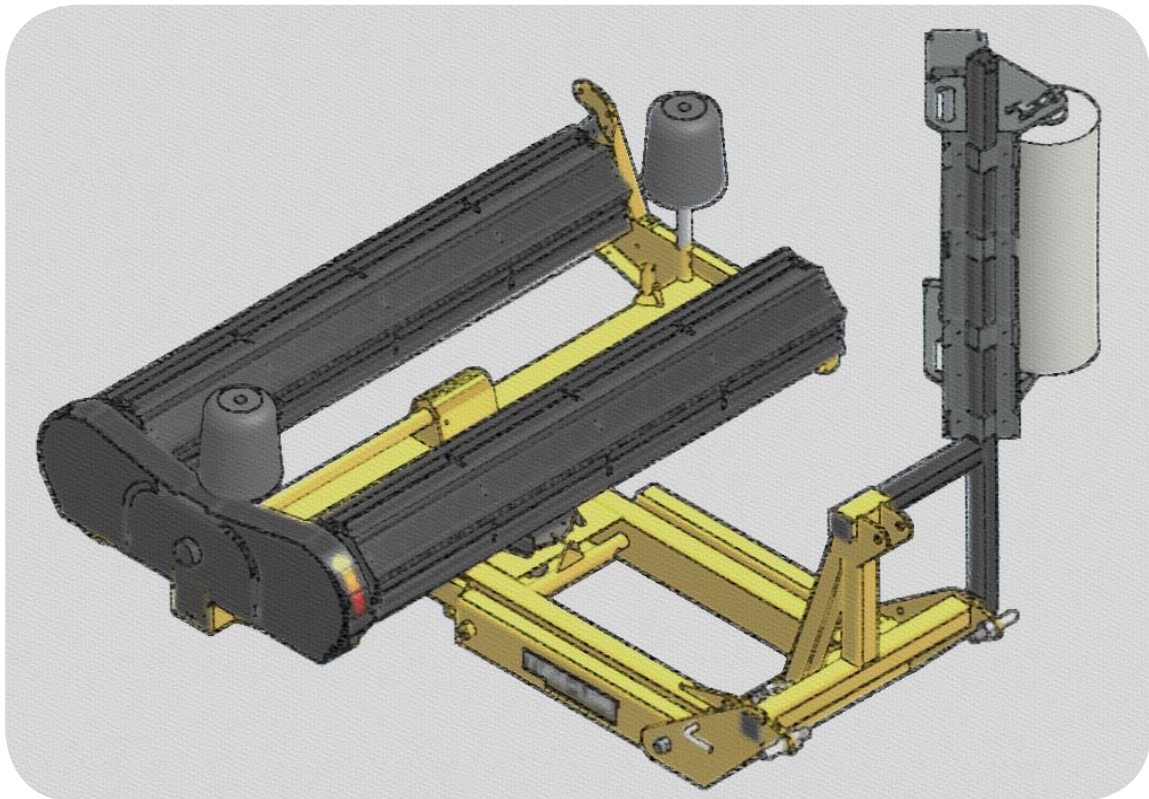


Tube-Line Individual Bale Wrapper TL1000R



Serial # Decal

Serial Number

The implement serial number is located on the front of the frame.

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 # : _____

Serial # : _____

Date Purchased : _____

Dealer Name : _____

Operator's 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 round bales in a film of plastic.

Please read and understand this manual and the machine before operation.

Warranty and Limitation of Liability

All equipment is sold subject to mutual agreement that it is warranted by the company to be free from defects of materials and workmanship. But the company shall not be liable for special, indirect or consequential, damages of any kind under this contract or otherwise. The company's liability shall be limited exclusively to replacing or repairing without charge, at its factory or elsewhere, at its discretion.

Any material, or workmanship defects which become apparent within one year from the date on which the equipment was purchased, and the company shall have no liability for damages of any kind. The buyer by the acceptance of the equipment will assume all liability for any damages, which may result from the use or misuse by his employees or others.

Warranty coverage is null and void unless Warranty
Registration form has been completely filled in and is on file at
Tube-Line Manufacturing Ltd.

Safety

Take note! This safety alert symbol is found throughout this manual to call your attention to instructions involving yourself and others working around the machine.

Failure to follow these instructions can result in injury or death!



This symbol means

**- Attention!
Become Alert!
Your Safety is involved!**

Signal Words are used in this book.

Caution: Indicates a potentially hazardous situation that may result in injury.

Warning: Indicates a potentially hazardous situation that could result in serious injury or death.

Danger: Indicates a hazardous situation that needs to be avoided. It is you the operator that needs to be aware of these dangers.

If you have any questions not answered in this manual, please contact your dealer or Tubeline Manufacturing Ltd.

6455 Reid Woods Drive,
R. R. #4 Elmira
Ontario, Canada
N3B 2Z3

Email : sales@tubeline.ca
Fax : (519)-669-5808
Tel : (519)-669-9488

Safety Guidelines

Safety of the operator is one of our main concerns, however we do hear of some accidents that could have been avoided if some precautions had been taken. To avoid personal injury study the following precautions and insist those working with you or for you, follow them.

In most cases the pictures will have the shielding in place, in some they may be removed, only to show a view behind the shield. Keep all the shields, safety doors in place. If they become faulty and fail to work replace them. They are for your safety, do not operate the equipment with them removed.

Replace any decals that may be missing or that are not readable. Location of the decals is indicated in this manual.

Do not operate this machine while under the influence of drugs or alcohol.

Review the safety instructions with all users annually.

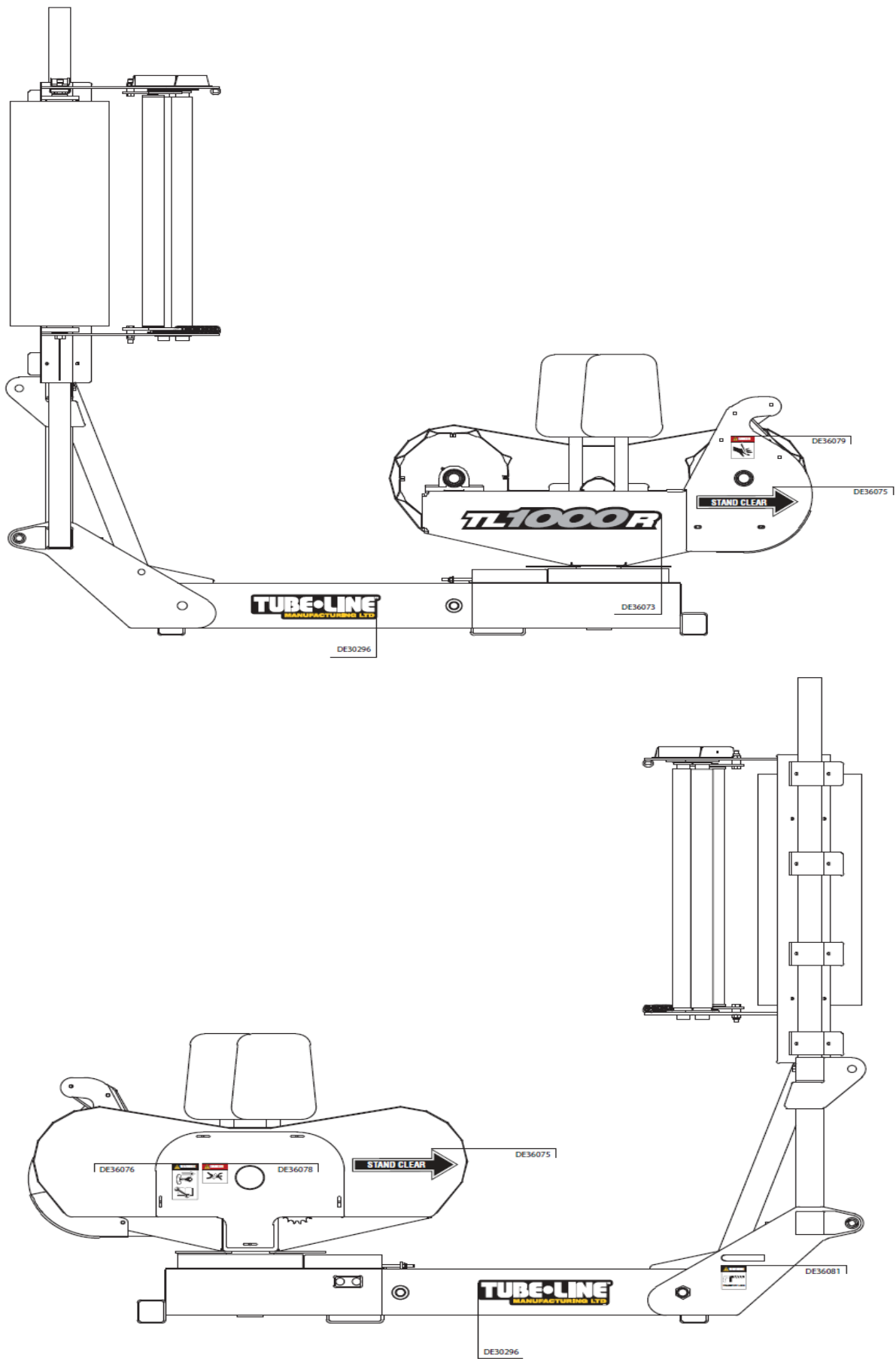
This equipment should not be operated by children, or with those unfamiliar with the operation of the machine. Do not allow persons to operate this machine until they have read this manual and/or were instructed by a qualified person.

Do not paint over, remove or deface any safety signs or warning decals on your equipment. Observe all safety signs and practice the instructions on them.

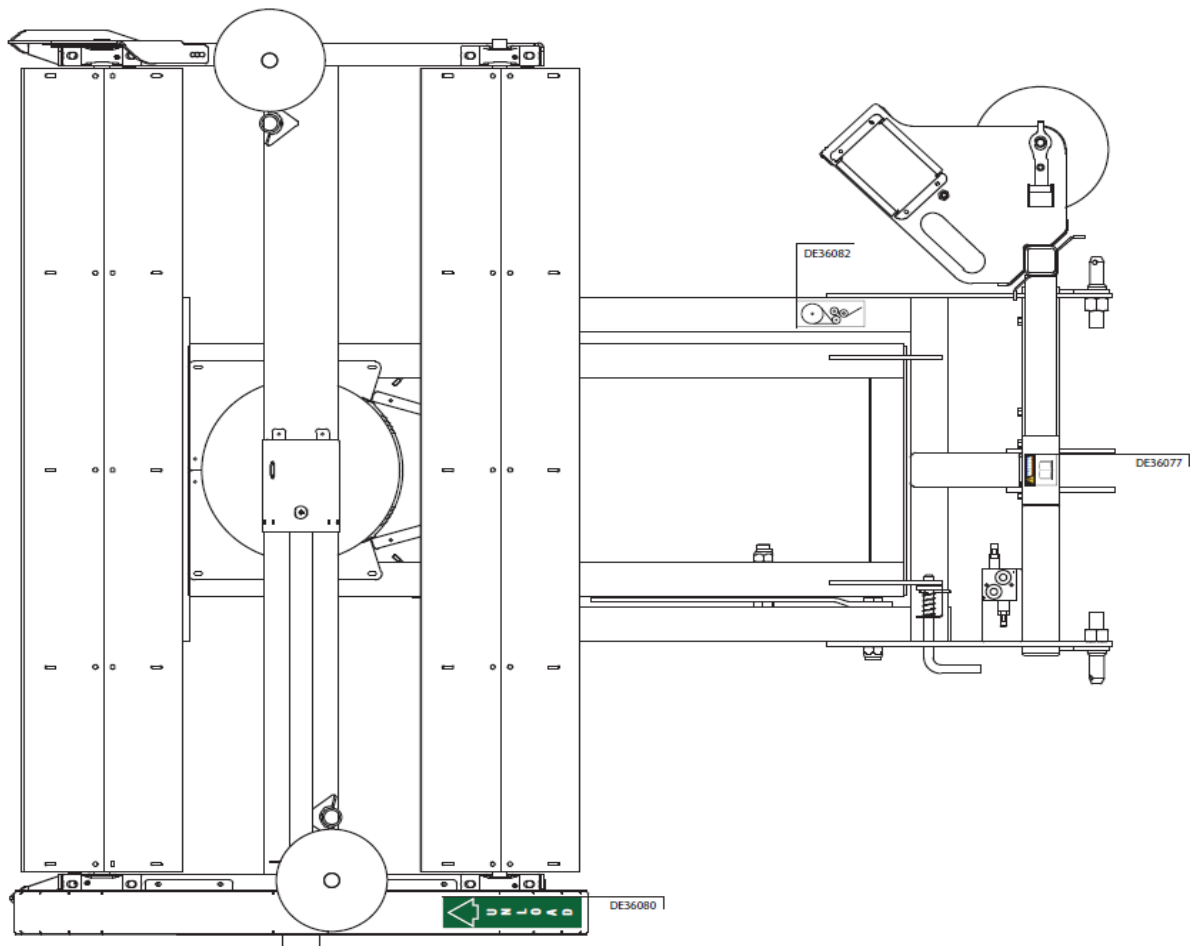
Storage & Maintenance

With regular upkeep and careful storage this machine should serve you well for many years. Store the machine in a cool dry place. It is recommended that you tighten the drive chains after the first day of use every year. Also grease the drive chains before storing the TL1000R, replace any removed shields.

Safety Decal Location



Safety Decal Location



Safety Decal

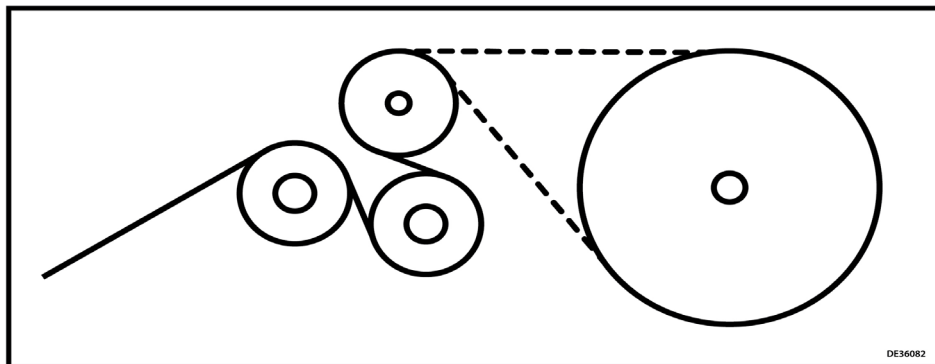
Part # : DE36075
Ends of Turntable



Part # : DE36080
Front Left of Turntable



Part # : DE36082
Top of Frame



Part # : DE36073
Side of Turntable



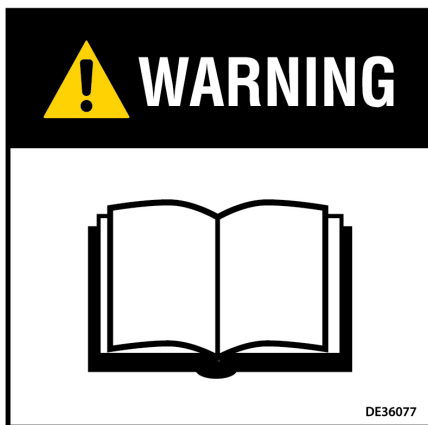
Safety Decal



Part # : DE36081
Front Right Side
of Frame



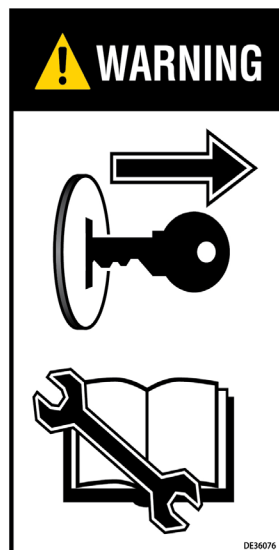
Part # : DE36079
Upper Ends of
Turntable



Part # : DE36077
Top of 3
Point Hitch



Part # : DE36078
Middle of
Turntable



Part # : DE36076
Middle of
Turntable



Remember

Your best assurance against accidents or damage to the machine is to know how it operates. If you do not understand a portion of the manual or a function of the wrapper, please contact your dealer or an experienced operator.



Before Operation

- Carefully study and understand the manual or be trained by an experienced operator.
- Do not wear loose clothing that may get caught in moving parts.
- Visually inspect the machine to make sure no parts are loose or missing.
- Be sure that no tools are left on the machine.
- Do not hurry the learning process. Be familiar with one part before trying the next part.
- Practice by running the machine through its paces without a bale on the machine until you are comfortable and familiar with the operation.

Bale Size

Round Bales - The TL1000R will wrap bales from a 4' diameter to 5' x 5 ½'

Square Bales - Model TL1000R is **NOT** a square bale machine.

Recommended Operating Procedure

We suggest the following method of operating the TL1000R Tubeline Wrapper.

Before you start wrapping your bales you will need to attach the wrapper to the 3 point hitch on your tractor. You will also need to install a plastic film roll to wrap your bales with.

To Install Plastic Wrap Film

Plastic from the factory has a natural tack on the inside. In the event of the plastic being stored for an extended period of time the tack may migrate to the opposite side. To test for tacky side fold plastic inside to inside and pull apart. Fold opposite way (top to top) to determine tackier side.

The roll of plastic should be installed with the tack on the inside of the plastic film next to the bale silage. The plastic then passes over the slave roller and is threaded through the two metal rollers on the Tensioner as shown in the diagram. The two metal stretcher rolls rotate at different speeds. This causes the plastic to be stretched. It is very important that the plastic goes over the slow roller first and the faster roll second. If there is any question, which is the faster roller :

- Turn one roller by hand and watch the speed of the other roller, this should help you determine which is the fast and slow roller. When the plastic is installed correctly, it should stretch tight on the bale to form a smooth wrapped bale.

Trouble Shooting Plastic Installation

Wrinkles in the plastic with seams between layers easily visible

Check to determine if the plastic is properly routed through the Tensioner rollers.

Plastic tears between the Tensioner and the bale

Film spool holders: not turning freely. Lubricate and turn by hand until free. Slave roller not turning freely. Lubricate and turn by hand until free.

Tensioner rolls not turning freely : Loosen the bolts holding the bearing and check if this makes a difference. It may be that the bearings have too much end pressure, in this case re-tighten the bearings and loosen the locking collar on the roller shaft this will allow the shaft to slide in the bearing; re-tighten the bearing collar. The gears can also be meshed too tight; this can be fixed by slightly loosening one set of bearing bolts. Using a hammer and punch, lightly tap the bearing away from the other roller.

Caution - Do not use a hammer on the aluminum stretcher rolls.

Poor quality plastic : Use a brand with good tear resistance.

Tack build up on the rollers: Particularly in hot weather. Clean the Tensioner with warm soapy water Plastic roll is too hot : In very hot weather the plastic can become soft if left in the sun for long periods of time. In these conditions, the spare rolls should be kept in the shade. After the rolls have been installed on the machine one can be parked on the bottom and a cover can be placed on the top one. Rolls of plastic may catch on the bottom of the bale. If bales are misshaped the roll of plastic may drag on the bottom of the bale, causing the plastic to break.

To Wrap Bales

Choose a suitable wrapping site, preferably somewhere flat, and close to where you are planning to store your wrapped bales. Before placing the first bale onto the rollers make sure the wrapper is lowered to the ground and that the rollers are parallel to the tractor's axle, you are ready to wrap if you see the unload arrow decal on the front right corner of the rollers. Remove the transport lock and connect the hydraulic hoses to your tractor ports.

First Bale

After placing the first bale onto the wrapper you will need to tie the plastic film edge to the netting/twine of the bale. Keep the tractor at a steady RPM while engaging the hydraulic motor on the wrapper to allow a smooth wrapping job. We recommend 6-8 layers of wrap per bale. The turntable has a maximum speed of 30 RPMs and can be set either by adjusting the flow control or the Bale Wrapper Computer.

Continuous Wrapping & Unloading

To unload the first bale make sure the unload arrow decal on the front right corner of the turntable is POINTING TOWARDS THE BACK of the machine. Next, raise the 3 point hitch on your tractor slowly. You should see the wrapper's frame rise up, while the wrapper tilts back, allowing the bale on the turntable to roll softly and safely to the ground. If you have not pulled out the transport pin the whole wrapper will raise off the ground instead of tilting. This machine has a feature that takes away the need to cut the plastic film after each bale is ejected from the turntable. When you load the next bale it will be sitting on top of plastic film stretched across the rollers. As you start wrapping each bale after the initial bale, a knife edge located on the rear left of the turntable will cleanly cut the wrap between the unloaded bale and the wrapper.

Note : The turntable **MUST** be parallel with the tractor axle before loading each bale.

Recommended Operating Procedure

Please follow these instructions when operating the Bale Wrap Computer

Bale Wrap Computer

1. Introduction

The *Bale Wrap Computer* has 6 channel functions with an illuminated 4 digit LCD display, 3 switches to control all functions and an internal alarm. An external alarm is optional.

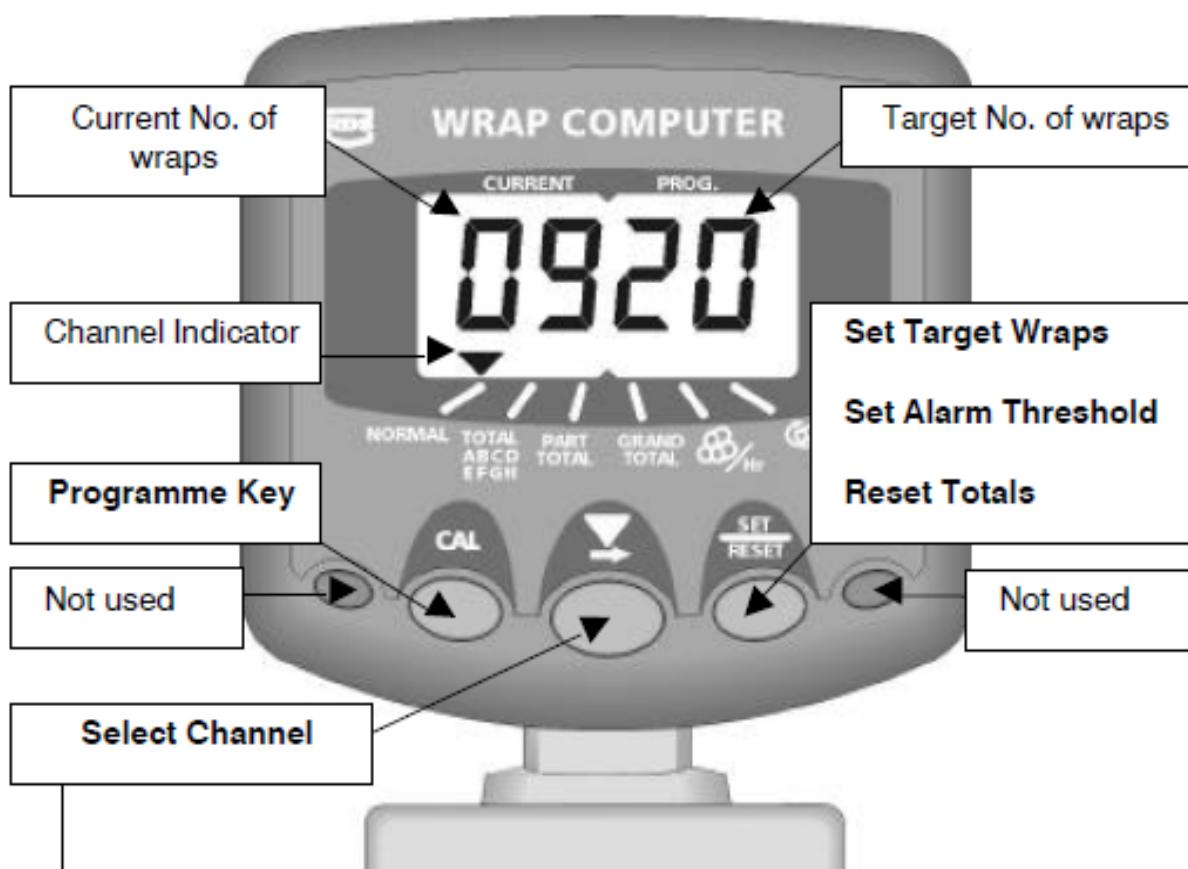
The instrument is normally powered on via the vehicle ignition circuit and recalls the function displayed when the instrument was last used.



What can it do ?

- ?? Continuously displays the current number of wraps around the bale alongside the desired (Target) number of wraps preset by the operator.
- ?? Sounds an alarm at a preset number of wraps before the target number is reached.
- ?? Automatically senses when the bale wrap sequence ends and records it to each of these memory registers:
 - (i) Grand Total
 - (ii) Part Total
 - (iii) One of eight selectable Store Totals
- ?? Displays the number of bales wrapped per hour, within any desired time period.
- ?? Displays bale wrapping speed in r.p.m. and sounds an alarm when a preset speed is exceeded.

2. The Control Switches

There are **three** switches on the front panel used individually or in combination to programme, set/reset or select a function.



Channel 1	NORMAL	'Normal' display (Current/Target no. of Wraps)
Channel 2	TOTAL ABCD EFGH	Store Totals (A – H)
Channel 3	PART TOTAL	Part Total
Channel 4	GRAND TOTAL	Grand Total
Channel 5	 /Hr	Bale Wrapping Rate
Channel 6	 /min	Bale Wrapping Speed

3. Using the Instrument

3.1 Channel 1 - Current/Target Wraps Display_____

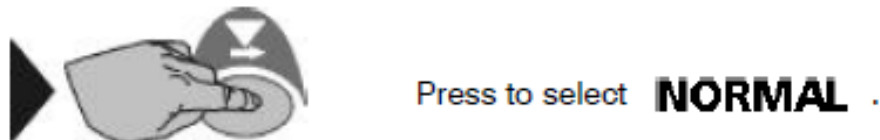


The left hand section shows the current number of wraps and the right hand section shows the target number.

When the current number = Target number, the alarm will sound for 2 seconds and the display will flash. (If set, the early warning alarm sounds beforehand).

Automatic reset of current number to zero normally occurs 3 seconds after the Target number is reached. If additional wraps are added after the Target number is reached, the current number will continue to advance.

3.1.1 Manually reset Current No. of Wraps to Zero



3.1.2 Programme the Target Wraps



Press to select **NORMAL**.



Hold continuously.



The third digit flashes.



Hold to cycle to the required digit then release, otherwise press once...



The fourth digit flashes.



Hold to cycle to the required digit.

Release all.


3.1.3 Programme Early Warning Alarm

An early warning alarm can be programmed to sound from 1 to 9 wraps before the target number is reached. Depending on the setting, the alarm will sound long beeps for up to 8 wraps, short beeps for the final wrap, and then a continuous beep for three seconds.

For example, if the bale requires 22 wraps and you want an alarm at 20 wraps, then set the number to 2.

To effectively disable the alarm, set the number to 0.



Press to select  min.



Hold continuously.



The fourth digit flashes.



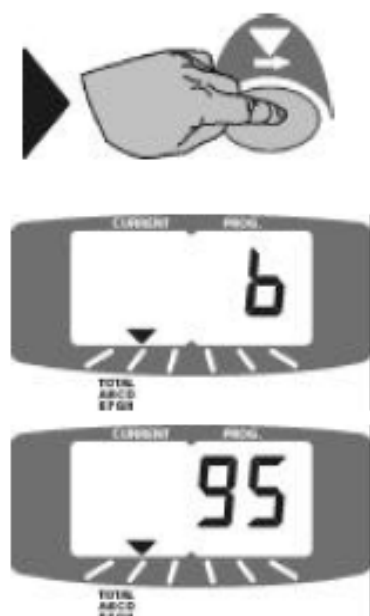
Hold to cycle to the required digit.

Release all.

3.2 Channel 2 - Store Totals

When bale wrap is complete, one of eight pre-selected memory store totals **A, b, C, d, E, F, G, or H**, is automatically advanced by 1. Store totals can be reset individually.

3.2.1 Display a Store Total



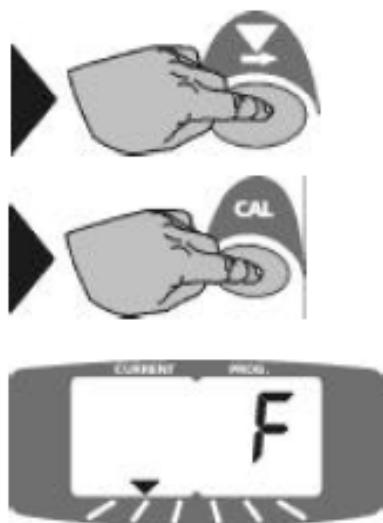
Press to select **TOTAL
ABCD
EFGH** .

←

The fourth digit displays the current store designation for 2 seconds.

The current total for that store then displays for five seconds, then defaults to channel 1.

3.2.2 Select a Store Total



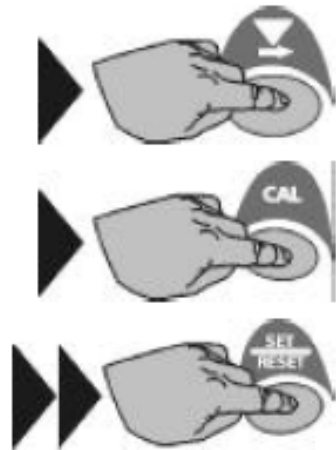
Press to select **TOTAL
ABCD
EFGH** .

Select the desired store total (A – H).

←

This is now the default store, and subsequent bale counts are stored there until another store is selected.

3.2.3 Reset a Store Total



Press to select

TOTAL
ABCD
EFGH

Select the desired store total (A – H).

Press and hold.

3.3 Channel 3 – Part Total

When the bale wrap is complete, the part total is automatically advanced by 1. The part total can be reset at any time

3.3.1 Display Part Total

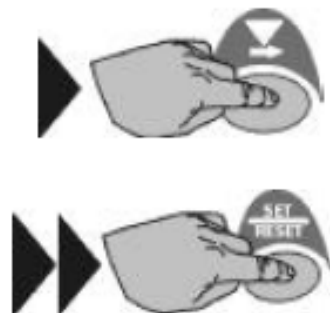


Press to select

PART
TOTAL

Part total displays for 5 seconds then defaults to channel 1.

3.3.2 Reset Part Total



Press to select

PART
TOTAL

Press and hold.

3.4 Channel 4 - Grand Total

When the bale wrap is complete, the grand total is automatically advanced by 1. The grand total cannot be reset.

3.4.1 Display Grand Total



Press to select **GRAND TOTAL**



Grand total displays for 5 seconds then defaults to channel 1.

3.5 Channel 5 - Bale Wrapping Rate

Displays number of bales wrapped per hour. The time period over which the rate is averaged may be re-started at any time.

3.5.1 Display Bale Wrapping Rate




Press to select **bales/Hr**



3.5.2 Reset Timing Period



Press to select  .




Press and hold.

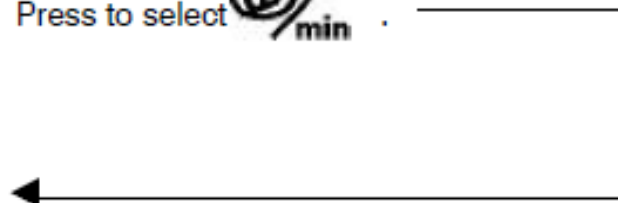
3.6 Channel 6 - Bale Wrapping Speed

Displays instantaneous r.p.m. of the bale wrapper at 3 second intervals in the range 10-99 r.p.m. An overspeed alarm will sound if the r.p.m. exceeds a pre-programmable limit. The display will default to this channel and flash for the duration of the overspeeding, subsequently reverting to the 'current/target wraps' display.

3.6.1 Display Bale Wrapping Speed



Press to select  .



3.6.2 Programme the Overspeed Alarm



Switch power on while pressed.



Release.



The third digit flashes.



Hold to cycle to the desired digit, then release, otherwise press once...



The fourth digit flashes.



Hold to cycle to the required digit.

Release all.

3.7 Total Reset

If for some reason the data in the instrument is corrupted or the display shows '**PrOg**' then the instrument must be totally reset.

- . Switch power off.
- . Press and hold all 3 control switches.
- . Switch power on.
- . Release all switches.

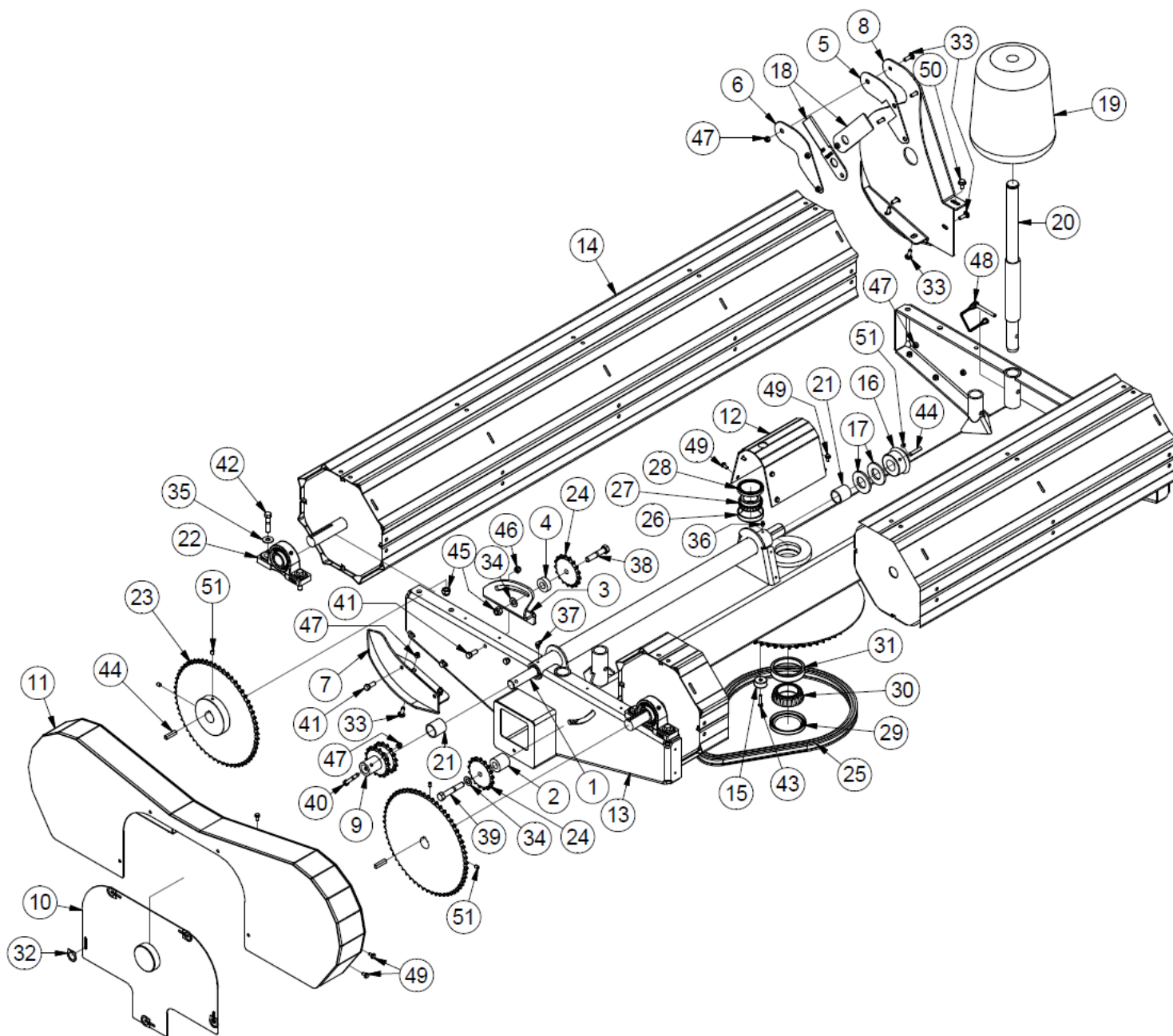
All instrument settings should be returned to the factory-set values. If the display shows '**PrOg**' again, the instrument may be faulty and must be returned to the manufacturer for inspection and repair.

NOTE : *These instructions are provided solely for informative purposes only.*

Used with permission from Digi-Star International.

Parts Lists & Breakdowns

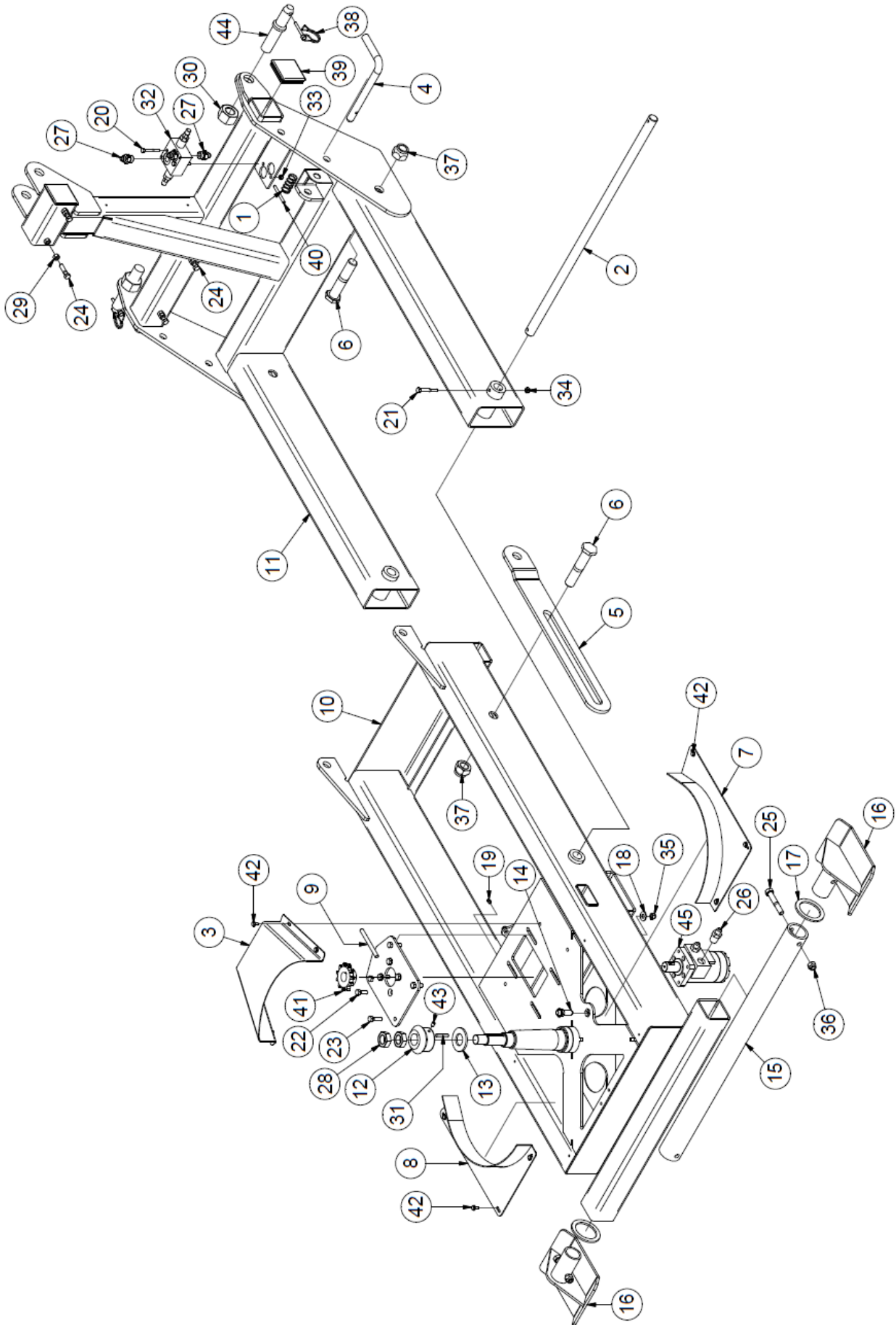
TL1000R Turntable



TL1000R Turntable

Item	Qty	Part #	Description
1	1	35036	Turntable Cross Shaft
2	1	35050	Long Idler Spacer
3	1	35051	Idler Mount
4	1	35052	Short Idler Spacer
5	1	35069	Middle Knife Holder
6	1	35070	Inner Knife Holder
7	1	35082	Skid Shoe
8	1	35083	Outer Knife Holder
9	1	35086	Large Sprocket Set
10	1	35088	Chain Cover
11	1	35090	Chain Guard
12	1	35092	Gear Shield
13	1	35093	Turntable
14	2	35094	Bale Rotater Drum
15	1	36254	Magnet
16	1	35714	24 Tooth Gear
17	1	35785	Miter Gear Spacer
18	2	BS200058	Knife
19	2	TLGRA	Guide Roller
20	2	TL550-301-239	Guide Roller Shaft
21	2	INS150125100B	Polymer Insert Bushing
22	4	BEA UCP207-20NTL	Pillow Block Bushing
23	2	SPR50B60-1.25	Sprocket
24	2	SPR50A15	Sprocket
	2	Obtain Locally	5' #50 Chain + Connector
25	1	Obtain Locally	5' #60 Chain + Connector
26	1	11-1009	Cup (13620)
27	1	11-1010	Cone (13686)
28	1	11-1011	Seal (CR20952)
29	1	11-1124	Seal (CR27361)
30	1	11-1125	Cone (JLM506849)
31	1	11-1126	Cup (JLM506810)
32	5	Obtain Locally	Camlock
33		Obtain Locally	CB 5/16 x 1 Carriage Bolt
34		Obtain Locally	FW 1/2 Flat Washer
35		Obtain Locally	FW 7/16 Flat Washer
36		Obtain Locally	1/4 Grease Fitting
37		Obtain Locally	1/4 90° Grease Fitting
38		Obtain Locally	HB 1/2 x 2 1/2 Hex Bolt
39		Obtain Locally	HB 1/2 x 3 Hex Bolt
40		Obtain Locally	HB 5/16 x 2 1/2 Gr.8 Hex Bolt
41		Obtain Locally	HB 3/8 x 1 Hex Bolt
42		Obtain Locally	HB 1/2 x 2 Hex Bolt
43	1	36255	HB M6 Stainless Bolt
44		Obtain Locally	1/4 x 1 1/2 Keystock
45		Obtain Locally	LN 1/2 Lock Nut
46		Obtain Locally	LN 3/8 Lock Nut
47		Obtain Locally	LN 5/16 Lock Nut
48		Obtain Locally	LP B1997 Lock Pin
49		Obtain Locally	SS 1/4 x .5 Set Screw
50		Obtain Locally	SS 3/8 x .625 Set Screw
51		Obtain Locally	SS 5/16 x .5 Set Screw

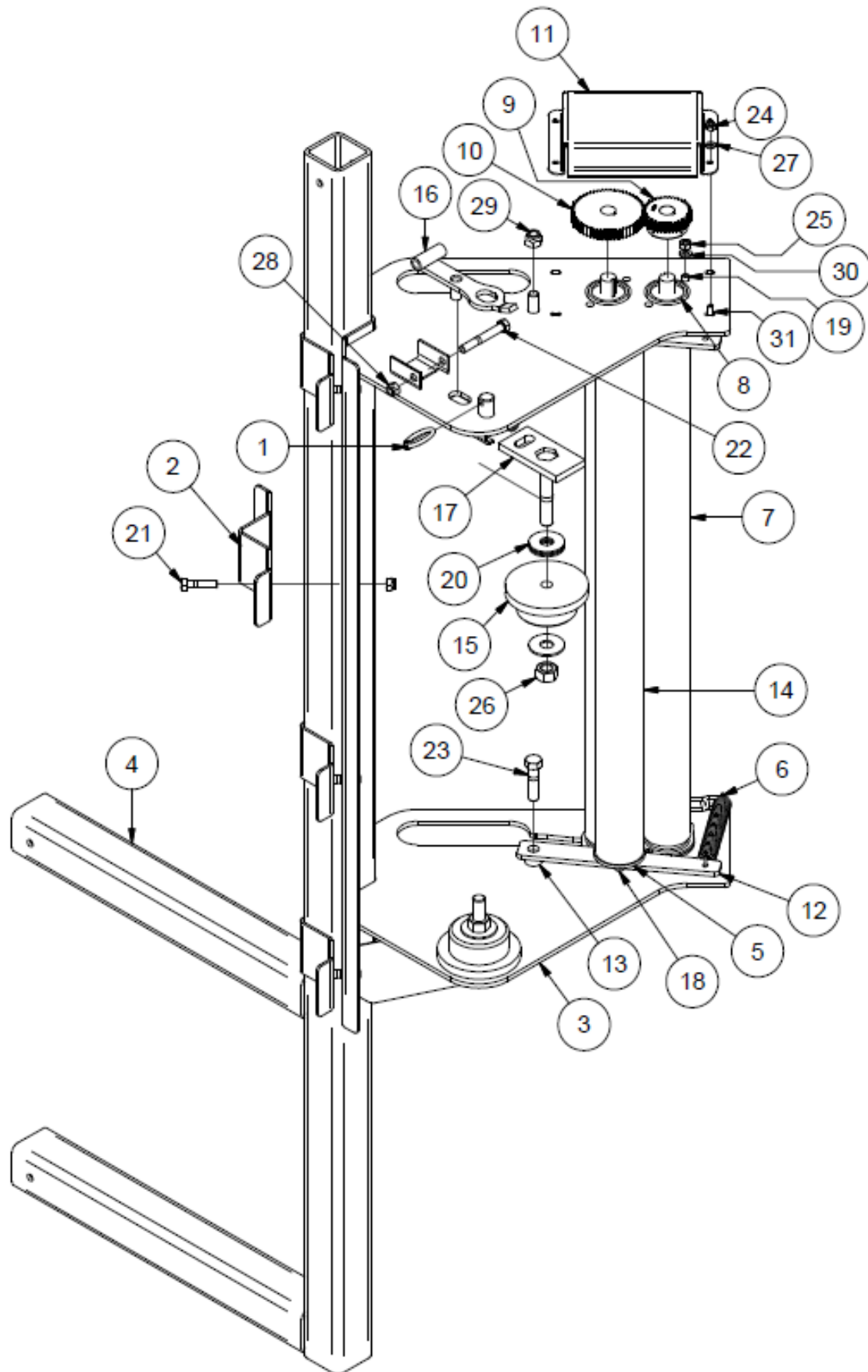
TL1000R Frame



TL1000R Frame

Item	Qty	Part #	Description
1	1	27566	Last Pushoff Spring Pin
2	1	35035	Frame Pivot Shaft
3	1	35046	Turntable Chain Cover
4	1	35055	Transport Lock Pin
5	1	35066	Tip Stop Link
6	2	35067	Machined Head Bolt
7	1	35084	Sprocket Shield
8	1	35084M	Sprocket Shield
9	1	35095	Chain Tightener
10	1	35096	Folding Main Frame
11	1	35097	Main Frame
12	1	35714	24 Tooth Gear
13	2	35785	Miter Gear Spacer
14	1	36253	Proximity Sensor w/ Wire Harness
15	1	36600	Pivot Tube
16	2	36604	Skid Shoe
17	2	36614	Washer
18		Obtain Locally	FW 3/8 Flatwasher
19		Obtain Locally	GR 1/4 Grease Fitting
20		Obtain Locally	HB 1/4 x 2 Hex Bolt
21		Obtain Locally	HB 5/16 x 2 1/4 Hex Bolt
22		Obtain Locally	HB 3/8 x 1 Hex Bolt
23		Obtain Locally	HB 3/8 x 1 1/4 Hex Bolt
24		Obtain Locally	HB 3/8 x 1 1/2 Hex Bolt
25		Obtain Locally	HB 1/2 x 3 Hex Bolt
26		HF 2404-6-8	Hydraulic Fitting
27		HF 6400-6-8	Hydraulic Fitting
28		Obtain Locally	HJN 1 Hex Jam Nut
29		Obtain Locally	HN 3/8 Hex Nut
30		Obtain Locally	HN 1 1/8 Hex Nut
31		Obtain Locally	KS 1/4 x 1 1/2 Keystock
32	1	LA-SB2000RV	Crossover Relief Valve
33		Obtain Locally	LN 1/4 Lock Nut
34		Obtain Locally	LN 3/8 Lock Nut
35		Obtain Locally	LN 1/2 Lock Nut
36		Obtain Locally	LP B1995 Lock Pin
37		Obtain Locally	LN 1" Lock Nut
38	2	LP B1995	Lock Pin
39	2	PEC2518S	Plastic End Cap
40		Obtain Locally	RP 1/4 x 2 1/2 Roll Pin
41	1	SPR60B11	Sprocket
42		Obtain Locally	SS 1/4 x 1/2 Set Screw
43		Obtain Locally	SS 5/16 x 1/2 Set Screw
44	2	TL386012	3 Point Hitch Pin
45	1	TL5X2-200-050	Hydraulic Motor
	4	35710	HH 3/8" x 66" (6FJX,6FJX) Hydraulic Hose












TL1000R Film Tensioner



TL1000R Film Tensioner

Item	Qty	Part #	Description
1	1	Obtain Locally	3/16 Linchpin
2	4	35019	Tensioner Mount Bracket
3	1	35091	Tensioner Frame
4	1	35099	Tensioner Mount
5	2	TL500-100-021	Plastic Roller Cap
6	1	TL500-100-135	Tension Spring
7	2	TL550-100-006	Tensioner Roller
8	4	TL550-100-007	3/4 Flange Bearing
9	1	TL550-100-008	Small Roller Gear
10	1	TL550-100-009	Large Roller Gear
11	1	TL550-100-010	Grease Box
12	2	TL550-100-016	Plastic Roller Mount
13	2	TL550-100-017	Roller Mount Spacer
14	1	TL550-100-022	Plastic Roller
15	2	TL550-200-012	Plastic Wrap Spool
16	1	TL550-200-103	Spool Latch
17	1	TL550-200-115	Spool Holder
18	1	TL553034	Plastic Roller Pin
19	8	Obtain Locally	CB 5/16 x 3/4 Carriage Bolt
20	6	Obtain Locally	FW 5/8 Flatwasher
21	8	Obtain Locally	HB 3/8 x 1 1/2 Hex Bolt
22	1	Obtain Locally	HB 3/8 x 2 3/4 Hex Bolt
23	2	Obtain Locally	HB 1/2 x 2 Hex Bolt
24	4	Obtain Locally	HN 1/4 Hex Nut
25	8	Obtain Locally	HN 5/16 Hex Nut
26	2	Obtain Locally	HN 5/8 Hex Nut
27	4	Obtain Locally	LW 1/4 Lock Washer
28	9	Obtain Locally	LN 3/8 Lock Nut
29	2	Obtain Locally	LN 1/2 Lock Nut
30	8	Obtain Locally	LW 5/16 Lock Washer
31	4	Obtain Locally	MS 1/4 x 3/4 Machiner Screw

UNIFIED INCH BOLT AND CAP SCREW TORQUE VALUES

SAE Grade and Head Markings	NO MARK	1 or 2 ^b	5	5.1	5.2	8	8.2
							
SAE Grade and Nut Markings	NO MARK	2	5		8		
							

TS1162 -19-03MAY1991

Size	Grade 1				Grade 2 ^b				Grade 5, 5.1, or 5.2				Grade 8 or 8.2			
	Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a	
	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.

^a "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.

^b 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.


























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.

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METRIC BOLT AND CAP SCREW TORQUE VALUES

Property Class and Head Markings	<div>4.8</div> <div></div>	<div>8.8</div> <div></div>	<div>10.9</div> <div></div>	<div>12.9</div> <div></div>
Property Class and Nut Markings	<div>5</div> <div></div>	<div>10</div> <div></div>	<div>10</div> <div></div>	<div>12</div> <div></div>

Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a		Lubricated ^a		Dry ^a	
	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.

^a "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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