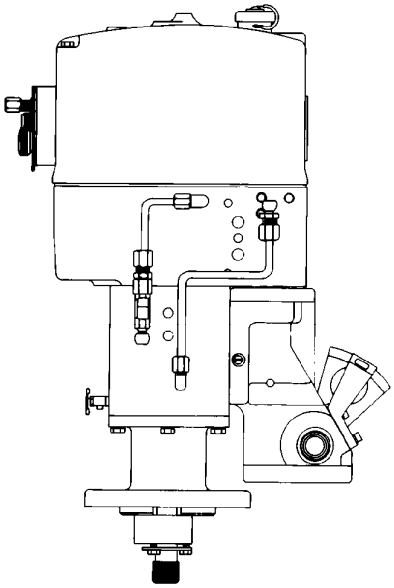
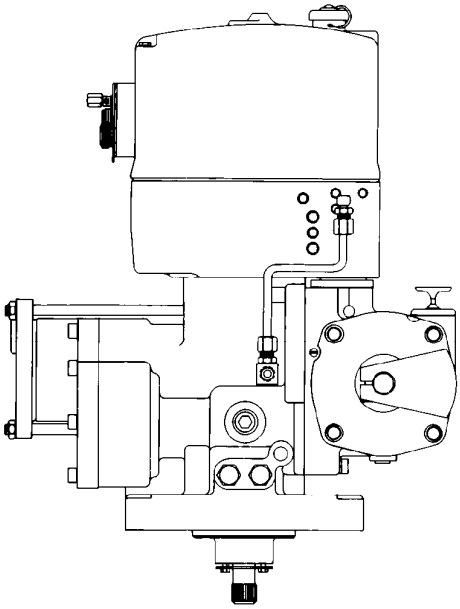
WOODWARD

Product Manual 36636
(Revision B)
Original Instructions



PGA 58



PGA 200

PGA-58 and PGA-200/300 Vibration Resistant Governors

Operation Manual

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

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, on the *publications page* of the Woodward website:

www.woodward.com/publications

The latest version of most publications is available on the *publications page*. If your publication is not there, please contact your customer service representative to get the latest copy.

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:

The original source of this publication may have been updated since this translation was made. Be sure to check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

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.

PGA-58 and PGA-200/300 Vibration Resistant Governors

Introduction

The PGA-58 and PGA-200/300 vibration-resistant governors incorporate the following special features:

- Redesigned speed-setting bracket assembly
- Oil damped speed-setting pilot-valve bushing and plunger
- Heavy-duty microswitch assembly
- Improved load-control linkage
- Hardened tailrod
- Oil-spray assembly fitted inside the column
- Narrow-neck base assembly (on PGA-58 only)
- Vibration-tolerant speeder spring

Basic Governor

The basic PGA-58 governor is described in manual 36604 (see Principles of Operation for technical details). The PGA-58 vibration-resistant governor has a narrow-neck base which improves isolation from engine-induced vibration.

The basic PGA-200/300 governor is described in manual 36618 (see Principles of Operation for technical details). Also refer to manual 36604 for additional information.

Ballhead Assembly

The ballhead assembly is the same as existing PGA governors, but is equipped with a vibration-tolerant speeder spring.

Column Assembly

The column assembly has been improved by the addition of the following:

Speed Setting Bracket Assembly
A specially designed speed setting bracket assembly protects component parts against vibration damage. It incorporates an oil-filled bellows-box assembly (19). a third mounting foot and additional bracket stiffening webs, a new manual speed-setting knob assembly (75.76). and a stronger link assembly (73.74).

IMPORTANT

After the receiver assembly is on the governor, fill the air supply cavity with oil (screw 17). Refer to manual 36604 for oil recommendations. Force the oil through the supply fitting with the bleed screw (20) slightly open. Continue filling until all air is bled from the system. The orifice now has approximately 2 inches (50 mm) of oil above it. A small amount of oil may leak out of the fitting during test.

Oil Damped Speed Setting Pilot Valve Plunger and Bushing
The oil-damped pilot valve (52 through 60) protects the speed setting bellows (19) against premature failure due to engine vibration in the vertical mode.

Heavy Duty Microswitch
A heavy-duty microswitch assembly (Figure 5) is used. The bracket is made from investment casting and incorporates a third foot for rigid mounting on the column. The actuating levers and cams are hardened to reduce wear.

Load Control Linkage Assembly
The load control linkage is improved with pins retained by "E" rings or stainless steel cotter pins. Load-control indicator, tailrod, and pivot links are hardened for greater resistance to wear.

Oil Spray Assembly
Constant lubrication is provided to assemblies mounted in the column by an oil-spray assembly, section A-A in Figure 2. This helps reduce wear and fretting corrosion within pivots and on other moving parts. Oil to the oil-spray unit is fed from the governor pump and accumulator. A check valve on the oil-spray device is opened by an actuating plunger when the cover is attached to the column. When the cover is removed, the check valve stops oil flow to the spray nozzle.

The PGA-58 governor also provides a SPRAY CLOSED VALVE (Figure 7). Make sure that this valve is open 1/4 to 1/2 turn before running the governor. Set the valve to between 1/4 and 1/2 turn if it is different.

A new or overhauled governor is shipped from the factory with this valve open 1/4 to 1/2 turn.

Replacement Parts Information

When ordering replacement pasts, include the following information:
- Governor serial number and part number shown on nameplate
- Manual number (this is manual 36636)
- Parts reference number in parts list and description of part or past name

IMPORTANT **"AR" as used in the Quantity column means "As Required".**

Parts List for PGA-58 (Figures 1 through 6)

Ref. No.	Part Name	Quantity
36636-1	Microswitch bracket	1
36636-2	PG hardened tailrod	1
36636-3	Overriding cylinder	1
36636-4	Lock nut	1
36636-5	Spray nozzle	1
36636-6	Soc hd plug, 0.062 NPTF	1
36636-7	Hex soc plug, 0.125-27	2
36636-8	O-ring, 0.426 ID x 0.070	1
36636-9	Orifice plug, 0.030	1
36636-10	Oil spray block	1
36636-11	Check valve	1
36636-12	Retaining ring, 0.145 ID	7
36636-13	Guide	1
36636-14	Adjusting plunger	1

36636-15	Speed setting bracket	1
36636-16	Orifice plug	1
36636-17	Air passage screw	1
36636-18	Washer, 0.400 OD	1
36636-19	Receiver bellows	1
36636-20	Ph pan hd screw, 6-32 x 0.312	1
36636-21	Nitrile thread seal, No. 6	1
36636-22	Washer, 0.149 x 0.375 x.032 thick	1
36636-23	Soc hd cap screw, 6-32 x 0.875	2
36636-24	Washer, 0.178 ID	2
36636-25	Spring anchor screw	1
36636-26	Spring mounting block	1
36636-27	Hex nut, 10-320	1
36636-28	Speed setting s0crew	1
36636-29	Male conn., 0.125 NPTF x 6mm tube	2
36636-30	Receptacle, 5 pin 18 shell	1
36636-31	Gasket	1
36636-32	Receiver dial plate	1
36636-33	Grooved pin	1
36636-34	PG long cover	1
36636-35	Set screw, 10-32 x 1.750	1
36636-36	Mid grip helicoil	1
36636-37	Block	1
36636-38	Cotter pin, 0.062 x 0.375 long	2
36636-39	Load control indicating washer	1
36636-40	Street fitting	1
36636-41	Soc hd cap screw, 0.250 x 28-750	3
36636-42	Washer, 0.265 x 0.500 x 0.032 thick	3
36636-43	Lockwasher, 8-0.164 ID	3
36636-44	PG long column	1
36636-45	Stainless steel tube	1
36636-46A	PG long neck base	1
36636-47A	Male elbow	2
36636-48A	Oil gauge elbow, 1.171 long	1
36636-49A	Oil gauge (weatherproof)	1
36636-50A	Male coupling	1
36636-51	Speeder spring	1
36636-52	Speed setting drive gear	1
36636-53	Speed setting loading spring	1
36636-54	Speed setting plunger	1
36636-55	Speed setting bushing	1
36636-56	Pilot-valve-bushing sleeve	1
36636-57	Internal retaining ring	1
36636-58	Needle thrust bearing	1
36636-59	Damped tension spring	2
36636-60	Thrust bearing race	2
36636-61	Oilite bushing	1
36636-62	Oil seal	1
36636-63	Friction plate	1
36636-64	Spring washer	2
36636-65	Knob	1
36636-66	Elastic hex nut, 0.250 x 20 (thin)	1
36636-67	Manual speed setting shaft	1
36636-68	Washer, 0.625 OD	1
36636-69	Roll pin, 0.094 dia. x 0.625 long	2
36636-70	Soc hd set screw, 8-32 x 0.375	2
36636-71	Block screw	1
36636-72	Pin, 0.125 dia. x 0.750	2
36636-73	Link	1
36636-74	Adjusting block	1
36636-75	Glyd seal ring, 0.688 ID	1
36636-76	O-ring, 0.739 ID x 0.070	1
36636-77	Grooved pin	1
36636-78	Grooved pin	1
36636-79	Pivot pin link	1
36636-80	Torsion spring	1

36636-81	Screw, 10-32 UNF	2
36636-82	Rod	2
36636-83	Cotter pin, 0.031 dia. x 0.375 long	1
36636-84	Needle bearing	1
36636-85	Load control indicator washer	1
36636-86	Ph pan hd screw, 6-32 x 0.500	2
36636-87	Microswitch bracket	1
36636-88	Micarta switch spacer	2
36636-89	Locking collar	1
36636-90	Socket set screw, 8-32 x 0.312	1
36636-91	Camshaft	1
36636-92	Lever shaft	1
36636-93	Spacer, 0.189 ID x 0.406 long	2
36636-94	Washer, 0.203 x 0.438 x 0.016 thick	AR
36636-95	Washer, 0.265 x 0.500 x 0.032 thick	3
36636-96	Spacer, 0.250 ID x 0.125	1
36636-97	Terminal strip, 5 pole	1
36636-98	Lockwasher, No. 6	4
36636-99	SPDT Microswitch	AR
36636-100	Ph pan hd screw,6-32 x 0.250	4
36636-101	Leaf loading spring	AR
36636-102	Actuating cam	2
36636-103	Switch actuating lever	2
36636-104	Hex jam nut, 0.312-24	2
36636-105	Locating screw	2
36636-106	Soc hd cap screw, 0.250-28 x 1.500	2
36636-107	Helicoil lock washer, 0.250	1
36636-108	Washer, 0.265 x 0.500 x 0.032 thick	2
36636-109	Lockwasher, No, 6	4
36636-110	Washer, 0.265 x 0.500 x 0.032 thick	1
36636-111	Soc hd cap screw, 0.250-28 x 1.000	1
36636-112	Oilite bushing	2
36636-113	Helicoil, 10-32 STI-2B	1
36636-114	Teflon wire, 20 ga coated red	AR
36636-115	Insulated terminal, No. 6 WG	AR
36636-116	Teflon wire, 20 ga coated blue	AR
36636-117	Teflon wire, 20 ga coated white	AR
36636-118	Teflon wire, 20 ga coated yellow	AR
36636-119	Internal shakeproof washer, No.6	2
36636-120	Screw	2
36636-121	Wire bundle clamp 0.250 ID	2
36636-122	Teflon tubing, No.4 AWG	AR
36636-123	Shrink tubing, 0.125 ID x 0.625	AR
36636-124	Teflon wire, 20 ga coated green	AR
36636-125	Nozzle, PG spray	1
36636-126	Connector S. 4 FML. BK. w/ ORF	1
36636-127	Nut #4 tube	1
36636-128	Sleeve 0.250 dia. tube	1
36636-129	Seal 7/16 Nitrile thread	1
36636-130	Washer 0.438 ID x 0.064 thick (T-060)	1
36636-131	Tube 0.250 OD stainless	AR
36636-132	Valve miniature (0.125 NPTF)	1

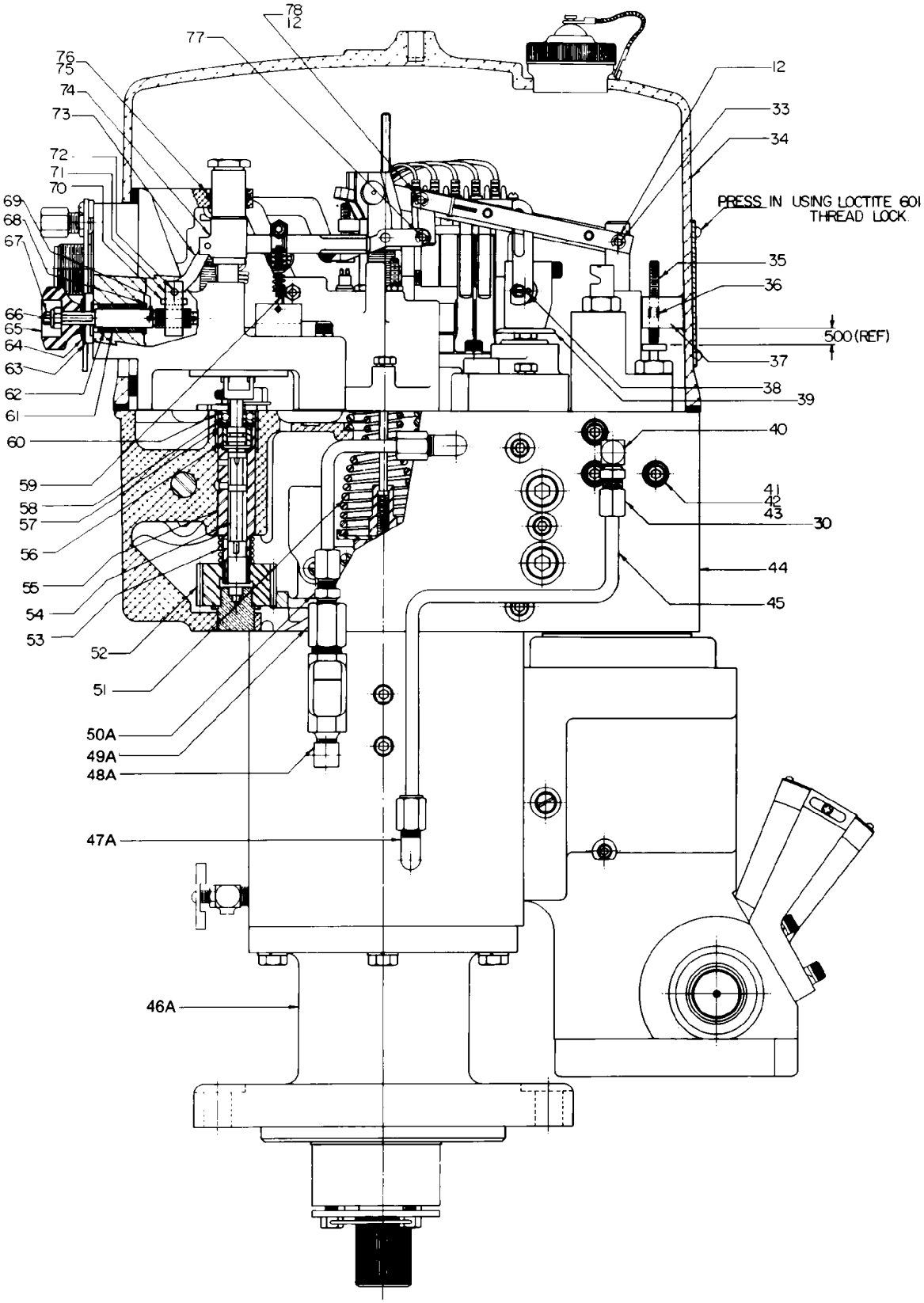
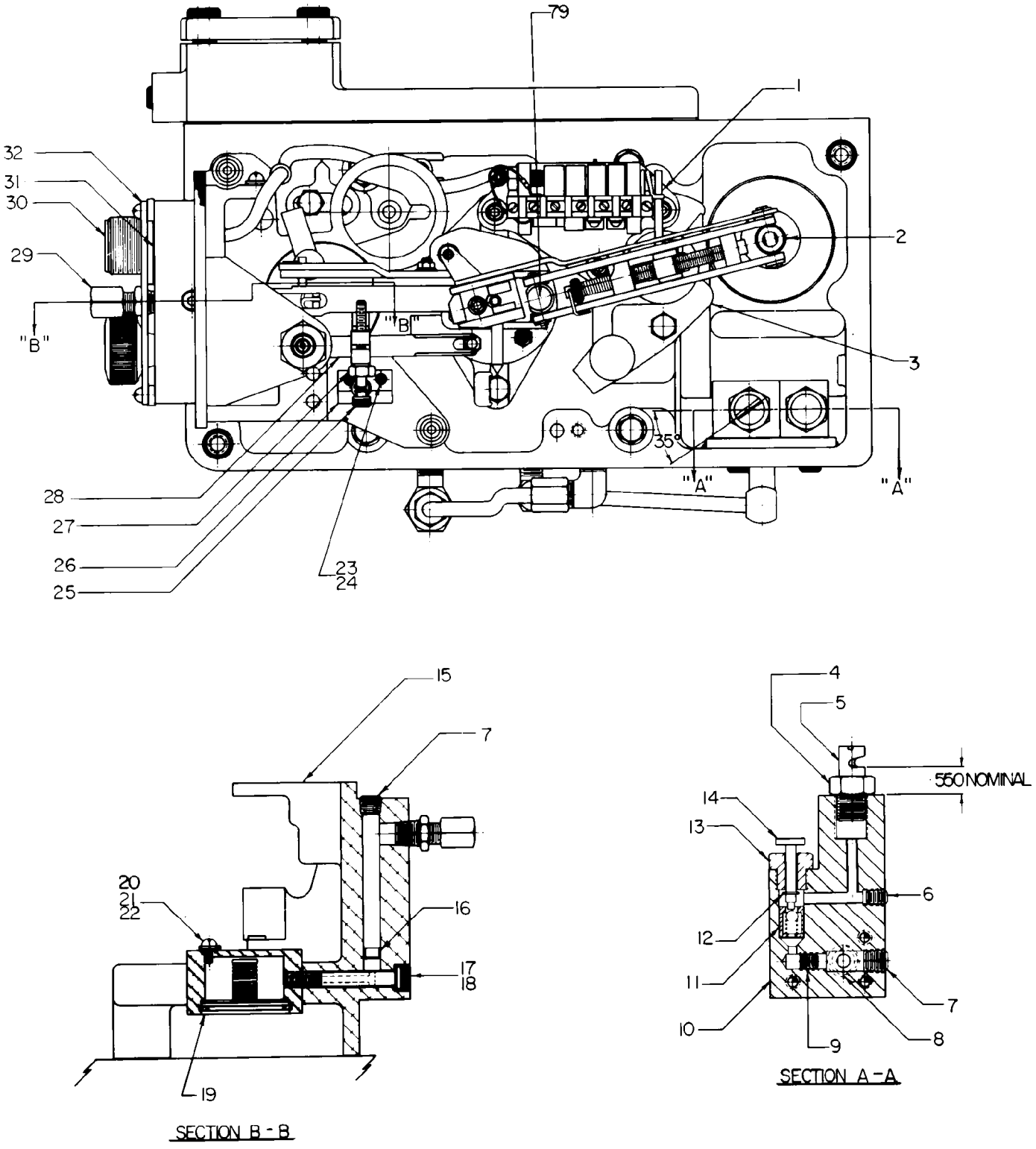


Figure 1. PGA-58 Vibration Resistant Governor with Oil Spray



See NOTE under “Speed Setting Bracket Assembly”

Figure 2. PGA-58 Vibration Resistant Governor with Oil Spray

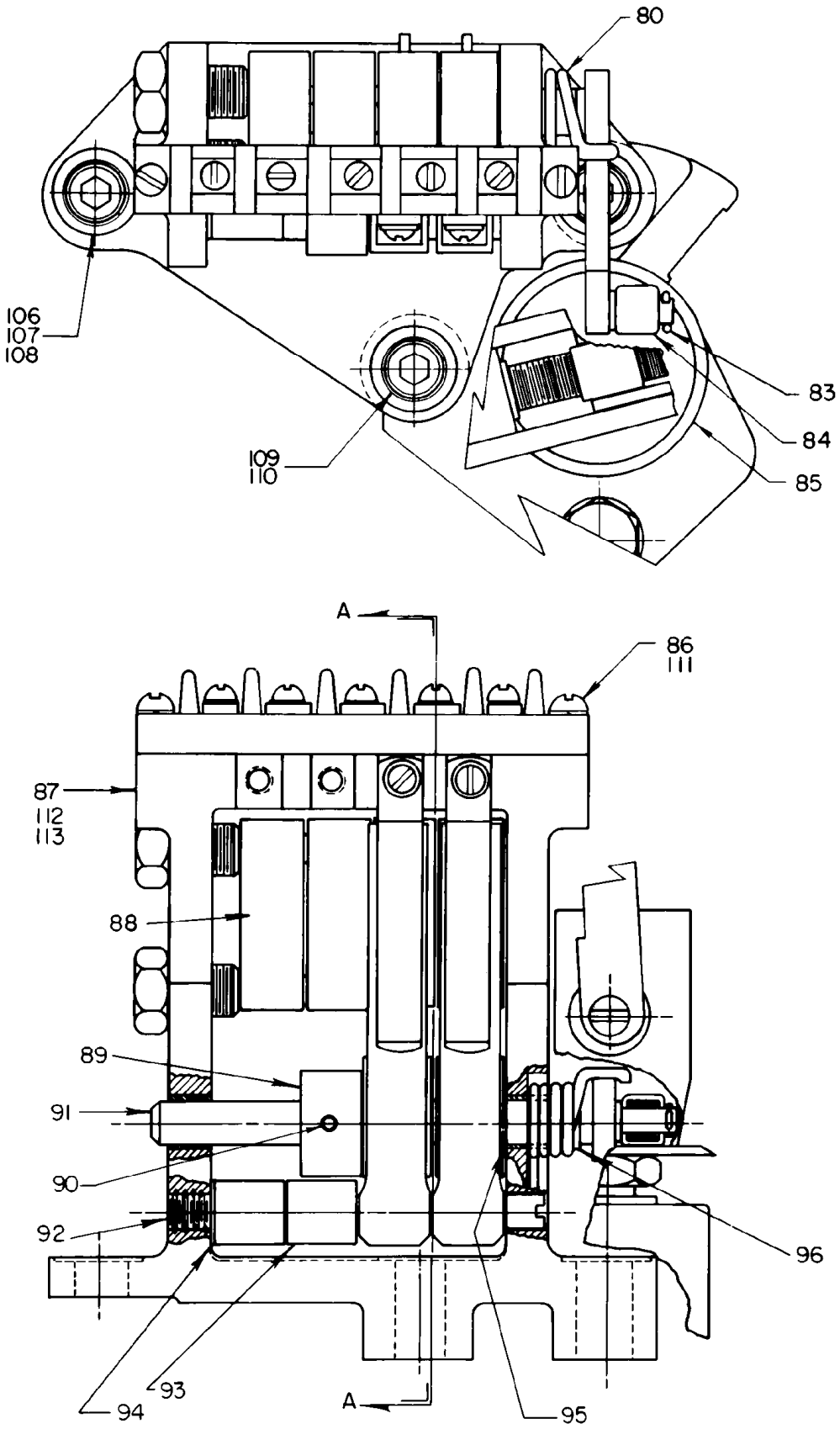
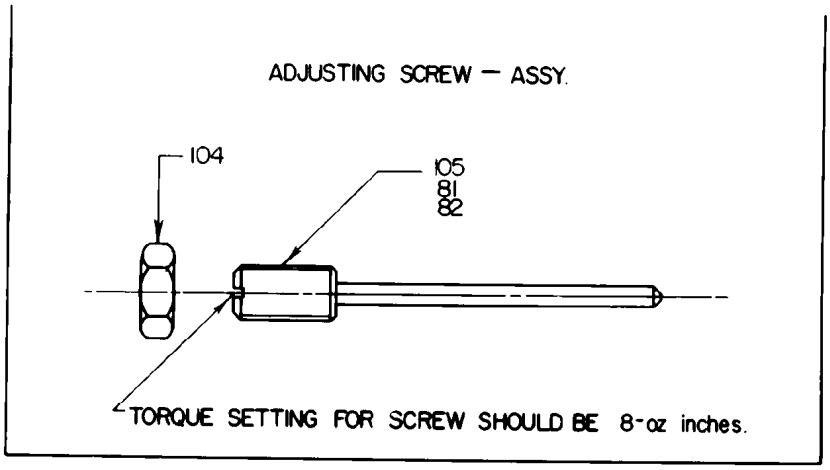


Figure 3. Microswitch Assembly



PARTS NOT SHOWN

114	– WIRE (A.R)	115	– WIRE TAGS –(10)
116	– WIRE (A.R)	117	– WIRE (A.R)
118	– WIRE (A.R)	119	– WASHER (2)
120	– SCREW (2)	121	– CLAMP (2)
122	– TUBING.	123	– TUBE SHRINK (AR)
124	– WIRE (A.R)		

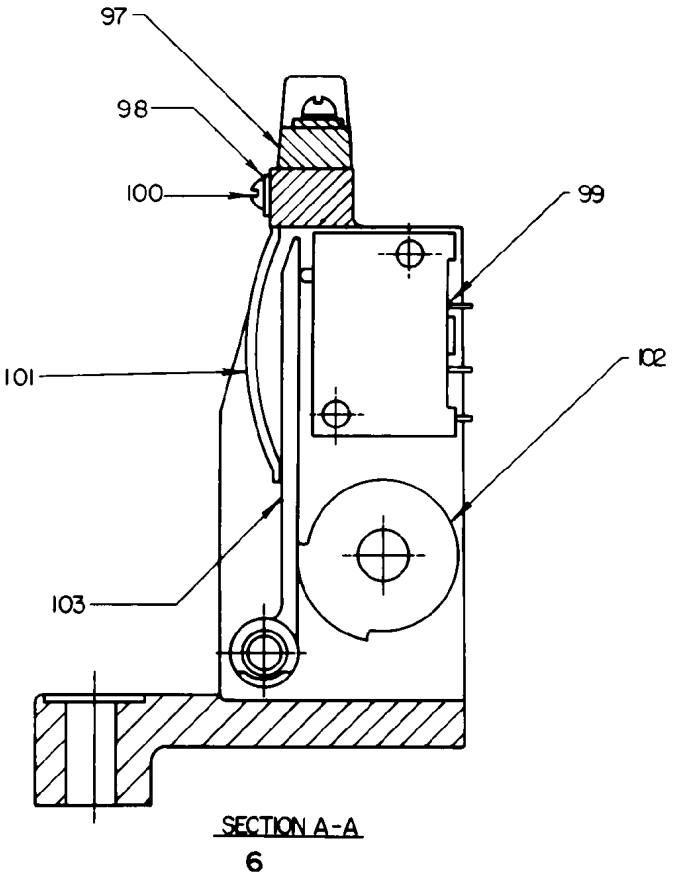


Figure 4. Microswitch Assembly

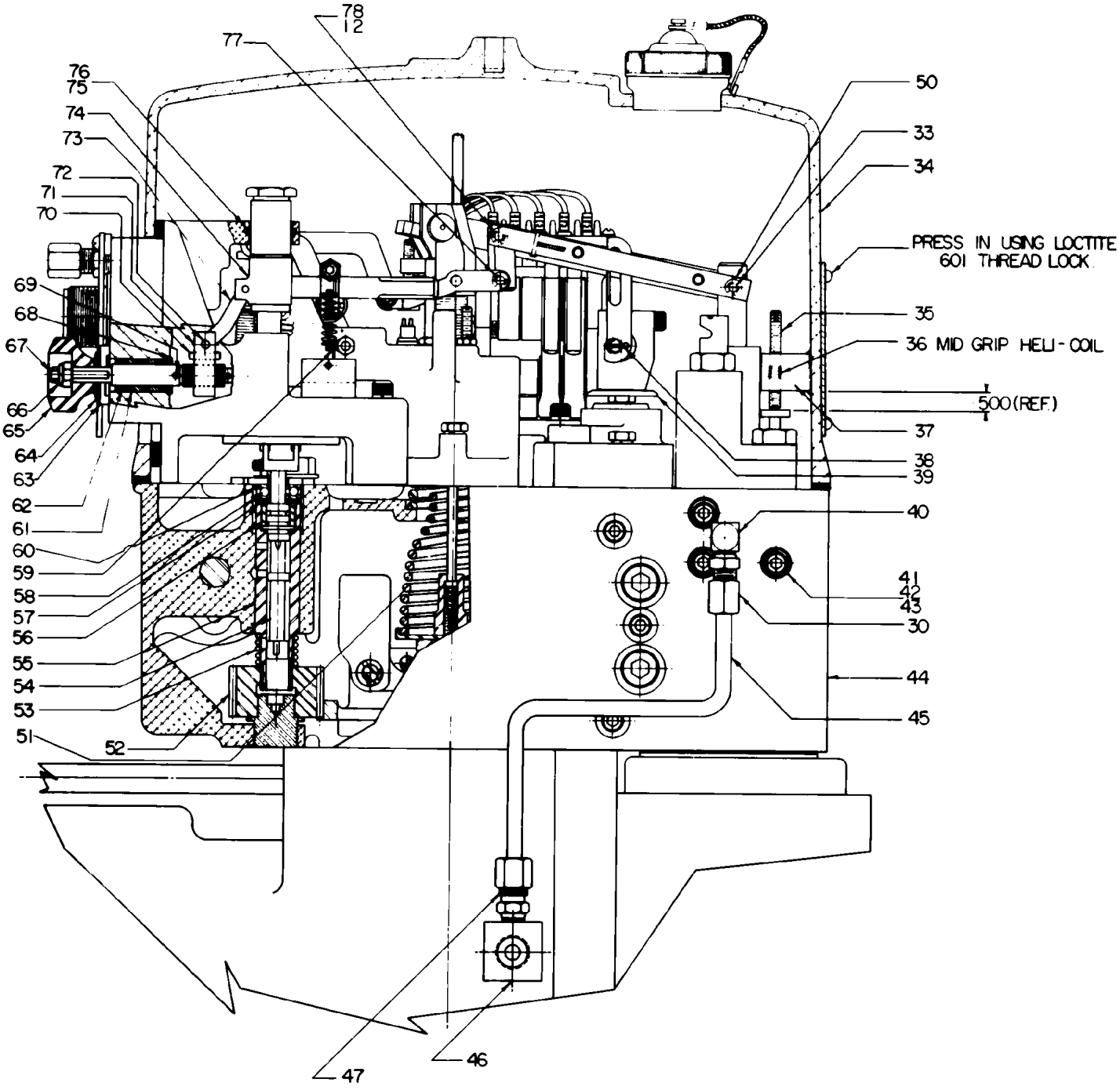


Figure 5. PGA-200 Vibration Resistant Governor with Oil Spray

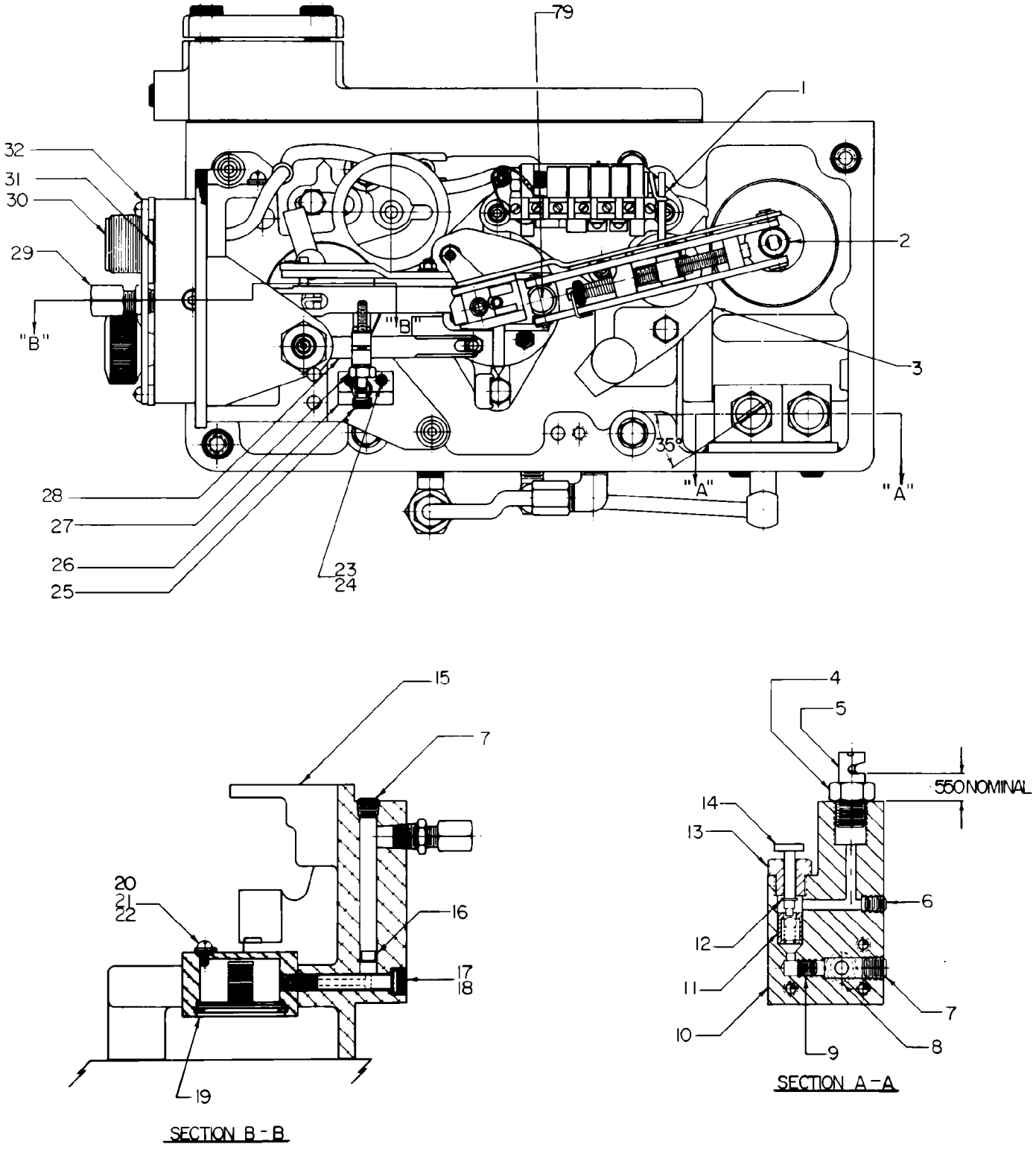


Figure 6. PGA-200 Vibration Resistant Governor with Oil Spray

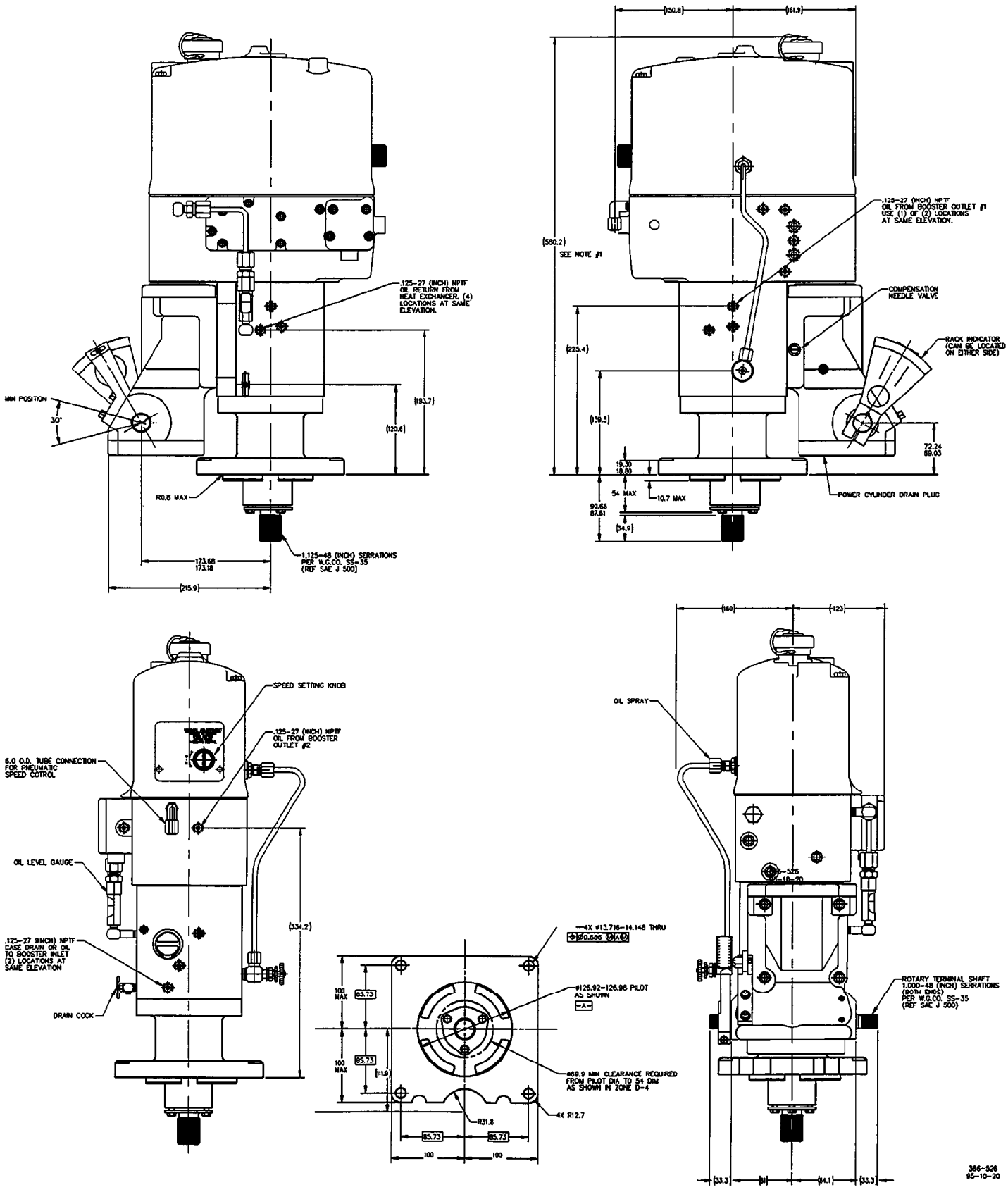


Figure 7. Outline Drawing

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 36636B.

PO Box 1519, Fort Collins CO 80522-1519, USA
1000 East Drake Road, Fort Collins CO 80525, USA
Phone +1 (970) 482-5811 • Fax +1 (970) 498-3058

Email and Website—www.woodward.com

**Woodward has company-owned plants, subsidiaries, and branches,
as well as authorized distributors and other authorized service and sales facilities throughout the world.**

Complete address / phone / fax / email information for all locations is available on our website.

2012/11/Colorado