



**TG611-13/-17 Overspeed Test Device
Conversion Kit**

Kit Part Number 8516-174



General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.



Revisions

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Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.



Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:

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Revisions—Changes in this publication since the last revision are indicated by a black line alongside the text.

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Warnings and Notices

Important Definitions



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

WARNING

**Overspeed /
Overtemperature /
Overpressure**

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

WARNING

**Personal Protective
Equipment**

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- Eye Protection
- Hearing Protection
- Hard Hat
- Gloves
- Safety Boots
- Respirator

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

WARNING

**Automotive
Applications**

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

NOTICE**Battery Charging
Device**

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electrostatic Discharge Awareness

NOTICE**Electrostatic
Precautions**

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).
- Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.
- Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual **82715**, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
 - Do not touch any part of the PCB except the edges.
 - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
 - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

TG611-13/-17 Overspeed Test Device Conversion Kit

WARNING

This conversion should only be performed by personnel experienced with, or properly trained on, the assembly and disassembly of the TG governor.

NOTICE

To ensure proper operation of the overspeed test device (OTD), make sure that all replacement parts are clean and visually free of debris during installation.

Tools Required

- 60 lb-ft (80 N·m) Torque Wrench
- 100 lb-in (11 N·m) Torque Wrench
- 1.5" Socket
- 3/8" Socket
- 3/32" Allen Wrench
- 3/16" (5 mm) Pick (Spring Removal Tool)
- 1/8" (3 mm) Pick (O-ring Installation)
- External Retaining Ring Pliers
- Wire-Gripping Pliers
- Adjustable Crescent Wrench
- Lightweight Hammer
- Arbor Press (1 ton)



Conversion Kit Package

Disassembly

See Figure 2.

1. Remove the 8x cover screws (102) and the speed-setting screw retaining ring (132). Discard retaining ring.
2. Remove the governor cover (152) and cover gasket (151) from the assembly.

IMPORTANT

You may need to assist by pushing down on the top of the speed-setting screw to disengage it from the cover.

Once the cover is removed, ensure that gasket residue is completely removed from the housing surface and no residue enters the inside of the governor. Discard the cover gasket.

3. Remove the speed-setting screw (145) from the assembly by unthreading it from the cylinder pivot pin (104). Discard the O-ring located in the top of the speed-setting screw.

IMPORTANT

These are left-hand threads. They loosen by turning in the opposite direction of normal (clockwise to loosen, as viewed from the top).

4. Remove the cylinder pivot pin (104) and 2x stop washers (103) from the feedback lever (105), and discard these parts.
5. Using the spring removal tool (3/16" / 5 mm pick), remove the loading spring (143) from inside the speed-setting screw guide bore (142). Do NOT remove bore (142), which is press-fitted in. Discard the loading spring.
6. Remove spring clip (106) and replace with new (shorter) spring clip (Figure 3, item 27). Be careful not to overstretch the spring clip; bend it just far enough to fit in the holes by engaging first one side, and then the other side. Make sure the tangs of the spring clip fully engage both the feedback lever (105) and the speed-setting nut (115).



Nameplate

7. Remove the old governor nameplate and drive screws (the nameplate may be on the side of the governor body as shown at right, or it may be on the cover as shown in Figure 2, item 153).
8. Transfer the old nameplate information to the new nameplate. Mark the new nameplate with the new part number. Discard the old nameplate.



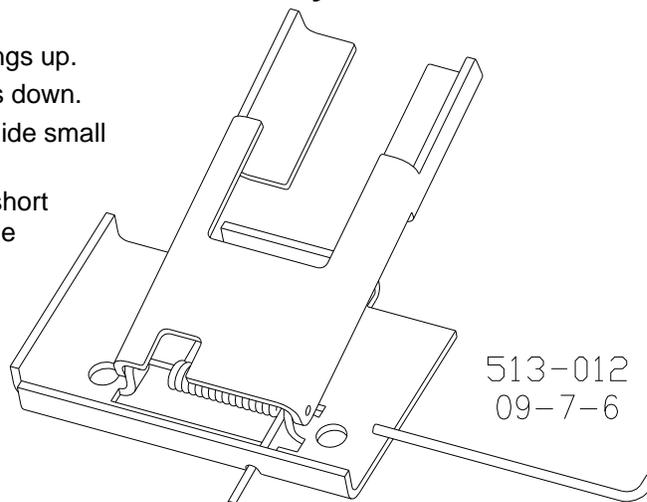
| | |
|------------------|--|
| IMPORTANT | Make sure that the correct nameplate is used on the governor (ATEX or non-ATEX). Use the ATEX nameplate if the governor is ATEX listed; otherwise use the non-ATEX nameplate. To determine if your governor is ATEX listed, see the governor spec sheet or bill of materials. |
|------------------|--|

9. Using new drive screws (Figure 3, item 21), attach the new nameplate (Figure 3, item 20) to the side of the case (127) in the pre-existing holes. This is the side that has the threaded breather hole (see photo).
10. Remove breather plug (101) and set aside for later installation.
11. Discard the old cover.

Overspeed Test Device (OTD) Bracket Assembly

See Figure 3.

12. Orient mounting guide (22) with mounting tangs up.
13. Orient lever bracket (26) with mounting tangs down.
14. Align both the lever bracket and mounting guide small through-holes.
15. Orient and align torsion spring (23) with the short tang in the groove of the lever bracket and the coils in line with the lever bracket and mounting guide through-holes.
16. Install the long leg of spring pin (24) through one side of the lever bracket and mounting guide holes, through the torsion spring coils, and through the other set of lever bracket and mounting guide holes.

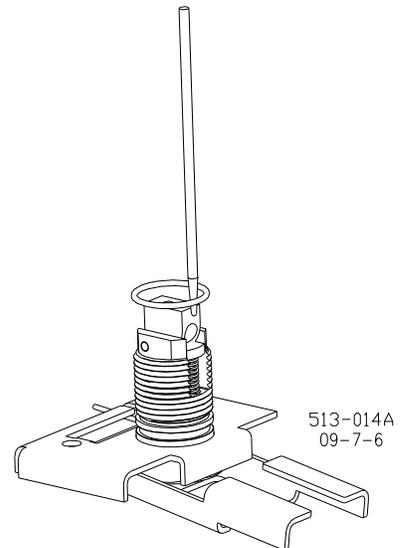
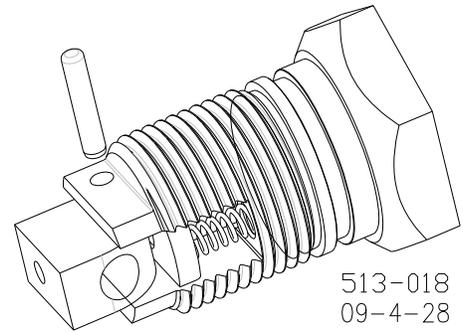
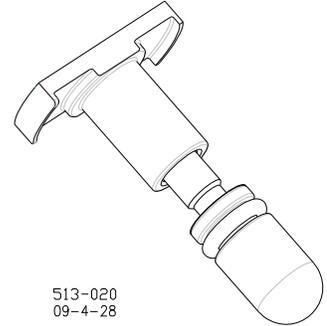


| | |
|------------------|---|
| IMPORTANT | Assemble pin in orientation shown (starting on the side closest to the long tang of the torsion spring). |
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17. Bend the end of the spring pin approximately 45 degrees to secure lever bracket and mounting guide assembly. To minimize pin movement due to vibration, bend the end in the opposite direction of the bend on the other end of the spring pin.

Mounting Bushing Assembly

18. Lubricate small O-ring (16) with petroleum jelly and install it onto the spherical end of push rod (14) until seated in groove (see drawing at right).
19. Apply a small amount of GN Paste onto the push rod threads and screw it approximately 8 turns into cam follower (13) (use a 3/32" Allen wrench and an adjustable crescent wrench to secure the cam follower while tightening). The cam follower has a locking-style helicoil, so you should feel resistance as you screw in the push rod. Once the 8 turns are complete, minimize the number of adjustments to ensure maximum helicoil life.
20. Install two small springs (15) into each cavity located in the bottom of the groove in mounting bushing (19).
21. With the mounting bushing oriented as shown at right, place cam (12) on top of the cam follower in the mounting bushing groove with the small hole facing away from the bushing while aligning holes with the mounting bushing holes.
22. Place the mounting bushing and cam into a suitable press tool with large flat pointing downward (slip fit hole pointing up).
23. Install pin (18) into the slip-fit hole side chamfer down, through the cam, and press flush with the top surface.
24. Inspect and verify the coil springs are properly positioned and the cam actuates freely.
25. Orient the mounting bushing with cam end up.



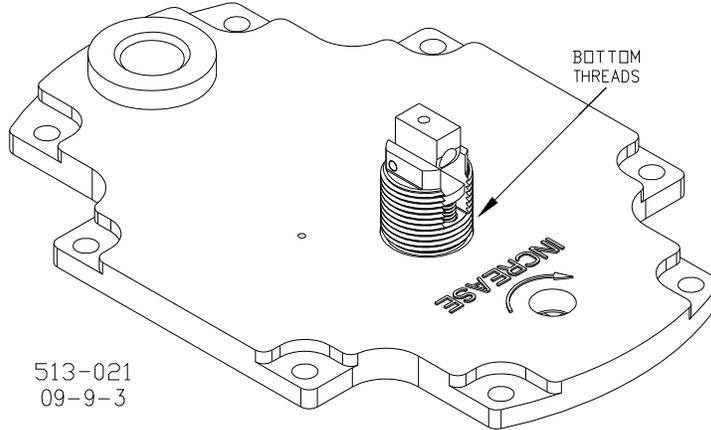
Cover Assembly

26. Pull apart lever bracket (26) and mounting guide (22), and install the mounting bushing assembly, with the pin side of the cam oriented towards the torsion spring (as shown in picture), into the mounting guide center hole until the top of the hex nut is seated against the mounting guide.
27. Lubricate and install large O-ring (17) over the mounting guide and into the mounting bushing groove. Place the O-ring over the end, and use a pick (~1/8" / 3 mm) or similar tool to work the O-ring over the threads and into the groove as shown at right. **Be careful not to damage the O-ring.**

IMPORTANT

The O-ring must sit in the bottom groove on the mounting bushing.

28. Lubricate the cover chamfer and bore with petroleum jelly. Align the two holes in the mounting guide with the two round protrusions on the inside of the governor cover (8), and place the lever bracket/ mounting guide assembly and mounting bushing assembly onto the cover, with the mounting bushing assembly placed through the cover center hole. Also make sure the torsion spring leg is still located in the notch of the lever bracket. The other leg of torsion spring (23) will be out, pointing away from the bracket assembly and loaded against the inside cover.
29. Apply G-N paste to the bottom three threads of the mounting bushing (see drawing at right).
30. Install retention nut (4) onto the threads of the mounting bushing and torque to $54 \pm 7 \text{ N}\cdot\text{m}$ ($40 \pm 5 \text{ lb}\cdot\text{ft}$). Make sure that lever bracket/mounting guide assembly and mounting bushing assembly remain in the correct orientation and position with each other and with the cover round protrusions when the retention nut is tightened.
31. Press dowel pin (1) into blind hole on side of cap (2).
32. Lubricate cap O-ring (3) with petroleum jelly and install into bottom of cap.
33. Install cap (2) onto the threaded bushing assembly until the O-ring is engaged and metal-to-metal contact is made between the cover and the nut.
34. Stick new warning label (5) onto cover (8). Make sure the cover surface is clean and dry before placing the new label.

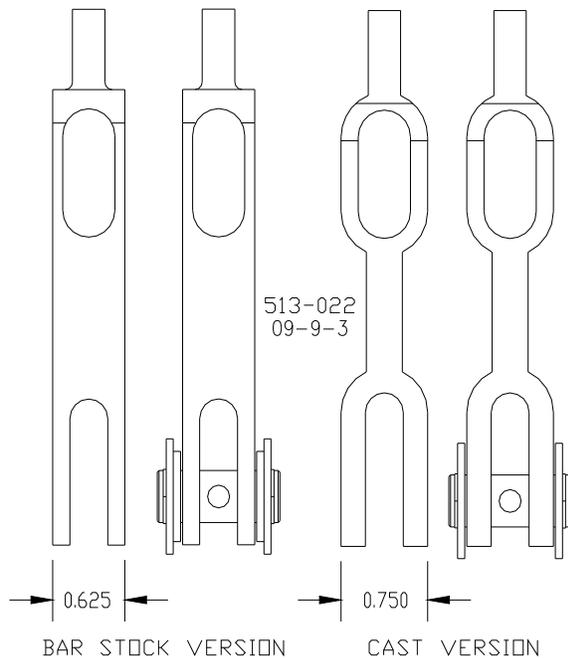


Installation of TG Replacement Parts

35. Install the larger diameter end of spring seat (32) onto loading spring (33) (light press fit).

IMPORTANT You may need to rotate the spring seat to engage the spring.

36. Install the spring with spring seat over the existing TG governor speed screw guide post (Figure 2, 142).
37. Measure the width across the tangs of the feedback lever. The 0.750" (19.05 mm) cast feedback lever requires 1 washer (29) on each side of the feedback lever in steps 38 and 40 (see drawing at right). The 0.625" (15.88 mm) bar-stock feedback lever requires 1 washer (29) and 1 washer (30) on each side of the feedback lever, as shown in the drawing.
38. Install one washer (29) and snap ring (28) to one side of pivot pin (31). For the bar-stock feedback lever, an extra washer (30) must also be installed as shown.



39. Install the pivot pin partial assembly into the existing TG governor feedback lever (Figure 2, 105) with the through-hole centered and oriented vertically.
40. Install remaining washer (29) on the other end of the pivot pin, outside of the feedback lever. For the bar-stock feedback lever, an extra washer (30) must also be installed as shown.
41. Install remaining snap ring (28) on the end of the roller pin, outside the washer.
42. With the long leg of the alignment guide (L-bracket) (25) pointing away from the head of speed-setting screw (11), thread the alignment guide by hand onto the speed-setting screw about $\frac{3}{4}$ of the entire length of the speed-setting screw.

IMPORTANT

These are left-hand threads. They tighten by turning in the opposite direction of normal (counterclockwise to tighten, as viewed from the top).

43. Install replacement O-ring (10) on speed-setting screw (11). Lubricate the replacement O-ring and speed-setting screw cover chamfer.

WARNING

Before operating this product, it must be tested as instructed per TSP 1381.

Installation of Cover Assembly

44. Install the speed-setting screw and L-bracket assembly into the cover by pushing the speed-setting screw head into the speed-setting screw hole in the cover until seated, ensuring that the larger diameter base of the speed-setting screw is seated against the inside cover above the lever bracket.

IMPORTANT

Pull down the spring-loaded bracket if needed to ensure it is below the speed-setting screw base. *If the gasket has more than 1.27 mm (0.050 inch) of protrusion, the gasket is assembled in the incorrect orientation.*

45. Install the TG cover assembly, including properly oriented cover gasket (9) and speed-setting screw, onto the governor housing, ensuring that the speed-setting screw locates into the pivot roller pin, through the spring seat and spring, and that the alignment guide L-bracket is inserted on the inside of the roller pin, between the feedback lever and roller pin.
46. Replace retaining ring (7) on the top side of the cover in the groove of the speed-setting screw head.
47. Install eight cover screws (6) and torque to 11.3 ± 0.6 N·m (100 ± 5 lb-in).

IMPORTANT

These screws are self-tapping screws, and improperly locating them will result in damaged thread ports. To avoid this, install all screws before tightening and thread the screw CCW until existing thread is engaged.

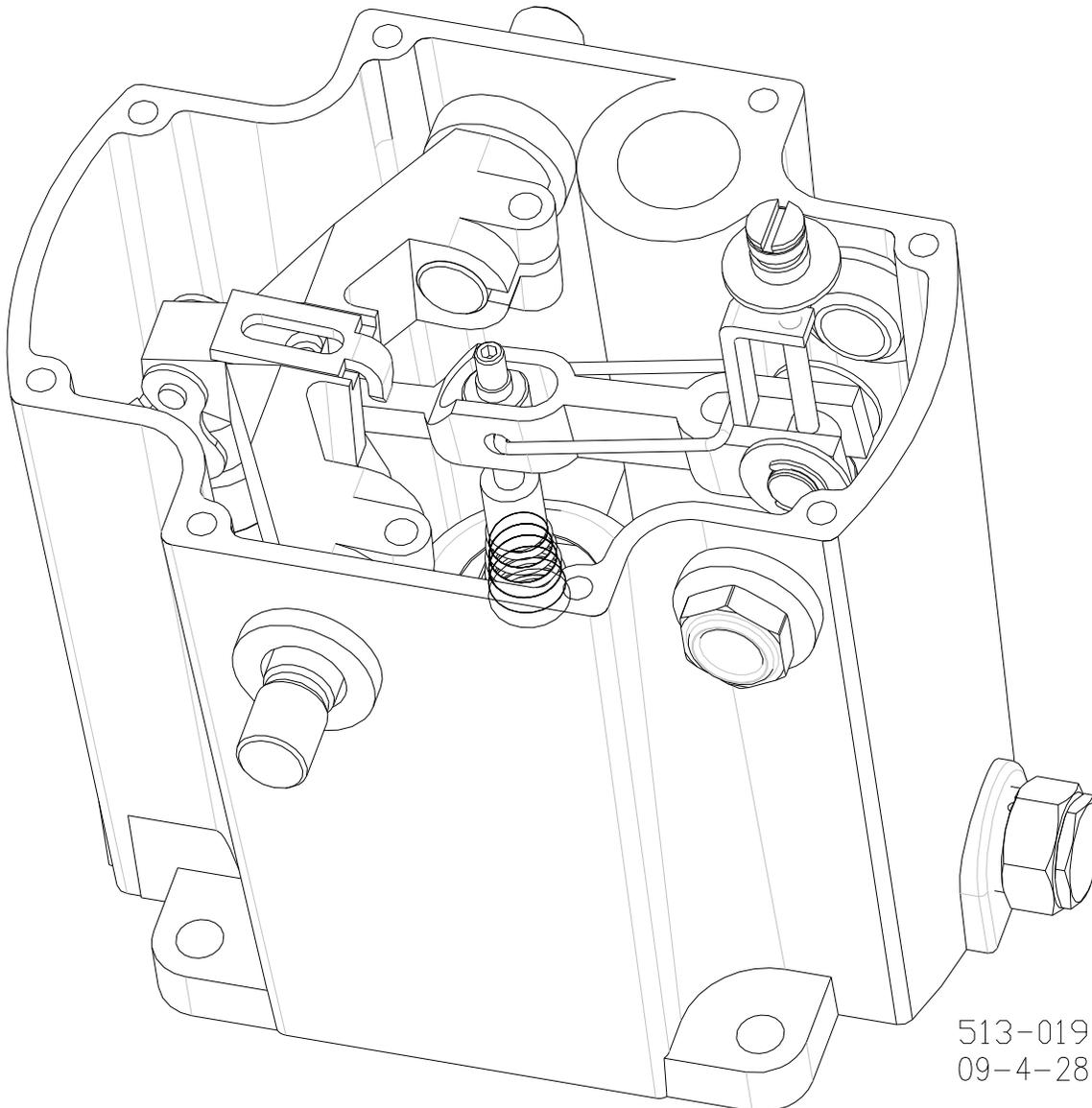
Operation

See Woodward manual 04042, *TG-13/TG-17/TG611-13/TG611-17 Governor Installation and Operation*, for operating and testing instructions for the Overspeed Test Device.



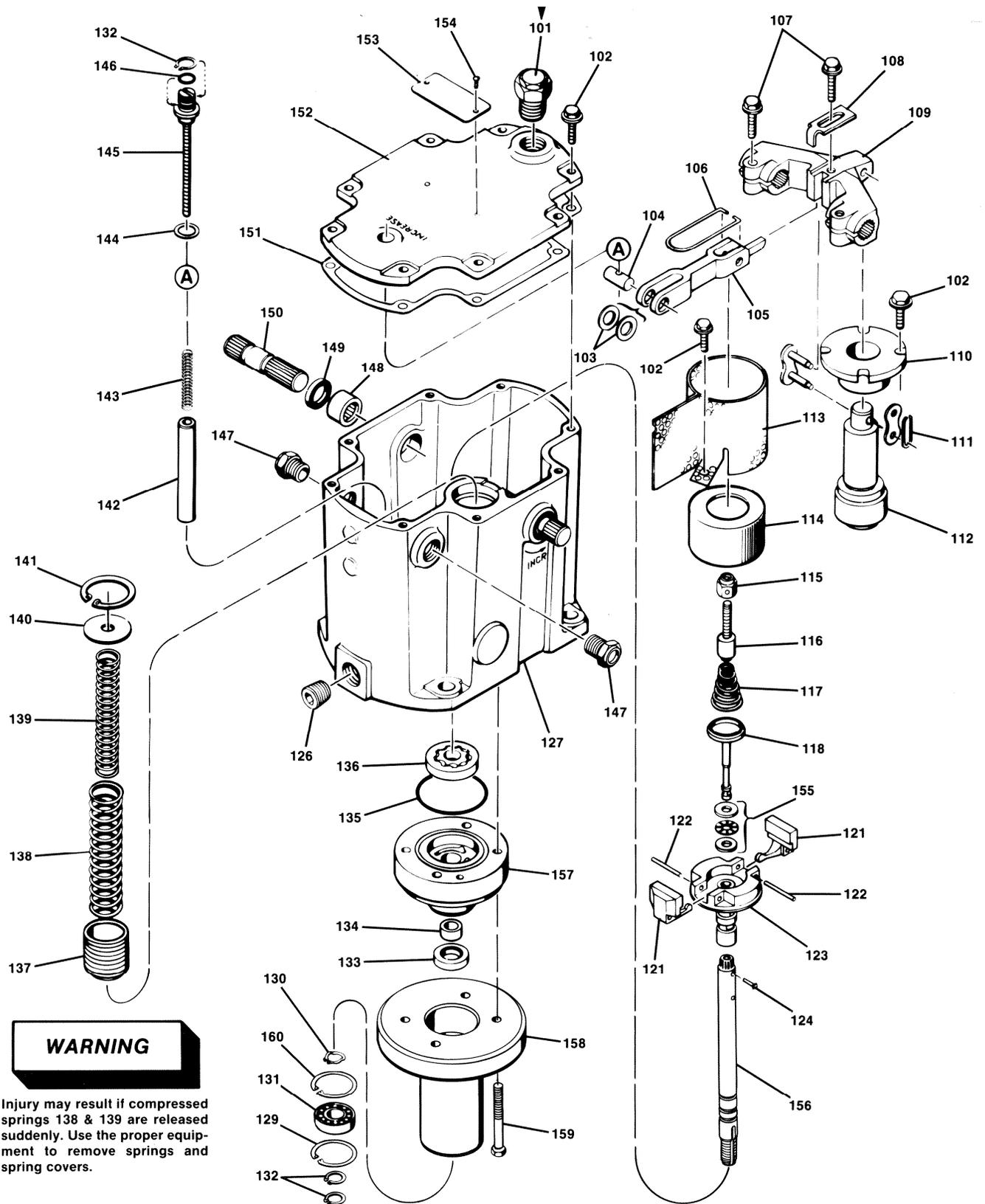
WARNING

To prevent malfunction of the overspeed test device (OTD) due to contamination from dirt or water, keep the OTD protective cap in place (hand-tight) when the OTD is not in use.



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09-4-28

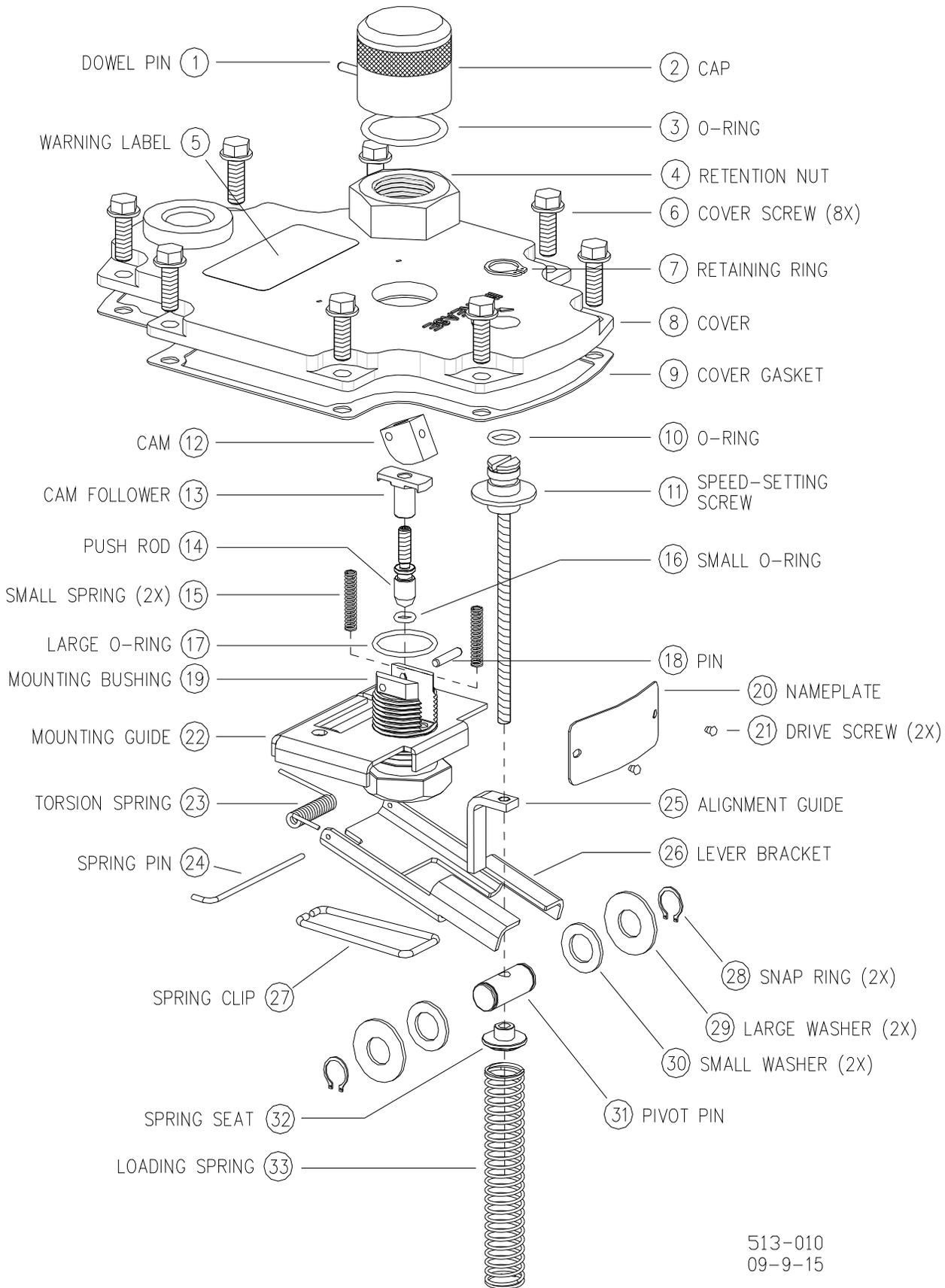
Figure 1. Positioning of Internal Components upon Completion



WARNING

Injury may result if compressed springs 138 & 139 are released suddenly. Use the proper equipment to remove springs and spring covers.

Figure 2. TG-13/-17 Exploded View (before installation of OTD)



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09-9-15

Figure 3. TG611-13/-17 Overspeed Test Device

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication **51348B**.



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