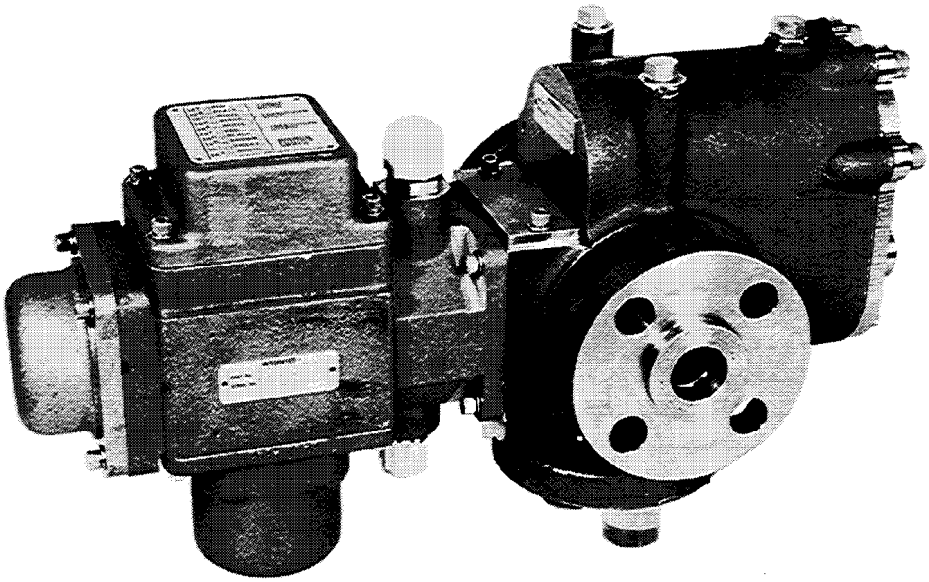
WOODWARD

Product Manual 40112
(Revision B)
Original Instructions



3151A Water Valve with TM-5L Integrating Actuator

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 Out-of-date translations are marked with ⚠.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

Contents

Illustrations and Tables

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.

Chapter 1.
General Information

Introduction

The 3151A Water Valve/TM-5L Integrating Actuator assembly meters water flow to gas-turbine combustors as part of a NO_X emission reduction system. It is intended for use with high-pressure centrifugal-type pumps, and provides a metered bypass flow for pump-stability and heat-balance considerations.

Description

The 3151A Water Valve is installed in combination with a Woodward TM-5L Integrating Actuator. The actuator receives position commands from an electric control and uses them to position the water valve.

The water valve is constructed of hardened stainless steel with ceramic liners to prevent cavitation and prolong life. A replaceable sleeve in the drain flange of the valve housing is hardened to reduce cavitation. The sleeve can be rotated in quarter-turn increments to further extend the life of the valve.

The TM-5L actuator is designed for safe use in hazardous environments.

The TM-5L actuator is an electrohydraulic Integrating actuator. It is designed for use with Woodward 43027 electronic controls. The TM-5L has an aluminum case with through-hardened stainless steel internal parts.

In the actuator, a torque motor servovalve, energized by the electronic control, modulates hydraulic pressures which position the power piston. The power piston positions the water-valve metering plunger. An electrical position feedback transducer provides the 43027 electronic control with exact feedback information on the position of the water valve.

The actuator is factory adjusted for bias in the minimum flow direction in the event of a loss of input current. A minimum flow switch is provided to prevent turbine start-up with the valve partially open.

Hydraulic fluid is sealed from the torque motor by a preformed packing ring between the armature and the servovalve housing, eliminating the accumulation of magnetic contaminants. The hydraulic inlet fitting incorporates a 40 µm filter screen to prevent accidental contamination in the event of an upstream filter failure.

The water valve closely follows the fuel valve schedule to prevent undesirable water insertion into the turbine during load swings. All water-flow schedules are weighted to prevent water flow in case of control or turbine malfunction.

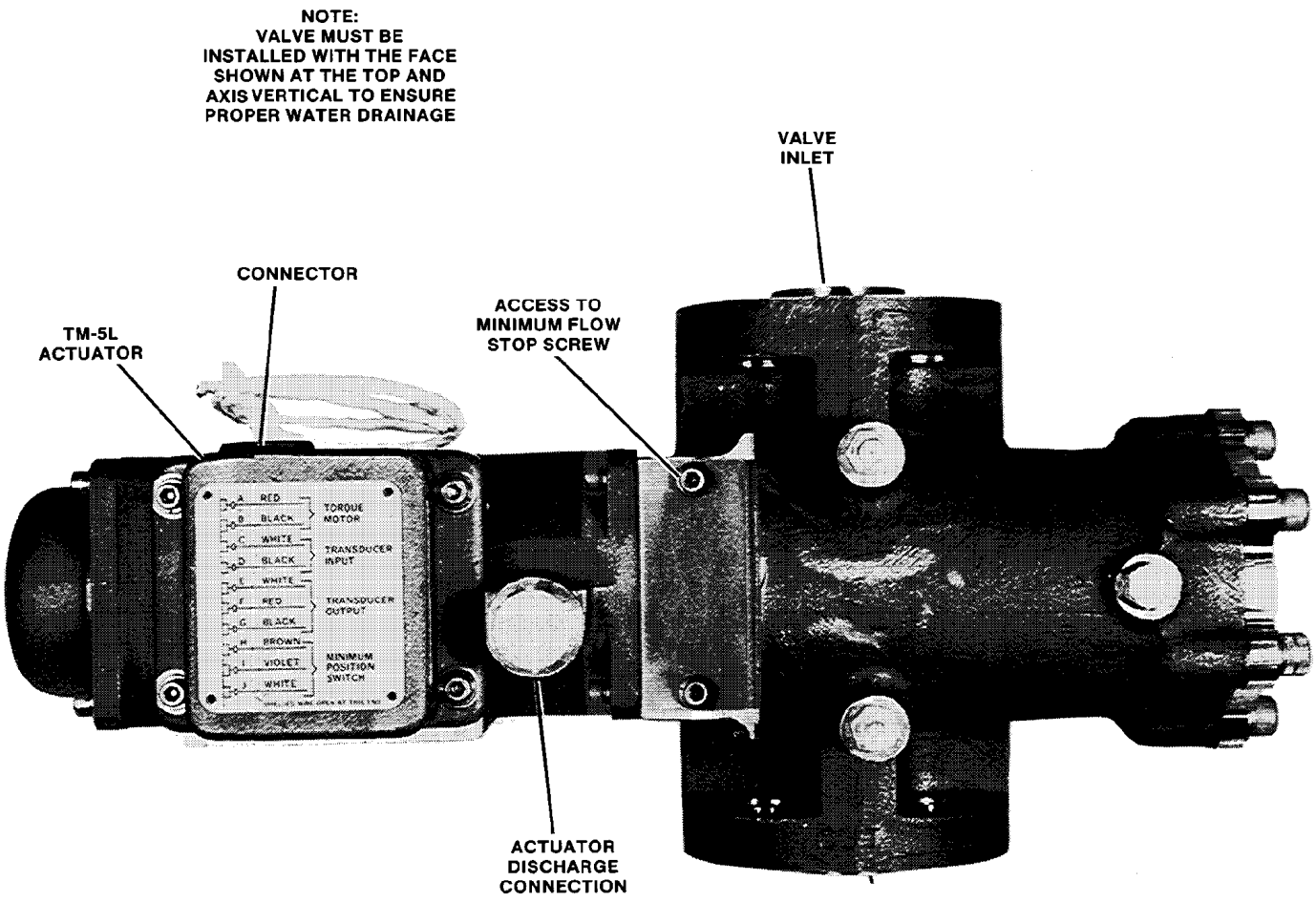


Figure 1-1. 3151A Water Valve/TM-5L Integrating Actuator Assembly

Chapter 2.
Installation

Introduction

Receiving, storage, and installation requirements for the 3151A Water Valve/ TM-5L Integrating Actuator are covered in this section. Refer to the outline drawing, Figure 2-1.

Use care while handling and installing the valve/actuator. Abuse can damage seals, installation surfaces, and factory adjustments. Hydraulic connections must be protected by plastic shipping caps or covers whenever the valve/actuator is not connected to the normal service connections.

Receiving

The valve/actuator is assembled, calibrated, and drained of calibration fluid at the factory. The assembly is then bolted to a transportation skid and packed in a protective box for delivery to the customer. Additional cleaning or calibration is not necessary prior to installation or operation of the unit.

Storage

The valve/actuator may be stored as received from the factory for a period of time before installation. Refer to manual 25075, *Commercial Preservation Packaging for Storage of Mechanical-Hydraulic Controls*.

Installation

See the outline drawing, Figure 2-1 for:

- Overall dimensions
- Installation hole locations
- Hydraulic fitting sizes
- Adjustment locations
- Electrical connections

NOTICE

The water valve must be installed with the pressure taps facing up and axis vertical to ensure proper water drainage and to prevent damage from freezing.

Make provisions for proper filtration of the hydraulic fluid that will supply the TM-5L actuator. It is recommended that a 25 µm nominal, 40 µm absolute, filter be installed in the supply line to the actuator. A metal element is preferred. The filter element should be installed as close to the actuator as possible. Take care to keep the immediate area clean and free of dirt and other contaminants.

Make all hydraulic connections that are needed. Supply pressure for the TM-5L actuator can be from either positive displacement or centrifugal type pumps. Woodward recommends the use of a pressure switch to ensure that correct supply pressure is established prior to startup and continually thereafter.

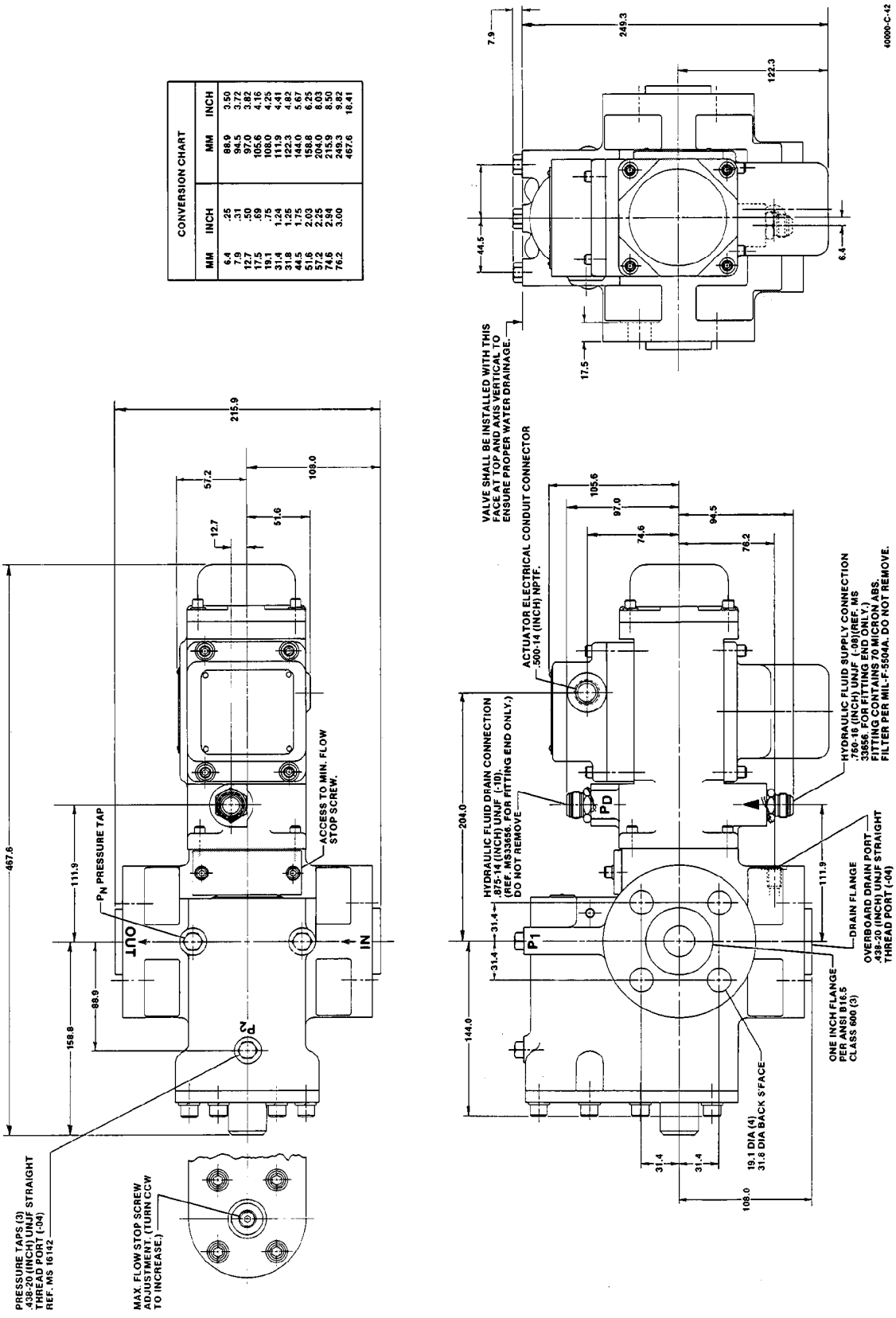


Figure 2-1. Outline Drawing of the 3151A Water Valve/TM-5L Integrating Actuator Assembly

Water Drain

Construction of the drain piping should consider the possible need to replace the cavitation-resistant sleeve from the drain flange of the valve housing. Removal and replacement of the sleeve requires a minimum clearance of 3.5 inches (9 cm). The removal clearance can be obtained by either constructing a removable piece of pipe in the drain line or by constructing the drain line so it can be swung away from the valve housing.

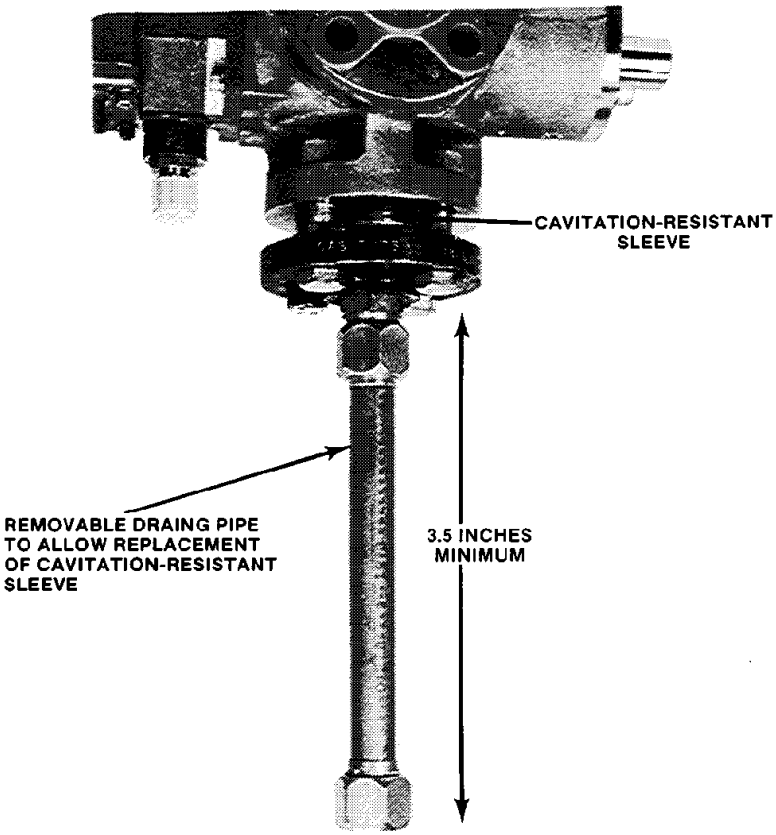


Figure 2-2. Valve Installed with Removable Drain

It is particularly important to allow for the replacement of the cavitation-resistant sleeve in valves operating with more than 900 psi (6200 kPa) water flows.

Installation should also consider the need to periodically rotate the cavitation-resistant sleeve. This will require loosening the drain flange connection and inserting a punch or Allen wrench in a spanner hole in the sleeve. Access should be provided to the drain flange for this purpose, particularly in valves which will operate with more than 900 psi (6200 kPa) water pressure.

Make all electrical connections that are required using applicable Woodward electronic control manuals. A plant wiring diagram will be supplied upon request. TM-5L actuators are normally supplied with conduit-type electrical connections.

TM-5L Hydraulic Fluid Requirements

Table 2-1. TM-5L Supply Characteristics

Fluid Types:	Mineral or synthetic based oil, diesel fuels, kerosenes, gasolines, or light distillate fuels
Specific Gravity:	0.6 to 1.0
Recommended Viscosity:	0.6 to 400 centistokes
External Filter:	10 µm nominal
Supply Pressure:	750 ±25 psig (5171 ±172 kPa)
Hydraulic Flow:	0.5 US gal/min (1.9 L/min) maximum

Chapter 3.
Operation and Adjustments

Initial Operation

Before initial operation of the valve/actuator, check that all previous installation and hookup steps are successfully accomplished, and all electrical connections and hydraulic and water fittings are secure and properly attached.

Make certain that correct hydraulic supply pressure to the actuator is established before start-up. Use applicable Woodward manuals for the particular Woodward electronic control to begin prime mover operation.

NOTICE

Trapped air within the hydraulic system may cause erratic behavior of the actuator during the first few minutes of initial operation.

Adjustments

Normally all operating adjustments are made to the 3151A Water Valve/TM-5L Integrating Actuator during factory calibration according to specifications provided by the customer. The unit should not require further adjustment.

Rotation of Sleeve

Periodic rotation of the hardened, disposable, cavitation-resistant sleeve may be necessary to extend valve life.

To index the sleeve, loosen the four drain-flange bolts, insert a 1/8 inch (3.2 mm) diameter punch or a 3/32 inch (<2.4 mm) Allen wrench In a sleeve spanner hole, and turn the sleeve 1/4 turn. The four spanner holes In the sleeve are numbered and an index mark is tamped into the face of the drain flange. Once all four positions of the sleeve have been used the sleeve should be removed, examined, and replaced if necessary.

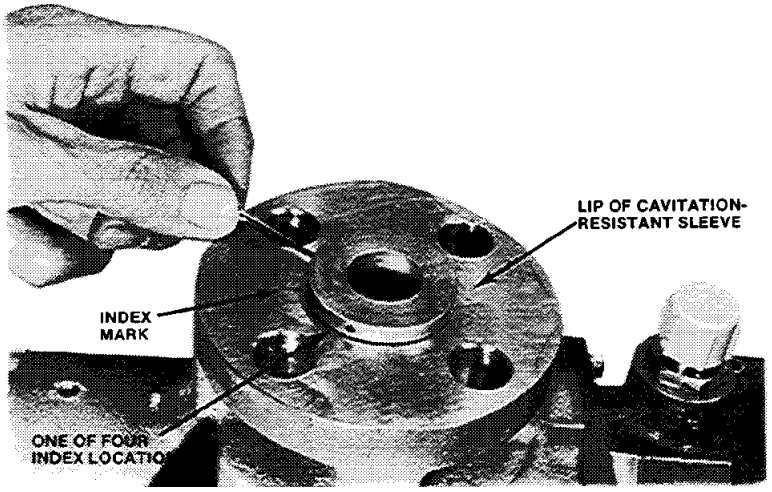


Figure 3-1. Indexing Cavitation-Resistant Sleeve

Replacement sleeve part number is 3429-087. The replacement O-ring seal part number is 182724.

To remove the sleeve, insert a punch or Allen wrench in a spanner hole and pry between the punch and the flange face of the valve with a screwdriver or other lever.

Service life of the sleeve depends on the water pressure being used, the impurity content of the water, and a number of other factors. In general the sleeve should be indexed every 4320 hours (6 months of around-the-clock operation) of turbine operation If the water pressure exceeds 900 psi (6200 kPa). Ideally, periodic inspections should be made to determine the length of time between index operations. If this is not practical, the sleeve should be indexed after each period of 4320 hours of turbine and NO_X emission control system operation. After four periods of operation, remove the sleeve and inspect for excessive cavitation of the interior surface. Discoloration of the interior surface is normal as is minor wear. Excessive pitting or distortion of the interior surfaces will require replacement of the sleeve or an additional index move.

IMPORTANT

Do not attempt adjustments to the actuator unless thoroughly familiar with the proper procedures. The water valve cannot be adjusted in the field. Should additional or new calibration be required, the unit must be returned to a Woodward facility.

Chapter 4.
Principles of Operation

A schematic drawing, Figure 4-1, illustrates working relationships of the various parts.

3151A Water Valve

The linear movement of the output shaft from the TM-5L Integrating Actuator moves the metering plunger to regulate water flow as a function of water schedule requirements.

The metering valve is designed to work with supply pressures of up to 2000 psi (13 790 kPa).

The water valve and actuator assembly provides two functions:

- To meter water flow to the gas turbine as determined by the flow vs valve position schedule
- To maintain a minimum pump-discharge flow by bypassing to a low-pressure area

The first function is obtained by two valves in series: a variable area metering valve followed by a single-stage, throttling, Delta-P regulator piston.

The variable-area-metering valve consists of a set of contoured ports at one end of the metering sleeve. The opening of these ports is determined by the position of the metering valve plunger (P2) controlled by the TM-5 actuator. The single-stage regulator piston senses and controls the pressure drop across the metering ports so flow is unaffected by variations in valve inlet or discharge pressures.

The minimum pump discharge flow is obtained by the single throttling valve, consisting of another set of contoured ports in the metering sleeve. As the metering plunger opens the metering ports, it also closes the bypass ports. The two sets of ports are sized so the total inlet flow at the valve (pump output) never falls below a constant, predetermined level.

Since there is little variation in pump discharge or bypass pressures, it is not necessary to control the pressure differential across the bypass ports in the valve. The purpose of maintaining a minimum pump flow Is to prevent instability and overheating In the pump.

Erosion problems in the water valve are controlled by the use of ceramic linings of valve parts and special contours of ports to prevent edge breakdown. Port design has been developed to reduce cavitation in the drain (low pressure side) of the valve. This design is generally cavitation free when used with supply pressures of less than 900 psi (6200 kPa). A cavitation-resistant, hardened, stainless-steel sleeve is included in the drain portion of the valve, This sleeve may be indexed through four positions to distribute unavoidable erosion. The sleeve Is replaceable to extend valve life in high-pressure applications.

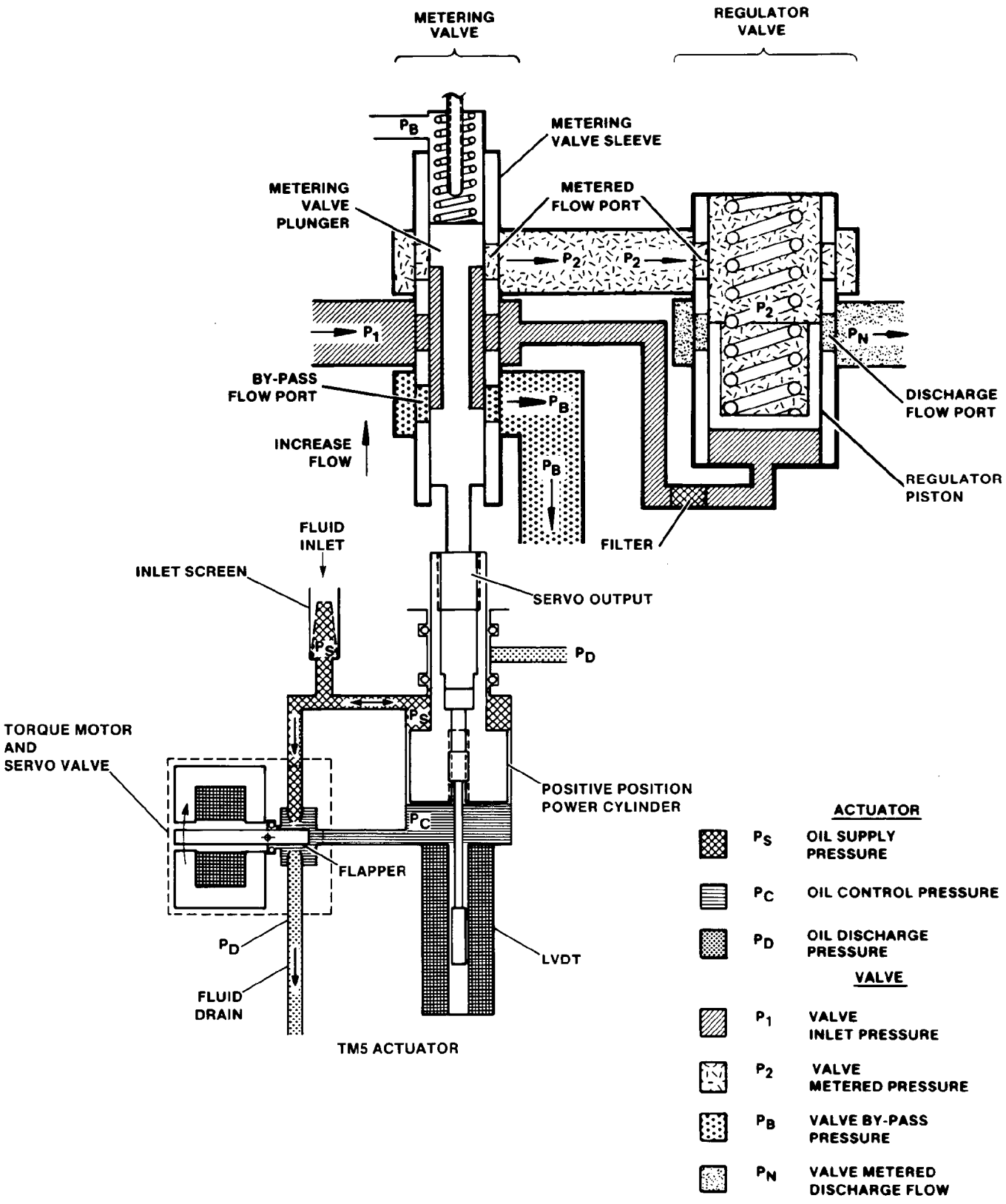


Figure 4-1. Schematic Drawing, 3151A Water Valve/TM-5L Integrating Actuator Assembly

TM-5L Integrating Actuator

The TM-5L actuator consists of a three-way torque motor servo valve, a differential-area piston, and an LVDT position transducer. The actuator operates in conjunction with Woodward's final-driver electronic system to provide fast response, high-accuracy positioning of the valve which controls water flow to the turbine.

The torque motor servo valve controls pressure on the large diameter (PC) side of the piston, while pressure on the small area (PS) side is constant at the supply level. The required actuator position is compared with the actual position, as determined by the LVDT signal. Any difference between the required actuator position and the actual position results in a change to the torque motor input signal. The signal change results in a change to the modulated servo pressure (PC) until the actuator reaches the required new position.

Chapter 5.
Maintenance

Indexing Drain Sleeve

The cavitation-resistant sleeve In the drain flange of the valve housing should be indexed on a routine basis according to the amount of erosion experienced in the individual installation. (A period of 4320 hours of operation is considered a possible operating period between index moves.)

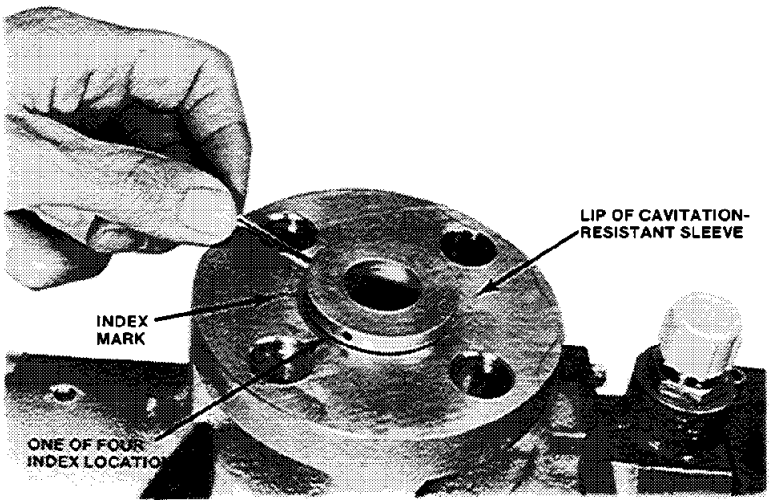


Figure 5-1. Indexing Cavitation-Resistant Sleeve

An index mark is located on the drain flange, and each of the four spanner holes in the lip of the sleeve is numbered. To index: loosen the four flange bolts, insert a 1/8 inch (3.2 mm) punch or 3/32 inch (<2.4 mm) Allen wrench in an index hole, and move the hole 1/4 turn clockwise until the next number is located at the Index mark. When all four positions have been used, remove the sleeve and inspect for wear. Replace with Woodward part number 3419-087 and O-ring 182724.

Cavitation should occur only in valves servicing water supplies in excess of 900 psi (6200 kPa). A mild discoloration of the interior of the valve is normal, but the surfaces should not be badly pitted.

Filter Cleaning

The TM-5L Integrating Actuator is equipped with a filter fitting at the supply inlet. (See the outline drawing, Figure 2-1, for the supply inlet location.) Should the filter become clogged as evidenced by sluggish response, the filter may be cleaned ultrasonically and back-flushed with a light solvent. To backflush the filter, remove the supply inlet filter. Be prepared to replace the O-ring at the inlet if the filter is removed for cleaning.

NOTICE

Do not operate the water valve/actuator, even momentarily, without the filter at the supply inlet and the inline filter. Even momentary exposure to hydraulic system contaminant can cause extensive damage to the actuator.

The actuator should not have to be removed from the water valve. Should removal become necessary it should only be attempted by trained service personnel familiar with the proper procedures.

Troubleshooting

Disassembly for the TM-5L actuator or 3151A water valve in the field is not recommended. Under unusual circumstances where disassembly becomes necessary, all work and adjustments should be made only by personnel thoroughly trained in the proper procedures.

When requesting information or service help from Woodward, it is important to include the part number and serial number of the water valve/actuator in your communication.

Chapter 6.
Service Options

Product Service Options

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact the manufacturer or packager of your system.
- Contact the Woodward Full Service Distributor serving your area.
- Contact Woodward technical assistance (see "How to Contact Woodward" later in this chapter) and discuss your problem. In many cases, your problem can be resolved over the phone. If not, you can select which course of action to pursue based on the available services listed in this chapter.

OEM and Packager Support: Many Woodward controls and control devices are installed into the equipment system and programmed by an Original Equipment Manufacturer (OEM) or Equipment Packager at their factory. In some cases, the programming is password-protected by the OEM or packager, and they are the best source for product service and support. Warranty service for Woodward products shipped with an equipment system should also be handled through the OEM or Packager. Please review your equipment system documentation for details.

Woodward Business Partner Support: Woodward works with and supports a global network of independent business partners whose mission is to serve the users of Woodward controls, as described here:

- A **Full Service Distributor** has the primary responsibility for sales, service, system integration solutions, technical desk support, and aftermarket marketing of standard Woodward products within a specific geographic area and market segment.
- An **Authorized Independent Service Facility (AISF)** provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. Service (not new unit sales) is an AISF's primary mission.
- A **Recognized Engine Retrofitter (RER)** is an independent company that does retrofits and upgrades on reciprocating gas engines and dual-fuel conversions, and can provide the full line of Woodward systems and components for the retrofits and overhauls, emission compliance upgrades, long term service contracts, emergency repairs, etc.
- A **Recognized Turbine Retrofitter (RTR)** is an independent company that does both steam and gas turbine control retrofits and upgrades globally, and can provide the full line of Woodward systems and components for the retrofits and overhauls, long term service contracts, emergency repairs, etc.

You can locate your nearest Woodward distributor, AISF, RER, or RTR on our website at:

www.woodward.com/directory

Woodward Factory Servicing Options

The following factory options for servicing Woodward products are available through your local Full-Service Distributor or the OEM or Packager of the equipment system, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is originally shipped from Woodward or a service is performed:

- Replacement/Exchange (24-hour service)
- Flat Rate Repair
- Flat Rate Remanufacture

Replacement/Exchange: Replacement/Exchange is a premium program designed for the user who is in need of immediate service. It allows you to request and receive a like-new replacement unit in minimum time (usually within 24 hours of the request), providing a suitable unit is available at the time of the request, thereby minimizing costly downtime. This is a flat-rate program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205).

This option allows you to call your Full-Service Distributor in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Full-Service Distributor.

Charges for the Replacement/Exchange service are based on a flat rate plus shipping expenses. You are invoiced the flat rate replacement/exchange charge plus a core charge at the time the replacement unit is shipped. If the core (field unit) is returned within 60 days, a credit for the core charge will be issued.

Flat Rate Repair: Flat Rate Repair is available for the majority of standard products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be. All repair work carries the standard Woodward service warranty (Woodward Product and Service Warranty 5-01-1205) on replaced parts and labor.

Flat Rate Remanufacture: Flat Rate Remanufacture is very similar to the Flat Rate Repair option with the exception that the unit will be returned to you in “like-new” condition and carry with it the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205). This option is applicable to mechanical products only.

Returning Equipment for Repair

If a control (or any part of an electronic control) is to be returned for repair, please contact your Full-Service Distributor in advance to obtain Return Authorization and shipping instructions.

When shipping the item(s), attach a tag with the following information:

- return authorization number;
- name and location where the control is installed;
- name and phone number of contact person;
- complete Woodward part number(s) and serial number(s);
- description of the problem;
- instructions describing the desired type of repair.

Packing a Control

Use the following materials when returning a complete control:

- protective caps on any connectors;
- antistatic protective bags on all electronic modules;
- packing materials that will not damage the surface of the unit;
- at least 100 mm (4 inches) of tightly packed, industry-approved packing material;
- a packing carton with double walls;
- a strong tape around the outside of the carton for increased strength.

NOTICE

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*.

Replacement Parts

When ordering replacement parts for controls, include the following information:

- the part number(s) (XXXX-XXXX) that is on the enclosure nameplate;
- the unit serial number, which is also on the nameplate.

Engineering Services

Woodward offers various Engineering Services for our products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- Technical Support
- Product Training
- Field Service

Technical Support is available from your equipment system supplier, your local Full-Service Distributor, or from many of Woodward's worldwide locations, depending upon the product and application. This service can assist you with technical questions or problem solving during the normal business hours of the Woodward location you contact. Emergency assistance is also available during non-business hours by phoning Woodward and stating the urgency of your problem.

Product Training is available as standard classes at many of our worldwide locations. We also offer customized classes, which can be tailored to your needs and can be held at one of our locations or at your site. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability.

Field Service engineering on-site support is available, depending on the product and location, from many of our worldwide locations or from one of our Full-Service Distributors. The field engineers are experienced both on Woodward products as well as on much of the non-Woodward equipment with which our products interface.

For information on these services, please contact us via telephone, email us, or use our website: **www.woodward.com**.

How to Contact Woodward

For assistance, call one of the following Woodward facilities to obtain the address and phone number of the facility nearest your location where you will be able to get information and service.

Electrical Power Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (0) 21 52 14 51
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Engine Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (711) 78954-510
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
United States	+1 (970) 482-5811

Turbine Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

You can also locate your nearest Woodward distributor or service facility on our website at:

www.woodward.com/directory

Technical Assistance

If you need to telephone for technical assistance, you will need to provide the following information. Please write it down here before phoning:

Your Name	
Site Location	
Phone Number	
Fax Number	
Engine/Turbine Model Number	
Manufacturer	
Number of Cylinders (if applicable)	
Type of Fuel (gas, gaseous, steam, etc)	
Rating	
Application	
Control/Governor #1	
Woodward Part Number & Rev. Letter	
Control Description or Governor Type	
Serial Number	
Control/Governor #2	
Woodward Part Number & Rev. Letter	
Control Description or Governor Type	
Serial Number	
Control/Governor #3	
Woodward Part Number & Rev. Letter	
Control Description or Governor Type	
Serial Number	

If you have an electronic or programmable control, please have the adjustment setting positions or the menu settings written down and with you at the time of the call.

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 40112B.

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Email and Website—www.woodward.com

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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.

2013/1/Colorado