

## **Tandem ProAct™ IV Actuator**

**Disabling the Current Limiter**  
**On-site Actuator Replacement**

**Technical Supplement**

## IMPORTANT



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.

## DEFINITIONS

- **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

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.



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.



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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.

## NOTICE

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.

## 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*.

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# Tandem ProAct™ IV Actuator

## Introduction

This Technical Supplement provides information about disabling the current limiter and on-site actuator replacement instructions for the Tandem ProAct™ IV Actuator.

## Disabling the Current Limiter

The Tandem ProAct IV actuator exists in two versions:

- A serial version consisting of a mechanical kit 8926-205 and an electrical kit 8926-207
- A master/slave version consisting of a mechanical kit 8926-205 and an electrical kit 8926-345

Mechanical kit 8926-205 contains:

Description	Qty	Part Number
ProAct IV actuators	2	8405-015
Actuator levers	2	5397-211
Mounting bracket	1	5485-267
Extra hardware (nuts, bolts, etc.)	–	

Electrical kit 8926-207 contains:

Description	Qty	Part Number
Driver box	1	9907-486
ProAct actuator interconnection cable	1	5417-164
Power supply and driver cable (length to customer specification)	1	5417-220

Electrical kit 8926-345 contains:

Description	Qty	Part Number
Driver box	1	9907-764
Driver to actuator connection cable	2	5417-731L15.0M
Power supply to driver connection cable	1	5417-733L2.00M

### **IMPORTANT**

Driver box 9907-764 is a derivative of driver box 9907-486.

Driver box part number 9907-486/9907-764 has an option to cancel the current limiter using a jumper. The unit is delivered default with the current limiter ON. The limiter can be bypassed by sliding the jumper over the two pins (see Figure 1). To prevent the actuator from overheating when the current limiter is disabled, make sure the actuator travel is always within the minimum and maximum position of the fuel rack, so that the actuator is always in control.

For this reason, the stops in the actuator should be used at both minimum and maximum positions. Note that the stops will allow up to 3° of additional rotation in both directions during impact. The engine must always shut down when the actuator is at the minimum stop.

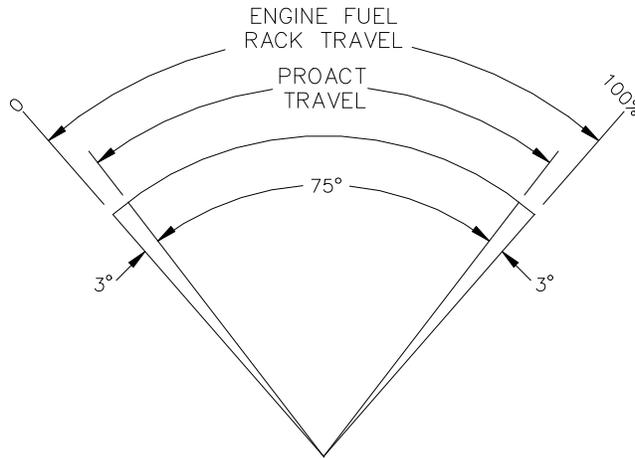


Figure 1. Use of ProAct Travel Stop When the Current Limiter is Disabled

Fine tuning of the actuator travel can be achieved by means of the range and offset potentiometers (see Figure 2).

NOTICE

**Make sure that the operating temperature of the actuators does not exceed 120 °C.**

Take care when switching off the control, as this will also switch off the power supply from the actuator driver. For power supply requirements, please contact Woodward.

The control requires a power supply of 30 Vdc with a rating of 12 A continuous and 20 A peak to obtain maximum torque.

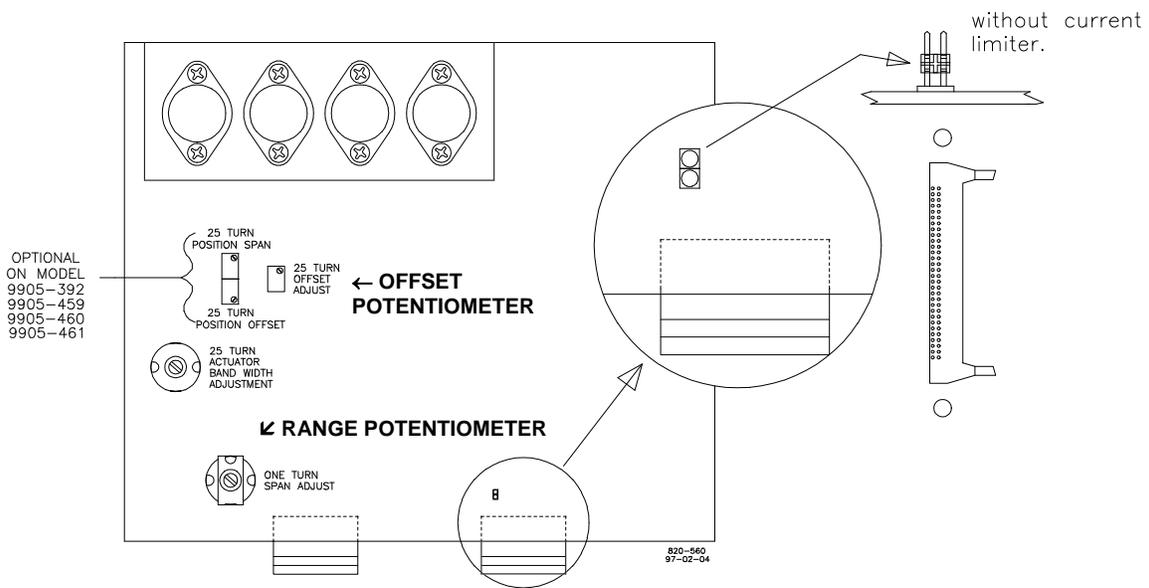


Figure 2. Layout of Driver Box Circuit Board

## On-site Actuator Replacement

Customers using the Tandem ProAct IV actuator kit (Woodward part number 8926-205) require a set of instructions to remove, install, and calibrate one actuator on-site.

### **NOTICE**

**Read these instructions carefully and completely before performing the actual work.**

### Removal

1. Stop the engine using the normal procedure.
2. Disconnect the power to the ProAct driver. Disconnect both cables to each of the actuators (irrespective of which one needs to be exchanged).
3. Carefully mark the exact position of the engine fuel rack linkage, then disconnect the fuel rack linkage from the output lever (part number 5397-211).
4. Identify the actuator that needs to be replaced.
5. Refer to Figure 3. On the actuator to be replaced, loosen nut (self-locking) 1029-675 with a 17 mm wrench while blocking hexagon socket head shoulder screw 3610-147 with a 6 mm hexagon key. Do not drop spacer 3205-085 when removing the screw from the terminal lever. Leave the connecting link connected to the terminal lever of the second actuator, and rotate it out of the way.
6. Mark the output lever to show which side is facing away from the actuator. Using a 0.250" (6.35 mm) hexagon key, loosen the screw in the lower end of the terminal lever 2 to 3 turns so the lever is loose.
7. Remove 4 hexagon head screws 1084-068 (not shown in Figure 3) using a 0.500" (~13 mm) wrench.
8. Carefully remove the actuator from the mounting bracket.
9. Return the actuator to Woodward (use the packaging from the replacement actuator).

### Installation

1. Unpack the replacement actuator.
2. If necessary, clean the mating surface on mounting bracket 5485-267. Position the actuator over the 4 holes in the mounting bracket, with the output shaft pointing in the correct direction.
3. Insert 4 hexagon head screws 1084-068 and tighten evenly to a torque of 20-24 N·m (15-18 lb-ft).
4. Refer to Figure 3. Rotate the terminal lever of the existing actuator fully counterclockwise until it is stopped against its internal stop. Leave it in this position. Do the same with the output shaft of the new actuator (if the output shaft is difficult to turn manually, temporarily install output lever 5397-211 on the output shaft and use it to turn the shaft).
5. Install output lever 5397-211 on the actuator output shaft so it is as parallel as possible with the existing terminal lever. Rotate connecting link 3901-041 and align its hole with the output lever. Look for a misalignment between the holes. Move the terminal lever first one serration to the left, then one serration to the right to determine if these positions give a better hole alignment. Choose the position that will require the least adjustment of the connecting link.

**IMPORTANT**

The output shaft serrations have 48 teeth, so the difference in angle between two positions on the shaft is 7.5 degrees. The actual difference must be as small as possible to ensure correct fuel control.

6. Make sure the orientation of the lever is correct (the lower threaded hole has a countersunk fit and a threaded section, install as marked during disassembly).
7. Using a 0.250" (6.35 mm) hexagon key, tighten the screw in the lower end of terminal lever 5397-211 to 10–12 N·m (8–9 lb-ft).
8. Loosen one of two hexagon nuts 1029-605 and rotate the free end of the connecting link until the hole in the rod end lines up with the hole in terminal lever 5397-211.
9. Install screw 3610-147, spacer 3205-085 and lock nut 1029-675. Use a new lock nut when possible. While blocking hexagon socket head shoulder screw 3610-147 with a 6 mm hexagon key, tighten nut 1029-675 with a 17 mm wrench to a torque of 20–24 N·m (15–18 lb-ft).
10. Tighten hexagon nut 1029-605 on the connecting link.
11. Manually stroke the actuators through their full movement. Make sure the linkage is not binding or running heavy. When set correctly, a minimum stroke of 70 degrees must be possible.
12. Re-connect the engine's fuel linkage to the terminal lever in the original position. Adjust the linkage following the engine manufacturer's instructions to compensate for slight changes in output lever position (e.g. zero of the actuator versus zero of the fuel pumps).
13. Re-connect the actuator cables and perform a full systems check as per normal start-up.

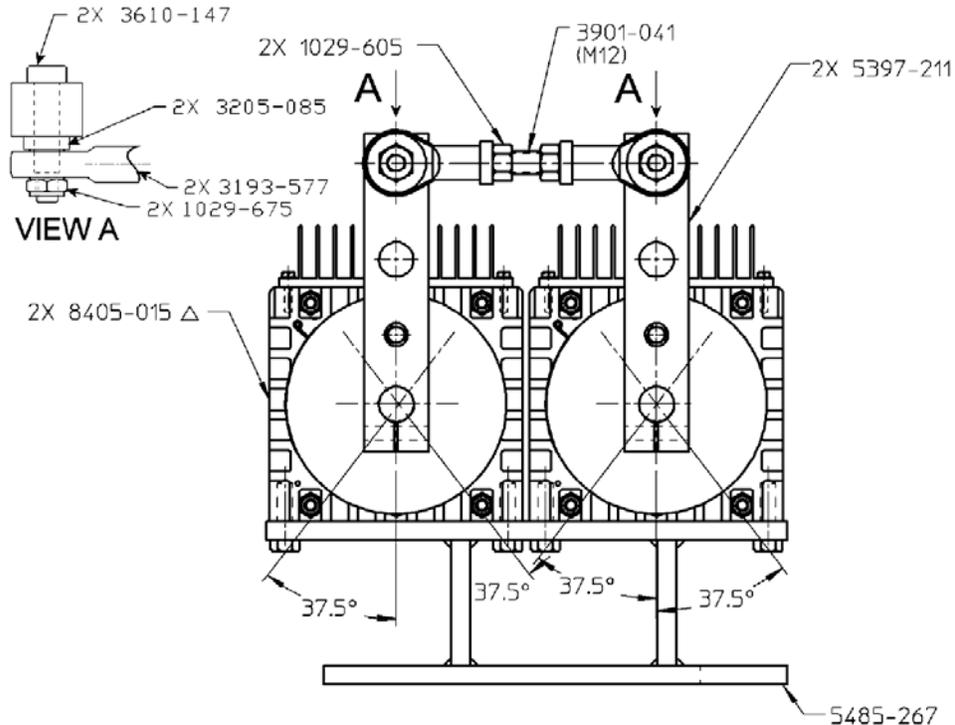


Figure 3. Tandem ProAct IV Actuator



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