

Powered Vehicle Suspensions

Owner's Manual

102, 102W & 102CC | Steel Spring Drive Axle Suspensions





Reyco Granning Suspensions 1205 Industrial Park Drive Mount Vernon, MO 65712 Phone: 417.466.2178 Fax: 833.896.6997 www.reycogranning.com

Document #: D712313 Revision: A Revision Date: 05/2015

SAFETY PROCEDURES & INFORMATIONO i.1 SAFETY FIRSTO i.1 OPERATOR SAFETYO i.1 LiftingO i.1 Parts HandlingO i.1 WeldingO i.1	—0 i.1
SUSPENSION SAFETYO i.2 Overloading the suspensionO i.2 TorqueO i.2	
SUSPENSION INFORMATION SECTION	—0 i.3
PRELIMINARY NOTES/PREPARATIONS	——O i.5
INSTALLATION INSTRUCTIONS	—0 i.6
AXLE ASS <u>EMBLY</u>	—o i.7
	—o i.8
	—o i.9
ALIGNMENT INSTRUCTIONS	—o i.10
ASSEMBLY NOTES	—0 i.11

It is the responsibility of the installer to insure that the installation is correct and to verify that this Installation Manual is the current version, prior to the installation of this suspension.

Properly installed and correctly maintained, your suspension will provide optimum service therefore rewarding your decision to use. Should you have any further questions regarding your Reyco Granning suspension, please contact us in the U.S. at 1-800-753-0050.

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.





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.



TORQUE

Proper tightening of the U-bolt 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.

THE MODEL 102 SUSPENSION FAMILY

The Model 102 Suspension family is a heavy duty, good riding, steel spring equipped, drive axle suspension, which has evolved into many variations and options, over many decades of successful use and operations in the field. The Model 102 in its basic popular form, is a tandem drive axle suspension, which uses four steel springs, coupled by two equalizers (rockers), and incorporates torque arms to position, control, and align, the two axles. The 102 uses two-piece bushings at the torque arm pivot points.

The Model 102W Tandem was developed from the Model 102 basic design, and is now the "Suspension of Choice", of the three designs, in the industry. The 102W utilizes many similar components of the 102, except for a smaller onepiece bushing at the axle seats, originally to accommodate wedge brakes.

The Model 102CC is a single drive axle suspension that uses some of the components of the Model 102, but has different designed springs, and utilizes an upper torque rod at the differential.

A list of the more popular, typical drawings is shown at the right. There are dozens of variations, which are available upon request. (See chart) Typical views of these three basic types of suspensions are shown on page i.4.

For these installation instructions, we are mainly dealing with Models 102 and 102W, standard 52" tandem, with the differences, noted in the following instructions.

There are many versions of the Model 102 family in existence, such as 50.0", 54.0", 60.0" nominal tandem axle spacings, plus single axle drive, with and without tag axle. There are also a large number of spring options available. Please consult Reyco Granning Engineering Department for any additional requirements.

Model	Nominal Tandem Axle Spacing	Drawing Number
102	50" (1270 mm)	73118-2
102	52" (1321 mm)	73109-2
102W	50" (1270 mm)	72112-2
102W	52" (1321 mm)	73120-2
102CC	Single Axle	79534

þ

ĽС



INSTALLATION INSTRUCTIONS

1. Generally, prior to any actual installations, technical representatives of both companies have made personal contacts, and most necessary technical information to make an installation have been exchanged. The following general steps are listed on the following pages in the interest of all involved, and should be included in the vehicle manufacturer's plan to install the suspension. The steps do not have to be done in the order presented.

2. During the following installation process, refer to the Reyco Granning drawing of choice, either for the Model 102, #73109-2 which shows the component locations, or the Model 102W, #73120-2, (both 52 inch nominal axle spacing only). Again, these instructions address only the "standard 52 inch tandem axle spacing" with multi-leaf springs (P/N 09475-01) with an 8.0 inch "Mounting Height", unladen. From either drawing, the frame mounting hole pattern can be determined.

3. Frame Preparation

The vertical positions of the hangers must be located correctly, to obtain the proper mounting height. Refer to assembly drawing for frame mounting hole pattern.

4. Hanger Locations

Start by marking the centerline of the tandem (center hanger) locations on each frame rail. Then work to the forward and rear of these locations for front and rear hanger locations, as required. Crossmembers are required at all hanger locations. These must be in-place and compatible with suspension components.





52" Tandem





Rear Hanger - Standard

4. Spring Centers

Spring centers will be overall frame width, plus 6.0 inches (3.0 inches for each side, due to hanger width).

5. Hanger Installation

6. Center Hangers

7. Rear Hangers

Obtain the two front hanger assemblies, and install these in the proper holes on the frame using Grade 8 or equivalent fasteners. These fasteners are customer-supplied. Once hangers are square to the frame, tighten these to manufacturer's specifications.

Obtain the two center hangers and install these in

Obtain the two rear hangers and install these in the

proper holes on the frame, using customer-

supplied fasteners. Note: Top plane of rear hangers are ³/₄" below plane of the other two

the proper holes on the frame, using customersupplied fasteners. Tighten to specifications.



Installation Instructions Models 102/102W/102CC

8. Equalizer Assemblies

Obtain the two equalizer assemblies and insert these into the center hangers. Note: Equalizers are marked "This Side In" indicating which side should be close to frame rail. Install threaded equalizer shaft through the front face, through the bushing, and into the prethreaded hole in the rear of each casting. Continue turning shaft until all threads are engaged in hanger. Do not force shaft after threads contact frame face. Back-off one-quarter turn. Install lockwasher and nut at front face. With equalizer parallel to frame rail, tighten the nut to 600-625 ft. lbs. (815-850 Nm). Make sure the shaft doesn't turn during this step.

9. Axle Preparation

Normally, the axle assemblies are prepared in a separate location where the axle, springs, and axle clamp groups are assembled and aligned in a fixture (squared to axle). The following steps are provided as an aid.

10. Axle Seat Placement

Axle seats with machined pinion angles and offset axle provisions, must be installed on the proper axle and side. Bottom plates also must be properly matched with the axle seats of the same pinion angles. These should be noted and marked for proper assembly.

11. Axle Assembly and Buildup

With the axle firmly clamped in a fixture or holding device, establish the spring centers on the axle(s). If the axles have dowels, the axle seats must be properly specified or modified, to fit these. Obtain the right and left axle seats and place into their proper locations on the axle. Install the spring assemblies on the spring seats. Obtain the top plates, U-bolts, bottom plates, washers, and the locknuts. Gradually place the sub-assemblies together in the proper locations and attitudes, while referring to the print. Make sure the pilot bolts in the spring assemblies engage the corresponding holes in the axle seats. Gradually tighten locknuts in a criss-cross pattern, in 100 ft. lb. increments, while making sure springs remain square to the axle.

Tighten to 300-325 ft. lbs. (410- 440 Nm).









Installation Instructions Models 102/102W/102CC

12. Axle Seat Welds

For the Model 102 ONLY, all axle seats must be welded to the axle. After the seats are properly located and clamped to the axle, weld each seat at the front and rear edges, but not on top surface of the axle. See sketch. Unwelded axle seats must be approved by Reyco Granning Engineering. The Model 102W axle seats do not require welding.

13. Axle Assembly Placement

At this point, the completed axle, springs, and clamp group assemblies are to be placed into the frame, hanger build-up. The spring tips should be guided into the proper locations in the hangers and equalizers.

14. Spring Retainer Fasteners

Install spring retainer bolts at hangers and equalizers. Note: Front hangers require a lockwasher installed under the bolt head, and no nut (casting is threaded). Equalizers require bolt, spring roller, lockwasher, and nut to be installed at each of the four locations, with nut on the frame side of equalizer. Rear hangers require bolt, spring roller, lockwasher, and nut.

15. Torque Arms

Obtain the adjustable torque arms. Set each adjustable torque arm to the same length as the rigid torque arm, and leave clamp bolts loose.

NOTE: The adjustable torque arms are recommended to be placed on the road side of the vehicle, and the rigid torque arms, on the curb side. The clamp portion of the adjustable torque arm should be directed away from the spring assembly, to avoid possible interference. With the axle assembly in position, place the torque arm assemblies into the hanger and axle seat slots. Start aligning all the bushing holes with their corresponding mounting holes.

Hint: Smaller diameter tapered drift pins are very useful for starting and holding the components in position, until the bolts and bushings can be installed.

16. Torque Arm Attachment to Hangers

Obtain one TK21640T fastener kit and install into the front hanger mounting holes. We recommend installing bolts with heads inboard so that if the nuts are ever lost, the bolt doesn't work itself out and into the tire. Repeat this same procedure for the other front hanger, and both center hangers. Snug these fasteners, but do NOT tighten at this time.

Lubricate and place the second rubber bushing and flat compression washer on the bolt from the opposite side of the torque arm. Use rubber lubricant.

NOTE: Both ends of torque arm should be loosely assembled before tightening locknuts.

Tighten the nut to 500 to 525 ft. lbs. (680-715 Nm). There should be an even build-up of rubber on each side of the torque arm between the torque arm and the hanger.

NOTE: Do not tighten the adjustable torque arm clamping fasteners until after final alignment.

NOTE: It is desirable to have suspension at ride height when tightening done.

17. Torque Arm Attachment to Axle

Model 102

Forgue Arm Bushing Assemb

Obtain one set of bushings/fasteners and install these through the holes in the axle seats and torque arms. Hint: See Assembly Notes section for aid in assembling the two-piece bushings. Some prying may be required to align all these holes. Repeat at the other three locations. Snug these fasteners, but do NOT tighten.

Model 102W

Obtain the bolt nut fasteners and install these through the holes in the axle seat and the onepiece bushing (which is already installed). Repeat at the other three locations. Snug these fasteners, but do not tighten, at this time.











MODEL 102W AXLE SEAT

IN SERVICE SUSPENSION ALIGNMENT INSTRUCTIONS

Place unloaded tractor on a level floor area. Move it back and forth several times, slowly and without using brakes, to free all suspension joints.

Check front wheel with tractor brakes released. Before alignment, make certain that all beams are not binding; that u-bolts and torque arm bolts are torqued to the manufacturer's specifications, and all bushings are in good condition.

Clamp an 8' piece of straight bar stock or angle iron securely after positioning it squarely across the frame. (The use of a carpenters square is required to be certain the bar is square to the frame).

The cross bar should be positioned as far forward of the drive axle as room will permit.

Beginning on the fixed torque arm side, measure from the bar stock to the centerline of the rear drive axle on both sides. See figure on the left.

If the measurements, x_1 and x_2 vary more than 1/8", alignment adjustment should be made through the adjustable torque arm side.

After aligning, tighten the 5/8" adjustable torque arm clamp bolts to 125-150 ft. lbs.



CAUTION: Specific torque requirements are recommended.

Once the rear drive axle is properly aligned, the front axle can then be aligned to the rear with the use of a standard trammel bar.

Following the alignment of both axles, it is recommended that it be driven through a short series of turns and then returned to the shop and the alignment rechecked, after again freeing all suspension joints by moving it back and forth several times.

Check the alignment after the first 1,000 - 3,000 loaded miles (1,500 - 4,800 kms) of operation during annual, "C", inspection.



ASSEMBLY NOTES

The following information has been reproduced from the drawing and various sources, as an aid in assembly.

- Suspension attaching fasteners that are customer-supplied, must be Grade 8, or equivalent.
- It is recommended, that the nuts on the U-bolts attaching the axle, be retorqued to the specified values of 300-325 ft. lb. (410-440Nm), one additional time, just prior to the vehicle leaving the factory. This is assuming that some driving and loaded checkouts will have been done on the completed vehicle at the factory. This will insure the best possible clamped condition for these important fasteners.
- When installing the two-piece bushings, it is important that there be no metal-to-metal contact at the bushings. There should be even beads of rubber between the washers, torque arms, and hangers or axle seats.

MAINTENANCE SCHEDULE	O m.1
IN SERVICE SUSPENSION ALIG <u>NMENT</u>	O m.2
TROUBLE SHOOTING GUIDE	O m.3
TYPICAL OPTIONS & PARTS	O m.4
102 SERIES MAINTENANCE KITS	

MAINTENANCE RECOMMENDATIONS

The Reyco Granning Model 102 Drive Axle Suspension, by design, requires a minimum of maintenance. However, all suspensions require periodic checks to assure continued trouble-free performance.

Recommended Maintenance Schedule

- Pre-Service inspection.
- First Service Inspection, after the first 1000-3000 miles (1600-4800kms).
- Preventative Maintenance (PM) Inspections every 50,000 miles (80,000 kms) or every 6 months, whichever is least.
- During/After replacement of service parts.

Visual Inspections Shall Include

- Determination if unit is operating at correct "Mounting Height".
- Search for loose or missing fasteners, especially the U-bolt nuts. Evidence of relative movement of components can often be detected by observing "rust patterns" coming out of the joints.
- Inspections of hangers, springs, for damage or wear.
- Search for abnormal tire wear. Tires can indicate misalignments, internal pressure problems, among others. Be sure to consult with the tire manufacturer for additional information, as they have expertise in these areas.

Suspension Torque Requirements

Tighten 3/4" U-Bolt nuts to 300-325 ft. lbs. (410-440 Nm) Tighten 7/8" U-Bolt nuts (if equipped) 400-425 ft. lbs. (545-580 Nm) Tighten equalizer nut (all sizes) to 600-625 ft. lbs. (815-850 Nm) Tighten 1" torque arm nuts (at hanger) 500-525 ft. lbs. (680-715 Nm) Tighten 1" torque arm nuts (at axle) 160-200 ft. lbs. (220-275 Nm) Tighten 5/8" adjustable torque arm nuts 125-150 ft. lbs. (170-205 Nm) Tighten 1/2" spring retainer nuts to 70-80 ft. lbs. (95-110 Nm)

General Maintenance Guidelines

- Follow "Common Sense" safety procedures when you service or maintain the vehicle's suspension.
- Follow published guidelines for working on powered equipment.
- Know the limitations and ratings of the equipment used during maintenance service procedures.
- Practice safe lifting procedures. Consider size, weight, and shape of large assemblies. Obtain assistance when lifting heavy assemblies.

Nm = Newton Meters; ft. lbs. = Foot Pounds

WELDING

When welding, be sure to wear all personal protective equipment for face, eyes, hands, and clothing. Have adequate ventilation. Protect other suspension components, such as bushings, wear pads, and air springs from weld spatter and grinding operations. Keep adjacent parts cool, from heat buildup.

Electrode Specifications for Welding.

Any one of the following four specifications is applicable for welding on these suspensions:

•	Shielded Metal	Arc with Stick	Electrodes	AWS E7018
---	----------------	----------------	------------	-----------

- Gas Metal Arc (MIG, solid wire).....AWS ER70S-X
- Gas Tungsten Arc (TIG).....AWS ER70S-X
- Flux Cored Arc (Tubular Wire).....AWS E70T-X

The weld strength must be at 70,000 psi. Higher or lower strengths are not acceptable. The best fusion and strengths will be obtained using the voltage, current, and shielding medium recommended by the electrode manufacturer.

In-Service Alignment Procedures

Follow the same procedures as the initial alignment procedures.

Suspension alignment should be checked and/or completed:

- After the first 1000-3000 miles (1600-4800Kms) of operation
- After each major PM inspection
- After discovery of any loose fasteners or components
- After replacement of any components

Torque Procedures - Proper tightening of all fasteners is extremely important. All values in the torque table are to be administered with clean, lightly lubricated fasteners, and verified with a quality, calibrated torque wrench. High priority should be given to the U-Bolts, nuts, and fasteners affecting alignment. A fastener system is considered "loose" any time that the torque is found below the required values.

It is extremely important that all of the bolt/nut tightening recommendations be followed after the first 1000-3000 miles (1600-3000 kms) of operation, and with each major PM inspection thereafter.

Failure to follow the recommended torque requirements could void the warranty. Failure to maintain the specified torque values and/or replace worn parts can cause component failure resulting in accidents with consequent injury.

Symptoms	Possible Causes	Remedies
Tractor leans to one side	 broken spring, hanger, equalizer equalizer bushing/bolt worn sagging springs, advanced wear 	 repair/replace broken parts replace equalizer/bolt replace with OEM parts
Excessive lateral movement	 loose u-bolts and/or sheared dowel pins on axle 	 repair axle/pins, new u-bolts, seats and hardware
Hard ride or axle bottoming out	overloaded or axle weight imbalanceaxle bump stops in wrong location	 reduce loads, balance drive axle weighouts with spacers correct axle bump stops
Poor handling	 look for excessive wear at hangers, loose components, rusty wear marks 	 repair/replace as necessary, check total vehicle, frame, etc.
Prematurely worn drive axle(s) tires	 check drive axle(s) alignment different types, sizes of tires 	realign axle(s) as necessarycheck tire types and sizes
Prematurely worn front steer tires	 total vehicle alignment, incorrect thrust angle, bent frame 	 align total vehicle, correct thrust angle, correct frame problems
Hanger(s)	 broken/damaged or adversely worn hanger wear pads, if applied loose hanger fastening hardware 	 replace worn/damaged parts replace worn/damaged parts tighten or replace
Spring(s)	 broken or adversely worn; failed though center bolt; damaged during repair; interfering at ends 	 replace with OEM parts u-bolts loose, replace spring replace with OEM parts usually aftermarket, replace with OEM
U-Bolts, Hardware	• running loose, used	 replace with new hardware
Equalizer(s)	 broken or worn running "cocked" up/down improper position, hits frame running loose 	 replace with OEM parts check axle weighouts bushing worn, replace center shaft loose, tighten
Torque Arm(s) (T/As)	 broken or worn hitting/rubbing hangers/bolts unit not keeping alignment unit not keeping alignment 	 replace with OEM parts replace bushings, bolts replace bushings, realign adjustable T/A slipping, replace
Bushing(s)	 large splits, tears, cracks small aging cracks premature failures, bushing slipping in cavity 	 replace with OEM parts monitor, note for future PM check lubricants, correct with P-80, or soap and water
Misc. Parts (such as Top Plates, Spring Liners, Bottom Plates, Brackets, etc.)	 broken and/or worn condition 	• replace with OEM parts

MODEL 102 & 102W SPECIFICATIONS AND OPTIONS

The model 102 and 102W are Reyco Granning's famous truck/tractor suspensions, known for easy ride and low maintenance. The model 102 family provides the smoothest ride available, due to the suspension geometry and extra attention to spring design. Strong hangers and cast axle seats ensure an extended service life without undue maintenance expense. All the pivot points use generous rubber bushings that will not only last, but will also absorb the twist, stress, and jarring experienced by today's vehicles.

Configuration	4 x 2, 6 x 4, 6 x 2, Tag, 6 x 4 Pushers
Mounting Heights	11" Standard, 9-3/4" to 11" Optional
Axle Compatibility	Compatible with most axle types
Axle Spread	50", 52" and 60"
Pinion Angles	0º to 5º Front, 9º to 13º Rear
Axle Alignment	Achieved with cast, adjustable torque arms
Brake Type	Model 102 & Model 102W will accept S-Cam Brakes, Use the Model 102W for Wedge Type Brakes*
Frame Rail Length	104" with Fuel Tank Clearance
Weight (Base Model)	734 lbs. with 4 leaf springs
Springs	All Reyco Granning [®] springs are shot-peened to maximize service life. Parabolic taper leaf springs are suggested for ultimate ride characteristics.

Spring Part #	rt # Ground Load Axle Spacing		# of Leafs
09475-01	40,000	52"	14
09884-01	44,000	52", 60"	15
12613-01	44,000	52"	15
14921-01	44,000	52"	12
16227-06	38,000	52"	3
16227-02	38,000	52"	3
21286-01	46,000	52", 60"	4

* The model 102 employs split torque arm bushings at each end, and the axle seat eye is positioned near the center line of the axle. This configuration may not be compatible with wedge brake assemblies. The model 102W torque arm attaches to the axle seat with a single piece bushing, and the axle seat eye is positioned near the top of the axle. This configuration should provide clearance for both s-cam and wedge brake assemblies.

Contact Reyco Granning through your Customer Service Representative or District Sales Manager for options not listed.

MODEL 102CC SINGLE AXLE SPECIFICATIONS AND OPTIONS

The Reyco Granning® model 102CC is an extra-duty single axle suspension for trucks used in heavy applications. The model 102CC will be found in construction, under dump bodies, roll-off service, curb pick-up, and other demanding applications that would quickly stress standard suspensions. The model 102CC shares the cast components, for intrinsic strength, found in all of the Reyco Granning® 102 products. It incorporates a special third torque arm connecting the top of the differential housing to a frame cross-member. This combination provides a firm suspension with resistance to engine and braking torque, excellent roll stability, steadfast pinion angle and the low maintenance found in all Reyco Granning® products.

Configuration	4 x 2, 4 x 2 with pushers and/or tags
Mounting Heights	7-1/2" to 10-1/2"
Axle Compatibility	Eaton, Meritor, Dana
Pinion Angles	0° to 5°
Axle Alignment	Achieved with cast, adjustable torque arms
Frame Rail Length	46" (50" with Fuel Tank Clearance)
Weight (Base Model)	460 lbs. with 9 leaf springs
Springs	Special service springs are shot-peened for long life. The spring rate is designed to start soft, and become firm soon after loading begins.

Spring Part # Ground Load		# of Leafs	Spring Rate
18308-01	31,000	10	15,400 #/in.
14712-01	29,000	9	13,900 #/in.
14514-01	23,000	8	11,500 #/in

102 SERIES MAINTENANCE KITS

Model 102	TK10587	. Torque arm rebushing kit (tandem)
Model 102	TK7424	Torque arm rebushing kit (axle seat end-1 pc)
Model 102	TK19089	Torque arm rebushing kit (center hanger end - 2pc)
Model 102	TK19168	Rear hanger wear pad replacement kit
Model 102	TK19011	Spring roller assembly
Model 102/102W	.TK19169	Rear hanger roller and bushing kit (one hanger)
Model 102/102W	.TK19056	Equalizer rebushing kit (one equalizer)
Model 102/102W	.TK21640T	. Torque arm rebushing kit (hanger end, one hanger)

Maintenance Record

Name of Owner			Address of Owner		
Date of Purchase	Name and Address of Dealer				
Model of Vehicle	Vehicle Identification Number				
Suspension Model Number:	Suspension Serial Number:				
Inspection and Maintenance Item	Date	Mileage	e Service Performed		

Maintenance Instructions Models 102/102W/102CC

For Your Own Notes		

This page intentionally left blank.



Reyco Granning Suspensions 1205 Industrial Park Drive Mount Vernon, MO 65712 Phone: 417.466.2178 Fax: 833.896.6997 www.reycogranning.com