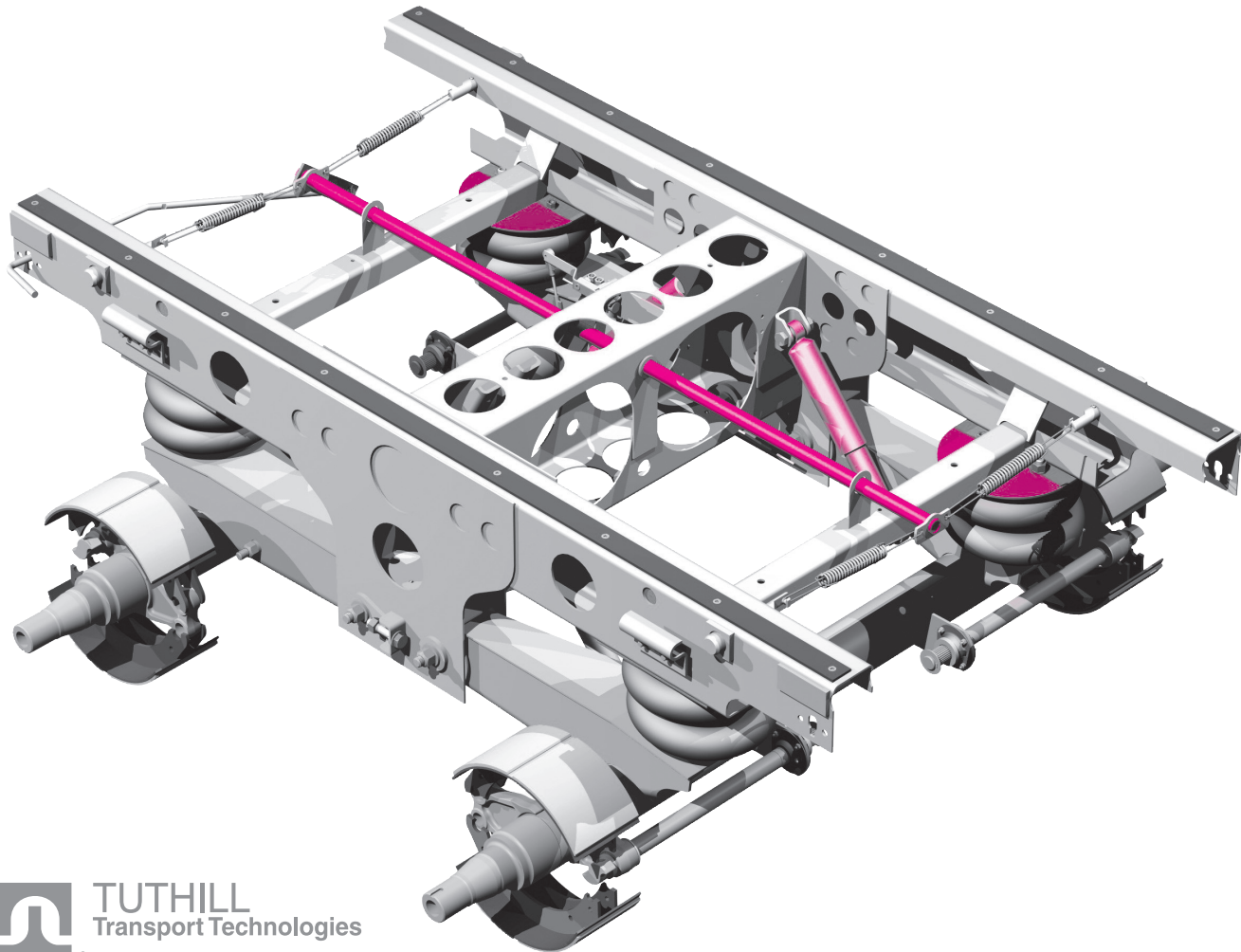


Reyco[®] **Granning[®]** S U S P E N S I O N S

**Installation and
Maintenance Instructions
The DockMaster II
Model 20AR/RS3162
On Highway
Suspension System**



Installation Instructions Model 20AR/RS3162

COMPANY PROFILE

Tuthill Transport Technologies is the Line of Business name arising from the acquisition and merger of two companies in the heavy-duty suspension and off-road axle industries. These companies were formerly known as Fluidrive, Inc. of Brookston, IN and Reyco® Industries, Inc. of Springfield and Mt. Vernon, MO and Reyco® Canada of Grimsby, Ontario. Tuthill Corporation purchased Fluidrive in December, 1998 and purchased Reyco in February, 1999.

Granning® Air Suspensions was founded in 1949 in Detroit, Michigan. Granning's product line was consolidated under Fluidrive, Inc. in 1985.

Reyco was founded in 1924 as Reynolds Mfg. Co. and assumed the Reyco Industries, Inc. name in 1956 in Springfield. Reyco Canada began at the current location in Grimsby, Ontario in 1963. The Mt. Vernon facility was established in 1973. In 2003 Tuthill Transport Technologies Springfield facility merged with the Mount Vernon location.

ReycoGranning® air and steel spring suspension systems are sold to truck, trailer, and specialty vehicle OEM's, and to truck equipment distributors. Tuthill Transport Technologies design, test, manufacture and market these products.

Tuthill Transport Technologies is certified to the internationally recognized ISO 9001:2000 Standard. This certification includes ReycoGranning® operations.

ISO 9001:2000 is the highest international quality standard and is recognized worldwide by all major countries and corporations. To obtain certification a company must undergo a series of rigorous audits to remain certified and ensure consistent quality standards are being maintained. This quality standard was developed by the International Organization of Standardization.

Tuthill Corporation is a privately held manufacturing company with facilities worldwide. Tuthill's corporate offices are located in Burr Ridge (Chicago), Illinois.

On Highway Suspension System

SAFETY PROCEDURES & INFORMATION	○ i.1
Safety First	○ i.1
Lifting	○ i.1
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Welding	○ i.1
Torque	○ i.1
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HEIGHT CONTROL VALVE AND ABS	○ i.3
ALIGNMENT PROCEDURE	○ i.4

Installation Instructions Model 20AR/RS3162

SAFETY FIRST

Be sure to read and follow all installation and maintenance procedures.

LIFTING

Practice safe lifting procedures. Consider size, shape and weight of assemblies. Obtain help or the assistance of a crane when lifting heavy assemblies. Make sure the path of travel is clear.



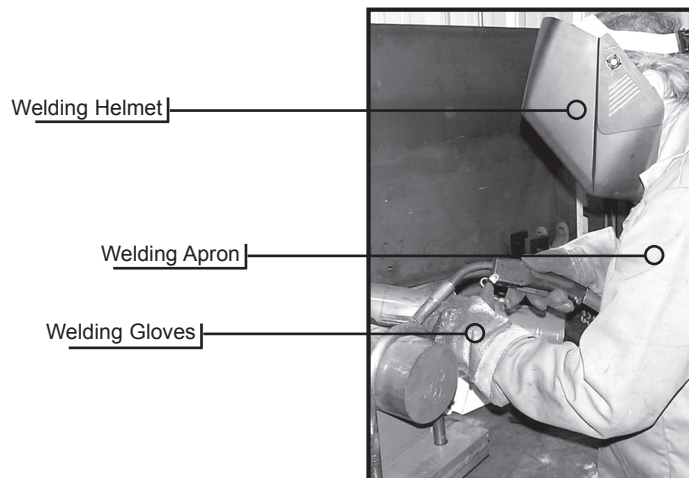
PARTS HANDLING

When handling parts, wear appropriate gloves, eyeglasses and other safety equipment to prevent serious injury.

WELDING

When welding, be sure to wear all personal protective equipment for face and eyes, and have adequate ventilation. When welding, protect spring beams and air springs from weld spatter and grinder sparks. Do not attach "ground" connection to springs.

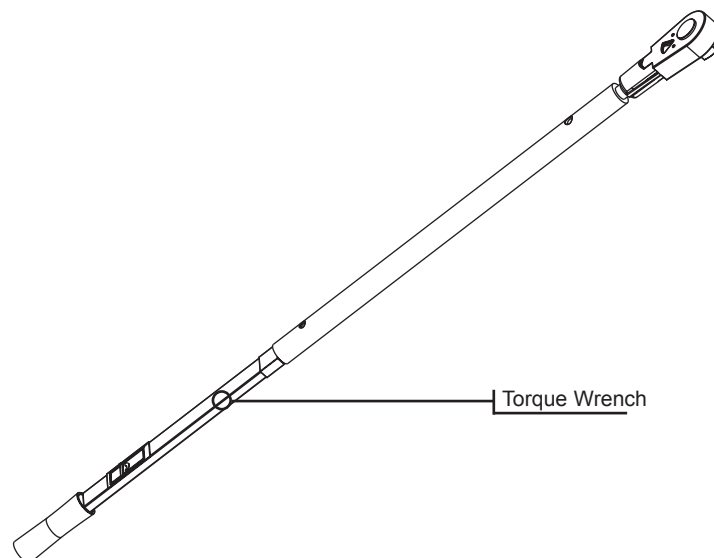
Under normal use, steel presents few health hazards. Prolonged or repeated breathing of iron oxide fumes produced during welding may cause siderosis.



TORQUE

Proper tightening of the nuts and alignment bolts are high priority items. A fastener system is considered "loose" any time the torque is found below required values. Failure to maintain the specified torque and to replace worn parts can cause component failure resulting in accident with consequent injury.

NOTE: It is extremely important after the first 1,000 to 3,000 loaded miles (1,600 - 4,800 kms) of operation, and with each annual inspection thereafter, that all of the bolt and nut tightening recommendations be followed. Any loose fasteners must be retorqued to comply with warranty requirements and to ensure long, trouble-free performance.





OVERLOADING

Overloading is the practice of transporting cargos that surpass the specified vehicle's ratings. Overloading can cause component failure, resulting in accidents and injuries.

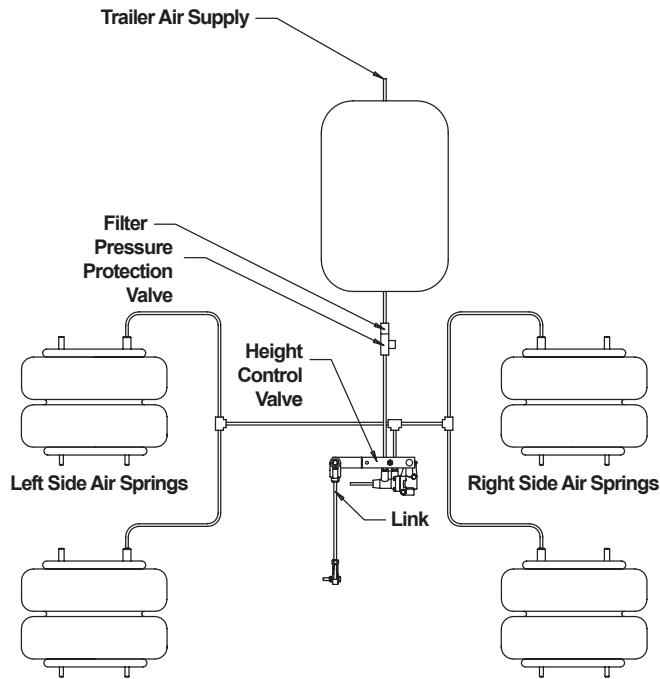


This symbol indicates to the reader to use caution when seen and to follow specific requirements or warnings stated.



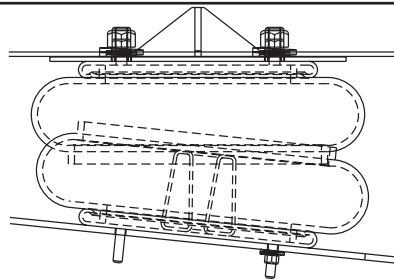
CAUTION: Specific torque requirements are recommended.

Plumbing Diagram
Air Supply With
Hadley 450 Height Control Valve



AIR SUPPLY

Check that supply air pressures and flow are adequate to supply system. Check height control valve and linkages to ensure unit is operating at correct ride height.



AIR SPRINGS

The air springs are equipped with internal bump stops for safety. However, do not operate the loaded unit on the bump stops for any extended period of time, except to move the unit to a repair facility.

Please ensure that you are matching the correct air spring to the suspension model.

Installation Instructions Model 20AR/RS3162

HEIGHT CONTROL VALVE

1. One height control valve (HCV) is used, regardless of the number of axles. The air springs on each side of the trailer are connected by 3/8" (9.5 mm) minimum diameter tubing (customer supplied). Care must be taken to ensure the HCV is positioned as shown on the installation drawing for the model being installed.

Note: HCV is on the front axle.

2. This suspension uses a height control valve (HCV) which utilizes a short delay.

3. Ensure that the air springs and all valves are plumbed as shown.

4. The pressure protection valve (PPV) and filter are installed between the HCV and the air reservoir.

5. Using customer supplied materials, connect the HCV to all air springs using 3/8" (9.5 mm) diameter tubing. As with any pressure system, check for leaks and eliminate leakage, if present.

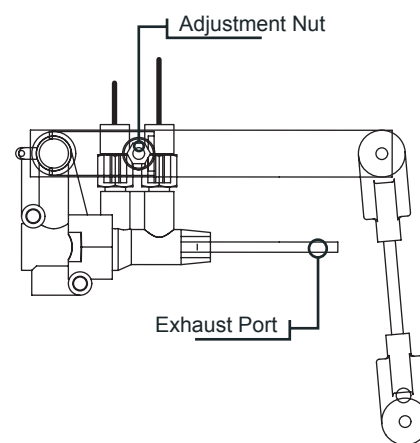
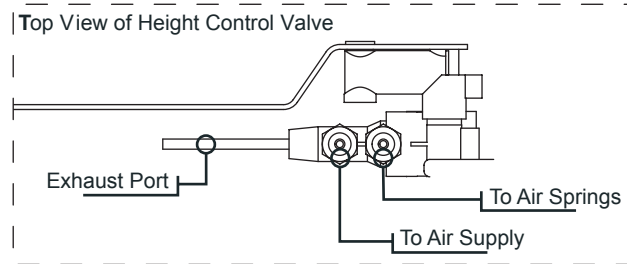
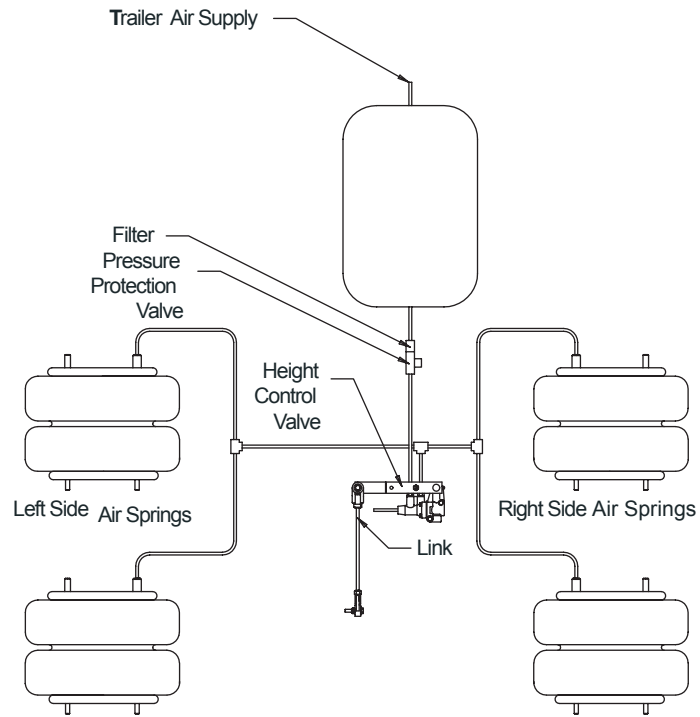
ANTI-LOCK BRAKE SYSTEMS

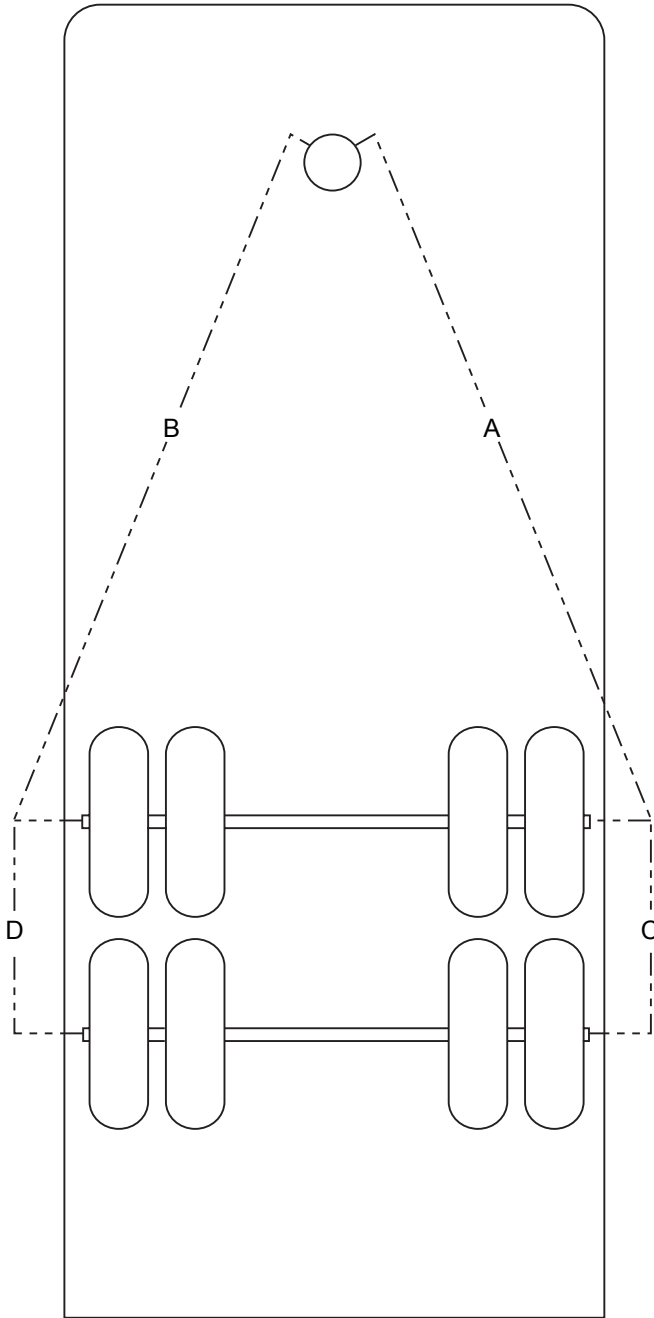
ABS sensors must be placed on the rear axle for 2S/1M system.



ATTENTION !

Plumbing Diagram
Air Supply With
Hadley 450 Height Control Valve





ALIGNMENT

1. Release the brake system and pull the trailer forwards and backwards several times in a straight line to free the suspension from binding and tension.

Note: This procedure must be performed on a smooth level surface.

Note: There is only one Rey-Align per axle.

2. For best results, the use of axle extensions and a 'bazooka' type king pin post, or a suitable optical alignment device are recommended.

3. Note: Align the front axle with the king pin as shown by loosening the 7/8" pivot bolt and turning the 3/4" Rey-Align bolt. Do Not loosen the pivot bolt more than 2 turns from snug.

4. Align the remaining axles to the front axle as shown.

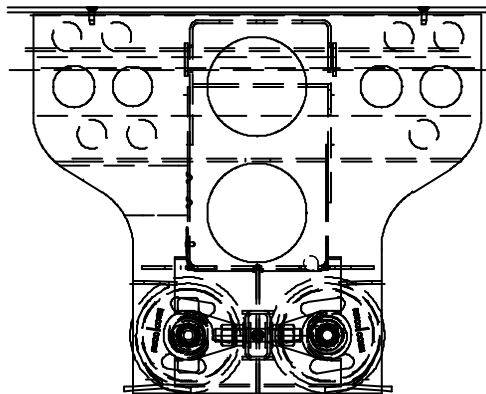
5. Torque the NUT side of the 7/8" alignment clamp bolt to 400-425 ft lbs (540-575 Nm) or the BOLT HEAD side of the alignment clamp bolt to 700-750 ft lbs (949-1017 Nm), using only a torque wrench (see illustration on page m.2).

6. Torque the adjustment shaft (Rey-Align feature) clockwise to 60 ft lbs (80 Nm).

7. Verify that torque is correct on all fasteners.

8. After initial 1,000 miles (1,600 km), the alignment should be re-checked and corrected if necessary, torque on the clamp nuts should also be checked.

NOTE: You can adjust either side or both to achieve alignment.



Maintenance Instructions Model 20AR/RS3162

On Highway Suspension System

MAINTENANCE SCHEDULE _____ ○ m.1

- Visual Inspection _____ ○ m.1
- Torque Requirements _____ ○ m.1
- Maintenance Schedule _____ ○ m.1

TROUBLE SHOOTING GUIDE _____ ○ m.2

- Fasteners _____ ○ m.2
- Bushings _____ ○ m.2
- Hardware Component List _____ ○ m.2

LOCKPIN OPERATION _____ ○ m.3

BILL OF MATERIAL _____ ○ m.5

SUSPENSION DRAWING - 704639 _____ ○ m.6

LIMITED WARRANTY _____ ○ m.7

- Product Installer Responsibilities _____ ○ m.8
- Product Owner Responsibilities _____ ○ m.8
- Warranty Claim Procedures _____ ○ m.8

Maintenance Instructions Model 20AR/RS3162

The Reyco Model 20AR/RS3162 Suspension, by design requires minimum maintenance. Suspensions require periodic checks to assure continued trouble-free performance.

Visual Inspection

1. Check for loose or missing fasteners.
2. Check for Cracks in hangers, trailing arms and axle connection.
3. Check air springs for abrasions and punctures.
4. Check torque on pivot bolts and shock bolts.

Torque Requirements

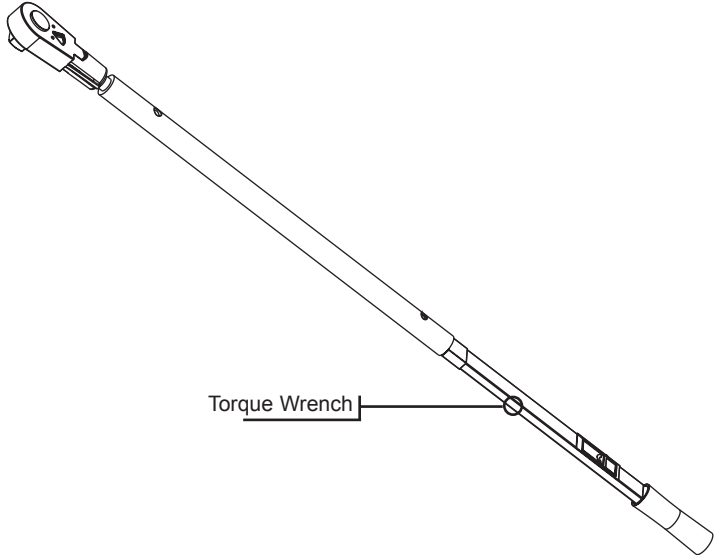
1. Tighten NUT side of pivot bolt to 400-425 ft lbs (540-575 Nm).
2. Tighten BOLT HEAD side of pivot bolt to 700-750 ft lbs (949-1017 Nm).
3. Tighten the Rey-Align to 60 ft lbs (81 Nm).
4. Tighten the shock absorber bolts to 175-200 ft lbs (237-275 Nm).
5. Tighten the upper 1/2" air spring nuts to 25-30 ft lbs (35-41 Nm).
6. Tighten the upper 3/4" spring retainer nuts to 40-45 ft lbs (55-60 Nm).
7. Tighten the lower 3/8" spring retainer nuts to 15-20 ft lbs (20-28 Nm).
8. Tighten 1/4" air valve linkage nut to 5-7 ft lbs (7 Nm).

Recommended Maintenance Schedules

1. Perform pre-service visual inspection (as outlined above).
2. Perform visual inspection after 1,000 - 3,000 miles (1600-4800 Km).
3. Perform visual inspection and Preventive Maintenance inspections, concurrent with DOT "C" inspections, annually.
4. Perform visual inspection during the replacement of any service parts.
5. Perform visual inspection upon discovery of any loose components.

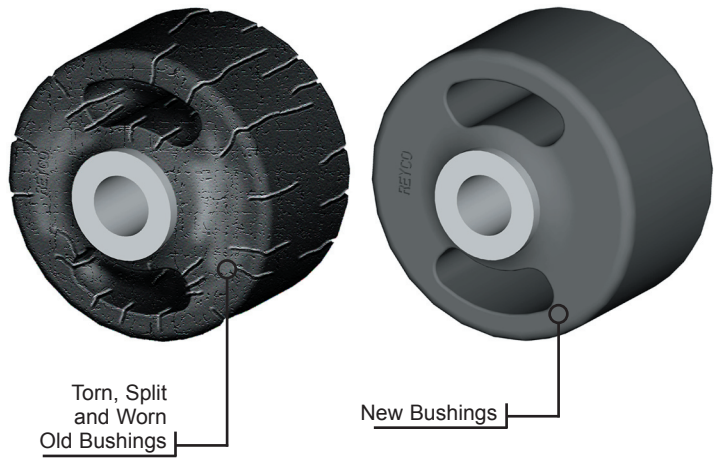
If any of the above defects are noted, have vehicle checked by a qualified mechanic. Torque values are specified with clean, lightly oiled fasteners, and should only be verified with a calibrated torque wrench. Failure to follow these instructions could void the warranty and could result in subsequent injury.

Lb-ft = Foot - Pounds; Nm = Newton - Meters



FASTENERS

Loose fasteners need immediate attention. Check components for wear and be sure holes are not worn or egg shaped. When replacing, be sure threads are clean, lightly oiled and not deformed. Consult the Maintenance Schedule Chart (page m.1) for the correct torque specification. To insure an accurate torque reading, the torque tool used for checking torque, must provide a correct measurement.

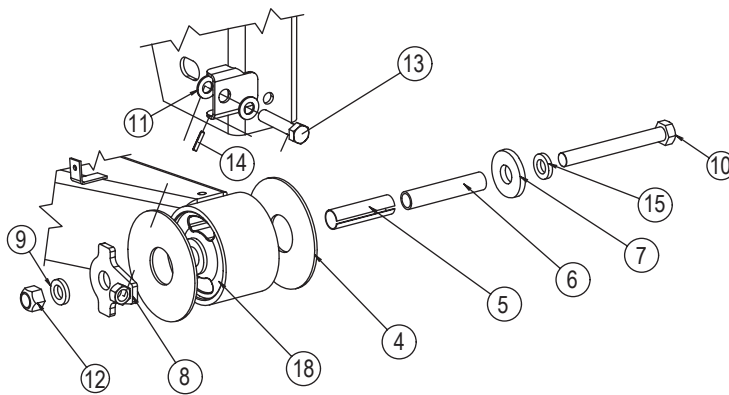


BUSHINGS

Inspect rubber bushings for large splits, tears and major wear. Rubber is attacked by sun, oils and greases. Replace any bushings which have noted damage.

Use P-80 Rubber Lubricant, water or soap and water.

Note: Keep bushing cavities at top and bottom when installing.



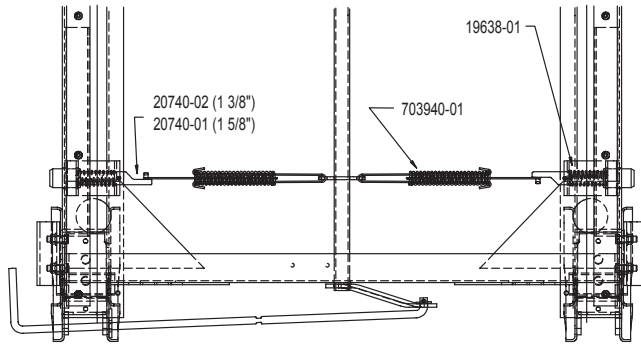
HARDWARE COMPONENT LIST (PER BEAM)

Item	Qty	Description	Part Number
4	2	beam spacers*	23427-01
5	1	sleeve cover*	23432-02
6	1	pivot shaft sleeve*	23674-02
7	1	flange washer	23656-02
8	1	Rey-Align® assembly	23673-02
9	1	disc spring washers*	23952-01
10	1	pivot shaft*	23286-02
11	2	3/4" washer	20852-01
12	1	nut*	14345-01
13	1	Rey-Align® bolt	24398-01
14	1	pin	24453-01
15	1	7/8 washer*	T7292
18	1	bushing*	25770-01

* indicates part of Rebush Kit

Rebush Kits
 K704656 - Single Beam
 K704657 - Two Beams

Maintenance Instructions Model 20AR/RS3162



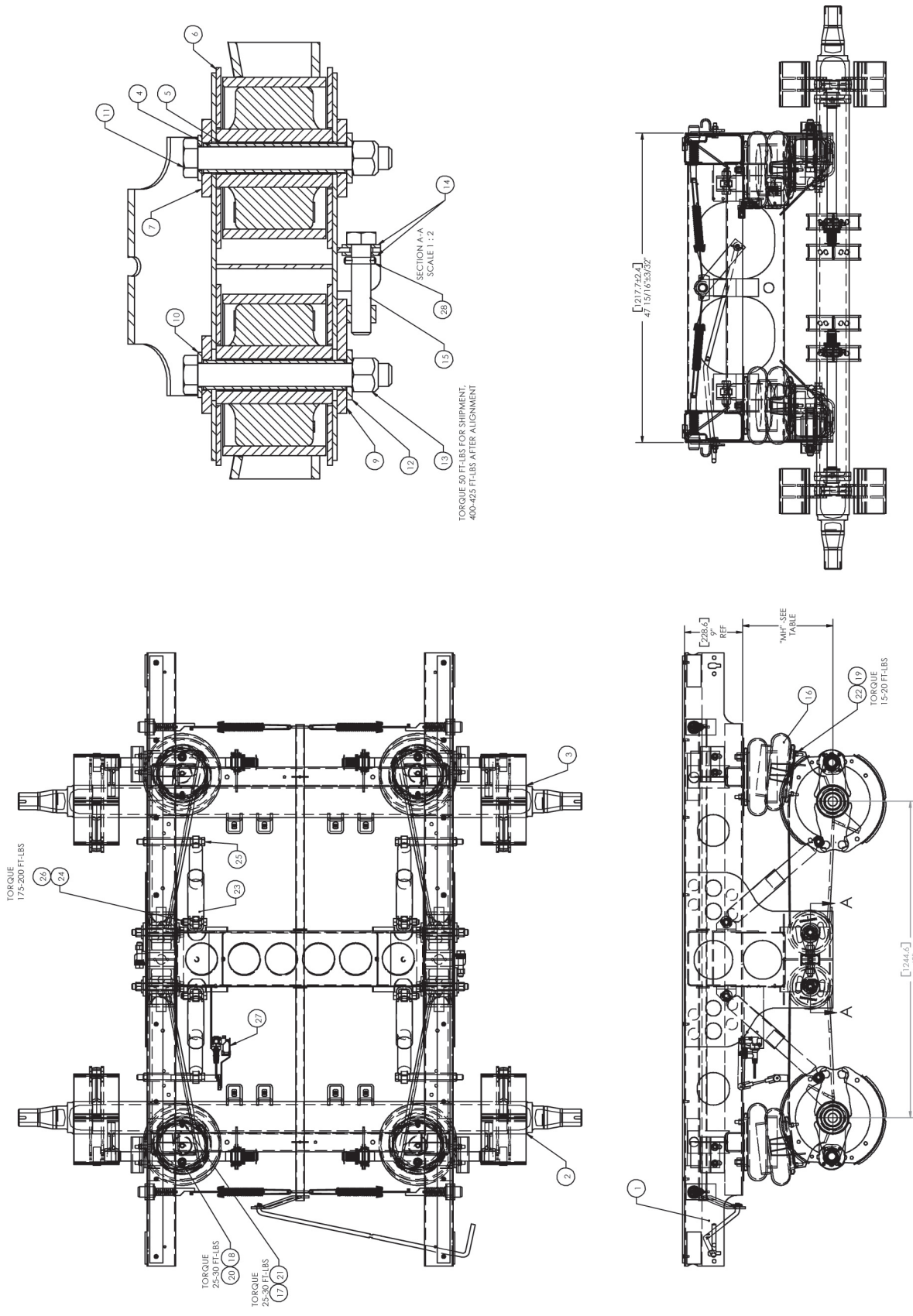
LOCKPIN OPERATION

Lockpins with Flexipull - used on sliders after 2-1-03 production date.

Maintenance Instructions Model 20AR/RS3162

ITEM	PART NO.	DRAWING NO.	DESCRIPTION	QTY.
1	704609-04	704609	SUBFRAME	1
2	704640-01	704640	TRAILING BEAM & AXLE ASSY-FRONT	1
3	704641-01	704641	TRAILING BEAM & AXLE ASSY-REAR	1
4	23674-02	97349	PIVOT SHAFT TUBE	4
5	23432-02	97207	SLEEVE COVER (4.375)	4
6	23427-01	97202	BEAM SPACER	8
7	23656-02	97336	REY-ALIGN FLANGE WASHER	6
8	23673-02	97348	REY-ALIGN ASSEMBLY	2
9	T-7292	93403 # 2	WASHER (7/8 ID)	4
10	23286-02	62158 # 4	HCS (7/8-14UNF-2A X 7.5 LG) GR 8	4
11	23952-01	98126	DISC SPRING WASHER (7/8 ID)	4
12	14345-01	93281	LOCK NUT (7/8-14UNF-2B) CLASS C	4
13	20852-01	93403 # 2	WASHER (3/4 ID)	4
14	24398-01	98480	REY-ALIGN ADJUSTMENT SHAFT	2
15	20018-01	79167	AIR SPRING ASSEMBLY	4
16	T-1705	62159	0.5 ID LOCK WASHER	4
17	T-3164	62159	0.75 ID LOCK WASHER	4
18	T-1859	62159	0.375 ID LOCK WASHER	8
19	08211-01	93280	HEX NUT (3/4-16UNF-2B) CLASS B	4
20	12920-01	93280	HEX NUT (1/2-13UNC-2B) CLASS B	4
21	20029-01	93280	HEX NUT (3/8-16UNC-2B) CLASS B	8
22	18163-01	79168	SHOCK ABSORBER	4
23	18116-01	62158 # 3	HCS (3/4-16UNF-2A X 3.5 LG) GR 8	4
24	12889-02	62158 # 1	HCS (3/4-16UNF-2A X 10 LG) GR 8	4
25	14344-01	93281	LOCK NUT (3/4-16UNF-2B) CLASS C	8
26	706235-01	706235	HEIGHT CONTROL VALVE	1
27	24453-01	98486	COILED SPRING PIN	2

PART NUMBER	SUBFRAME	TRAILING BEAM & AXLE ASSY-FRONT	TRAILING BEAM & AXLE ASSY-REAR	MH	BODY RAIL	SPINDLE	WEIGHT
704639-01	704609-01	704640-01	704641-01	14	HUTCH	TAPERED	1375
704639-02	704609-02	704640-01	704641-01	14	TTMA	TAPERED	1374
704639-04	704609-04	704640-01	704641-01	15.5	HUTCH	TAPERED	1384
704639-05	704609-05	704640-01	704641-01	15.5	TTMA	TAPERED	1383
704639-07	704609-07	704640-01	704641-01	17	HUTCH	TAPERED	1398
704639-08	704609-08	704640-01	704641-01	17	TTMA	TAPERED	1397
704639-21	704609-01	704640-01	704641-01	14	HUTCH	STRAIGHT	1371
704639-22	704609-02	704640-21	704641-21	14	TTMA	STRAIGHT	1370
704639-24	704609-04	704640-21	704641-21	15.5	HUTCH	STRAIGHT	1380
704639-25	704609-05	704640-21	704641-21	15.5	TTMA	STRAIGHT	1379
704639-27	704609-07	704640-21	704641-21	17	HUTCH	STRAIGHT	1394
704639-28	704609-08	704640-21	704641-21	17	TTMA	STRAIGHT	1393
704639-201	704609-01	704640-36	704641-31	14	HUTCH	TAPERED	1375
704639-202	704609-02	704640-36	704641-31	14	TTMA	TAPERED	1374
704639-204	704609-04	704640-36	704641-31	15.5	HUTCH	TAPERED	1384
704639-205	704609-05	704640-36	704641-31	15.5	TTMA	TAPERED	1383
704639-207	704609-07	704640-36	704641-31	17	HUTCH	TAPERED	1398
704639-208	704609-08	704640-36	704641-31	17	TTMA	TAPERED	1397
704639-221	704609-01	704640-46	704641-41	14	HUTCH	STRAIGHT	1371
704639-222	704609-02	704640-46	704641-41	14	TTMA	STRAIGHT	1370
704639-224	704609-04	704640-46	704641-41	15.5	HUTCH	STRAIGHT	1380
704639-225	704609-05	704640-46	704641-41	15.5	TTMA	STRAIGHT	1379
704639-227	704609-07	704640-46	704641-41	17	HUTCH	STRAIGHT	1394
704639-228	704609-08	704640-46	704641-41	17	TTMA	STRAIGHT	1393



On Highway Suspension System

Suspension Drawing - 704639

Maintenance Instructions Model 20AR/RS3162

Tuthill Transport Technologies (TTT) (The Company) warrants ReycoGranning suspension products manufactured by it to be free from defect in material and workmanship, which occur under normal use and service, subject to the following conditions and limitations.

Trailer suspension model: 20AR/RS3162 trailer suspension for on-highway use.

- Coverage is per below in months:

Component	Coverage Period	Coverage Provided
Air Controls	0-24	Parts and labor allowance
Air Springs	0-60	Parts and labor allowance
Shock Absorbers	0-12	Parts and labor allowance
Trailing Arms	0-24	Parts and labor allowance
	25-60	Parts only
Trailing Arm to Axle Connection (Weld only)	0-60	Parts and labor allowance
Bushings	61-120	Parts only
	0-60	Parts and labor allowance
Slider Sub Frame and Hanger Assembly	61-84	Parts only
	0-24	Parts and Labor Allowance

- This warranty shall not apply and no warranty of any kind shall exist as to any product which has been subject to abuse, misuse, neglect, misapplication or accident of any type or cause, or which has been repaired, replaced, substituted or used with parts other than genuine parts of The Company or has been altered by anyone.
- This warranty shall not apply, and no warranty of any kind shall exist, on normal wear and deterioration resulting from the normal use of the suspension system.
- The Company shall not be liable for the loss of use of any product, loss of time, inconvenience, commercial loss or any other indirect consequential, special or incidental damages due to breach of the above warranty of any other failure to comply with the terms of the contract between The Company and The Buyer. The Company makes no warranties of any kind, express or implied, other than as herein expressly provided, and specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.
- With respect to parts manufactured by others, The Company shall have no duty except to assign to the buyer any claim which The Company may have against the manufacturer thereof. (The Company warrants purchased components to the same extent as the Warranty extended by the original manufacturer to The Company).
- The determination of the reasonable cost of labor as required in paragraph one (1), shall be made in accordance with the Tuthill Transport Technologies shop standard times. Maximum hourly allotment for labor cost is determined by The Company annually. Shop standard times and the maximum hourly allotment for labor cost may be revised periodically at the sole discretion of The Company.
- The Company is not responsible for damages from improper installation or operations beyond design capability. The Company, in its sole discretion, shall determine whether or not any product is defective or otherwise covered by this warranty. No action for breach of this warranty may be commenced more than one year after the occurrence of alleged breach. This warranty is not transferable.
- Retention of possession or use of the product for the warranty period shall constitute an unconditional acceptance thereof and fulfillment of all warranties and obligations of The Company and no assistance rendered by The Company in operating the product or remedying any defect either before or after that time shall operate to extend the warranty period.

PRODUCT INSTALLER RESPONSIBILITIES

9. Installer is responsible for installing the product in accordance with The Company specifications and installation instructions.

Installer is responsible for providing proper vehicle components and attachments, as well as, required or necessary clearance for suspension components, axles, wheels, tires, and other vehicle components to ensure a safe and sound installation and operation.

Installer is responsible for advising the owner of proper use, service and maintenance required by the product and for supplying maintenance and other instruction as readily available from The Company.

PRODUCT OWNER RESPONSIBILITIES

10. Owner is solely responsible for pre-operation inspection, periodic inspections, maintenance, and use of the product as specified in the particular TTT instructions available by product model, except as provided in this warranty, and for maintenance of other vehicle components. Of particular importance is the re-torque of fasteners. *This re-torque must be performed within 90 days of the suspension being put in service.* Owner is responsible for “down time” expenses, cargo damage, and all business costs and losses resulting from a warrantable failure.

WARRANTY CLAIM PROCEDURES

11. For a claim to be considered it must contain adequate documentation which states vehicle mileage, in-service date of vehicle (license and registration date), product model, where and how used, and a Tuthill Transport Technologies Return Material Authorization Number. This claim must be made within one year of failure of the component. Such part or parts must be returned to The Company, transportation charges paid. The Company reserves the right to inspect any returned components to determine cause of defects.

*In Service Date is defined as follows:
NEW VEHICLE – license and registration date
AFTERMARKET – date of installation, service invoice

War_20AR/3162 Rev 09/04

Reyco[®] **Granning**[®] **S U S P E N S I O N S**

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Form # 20AR/RS3162I&M 07/06