

36532



DYNA 70025
APECS Integrated Actuator
For Stanadyne “D” Series Injection Pumps

Installation Guide

Manual 36532



WARNING

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.

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.



CAUTION

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.

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.



IMPORTANT DEFINITIONS

WARNING—indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION—indicates a potentially hazardous situation which, if not avoided, could result in damage to equipment.



NOTE—provides other helpful information that does not fall under the warning or caution categories.

Revisions—Text changes are indicated by a black line alongside the text.

Woodward Governor Company reserves the right to update any portion of this publication at any time. Information provided by Woodward Governor Company is believed to be correct and reliable. However, no responsibility is assumed by Woodward Governor Company unless otherwise expressly undertaken.

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Electrostatic Discharge Awareness

All electronic equipment is static-sensitive, some components more than others. To protect these components from static damage, you must take special precautions to minimize or eliminate electrostatic discharges.

Follow these precautions when working with or near the control.

1. Before doing maintenance on the electronic control, discharge the static electricity on your body to ground by touching and holding a grounded metal object (pipes, cabinets, equipment, etc.).
2. 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.
3. Keep plastic, vinyl, and Styrofoam materials (such as plastic or Styrofoam cups, cup holders, cigarette packages, cellophane wrappers, vinyl books or folders, plastic bottles, and plastic ash trays) away from the control, the modules, and the work area as much as possible.
4. 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.



CAUTION

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*.

Chapter 1.

Installation Instructions

This manual provides instructions on the installation and calibration of the DYNA 70025 integrated actuator for Stanadyne "D" series injection pumps.

Removal of Existing Governor Control Cover

1. Clean exterior of pump with solvent and dry with compressed air before removing the governor control cover. Place a suitable container under the fuel injection pump to catch any fuel that may spill when removing the cover.
2. Remove the fuel return line from the pump's return line connector assembly. Use two wrenches to loosen. See Figure 1.
3. Remove the return line connector assembly from the governor control cover using care not to allow dirt to enter the injection pump. Remove and discard the return line connector O-ring. Set aside the return line connector for later installation on the new actuator cover assembly.
4. Remove the electric shutoff (ESO) solenoid wire from the governor control cover. Trace the solenoid wire back to its source. Remove and discard the wire.

CAUTION: Do not use this wire to power the new integrated actuator.

5. Loosen the three cover screws and remove the governor control cover assembly from the pump. Save all three screws for later installation of the integrated actuator cover assembly.

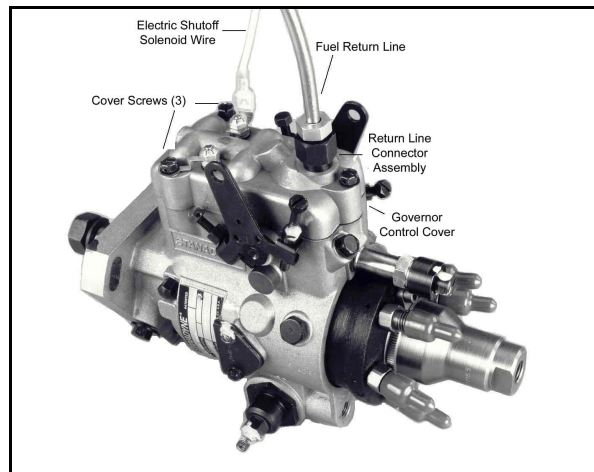


Figure 1

Installing New Integrated Actuator Cover Assembly

1. Install new cover seal (item 2) into the groove of the integrated actuator cover assembly as shown in Figure 2.
2. Align and hold the metering valve drive coupling parallel to the side of integrated actuator cover as shown in Figure 3.
3. Position the integrated actuator cover assembly into the top of the pump while holding the metering valve drive coupling parallel to the pump body. Slightly lift the front portion of the integrated actuator cover as shown in Figure 4.
4. Carefully slide the integrated actuator cover toward the rear of the pump until the horseshoe portion of the metering valve drive coupling contacts the pump's governor linkage hook as shown in Figure 5. Once contact has been made, continue moving the integrated actuator cover in the same direction until the mounting holes between the integrated actuator cover and the pump body are aligned.

CAUTION: Failure to properly install the metering drive coupling to the pump's governor linkage can result in serious damage.

5. Retrieve the three cover screws from the original governor control cover. Assemble integrated actuator cover to the pump body with these screws. Tighten to 35-45 lbs./in.
6. Install a new O-ring (item 3), on the return line connector assembly retained from the original governor control cover. Apply a light coating of all-purpose grease to the O-ring and install connector into the 7/16-20 UNF-2A threaded hole located in the integrated actuator cover. Tighten to 43-53 lbs./in. See CAUTION below.

CAUTION: If the return line connector is a 7/16-20 UNF-2A, Step 2 can be completed. If the return line connector is not 7/16-20 UNF-2A, there are two possible solutions:

OPTION 1

A Stanadyne 21251 return line connector may be used to replace the return line connector assembly on the return fuel line.

OPTION 2

A Stanadyne 24509 connector body can be used to mate the 1/8-27 NPT return line connector assembly to the 7/16-20 UNF-2A threaded hole located in the integrated actuator cover.

7. Install the fuel return line to the return line connector. Hold return line connector in place and tighten fuel return line to engine manufacturer's specification.

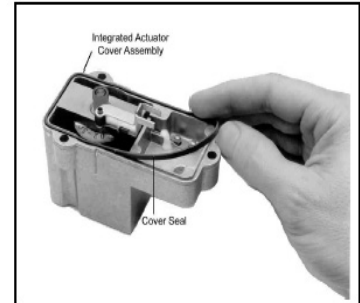


Figure 2

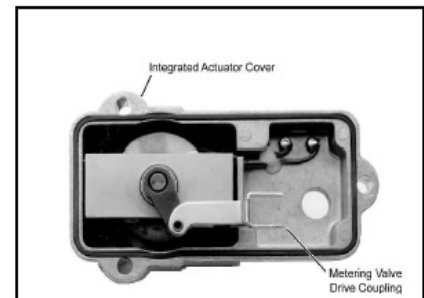


Figure 3

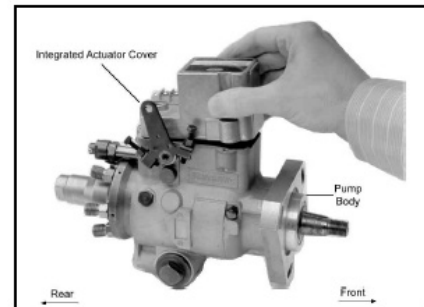


Figure 4

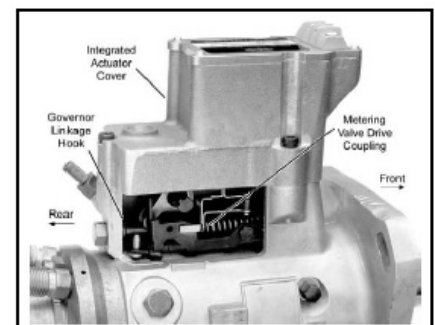


Figure 5

Preliminary Set-Up Procedure

The following method will properly set up the mechanical governor for operation with the electronic integrated actuator. Proper calibration of both the mechanical and electronic governor must be performed in order for the system to operate properly. Failure to perform this procedure properly may result in inability to provide maximum power or cause poor steady state speed control.

CAUTION: Perform Steps 1 thru 3 PRIOR to starting the engine.

1. Position the shut-off shaft assembly (if equipped with one) in the “Fuel On” position by rotating it in the direction shown in Figure 6 until it reaches its limit of travel. Secure the shut-off shaft assembly in place with existing mechanical linkage. A spring may be used to hold it in place when there is no linkage.

CAUTION: Do not attach springs to the engine’s high-pressure lines.

2. Throttle shaft assemblies are often locked in the “High Idle” position on pumps equipped with speed droop governors. When this is the case, the low idle screw may be backed out a **maximum** of three (3) turns. This should only be done if the high idle speed is known to be greater than 12% above the rated speed. Excessive backing out of the low idle screw may result in the disengagement of the pump’s internal components.

WARNING

This procedure must be followed carefully in order to not overspeed the engine and cause damage to the generator or other load.

3. Adjust the droop by turning the droop adjusting screw in a counter-clockwise (CCW) direction until it stops. See Figure 6. Some pumps may not be equipped with a speed droop adjustment.

Turn the droop adjusting screw clockwise (CW) two full turns. The mechanical governor is now set in a position that will permit starting the engine to calibrate the electric integrated actuator governor. Do not operate the engine without the electronic governor connected and the system calibrated properly as described in the calibration chapter.

Once this droop adjustment has been made, do not readjust.

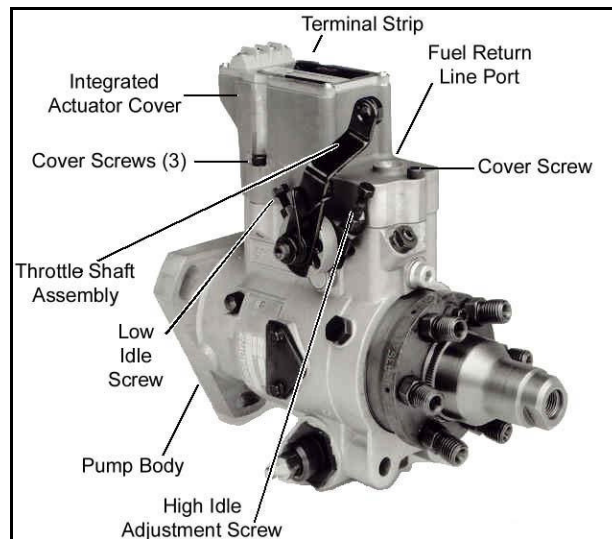


Figure 6

Magnetic Pickup Installation

Refer to Manual 36535.

Governor Control Box Installation

CAUTION: Make certain that proper voltage (12 or 24 Vdc) governor control box and integrated actuator assembly are used.

1. Wire and pre-set the adjustments of the integrated governor system as described in the wiring and calibration information for the controller's specific part number. Make certain to use the shielded wire and the twisted cables as shown in the installation information. Connect actuator wires to the two center terminals on the terminal strip. Do not connect any other wires to the actuator than the ones from the governor control box.
2. The mechanical governor is to be set 12% higher than the desired running speed. Calculate the maximum speed setting for the mechanical governor as follows:

EXAMPLE: If desired speed is 1800 RPM for electronic governing, then
 $1800 \times 0.12 = 216$ RPM: $1800 + 216 = 2016$ RPM.

Chapter 2. Calibration

1. Make certain the electronic governor adjustments are set as stated in the proper governor literature. The speed adjustment is a 20-turn potentiometer on the DYN1-10784 and DYN1-10794 control boxes. Turn it counterclockwise (CCW) 20 turns and then clockwise (CW) 5 turns.
2. Rotate and hold the throttle shaft lever to maximum position as permitted by present high idle screw adjustment. Do not attempt at this time to adjust the high idle screw beyond its present setting.
3. Turn on the DC power to the system.

NOTE: Be sure Step 1 above has been performed.

4. Start the engine. The engine should be operating on the integrated actuator cover governor. The speed should be below 1800 RPM or the desired speed.

NOTE: Check for fuel leaks.

5. Slowly, using the governor control box speed adjustment, increase the engine speed. (If the engine does not increase in speed, follow the troubleshooting procedure in the governor manual.)
6. Keep increasing the speed until it is approximately 20 RPM higher than the speed calculated in Step 2 of the control box installation procedure. If this speed cannot be obtained, loosen the jam nut on the high idle speed adjustment screw of the throttle lever and turn the high idle adjustment screw counterclockwise (CCW) until the calculated speed can be obtained. See Figure 6.
7. Set the speed with the electronic governor to the value calculated in Step 2 of the control box installation procedure. Then *slowly* turn the high idle adjustment screw on the throttle lever clockwise (CW) until the speed just starts to decrease. Turn the high idle adjustment screw counterclockwise (CCW) until the speed just controls at the proper calculated speed. Tighten the high idle adjusting screw locknut to 35-45 lbs/in.
8. Turn the low idle screw clockwise (CW) to lock the throttle lever at this maximum position. Tighten the low idle adjustment screw locknut to 35-45 lbs/in.

NOTE: On some pump bodies, the low idle adjustment screw may not be able to position the throttle lever to the proper position. If it cannot hold the throttle to the proper position, use a spring to hold the throttle to the maximum position, otherwise maximum speed and power will not be obtainable.

CAUTION: Do not attach springs to the engine's high pressure lines.

9. Decrease the speed on the electronic governor control box until the desired run speed is obtained.
10. Properly calibrate the adjustments of the electronic governor. Check the system for good response and stability at all possible loads and speeds.
11. Shut off the engine.

Chapter 3. Parts List

Governor Assembly

ITEM	DESCRIPTION	PART NUMBER	QTY.
1	Integrated actuator *	DYNC-70025	1
2	Cover seal	L5-162	1
3	O-ring for fuel return	L5-163	1
4	Controller	See Notes a & b	1

NOTES

(a) DYN1-1078X analog controller w/o remote speed

(b) DYN1-1079X analog controller with remote speed

"X" Specify operating frequency

(*) Specify voltage

Optional Control Components

ITEM	DESCRIPTION	PART NUMBER	QTY.
--	Magnetic pickup (3/8" dia.)	DYNT-17200	1
--	Remote speed potentiometer	DYNS-10000	1

Chapter 4. Service Options

Product Service Options

The following factory options are available for servicing Woodward equipment, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is purchased from Woodward or the service is performed:

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

If you are experiencing problems with installation or unsatisfactory performance of an installed system, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact Woodward technical assistance (see “How to Contact Woodward” later in this chapter) and discuss your problem. In most cases, your problem can be resolved over the phone. If not, you can select which course of action you wish to pursue based on the available services listed in this section.

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 also a flat rate structured program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205).

This option allows you to call 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 Woodward facility as explained below (see “Returning Equipment for Repair” later in this chapter).

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 to Woodward within 60 days, Woodward will issue a credit for the core charge. [The core charge is the average difference between the flat rate replacement/exchange charge and the current list price of a new unit.]

Return Shipment Authorization Label. To ensure prompt receipt of the core, and avoid additional charges, the package must be properly marked. A return authorization label is included with every Replacement/Exchange unit that leaves Woodward. The core should be repackaged and the return authorization label affixed to the outside of the package. Without the authorization label, receipt of the returned core could be delayed and cause additional charges to be applied.

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 to Woodward for repair, please contact Woodward in advance to obtain a Return Authorization Number. When shipping the item(s), attach a tag with the following information:

- 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.



CAUTION

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*.

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.

Return Authorization Number

When returning equipment to Woodward, please telephone and ask for the Customer Service Department [1 (800) 523-2831 in North America or +1 (970) 482-5811]. They will help expedite the processing of your order through our distributors or local service facility. To expedite the repair process, contact Woodward in advance to obtain a Return Authorization Number, and arrange for issue of a purchase order for the item(s) to be repaired. No work can be started until a purchase order is received.



NOTE

We highly recommend that you make arrangement in advance for return shipments. Contact a Woodward customer service representative at 1 (800) 523-2831 in North America or +1 (970) 482-5811 for instructions and for a Return Authorization Number.

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.

How to Contact Woodward

In North America use the following address when shipping or corresponding:

Woodward Governor Company
PO Box 1519
1000 East Drake Rd
Fort Collins CO 80522-1519, USA

Telephone—+1 (970) 482-5811 (24 hours a day)
Toll-free Phone (in North America)—1 (800) 523-2831
Fax—+1 (970) 498-3058

For assistance outside North America, call one of the following international 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.

<u>Facility</u>	<u>Phone Number</u>
Brazil	+55 (19) 3708 4800
India	+91 (129) 230 7111
Japan	+81 (476) 93-4661
The Netherlands	+31 (23) 5661111

You can also contact the Woodward Customer Service Department or consult our worldwide directory on Woodward's website (www.woodward.com) for the name of your nearest Woodward distributor or service facility. [For worldwide directory information, go to www.woodward.com/ic/locations.]

Engineering Services

Woodward Industrial Controls Engineering Services offers the following after-sales support for Woodward products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- Technical Support
- Product Training
- Field Service

Contact information:

Telephone—+1 (970) 482-5811

Toll-free Phone (in North America)—1 (800) 523-2831

Email—icinfo@woodward.com

Website—www.woodward.com/ic

Technical Support is available through our many worldwide locations or our authorized distributors, depending upon the product. This service can assist you with technical questions or problem solving during normal business hours. Emergency assistance is also available during non-business hours by phoning our toll-free number and stating the urgency of your problem. For technical support, please contact us via telephone, email us, or use our website and reference **Customer Services** and then **Technical Support**.

Product Training is available at many of our worldwide locations (standard classes). 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. For information concerning training, please contact us via telephone, email us, or use our website and reference **Customer Services** and then **Product Training**.

Field Service engineering on-site support is available, depending on the product and location, from one of our many worldwide locations or from one of our authorized 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 field service engineering assistance, please contact us via telephone, email us, or use our website and reference **Customer Services** and then **Technical Support**.

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:

General

Your Name _____
Site Location _____
Phone Number _____
Fax Number _____

Prime Mover Information

Engine/Turbine Model Number _____
Manufacturer _____
Number of Cylinders (if applicable) _____
Type of Fuel (gas, gaseous, steam, etc) _____
Rating _____
Application _____

Control/Governor Information

Please list all Woodward governors, actuators, and electronic controls in your system:

Woodward Part Number and Revision Letter _____
Control Description or Governor Type _____
Serial Number _____

Woodward Part Number and Revision Letter _____
Control Description or Governor Type _____
Serial Number _____

Woodward Part Number and Revision 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 include the manual number from the front cover of this publication.



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Email and Website—www.woodward.com



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BS EN ISO 9001:1994
6 March 2001

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.