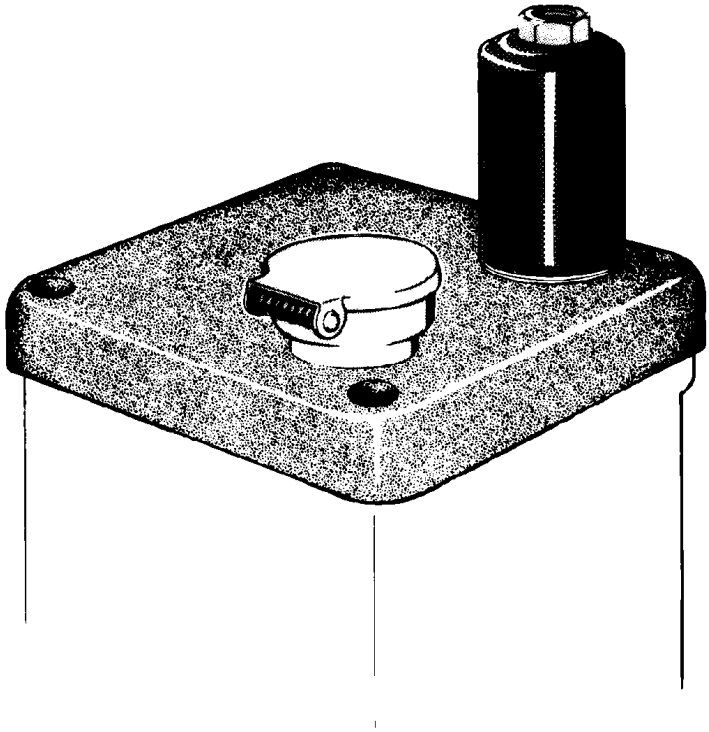
WOODWARD

Product Manual 36653
(Revision NEW)
Original Instructions



Pressure Actuated Shutdown for PG Dial and Lever 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:

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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:

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 Out-of-date translations are marked with ⚠.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.

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

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.

Pressure Actuated Shutdown for PG Dial and Lever Governors

Description

WARNING

This pressure actuated shutdown must not be used for overspeed shutdown. Use only for shutdown from low oil pressure, high oil or water pressure, etc.

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.

The pressure actuated (air, oil, or water) shutdown assembly used on PG Dial and PG Lever governors serves to stop the engine or turbine in the event of equipment failure (such as a loss of lubrication oil pressure, etc.), or as remote shutdown where electrical assemblies cannot be used.

When actuated, this device drains the oil from the power cylinder which, results in the fuel or steam valve linkage being moved to the shutdown or off position. The pressure actuated shutdown device can be arranged to shut down the engine or turbine on either increasing or decreasing signal pressure. Shutdown assemblies are available to operate with systems using from 3 to 100 psi (21 to 690 kPa) pressure. Maximum input pressure must be less than 140 psi (965 kPa).

Figure 1 shows the outline of a PGD (dial) with a pressure shutdown.

Operation

As shown in the schematic diagram, Figure 2, the shutdown device consists essentially of a check valve and a bellows. When high pressure is applied, the bellows is compressed against the force of the bellows spring and the adjusting screw forces the plunger rod downward, pressing down on the ballcheck. Oil is released from under the power servo, which lets the engine shut down. Therefore, normal governor operation requires low signal pressure. Also see Figure 4 for a cutaway of this type.

A second type of pressure shutdown is similar to the one in Figure 2 except that a different ballcheck is used that requires high pressure to keep it closed for normal operation. Upon release of pressure, the check valve opens up to release oil from under the power servo and shut the engine down.

A third type, Figure 3, is also a release pressure to shutdown type. That is, it requires high pressure during normal operation of the governor. It also has a manual reset which must be pushed in to reset the unit for normal operation once the shutdown is actuated.

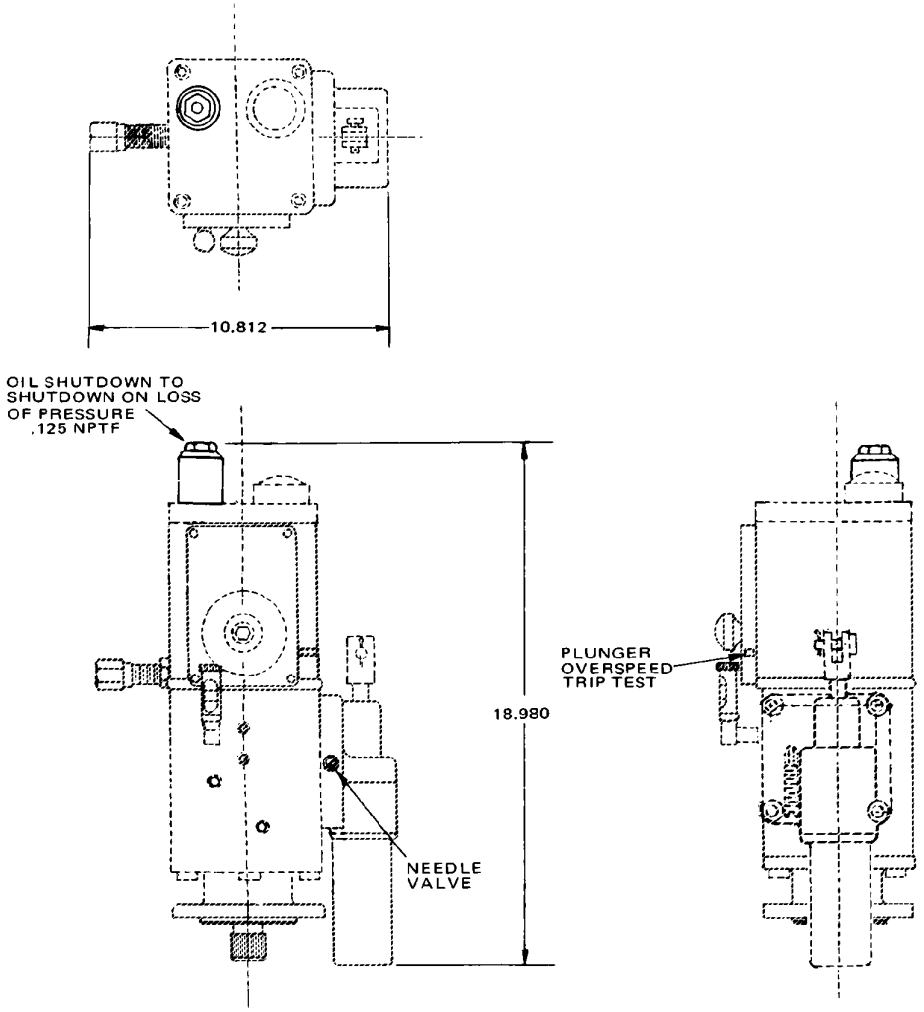

Figure 1. Outline Drawing of Pressure Actuated Shutdown on PGD Governor

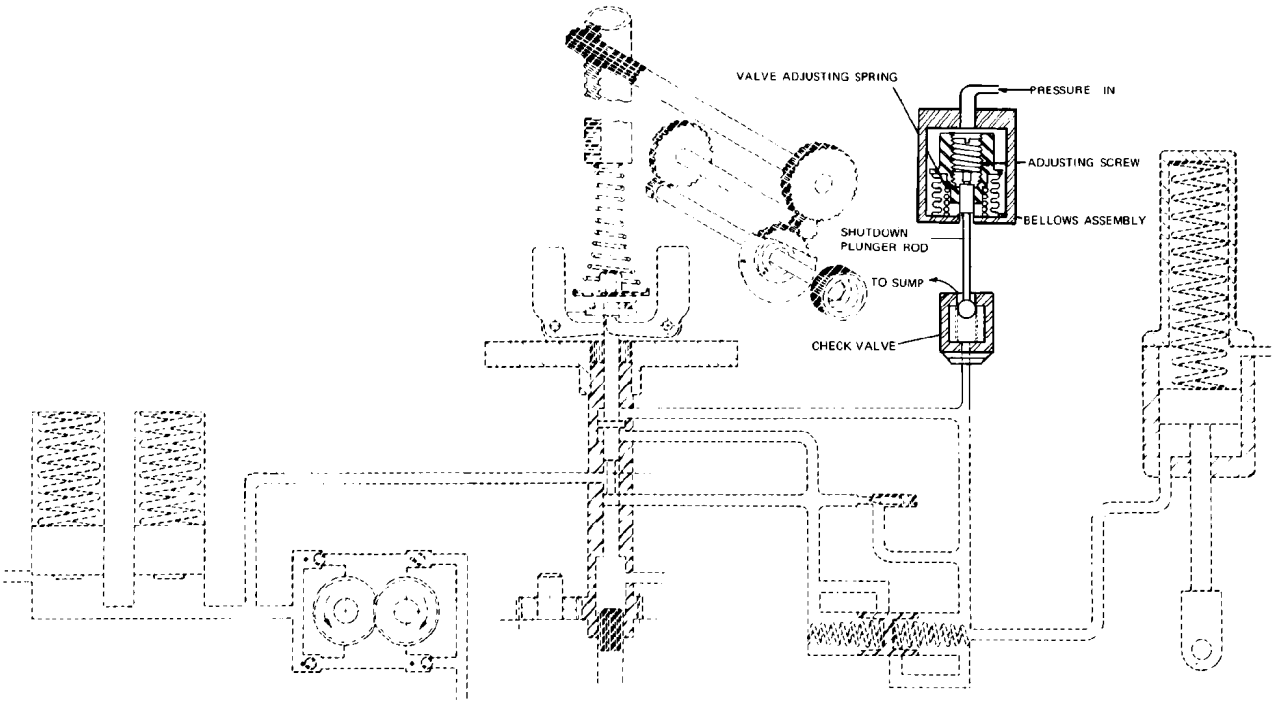

Figure 2. Schematic Diagram of PGD with Pressure Actuated Shutdown

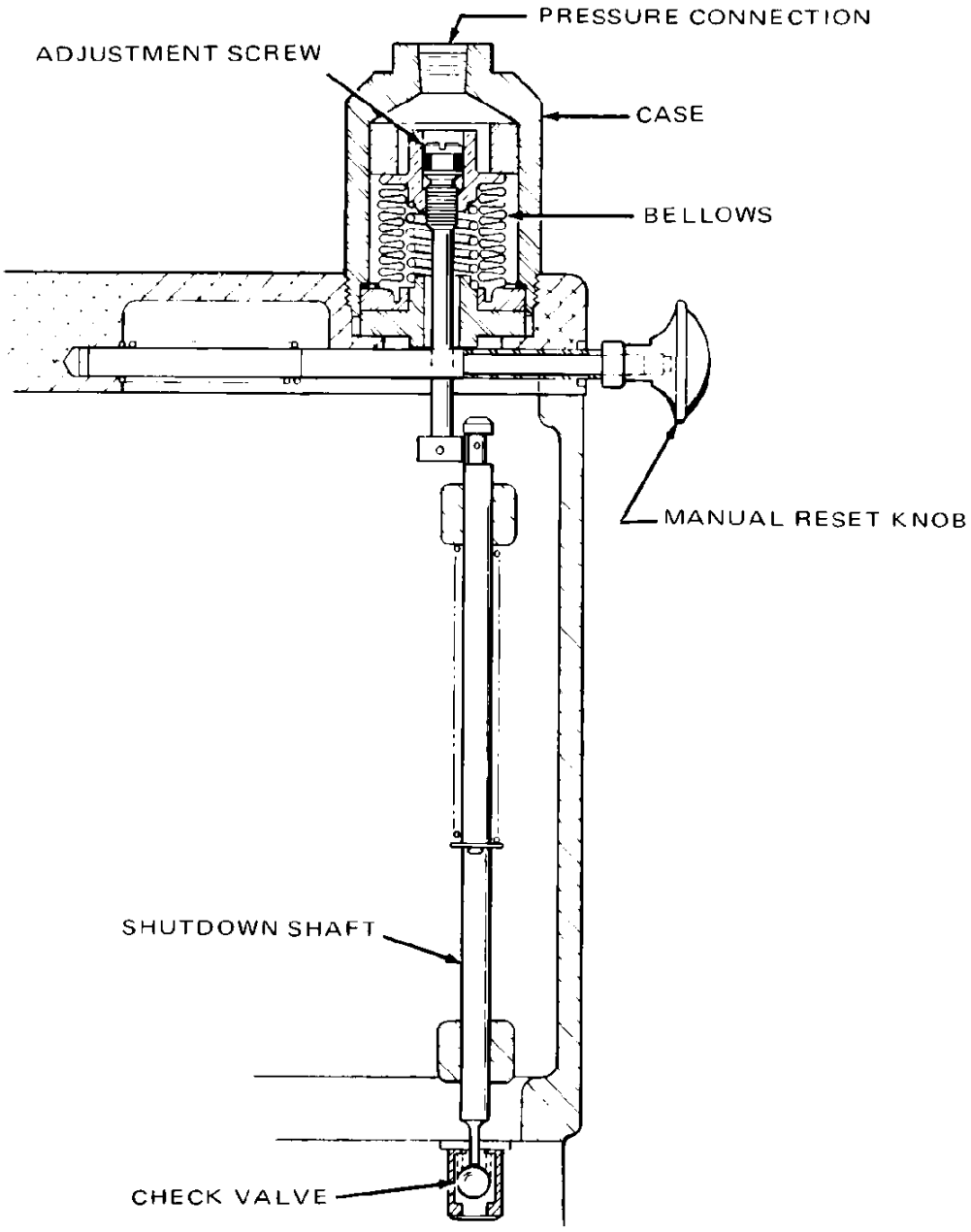

Figure 3. Cutaway View of Loss of Pressure to Shutdown Unit with Manual Reset

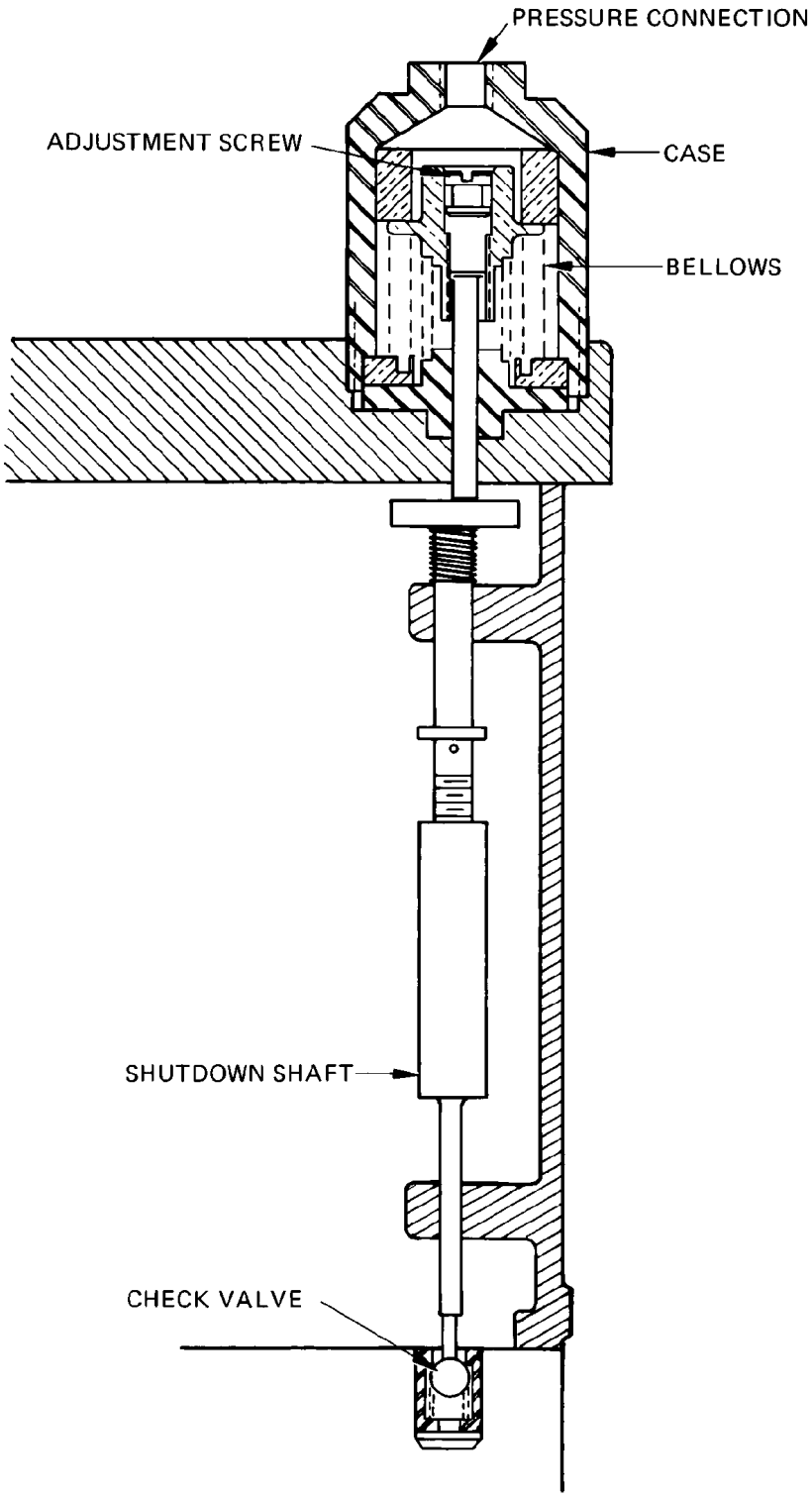

Figure 4. Cutaway View of Pressurize to Shutdown Unit

Adjustment

Place a screwdriver through the pressure opening and adjust screw (11, Figure 5) to contact the shutdown plunger rod at the desired pressure level. To raise the shutdown point of either a “decrease in pressure” or an “increase in pressure” valve, turn the adjusting screw counterclockwise.

Replacement Parts Information

When ordering replacement parts, include the following information:

- Governor serial number and part number shown on nameplate
- Manual number (this is manual 36653)
- Parts reference number in parts list and description of part or part name

Figures 5 and 6 illustrate and list all the replaceable parts for the pressure actuated shutdowns. The numbers assigned are used as reference numbers and are not specific Woodward part numbers. Woodward will determine the exact part number for your particular governor.

Parts List for Figure 5

Ref. No.	Part Name	Quantity
36653-1	Cover	1
36653-2	Shutdown case	1
36653-3	Micarta spacer	1
36653-4	Bellows head	1
36653-5	Bellows assembly	1
36653-6	Bellows spring	1
36653-7	Gasket	1
36653-8	Bellows base	1
36653-9	Adjusting screw guide	1
36653-10	O-ring, 0.176 ID x 0.070	2
36653-11	Adjusting screw	1
36653-12	Shaft	1
36653-13	Spring	1
36653-14	Adjusting screw end	1
36653-15	Roll pin, 0.062 dia. x 0.375	1
36653-16	Spacer	1
36653-17	Hex nut, 10-32	1
36653-16	Knob	1
36653-19	Shutdown shaft	1
36653-20	Pin	1
36653-21	Spring	1
36653-22	Washer	1
36653-23	Check valve	1

36653-24 to 40 Not Used

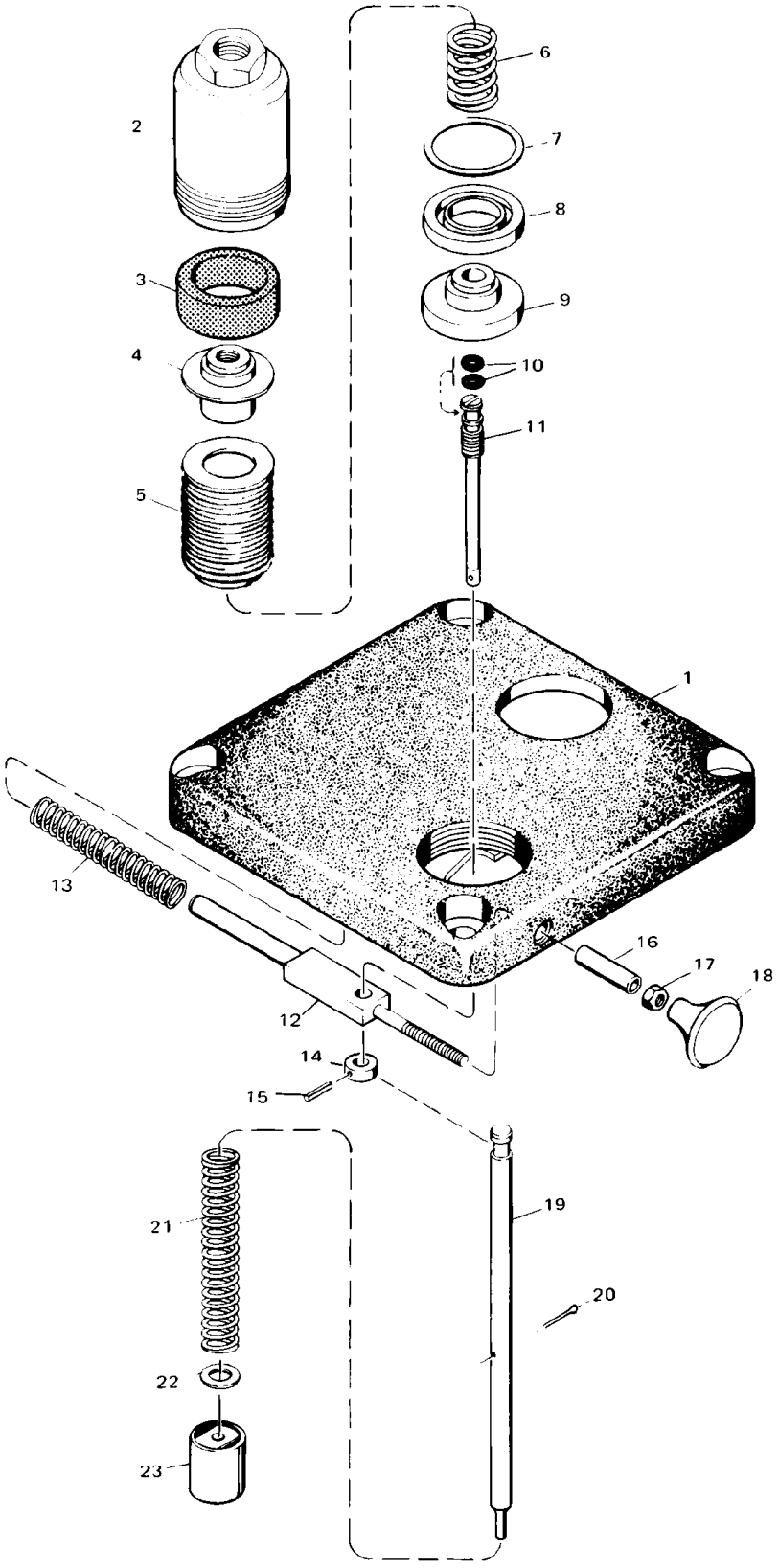

Figure 5. Exploded View of Pressure Release to Shutdown with Manual Reset

Parts List For Figure 6

Ref. No.	Part Name	Quantity
36653-1	Cover	1
36653-2	Shutdown case	1
36653-3	Micarta spacer	1
36653-4	Bellows head	1
36653-5	Bellows assembly	1
36653-6	Bellows spring	1
36653-7	Gasket	1
36653-8	Bellows base	1
36653-9	Adjusting screw guide	1
36653-10	O-ring, 0.176 ID. x 0.070	2
36653-11	Adjusting screw	1
36653-41	Check valve	1
36653-42	Shutdown rod end assembly	1
36653-43	Washer	1
36653-44	Shutdown rod spring	1
36653-45	Shutdown rod cap	1
36653-46	Cotter pin	1
36653-47	Split cover	1
36653-48	Not Used	
36653-49	Set screw	1

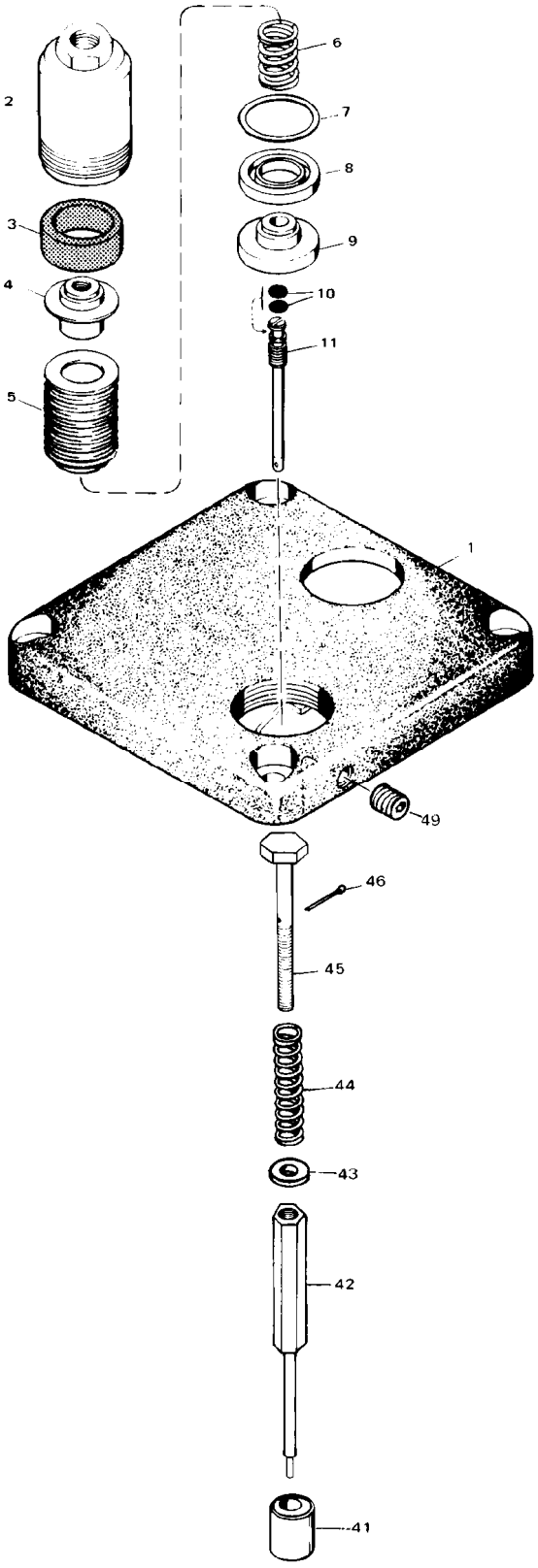

Figure 6. Exploded View of Pressure Actuated Shutdown

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Send comments to: icinfo@woodward.com

Please reference publication 36653.

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