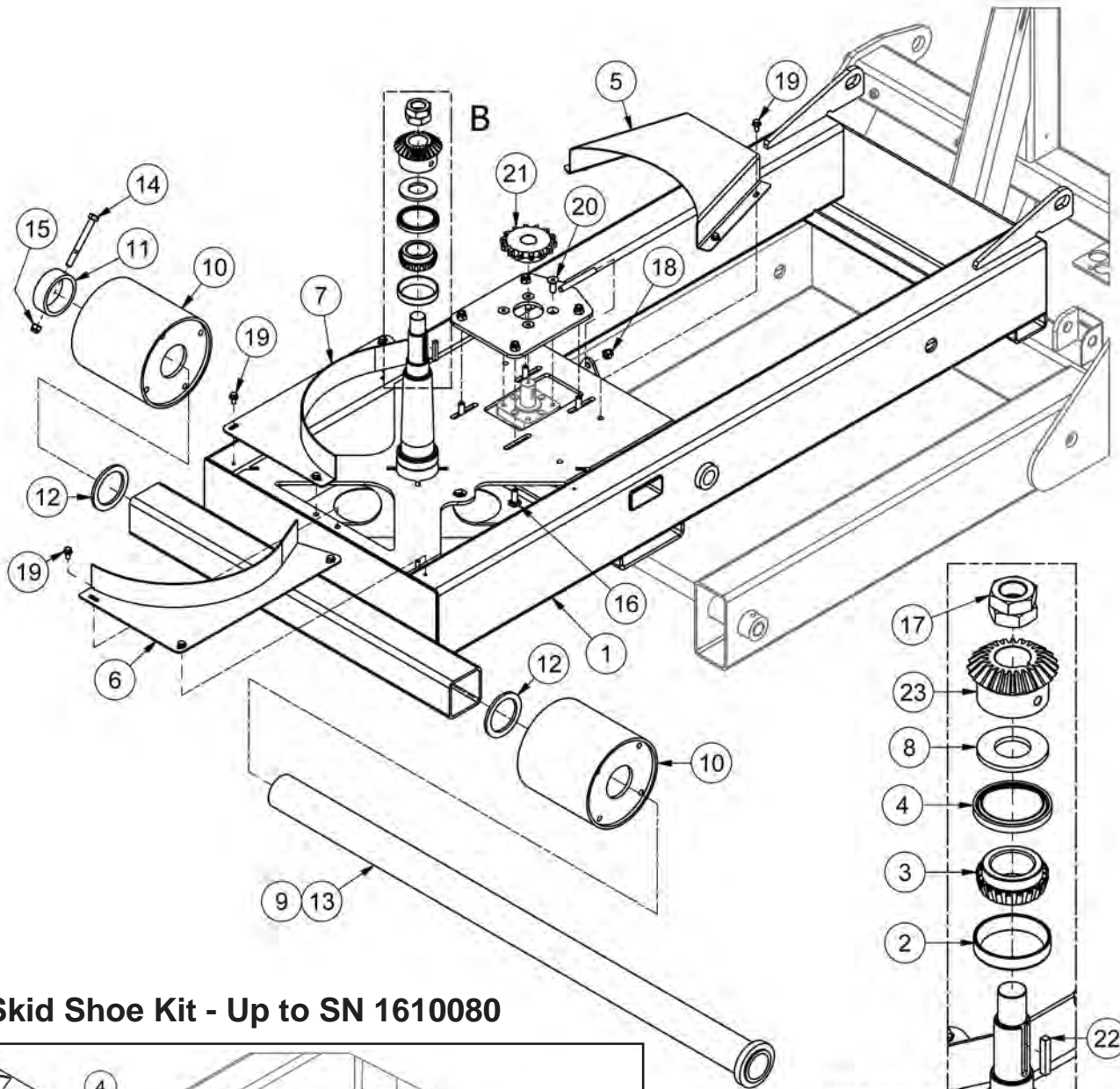


## Main Frame

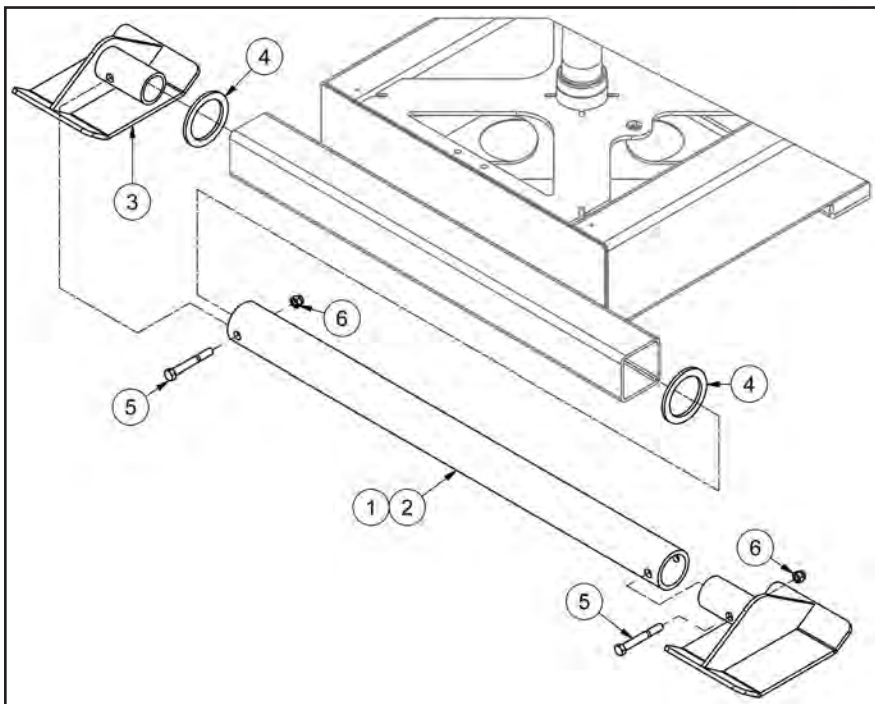
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	27566	Last Pushoff Spring Pin
2	1	32854	Small Operators Manual Holder
3	1	35035	Frame Pivot Shaft
4	1	35055	Transport Lock Pin
5	1	35066	Tip Stop Link
6	2	35067	Machined Head Bolt
7	1	35097	Main Frame
8	2	HB1/4-20X0.5Z5	Hex Bolt 1/4-20x1/2 Grade 5 Zinc Plated Hex Cap Screw
9	2	HB5/16-18X2.25Z5	Hex Bolt 5/16-18x2 1/4 Grade 5 Zinc Plated Hex Cap Screw
10	2	HN1 1/8-7CZ5	Hex Nut 1 1/8"-7 Grade 5 Zinc Plated Finished
11	2	LN1-8NCZ5	LN 1-8 Zinc Plated Nylon Insert Lock Nut
12	2	LN5/16-18NCZ5	LN 5/16-18 Zinc Plated Nylon Insert Lock Nut
13	2	PEC3018S	3' Plastic End Cap
14	1	RP 1/4 x 2 1/2	Pin - Roll Pin 1/4 x 2 1/2
15	2	TL386012	Lift Arm Pins Cat. 1.12 X 6.25



# Folding Frame



## Skid Shoe Kit - Up to SN 1610080



DETAIL B

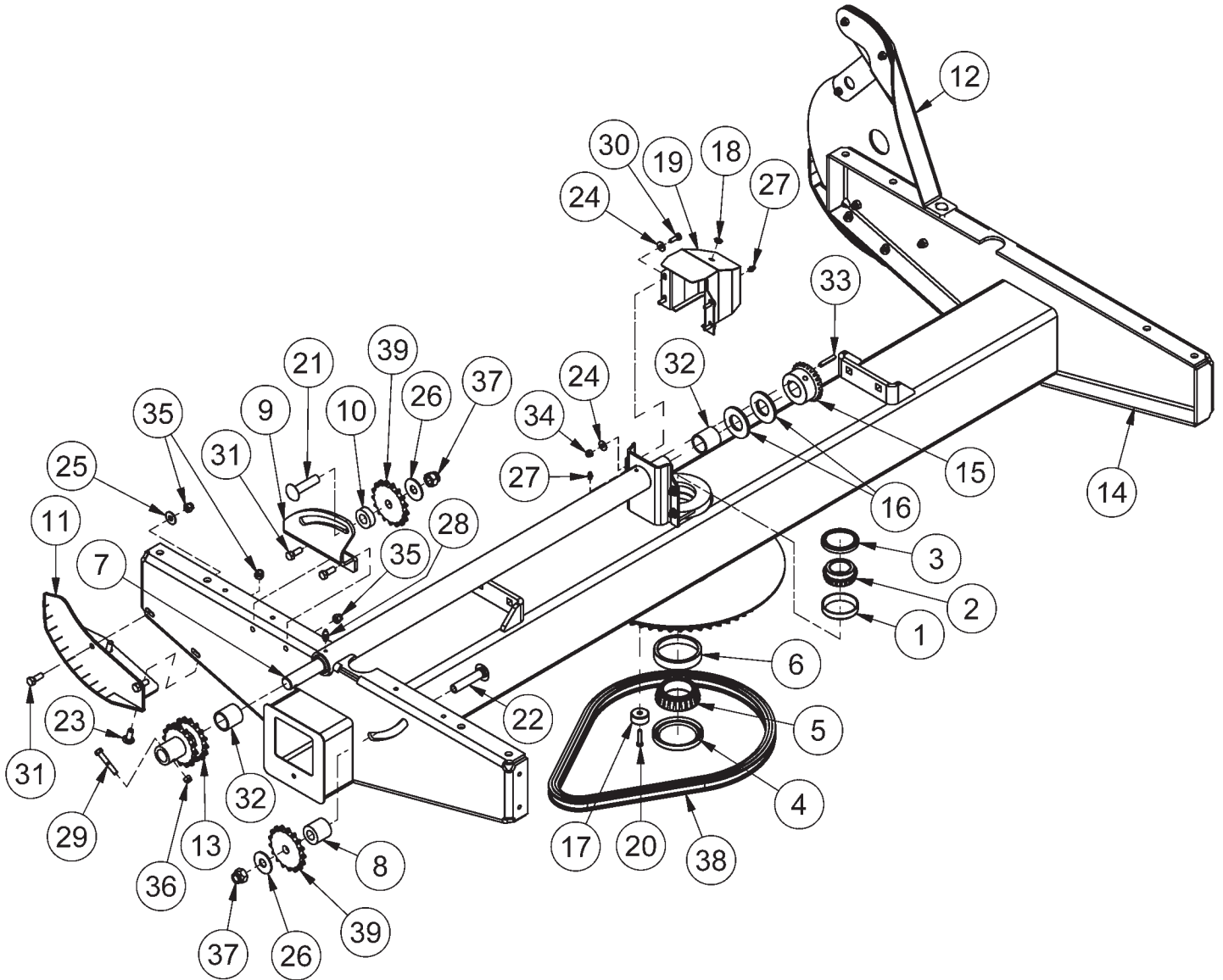
## Folding Frame

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
1	1	35096	Folding Frame	
2	1	LA-11-1009	Cup (13620)	
3	1	LA-11-1010	Cone (13686)	
4	1	LA-11-1011	Seal (CR20952)	
5	1	35046	Turntable Drive Chain Cover	
6	1	35084	Sprocket Shield	
7	1	35084M	Sprocket Shield	
8	1	35785	Miter Gear Spacer	
9	1	39824	Complete Roller Kit	Incl. Items 10-15 SN 1610081 - Current
10	2	39822	Roller	
11	1	39823	Roller Collar	
12	2	36614	Washer	
13	1	39839	Welded Collar Axle	
14	1	HB3/8-16X3.5Z5	Hex Bolt 3/8-16x3 1/2 Grade 5 Zinc Plated Hex Cap Screw	
15	1	LN3/8-16NCZ5	LN 3/8-16 Zinc Plated Nylon Insert Lock Nut	
16	4	CB3/8-16X1CZ5	Carriage Bolt - 3/8-16 x 1" Grade 5 Zinc	
17	2	HNJ1-12	Hex Nut - 1-12 Zinc Plated Hex Jam Nut	
18	5	LN3/8-16NCZ5	LN 3/8-16 Zinc Plated Nylon Insert Lock Nut	
19	10	HBC1/4X0.5	Hex Bolt Cerrated 1/4-20 x 1/2 Zinc Flange Bolt	
20	4	FHSCS3/8-16X1	Hex Bolt - 3/8"-16 x 1" Flat Socket Cap Screw	
21	1	SPR60B14-1	60B14 Sprocket w/1 Bore 1/4 Kw. 2 1/4 SS	
22	1	KS41749	Keystock .250 X 1.500	
23	1	35714	Tapered Gear- 24 Tooth - 8 Pitch	

## Skid Shoe Kit - Up to SN 1610080

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
1	1	36971	Skid Shoes Kit	Incl. Items 2-6
2	1	36600	Pivot Tube	
3	2	36604	Skid Shoe	
4	2	36614	Washer	
5	2	HB3/8-16X3Z5	Hex Bolt 3/8-16x3 Grade 5 Zinc Plated Hex Cap Screw	
6	2	LN3/8-16NCZ5	LN 3/8-16 Zinc Plated Nylon Insert Lock Nut	

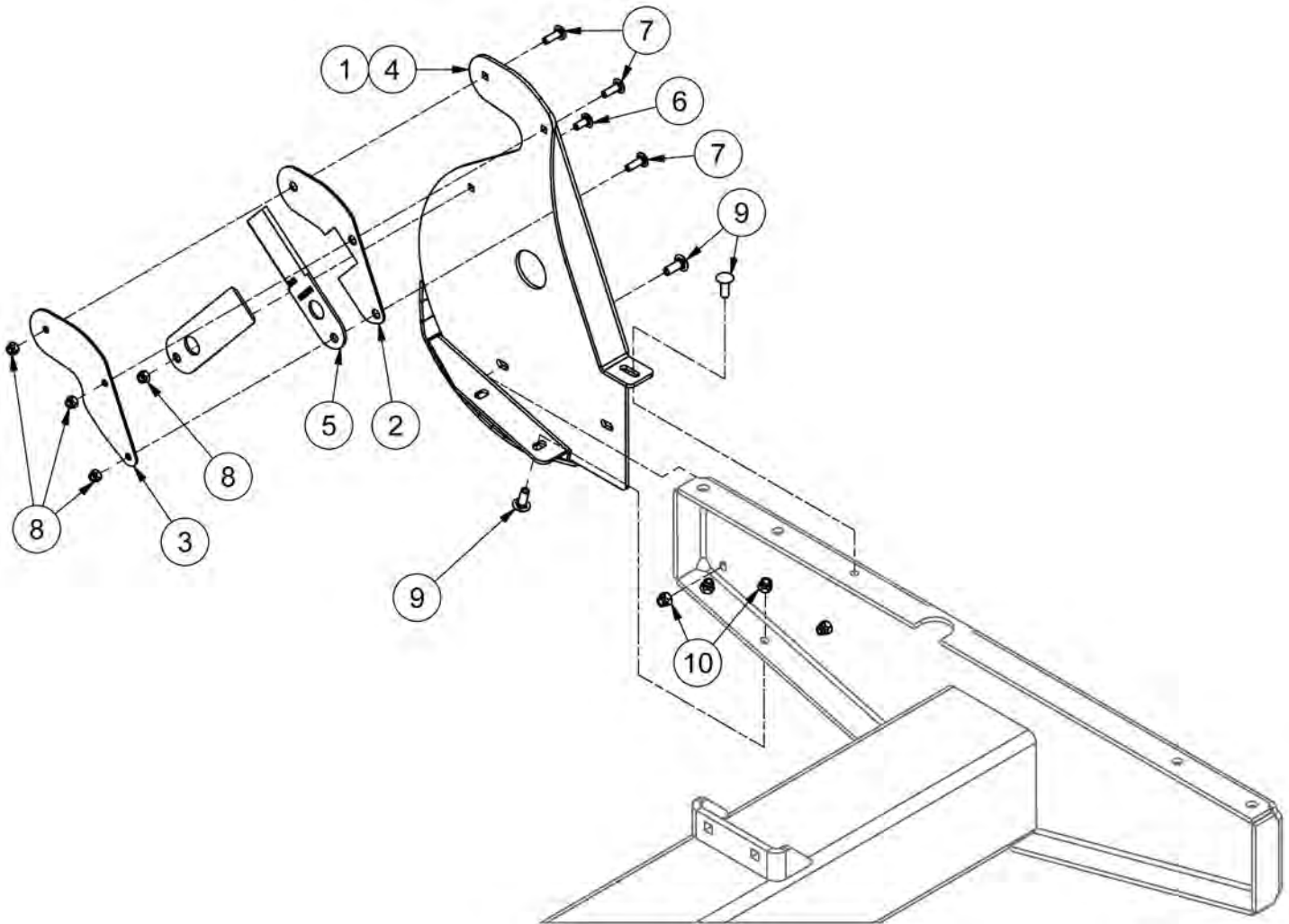
# Turntable



## Turntable

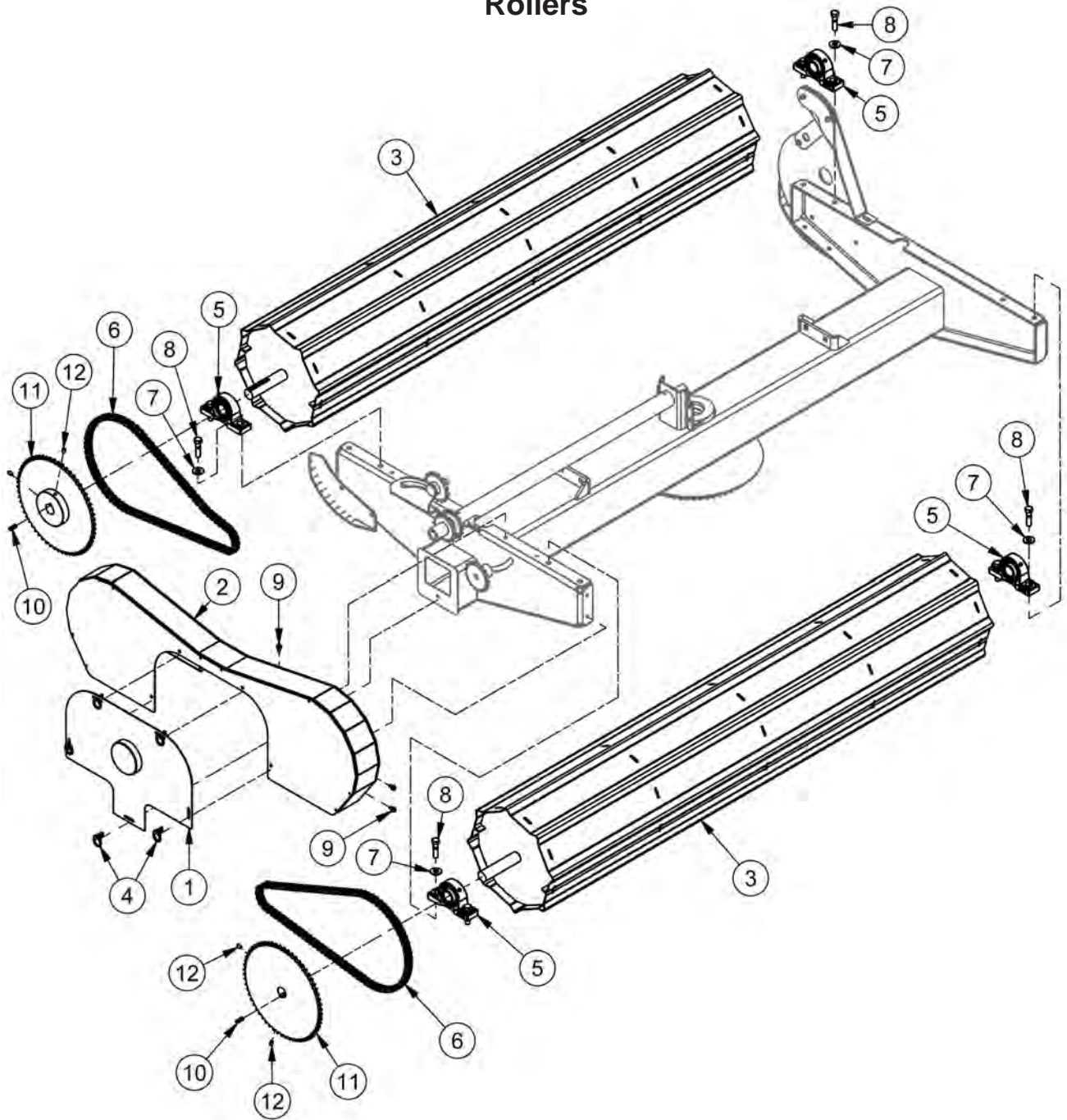
ITEM	QTY	PART NUMBER	DESCRIPTION	SERIAL BREAK
1	1	11-1009	Cup (13620)	
2	1	11-1010	Cone (13686)	
3	1	11-1011	Seal (CR20952)	
4	1	11-1124	Seal (CR27361)	
5	1	11-1125	Cone (JLM506849)	
6	1	11-1126	Cup (JLM506810)	
7	1	35036	Turntable Cross Shaft	
8	1	35050	Long Idler Spacer	
9	1	35051	Idler Mount	
10	1	35052	Short Idler Spacer	
11	1	35082	Skid Shoe	
12	1	35085	Knife Kit	See <a href="#">Pg.1-10</a>
13	1	35086	Large Sprocket Set	
14				
15	2	35714	Tapered Gear- 24 Tooth - 8 Pitch	
16	3	35785	Miter Gear Spacer	
17	1	36254	Magnet	
18	1	38613	Plastic Plug	1810001 - Current
19	1	42851	Grease Cover	1810001 - Current
	1	35092	Grease Cover	Up to 1810001
20	1	36255	DigiStar M6 Stainless Bolt	
21	1	CB5/8-11X2.5CZ5	Carriage Bolt - 5/8-11 x 2 1/2" Grade 5 Zinc	
22	1	CB5/8-11X3CZ5	Carriage Bolt - 5/8-11 x 3" Grade 5 Zinc	
23	2	CB3/8-16X1CZ5	Carriage Bolt - 3/8-16 x 1" Grade 5 Zinc	
24	8	FW 1/4	Flatwasher - 1/4" Zinc Plated USS	
25	2	FW 3/8	Flatwasher - 3/8" Zinc Plated USS	
26	2	FW 5/8	Flatwasher - 5/8" Zinc Plated USS	
27	1	GR 1/4 X 28	.25" Grease Fitting	
28	1	GR 1/4X28X90	.25" 90° Elbow Grease Fitting	
29	1	HB 5/16-18X2 Z5	Hex Bolt 5/16-18x2 Grade 5 Zinc Plated Hex Cap Screw	
30	4	HB1/4-20X0.75Z5	Hex Bolt 1/4-20x3/4 Grade 5 Zinc Plated Hex Cap Screw	
31	4	HB3/8-16X1Z5	Hex Bolt 3/8-16x1 Grade 5 Zinc Plated Hex Cap Screw	
32	2	INS150125150B	Insert Bushing 1.50 OD X 1.25 ID X 1.50 Long (Bronze)	
33	2	KS41749	Keystock .250 X 1.500	
34	6	LN1/4-20NCZ5	LN 1/4-20 Zinc Plated Nylon Insert Lock Nut	
35	6	LN3/8-16NCZ5	LN 3/8-16 Zinc Plated Nylon Insert Lock Nut	
36	1	LN5/16-18NCZ5	LN 5/16-18 Zinc Plated Nylon Insert Lock Nut	
37	2	LN5/8-11NCZ5	LN 5/8-11 Zinc Plated Nylon Insert Lock Nut	
38	1	Obtain Locally	5' #60 Chain	
39	2	SPR50A17	.625 Bore, 17 Tooth Sprocket	

## Knife Kit



ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
1	1	35085	Knife Kit	Items 2-8
2	1	35069	Knife Spacer A	
3	1	35070	Knife Spacer B	
4	1	35083	Knife Holder	
5	2	BS200058	Chopper Blade	
6	1	CB5/16-18X0.75CZ5	Carriage Bolt - 5/16-18 x 3/4" Grade 5 Zinc	
7	3	CB5/16-18X1CZ5	Carriage Bolt - 5/16-18 x 1" Grade 5 Zinc	
8	4	LN5/16-18NCZ5	LN 5/16-18 Zinc Plated Nylon Insert Lock Nut	
9	7	CB3/8-16X1CZ5	Carriage Bolt - 3/8-16 x 1" Grade 5 Zinc	
10	12	LN3/8-16NCZ5	LN 3/8-16 Zinc Plated Nylon Insert Lock Nut	

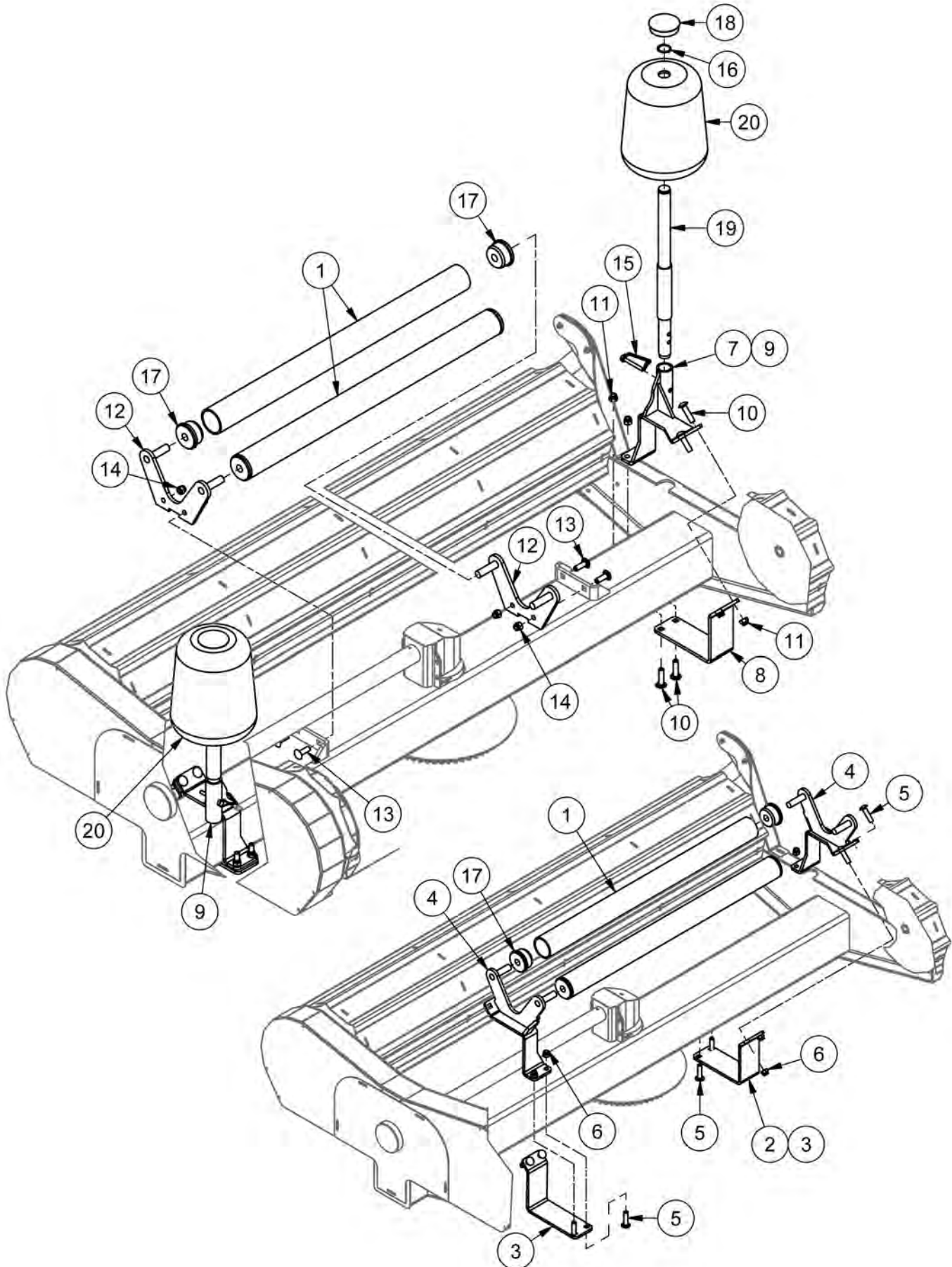
## Rollers



ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	35088	Chain Cover
2	1	35090	Chain Guard
3	2	35094	Bale Rotator Drum
4	5	36268	Cam Lock
5	4	BEA UCP207-20NTL	Bearing 1.25 Pillow Block Bearing
6	10ft	CHAIN 50 ROLLER	Chain - #50 Roller (Heavy Duty)
7	8	FW 1/2	Flatwasher - 1/2" Zinc Plated USS
8	8	HB1/2-13X2Z5	Hex Bolt 1/2-13x2 Grade 5 Zinc Plated Hex Cap Screw
9	18	HBC1/4X0.5	Hex Bolt Cerrated 1/4-20 x 1/2 Zinc Flange Bolt
10	2	KS40254	Keystock .250 X 1.000
11	2	SPR50B60-1.25	Sprocket - #50 60 Teeth 1.25 Bore 1/4 Key
12	4	SS5/16-18CX0.5CP	Allan Head Set Screw, 5/16-18 x 1/2

## Middle Rollers

**NOTE:** Standard as of SN 1510165, 37985 kit retrofittable to earlier machines.



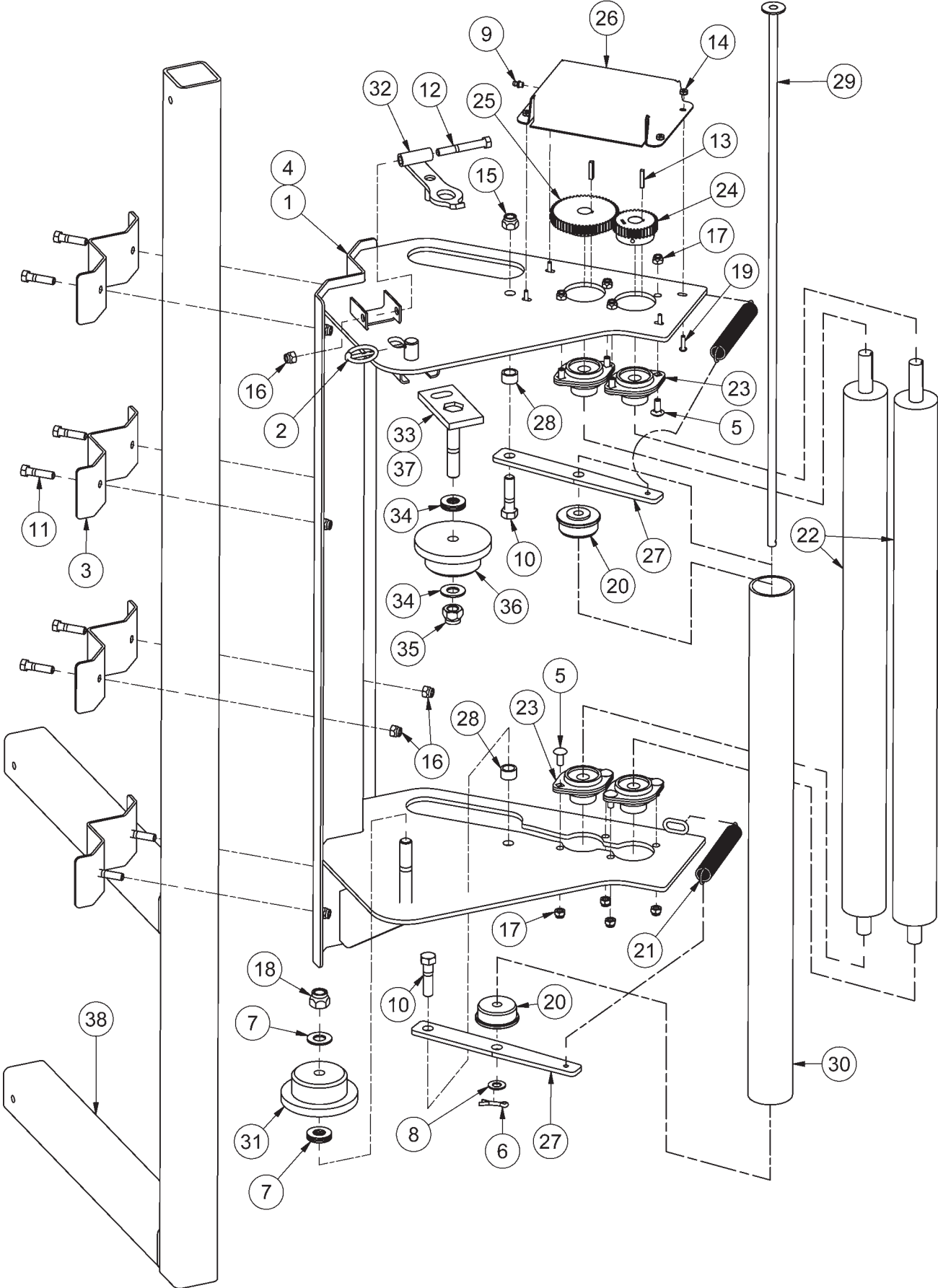
## Middle Rollers

**NOTE:** Standard as of SN 1510165, 37985 kit retrofittable to earlier machines.

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
1	2	31384	Middle Roller	
2	1	37985	Bale Support Roller Kit	Items 1,3-6 Up to SN 2210140
3	2	37977	Guide Roller Bracket Bottom	Up to SN 2210140
4	2	37980	Top Roller Bracket Weldment	Up to SN 2210140
5	8	CB1/2-13X2CZ5	Carriage Bolt - 1/2-13 x 2" Grade 5 Zinc	Up to SN 2210140
6	8	LN1/2-13NCZ5	LN 1/2-13 Zinc Plated Nylon Insert Lock Nut	Up to SN 2210140
7	2	37986	Adjustable Bobbin Holder Kit	Items 8-20
8	1	37977	Clamp Bracket	Qty Per Side
9	1	37984	TL1000R Guide Roller Brackets	Qty Per Side
10	4	CB1/2-13X2CZ5	Carriage Bolt - 1/2-13 x 2" Grade 5 Zinc	
11	4	LN1/2-13NCZ5	LN 1/2-13 Zinc Plated Nylon Insert Lock Nut	Qty Per Side
12	2	48313	Top Center Roller Assembly	SN 2210141 - Current
13	4	CB1/2-13X1.5CZ5	Carriage Bolt - 1/2-13 x 1 1/2" Grade 5 Zinc	
14	4	LN1/2-13NCZ5	LN 1/2-13 Zinc Plated Nylon Insert Lock Nut	
15	2	LP B1997	Pin - Lock Pin 5/16 X 2 1/2	
16	2	RR 1.25	Retaining Ring-1 1/4- External	
17	4	T650RL04	Small Roller Bearing	
18	2	TL245-057	3" Guide Roller Cap	
19	2	TL550-301-239	Guide Roller Shaft	
20	2	TLGRA	Guide Roller	



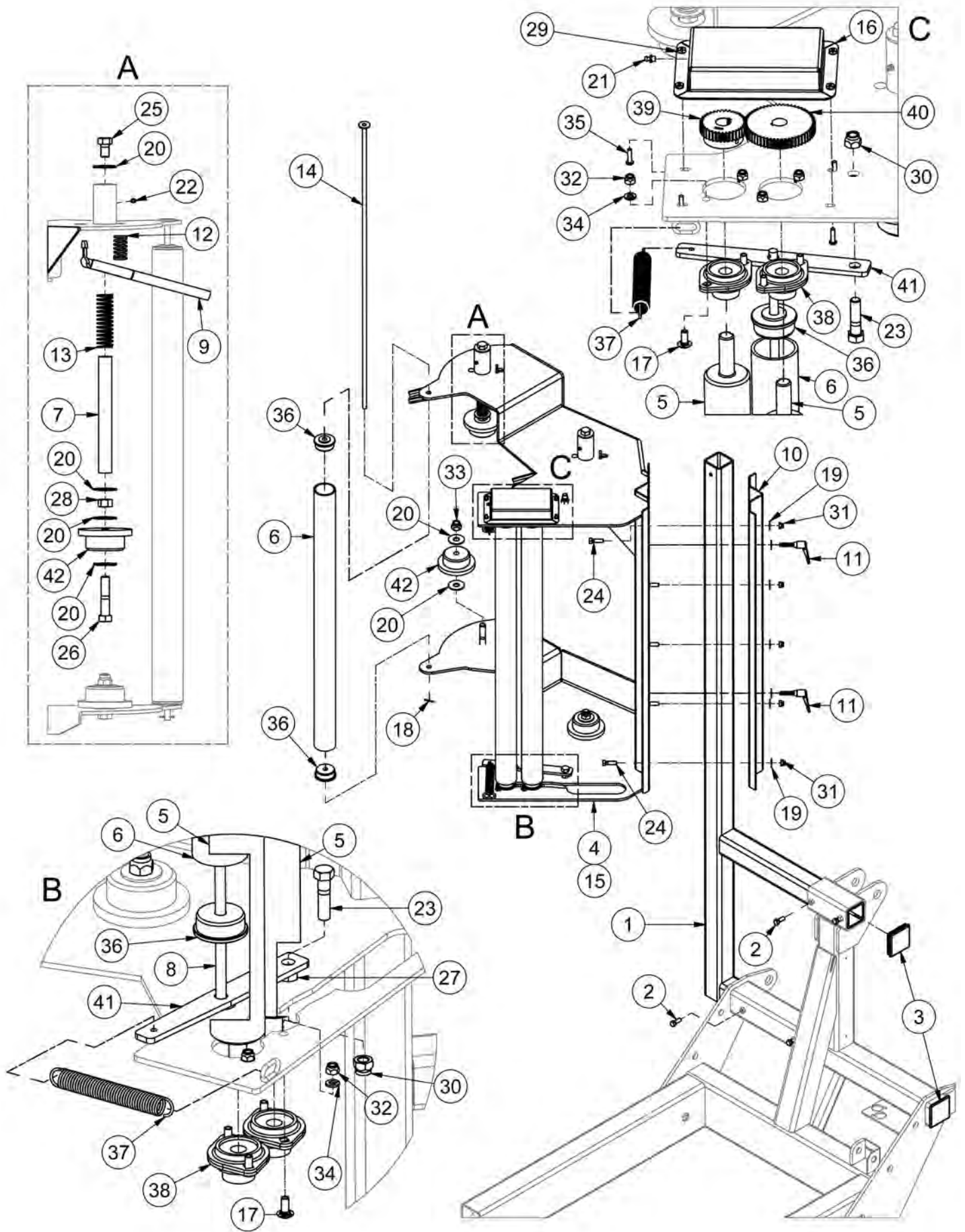
# Film Tensioner - Up to SN 1810001



## Film Tensioner - Up to serial no.1810001

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
1	1	35098	Tensioner Frame Assembly	Items 2 - 33
2	1	25680	Linch Pin 3/16 X 1.5	
3	4	35019	Tensioner Mount Bracket	
4	1	35091	Tensioner Frame	
5	8	CB5/16-18X0.75CZ5	Carriage Bolt - 5/16-18 x 3/4" Grade 5 Zinc	
6	1	CP 3/16 X 1	Pin,Cotter - 3/16" X 1" Zinc Finish Extended Prong	
7	4	FW 5/8	Flatwasher - 5/8" Zinc Plated USS	
8	1	FW 7/16	Flatwasher - 7/16" Zinc Plated USS	
9	1	GR 1/4 X 28	Grease Fitting 1/4-28 Straight Standard Zerk	
10	2	HB1/2-13X2Z5	Hex Bolt 1/2-13x2 Grade 5 Zinc Plated Hex Cap Screw	
11	8	HB3/8-16X1.5Z5	Hex Bolt 3/8-16x1 1/2 Grade 5 Zinc Plated Hex Cap Screw	
12	1	HB3/8-16X2.75Z5	Hex Bolt 3/8-16x2 3/4 Grade 5 Zinc Plated Hex Cap Screw	
13	2	KS43726	Keystock .188 X 1	
14	4	LN 10-24	K-Lok Locknut	
15	2	LN1/2-13NCZ5	LN 1/2-13 Zinc Plated Nylon Insert Lock Nut	
16	9	LN3/8-16NCZ5	LN 3/8-16 Zinc Plated Nylon Insert Lock Nut	
17	8	LN5/16-18NCZ5	LN 5/16-18 Zinc Plated Nylon Insert Lock Nut	
18	1	LN5/8-11NCZ5	LN 5/8-11 Zinc Plated Nylon Insert Lock Nut	
19	4	MS #10X24X0.75	Machine Screw - (Inch)	
20	2	TL500-100-021	Plastic Roller Cap	
21	2	TL500-100-135	Spring - Tensioner	
22	2	TL550-100-006	Tensioner Roller	
23	4	TL550-100-007	3/4" Flange Bearing (Flangettes & Bearing)	
24	1	TL550-100-008	Small Roller Gear	
25	1	TL550-100-009	Large Roller Gear	
26	1	TL550-100-010	Grease Box	
27	2	TL550-100-016	Plastic Roller Mount	
28	2	TL550-100-017	Roller Mount Spacer	
29	1	TL550-100-018	Plastic Roller Pin	
30	1	TL550-100-022	Plastic Roller	
31	1	TL550-200-012	Plastic Wrap Spool	
32	1	TL550-200-103	Spool Latch	
33	1	TL5X2-500-103	Spool Holder Assembly	Items 34 - 37
34	4	FW 5/8	Flatwasher - 5/8" Zinc Plated USS	
35	1	LN5/8-11NCZ5	LN 5/8-11 Zinc Plated Nylon Insert Lock Nut	
36	1	TL550-200-012	Plastic Wrap Spool	
37	1	TL550-200-115	Spool Holder	
38	1	35099	Tensioner Mount	

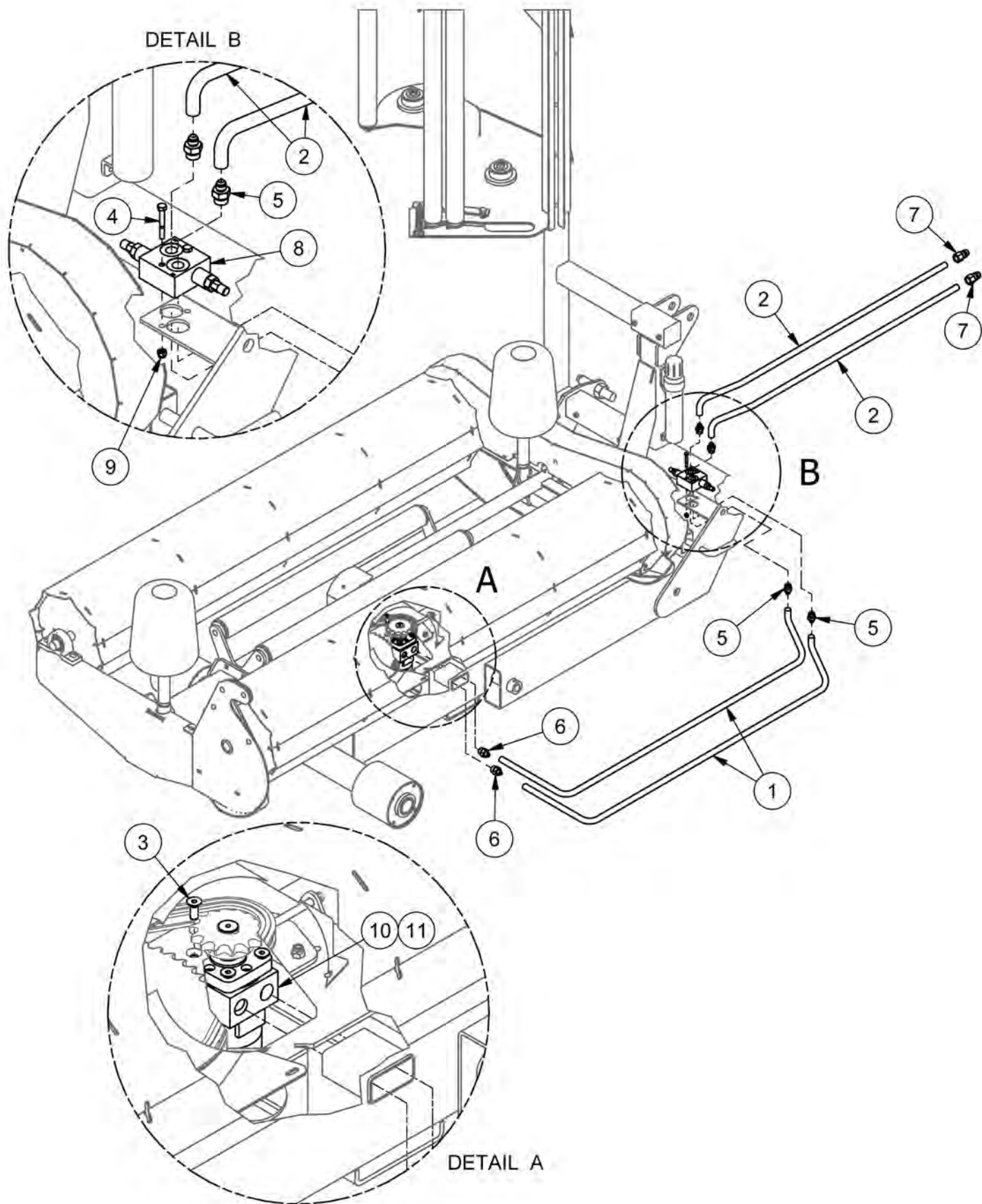
# Offset Film Tensioner - SN 1810001-Current



## Offset Film Tensioner - SN 1810001-Current

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTE
1	1	35099	Tensioner Mounting Frame	
2	4	HB3/8-16X1Z5	Hex Bolt 3/8-16x1 Grade 5 Zinc Plated Hex Cap Screw	
3	2	PEC3018S	3' Plastic End Cap	
4	1	42444	TL1000R Offset Tensioner Assembly	Items 5-42
5	2	39916	Extended Tensioner Roller	
6	2	39917	Extended Plastic Roller	
7	2	41584	Top Wrap Holder Pin	
8	1	41624	Plastic Roller Pin	
9	2	41829	Rod Spool Clamp Holder	
10	1	41843	Tensioner Back Plate	
11	2	41844	Adjustable Handle	
12	2	41882	Compression Spring .120" Wire X 1" OD X 1.75" Long	
13	2	41883	Compression Spring .090" Wire X 1.22" OD X 7" Long	
14	1	42020	Second Roller Pin	
15	1	42436	Double Tensioner Frame	
16	1	44284	Grease Box	
17	8	CB5/16-18X0.75CZ5	Carriage Bolt - 5/16-18 x 3/4" Grade 5 Zinc	
18	1	CP 3/16 X 1.0	Pin, Cotter 3/16 x 1	
19	12	FW 3/8	Flatwasher - 3/8" Zinc Plated USS	
20	14	FW 5/8	Flatwasher - 5/8" Zinc Plated USS	
21	1	GR 1/4 X 28	Grease Fitting 1/4-28 Strght-Standr Zerk	
22	2	GR 3/16D	3/16 Drive Straight Grease Fitting (King Fisher Brand)	
23	2	HB1/2-13X2Z5	Hex Bolt 1/2-13x2 Grade 5 Zinc Plated Hex Cap Screw	
24	5	HB3/8-16X1.25Z5	Hex Bolt 3/8-16x1 1/4 Grade 5 Zinc Plated Hex Cap Screw	
25	2	HB5/8-11X1Z5	Hex Bolt 5/8-11x1 Grade 5 Zinc Plated Hex Cap Screw	
26	2	HB5/8-11X3Z5	Hex Bolt 5/8-11x3 Grade 5 Zinc Plated Hex Cap Screw	
27	2	HN1/2-13CZ5	Hex Nut 1/2"-13 Grade 5 Zinc Plated Finished	
28	2	HN5/8-11CZ5	Hex Nut 5/8"-11 Grade 5 Zinc Plated Finished	
29	4	LN 10-24	K-Lok Locknut	
30	2	LN1/2-13NCZ5	LN 1/2-13 Zinc Plated Nylon Insert Lock Nut	
31	5	LN3/8-16NCZ5	LN 3/8-16 Zinc Plated Nylon Insert Lock Nut	
32	8	LN5/16-18NCZ5	LN 5/16-18 Zinc Plated Nylon Insert Lock Nut	
33	2	LN5/8-11NCZ5	LN 5/8-11 Zinc Plated Nylon Insert Lock Nut	
34	8	LW 5/16	LW - 5/16" Zinc Plated Medium Split	
35	4	MS #10X24X0.75	Machine Screw - (Inch)	
36	4	TL500-100-021	Plastic Roller Cap	
37	2	TL500-100-135	Spring - Tensioner	
38	4	TL550-100-007	Rear Wheel 4"	
39	1	TL550-100-008	Small Gear	
40	1	TL550-100-009	Large Gear	
41	2	TL550-100-016	Plastic Roller Mount	
42	4	TL550-200-012	Plastic Wrap Spool	

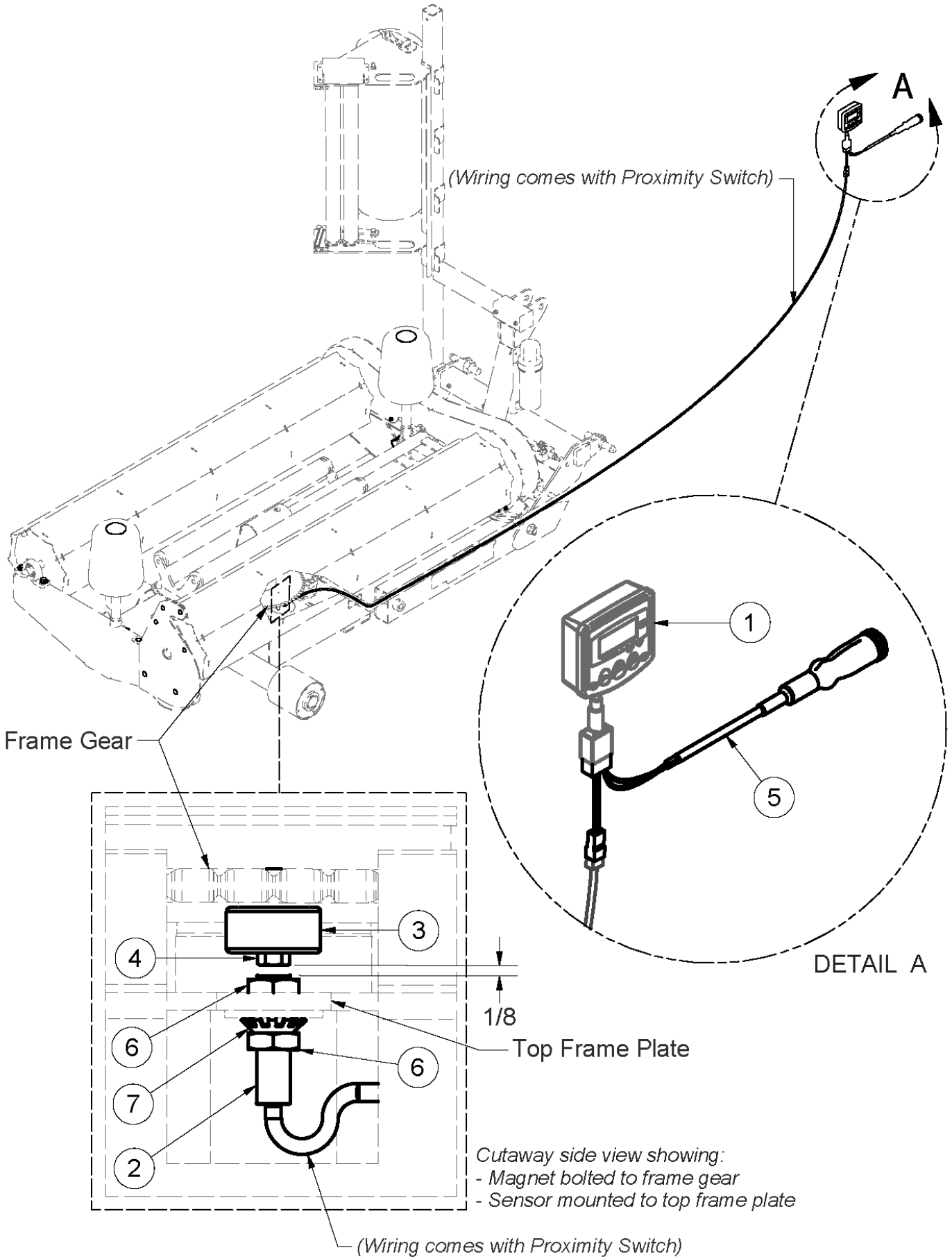
# Hydraulic Schematic



## Hydraulic Schematic

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	35710	HH 3/4 Hydraulic Hose - 66" (6FJX-6FJX)
2	2	36423	HH 3/4 Hydraulic Hose - 66" (6FJX-8MP)
3	4	FHSCS3/8-16X1	Hex Bolt - 3/8"-16 x 1" Flat Socket Cap Screw
4	2	HB1/4-20X2Z5	Hex Bolt 1/4-20x2 Grade 5 Zinc Plated Hex Cap Screw
5	4	HF 6400-6-8	Hydraulic Fitting
6	2	HF 6400-6-10	Hydraulic Fitting - Male JIC - Male ORB
7	2	HF 8010-4	Hydraulic Fitting
8	1	LA-SB2000RV	Crossover Relief Valve
9	2	LN1/4-20NCZ5	LN 1/4-20 Zinc Plated Nylon Insert Lock Nut
10	1	TL5X2-200-050	Hydraulic Motor (M t S 2009 Models)
11	1	SKMLHPQUDE	Seal Kit for 200 & 400 Series Motors

# Electrical Diagram














## Electrical Diagram

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	36252	Bale Wrap Computer
2	1	36253	Proximity Sensor
3	1	36254	Magnet
4	1	36255	M6 x 1 x 30 Metric Hex Bolt
5	1	36970	Power Supply Wiring Harness
6	2	Obtain Locally	HJN M12 x 1.75 Hex Jam Nut
7	1	Obtain Locally	M12 Toothed Lock Washer



# Torque Values - Imperial

SAE Grade and Head Markings	NO MARK	1 or 2 <sup>b</sup>	5	5.1	5.2	8	8.2
							
SAE Grade and Nut Markings	NO MARK	2	5		8		
							

Size	Grade 1				Grade 2 <sup>b</sup>				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>	
	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft
1/4	3.7	2.8	4.7	3.5	6	4.5	7.5	5.5	9.5	7	12	9	13.5	10	17	12.5
5/16	7.7	5.5	10	7	12	9	15	11	20	15	25	18	28	21	35	26
3/8	14	10	17	13	22	16	27	20	35	26	44	33	50	36	63	46
7/16	22	16	28	20	35	26	44	32	55	41	70	52	80	58	100	75
1/2	33	25	42	31	53	39	67	50	85	63	110	80	120	90	150	115
9/16	48	36	60	45	75	56	95	70	125	90	155	115	175	130	225	160
5/8	67	50	85	62	105	78	135	100	170	125	215	160	240	175	300	225
3/4	120	87	150	110	190	140	240	175	300	225	375	280	425	310	550	400
7/8	190	140	240	175	190	140	240	175	490	360	625	450	700	500	875	650
1	290	210	360	270	290	210	360	270	725	540	925	675	1050	750	1300	975
1-1/8	400	300	510	375	400	300	510	375	900	675	1150	850	1450	1075	1850	1350
1-1/4	570	425	725	530	570	425	725	530	1300	950	1650	1200	2050	1500	2600	1950
1-3/8	750	550	950	700	750	550	950	700	1700	1250	2150	1550	2700	2000	3400	2550
1-1/2	1000	725	1250	925	990	725	1250	930	2250	1650	2850	2100	3600	2650	4550	3350

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

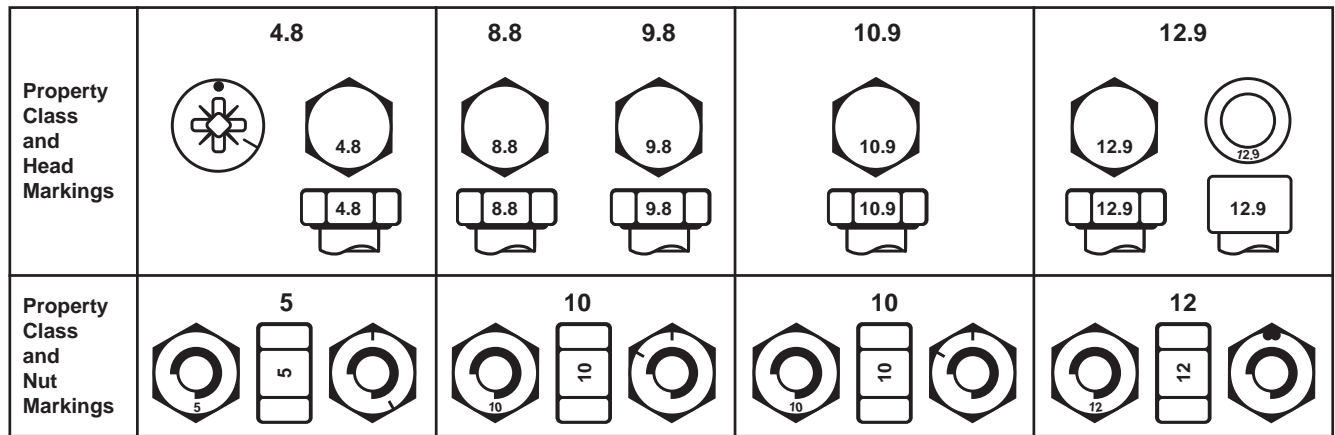
Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

<sup>a</sup> "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

<sup>b</sup> Grade 2 applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. Grade 1 applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.

# Torque Values - Metric



Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>		Lubricated <sup>a</sup>		Dry <sup>a</sup>	
	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	255	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical property class.

Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

<sup>a</sup> "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

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